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Convention on the Conservation of
Migratory Species of Wild Animals

UNEP/CMS OFFICE – ABU DHABI
United Arab Emirates

REPORT OF THE WORKSHOP ON

DEVELOPING A STANDARDISED INTERVIEW METHOD FOR RAPID DUGONG POPULATION AND THREAT ASSESSMENT

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Singapore

Marine Research Foundation
Sabah Malaysia

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1. Introduction

Dugongs (*Dugong dugon*) can be found in over 40 countries and territories through the Indo-Pacific. Unfortunately, populations decline have been reported from all subregions. The International Union for the Conservation of Nature (IUCN) classifies them as Vulnerable to extinction on a global scale.

Dugongs are vulnerable to anthropogenic influences due to their dependence on seagrasses which are restricted to coastal habitats and are often under increased pressure from human activities. Being slow breeders also exacerbates the risks. Traditional hunting, vessel strikes and incidental catch in fishing nets are the main direct impacts, with bycatch considered the largest threat to dugong populations, but little reliable information documents these impacts. Throughout most of the dugong's range, pressure comes from locally based artisanal fisheries. Recent evidence has highlighted the potential for artisanal fisheries in developing countries to have significant negative impacts on dugongs. Small-scale fisheries occur primarily in developing nations, and their documentation and management are limited or non-existent**,** precluding evaluation of bycatch impacts. Thus there is a need to assess dugong populations, quantify artisanal fishing effort and bycatch rates in data deficient areas.

Most dugong range states except Australia and the United Arab Emirates are developing countries with limited capacity to contain impacts on dugongs within sustainable levels. Sophisticated survey techniques that include conducting line transect surveys from ships or boats and airplanes have limited application in developing countries, because they require expensive and sophisticated equipment, trained support personnel, or cost too much. Therefore, more economical survey and research techniques, such as interviews, should be used to document these impacts in those countries where resources are limited.

The Rapid Bycatch Assessment through interview surveys, developed by Project GloBAL at Duke University is a useful tool to quantify the extent of marine mammal bycatch (see GLOBAL project, Global Bycatch Assessment of Long-lived Species, http://bycatch.env.duke.edu/). This methodology was trialled at seven sites across the globe. Unfortunately, inadequate descriptions of interview methodology and lack of standardised interview protocols meant that data reliability was difficult to assess and results across studies were often not comparable. A follow-up version of this survey, developed in consultation with social scientists and using the lessons from Phase I was used as a starting point for the development of a dugong-specific standardised survey.

This workshop brought together individuals with dugong and bycatch assessment background and experience who contributed to the design of the standardised interview survey protocol

based on the original method developed by Project GloBAL. This protocol was subsequently sent out for review to a wide-experience base, and revised accordingly.

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3. Welcoming Remarks

by Donna Kwan

Donna welcomed the workshop participants to Singapore, and explained the link between the workshop and the CMS/UNEP Dugong MoU.

"Abu Dhabi is supporting this workshop as part of its function as the Secretariat to the UNEP/CMS Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats in their Range *(*Dugong MoU) and organizer of Dugong Asia Sub-Regional Technical Workshop/Meeting. The dugong MoU has been in effect since 2007 and seeks to conserve and protect dugongs throughout its global range across over 40 countries. There are now 11 signatory states: Australia, Comoros, Eritrea, France (New Caledonia, Mayotte and Reunion Island), India, Kenya, Madagascar, Myanmar, Philippines, Tanzania and the United Arab Emirates (UAE). The UAE government provided 3.6 million USD between 2009 – 2011 for secretariat and technical support to the Dugong MoU, along with the MoU on the Conservation of African-Eurasian Birds of Prey and other regional important marine species, including marine turtles.

"In the lead-up to the First Official Signatory State Meeting of the Dugong MoU (to be held in Abu Dhabi on 4-6 December), the UNEP/CMS Office – Abu Dhabi is funding a number of regional (Range States) and country (Signatory) projects. Among those are the study of dugong populations in the waters of Madagascar, Mauritius and Rodrigues by the Community Centred Conservation (C3). In Asia, the Phuket Marine Biological Center (PMBC) has submitted a proposal to the CMS Dugong secretariat for funding to support a rapid survey of dugong status, distribution and impact of fisheries in Southeast Asia. This project, led by Thailand in collaboration with Myanmar, Malaysia, Viet Nam and Cambodia will be the first opportunity to pilot the standardised rapid survey method before extending its use to other range state sub regions (*including western Indian Ocean, Pacific Islands and South Asia)* to obtain information on dugong distribution, abundance and their habitats and impacts. This rapid survey method was the reason behind bringing together this group of technical experts in Singapore. Participants include Professor Helene Marsh, the world's leading dugong expert as well as Dr. Nicolas Pilcher and Patricia Davis, who trialled the RBA surveys from Project GloBAL, and Kanjana Adulyanukosol from the Phuket Marine Biological Centre (PMBC) who also has a long history of interview-based projects. The team is rounded out with John Reynolds, from the US Marine Mammal Commission, Ellen Hines, who has a long experience working in SE Asia on dugongs and other marine mammals, and Himansu Das from the Environment Agency in Abu Dhabi, which hosts the second largest dugong population in the world.

"On the 7th and 8th of April 2010, the PMBC, in collaboration with the Marine Research Foundation, will host a Technical Workshop as part of the South East Asia regional project to introduce the standardised rapid survey methodology, and train participants in its use. This workshop will invite participation from other Asian range states, including Indonesia, Philippines. It will also provide an opportunity to share information about each country's dugong conservation and management activities and set priorities in range states as part of the implementation of the Dugong MoU Conservation and Management Plan.

"I anticipate great things from the coming two days, and thank you for taking the time out of your busy schedules to help us all out. With that I look forward to working with you and seeing a standardised questionnaire format for use in the dugong range states."

4. Discussions and Summaries

Discussions among the participants begun after case study presentations by the following participants: Kanjana (Thailand), Patricia (Comoros and Madagascar), and Nicolas (Malaysia). Following this the participants reviewed the RBA Phase II survey questionnaire and adapted it to a dugong-specific tool, during which a number of key discussion points arose. The following section encompasses issues and topics highlighted during this process. Topics are categorized into four major themes titled Requisite Information, Interviewer, Interviewee, and Survey Design.

4.1 Requisite Information

- Lack of pre-exiting spatial data on fisheries

There's a need for a preliminary report from each country that covers data on the study area, particularly fishing villages and fishing operations, which has to be prepared before conducting actual surveys. Data required include information on number of sites or communities, location of fishing villages, timing of fishing operations and safety aspects (e.g., avoid areas of political unrest) throughout the study area. Fishery data could be obtained from the fishery department of each country. It would also be useful for interviewers to consult locals on the existence of certain villages stated on the map before embarking on expeditions as some maps are not up-to-date. This pre-existing information will allow a safe and sure way to obtain relevant data and surveys without wasting time and effort. In particular information is needed on:

Logistics	- Transportation Infrastructure
Safety	- Political or civil unrest
Timing	- Fishing operations
Unreliable map	- Village location

4.2 Interviewer

- Inexperience: Lack of Interviewing Skills/Techniques

Interviewers are often university students or volunteers / low wage temporary hires having adequate biological knowledge but inadequate knowledge of terminology used in the fishery, e.g., fishing gears and its measurements.

- Personality: Lack of Interpersonal Skills

Interviewers are often inexperienced in dealing with people from all walks of life, especially fishermen, to whom the interviewers often regard as having a lower status. In a worst-case scenario, fishers could be intimidated and data could not be collected.

Principal investigators should explain thoroughly the study objectives, methodology, and sampling design, and provide adequate training for administering interviews. Training should

also include interviewing techniques and introduction to fishing terminologies (e.g. fishing gears, net measurements) to prepare interviewers with unavoidable jargon and interpretation of fishers' responses. Well-informed interviewers will be in a better position to recognize and clarify strange responses during interviews and assess the reliability of information from each interviewee. Interviewers should possess a good background in fisheries and marine mammal, excellent interpersonal skills, and is not someone working with government agencies as it could lead to biased perception.

4.3 Interviewee

- Non Response / Fear of Risk of Participation

Legislation can cause interviewee to under-report (see 'Data Reliability' section) and to be reluctant to giving out information.

It is important to have good rapport with informants before starting an interview. Posters give-away is particularly helpful in certain countries, e.g. Thailand, as a friendly approach. However, another appropriate way to approach people is to first speak to the village elder and to call up a village meeting. The arranged village meeting is meant to raise people's interest and it provides people a way to talk freely and ask questions. This is also a clear sign of respect and villagers are often friendlier when the head of village had made an introduction. Interviewers should make clear from the beginning the interviewee's confidentiality, the risk of direct personal consequences from participation, and that surveys are conducted for scientific purposes to provide input to management. Furthermore, it is often advantageous to disassociate oneself from government agencies/fisheries enforcement personnel, maybe even present card of occupation as proof if necessary, to eliminate fears of government reprisals. Fishermen may also be more likely to participate if the interviewer is native to the study area.

- Memory Decay

Interviewers must learn to guide the interviewee. Some open-ended questions may be useful to improve interviewees' memory recall for factual questions and yield unanticipated insights. Interviewer could ask if there was any significant event during the year and animal was sighted. For example, if and animal was sighted in the same year a substantial port was built. This piece of information can help the interviewer in estimating the year the dugong was sighted. Survey questions have also been modified to have shorter temporal sampling frames and now start with questions about more recent events, as they are likely to yield more accurate data, since memory recall degrades with time.

- Inability to Read Maps / Determine Distances

Location may be estimated by interviewers based on indications/reference points given by fishers (e.g., somewhere near xxx village, xxx oil rig). It might also be deduced through information such as average speed of a boat and drums of oil (fishing terms/jargon used by fishers from Papua New Guinea, for example, when it comes to describing fishing distance).

Google maps, road maps and charts are useful when dealing with people who work better visually than verbally. Some people might be illiterate but they have good spatial skills. However, there are some cases where fishers are unable to read maps and do not have spatial understandings.

- Data reliability: Under-reporting / Over-reporting

Bycatch of discarded species or protected species has often been under-reported, presumably / in part because of perceived negative consequences of accurate reporting, particularly in areas where bycatch is prohibited. Willingness to provide information is likely to diminish if the provision of information is seen to be followed by imposition of restrictions on fishing activity (see 'Non Response/Fear of Risk of Participation' section). It is also possible that fishermen would over-report bycatch to impress interviewers, comply with perceived interviewer attitudes, or if they perceive opportunities to attract outside investments to their communities.

A 'Reliability Score' was initially suggested to assign to each survey to address the reliability of the data given by fishers when interviewers get suspicious. However, everyone agreed on including questions which enable detection of reliability to filter out unreliable records. The reliability of answers can be assessed by asking questions to which the interviewer already knows the answer and questions to which the informant could not possibly know the answer. A section of general evaluation was also included at the bottom of the survey for the interviewer to provide his/her comments to rate the honesty of interviewee during the interview process.

- Uncertainty in Species Identification

The use of clear and large graphics is very useful when trying to get fishermen to identify bycatch. This way, the identification of catches will be a lot more reliable.

4.4 Survey Design

The objective is to interview fishers in order to identify 'dugong risk areas' or 'trouble spots', where the number of dugongs and the threats to their survival are high. Risk is a combination of the likelihood of something happening and the consequences of it happening. Data obtained from fishery that provide information on dugong and fishing hotspots can be combined in order to identify areas where the likelihood of them being killed is greatest, by hunting, capture in fishing gear and vessel strikes. This information would then be incorporated into the geographical information system (GIS) as a tool for community visualization to allow management plans in reducing the risks to dugongs and their habitats.

4.4.1 Questionnaire

The questionnaire survey was modified based on the following criteria:

- Address Bycatch and Effort
  Questions were focussed on fishing activities (e.g., fishing effort, fishing location) and dugong sightings (e.g., common dugong hotspots).

- Spatial data
  Spatial data must be collected despite the fact that some interviewees are unable to read maps. Additional materials such as road maps, Google maps, and charts were also

added as options to accompany the questionnaire to assist interviewee in identifying locations.

- Quantifiable
  Numerical category was assigned to some of the questions so that results of one location can be put into context with another, and be extrapolated to larger areas.

- Scientific rigor
  Survey results have to have the capacity to be accurate and transit into management level.

- Address Conversion Factors/Confusing Terms
  Different countries report effort and fishery practices differently. In some countries, fishing effort may be deduced through number of boats, net size, and fishing duration. Also, some of the confusing terms were reworded.

- Order of prioritization
  The sequence of the questions was rearranged in a way that it allows more important questions to be asked first, followed by not-so-important ones. This was thought to be useful especially when the interviewee does not have the time to complete the whole interview process.

- Minimal Training
  Survey questions were designed in a way that they require minimal training; e.g., questions that provide aspects on the quality of the information were included.

- Cost effective
  Surveys require no equipment costs and thereby, no technical faults to be anticipated. This low cost survey can be applied to both short- and more repeatable in longer term.

- Issues vary in different countries
  Certain questions must adapt a degree of flexibility, e.g., bycatch is less of an issue in the Pacific than it is in South East Asia. In addition, some questions should be modified to address local issues and sensitivities (e.g., some utilization of the questions may not be sensible where harvest is legal), and therefore language should be adapted to the local/regional ways of speaking (e.g., “is it illegal to catch turtles” vs. “are turtles legally protected”).

5. Follow-up

5.1 Disciplinary Social Science Approach

An interdisciplinary team of natural and social scientists will be best equipped to design and implement interview-based research. The questionnaire will be reviewed by social scientists – questionnaire scientists, for example, rather than to rely on interviewer to read on reliability/honesty of interviewee. Dr. Nicolas Pilcher has asked the help from Lisa Campbell and Grant Murray, who are social scientists, Jeff Moore, who is a lead author on the RBA process, and Rebecca Lewinson, one of the key folk in the RBA process to review the outcome of the questionnaire and hopefully to provide us some insights on whether or not this survey is heading in the right direction. Similarly, Dr. Ellen Hines has sent the questionnaire to a faculty member of hers who specializes in interviews and human geography for review.

5.2 Ethical Considerations

All research proposals involving data collection involving human participants normally require prior ethical approval to ensure the safety, rights, dignity and well-being of the participants and those of the researcher. Ethical approval is a mechanism for ensuring and demonstrating that the design of the research respects the rights of those who are the participants of the research. Application for ethical approval can be made via a relevant university's ethics committee. Dr. Ellen Hines proposed to submit the questionnaire to the ethics committee of her University (San Francisco State University), where she is also a chair committee, for ethical inspection.

5.3 Trials

Pre-testing the questionnaire will serve as a trial run to allow us to identify potential problems in the future. Although this means extra effort at the beginning of a research project, the pre-test allows methods and logistics of data collection, if necessary, to be revised before starting the actual fieldwork. As a result, a good deal of time, effort and money can be saved in the long run as pre-test is usually easier to be conducted and less time-consuming and costly than conducting an entire pilot study. Louisa Ponnampalam, Helene Marsh (and her 'volunteered' student) and John Reynolds volunteered to run trials for the newly designed survey, and Nick sent it to his Project Manager in Papua New Guinea for trial.

6. Concluding Message from the Workshop

Rapid assessment interviews offer an attractive and relatively cheap method to acquire long-term and spatial data related to endangered species status and threats, and are recommended as an appropriate starting point to assess dugong populations in developing countries. The newly-designed questionnaire resulting from this workshop, created to address the issues and problems encountered while conducting surveys in the past, will be reviewed and revised prior to sub-regional testing. By the time this refined questionnaire is ready to be applied in the field, we envision a smooth-running interview survey process and to be able to address bycatch problems in more specific and focussed initiatives in the future.

7. Appendix (Survey Interview Version I)

INTERVIEWEE BACKGROUND

1. Name:_____

2. Age:_____

3. Gender: Male ☐ Female ☐

4. Have you previously participated in interviews related to:

Fishing ☐ Marine Mammals ☐ MPAs ☐ Ecotourism ☐ Sea Turtles ☐ Other ☐ None of these ☐

When did you participate?_____

Describe: _____

5. For how many years has fishing been your occupation?_____

6. Were your parents fishers? Yes ☐ No ☐ Were your Grandparents? Yes ☐ No ☐

7. Is fishing your primary occupation? Yes ☐ No ☐

8. Is fishing your only occupation? Yes ☐ No ☐

If No, what is(are) your other occupation(s)?_____

9. Which months do you normally fish (out of the last 12)?_____(if seasonal, indicate season start and end)

10. How many days each week do you fish?_____days (low season)_____days (peak season)

11. What is your position on the boat? I am the captain ☐ I am a crew member ☐

12. How many fishermen, including yourself, work on the boat?_____

13. How long is the boat you fish on?_____
(*Note to interviewer: provide answer in meters*)

14. Is the boat motorized? Yes ☐ No ☐

(if yes) Inboard ☐ Outboard ☐

15. What is the horsepower of the motor?_____

FISHERY INFORMATION

Note to interviewer: Respondent should answer these questions to describe his/her individual experience, not that of their community. Use illustrations to assist where necessary.

Habitat Codes: (D) Deep Water; (C) Coral; (S) Seagrass; (F) Fine Sediments; (M) Mangroves; (R) Rocks; (E) Estuaries; (U) Unknown

16. What type of fishing gear do you use?

Longline (many hooks) Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Hook and line (1 or few hooks) Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Purse seine or surround seine Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Beach seine Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Trawl or other towed nets Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Traps Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____

Gill or trammel nets Only ☐ Mostly ☐ Sometimes ☐ Season:_____
Habitat:_____Target:_____
Do you tend the nets when they are in the water? Yes ☐ No ☐
How long do you leave the nets in the water?_____hours
Do you fish during the day ☐ or night ☐?
What is the position of the gear? Surface ☐ Midwater ☐ Bottom ☐
Describe the net: Length_____Depth_____Mesh size_____
_____

Other (describe):_____
Only ☐ Mostly ☐ Sometimes ☐ Season:_____

Habitat:_____Target:_____

17. In what places do you normally fish?_____

_____

(*Use road maps, charts, Google Maps, whatever works and have interviewee point out areas*)

18. Do people in your village / community target sharks? Yes ☐ No ☐ No, but they are occasionally landed ☐

Please elaborate:_____
(*This can be area sensitive*)

DUGONG CATCH / BYCATCH

19. Have you ever seen a dugong? Yes ☐ No ☐ Do you have another name for it?_____

20. Tell me about the difference between a dugong and a dolphin?_____

21. How long do you think a dugong lives?_____Don't know ☐

22. Do you have any dugong experts in your village? Yes ☐ No ☐ Who?_____

23. What about in other villages? Yes ☐ No ☐ Who?_____

24. Do you see dugongs while fishing? Yes ☐ No ☐

25. How frequently have you seen dugongs? Once in my life ☐ A few times in my life ☐
Less then once a year ☐ Several times a year ☐
Every month ☐ Every week ☐ Every day ☐

26. Where do you find dugongs? Areas where you fish ☐ When travelling to fishing sites ☐
Other areas (describe):_____

27. Do people from other villagers / communities hunt dugongs? Yes ☐ No ☐ Don't Know ☐
Who?_____Any more details you wish to add?_____

28. Have people in your community ever hunted dugongs? Yes ☐ No ☐ Don't Know ☐
If yes, for how long?_____

29. Do they do so now? Yes ☐ No ☐ Don't Know ☐

30. How many people in your community hunted dugongs in the last year?_____

31. Do dugongs get entangled in fishing gear? Yes ☐ No ☐ Don't Know ☐
(*Note to interviewer: Refer to and complete attached table and mark locations on maps*)

32. Compared to when you started fishing, are dugong captures in fishing gear
Higher ☐ Lower ☐ Same ☐ Don't know ☐?
If higher or lower, why do you think this?_____

33. Do you know of any important dugong areas? Yes ☐ No ☐ Don't Know ☐
Where are these important dugong areas?:_____
(*also indicate on maps*)
Any more details about this you wish to add?_____

34. Do these important dugong areas change over time? Yes ☐ No ☐ Don't Know ☐

35. Have you ever seen dugongs mating? Yes ☐ No ☐ When?_____
If yes, where did you see dugongs mating?(*use maps*)?_____
Have you seen dugongs calving? Yes ☐ No ☐ When?_____
Where did you see them calving? (*use maps*)?_____

36. How many dugongs do you think might live in the important dugong areas? 10s ☐ 100s ☐ 1000s ☐

Don't Know ☐

37. When do you see dugongs? (*indicate months or seasons where possible*):_____

38. When was the last time you saw a dugong?_____(*if long time ago note the year*)

39. Did you catch any dugongs in the last year? Yes ☐ No ☐

If yes, how many in the last year? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

Was this is a typical number to catch in a year? Yes ☐ No ☐

If no, was it higher or lower than usual? Higher ☐ Lower ☐

40. How many in the last five years? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

41. How many in your life? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

41. What do you do (or would you do) with a dugongs if you caught one? *(do not lead interviewee)*

Eat ☐ Sell ☐ Use as Bait ☐ Other Use ☐ Discard (dead) ☐ Release (alive) ☐

If sold, what is the value? Meat_____Bone_____Skin_____Tusks_____

Tears_____Oil_____Genitals/Mammary Glands____

Other_____

SEA TURTLE CATCH / BYCATCH

42. Have you ever seen sea turtles? Yes ☐ No ☐ Do you have another name for them?_____

43. What species of turtles do you see? Green ☐ Hawksbill ☐ Olive Ridley ☐ Loggerhead ☐

Flatback ☐ Leatherback ☐ Don't know ☐

44. How long do you think a turtle lives?_____Don't know ☐

45. Do you have any turtle experts in your village? Yes ☐ No ☐ Who?_____

46. What about in other villages? Yes ☐ No ☐ Who?_____

47. Do you see turtles while fishing? Yes ☐ No ☐

48. How frequently have you seen turtles? Once in my life ☐ A few times in my life ☐

Less then once a year ☐ Several times a year ☐

Every month ☐ Every week ☐ Every day ☐

49. Where do you find turtles? Areas where you fish ☐ When travelling to fishing sites ☐

Other areas (describe):_____

50. Do people from other villagers / communities hunt turtles? Yes ☐ No ☐ Don't Know ☐

Who?_____Any more details you wish to add?_____

51. Have people in your community ever hunted turtles? Yes ☐ No ☐ Don't Know ☐

If yes, for how long?_____

52. Do they do so now? Yes ☐ No ☐ Don't Know ☐

53. How many people in your community hunted turtles in the last year?_____

54. Do turtles get entangled in fishing gear? Yes ☐ No ☐ Don't Know ☐
(*Note to interviewer: Refer to and complete attached table and mark locations on maps*)

55. Compared to when you started fishing, are turtle captures in fishing gear

Higher ☐ Lower ☐ Same ☐ Don't know ☐?

If higher or lower, why do you think this?_____

56. Are there any important turtle areas? Yes ☐ No ☐ Don't Know ☐

Where are these important areas?_____(*also indicate on maps*)

Any more details about this you wish to add?_____

57. Do these important areas change over time? Yes ☐ No ☐ Don't Know ☐

58. Do you see mating turtles? Yes ☐ No ☐ When?_____Where (*use maps*)?____

59. How many turtles do you think might live in these areas? 10s ☐ 100s ☐ 1000s ☐ Don't Know ☐

60. When do you see turtles? (*indicate months or seasons where possible*):_____

61. When was the last time you saw a turtle?_____(*if long time ago note the year*)

62. Did you catch any turtles in the last year? Yes ☐ No ☐

If yes, how many in the last year? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

Was this is a typical number to catch in a year? Yes ☐ No ☐

63. How many in the last five years? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

64. How many in your life? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

65. What do you do (or would you do) with a turtle if you caught one?

Eat ☐ Sell ☐ Use as Bait ☐ Other Use ☐ Discard (dead) ☐ Release (alive) ☐ *(do not lead interviewee)*

If sold, what is the value? Meat_____Bone_____Skin_____Oil_____

Shell_____Other_____

(Note differences by species where possible and if available)

DOLPHIN CATCH / BYCATCH

66. Have you ever seen dolphins? Yes ☐ No ☐ Do you have another name(s) for them?_____

67. What species of dolphins do you see (describe)?_____

Any other cetaceans (describe)?_____Don't know ☐

68. How long do you think dolphins live?_____Don't know ☐

69. Do you have any dolphin experts in your village? Yes ☐ No ☐ Who?_____

70. What about in other villages? Yes ☐ No ☐ Who?_____

71. Do you see dolphins while fishing? Yes ☐ No ☐

72. How frequently have you seen dolphins? Once in my life ☐ A few times in my life ☐

Less then once a year ☐ Several times a year ☐

Every month ☐ Every week ☐ Every day ☐

73. Where do you find dolphins? Areas where you fish ☐ When travelling to fishing sites ☐

Other areas (describe):_____

74. Do dolphins get entangled in fishing gear? Yes ☐ No ☐ Don't Know ☐
(*Note to interviewer: Refer to and complete attached table and mark locations on maps*)

75. Compared to when you started fishing, are dolphin captures in fishing gear

Higher ☐ Lower ☐ Same ☐ Don't know ☐?

If higher or lower, why do you think this?_____

76. Are there any areas where you see dolphin regularly? Yes ☐ No ☐

If yes, describe:_____(*also indicate on maps*)

77. How many dolphins do you think might live in these areas? 10s ☐ 100s ☐ 1000s ☐ Don't Know ☐

78. When do you see dolphins? (*indicate months or seasons where possible*):_____

79. When was the last time you saw one?_____(*if long time ago note the year*)

80. Did you catch any dolphins in the last year? Yes ☐ No ☐

If yes, how many in the last year? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

Was this is a typical number to catch in a year? Yes ☐ No ☐

81. How many in the last five years? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

82. How many in your life? 0 ☐ 1-2 ☐ ≤10 ☐ >10 ☐ Specifics (*if available*):_____

83. What do you do (or would you do) with a dolphin if you caught one? *(do not lead interviewee)*

Eat ☐ Sell ☐ Use as Bait ☐ Other Use ☐ Discard (dead) ☐ Release (alive) ☐

PERCEPTIONS

84. Compared to when you started fishing, are dugong numbers today

Increasing ☐ Declining ☐ Same ☐ Don't know ☐

Why do you think this?_____I don't know ☐
(*interviewer to determine what other impacts may be driving the trend*)

What about turtles? Increasing ☐ Declining ☐ Same ☐ Don't know ☐

Why do you think this?_____I don't know ☐

What about dolphins? Increasing ☐ Declining ☐ Same ☐ Don't know ☐

Why do you think this?_____I don't know ☐

85. Do you think there will always be dugongs in the sea? Yes ☐ No ☐ Don't Know ☐

If yes or no, why?_____

86. Do you think there will always be turtles in the sea? Yes ☐ No ☐ Don't Know ☐

If yes or no, why?_____

87. Do you think having dugongs around is important? Yes ☐ No ☐ Why?_____

What about turtles? Yes ☐ No ☐ Why?_____

What about dolphins? Yes ☐ No ☐ Why?_____

88. Are seagrass areas important? Yes ☐ No ☐ Why?_____

89. Are dugongs legally protected? Yes ☐ No ☐ Don't know ☐

Turtles? Yes ☐ No ☐ Don't know ☐

Dolphins? Yes ☐ No ☐ Don't know ☐

90. If yes, are these protections enforced? Yes ☐ No ☐ Don't know ☐

91. Have you ever found ☐ heard of ☐ dugongs, turtles or dolphins stranded on the shore? (*explain stranded if necessary*)

Dugongs Yes ☐ No ☐ Turtles Yes ☐ No ☐ Dolphins Yes ☐ No ☐

If yes, where (*also indicate on maps*)?_____

When and how many?_____

What happened to the animal?_____

92. What would you do or did you do if you found a stranded dugong/turtle/dolphin?_____

93. Are there any taboos related to dugongs? Yes ☐ No ☐ Don't know ☐

If yes, please describe:_____

94. Are there any taboos related to turtles? Yes ☐ No ☐ Don't know ☐

If yes, please describe:_____

95. Are there any taboos related to dolphins? Yes ☐ No ☐ Don't know ☐

If yes, please describe:_____

96. Are there any legends or rituals or stories about dugongs or turtles? Yes ☐ No ☐ Don't know ☐

If so, what are they?_____

Where / from whom did you hear it?_____

97. Additional stories / incidents you wish to report:_____

_____

_____

CONFIDENTIAL INTERVIEWER COMMENTS

98. How open and honest did the fisher seem about answering bycatch questions?

Very open/honest ☐ Somewhat open/honest ☐ Not honest ☐

99. How interested and engaged did the fisher seem with interview?

Very interested ☐ Moderately interested ☐ Bothered/ Not interested ☐

100. How certain did the fisher seem about answers to numerical questions?

Very sure ☐ Reasonable sure ☐ Unsure ☐

101. Why do you think this?_____

_____

_____

Record #	# individuals	Habitat	Size S,L	Mother - Calf Pair Y / N	Day / Night	Year	Month	Dead / Alive	Cause	Condition	Accidental / Direct	Reported Y / N	Notes

Habitat Codes: (D) Deep Water; (C) Coral; (S) Seagrass; (F) Fine Sediments; (M) Mangroves; (R) Rocks; (E) Estuaries; (U) Unknown

Cause: (G) Gill net, (O) Other Fishing Gear (specify in notes), (B) Boat Strike, (H) Hunting (D) Don't Know

Condition: (F) Fresh, (D) Decomposed

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STANDARDISED DUGONG CATCH/BYCATCH QUESTIONNAIRE

Rationale

In most countries where dugongs occur, numbers are small and most local people believe they are declining. If we wait for scientific data before initiating conservation actions, the dugongs will have disappeared before we get the data to prove that there is a problem. Most data on the distribution and abundance of dugongs and their habitats are not suitable for designing effective conservation actions. In addition, collecting such information using scientific techniques such as aerial surveys is beyond the infrastructure, resources and financial capacity of most countries.

An alternative and cost-effective approach is to interview fishers to identify '**dugong trouble spots'** where the number of dugongs and the threats to their existence are high. We need to be able to identify the areas where the likelihood of dugongs being killed is greatest by hunting, capture in fishing gear and vessel strikes, so that dugongs can be protected in their key habitats.

This information on dugongs and the threats to their existence can be combined in a geographical information system (GIS) to identify **'dugong trouble spots'** as a tool for community visualization that assists in enabling local peoples to explore the ways in which the risks to dugongs and their habitats can be reduced.

The conduct of standardized, culturally appropriate surveys can be done quickly, efficiently and cost effectively. The relatively low cost could facilitate multiple, "longitudinal" surveys at particular locations to assess changes over time, as well as collection of comparable data from a number of locations and range states.

In addition, the survey we propose is designed to collect data not only for sirenians (e.g., dugongs), but also sea turtles and cetaceans. Since the latter groups face similar conservation threats to those that jeopardize sirenians, the value of the surveys for identifying and focusing conservation actions extends far beyond that for sirenians alone.

Risk is a combination of the likelihood of something happening and the consequences of it happening. The likelihood of a dugong interacting with a fisher in an area generally increases with the number of dugongs and the number of fishers using gear that catches dugongs. The consequences of the interaction are greatest when adult dugongs, particularly females are killed.

To be effective, surveys must be conducted consistently and at the scale of whole countries. The survey will enable future efforts to concentrate on action which ensures that there are dugongs, cetaceans, and sea turtles around for future generations.