Report of The Regional training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment

23rd-25th November 2010
Chachoengsao Province, Thailand

TD/RP/144
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REPORT OF THE REGIONAL TRAINING PROGRAM ON CEATACEAN INFORATION GATHERING AND RESEARCH METHODODLOGY ON CETACEAN STOCK ASSESSMENT

23rd - 25th November 2010
Chachoengsao Province, Thailand

I) Introduction

In 2008, SEAFDEC Training Department (TD) initiated a program on regional cetacean research aiming to collect scientific information on the distribution and composition of cetacean species in the Southeast Asian waters as well as to assess the interaction and the degree of the impact of the cetaceans to the fishery resources and habitats. This program of activity was then implemented under project entitled "Cetacean research in Southeast Asian Waters: Cetacean Sighting Program" with the financial support by Japanese Trust Fund. The main objectives of this program are to:

1. Develop inventory of cetacean species found in the Southeast Asia Waters;
2. Gather information of the accidentally death of cetacean on the coastal areas of the region;
3. Enhance human resources capacity on the cetacean research work in the region;
4. Disseminate the information of Cetacean Species distributed in relation to their habitat/coastal ecosystem in the Southeast Asia waters; and
5. Study interaction of the (large) cetacean to the coastal marine ecosystem/habitat

For better understanding the research work on cetacean, TD primarily provided the in-house training on the cetacean research and shipboard training/survey on cetacean sighting by MV SEAFDEC2, held during 21-30 November 2008 at TD. During the course of training, two (2) resource persons from Fisheries Research Agencies of Japan provided guide and lessons to the TD staff concerned for further effective implementation of the project activity. Subsequently, TD has conducted the actual cetacean sighting program by using MV SEAFDEC 2 and other research vessels in collaboration with the member countries, such as MV DA-BFAR of the Philippines, RV Chulabhorn of DOF-Thailand.

In 2009, SEAFDEC/TD organized the 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Waters during 30-31 July 2009 at TD. The aim of the Workshop was to understand current status of cetacean research works conducting in the region as well as to provide fora to the member countries and researchers in the region to share experiences and exchange view on the issue related to cetacean research. Major recommendations resulted from the Workshop is on the need for enhancing human resources capacities in the field study by focusing on the methodologies for assessment of cetacean stock size.

In this connection, TD plans to organize the Regional Training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment with the main objective to enhance/build human resources capacities on the actual cetacean sighting and its stock assessment methodology as well as to gather updates research work related to study on stock of cetacean in the region.

II) Objectives of the Training

1. To develop the human resource capacities for the member countries on cetacean stock assessment methodology through the practical training activities and sharing information among participants/researchers;
2. To update information on cetacean stock studies conducted in the region; and
3. To obtain suggestion on future following-up activity on the cetacean research for the region.

III) Expected Outputs

1. A Practical handbook on cetacean stock assessment methodology
2. Up-to-date on the study on cetacean stock in the region
3. A set of recommendation for future activity to be implemented by the project as well as by the national initiatives.

IV) Date and Venue:

The Regional Training will be organized in Baan Plaloma Resort, Bang Pakong, Chachoengsao Province, Thailand, tentatively from 23-25 November 2010.

V) Participants:

1. It is envisaged that the participants for the regional training will be the following:
2. Resource persons from: Fishery Research Agency – Japan; Department of Fisheries – Thailand; Department of Marine and Coastal Resources; TD, etc.
3. Researchers working on cetacean research from the member countries.
4.

VI) Agenda and Arrangement of the Training

Agenda	***Activity***
23 November 2010	
Opening and Introduction	*Background and objectives of the program/training; introduction of the training program/activity; introduction of the resource persons; will be provided.*
Experience and lessons learned from the national/regional initiatives related to cetacean research with particular focus on	*Countries/Initiatives presentation at the plenary based on their existing programs related to cetacean research/study, in*

stock assessment study/work in the Southeast Asian Region	*particular to the methodology for stock assessment of the cetacean.*
Research methodology for cetacean stock assessment	*- Science-based research methodology by researchers from FRA-Japan and DMCR-Thailand. It includes "Case study of the stock assessment of the cetacean based on experiences from Japan and Thailand (in the Gulf of Thailand and Andaman Sea").* *- The use of photography techniques for the cetacean species identification by Mr. Somchai* *- Forensic identification for dolphin and whale by Dr. Kongkiet* - Etc.
Orientation of the training program on cetacean actual sighting survey	*Explanation on the program of activity for the training program to be conducted onboard for actual sighting survey*
24 October 2010	
Onboard actual sighting survey (one-day trip)	*All resource persons and participants embark the survey vessel. Program of activity including dolphin sighting (filling record-sheet, photo techniques, etc.)*
25 October 2010	
Wrap-up discussion	*- Discussion on actual sighting survey conducted onboard* *- Summary of the major outputs from the Meeting*
Conclusion and Closing	*- Follow-up actions* - Conclusion and recommendation

VII) Training Schedule

Time	Activities
23 November 2010	
07:00	Leave SEAFDEC/TD for Baan Plaloma Resort, Chachoengsao
08:30-09:00	Check in and refreshment
09:00-09:15	Registration
09:15-09:30	Opening by SEAFDEC Secretary General
09:30-09:45	Introduction to the Regional Training Program on Cetacean Information Gathering and Research Methodology for Cetacean Stock Assessment Dr. Worawit W.

Time	Activities
09:45-10:15	Introduction to cetaceans and interaction to fisheries
	Mr.Supot C.
10:15-10:30	Group photo and coffee break
10:30-10:45	Update information on cetaceans distribution in South East Asian and its interaction to fisheries Mr. Sayan P.
1045-1200 10:45-11:00 11:00-11:15 11:15-11:30 11:30-11:45 11:45-12:00	National initiative related to cetacean stock assessment 1. Cambodia 2. Indonesia 3. Malaysia 4. Philippines 5. Thailand
12:15-13:30	Lunch
13:30-14:30	Methodology for cetacean stock assessment "Abundance estimation of cetaceans from sighting data " Dr. Hideyoshi Yoshida
14:30-15:15	Photo Identification method in cetaceans research Mr.Somchai M.
15:15-15:30	Coffee break
15:30-16:00	Biodiversity of Marine Mammal in Thailand (Case study in Thailand) Dr.Kongkiat K.
16:00-16:30	Forensic Identification for Dolphin and Whale Dr.Wansuk S.
16:30-16:45	The Link Between Cetacean Abundance and Environmental Feature /Mr. Sukchai A.
16:45-17:15	Study on Irrawaddy Dolphins in the Inner Gulf of Thailand (Dr.Saisunee S)
18:00-20:00	Welcome reception
24 November 2010	
08:30-16:00	Field Trip - Onboard the cetaceans watching boat to Bang Prakong Estuary - Cetacean observation - Data collection - Photographic Lunch on board - Observation for ecotourism with cetacean (Mr. SurasakThongsugdee)
25 November 2010	
09:30-10:00	Special session (Mr. KreingMahasiri) - Ecotourism - Alternative livelihood for local fisheries / villages
10:00-12:000	Group Presentation and discussion on the cetacean observation training
12:00-13:30	Lunch
13:30-14:00	Recommendations for future follow up action by SEAFDEC
14:00-14:15	Closing by SEAFDEC Deputy Secretary General

VIII) Detail of Training Curriculums

1. **Introduction to cetaceans and interaction to fisheries**
   Mr. Supot Chantrapornsyl (Annex 4)

   The topic is related with the introduction and rational of cetacean study in Thailand. Topics what studied by Thai scientists under Department of Marine and Coastal Resources, Ministry of Agriculture and Cooperative. Methodologies of information gathering are defined regarding to the topic of the studies.

2. **Methodology for cetacean stock assessment "Abundance estimation of cetaceans from sighting data"**
   Dr. Hideyoshi Yoshida (Annex 11)

   Methodology of Survey planning and track lines survey design is described.Pattern of sailing for cetacean research survey as well as merit and demerit of various types of survey vehicle is defined. Data log sheet for cetacean sighting record is exhibited. Lecturer also taught on the estimation of cetacean abundance by using the specific formula for line transect method.

3. **The Use of Photo Identification in Cetacean Research in Thailand**
   Mr. Somchai Monanunsap (Annex 12)

   Techniques of coastal cetacean research by direct survey, Method of photo identification (Photo-ID). In depth particulars on Photo-ID e.g. material, methodology, and etc. Major distinctive features of cetacean species by lesson learn and experience of Thailand's project Photo-ID year in 2009-2010.

4. **Biodiversity of Marine Mammal in Thailand: Case study in Thailand**
   Dr. Kongkiat Kittiwattanawong (Annex 13)

   Definition and classification of Marine mammal. Physiology, behavior, classification and research survey for Dugong. Distribution and population of Dugong in Thailand. Cause of dugong stranding in coastal area of Thailand. Physiology, classification and research survey for cetacean, i.e. whale, dolphin and porpoise. Physiology, behavior, classification and research survey for individual species of cetacean. Distribution and population of cetacean in Thailand.

5. **Forensic identification for whales and dolphins**
   Dr. Wansuk Senanan (Annex 14)

   Introduction and rational of cetacean forensic study in Thailand.Types of forensic issues in crimes against cetacean and some samples usually available for forensic investigation. Species identification from meat, remains and products as well as DNA markers, Polymer chain reaction- based (PCR-base), Molecular techniques for species

identification. Future work under collaboration with DMCR, e.g. DNA profiling, Microsatellite genetic markers, Geographic origin of specimens, and etc.

6. **The Link Between Cetacean Abundance and Environmental Feature**
   Mr. Sukchai Arnupapboon (Annex 15)

   The concept of cetacean appearance predicting based on environmental tolerance and favorite. Physiology of cetacean related with the marine environment parameters. Relationship between Estuary and area where high primary productivity and the abundance of cetacean.

7. **Study on Irrawaddy Dolphins in the Inner Gulf of Thailand**
   Mrs. Saisunee Chaksuin (Annex 16)

   Introduction, rational and area of study on Irrawaddy Dolphins in the Inner Gulf of Thailand under A collaboration project between World Wildlife Foundation, Thailand, Department of Marine and Coastal Resource and Gulf Electric Co.,Ltd. The project activities included Research, public relation included relevant activities are exhibited. Result of Photo-ID through vessel observation is presented.

8. **Update Information on Cetacean Distribution in South East Asian and Its Interaction to Fisheries**
   Mr. Sayan Promjinda (Annex 5)

   Introduction and background of Cetacean Sighting Program sponsored by Japanese Trust Fund. Area of survey operations conducted by SEAFDEC and member countries research vessels, around Southeast Asian Region. Update information of cetacean sighting activities conducted by SEAFDEC/TD under collaborated with SEAFDEC member countries in year 2009-2010. Briefly experience on interaction between the appearances of cetacean to fishing operations.

9. **Administration Guideline manages the resource by Marine and the Coastal of Thailand Alternative livelihood for local fisheries / villages**
   Mr. Kreing Mahasiri (Annex 17)

   Explaination on the situation and impactby fisheries of Irrawaddy dolphin population around Bang Prakong Estuary during pre-management. Local-base management appropriate modified for Bang Prakong Estuary area. Important of Policy to alternate fishing activities to eco-tourism local industry.Standard operational guideline for Irrawaddy dolphin conservation and responsible fishing.

IX) Detail of Country Reports

1. **Cambodia: Conservation Status and Management of Marine Mammals along the Coastline of Cambodia**
   Mr. LiengSaroeun (Annex 6)

   Introduction and rational of marine mammal study in Cambodia. Result of the coastal sighting survey in year 2010. Status of marine mammals in Cambodia.Cause of marine mammal stranding in coastal area of Cambodia. National policies of Cambodia to mitigate the mortality risk of mammal. Collaborative program with international/regional organization related with marine mammals in Cambodia.

2. **Republic of Indonesia: Research Activities of Cetaceans in Indonesia**
   Mr. Dharmadi (Annex 7)
   The report of Indonesia as detail of cetacean species positively identified to Date in Indonesia and research locations. Number of whale and dolphin species frequency sighting during 2006-2009 around Sulawesi and during 2004-2008 around East Kalimantan. Number of sighting and encounter of cetacean on difference depth and average encounter of cetacean individual based on habitat type in East Kalimantan during 2009-2010

3. **Malaysia: National Initiative related to Cetacean stock assessment**
   Mdm. Nurridan Bt Abdul Han (Annex 8)
   The report on the cetacean research activities in Malaysia, showed that under project of Sarawak. The project consists of collect important baseline data on the seasonal distribution habitat use and conservation needs of dolphins in Sarawak, to raise awareness of marine mammals and their conservation needs in the local population and to apply the study result to develop effective conservation and management plans. Moreover, the other works to collaborates with Fisheries Research Institute for survey of conservation, habitat and biodiversity in Sarawak-ad-hoc observation and organized the meeting in August 2010, to delegate works among agencies on study and conservation and standard operating procedures on stranded cetacean and marine fisheries Department as the key player.

4. **The Philippine: Research Activities of Cetaceans in The Philippines**
   Mr. Joseph Rayos (Annex 9)
   Current status of marine mammals in The Philippines included with cetacean hotspots in Philippine Waters. Cause of cetacean stranding in coastal area of Philippines as well as the record of stranding cetacean and rescue activities. National conservation and management under BFAR and NFRDI on cetacean research in The Philippines. Regional research studies of cetacean in Philippine Watersunder Tri-Nationa Marine Mammal survey.

5. Thailand: Research Activities of Cetaceans in Thailand

Mr. Pornanan Keereerut (Annex 10)

The cetacean studies in responsible of Department of Fisheries in Thailand was studies on the status of cetacean in Thailand, conducted the surveying along the whole coastal in Thailand. To record data on cetacean stranding and the interaction between cetacean and fisheries.

X) Brief report on on-site training activity of cetaceans sighting vessel around Bang Prakong Estuary

Eighteen (18) participants are divided into two (2) groups. Each group consisted of nine (9) members. Sighting activity stared from 9 am until 3 pm. Three (3) survey sites, around Bang Pakong Estuary, are positioned to conduct the sighting survey (see figure). Major aquatic environment parameters e.g. surface temperature, dissolve oxygen, salinity, pH and turbidity, is collected by SEAFDEC/TD oceanographers. Total numbers of cetacean discovered by participants are nineteen (19) cetaceans appeared by Table 2 Result of Photo Identification by Actual Cetacean Sighting Survey around Bang Pakong Estuary.

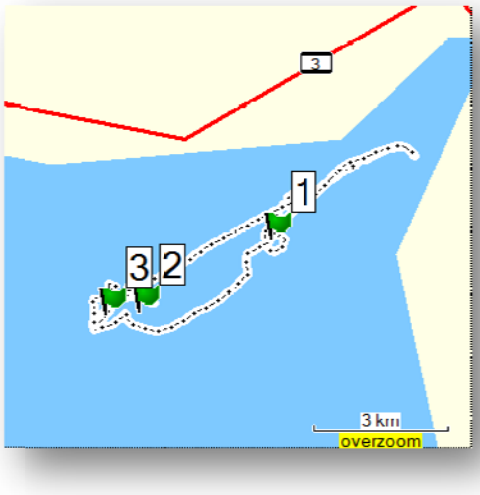
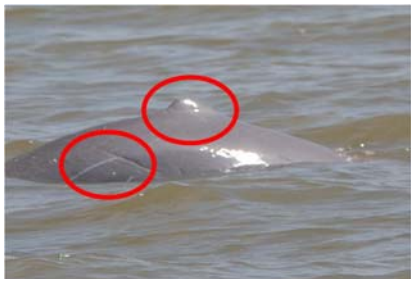


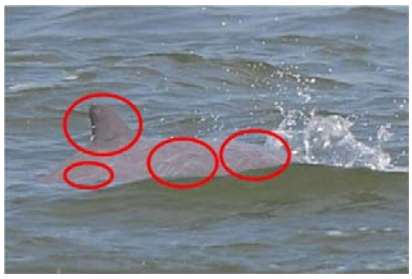
Figure 1: Sighting survey sites around Bang Prakong Estuary (Left)
Table 1: Environmental parameter around survey sites, Bang Prakong Estuary(Right)

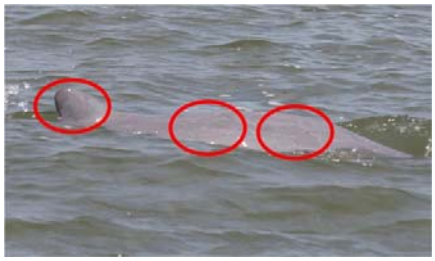
Sighting No.	ID: Ob-BPK-XXX																
	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017
1 (09:30 - 10:10)	✓	✓															✓
2 (11:25 - 11:40)			✓	✓	✓	✓		✓						✓			
3 (12:00 - 12:40)				✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	

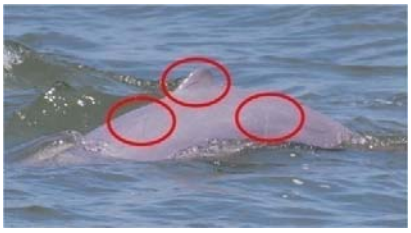
Table 2 Result of Actual Cetacean Sighting Survey around Bang Prakong Estuary

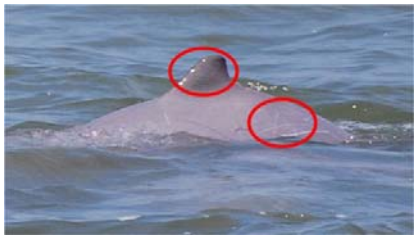
Table 3: Result of Photo Identification
Actual Cetacean Sighting Survey around Bang Prakong Estuary

Picture	Name and Identities
	**Name:** OB-BPK-001 **Time of observation:**1000hr **Distinguishing characteristic** ***** Nicked on the tip of the Dorsal fin * Scars on the right side of the body
	**Name:** OB-BPK-002 **Time of observation:** 1129 hrs **Distinguishing characteristic** * Nicked on the tip and posterior of the Dorsal fin * Scars on the left side of the body

Picture	Name and Identities
	**Name:** OB-BPK-003 **Time of observation:** 1156hr**s** **Distinguishing characteristic** * Dorsal fin nicked w/ bite scar on the right anterior part * Scars on the left side of the body
	**Name:** OB-BPK-004 **Time of observation:** 1157hrs **Distinguishing characteristic** * Dorsal fin complete with scars on the side * Scars on the left side of the body
	**Name:** OB-BPK-005 **Time of observation:** 1157hr **Distinguishing characteristic** * Dorsal fin nicked on the upper posterior portion * Scars on the right side of the body
	**Name:** OB-BPK-006 **Time of observation:** 1158 hrs **Distinguishing characteristic** * Dorsal fin nicked on the tip * Bite Scars on the right side of the body
	**Name:** OB-BPK-007 **Time of observation:** 1159 hrs **Distinguishing characteristic** * Dorsal fin nicked w/ 2 small holes on the posterior * Scars on the right side of the body

Picture	Name and Identities
	**Name:** OB-BPK-008 **Time of observation:** 1201 hrs **Distinguishing characteristic** * Dorsal fin complete * Scars on the left side of the body
	**Name:** OB-BPK-009 **Time of observation:** 1206 hrs **Distinguishing characteristic** * Dorsal fin with V-shaped cut on the anterior * Scars on the right side of the body
	**Name:** OB-BPK-010 **Time of observation:** 1209 hrs **Distinguishing characteristic** * Dorsal fin smooth and no scars on the side * Scars on the right side of the body
	**Name**: OB-BPK-011 **Time of observation**: 1212 hrs **Distinguishing characteristic** * Dorsal fin nicked on base of the posterior * Minimal scars on the right side of the body
	**Name:** OB-BPK-012 **Time of observation:** 1218 hrs **Distinguishing characteristic** * Dorsal fin nicked on the posterior base * Scars on the right side of the body

Picture	Name and Identities
	**Name:** OB-BPK-013 **Time of observation:** 1216 hrs **Distinguishing characteristic** * Dorsal fin nicked V-shaped on the posterior
	**Name:** OB-BPK-014 **Time of observation:** 1216 hrs **Distinguishing characteristic** * Dorsal fin nicked V-shaped on the upper anterior
	**Name:** OB-BPK-015 **Time of observation:** 1216 hrs **Distinguishing characteristic** * Dorsal fin nicked on the middle posterior * Minimal body scars
	**Name:** OB-BPK-016 **Time of observation:** 1152 hrs **Distinguishing characteristic** * Dorsal fin complete * Minimal scars on the right of the body
	**Name:** OB-BPK-017 **Time of observation:** 1218 hrs **Distinguishing characteristic** * Dorsal fin complete with scars on the left side * Scar on the left side of the body

Picture	Name and Identities
	**Name:** OB-BPK-018 **Time of observation:** 1218hrs **Distinguishing characteristic** * Dorsal fin complete with scars on the left side * Scar on the left side of the body
	**Name:** OB-BPK-019 **Time of observation:** 1251hrs **Distinguishing characteristic** * Dorsal fin nicked on the posterior * Scar on the left side of the body (from base of the dorsal to interiorly)

XI) Conclusion result of Training/Workshop

Conclusion result of training/workshop on Cetacean Information and Research Methodology on cetacean stock assessment has been conducted by focusing on the reverine/coastal cetacean; Irrawaddy dolphin. The stock assessment and practical sighting on Irrawaddy dolphin has been practice under supervised by several research person from Japan and Thailand. Experience on cetacean sighting included with exchanging some sighing techniques among resource persons and participant has initiate the Riverine-Coastal Cetacean Photo Identification techniques what are requested by member of training/workshop to publish and distribute to SEAFDEC member countries under the proceeding by SEAFDEC/TD. Update information on cetacean research activities initiated by SEAFDEC member countries included with Non Government Organization (NGO), i.e. World Wildlife Foundation (WWF) is presented the research studied and policy. Few countries, however, research works on cetacean have not been developed yet, that SEAFDEC/TD should seek for support the assistance to those countries.

The outcome from training/workshop what strongly recommended by participants (resources persons and member country scientists) is the *Handbook on Photo Identification Techniques for Irrawaddy Dolphin*, what obtain during this practical sighing activity. SEAFDEC/TD by Capture Fisheries Technology Division in collaborate with SEAFDEC member countries shall conduct appropriate activities to centered information available on Irrawaddy dolphin through hard copy and website.

XII) Recommendation on future activities

The following recommendations are based on general considerations from all participants. The recommendation is able to topic into 2 main activities i.e. research activity and training activity;

1. Research Activities

There are few recommendation on the future research activities, should be organized by SEAFDEC/TD under the collaboration with SEAFDEC member countries; The first recommendation is SEAFDEC/TD should develop the Practical guideline/manual on Photo-ID Techniques for Cetacean Study in Southeast Asian Region, focus stock assessment, species distribution. Secondly, SEAFDEC scientists in collaborate with SEAFDEC member countries should simplified sighting data form (regional information) into particular cetacean topic, i.e. species distribution, stock size and cetacean behavior data. Thirdly, future collection of information should be focused on interaction between cetacean and fisheries in researchable issue, e.g. feeding behavior of cetacean by various methodologies (e.g., stomach content, fishing ground, and etc.), Environmental parameters related to cetacean distribution (Sea Surface Temperature, Concentration of Nutrient related with primary productivity). Finally, the genetic baseline information what related with the identification of cetacean species, forensic identification and cause of stranding cetacean are recommended to have such candidates trained at the overseas organizations or laboratories.

2. Training Activities

The training activity is able to summarize into three (3) main items. Firstly, the program for enhance the personnel of cetacean works should be continue included with human capacity building of sighting survey focus on the oceanic cetacean research in Pacific conducted by Japan and survey conducted under the national survey of SEAFDEC member countries. Secondly, SEAFDEC should initiate the photo identification information of cetacean through appropriated communication method. Finally Guideline/manual/handbook for Photo Identification should be appropriately standardized for Southeast Asian region.

Annex 1

LIST OF PARTICIPANT

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Annex2

OPENING REMARKS
By SEAFDEC Secretary-General

The Regional training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment

23 -25 November 2010, Bangprakong, Chachoengsao, Thailand

Participants from SEAFDEC member countries,
Distinguished guests and other participants,
Ladies and gentlemen, a very pleasant good morning,

On behalf of SEAFDEC, I am pleased to be here and welcome you all to this Regional Training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment.

Last year, SEAFDEC Training Department organized the 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Water. During that workshop member countries provided the current status of cetacean research works and share experience and exchange view on the issue related to cetacean research. At the end, the workshop recommended that SEAFDEC should enhance human resources capacity of Member Countries on methodology to assess cetacean stock size. Therefore, SEAFDEC Training Department is organizing the "The Regional Training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment" from today until 25 November. The objectives of this training are to develop human resource capacity of our member countries on cetacean stock assessment methodology through the practical training activities. Moreover, the training will be a floor for sharing and updating information of cetacean research among participants and resource persons. Lastly, it is important to obtain suggestion on the future follow up activities on the cetacean research in the region.

Ladies and Gentlemen, I would like to thank you all for taking your valuable time to come here. Again I welcome all of you to Thailand and hope that you enjoy a pleasant and comfortable stay in Chachoengsao during the training program.

Thank you very much and good day

Annex 3

Introduction to the Regional Training Program on Cetacean Information gathering and Research Methodology for Cetacean Stock Assessment

Dr.WorawitWanchana: worawit@seafdec.org

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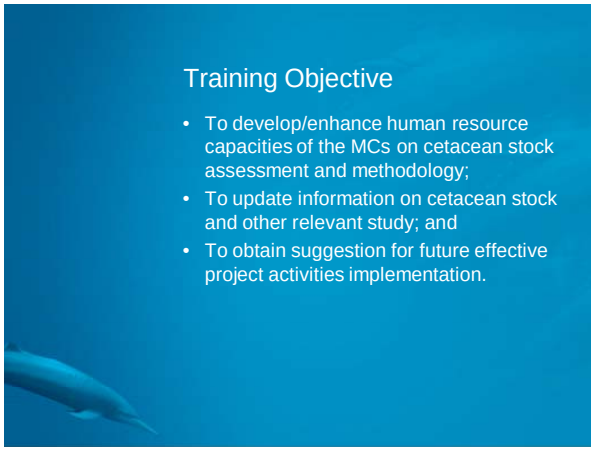

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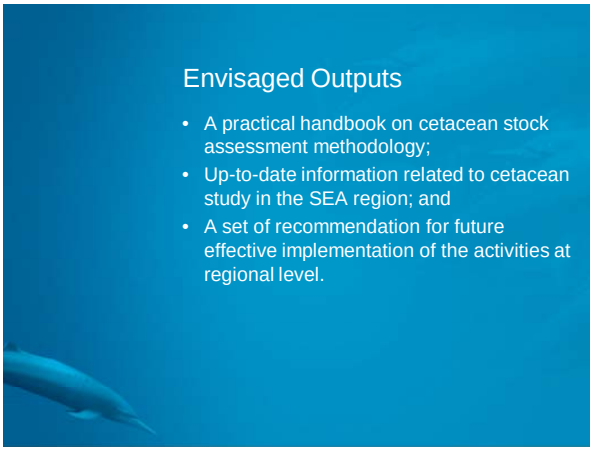


6

Resource Persons and Participants

- Fisheries Research Agency – Japan
- Department of Marine and Coastal Resources – Thailand
- Department of Fisheries – Thailand
- Kasetsart University Student
- SEAFDEC Training Department Staff
- WWF
- Others

7

Tentative Schedule

- Day One:
  - Cetacean research and national information
  - Photo-techniques and forensic identification
  - Orientation for actual sighting onboard
  - Others
- Day Two:
  - Actual cetacean sighting and others
- Day Three:
  - Group reporting, discussion, closing

8

Thank you !!!

10

Annex 4

Introduction to Cetacean and Its Interaction with Fisheries

Mr.Spot Chantrapornsyl: supot.chang@gmail.com

Introduction to Cetacean and its interaction with fisheries

Supot Chantrapornsyl

Department of Marine and Coastal Resources

1

Cetacean research in Thailand (1993)

Dr. Carl Kinze
Mr. Michael Andersen

2

Why we have to study cetacean

- Saving biodiversity (CBD)
- High migratory species (CMS)
- Share resources in the regions
- Listed in CITES appendix

3

1. **Study on biology**
2. **Species identification**
3. **Morphology and anatomy:** Dissected dead specimens
4. **Osteology:** Measurements

Data retrieving schemes

- *Interview survey*
- *Field survey*
  - Land-based investigation
  - Ship-based survey
  - Aerial survey
- *Stranding specimens*
  - Live-stranded specimens
  - Carcass specimens

4

Study on biology of cetacean

- ⇒ **Species and distribution**
- ⇒ **Morphology and anatomy**
- ⇒ **Pathology**
- ⇒ **Stomach contents**
- ⇒ **Heavy metal in organ tissue**
- ⇒ **Genetic variation**
- ⇒ **Osteology**

5

Interview survey

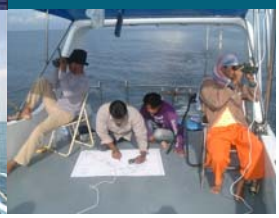
-Species
-Distribution
-Related to fishermen

6

Ship base survey

Systematic survey

-Species
-Abundance
-Circumstance



7

Arial survey

8

Marine mammal survey

9

Stranded animal

Marks and scars; disease symptom

10

Stranded animals

Morphology

11

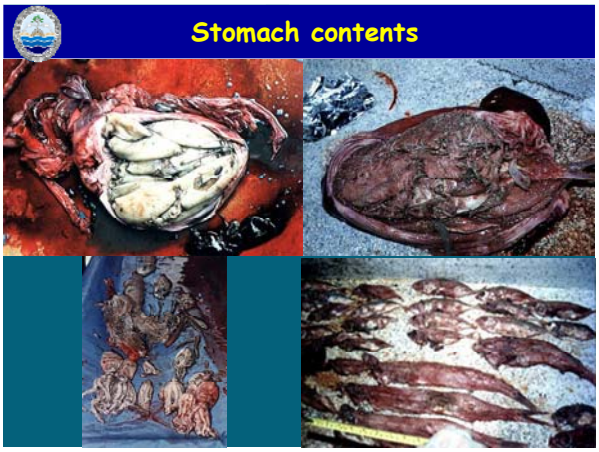
Stranded animals

12

13

14

15



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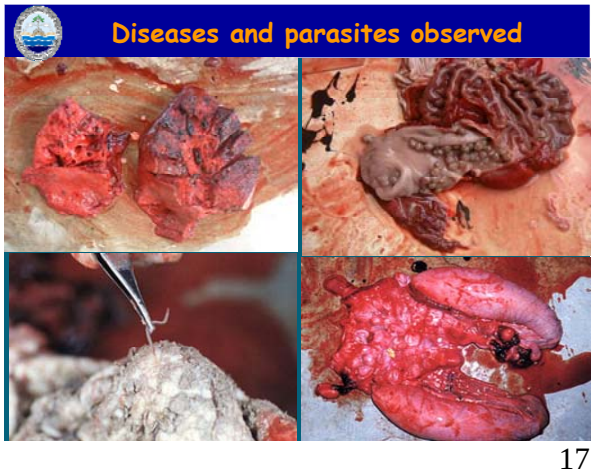

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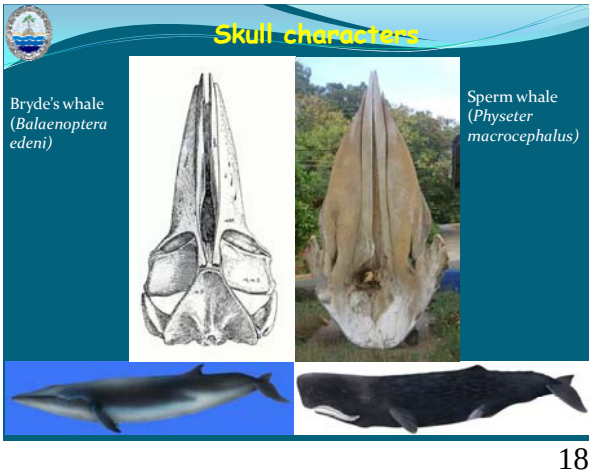
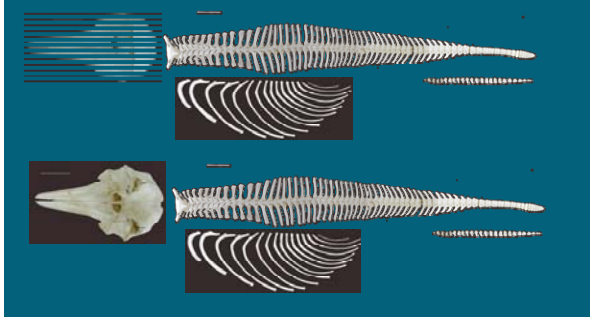


18

Skull characters

19

Dolphin skeleton



20

Osteology study

- **Species identification**
- **Population structure / geographical variation**
- **Polymorphism: maturity, sex**
- **Age determination**
- **Asymmetric development**

21

Baleen whale bone characters

22

Sasaki, et. al., 2006

- From characters of the skeletons
- 2 species of Balaenoptera in Thailand
  - *Balaenoptera edeni*
  - *Balaenoptera omurai*

23

Rescue of live stranding

24

Rescue live stranding

Stranding network

25

Cetacean in Thailand

- 25 species belonging to 6 families have been found in Thai waters
- Oceanic population
- Coastal population
  - Resident groups (mostly irrawaddy and humpback dolphin)

26

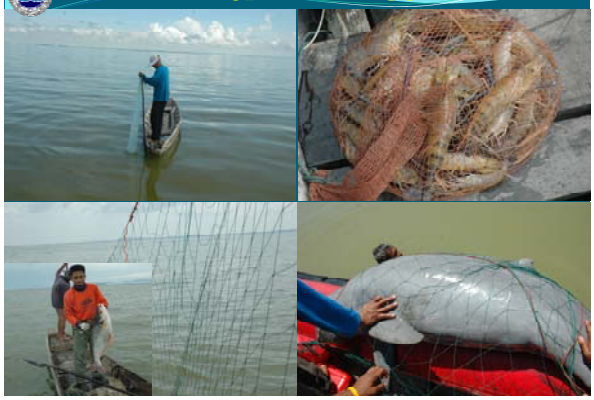
Cetacean interaction with fishing gears

Few numbers of incidental catch were reported in two principal gears, purse seines and gill nets.

Most of the stranded animals of the oceanic species caused by other events such as got sick or injured, they were skinny and very weak when ashore.

27

Various type of fishing gears



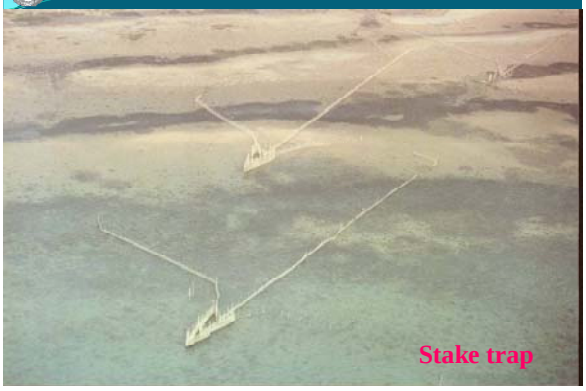
28

Entangle in gillnets

Death; causing by gill net

29

Steak trap in coastal areas



Stake trap

30

31

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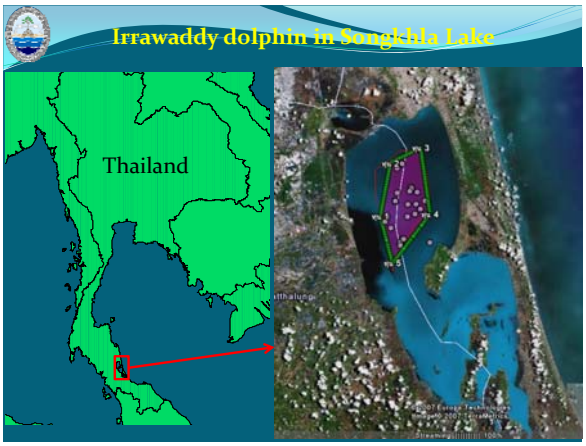

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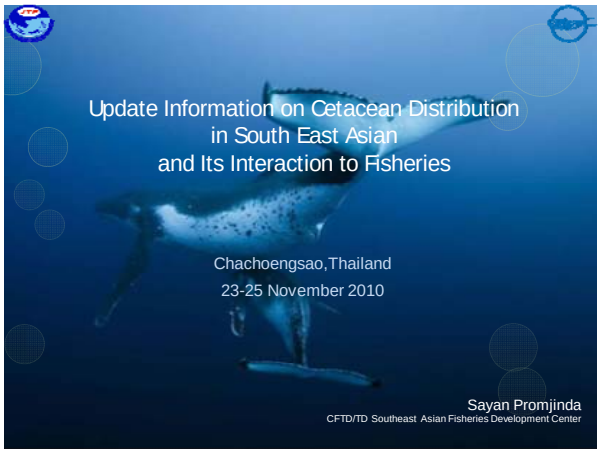
Annex 5

Update Information on Cetaceans Distribution in South East Asian and Its Interaction of Fisheries

Mr.SayanPromjinda: sayan@seafdec.org



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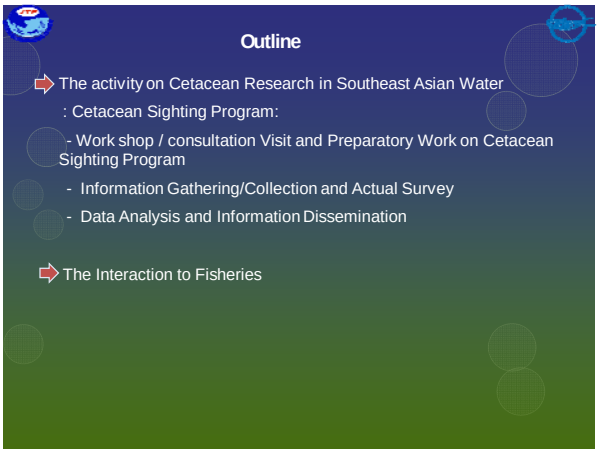

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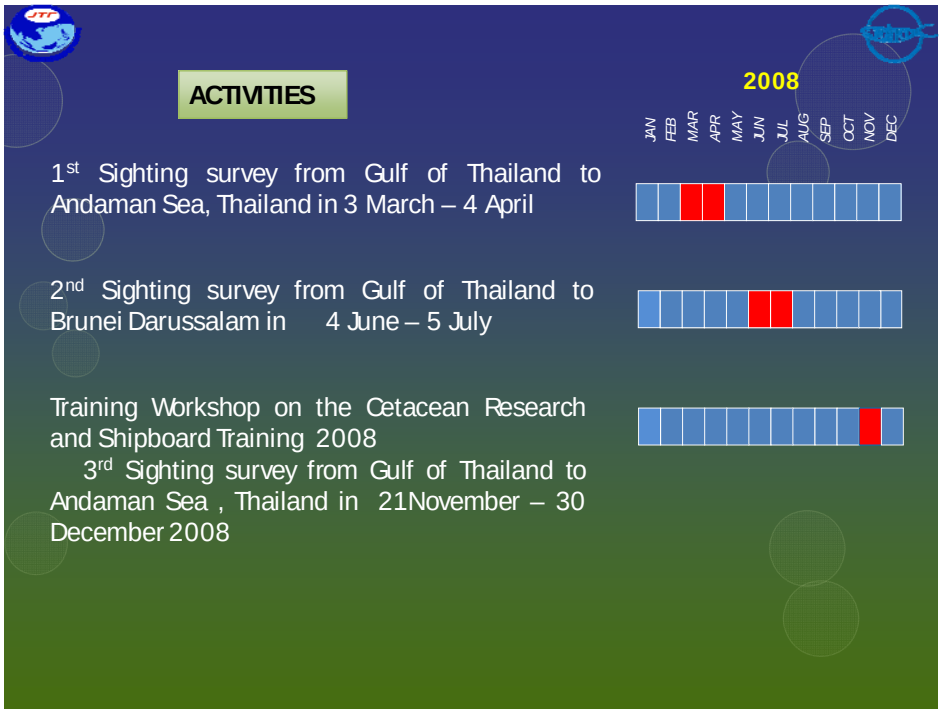


3

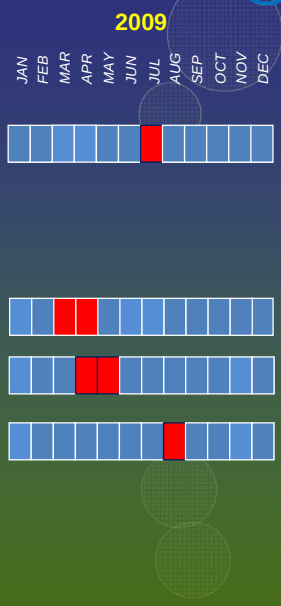
ACTIVITIES

Activity 1 : Workshop/Consultation Visit and Preparatory Works

The 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Waters 30 – 31 July

Activity 2 : Information Gathering and Actual Survey by Research Vessel

- 4th Sighting survey from Gulf of Thailand to Brunei Darussalam in 6 March – 10 April
- 5th Sighting survey from Gulf of Thailand to Bitung, Indonesia in 23 April – 22 May
- 6th Sighting survey in Philippines water in 16 – 26 Agust



4

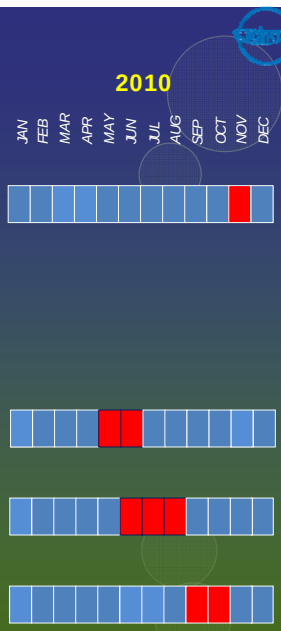
ACTIVITIES

Activity1 : Workshop/ Consultation Visit and PreparatoryWorks

The 1st Regional Training Program on Cetacean Information Gathering and Research Methodology for Cetacean Stock Assessment, 23-25 November

Activity 2 : Information Gathering and Actual Survey by Research Vessel

- 7th Sighting survey in Andaman Sea, Thailand in 5 May – 7 June
- 8th Sighting survey from Gulf of Thailand to Sabah and Sarawak, Malaysia in 28 June – 11 August
- 9th Sighting survey Gulf of Thailand to Brunei Darussalam, Brunei water in 15 September – 25 October



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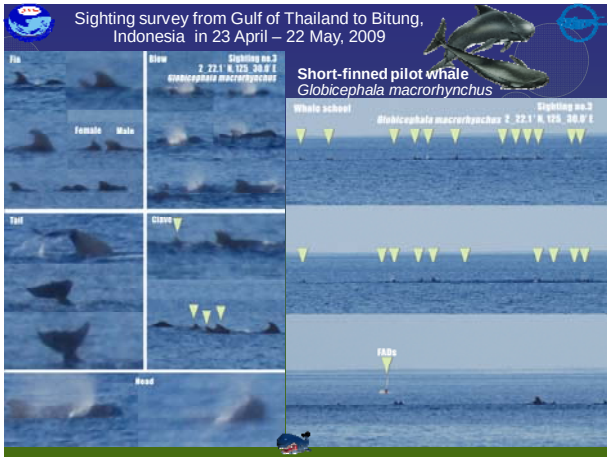
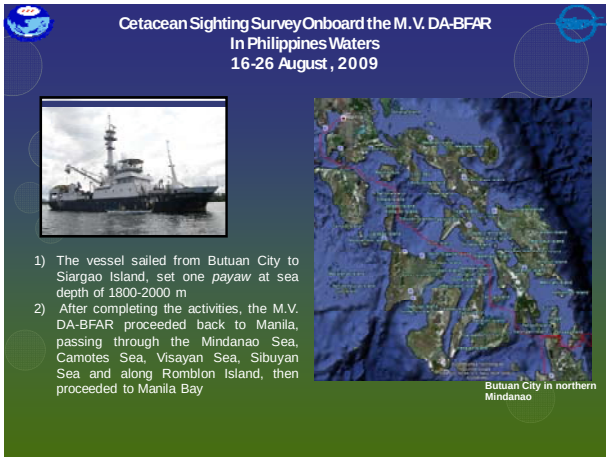
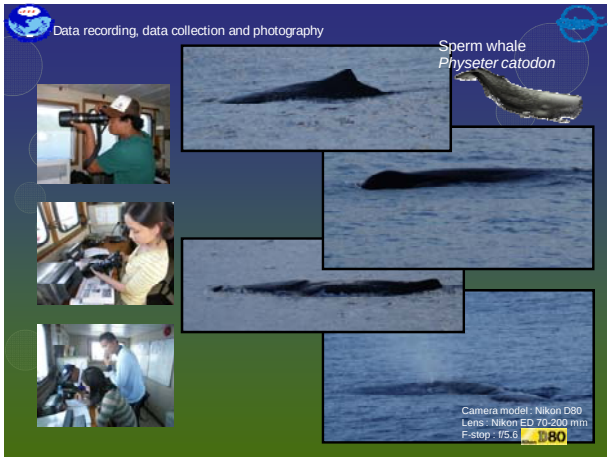

Sighting survey from Gulf of Thailand to Bitung, Indonesia in 23 April – 22 May, 2009
Short-finned pilot whale
Globicephala macrorhynchus
Female
Male
Whale school
FADs

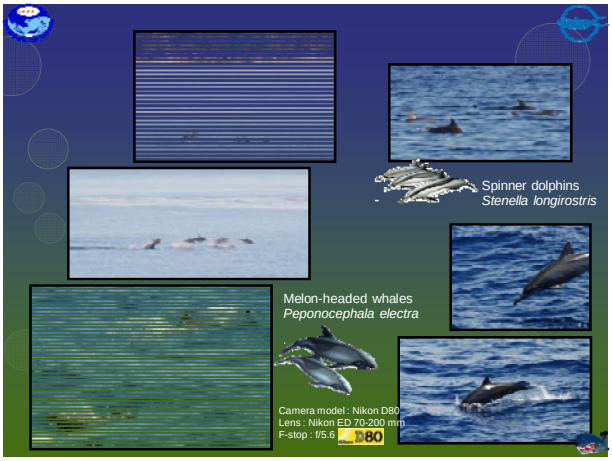
6


Cetacean Sighting Survey Onboard the M.V. DA-BFAR
In Philippines Waters
16-26 August, 2009
1) The vessel sailed from Butuan City to Siargao Island, set one payaw at sea depth of 1800-2000 m
2) After completing the activities, the M.V. DA-BFAR proceeded back to Manila, passing through the Mindanao Sea, Camotes Sea, Visayan Sea, Sibuyan Sea and along Romblon Island, then proceeded to Manila Bay
Butuan City in northern Mindanao

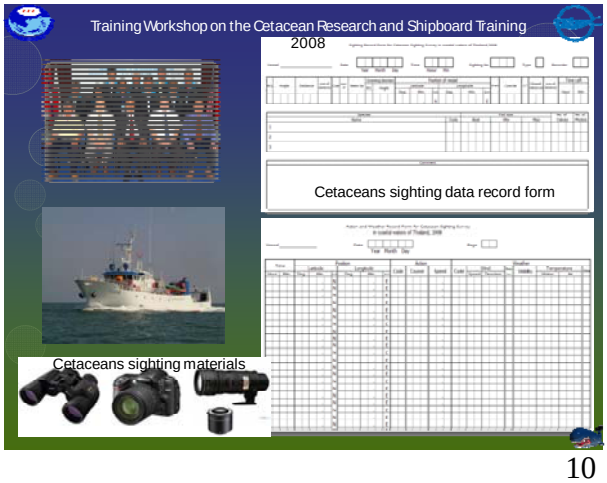
7


Data recording, data collection and photography
Sperm whale
Physeter catodon
Camera model : Nikon D80
Lens : Nikon ED 70-200 mm
F-stop : f/5.6

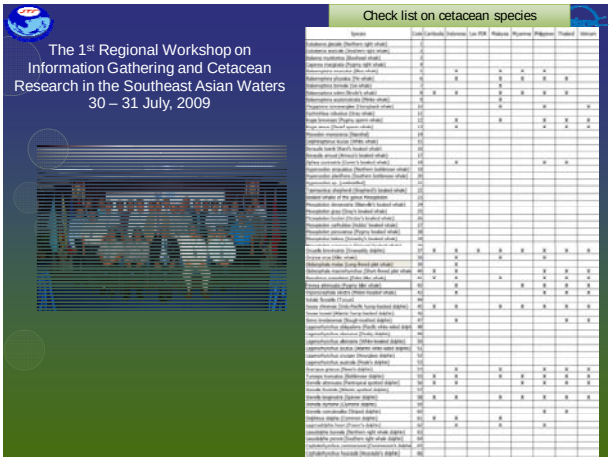
8


Spinner dolphins
Stenella longirostris
Melon-headed whales
Peponocephala electra
Camera model : Nikon D80
Lens : Nikon ED 70-200 mm
F-stop : f/5.6

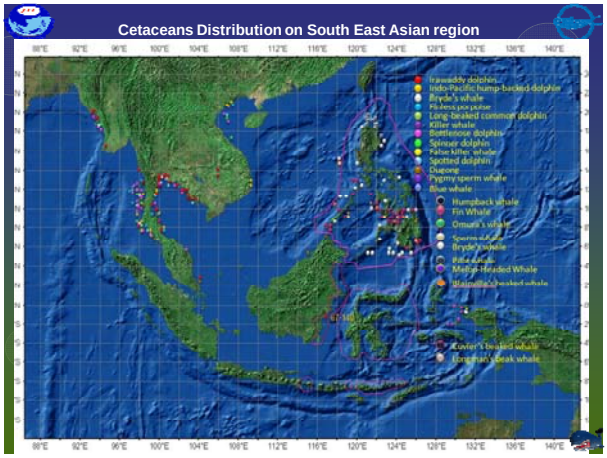
9


Training Workshop on the Cetacean Research and Shipboard Training
2008
Cetaceans sighting data record form
Cetaceans sighting materials

10


The 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Waters
30 – 31 July, 2009
Check list on cetacean species

11



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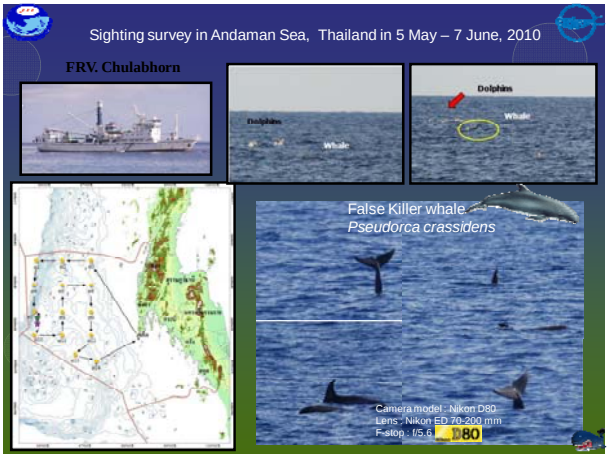

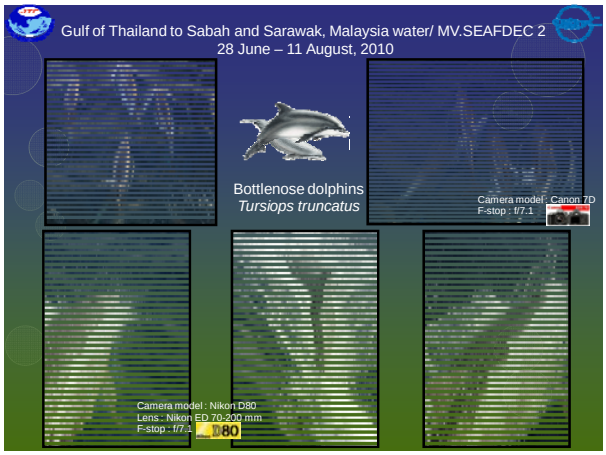

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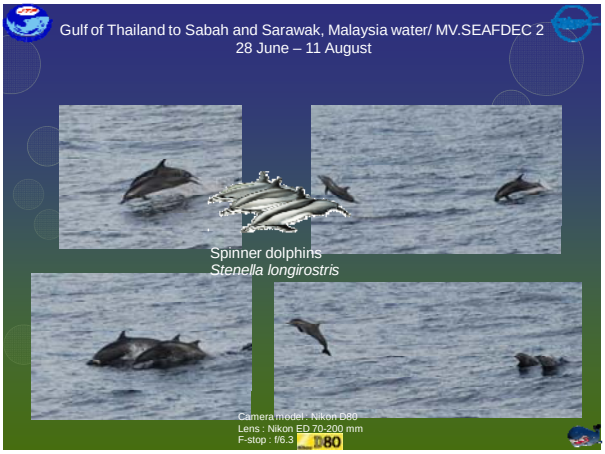


15

Preliminary data report of cetacean sighting

M.V. SEAFDEC 2 **7 cruise**
Andaman Sea 2 cruise
Brunei water 3 cruise
Indonesia water 1 cruise
Malaysia water 1 cruise

FRV.Chulabhorn **1 cruise**
Andaman Sea 1 cruise

M.V. DA-BFAR **1 cruise**
Philippines water 1 cruise

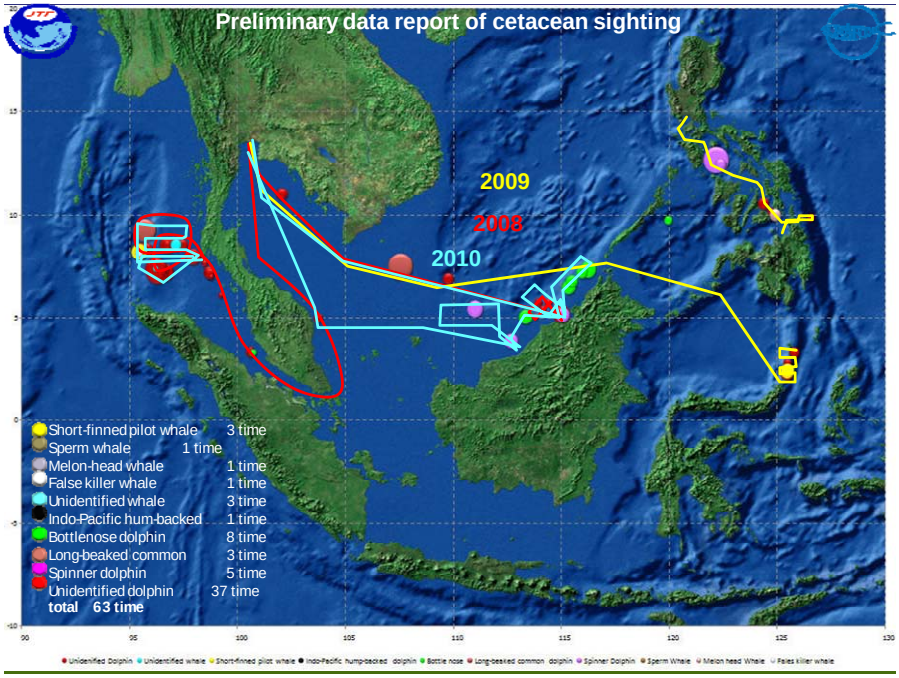
List of Cetacean found

Short-finned pilot whale	3 time
Sperm whale	1 time
Melon-head whale	1 time
False killer whale	1 time
Unidentified whale	3 time
Indo-Pacific hum-backed	1 time
Bottlenose dolphin	8 time
Long-beaked common	3 time
Spinner dolphin	5 time
Unidentified dolphin	37 time

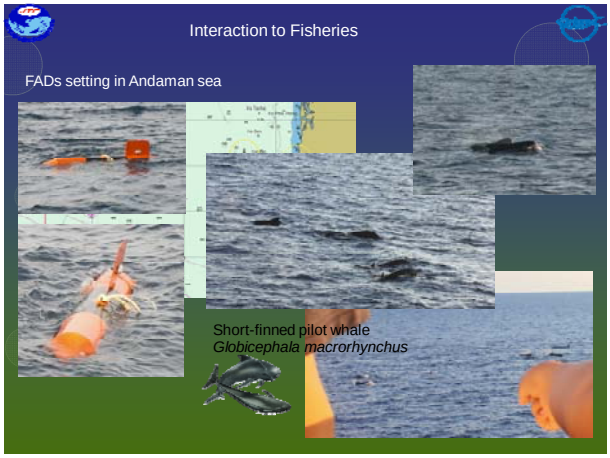
total 63 time

Cruise no.	Date	Time	Latitude	Longitude	Number of found	Species
	20 Mar 08	10:00	7.1599	96.7349	2	Dolphin
	20 Mar 08	18:00	7.1596	96.7349	10	Dolphin
32-2/2009	5 May 09	10:55	2.7396	125.5029	5	Dolphin
	6 May 09	9:40	3.2341	125.8006	5	Dolphin
	6 May 09	9:40	3.2334	125.8006	8	Dolphin
	8 May 09	15:25	2.3673	125.5000	15	Short-finned pilot whale
	8 May 09	15:49	2.3170	125.5000	3	Dolphin
	8 May 09	16:15	2.2674	125.5001	15	Dolphin
DA-BFAR	19-Aug-09	6:26	9.7140	126.1810	5	Common bottle nose Dolphin
	20-Aug-09	11:50	9.8367	126.5863	3	Dolphin
	20-Aug-09	17:30	9.8717	126.1800	1	Sperm Whale
	21-Aug-09	12:47	9.9600	124.9350	10	Melon head Whale
	21 Aug 09	14:07	10.1078	124.7543	4	Dolphin
	21-Aug-09	17:11	10.4467	124.4683	5	Dolphin
	21-Aug-09	17:40	10.4967	124.3900	10	Dolphin
	22-Aug-09	11:05	12.3867	122.3900	10	Spinner Dolphin
	22-Aug-09	17:15	12.6083	122.2008	50	Spinner Dolphin
Chulabhron	10-May-10		8.1490	95.4860	20	Short-finned pilot whale
	31-May-10		8.0707	95.4767	4	Fales killer whale
35-3/2010	2-Jun-10	17:40	8.1889	95.5036	30	Short-finned pilot whale / Dolphins
	2 Jul 10	12:05	5.0800	115.0600	15	Spinner Dolphin
	8-Jul-10	6:30	7.1880	116.1710	20	Common bottle nose Dolphin
	8-Jul-10	15:45	7.0940	115.5850	10	Common bottle nose Dolphin
	9-Jul-10	20:00	6.2690	115.2240	15	Common bottle nose Dolphin
	12-Jul-10	21:00	6.4360	115.3020	10	Common bottle nose Dolphin
	18-Jul-10	9:25	5.0080	113.2420	15	Common bottle nose Dolphin
	29-Jul-10	17:30	3.4990	112.4160	15	Spinner Dolphin
	8-Aug-10	6:48	5.2400	111.0190	20	Spinner Dolphin
36-4/2010	22-Sep-10	17:50	5.073	113.502	4	Whale
	30-Sep-10	7:30	5.099	114.072	5	Dolphin
	18-Oct-10	20:29	5.377	114.192	10	Bottlenose dolphin
30-3/2008	28 Nov 08	12:39	3.4002	100.6342	2	Dolphin
	3 Dec 08	18:25	8.2342	95.8005	15	Dolphin
	6 Dec 08	9:25	9.2007	95.7170	40	Long-beaked common dolphin

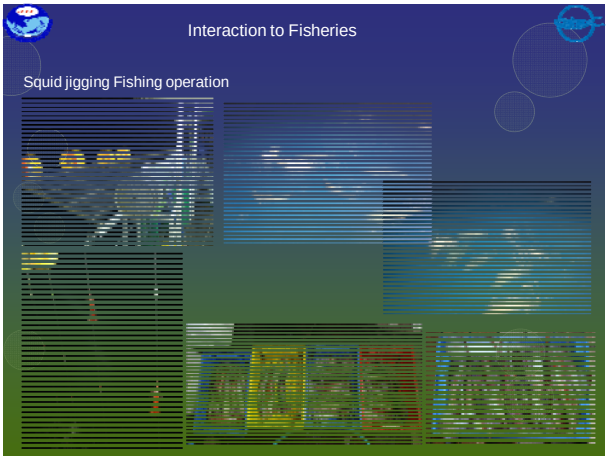
16


Preliminary data report of cetacean sighting
2009
2008
2010
Short-finned pilot whale 3 time
Sperm whale 1 time
Melon-head whale 1 time
False killer whale 1 time
Unidentified whale 3 time
Indo-Pacific hum-backed 1 time
Bottlenose dolphin 8 time
Long-beaked common 3 time
Spinner dolphin 5 time
Unidentified dolphin 37 time
total 63 time

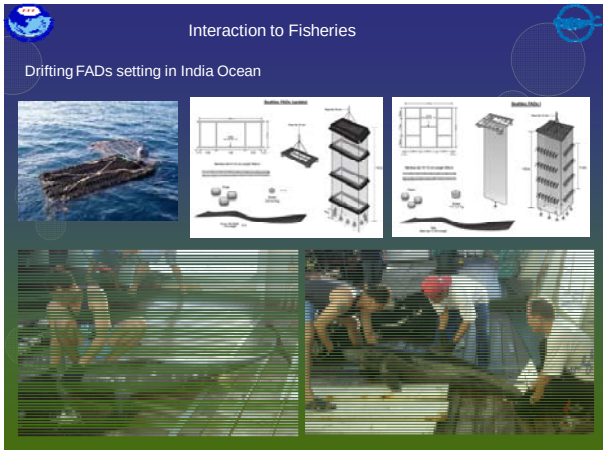
17


Interaction to Fisheries
FADs setting in Andaman sea
Short-finned pilot whale
Globicephala macrorhynchus

18


Interaction to Fisheries
Squid jigging Fishing operation

19


Interaction to Fisheries
Drifting FADs setting in India Ocean

20


Interaction to Fisheries
* The Human and the Cetacean hunting the same preys ?
* How these two hunters living together in balance ?
http://www.youtube.com/watch?v=J_RSESnUI1E&feature=related

21

Interaction to Fisheries

Taking into account, the declining of fisheries resources in the Southeast Asian and increasing of demand of fish and fisheries products, many national programs on enhancing fisheries resources in the coastal and offshore areas are high prioritized and implemented in line with the improved policy framework to manage fisheries.

Regarding this, fish stock has been increasing around the enhancing areas for fishers to fish. Unfortunately, it is reported that many large cetacean are also found in the such areas where they are enjoy to feed fish which are aggregated. Competition between people/fishers and cetacean to get the same target fish are often found in some season when existing cetacean or migrate cetacean come into the human fishing ground.

To protect fish for the people or to feed them for cetacean, national policy management are needed to be clarified. Proper fisheries management framework needed to be adapted to ensure sustainable fisheries on fish for the people…

22

Thank you for your Attention

23

Annex 6

Conservation and Management Status of Marine Mammals along the Coastline of Cambodia

Mr.LiengSaroeun: saroeun7@yahoo.com

WWF for a living planet

Conservation Status and Management of Marine Mammals along the coastline of Cambodia

Cambodian Mekong Dolphin Conservation Project

LIENG SAROEUN
Senior Officer of Cambodian Fisheries Conservation DoF/FiA

PADI FOUNDATION

1

THE CHART OF MANAGEMENT AND CONSERVATION OF MARINE MAMMALS IN CAMBODIAN WATERS

MARINE MAMMAL STUDIES
⇩
MARINE MAMMAL STATUS
⇩
THREATS
⇩
SOLUTIONS
⇩
DEVELOP CONSERVATION STRATEGY

2

MARINE MAMMAL STUDIES

1- Previous marine mammal studies

- The research on marine mammals had never been conducted in Cambodian marine waters before 2001
- The only known confirmed records of two species of coastal cetacean were observed (Finless Porpoise *Neophocaena phocaenoides* and Irrawaddy dolphins *Orcaella brevirostris*) and unconfirmed local reports of Indo-Pacific Humpback Dolphins (*Sousa chinensis*) were received during the coastal surveys for coral and sea grass, (Nelson 1999)
- Dugongs were reported to be abundant along parts of the coast until approximately 1975 (Nelson 1999). They were reportedly found in large groups but their numbers declined due to hunting, fishing and loss of sea grass (OI 1998)
- Six Dugongs were accidentally snared in gill and trawl nets during 1995 in Kampot bay (Tana 1995)

3

MARINE MAMMAL STUDIES (Cont. d)

2- Current marine mammal studies

- The Fisheries Administration (previously called DoF) began research on marine mammals in coastal waters in January 2001, in collaboration with James Cook (JCU) University and Wildlife Conservation Society (WCS)
- The objectives were to:

i)- Conducted the line transect survey throughout the coastal waters to assess distribution and abundance of marine mammals

ii)- Conducted the interviews with local people and fishermen to assess levels of by-catch, perceptions of local people towards marine mammals and conservation and to emphasis the importance of reporting any stranded or by-caught marine mammals

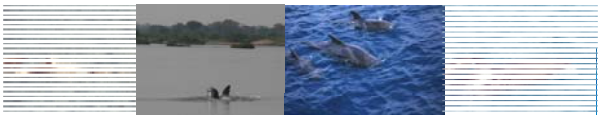
iii)- Conducted the education and public awareness through village, school and pagoda workshops

4

MARINE MAMMAL STUDIES (Cont. d)

- The total number of marine mammal species recorded in Cambodian waters is eleven:

1. False Killer Whale *Pseudorca crassidens*
2. Long-beaked Common Dolphin *Delphinus capensis*
3. Pantropical Spotted Dolphin *Stenella attenuata*
4. Dwarf Spinner Dolphin *Stenella longirostris roseinventris*
5. Bottlenose Dolphin *Tursiops truncatus (including aduncus-type)*
6. Indo-Pacific Humpback Dolphin *Sousa chinensis*
7. Irrawaddy Dolphin *Orcaella brevirostris*
8. Finless Porpoise *Neophocaena phocaenoides*
9. Short-finned Pilot Whale *Globicephala macrorhynchus*
10. Bryde's Whale *Balaenoptera edeni*
11. Dugong *Dugong dugon*

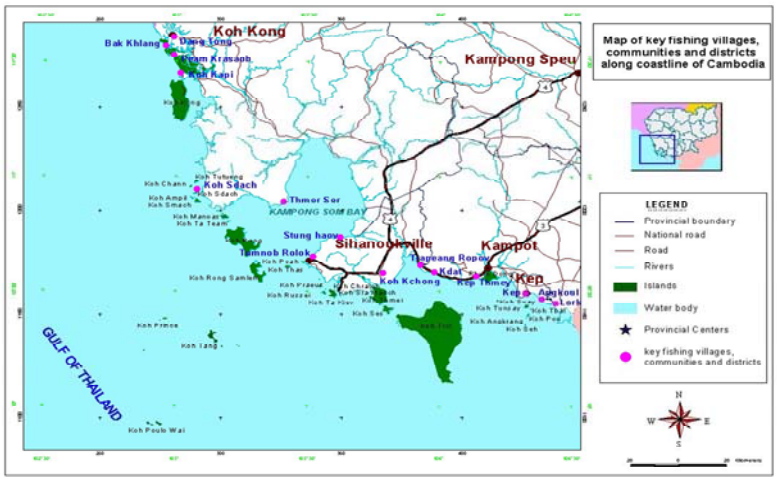


5

Summary of species sighted during coastal surveys 2001

Species	# of sightings	Average group	Total sighted	Average depth(m)
Long-beaked Common Dolphin	1	43	43	45
Finless Porpoise	2	4	26	12.1
Irrawaddy Dolphin	16	6	103	0.7
False Killer Whale	1	62	62	26
Pantropical Spotted Dolphin	1	38	38	41
Indo Pacific Humpback Dolphin	4	6	25	5.2
Dwarf Spinner Spinner Dolphin	1	6	6	42
Bottlenose Dolphin	6	22	130	29
Unknown	6	3	19	17

Map showing the whole coastline of Cambodia



7

Map showing the important Dolphin areas

8

MARINE MAMMAL STATUS

- Eleven species of marine mammals in Cambodian waters (3 species of coastal cetacean and other 8 of offshore species): 8 species have been identified from the survey sightings and other 3 species from carcasses and skeleton
- High mortality rate of stranded and by-catch: 36 dead animals were collected during the past six years
- Populations of both coastal cetacean and offshore species have been declining due to many kinds of threats

9

BY-CATCH IN FISHING NETS

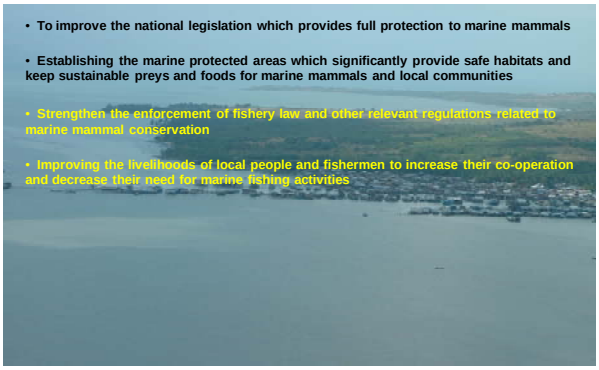
10

HABITAT DEGRADTION AND OVERFISHING

- Due to the lack of resources and patrol craft to control the fishing areas, both offshore and inshore have been destroyed by large trawlers (both single and pair trawls) of neighboring countries
- The trawl gears which are more than 20 hps are not allowed to operate at the areas where the depth of water is less than 20 m (fishery law) but low education, poverty, poor enforcement of regulations make them do not respect the law

11

REDUCE THE THREATS AND MORTALITY



12

STRENGTHEN AND INCREASE LOCAL EDUCATION AND AWARENESS

- Workshops in key fishing villages
- Workshops in schools
- Workshops at pagodas with monks
- Production and distribution of education and awareness materials
- Radio and television campaign

13

CO-OPERATION AND REGIONAL CO-ORDINATION

- Government responsibilities for the conservation and management of marine mammal population need to be made more clear
- Establishment of national and regional committees
- National and regional working group meetings

14

THE DEVELOPMENT OF CONSERVATION STRATEGY

To conserve marine mammals for next generations and also protect marine natural resources for sustainable uses of local fishery communities

for a living planet

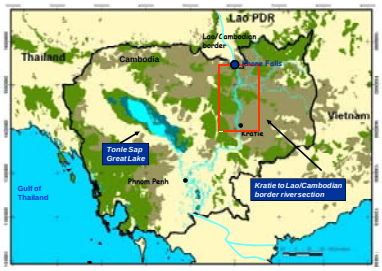
Cambodian Mekong Dolphin Conservation Project

The Project

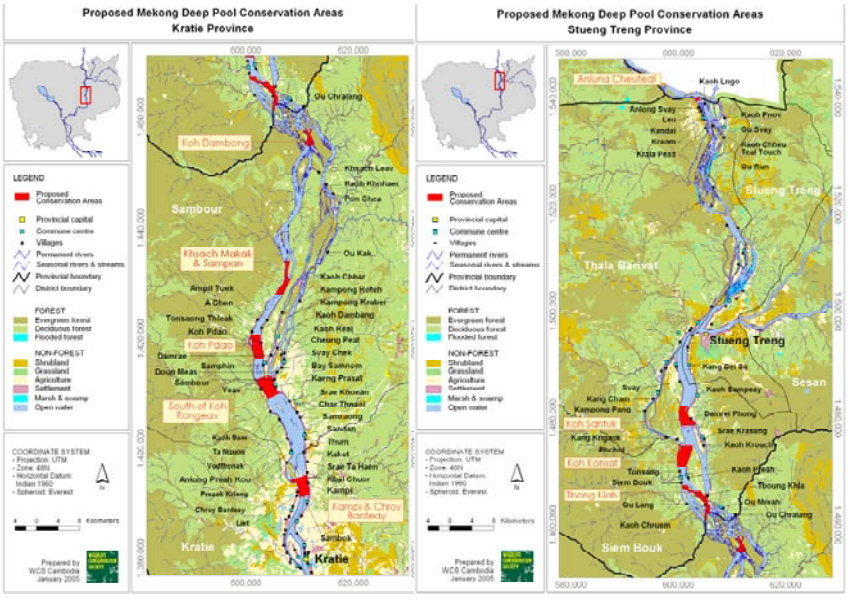
- **Collaboration between WWF, Cambodian Fisheries Administration (FiA), World Conservation Society (WCS) and Cambodian Rural Development Team (CRDT)**
- **CMDCP formed in mid 2005 to implement the Government's Cambodian Mekong Dolphin Conservation Strategy**
- **Project managed by WWF, FiA provide counterpart staffing, WCS provide veterinary expertise, and CRDT implement the community livelihoods and development programmes**

Mekong Irrawaddy Dolphin Status

- **Used to be distributed throughout the Mekong rivers, including the Tone Sap Great Lake**
- **Estimate that less than 100 dolphins remain and restricted to a 190km stretch of the Mekong in NE Cambodia from Kratie to the Lao border**



Mekong Dolphin Distribution Map



Estimates of dolphin abundance in the Mekong based on direct counts since 2002

Survey Date	Estimates	Reference
April-May 2002	47	Beasley et al 2007
April-May 2003	66	Beasley et al 2007
April-May 2004	66	Beasley et al 2007
April 2005	48	Beasley et al 2007
April 2007	56	Trujillo 2007
May 2007	56	Report Trujillo

20

CMDCP Key Conservation Interventions to date

Conservation

- identification and demarcation of core dolphin habitat
- joint stakeholder patrols
- guidelines for dolphin ecotourism
- new legislation & regulations campaigning

Research

- mortalities
- population & distribution
- monitoring threats

Regional co-operation

- working with stakeholders to develop trans-boundary dolphin pool management

21

Success stories

22

Conclusion

23

Annex 7

Research Activity for Cetacean in Indonesia

Mr.Dharmadi: darma_ancol@yahoo.com

RESEARCH ACTIVITIES OF CETACEAN IN INDONESIA

Dharmadi

Research Centre for Fisheries Management and Conservation

1

CETACEAN MANAGEMENT WORKS BY SOME INDONESIAN INSTITUTIONS

1. WWF (World Wide Foundation)
2. TNC (The Nature Conservancy)
3. CI (Conservation International)
4. RASI Foundation
5. APEX ENVIRONMENT

2

Cetacean Species Positively Identified to Date in Indonesia

Species identification (ID)	Scientific ID	Status[1]
1. Sperm whale	*Physeter macrocephalus*	V
2. Dwarf sperm whale	*Kogia simus*	K
3. Pygmy sperm whale	*Kogia breviceps*	K
4. Short-finned pilot whale	*Globicephala macrorhynchus*	K
5. Orca	*Orcinus orca*	L
6. False killer whale	*Pseudorca crassidens*	K
7. Pygmy killer whale	*Feresa attenuata*	K
8. Melon-headed whale	*Peponocephala electra*	K
9. Spinner dolphin	*Stenella longirostris*	L
10. Pantropical spotted dolphin	*Stenella attenuata*	L
11. Striped dolphin	*Stenella coeruleoalba*	L
12. Rough-toothed dolphin	*Steno bredanensis*	K
13. Risso's dolphin	*Grampus griseus*	K
14. Bottlenose dolphin	*Tursiops truncatus*	K
15. Short-beaked common dolphin	*Delphinus delphis*	K

Status - IUCN status categories of threat. (Ex-Extinct; E-Endangered; V-Vulnerable; R-Rare: L-Lower Risk; I-Intermediate; K-Insufficiently Known; as defined in IUCN, 1996) . Reported by Rudolph *et al.* (1997).

3

Continued ……

16. Long-beaked common dolphin	*Delphinus capensis*	K
17. Fraser's dolphin	*Lagenodelphis hosei*	K
18. Indo-Pacific humpback dolphin	*Sousa chinensis*	K
19. Irrawaddy dolphin	*Orcaella brevirostris*	K
20. Finless porpoise	*Neophocaena phocaenoides*	K
21. Beaked whales	*Mesoplodon sp.*	K
22. Cuvier's beaked whale	*Ziphius cavirostris*	K
23. Bottlenose whales	*Hyperoodon sp.*	K
24. Minke whale	*Balaenoptera acutorostrata*	L
25. Bryde's whale	*Balaenoptera brydei*	K
26. Pygmy Bryde's whale	*Balaenoptera edeni*	K
27. Sei whale	*Balaenoptera borealis*	E
28. Fin whale	*Balaenoptera physalus*	E
29. Blue whale	*Balaenoptera musculus*	E
30. Humback whale	*Megaptera novaeangliae*	V

V = 2 species …… K = 20 species …….. L = 5 species ……. E = 3 species

Status - IUCN status categories of threat. (Ex-Extinct; E-Endangered; V-Vulnerable; R-Rare: L-Lower Risk; I-Intermediate; K-Insufficiently Known; as defined in IUCN, 1996) . Reported by Rudolph *et al.* (1997).

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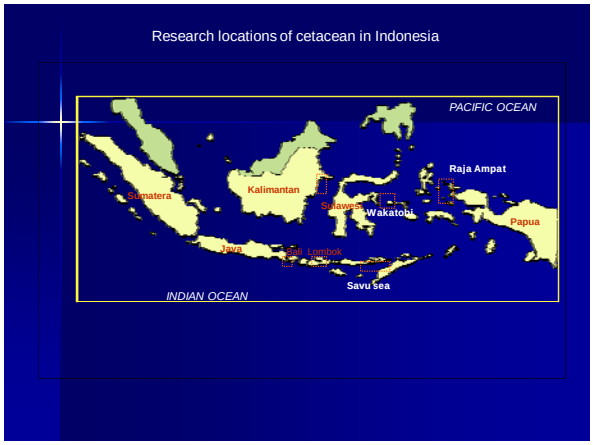

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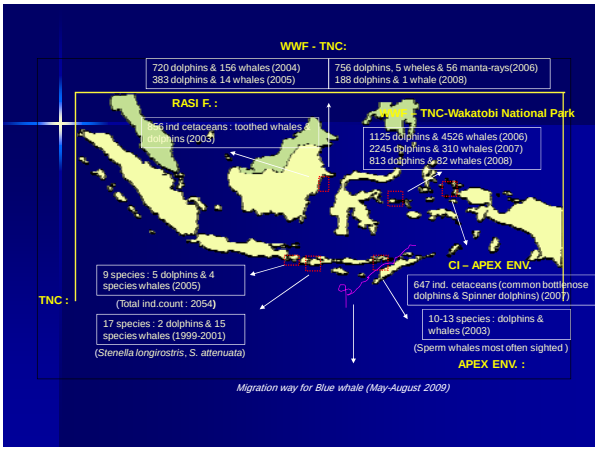

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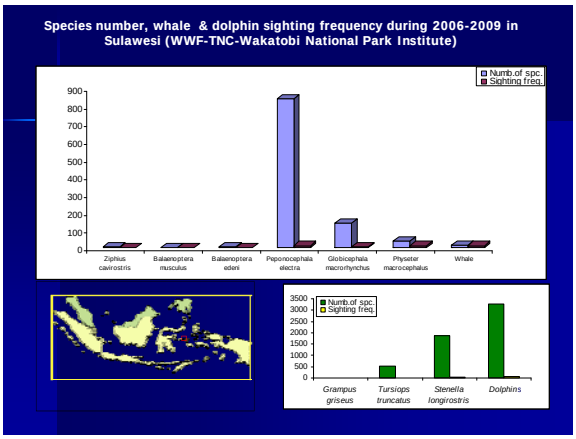

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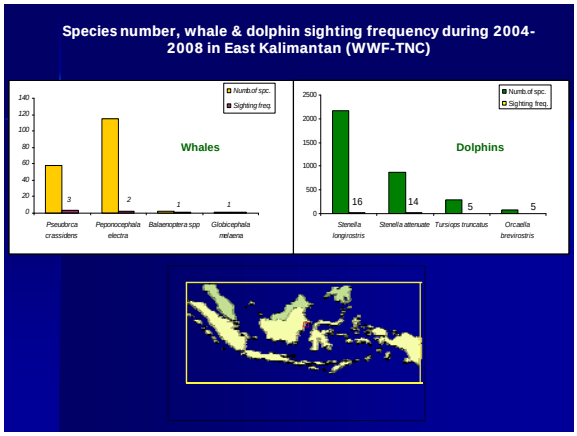


8

Species number of whale and dolphin sighting frequency during the observation (2004-2008) in Kalimantan Region (WWF – TNC and KKL Berau Cooperation)

No.	Name of species	Scientific name	Number of species	Sighting frequency
1	False Killer Whale	*Pseudorca crassidens*	58	3
2	Melon – Headed Whale	*Peponocephala electra*	115	2
3	Fin Whale	*Balaenoptera spp*	2	1
4	Pilot Whale	*Globicephala melaena*	1	1
		Total	176	7
5	Spinner Dolphin	*Stenella longirostris*	2180	16
6	Common Bottlenose	*Tursiops truncates*	863	14
7	Dolphin Pantropical	*Stenella attenuate*	300	5
8	Spotted Dolphin	*Orcaella brevirostris*	69	5
	Irrawady Dolphin			
		Total	3412	40

9

Species number of whale and dolphin sighting frequency during the observation (July 2006 to March 2009) in Sulawesi Region (WWF – TNC and KKL Berau Cooperation)

No	Name of species	Number of species	Sighting frequency
1	Beaked whale	3	2
2	Blue whale	1	1
3	Bryde's whale	4	1
4	Melon head whale	840	12
5	Pilot whale	140	3
6	Sperm whale	39	12
7	Whale	16	12
	Total	1043	43
1	Risso dolphin	5	1
2	Bottlenose dolphin	530	10
3	Spinner dolphin	1860	23
4	Dolphins	3255	60
	Total	5650	94

10

Number of sighting and encounter of cetacean on difference depth in East Kalimantan (2009-2010)

Depth	Area (km)	Sighting (n)	Num.ind.of cetacean	Everage sigthing (sight / km)	Average encounter (dolphin / km)
	May-09 / May-10	May-09/May-10	May-09/May-10	May-09/May-10	May-09/May-10
< 100 m	484 / 295	8 / 4	96 / 49	0.0165 / 0.014	0.198 / 0.166
100 – 200 m	72 / 43	3 / 5	450 / 56	0.0417 / 0.116	6.25 / 1.302
> 200 m	194 / 231	7 / 6	419 / 211	0.0361 / 0.026	2.16 / 0.913
Total	**750 / 569**	**18 / 13**	**965 / 304**	**0.024 / 0.023**	**1.287 / 0.534**

Kreb, *et al.*, (2010)

11

Average encounter of cetacean individual based on habitat type in East Kalimantan (2009-1010)

2009				
Species	Habitat sighting	Numb. of group found	Ave. encounter per habitat (Dolphin / km)	Area observation (km)
Stenella attenuata	Shelf	2	0.54	556
Stenella l. roseiventris	Shelf	3	0.10	556
Stenella longirostris	Shelf	1	0.12	556
Tursiops aduncus	Shelf	6	0.10	556
Physeter macrocephalus	Shelf	1	0.002	556

Kreb, *et al.*, (2010)

12

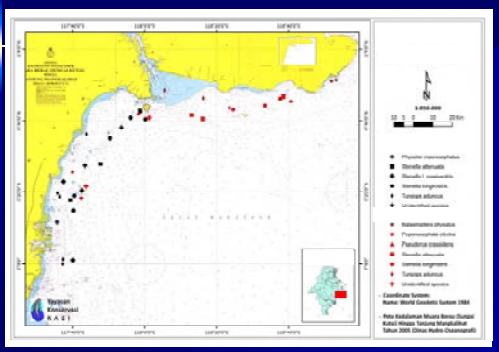
Continued .....

2010				
Species	Habitat sighting	Numb. of group found	Ave. encounter per habitat (Dolphin / km)	Area observation (km)
Stenella longirostris	Shelf	2	0.09	339
Peponocephala electra	Slope	1	0.259	231
Stenella attenuata	Shelf	1	0.07	339
Tursiops aduncus	Shelf	3	0.09	339
Pseudorca crassidens	Shelf	1	0.04	339
Balaenoptera physalus	Shelf	1	0.01	339

Kreb, *et al.*, (2010)

13

Map observation of cetacean in East Kalimantan (May 2009 – May 2010)



Kreb *et al.*, (2010)

14

15

Annex 8

National Initiative Related to Cetacean Stock Assessment

Mdm.NuriidanBt Abdul Han:nahan1970@yahoo.com.my, nurridan@dof .gov.my

1

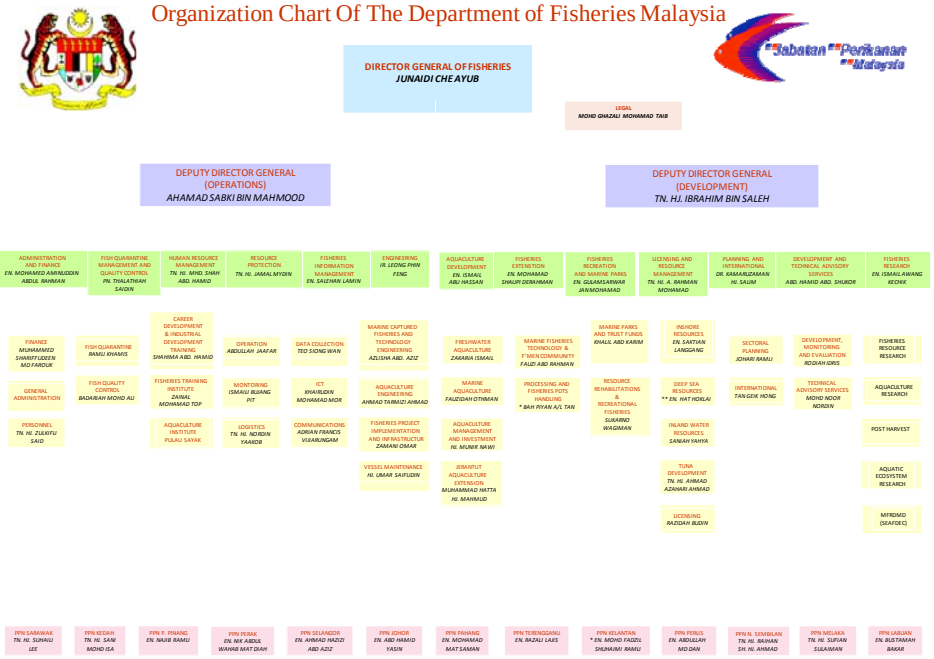
Malaysia is divided into two region by South China Sea- West Malaysia that constitute of 11 states and Federal Territory Kuala Lumpur and Putrajaya

Where

East Malaysia constitute of Sarawak(Land of the hornbill) , Sabah(land beneath the wind) and Federal Territory Labuan

2

Organization Chart Of The Department of Fisheries Malaysia



3

Sarawak Dolphin Project

Objective

1.Collect important baseline data on the seasonal distibution habitat use and conservation needs of dolphins in Sarawak

2. Raise awareness of marine mammals and their conservation needs in the local population

3. Apply the study results to develop effective conservation and management plans

4

Survey areas – nearshore waters around Miri, Bintulu and kuching

Agency involved-
Sarawak Shell Berhad and Sarawak Government-fund
UNIMAS(Dr. Andrew Alek Tuen, Dr.Gianna Minton) and SFC-

Results-76 dolphins sightings, details of which stored in the purpose designed "sarawak cetacean database"

5

Spesies found

Common Name	Scientific Name	Local Name
Irrawaddy Dolphins	Orcaena brevirostris	Empesut
Finless porpoise	Neophocaena phocaearides	Lumba-Lumba ambu
Bottlenose Dolphin	Tursiops aduncus	Lumba-Lumba Hidung Botol
Humpback Dolphin	Sousa chinensis	Lumba-Lumba Putih

6

Other Works

- Fisheries Research Institute-Survey of Conservation, habitat and Biodiversity in Sarawak-ad-hoc observation
- Meeting in August 2010, delegate works among agencies on study and conservation and Standard Operating Procedures on Stranded cetacean and Marine Fisheries Department as the key player

7

Annex 9

Country Report Philippines

Mr.Joseph Christopher C. Rayos: josephrayos@yahoo.com

1

Overview

2

Current Status of Marine Mammals in the Philippines

27 confirmed species + 1 unconfirmed

24 Cetaceans *(20 Odontocetes, 4 mysticete)*
1 Sirenian *(dugong)*
1 Larga Seal *(extralimital record)*
1 Small Clawless otter

In the World....
75 Cetaceans

3

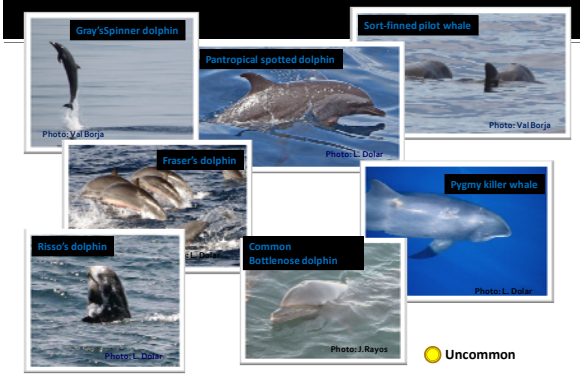
Baleen whales (Balyena)

4

Toothed whales (Balyena)

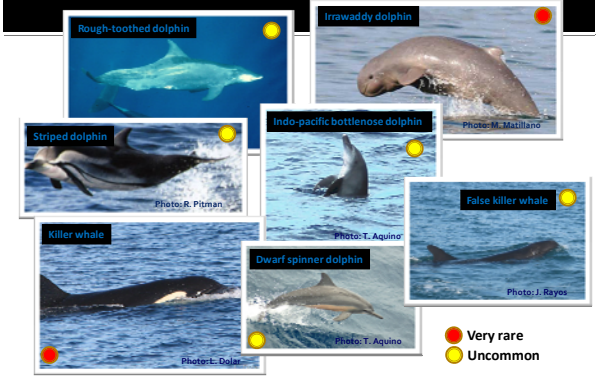
5

Dolphins (Lumba lumba)



6

Dolphins (Lumba-lumba)



7

Cetacean Hotspots

- identified key biodiversity areas for cetaceans based on survey, stranding and by-catch reports
- need for more surveys

8

Major fishing gears that have been reported to incidentally take marine mammals in the area

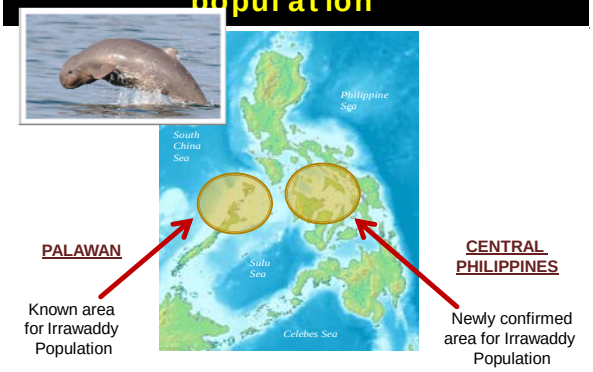
purse seines
gill nets
driftnets
fish corrals
Bag nets
drive nets

9

New discovery

10

Irrawaddy population



11

Latest Records of stranding and rescue

12

Stranding and Rescue

Recent mass strandings of more than 200 melon-headed whales in Bataan, Northwestern Philippines; probably the **largest** in the history of the country

13

Stranding and Rescue

SPERM WHALE

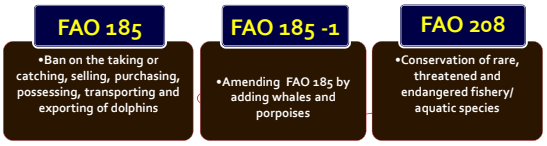
December 2009
Puerto Bay, Palawan

14

Conservation and management

15

National Laws



16

Observer Program

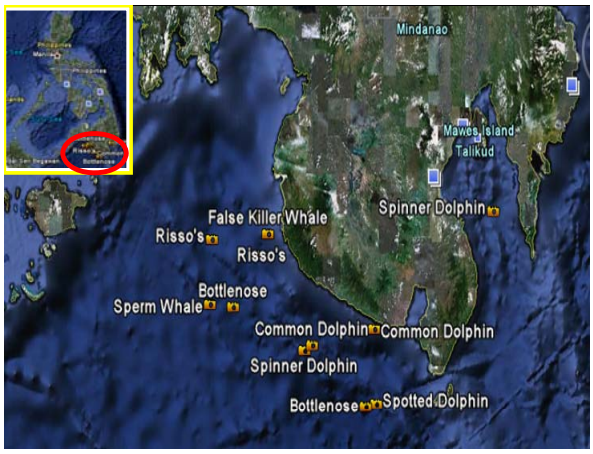
- Organized in 2009
- Trained 4 batches of observers since 2009
- Deployed Observers (national and International waters)

17

Observer Program

Opportunistic Survey under the Fisheries Observer Program

18



19

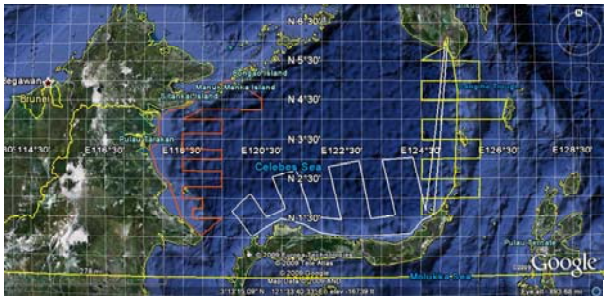
Tri-national marine mammal survey

SSME

Sulu-Sulawesi Marine Eco-region

20

Tri-national marine mammal survey



21

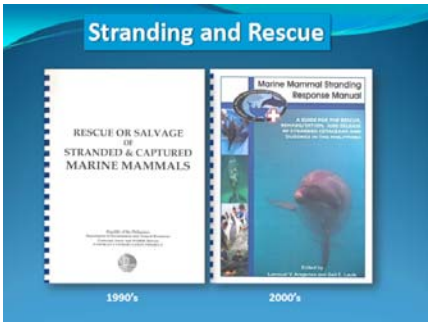
Eco-Tourism

Whale, Dolphin, Whaleshark Watching

- regular tourist attraction in Bais, Negros Oriental; Pamilacan, Bohol; Donsol, Sorsogon

22

Stranding and Rescue manuals



23

Fish and Cetacean Cemetery

Located at:
Dagupan, Pangasinan

24

Research Studies

NFRDI

BFAR

25

THANK YOU

26

Annex 10

Cetacean in Thialand

Mr. PornananKeereerat: nok_duidui@hotmail.com

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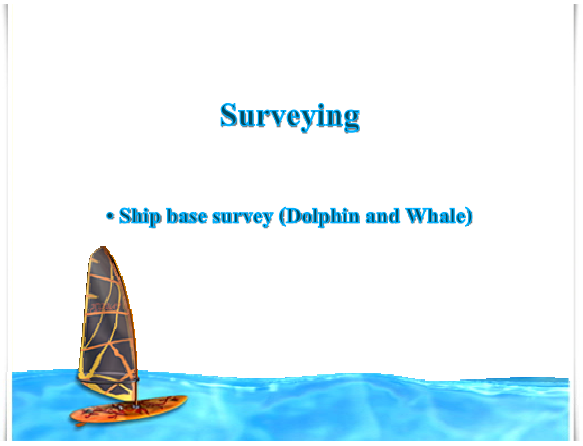

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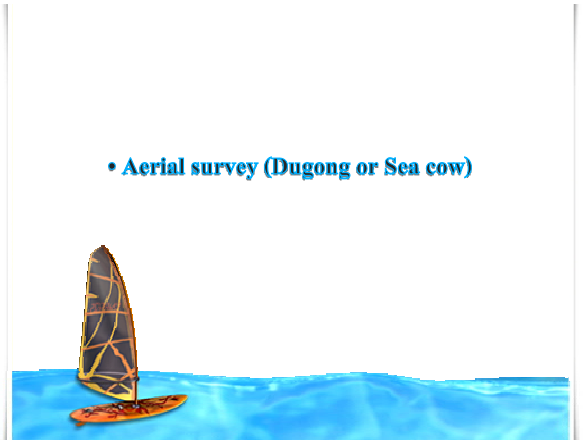

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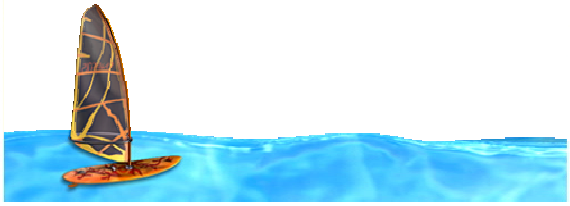
Status of Cetacean in Thailand



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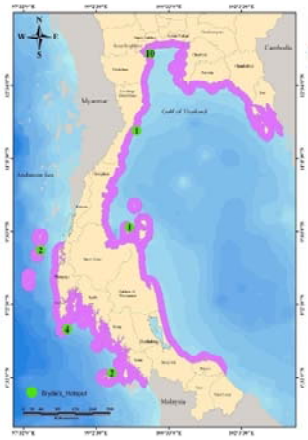

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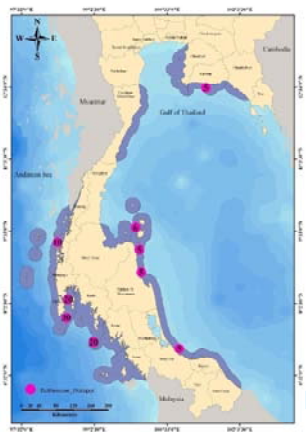

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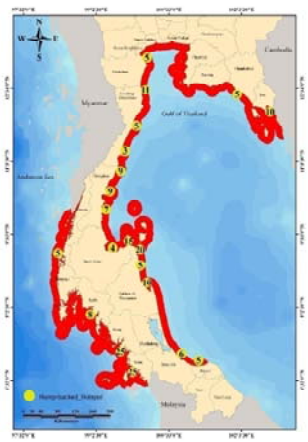

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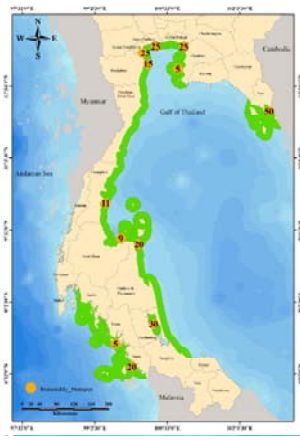

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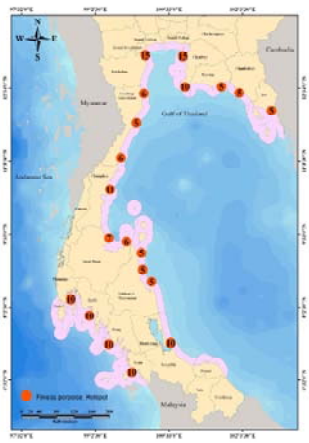

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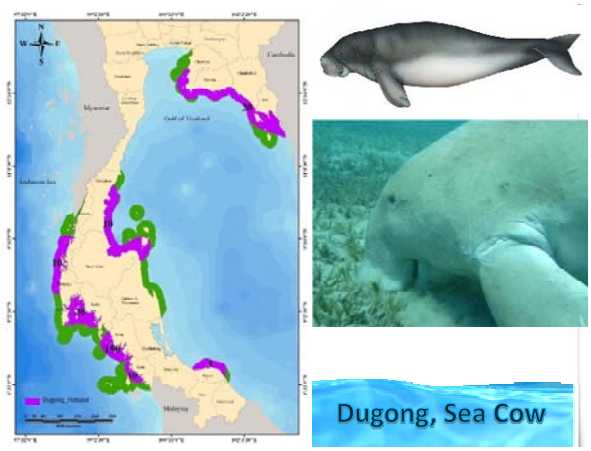

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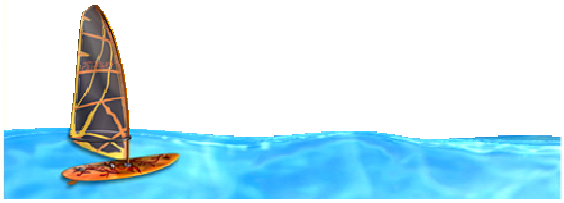
สาเหตุการตาย

cause of death



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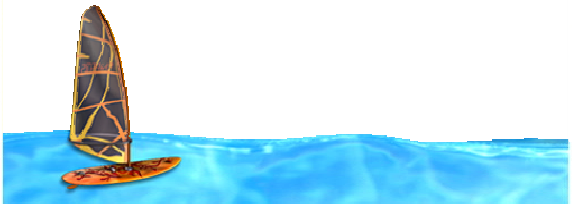
การเกยตื้น aground, run ashore



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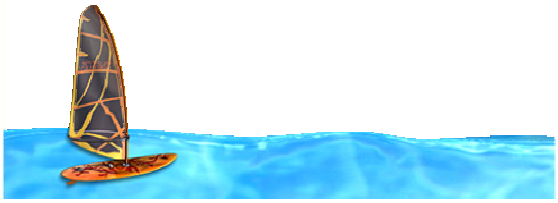
16

FISHING GEARS



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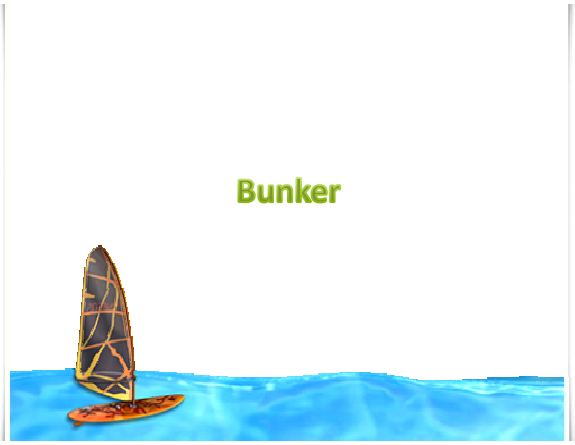

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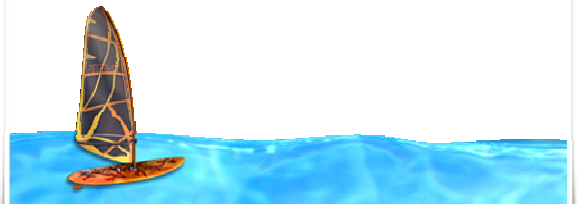
Activities of DOF, THAILAND

Now no activities



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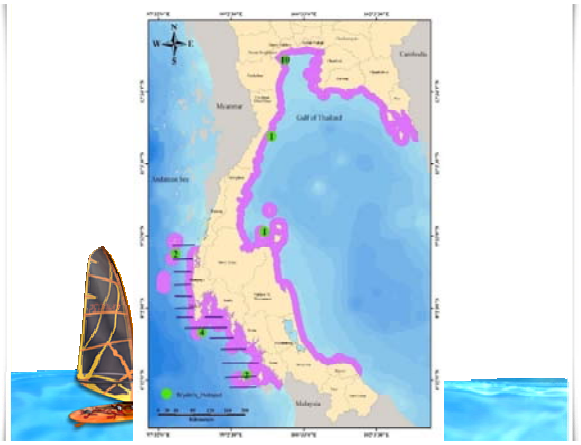

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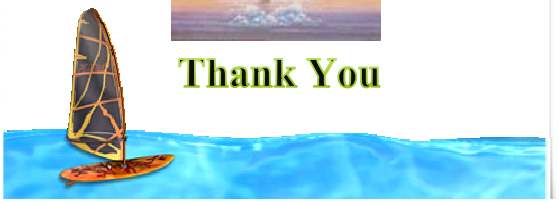
Thank You



27

Annex 11

Methodology for Cetacean Stock Assessment "Abundance Estimation of Cetacean from Sighting Data"

Dr.Hidayoshi Yoshida: hideka@fra.affrc.go.jp

Methodology for cetacean stock assessment

-Abundance estimation of cetaceans from sighting data-

Hideyoshi Yoshida

National Research Institute of Far Seas Fisheries, Japan

1

Survey planning

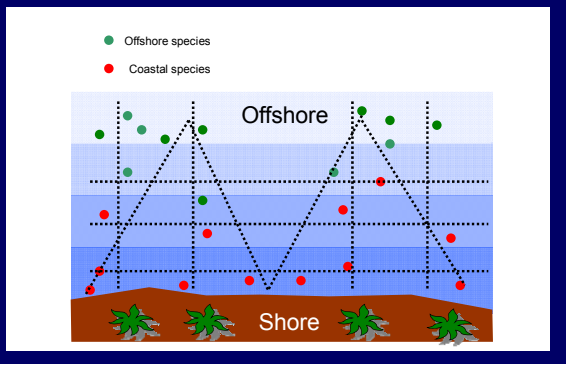
Available information

1. Timing of survey
2. Research area
3. Blocks (stratum)
4. Survey track line

Research vessel, Logistics

2

Design for survey survey lines



3

Research vessel used in Japanese sighting survey

4

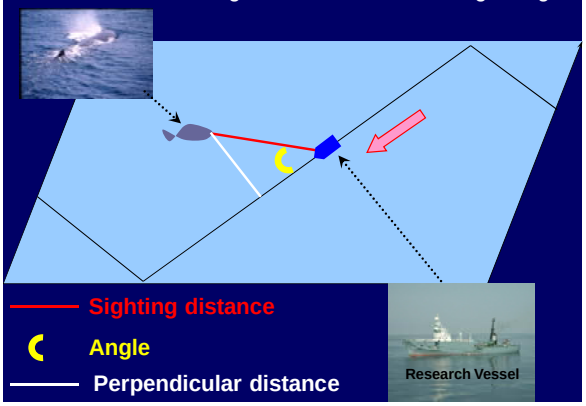
Cetacean sighting expert searching sea surface

5

Sighting Cues

6

A schematic diagram of cetacean sighting

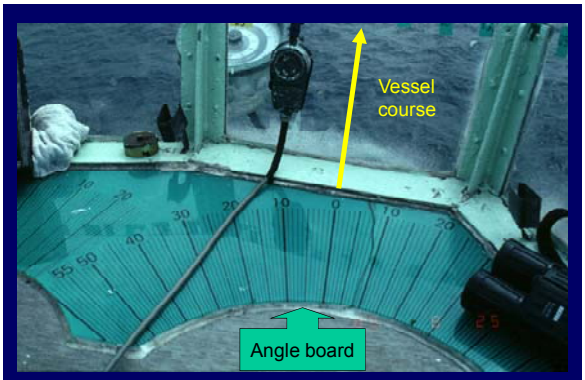


Sighting distance

Angle

Perpendicular distance

7



Angle board for measuring angel from the trackline to the animal

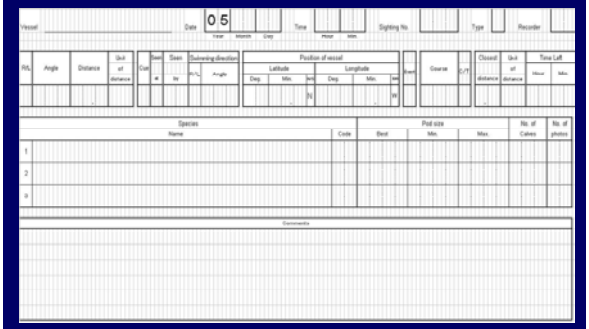
8

Data list collected during the survey

1. Sighting data
   - Sighting position (coordinates) and time
   - Sighting distance, angle, and cue
   - Species name
   - School size
   - Others (animal behaviour, photo taking, etc.)
2. Effort data
   - Vessel action (time and position)
   - Weather condition (weather, wind scale, sea state, sea temperature, etc.), to correct sighting data

9

Sighting record form



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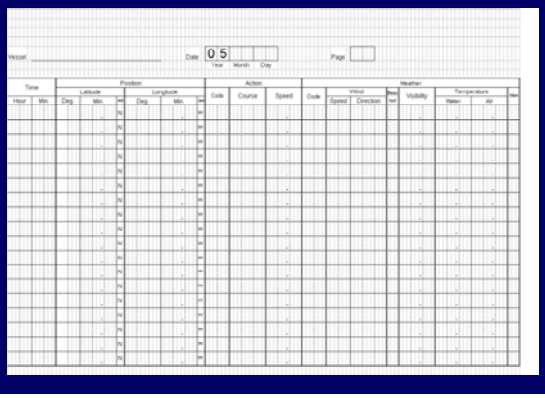
Action and weather form



11

Abundance estimation using **the Line Transect Method**

1. Sighting distance
2. Sighting angle

} Perpendicular distance

3. Research distance (Length of lines searched)
4. Number of sightings (schools)
5. Mean school size

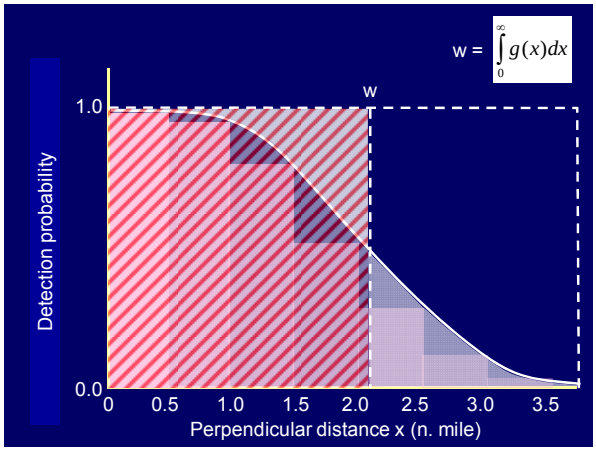
12

Basic formula for line transect method

$$\hat{N} = \frac{n \cdot \bar{s} \cdot A}{2L \cdot \hat{w}}$$

$\hat{N}$ = Abundance estimate
n = number of sightings
$\bar{s}$ = mean school size
A = size of area containing of the population of N animals
L = Research distance (Length of track lines searched)
$\hat{w}$ = effective strip width = $\int_0^\infty g(x)dx$

13



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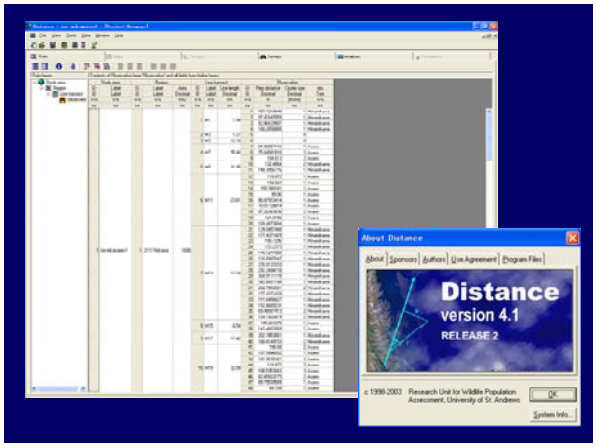

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Basic formula for line transect method

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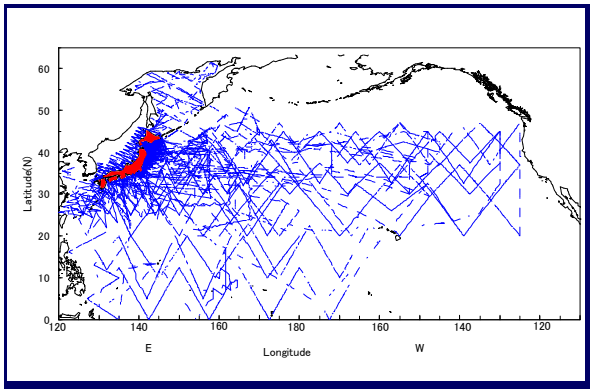
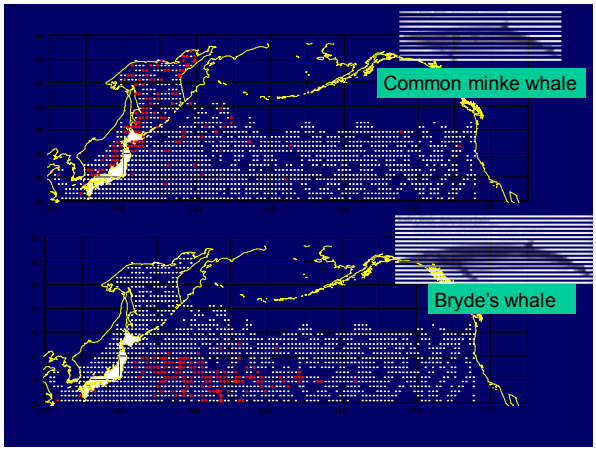


Track lines searched in Aug and Sep from 1983 to 1996

17



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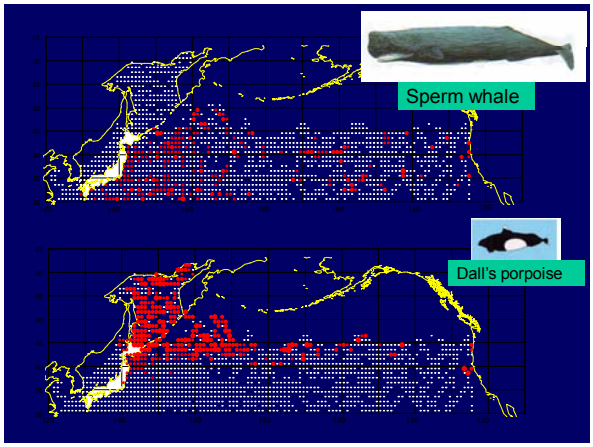


19

Abundance estimates of Cetaceans in the western North Pacific

Common minke whale	25000+ animals
Bryde's whale	22000
Sperm whale	102000
Dall's porpoise	554000

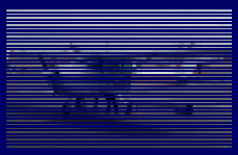
Miyashita (2001)

20

Platforms for cetacean sighting surveys

Large vessel

Small boat



Aircraft

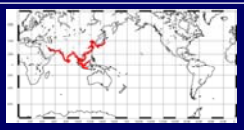
21

Merit and demerit in platforms for sighting survey

	Large vessel	Small boat	Aircraft
Range	Long	Short	Short
Accommodation	Good	Poor	None
View	Good	Poor	Poor
Action	Sluggish	Quick	Very quick
Cost	High	Low	Middle
Suitable Survey	Offshore, large scale long period	Coastal, small scale short period	Coastal, small scale short period

22

Sighting survey for finless porpoises in Japanese coastal waters, using aircraft



Finless porpoise: small toothed whale (max 2m)
Distribution = shallow coastal waters, estuaries, mangrove creeks, large rivers, and lakes, in tropical and temperate Asia.

23

☆ Finless porpoises in Japanese coastal waters

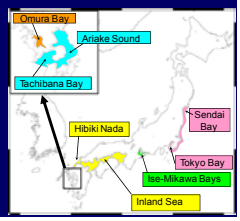
- Distribution: Sendai Bay -Tokyo Bay, Ise - Mikawa Bays, Inland Sea – Hibiki Nada, Ariake Sound – Tachibana Bay, Omura Bay.
- Porpoises in each of the 5 waters belong to distinct stocks.
  --- Among the 5 waters, geographic variation reported in timing of parturition, external and skull morphology, and mtDNA sequences.

☆ Sighting surveys for abundance estimation of finless porpoises

- Surveys for abundance estimation should be conducted in each of the 5 waters.
- In coastal waters, shallow depth and many ships and fishing nets

→ Ship is not suitable platform.

◎Aerial sighting surveys using small aircraft were conducted in each of the 5 locations.



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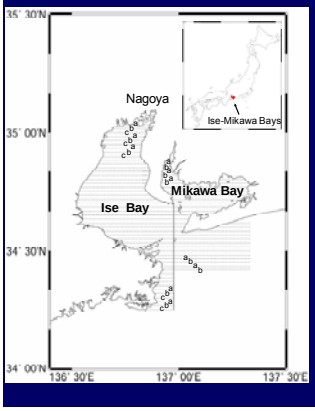
Survey in Ise - Mikawa Bays



☆ Survey area:
Areas shallower than 60 m in depth, from porpoise distribution information.

☆ Layout of survey lines:

Number of lines:
Lines were set at intervals of 1 nm.
48 lines in Ise Bay, 28 in Mikawa Bay

Direction of lines:
East-west lines along the latitude, from north-south isobaths.

Selection of lines:
At a survey, some of lines were selected from systematic sampling.
1/3 in Ise Bay (16 lines)
1/2 in Mikawa Bay (14 lines)

25

Survey methods

☆Aircraft: Cessna172P (Single-propeller, high-wing, 4-seater plane)

☆Speed and altitude: 90 knots (167 km/h) and 500 feet (152 m)
--- the lowest practicable speed and altitude

☆Observer: 2 observers in rear seats searched the sea surface perpendicular to the transect line without optical aids

☆Recorder: A recorder in the copilot seat noted time, aircraft location measured by GPS, weather conditions, and sighting information

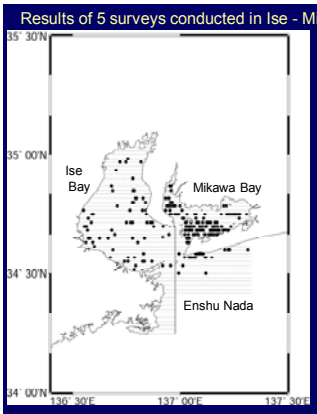

Cessna 172P


Observer searching the sea

26

27

Results of 5 surveys conducted in Ise - Mikawa Bays



Sighting positions made in the 5 surveys

1) Date: 17 nov 02
Research dist: 327.3 nm
Sightings: 88 animals/ 66 schools

2) Date: 19 nov 02
Research dist: 339.7 nm
Sightings: 76 animals/ 58 schools
(Bad sea condition in Mikawa Bay)

3) Date: 20 nov 02
Research dist: 342.4 nm
Sightings: 61 animals/ 50 schools
(Bad sea condition in Mikawa Bay)

4) Date: 05 oct 03
Research dist: 334.2 nm
Sightings: 94 animals/ 62 schools
(Bad sea condition in Ise Bay)

5) Date: 07 oct 03
Research dist: 337.2 nm
Sightings: 122 animals/ 97 schools

28

Small scale survey in Caribbean waters, using small boats

Survey area in the Caribbean waters.

Coastal waters of 4 Caribbean countries, Dominica, St. Lucia, St. Vincent, and Grenada, surveys were conducted.

To obtain information on cetacean distribution, migration, and abundance, cetacean sighting surveys were conducted of 2000-2003, by Caribbean researchers.

In the waters, small islands form a line from north to south.

Small scale surveys using boast were conducted in coastal waters of each of the islands, simultaneously.

29

Results of the 2003 Dominican and St. Lucian surveys

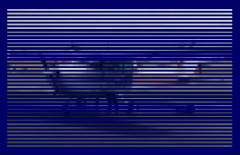
	Dominica	St. Lucia
Survey period:	7-11 July 2003	7-11 July 2003
Distance searched:	285 nm	211 nm
Sperm whales:	12 animals/ 8 schools	2 animals/ 2 schools
Short-finned pilot whales:	17/ 2	0/ 0
False killer whales:	5/ 2	0/ 0
Bottlenose dolphins:	0/ 0	150/ 1
Spotted dolphins:	248/ 9	150/ 1

30

Platforms used for cetacean sighting surveys

Large vessel

Small boat



Aircraft

31

Thank you!!

32

Annex 12

Photo Identification Method in Cetacean Research

Mr.Somchai Munanansap: mannaisomchai@yahoo.com

The Use of Photo Identification in Cetacean Research in Thailand

SOMCHAI MONANUNSAP and et al.

Eastern Marine and Coastal Resources Research Center, Rayong Province, Thailand

1

Development of cetacean research in Thailand

- Background: intensive research initiated in 1993 (PMBC)
- Institutions : local universities and Department of Marine and Coastal resources collaborative with foreign researcher
- Data collection: -Newsletter information exchange
  - Stranding and by-chance sighting record
  - Direct survey
  - Web-board exchange, local & national networks

2

Thailand research Institutes for Cetacean

- **Government sector**
  1. Department of Marine and coastal Resources (established in 2003) - Marine Endangered Species research Units
  2. Department of Fisheries
  3. Universities (near shore)
- **Non government (NGO)**

  WWF Thailand

3

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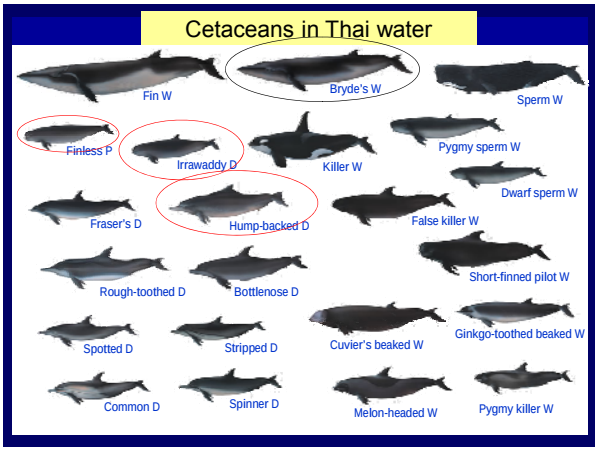

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Coastal cetacean research techniques

-Direct survey by transect helps obtain information on species distribution, population size and abundance (stock assessment)

-Method of Photo-ID : obtain more on behaviours, group structure, movement patterns or site fidelity

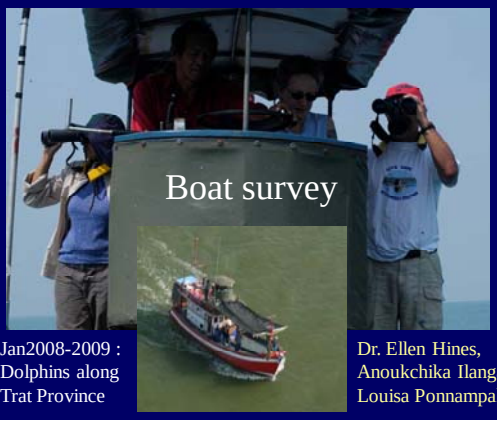
Survey type
- on shore (including high cliff and hill)
- boat (advantage on poaching)
- airplane (not much effective to clear photo)

equipments
- camera with basic 35 mm lens and tele-lens
- motor drive is necessary
- binocular

6

Dolphin photo from a jetty

7



Boat survey

Jan2008-2009 : Dolphins along Trat Province

Dr. Ellen Hines, Anoukchika Ilangakoon Louisa Ponnampalam

8

Jan 2004-2009:

Aerial survey

Feeding on squids

9

Poaching to fishing boat

10

Photo Identification Technique

Advantage	Disadvantage
- Not usually disturbing to wild animals -Long-term data may enhance description of life cycle parameter such as age at sexual maturity, calving interval and life span of each cetacean species	-Costly (equipment) -Frequently Monitoring (monthly) -Hard works (consume man-power) -Not much effective for inconspicuous cetacean species

11

Major distinctive features

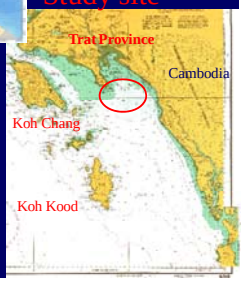
species	Major distinctive feature
- Killer whale (Orcar)	- Dorsal fin shape and nick , Scar on back
-Indo-Pacific Humpbacked	-Scar on dorsal fin, back and flank, pigment pattern
-Irrawaddy D	- Scar on dorsal fin and back
-Finless porpoise	-Scar on back and head

12

Thailand's project Photo ID : in 2009-2010

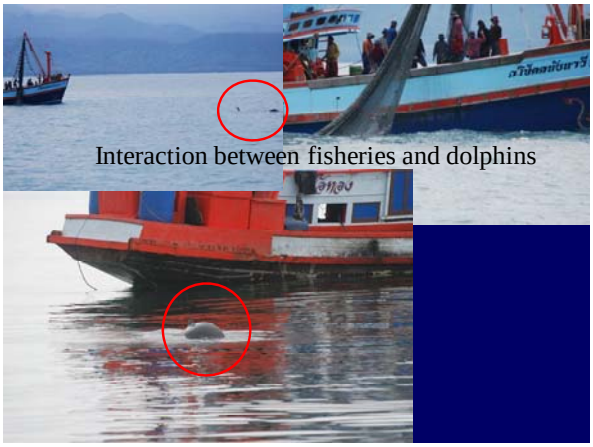
- ♦using boat survey every 1-2 months (3 days/trip)
- ♦Trip 1 : 8-10 April 2009
- ♦Trip 2 : 11-13 May 2009
- ♦Trip 3 : 19-21 July 2009
- ♦Trip 4 : 27-29 Sep 2009
- ♦Trip 5 : 16-18 Dec 2009
- ♦Trip 6 : 14-16 Jan 2010
- ♦Trip 7 : 1-3 Feb 2010

Study site



- behavior record
- compare and identify dolphins by photo
- create photo database

13



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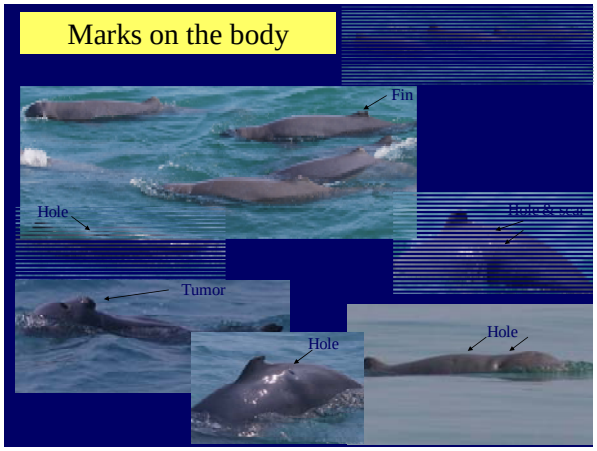
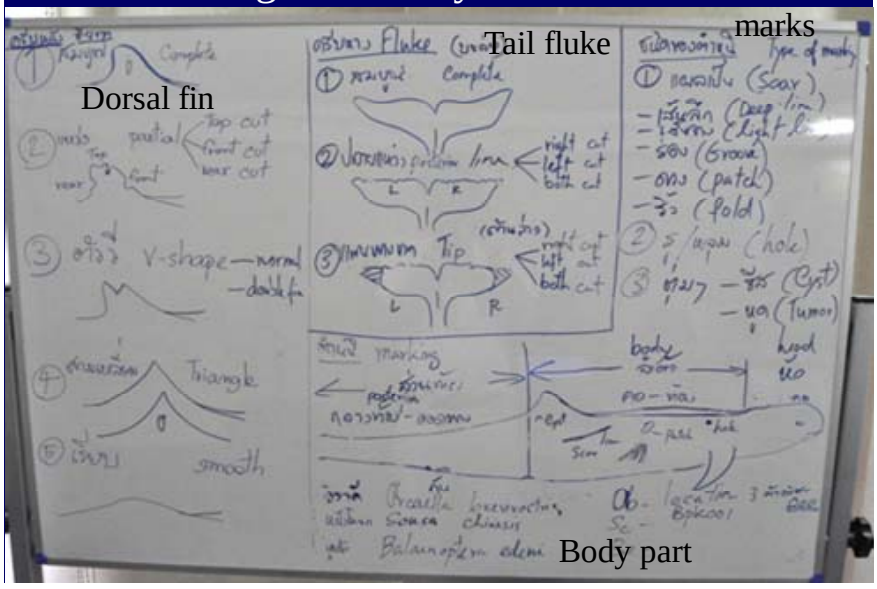


16

Photo storage and analysis



17

Upload sheet

1. ID – Ob-XXX 000 = *Orcaella brevirostris*, Location, number
2. Date
3. Time
4. Species
5. Location
6. District
7. Province
8. Latitude
9. Longitude
10. Fin – shape (5 shapes: complete, nick, V-shape, Pyramid, smooth)
11. Fin – mark (3 patterns : Scar, Hole, Cyst) on Right-Left side
12. Fluke – type (3 types: complete, nick, tip tear) on R-L side
13. Fluke - mark (3 patterns : Scar, Hole, Cyst) on R-L side
14. Head - mark (3 patterns : Scar, Hole, Cyst) on R-L side
15. Body – mark (3 patterns : Scar, Hole, Cyst) on R-L side
16. Posterior – mark (3 patterns : Scar, Hole, Cyst) on R-L side
17. Photo (Fin R-L, Fluke Dorsal-ventral,Body R-L, Head R-L,Post R-L

18

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22

Number of dolphins in photo database

Date	No. Dolphin found-photo	No. of Group	No.Dolphin recovery	Date to date recovered
April 2009	13	2		
May 2009	18	3		
July 2009	6	1		
Sep 2009	10	2	3	May-Sep
Dec 2009	16	3		
Jan 2010	15	3		
Feb 2010	14	2		
Total	**92**	**16**	**3**	

23

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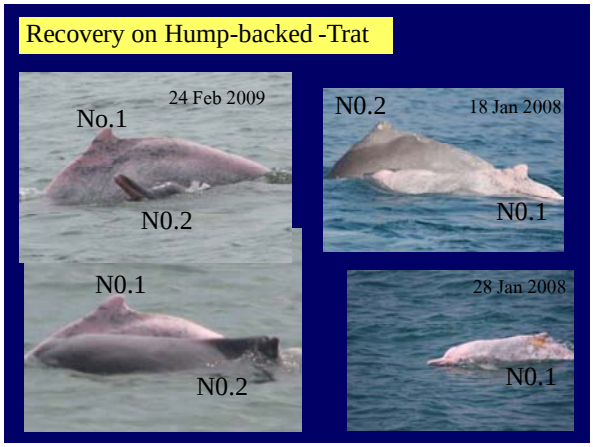

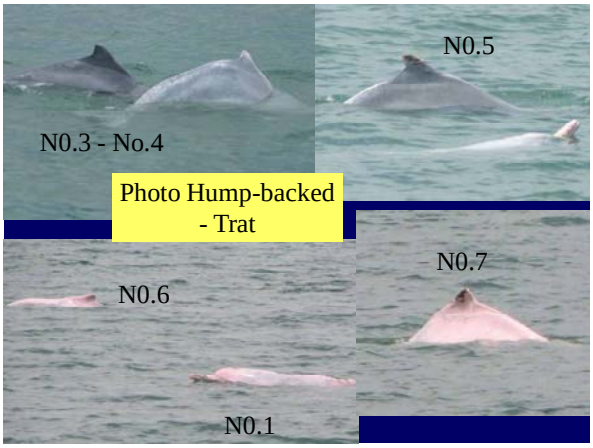

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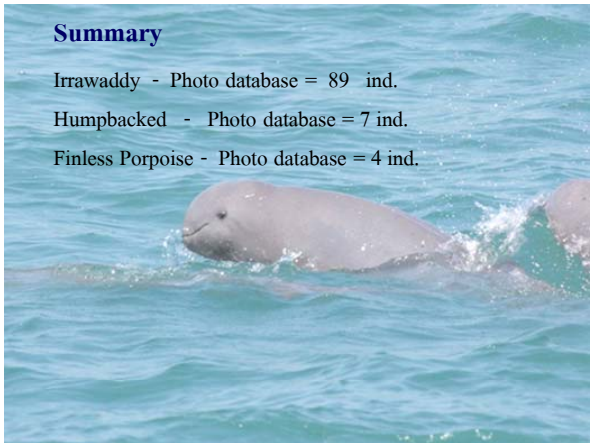

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28

Conclusions

Trat Bay is one of the hotspot dolphin population in Thai water and many local communities in this area have been interested to develop this area to be tourist spot for dolphin watch. Therefore it is urgently need to gather some information and knowledge of dolphins to support local people for conservation and management in the future

29

Suggestion

- Gather and share photo ID databases of dolphin to the other connecting area to monitor some behavior of migration.

- study on genetic population and compare to adjacent areas or neighboring waters

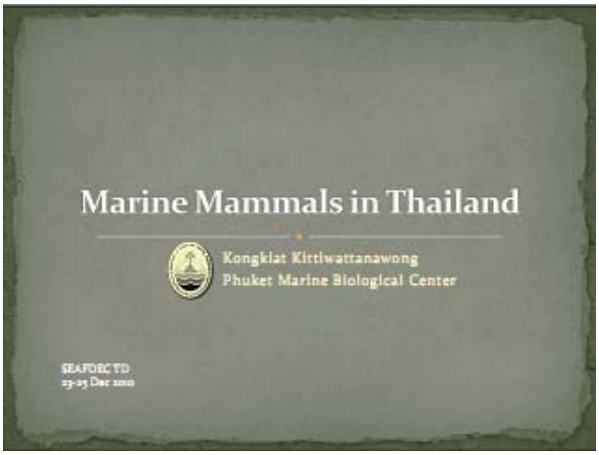
30

31

Annex 13

Biodiversity of Marine mammal in Thailand (Case Study in Thailand)

Dr.Kongkiat Kittiwattanawong: kkongkiat@gmail.com



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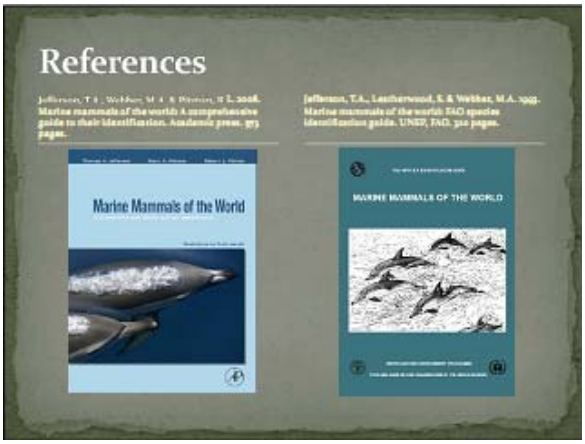

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6

Marine Mammals Classification

- Order Sirenia –Manatees and dugongs (4)
  - Family Trichechidae –Manatees (3)
  - Family **Dugongidae** –Dugong (1)
  - Steller's sea cow (extinct 1700s)
- Order Cetacea –Whale, dolphin and porpoise (86)

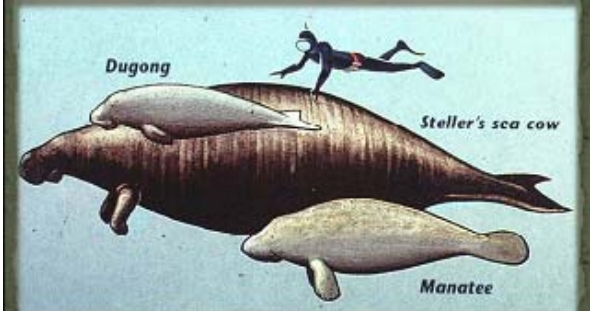
7

Dugong

Biology, Distribution, Status and threats

8

Order Sirenia



9

Dugong, *Dugong dugon*

- Adult length of 2.7 m
- The largest records was 4.03 m and 1,018 kg
- Weight of 250 to 300 kilograms
- Females are larger than males.

10

Feeding

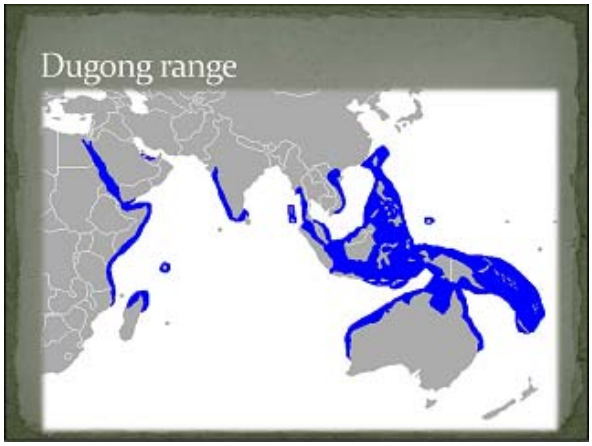
- Dugongs are referred to as '**sea cows**' because their diet consists mainly of sea-grass.
- Benthic feeder
- Their primary feeding mechanism is uprooting sea-grass by digging furrows in the sea-floor with their snouts.
- .

11

Feeding

- Analysis of 6 dugong stomachs
- 9 species of seagrasses
  - *Halophila ovalis*
  - *Halodule uninervis*
  - *Halodule pinifolia*
  - *Thalassia hemprichii*
  - *Cymodocea serrulata*
  - *Cymodocea rotundata*
  - *Syringodium isoetifolium*
  - *Enhalus acoroides*
  - *Halophila decipiens*

12



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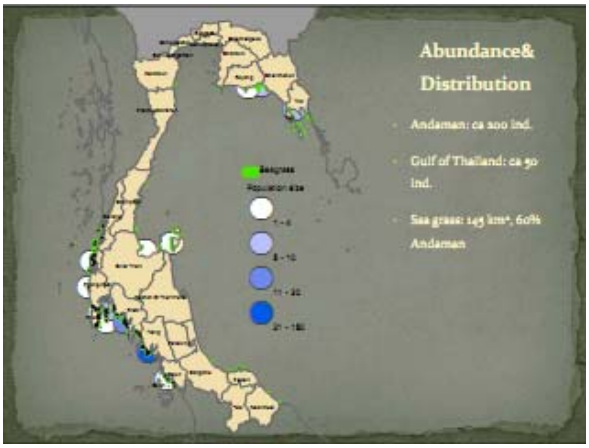

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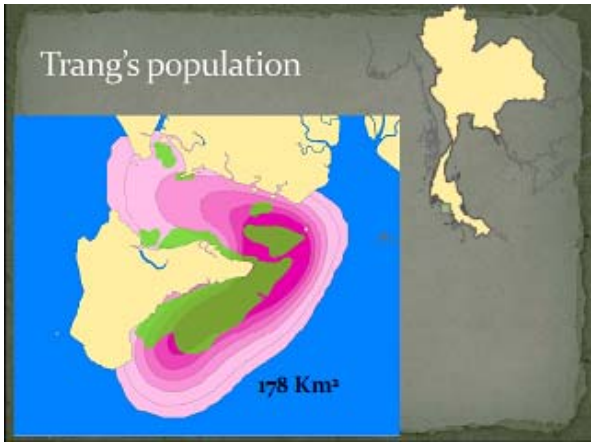

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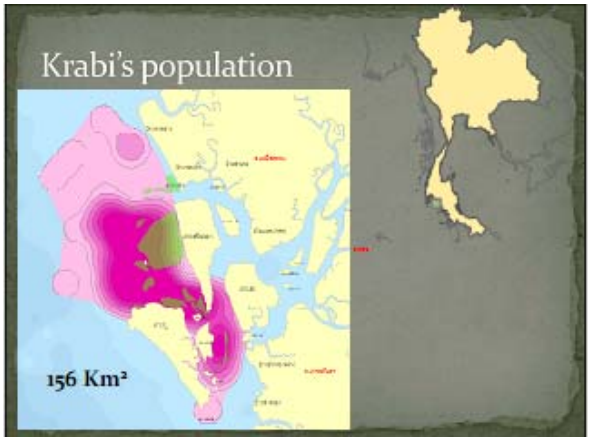

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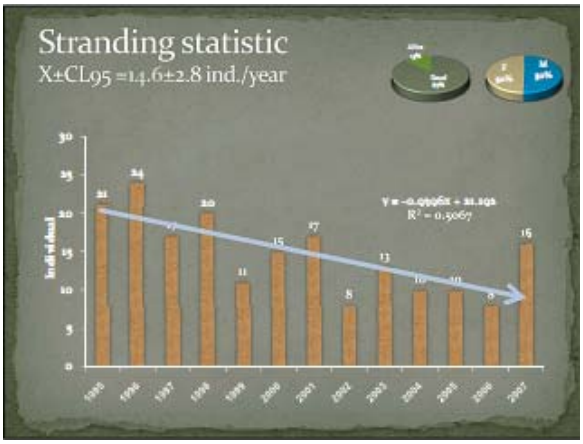

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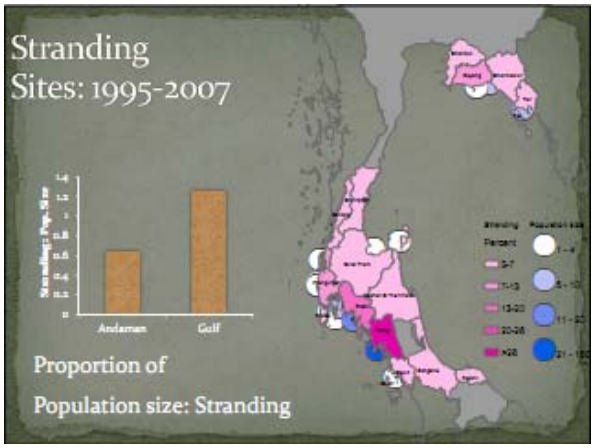

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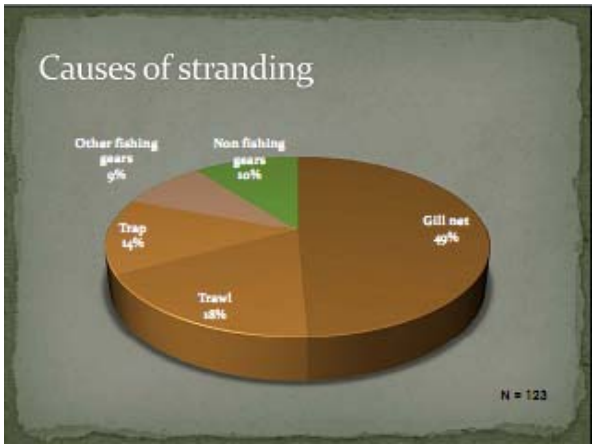

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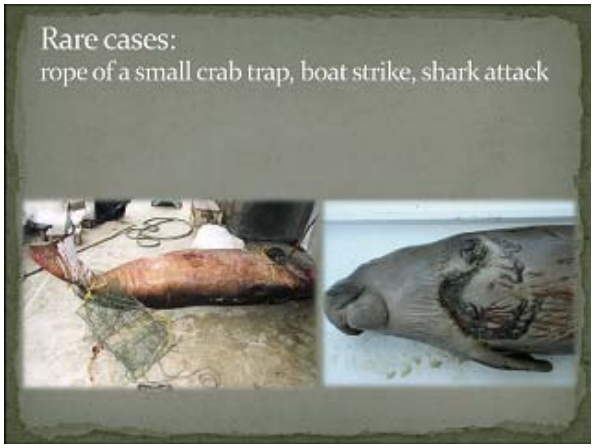

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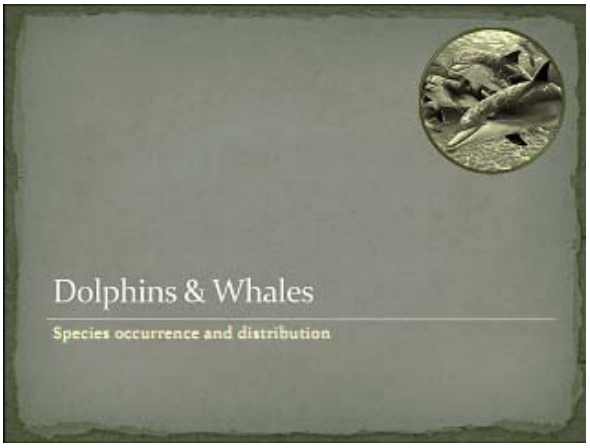


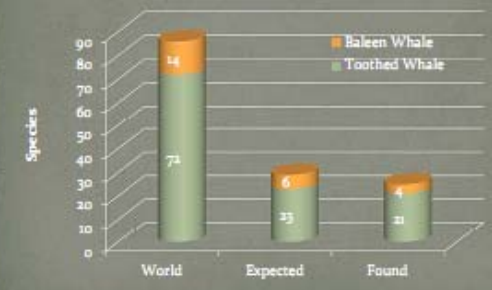
24

Order Cetacea –Whale, dolphin and porpoise (86)

- Suborder Mysticeti –Baleen whales (14)
  - Family Balaenidae –Right and bowhead (4)
  - Family Neobalaenidae –Pygmy right whale (1)
  - Family **Balaenopteridae** –Rorquals (8-9)
  - Family Eschrichtiidae –Gray whale (1)
- Suborder Odontoceti –Toothed whales (72)
  - Family **Physeteridae** –Sperm whale (1)
  - Family **Kogiidae** –Pygmy and dwarf sperm whale (2)
  - Family Monodontidae –Narwhale and beluga whale (2)
  - Family **Ziphiidae** –Beaked whale (21)
  - Family **Phocoenidae** –Porpoise (6)
  - Family **Delphinidae** –Marine dolphin (36)
  - Family Platanistidae –South Asian river dolphin Susu and Bhulan (1)
  - Family Iniidae –Boto (1)
  - Family Lipotidae –Baiji (1)
  - Family Pontoporiidae –Franciscana (1)

25

Species of cetacean



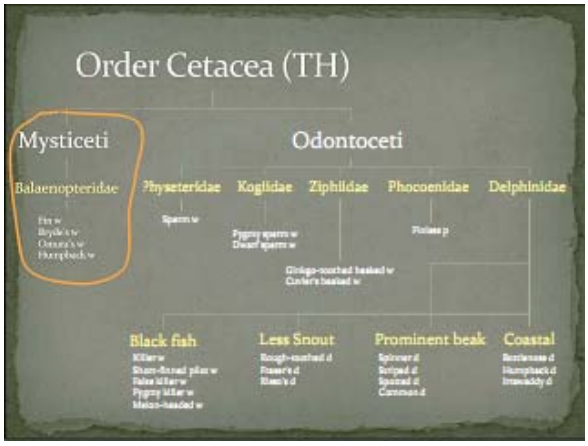
26

Baleen Whale

Toothed Whale

27

Order Cetacea (TH)



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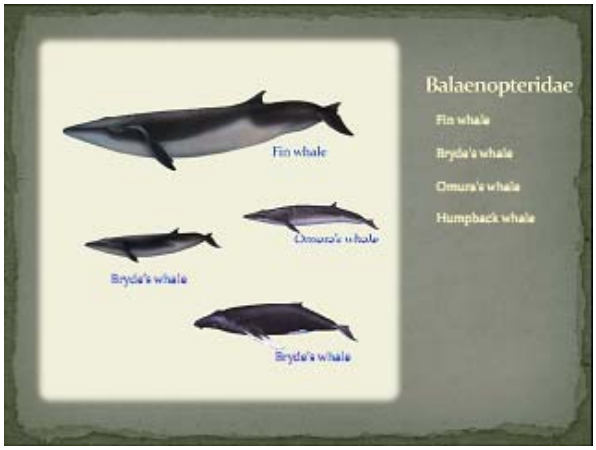


29

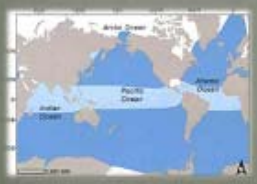
Feeding

30

Fin *whale*

Balaenoptera physalus

- 24-27 m
- F>M 5-10%
- Asymmetrical color in lower jaw
  - Left is mostly dark
  - Right largely white
- Dorsal fin tall and falcate



31

Fin *whale*

Occurrence

- Semi-fossilized bones in ChaCherngSao
- C_{14}-dating undetectable (>15,000 y)

32

Humpback whale

Megaptera novaeangliae

- 11-17 m, F>M 1-1.5 m
- robust Body
- enormous Flippers
- Very distinctive Flukes

33

Humpback whale

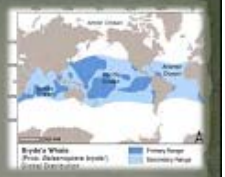
Occurrence

- A sighting record at Phuket in 2009

34

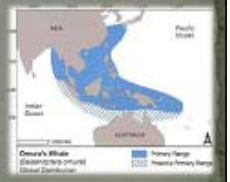
Bryde's whale

Balaenoptera brydei and or B. edeni



Omura's whale

Balaenoptera cf. *B. omurai*



35

Bryde's & Omura's whales

Bryde's whale **Omura's whale**

36

Skull & Rib

Bryde's whale

Omura's whale

37

Bryde's & Omura's whales

Occurrence

- Yearly sigthing
- 85 (19A:66G) records of Bryde's
- 30 (12A:18G) records of Omura's

38

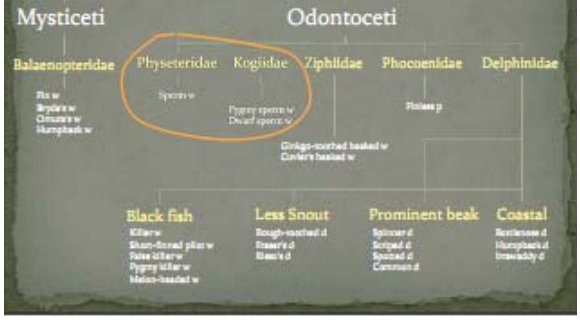
Bryde's & Omura's whales

Occurrence

- Yearly sigthing
- 85 (19A:66G) records of Bryde's
- 30 (12A:18G) records of Omura's

39

Order Cetacea (TH)



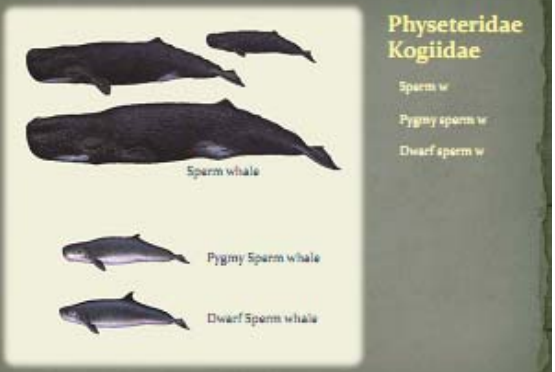
40

Physeteridae
Kogiidae

Sperm w

Pygmy sperm w

Dwarf sperm w



41

Sperm Whale

Physeter macrocephalus

- Huge head 1/3 of the total length
- M 18 m, F 12 m
- Teeth 18-26 pairs in the only lower jaw
- Inhabit continental slope and oceanic waters deeper than about 1,000 m

42

Sperm Whale

Physeter macrocephalus

- 13 stranded records, 1991-2010.
- 3-4 m Calf, 8-10 m F (11)

43

Kogiidae

Pygmy sperm whale

Kogia breviceps

- 12-16 pairs LJ
- 2.7-3.8 m
- Rel. small dorsal fin

Dwarf sperm whale

Kogia simus

- 7-12 pairs LJ
- 2.5-2.7 m
- Rel. large dorsal fin

44

Pygmy sperm whale

Kogia breviceps

- 8 stranded records
- 1994-2007
- Phuket, PhangNga
- Rayong, Chumporn, Prachuab, Songkhla, Narathiwat

45

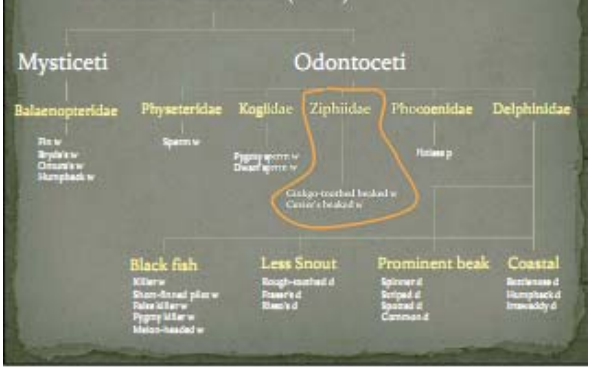
Dwarf sperm whale

Kogia simus

- 7 stranded records
- 1987-2010
- Phuket, PhangNga, Satun

46

Order Cetacea (TH)



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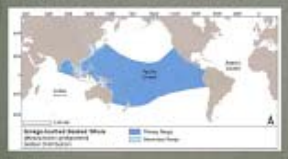
Ginkgo-toothed Beaked Whale

Mesoplodon ginkgodens

- A single pair of the ginkgo tree leave-liked teeth at the lower jaw
- a single pair of shallow throat grooves
- 5 m Adult, 2-2.5 m new born



49

Cuvier's beaked whale

Occurrence

- Single record at Phuket
- 6 Sep 1988, Female 2 m

50

Cuvier's beaked whale

Ziphius cavirostris

- A single pair of conical teeth at the tip of lower jaw
- 7 m Adult, 2.7 m new born

51

Cuvier's beaked whale

Occurrence

- Single record at Sarai Island
- 11 Aug 1999, Female 5.2 m

52

Order Cetacea (TH)

Mysticeti

Balaenopteridae

Bs w
Brydes w
Omuras w
Humpback w

Odontoceti

Physeteridae

Sperm w

Kogiidae

Pygmy sperm w
Dwarf sperm w

Ziphiidae

Ginkgo-toothed beaked w
Cuvier's beaked w

Phocoenidae

Finless p

Delphinidae

Black fish

Killer w
Short-finned pilot w
False killer w
Pygmy killer w
Melon-headed w

Less Snout

Rough-toothed d
Risso's d
Blacks d

Prominent beak

Spinner d
Striped d
Spotted d
Common d

Coastal

Bottlenose d
Humpback d
Irrawaddy d

53

Phocoenidae
Delphinidae
(Coastal)

Finless p

Bottlenose d

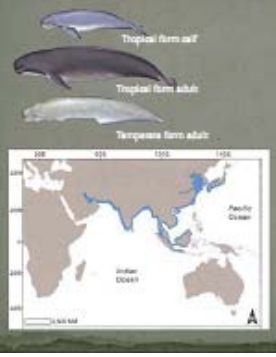
Humpback d

Irrawaddy d

54

Finless Porpoise

Neophocaena phocaenoides

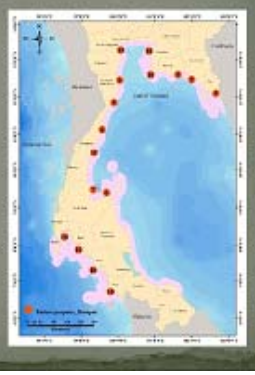


- 15-22 of spade shaped teeth each jaw
- 1.5-2.2 m
- Three subspecies:
  - *N. p. phocaenoides* in the Indian Ocean and South China Sea,
  - *N. p. asiaeorientalis* in the Yangtze River,
  - *N. p. sunameri* from the Taiwan Strait north to northern China and Japan.

55

Finless Porpoise

Distribution and abundance



56

Bottlenose dolphin

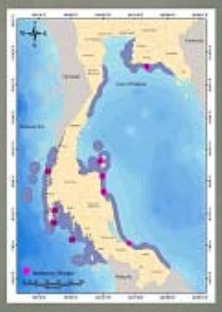
Indo-Pacific Bottlenose Dolphin
Tursiops aduncus

Common Bottlenose Dolphin
Tursiops truncatus

57

Indo-Pacific Bottlenose Dolphin

Distribution and abundance



58

Indo-Pacific humpback dolphin

Sousa chinensis

- 31 to 39 teeth in each upper tooth row, and 29-38 in each lower row
- M 2.8 m, F 2.6 m

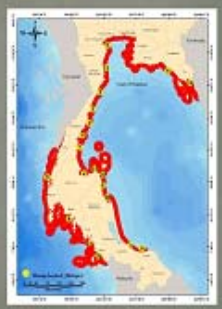

Chinese type


Plumbea type

59

Indo-Pacific humpback dolphin

Distribution and abundance



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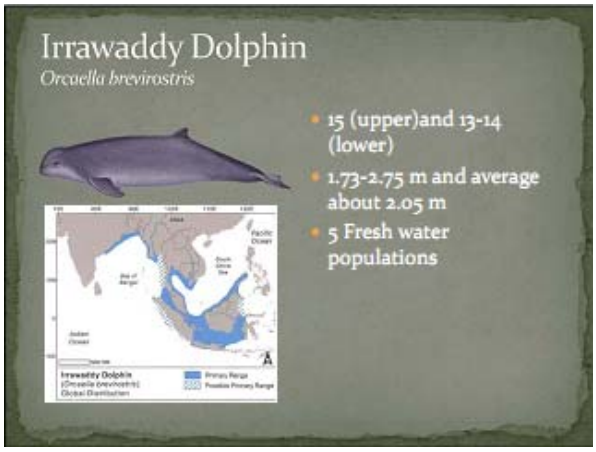

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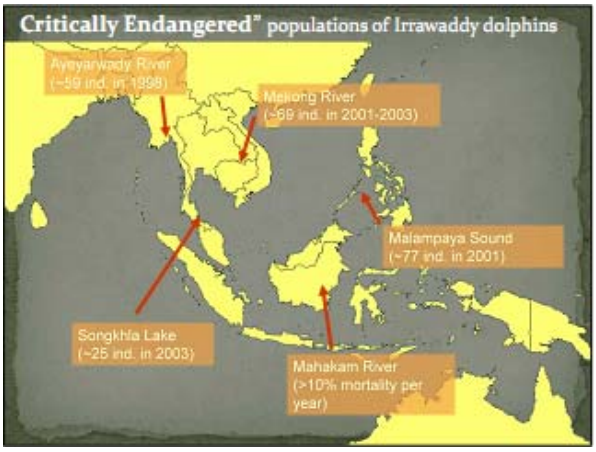

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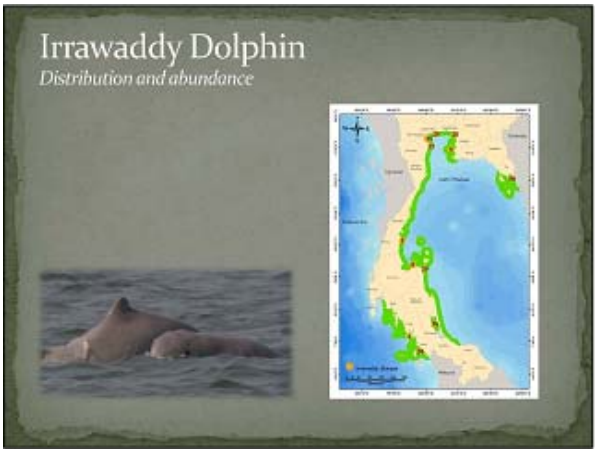

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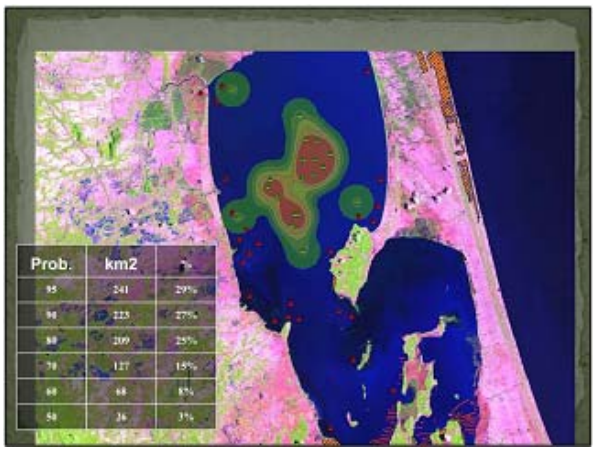

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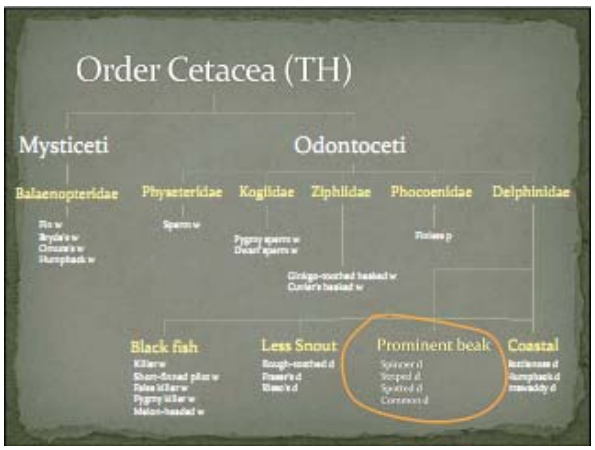

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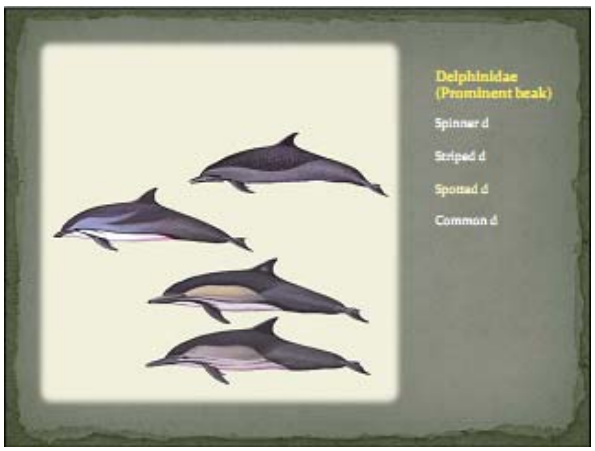
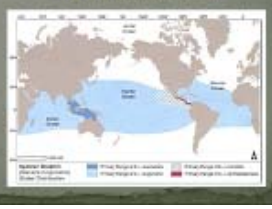


66

Spinner Dolphin

Stenella longirostis

- 40-60 per row, 2 m L
- 5 geographic forms
  - Gray's spinner dolphin (*S. l. longirostris*) found in most areas
  - Dwarf spinner dolphin (*S. l. roseiventris*) Southeast Asia and northern Australia



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Spinner Dolphin

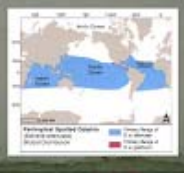
Stenella longirostis

68

Pantropical Spotted Dolphin

Stenella attenuata

- 1.6 to 2.4 m long
- 2 geographic forms
  - Offshore spotted dolphin (*S. a. attenuata*) smaller and more slender than the coastal form. Dorsal spotting is much less dense, and in some populations can be virtually nonexistent in adults.
  - Coastal spotted dolphin (*S. a. graffmani*) the eastern tropical Pacific. Spotting tends to be much more extensive on the coastal form



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Pantropical Spotted Dolphin

Stenella attenuata

- Sighted pops in PhangNga Bay
- Phuket, PhangNga, Krabi, Trang
- Samutprakarn, Prachuab, Cholburi, NakornSri

70

Striped Dolphin

Stenella coeruleoalba

- 40-55 slender pointed teeth in each tooth row
- Adult striped dolphins are up to 2.56 m long

71

Striped Dolphin

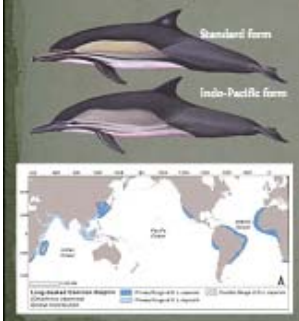
Stenella coeruleoalba

- Sighted pops PhangNga, Phuket
- Stranded records from Ranong to Satun

72

Long-beaked Common Dolphin

Delphinus capensis



- 2 geographic forms
  - Standard long beaked common dolphin (*D. c. capensis*)—the nominal, the Pacific and Atlantic oceans, slightly shorter beak
  - Indo-Pacific common dolphin (*D.c. tropicalis*) , the Indian and far western Pacific oceans. The beak is narrow and long

73

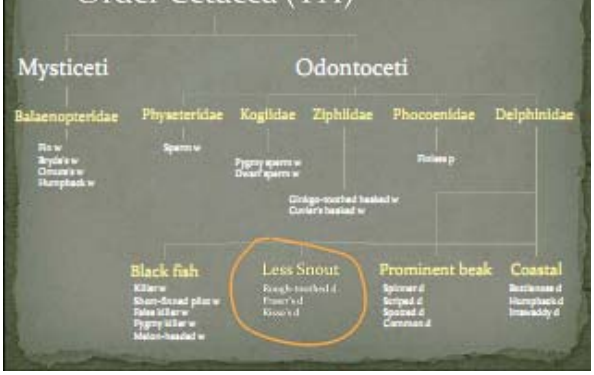
Long-beaked Common Dolphin

Delphinus capensis

- 2002, 1 record in Prachuab
- 2007, 1 record in Petchaburi
- 2009 2 record in PhangNga and Cholburi

74

Order Cetacea (TH)



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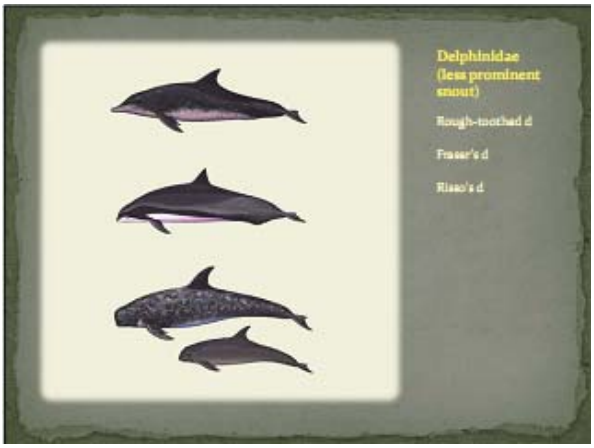
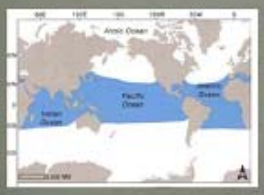


76

Rough-toothed dolphin

Steno bredanensis



77

Rough-toothed dolphin

Occurrence

- 1993-2010, 9 records
- Phuket and Satun
- Nakornsrithammaraj, Chonburi

78

Fraser's Dolphin

Lagenodelphis hosei

Fraser's dolphin

Indo-pacific bottlenose dolphin

79

Fraser's Dolphin

Occurrence

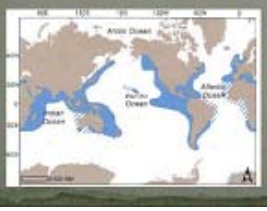
- 1996, 1 record in Trang
- 2009, 5 records in Phuket, Trang and Satun

80

Risso's Dolphin

Grampus griseus

- 2-7 pairs of stout, pointed teeth in the front of the lower jaw, and usually none (but occasionally 1-2 pairs)in the upper jaw
- Adult 3.8 m



81

Risso's Dolphin

Grampus griseus

- 2003-2009, 4 records in Phuket
- 2010, 1 record in Nakorn

82

Order Cetacea (TH)

Mysticeti

Odontoceti

Balaenopteridae | Physeteridae | Kogiidae | Ziphiidae | Phocoenidae | Delphinidae

Black fish

Less Snout

Prominent beak

Coastal

83

Delphinidae (Black fish)

Killer w

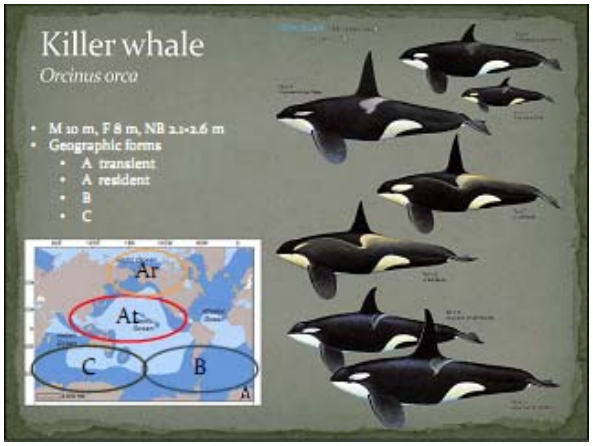
Short-finned pilot w

False killer w

Pygmy killer w

Melon-headed w

84



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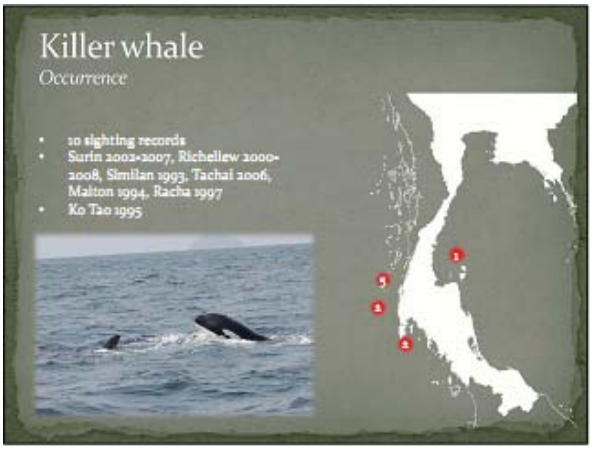

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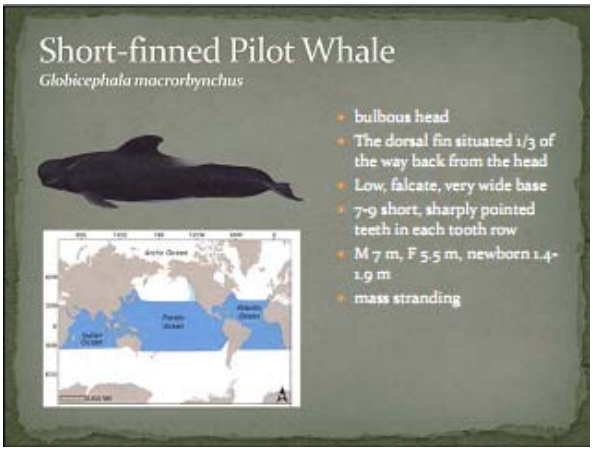

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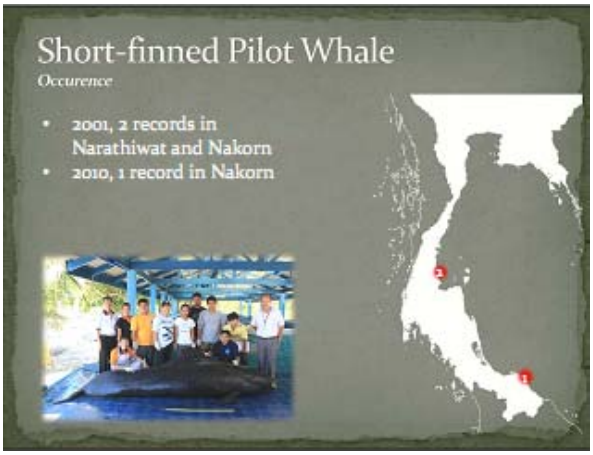

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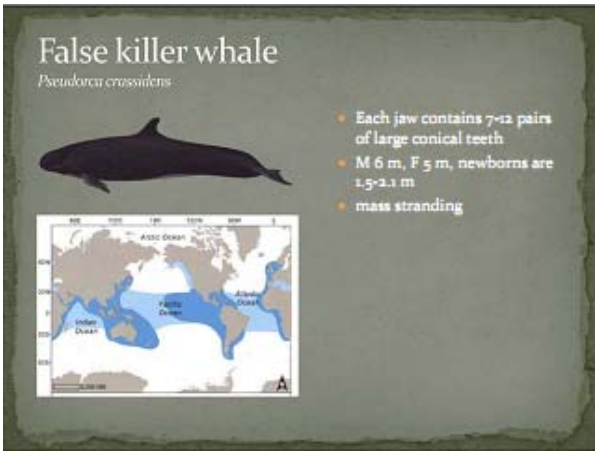


90

False killer whale

Occurrence

91

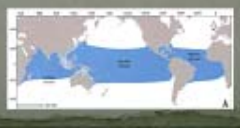
Pygmy Killer & Melon-headed Whales

Pygmy Killer Whale
Feresa attenuata

- 8-13 pairs of large teeth
- Rounded tip flipper
- 2.6 m Adult

Melon-headed Whale
Peponocephala electra

- 20-25 pairs of small slender teeth
- Pointed tip flipper
- 2.7 m Adult



92

Pygmy Killer Whale

Occurrence

- 1996, 2 records in Trang
- 2003, 2 record in Petchburi

93

Melon-headed Whale

Occurrence

- 1973, 1 record in Songkhla
- 1998, 1 record in Cholburi

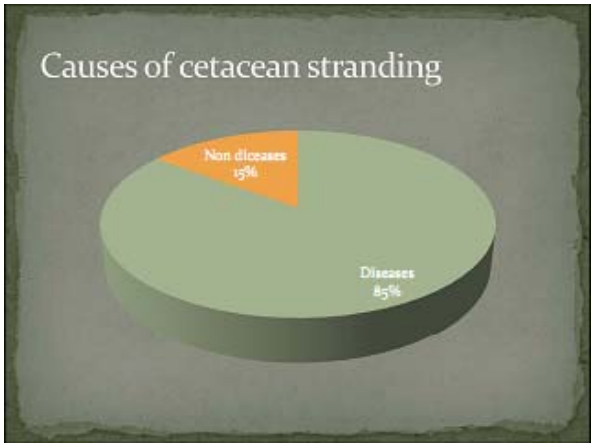
94

Status and Threats

95

			6	15	5	30	56
			-	-	-	-	
	35	41	25	30	40	171
	-	-	-	-	-	
	5	63	45	30	60	203
	-	-	-	-	-	
					90	90
					-	
	90	31	20	155	25	321
	-	-	-	-	-	
	5	3	2	1	7	18
	-	-	-	-	-	
	135	144	127	221	252	859

96


Causes of cetacean stranding
Non diceases
15%
Diseases
85%

97


Dwarf sperm whale
Patong, Phuket
Sea garbage

98


Bryde's whale calf
Trang
Net

99


Thank you

100

Forensic Identification for Dolphin and Whale

Dr.Wansuk Senanan: wansuk@buu.ac.th

Forensic identification for whales and dolphins

Dr. Wansuk Senanan
Burapha University
Chon Buri, Thailand

1

What is forensic science?

- Forensic = forum (Latin)
- the application of scientific knowledge to legal problems and legal proceedings
  - Forensic anthropology
  - Forensic pathology
  - Forensic odontology
  - Etc.

2

Why forensic issues relevant to Cetacean conservation

- Most species are protected under a national and international laws
- Most species are protected under CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora; Appendix 1 and 2)
- Some species occur beyond national boarders and legal protection varied in different countries

3

Types of forensic issues in crimes against cetacean

- Meat sold in markets
  - What species are they?
  - Are they protected species?
  - How many are caught?
- Trades – live and/or products
  - Is the specimen correctly labeled – at species or individual level?
- Live individuals travel long distances
  - Whose animal is it?

4

Types of samples usually available for forensic investigation

- Meat – fresh, dried, salted
- Skin
- Blood stain
- Carcass
- Products – power, ingredient, teeth, bones
- Live animals (in captivity)

5

Species identification from meat, remains and products

- Morphology
- Protein, specific chemicals
- DNA markers (require baseline information)
  - Genetic material found in nucleus and organelle of cells
  - Mitochondrial DNA
  - Nuclear DNA

6

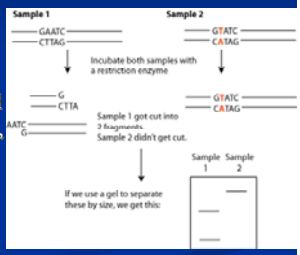
DNA markers for species identification

- DNA patterns are distinct between species, but not so variable within species
- Functional genes are typically appropriate
- Requires baseline genetic data
  - In-house research
  - Public databases, e.g., GenBank

7

Detection of DNA variation

- Restriction fragment length polymorphisms (RFLP)
  - Entire genome detected by specific probes – eg., minisatellite DNA fingerprint
  - Region specific (PCR-based)



scienceblogs.com/digitalbio/2008/05/genetic_variation_ii_what_is_a.php

8

Disadvantages

- RFLP of the entire genome requires a large amount of DNA
- Fragment size is large; DNA quality dependent
- Repeatability

9

PCR-based techniques

- RAPD (Random Amplified Polymorphic DNA), AFLP – length polymorphism (bp)
- Targeted DNA region, e.g., control region of mtDNA (RFLP, sequencing), CytB of mtDNA (RFLP, sequencing, microsatellite DNA (size based)

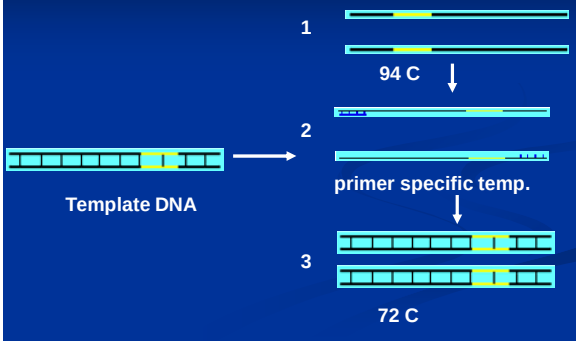
10

Molecular techniques involved

- DNA extraction
- Polymerase chain reaction (PCR)
  - Small amount of DNA templates
  - A, T, C, G
  - Polymerase enzymes, buffer, MgCl2
- Gel electrophoresis
- Size scoring on a gel or Sequencing

11

Polymerase chain reaction (PCR)



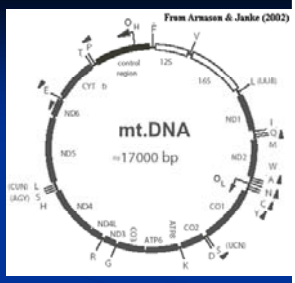
12

Advantages

- Require only small amount of DNA
- Degraded DNA is OK (suitable of analysis of rotten tissues, dried meat, salted meat, meat products)
- Many options for available DNA regions – varying degrees of polymorphisms
- Non-invasive sampling possible (live animals)

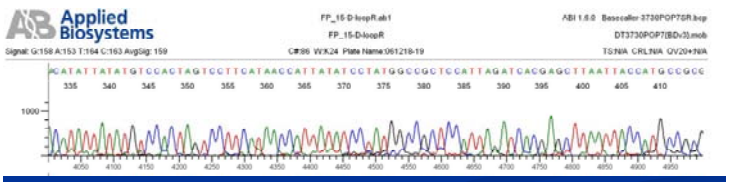
13

- D-loop, CytB gene, COI gene of mtDNA are proven useful for species ID in Cetacea
- Other nuclear genes
- Small amount of template DNA are required for DNA amplification using PCR



14

Sequencing and RFLP



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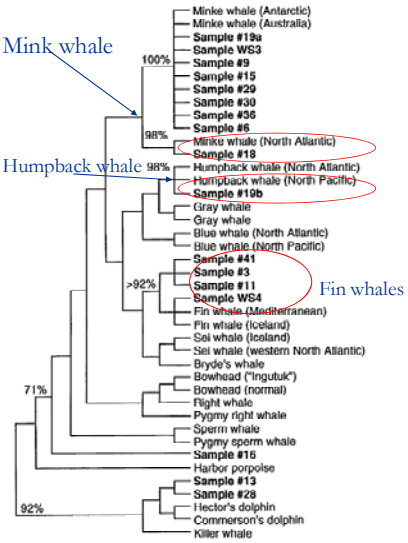


Molecular genetic method to monitor whaling (Baker and Palumbi, 1994)

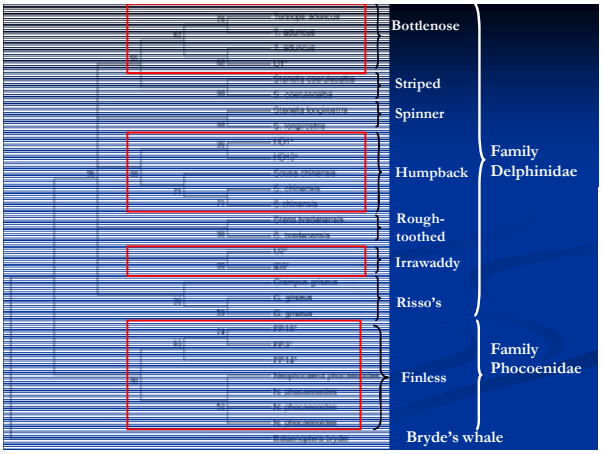
- Whale meat sold in Japanese market (labeled as kujira)
- Use of PCR – avoid violation to CITES
- Dloop mtDNA sequences
  - 16 samples from markets
  - Baseline sequences from known individuals

16

On-going work in our lab (in collaboration with DMCR)

- Identify species of dolphins in western Gulf of Thailand using mitochondrial D-loop region
- Develop genetic database for dolphins in Thailand
- Expand the number of Cetacean species from both Andaman sea and Gulf of Thailand

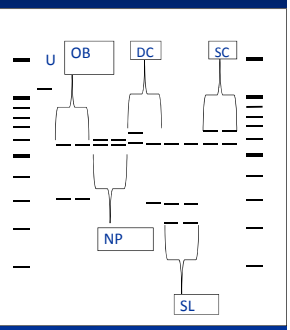
17



18

PCR-RFLP of mtDNA Dloop

b	แฮพโพไทป์ ขนาดชิ้นดีเอ็นเอ (bp)				
	OB	NP	DC	SL	SC
SduI-A	553,300,256	-	-	-	-
SduI-B	-	600,533	-	-	-
SduI-C	-	-	640,566,300	-	-
SudI-D	-	-	560,290,210	-	-
SduI-E	-	-	-	560,290,210	-
SduI-F	-	-	-	-	660, 566



19

DNA profiling for individual identification

- Does a DNA profile match an individual under investigation (a victim, individuals in captivity)?
- Does the individual exported originate from a captive population?
- How many individuals in a population under investigation?
- Need DNA regions that are highly polymorphic – specific to individual

20

Types of DNA regions that are useful for individual identification

- Variable Number Tandem Repeat (VNTRs)
  - Minisatellite – large fragments (repeat units range from 6-60 bp)
  - Microsatellite – small fragments (repeat units range from 1-6 bp)
  - Hypervariable regions, large number of copies throughout the genome
- Single nucleotide length polymorphisms (SNPs)
  - More recent – almost unlimited amount of polymorphism

21

Microsatellite DNA

- Regions of DNA containing tandem repeats of 1-6 bp
- Small fragments <500 bp (only small amount of template DNA needed)
- Dispersed throughout the genome

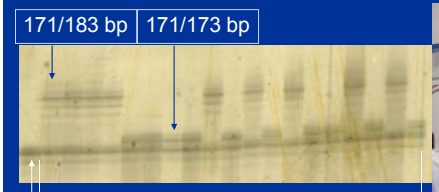
GCTAGCGCGCGCGCTAATGG
CGATCGCGCGCGCGATTACC

- Co-dominant; usually inherited in a Mendelian fashion
- DNA profiles consist of several loci

22

Detection of microsatellite variation

- Electrophoresis + silver staining techniques



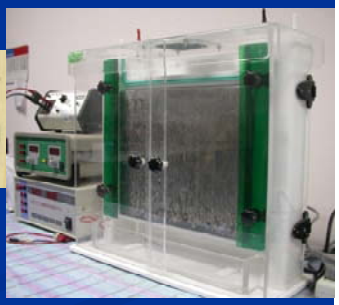
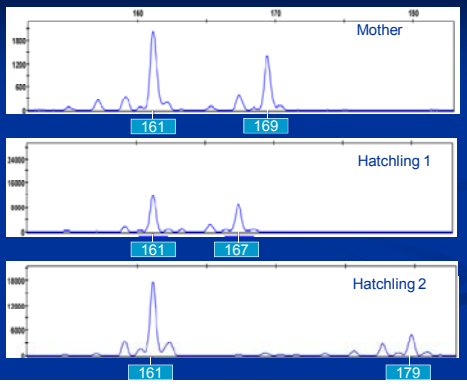


Photo: Chawalee Jaisook

23

Microsatellite alleles at one locus



24

Need to prove….

- Low probably that two individuals in a population have identical DNA profiles (matching probability)
- Acceptable value is one out of at least the numbers of animals in a population
- Probability of a genotype given allele frequencies in a population
- Multiplication of genotypes in a DNA profile

25

DNA profiling of North Atlantic Right Whale (*Eubalaena glacialis*)

- Population estimate
  - Sighting
  - Physical marks
- DNA analysis
  - Fecal samples

www.ronnestam.com/.../10/whale_diver_wow1.jpg

26

Molecular identification of individual North Atlantic right whales (*Eubalaena glacialis*) using free-floating feces

- Free-floating feces
- Microsatellite genotyping
- D-loop of mtDNA
- Sex-specific markers
- Needs to provide matching probability with another individual in a population

Gillett et al. 2010

MARINE MAMMAL SCIENCE, 26(4): 917–936 (October 2010)

27

Right whale DNA profiling (cont.)

- With biopsy samples – usually employ 35 loci, but for fecal samples the authors used five most variable loci
- Population size = 350-400 individuals; Matching probability should be less than 1/1000
- 118 fecal samples = 61 genotypes (24 genotypes did not match photo id; and 12 genotypes are not in the database)

28

Geographic origin of specimens

- Needs variable markers that allowing detection of population differentiation
  - Fix differences
  - Haplotype/frequency differences
  - Baseline information of putative origins

29

Take home message…

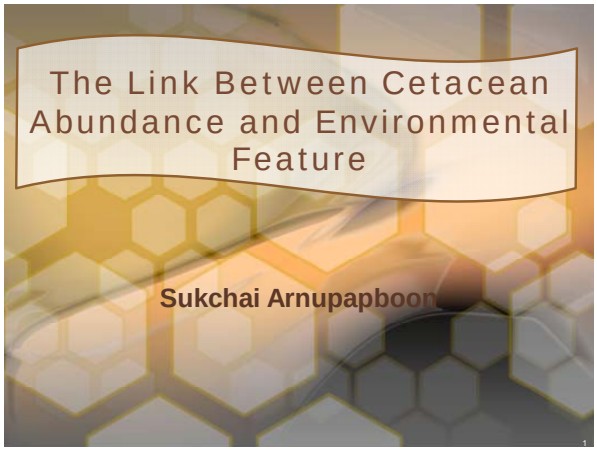
- DNA can be a powerful forensic tool
- However,…
  - Different kinds of DNA are appropriate for different application –verification needed
  - Needs appropriate baseline information – research needed
  - Cares needed for sample collection for DNA analysis
- Collaboration needed for a region-wide genetic baseline

30

Annex 15

The Link Between Cetacean Abundance and Environmental Feature

Mr.Sukchai Arnupapboon: sukchai@seafdec.org



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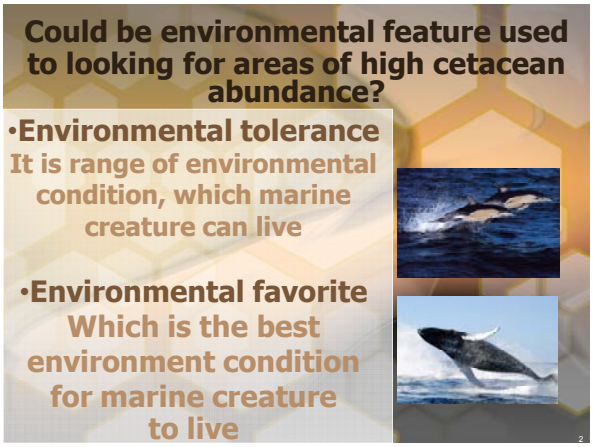

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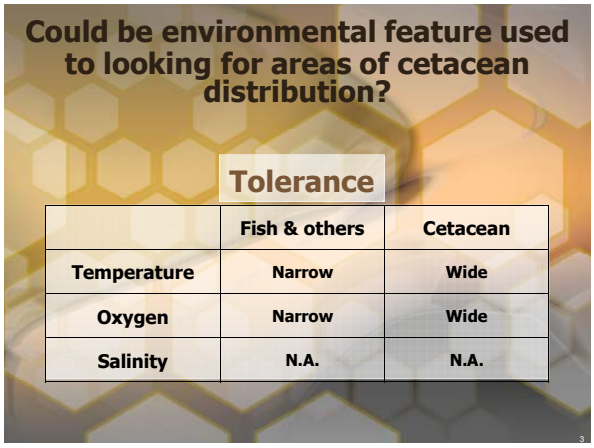
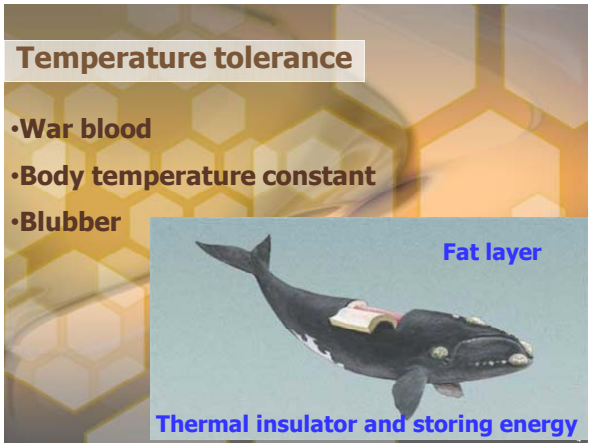


	Fish & others	Cetacean
Temperature	Narrow	Wide
Oxygen	Narrow	Wide
Salinity	N.A.	N.A.

3



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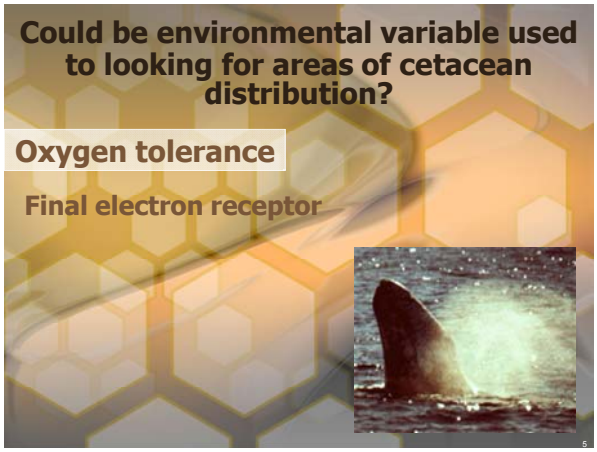

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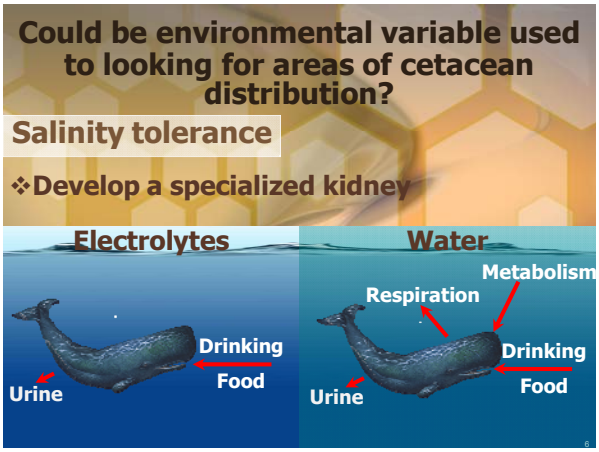
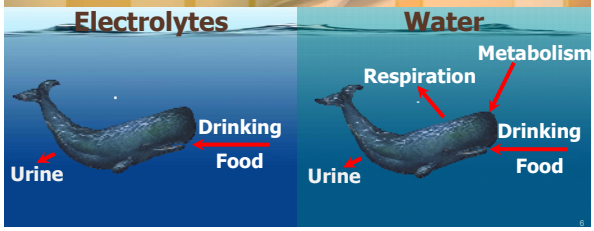


6

Could be environmental variable used to looking for areas of cetacean distribution?

Salinity tolerance

❖Develop a specialized kidney



7

The link Between cetacean abundabce and environmental feature

❖Slope

❖Thermal front

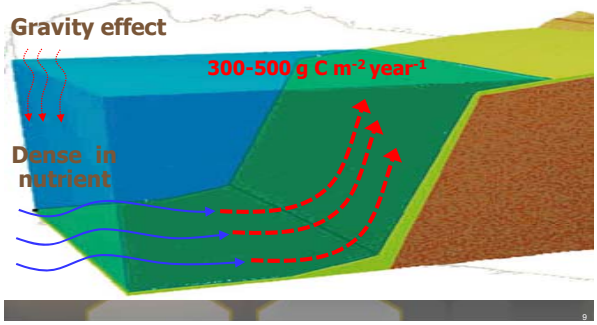
❖Chlorophyll-a concentration

❖Depth

❖ River runoff

8

Slope

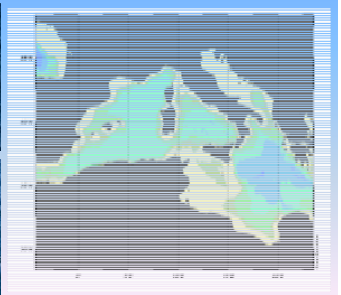


9

Slope

Risso's dolphin in the Mediterranean Sea

(Bonaccorsi and Sacchi, 1999)

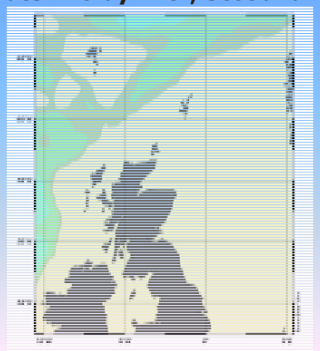


10

Slope

Minke whale in the Outer Moray Firth, Scotland

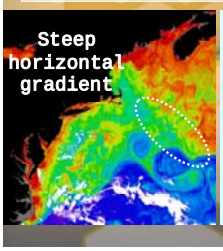
(Tetley, 2004)

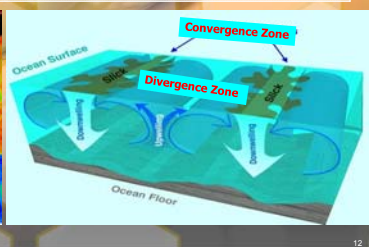


11

Thermal front

Fronts are the area of farcing between two water mass that have contrasting properties, particularly temperature or salinity

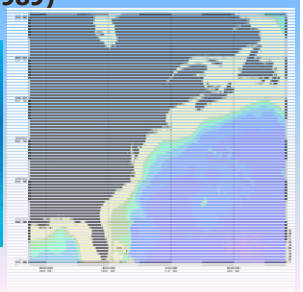




12

Thermal front

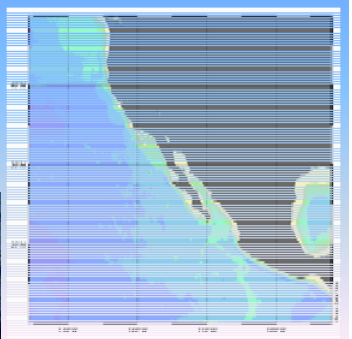
Northern right whale in the Great South Channel, Canada (Brown&Winn, 1989)



13

Thermal front

White-sided dolphin in Californian (Tetley, 2004)



14

Chlorophyll-a concentration

Phytoplankton

Photosynthesis

Inorganic compound NO_2, NO_3, PH_4^{-3}, Si

Organic compound

15

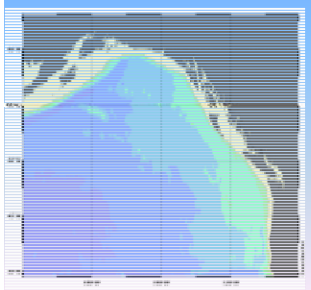
Chlorophyll-a concentration

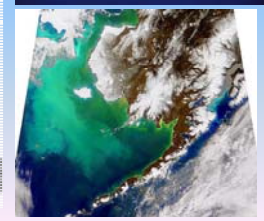
Class	Chlorophyll-a	Chlorophyll-b	Chlorophyll-c
Cyanophyta	X	-	-
Chlorophyta	X	X	-
Chrysophyta	X	-	X
Bacillariophyta	X	-	X
Pyrrophyta	X	-	X
Cryptophyta	X	-	X
Euglenophyta	X	X	-

16

Chlorophyll-a concentration

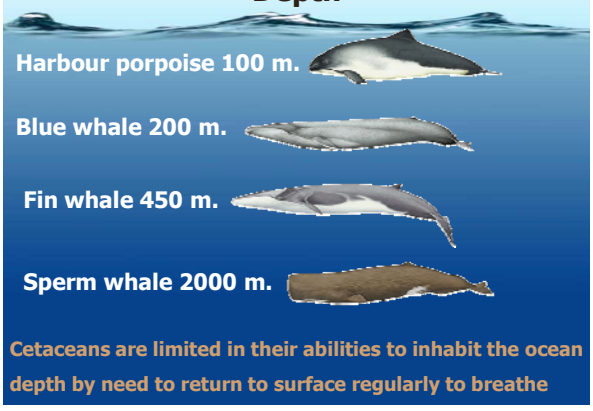
Blue whale in the eastern North Pacific (Burtenshaw *et al*, 2004)





17

Depth

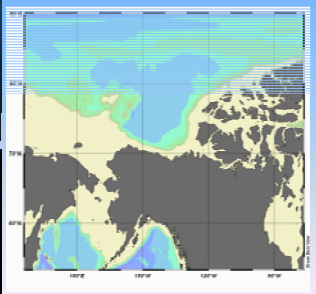


Cetaceans are limited in their abilities to inhabit the ocean depth by need to return to surface regularly to breathe

18

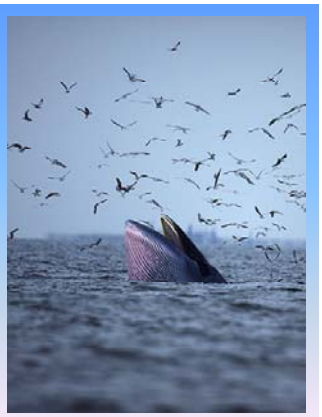
Depth

Gray whale and Beluga whale in the Alaskan Arctic (Moore and DeMaster, 1998)



19

Thank you



20

Irrawaddy Dolphins in the Inner Gulf of Thailand

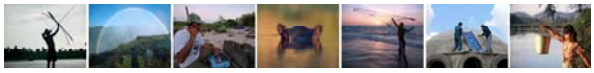
Ms. Thananya Inthasak: thananyai@wwf.panda.org (Presenter)

Irrawaddy dolphin

in the Inner Gulf of Thailand

A Joint Project between

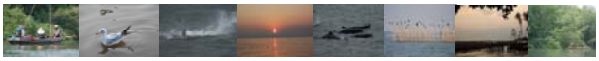
WWF Thailand,
Department of Marine and Coastal Resource
and Gulf Electric Co.,Ltd.



1

Goal:

The overall long-term goal of the proposed Project is to ensure the survival of the remaining populations of endangered dolphins in the Inner Gulf of Thailand through participatory research, and participatory conservation interventions, supported by strengthened awareness raising and education.



2

Objectives:

- To conduct dolphin surveys in the Inner Gulf of Thailand in collaboration with the Department of Marine and Coastal Resources and selected fishermen from targeted communities in the Inner Gulf of Thailand.
- To increase understanding of local communities to their coastal resources and develop preliminary management interventions for improved coastal resources conservation and dolphin conservation.

3

Objectives:

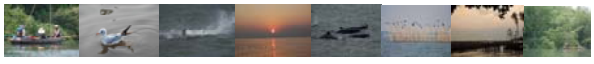
- To strengthen civil society in conserving marine and coastal resources in the inner gulf provinces, with the conservation of dolphins being highlighted as flagship species for healthy ecosystems.
- To promote conservation education and raise awareness about the conservation value and needs of dolphins within targeted schools and communities in the Inner Gulf of Thailand

4

Study Areas:

Five main estuaries in the Inner Gulf of Thailand namely the Bang Prakong, the Chao Praya, the Tachin the Maeklong and the Bang Taboon-PhetChaburi.

Cover Chonburi, Chachengsao, Samuthprakran, Bangkok, Samuthsakorn, Phetchaburi and some part of Prachuabkirikhan province



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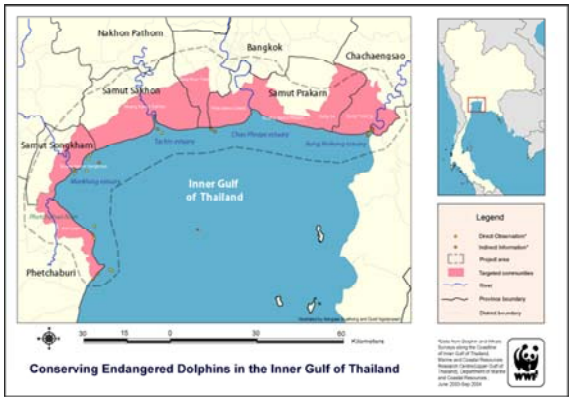
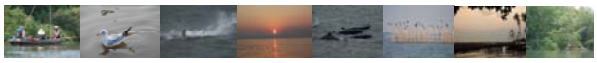


6

1. Dolphin research activities:

- Dolphin survey with DMCR and local network, Photo ID, dolphin strand
- Environmental activities with local, improved coastal resources conservation and dolphin conservation



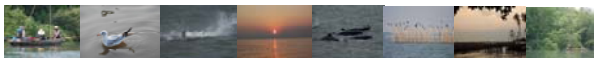
7

Research : Dolphin survey

8

Result from dolphins survey:

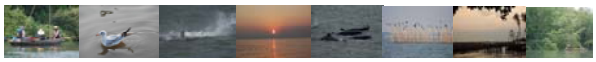
- Survey areas covered 3,000 km^2
- Period D.C. 2007-2009 conduct survey 68 times
- snap-shot survey (3 estuaries in the same time) 5 times
- Irrawaddy dolphin in the Inner Gulf of Thailand was mostly distribution near coastal area e.g., Bang Pakong, Tha Chin and Phetchaburi-Mae Klong.



9

Result from dolphins survey:

- Bangpakong estuary found 25-30 dolphin individuals
- Tha Chin estuary found 20-25 individuals
- Phetburi up to Mae Klong estimated 20-30 individuals
- Constantly population but easily to find Irrawaddy dolphins on October due to February.



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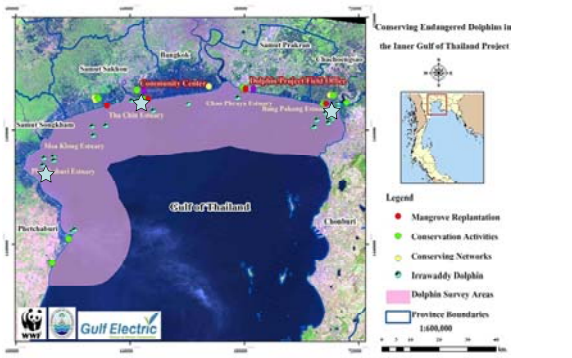
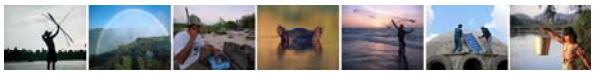
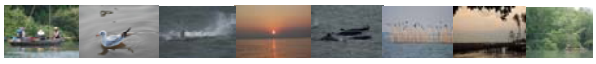




11

Result from dolphins survey:

- Photo ID recored 24 patterns
  - Bang Pakong 13
  - Tha-Chin 4
  - Phetburi-Mae Klong 7



12

Bang Pakong

13

Tha-Chin

14

Phetburi-Mae Klong

15

Threat:

Seriously threatened in the areas: by catch (gill net), habitat degradation, water pollution (debris), and accident (water traffic)

16

Research : Dolphin strand

17

2. Increase understanding of local communities:

Local villages training

Meeting

18

3. Promote conservation education:

19

4. Public relation activities:

Press trip

Raising awareness

Public

20

Funding by Gulf Electric Group of Power Companies

Partnership

& Thank you for all "Dolphin Conservation Team"

21

for a living planet

ขอบคุณค่ะ

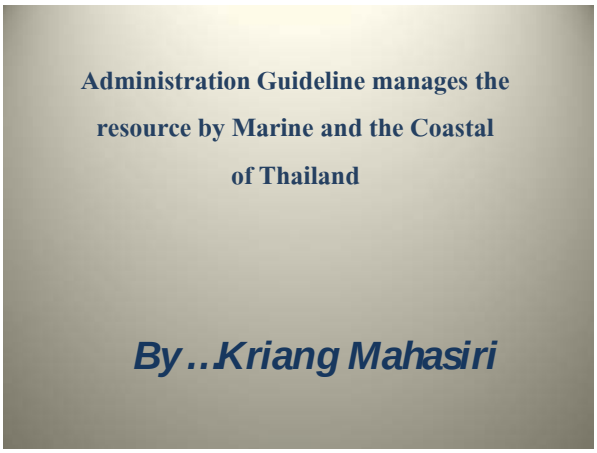
saisuneec@wwf.panda.org
www.panda.org
http://thailand.panda.org

22

Annex 17

Administration Guideline manages the resource by Marine and the Coastal of Thailand

Mr.Kriang Mahasiri: Ajkriang@yahoo.com



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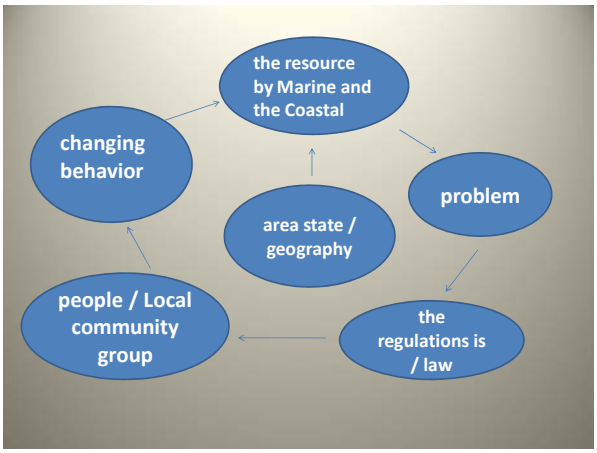

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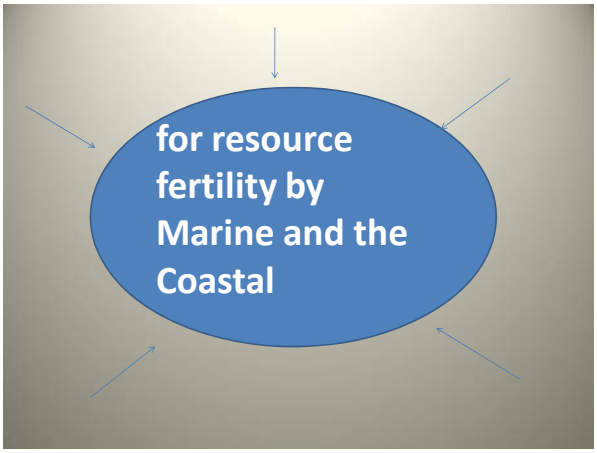

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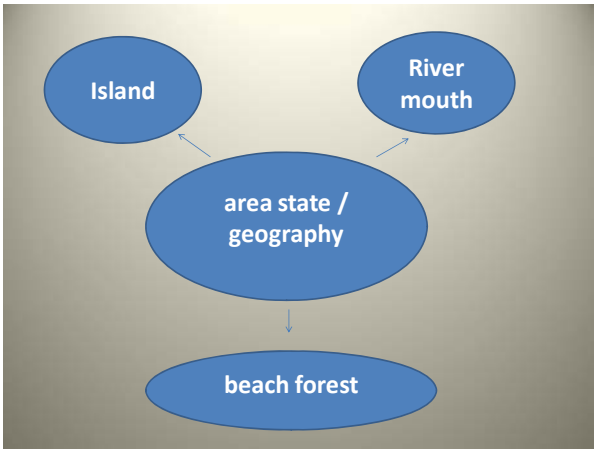

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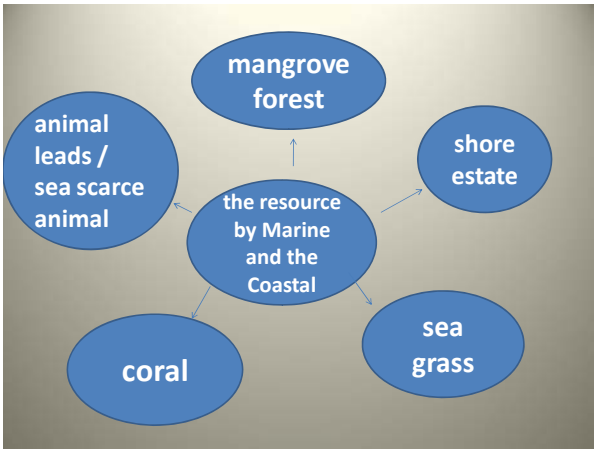

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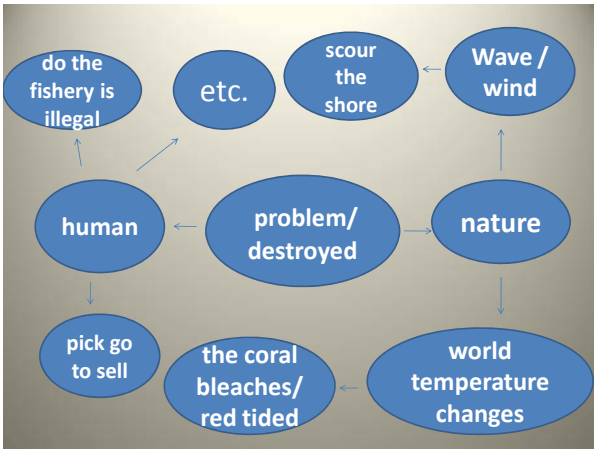

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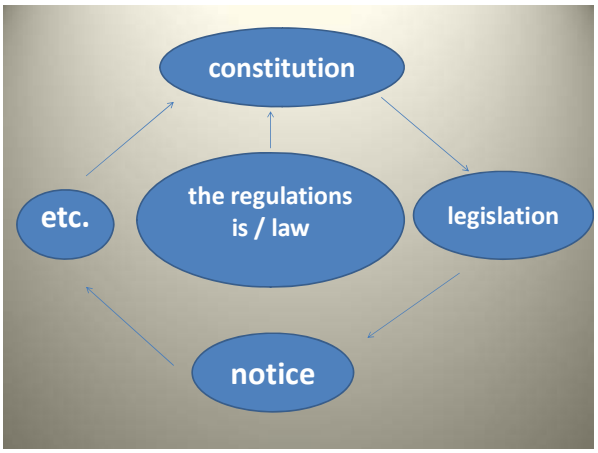
constitution
etc.
the regulations
is / law
legislation
notice

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knowledge
the being
is good
the right
is /duty
people /
Local group
the
prevention /
take care
requirement

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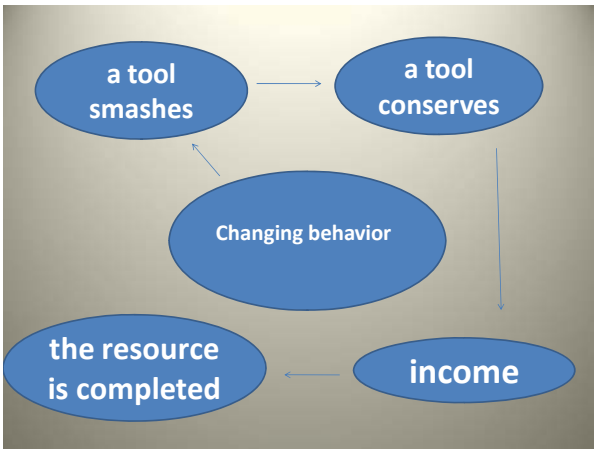
a tool
smashes
a tool
conserves
Changing behavior
the resource
is completed
income

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Case Study
Bangpakong River

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area state / geography

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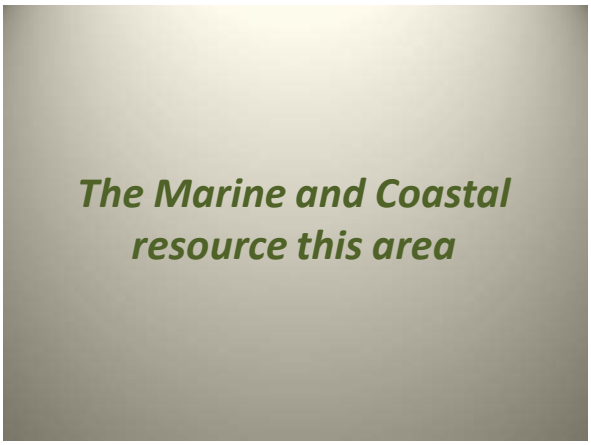
The Marine and Coastal
resource this area

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problem/ destroyed

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know or not is fishery kind this tool ?

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ring net pushes

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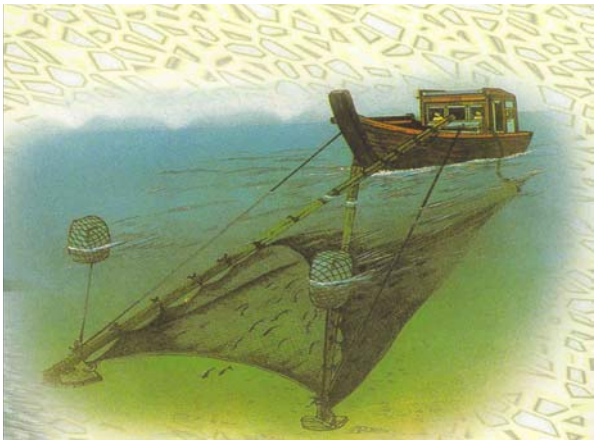

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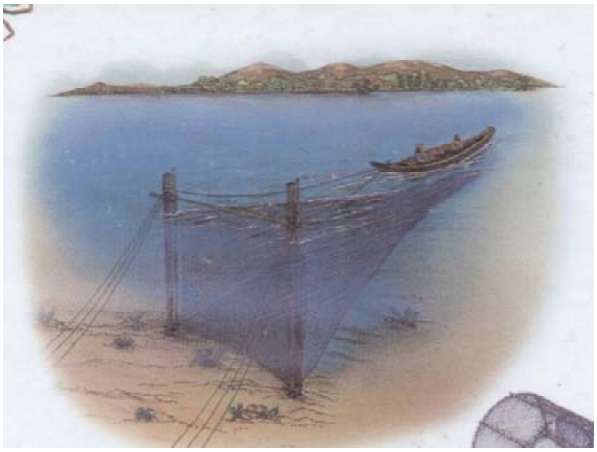

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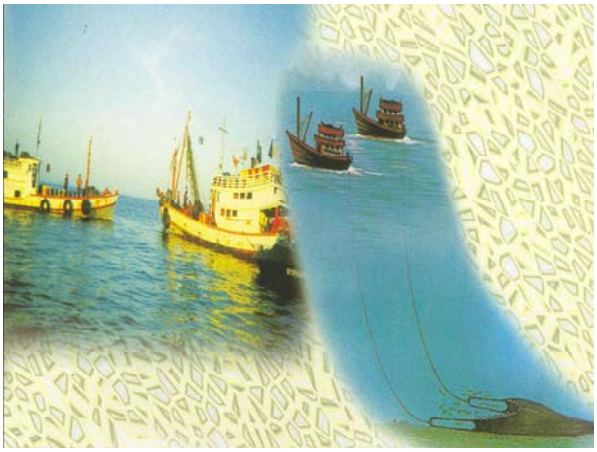

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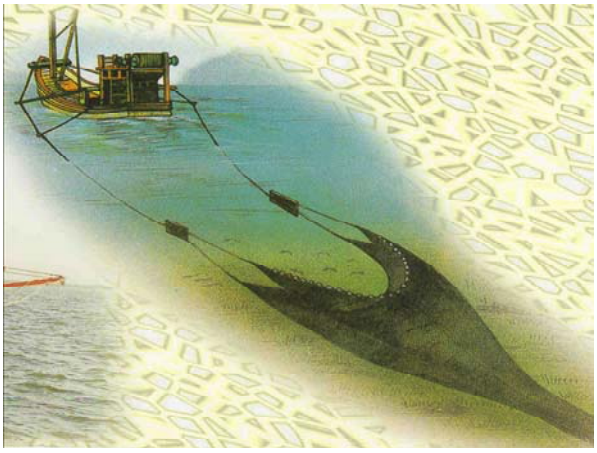

39

40

the regulations / law

41

constitution

66 sections and 67

42

- the act of legislation something the fishery , a Buddhist Era is 2490
- the act of legislation reserves and protect wild animals , a Buddhist Era is 2535

43

- *Ministry of Agriculture and Cooperatives notice*

44

- prohibit do something the fishery with otter trawl tool and a ring net push within 3,000 meter borders , since , the edge leads the shore
- etc.

45

people / Local group

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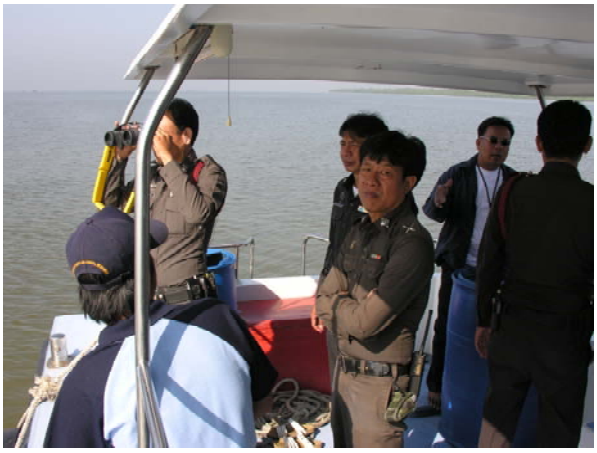

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Changing behavior

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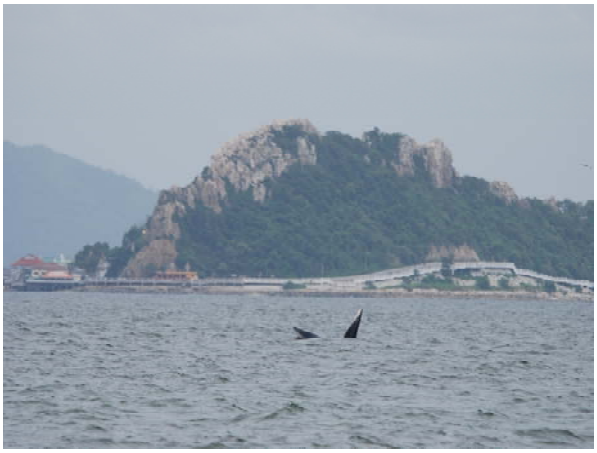

83

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the way protects natural resources of Thailand , that best ... , for example , ...

87

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Annex 18

Group Presentation and Discussion on the Cetacean Observation Training

Group 1

Irrawaddy Dolphin Sighting Survey in Bang Pakong Estuary

24 November 2010

Group 1

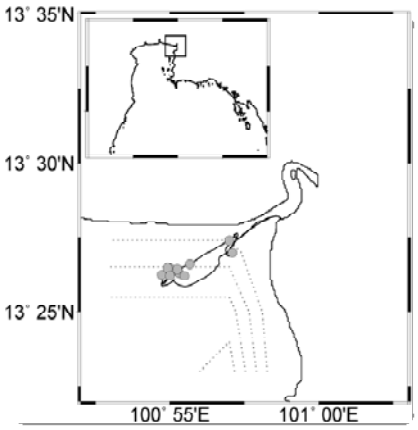
Members

1. Mr. Lieng Saroeum
2. Mr. Dharmadi
3. Mrs.Mdm. Nurridan Bt Abdul Han
4. Mr. Anurak Loog-on
5. Mr. Nobphadol Somjit
6. Ms. Nuchjaree Oundee
7. Ms. Worawan Simaroj
8. Mr. Theerawat Prempree
9. Mr. Surachai Passada

1

2

Map Survey



3

Oceanography Data

Parameter	Station 1	Station 2
Time	10:50	12:55
Depth (m)	1.6	1.6
Temp (˚C)	28.9	28.9
DO (mg/l)	7.42	6.47
pH	7.26	7.93
Turbidity (NTU)	3.5	18.8
Salinity (ppt)	33.1	31.4

4

Ob-BPK-001

Nick on rear base of dorsal fin

5

Ob-BPK-002

Nick on upper front of dorsal fin and some body scratch

6

Ob-BPK-003

The tip of dorsal fin absent

7

Ob-BPK-004

Nick on middle of posterior dorsal fin

8

Ob-BPK-005

Nick and scar on dorsal fin

9

Ob-BPK-006

Nick on posterior part of dorsal fin

10

Ob-BPK-007

Nick on frontal part of dorsal fin
and scar on left side body

11

Ob-BPK-008

Top cut and nick on posterior of dorsal fin

12

Ob-BPK-009

Top cut of dorsal fin

13

Ob-BPK-010

Small nick in the middle of posterior dorsal fin
and scar on right side body

14

Ob-BPK-011

Two small nicks on posterior of dorsal fin

15

Ob-BPK-012

Nick on base of posterior dorsal fin
and scars on fin and body

16

Ob-BPK-013

V-shape nick in middle of posterior dorsal fin

17

Ob-BPK-014

U-shape top cut dorsal fin

18

Ob-BPK-015

Two nicks on posterior of dorsal fin

19

Ob-BPK-016

Complete dorsal fin and has small groove on posterior near fin base

20

Ob-BPK-017

Incomplete smooth dorsal fin and scar on right side body

21

Summary of Photo ID

Sighting No.	ID: Ob-BPK-XXX															
	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017
1 (09:30 - 10:10)	✓	✓															✓
2 (11:25 - 11:40)			✓	✓	✓	✓		✓						✓			
3 (12:00 - 12:40)				✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	

Remarks:
- Approx. 20 individuals found
- 17 identified
- 2 calves seen

22

23

Annex 19

Group Presentation and Discussion on the Cetacean Observation Training

Group 2

MARINE MAMMAL SURVEY IN BANG PA KONG ESTUARINE

1

Group 2

- Mr.Joseph Chistopher Rayos
- Mr.Pornanan Keereerut
- Mr.Tu Hoang Nhan
- Mr.Tossaporn Sukhapindha
- Ms.Chalatip Junchompoo
- Mr.Thanainun Knowcome
- Mr.Attapol In-pang
- Ms.Saisunee Chaksuin
- Ms.Thananya Inthasak

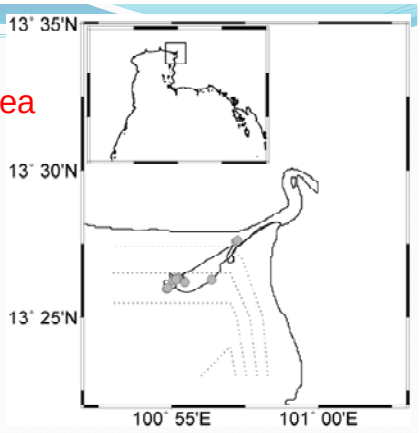
2

Oceanographic information During the time of observations

Water Parameter	ST.1	ST.2
Depth (m.)	1.7	1.6
DO (mg/L)	7.32	6.47
Temp.(C)	28.9	28.9
pH	7.3	7.9
Salinity (psu)	33.5	31.4
Conductivity (us/cm)	51408	48949
Turbidity (ntu)	3.1	18.8

3

Survey Area



4

Cb-BPK001

Time of observation:1000hr
Distinguishing characteristic
* Nicked on the tip of the Dorsal fin
* Scars on the right side of the body

5

Cb-BPK002

Time of observation: 1129hr
Distinguishing characteristic
* Nicked on the tip and posterior of the Dorsal fin
* Scars on the left side of the body

6

Ob-BPK-003

Time of observation: 1156hr
Distinguishing characteristic
* Dorsal fin nicked w/ bite scar on the right anterior part
* Scars on the left side of the body

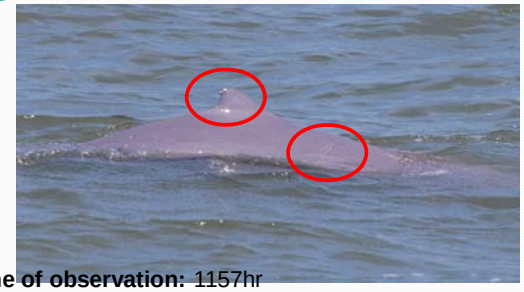
7

Ob-BPK-004

Time of observation: 1157hr
Distinguishing characteristic
* Dorsal fin complete with scars on the side
* Scars on the left side of the body

8

Ob-BPK-005



Time of observation: 1157hr
Distinguishing characteristic
* Dorsal fin nicked on the upper posterior portion
* Scars on the right side of the body

9

Ob-BPK-006

Time of observation: 1158hr
Distinguishing characteristic
* Dorsal fin nicked on the tip
* Bite Scars on the right side of the body

10

Ob-BPK-007

Time of observation: 1159hr
Distinguishing characteristic
* Dorsal fin nicked w/ 2 small holes on the posterior
* Scars on the right side of the body

11

Ob-BPK-008

Time of observation: 1201hr
Distinguishing characteristic
* Dorsal fin complete
* Scars on the left side of the body

12

Ob-BPK-009

Time of observation: 1206hrs
Distinguishing characteristic
* Dorsal fin with V-shaped cut on the anterior
* Scars on the right side of the body

13

Ob-BPK-010

Time of observation: 1209hrs
Distinguishing characteristic
* Dorsal fin smooth and no scars on the side
* Scars on the right side of the body

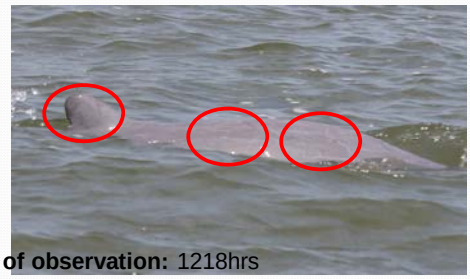
14

Ob-BPK-011

Time of observation:
Distinguishing characteristic
* Dorsal fin nicked on base of the posterior
* Minimal scars on the right side of the body

15

Ob-BPK-012



Time of observation: 1218hrs
Distinguishing characteristic
* Dorsal fin nicked on the posterior base
* Scars on the right side of the body

16

Ob-BPK-013

Time of observation: 1216hrs
Distinguishing characteristic
* Dorsal fin nicked V-shaped on the posterior

17

Ob-BPK-014

Time of observation: 1216hrs
Distinguishing characteristic
* Dorsal fin nicked V-shaped on the upper anterior

18

Ob-BPK-015

Time of observation: 1216hrs
Distinguishing characteristic
* Dorsal fin nicked on the middle posterior
* Minimal body scars

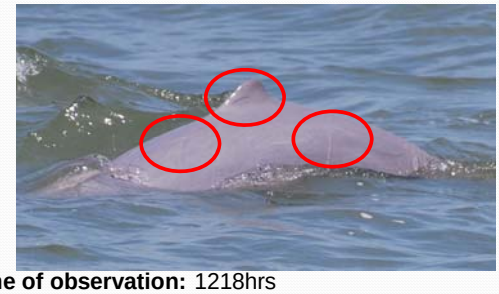
19

Ob-BPK-016

Time of observation: 1152hrs
Distinguishing characteristic
* Dorsal fin complete
* Minimal scars on the right of the body

20

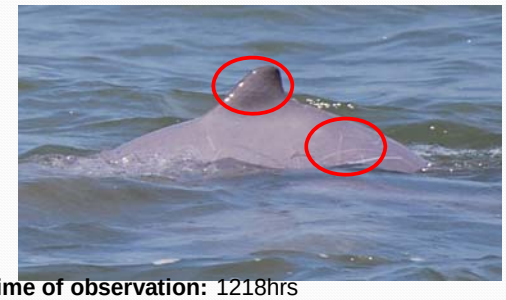
Ob-BPK-017



Time of observation: 1218hrs
Distinguishing characteristic
* Dorsal fin complete with scars on the left side
* Scar on the left side of the body

21

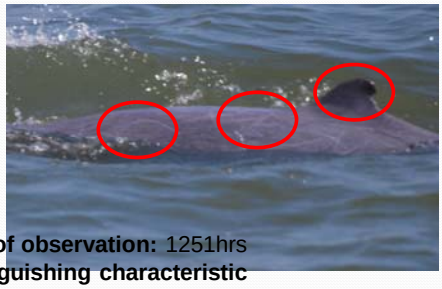
Ob-BPK-018



Time of observation: 1218hrs
Distinguishing characteristic
* Dorsal fin complete with scars on the left side
* Scar on the left side of the body

22

Ob-BPK-019



Time of observation: 1251hrs
Distinguishing characteristic
* Dorsal fin nicked on the posterior
* Scar on the left side of the body
(from base of the dorsal to interiorly)

23

THANK YOU

24

Annex 20

Closing Remarks
By Deputy Secretary-General of SEAFDEC, Mr. Kenji Matsumoto

Regional Training Program on Cetacean Information Gathering and Research Methodology on Cetacean Stock Assessment
23-25 Nov 2010, Chachoengsao, Thailand

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This is my pleasured to say that all of you have had a very practical training program related to conservation of endangered species. I have been informed that you have detailed technical and requirements of particular aspect for the study on cetacean, including: science-based research methodology on cetacean stock assessment; the use of various techniques for cetacean species identification; actual observation survey practice onboard. I do strongly hope that these kinds of knowledge and experiences could provide you as a basis for effectively implementation of the programs related to the cetacean study in your country which will be also benefit to the regional. Consequently, you have also provided us a set of recommendations and suggestions for the way towards effective implementation of the regional program on cetacean study.

During this training, I hope that you have enjoyed this 3-day program of activities. This blends of formal and informal interaction among experts and country representatives contributing to the great benefit of both regional and national initiatives related to cetacean study in the region.

I would like to acknowledge the support of the Japanese Government to make this training happened, as well as many thanks to all resource persons that mainly coming from Department of Marine and Costal Resources, and also many thanks to participants for your great contributions and valuable inputs to this training. I would also like to thank my SEAFDEC staff for their excellent support and preparation in organizing this important event.

Ladies and gentlemen, that concludes our business here. Thank to all, once again, for your cooperation and support, and thanks to you active and constructive participation. Hope that we will meet again.
Thank you very much.