## Gulf of Mottama Project

# Local Ecological Knowledge and Rapid Bycatch Assessment for Coastal Marine Mammals

## IN THE GULF OF MOTTAMA

## TECHNICAL REPORT | 2024

**Reported by:**

Win Hte | Gulf of Mottama Project, International Union for Conservation of Nature (IUCN)
Yin Yin Htay | Point B Design + Training, Myanmar Coastal Conservation Lab
Su Su Maw, Moe Kyaw Kyaw Hein, Zun Pyae Oo
Myanmar Coastal Conservation Lab @ Point B Design + Training

**Supervised by:**

Dr. Tara Sayuri Whitty | Kiruna Inc.

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# 1 INTRODUCTION

Bycatch in small-scale fisheries is a global threat to marine mammals, complicated by its very direct yet complex linkages to livelihoods, governance, and challenging conditions for research, monitoring, and implementation (Brownell et al., 2019; Lewison et al., 2004; Moore et al., 2010). While the design and implementation of mitigation solutions is fraught with difficulties, another substantial challenge is the lack of basic data on marine mammal populations and bycatch rates in much of the world (Moore et al., 2010; Whitty, 2018). This information gap must be addressed, along with thoughtful, strategic efforts to meaningfully understand and engage communities at the conservation-livelihood interface while working with the local governance context (Brownell et al., 2019; Whitty, 2018).

Southeast Asia is home to threatened and endangered marine mammal species, including the Irrawaddy dolphin (*Orcaella brevirostris*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*), and Indo- Pacific humpback dolphin (*Sousa chinensis*). The former is Endangered, with six subpopulations assessed as Critically Endangered, while the other two species are Vulnerable (IUCN Red List). Though there is a strong community of local researchers and conservation groups whose efforts have substantially expanded in recent years, there is still widespread lack of data on local marine mammal populations, given the extensive coastlines in the region and logistical constraints (Ellen Hines et al., 2015). Bycatch in small-scale fisheries remains one of the top concerns in the region (Ellen Hines et al., 2015).

In the region, Myanmar is one of the countries with particularly sparse data (Ellen Hines et al., 2015). Work on coastal marine mammals has been limited to occasional surveys establishing species presence, without extending into further data collection, let alone dedicated conservation programs (Tint Tun personal communication). As of mid-2018, there were no active marine mammal research or conservation projects on Myanmar's coastline (Tint Tun personal communication).

For this reason, the recent designation of Important Marine Mammal Areas (IMMAs) resulted in no IMMAs declared for Myanmar, though the Myeik Archipelago was listed as an area of interest (IMMA e-Atlas). However, given the extensive coastline of Myanmar and the documented presence of marine mammals throughout, it is likely that there are multiple other potential IMMAs that need to be assessed.

Furthermore, during the significant changes to Myanmar in the past decade as the country opened up, impacts to coastal ecosystems intensified. The country is currently undergoing a military coup, as well as the struggling through the COVID 19 pandemic, which are slowing down such economically driven developments. However, this also signifies fundamental disruptions to conservation efforts, with defunct government agencies, international projects unwilling to fund engagement with governments, and depressed livelihoods pushing local communities to more direct exploitation of coastal resources (including illegal fishing). The education sector has also been severely disrupted, risking the loss of the next generation of skilled environmental leaders as vast numbers of university faculty and students are now boycotting the government-run university system. As such, establishing a sustained, locally

focused program for marine mammal research, conservation action, and young researcher training is even more critical now than in recent years.

## 1.1 Marine Mammals in the Gulf of Mottama

Prior to 2018, there had been no survey effort on marine mammals in the Gulf of Mottama, a turbid, shallow body of water east of the Ayeyarwady Delta and north of the Myeik Archipelago (Tint Tun, personal communication, (Holmes et al., 2014)). Through work on general fisheries management as part of the multi-sector Gulf of Mottama Project (working across natural resources and conservation, livelihoods, and governance), Dr. Tara Whitty learned from local fishers that they regularly saw small cetaceans in their fishing grounds. This prompted a series of Local Ecological Knowledge (LEK) surveys with villages along the Gulf of Mottama coast, conducted by Dr. Whitty with Wint Hte and Yin Yin Htay of the Myanmar Coastal Conservation Lab (MCCL).

During the initial 2018 LEK surveys, respondents described the presence of at least Irrawaddy dolphins and finless porpoises likely extending up to the Sittaung River. This includes two documented instances of capture (one deliberate, one bycatch) of finless porpoises along the Sittaung River, with one occurring near the river mouth and the other on a tributary.

Results from these LEK surveys led to the first boat-based marine mammal surveys in the area in late 2018 and early 2019, with sightings confirming the presence of Irrawaddy dolphins (*Orcaella brevirostris*), Indo-Pacific finless porpoises (*Neophocaena phocaenoides*), and Indo-Pacific humpback dolphins (*Sousa chinensis*). This broadened the scope of the Gulf of Mottama Project's (GoMP) conservation component, and MCCL was contracted by GoMP to lead marine mammal research and conservation efforts.

## 1.2 Critical Knowledge Gap

To move forward with meaningful coastal cetacean conservation in the Gulf of Mottama, we need to fill these key knowledge gaps:

- Population abundance for the three species in the Gulf of Mottama area
- Distribution of the three species in the Gulf of Mottama area, including identifying potential hotspots, and whether (and how) this has been changing with time.
- Annual rate of bycatch of each of the three species in Gulf of Mottama small-scale fisheries
- Avenues for bycatch mitigation, including possible technological solutions (gear alterations or changes to gear deployment), research into feasible livelihood alternatives, and community- based momentum to avoid potential conflict through heavily top-down measures from the Department of Fisheries.

## 1.3 Goal and Objectives

To address these critical knowledge gaps, this project's integrated approach encompasses the following objectives:

- Estimate the population abundance of three cetacean species in the Gulf of Mottama through line transect surveys.

- Test and establish an acoustic monitoring program for Indo-Pacific finless porpoises in the Gulf of Mottama for future population monitoring work.
- Estimate the annual bycatch and bycatch mortality rate for the three species of coastal cetaceans in the Gulf of Mottama.
- Determine the current distribution of these three cetacean species in the Gulf of Mottama, including the Sittaung River, through expanded LEK survey efforts.
- Engage communities in the monitoring, stranding response, and conservation campaigns of Gulf of Mottama marine mammals.
- Assess the community potential, motivations, and interest to initiate community-based marine mammal conservation zones (especially in Chaung Zone EMU of GoM) and establish these zones in collaboration with local communities and stakeholders.

Among these objectives, the report focuses on estimate the annual bycatch and bycatch mortality rate for the three species of coastal cetaceans in the Gulf of Mottama with key findings from the local ecological knowledge and rapid bycatch assessment interviews.

# 2 METHODS

## 2.1 Local Ecological Knowledge and Rapid Bycatch Assessment (LEK & RBA)

As there is no marine mammal related research conducted in the Gulf of Mottama, information on distribution of marine mammals in the area is limited. For that reason, the study applied Local Ecological Knowledge and Rapid Bycatch Assessment to understand both historical and current distributions of marine mammals, annual bycatch rate from small-scaled fisheries, identify types of animals being caught, trends over the years, patterns of consumption and use of animals, and learn feelings and stories from local communities about marine mammals.

"*Local Ecological Knowledge (LEK) defines as knowledge and experiences that local communities have about the natural world around them and it is similar to Traditional Ecological Knowledge (TEK)- traditional information passed down through generation about the natural world, natural resources, and management of natural resources*" (Whitty, 2020). A type of LEK, Rapid Bycatch Assessment (RBA), is a way to estimate the number of animals which are caught accidently each year, measured by doing the interview. RBA can be a sensitive topic, but it can help evaluate if bycatch is a major conservation threat for marine mammals. Through RBA interviews, the research estimates total bycatch accidents in an area by identifying the fishing gears causing the bycatch, the number of bycatches happen in the fishing gear, the number of people using these gears in the interview, and the number of people in the same area who are using the fishing gear.

### 2.1.1 Study Area

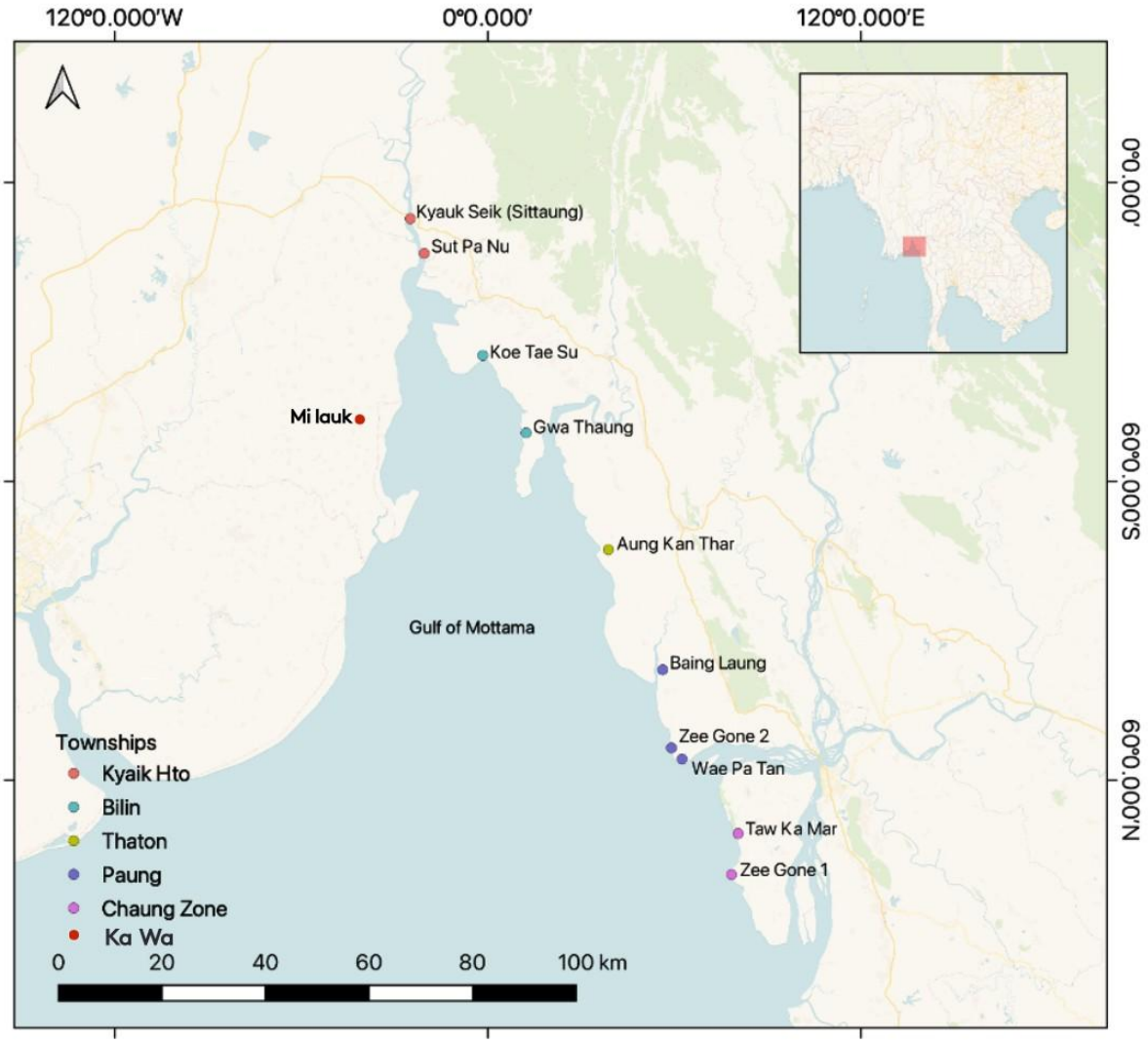


**Figure 2.2.** The map showing the villages where the LEK and RBA interviews are conducted from 2019-2023

The pilot interviews were conducted in Zee Gone, Chaung Zone Township, Mon State in 2019. Following the pilot interview, the study extended to fishing villages along the coast (within 10 miles from the shore) of the Southern and Northern part of the Gulf of Mottama. The site selections were based on location of the villages on the map, suggestions from the pilot interviews, current and historical events of marine mammal sightings and strandings. From 2019 to 2023, the study accomplished interviewing 11 villages in 6 townships in Mon and Bago as shown in Figure 3.2. Villages in the Southern part of the coast include Zee Gone, Taw Ka Mar (Chaung Zone Township), By Laung, Wae Pa Tan, Zee Gone (Paung Township), Aung Kan Thar (Thaton Township). The Northern part of the coast include Koe Te Su, Gwa Thaung (Bilin Township), Su Pa Nu, Kyauk Seik (Kyaik Hto Township), and the North-west part of the coast include Mi Lauk village, Kawa Township, Bago Region. **In 2024, the MCCL team could not extend the interview due to the political conflict and its sensitivity.**

### 2.1.2 Field Interviews

The LEK and RBA interview consisted of both qualitative and quantitative questions, and they were conducted through Key Informant Interviews (KII) and Fisher Interview (FI).

**Key Informant Interview (KII):** The interviews were conducted with village leaders and/or experienced fishers in the community to understand the context and background of the target fishing community.

**Table 2.1.** Sample frame of LEK and RBA interviews in each study village.

| Village | Township | Total fishing household (#) | Sample household (#) | Sample household (%) |
|---|---|---|---|---|
| Kyauk Seik (Sittaung) | Kyaik Hto | 70 | 22 | 31.43 |
| Sut Pa Nu | Kyaik Hto | 50 | 20 | 40.00 |
| Koe Tae Su | Bilin | 46 | 8 | 17.39 |
| Gwa Thaung | Bilin | 10 | 6 | 60.00 |
| Aung Kan Thar | Thaton | 50 | 17 | 34.00 |
| By Laung | Paung | 68 | 10 | 14.71 |
| Zee Gone 2 | Paung | 80 | 19 | 23.75 |
| Wae Pa Tan | Paung | 80 | 28 | 35.00 |
| Taw Ka Mar | Chaung Zone | 42 | 11 | 26.19 |
| Zee Gone 1 | Chaung Zone | 65 | 37 | 56.92 |
| Milauk | Kawa | 30 | 11 | 36.66 |

**Fisher Interview (FI):** The in-depth interviews were conducted with active fishers by using purposive sampling method in the selected communities. The sample size for each village is tabulated in Table 3.1. Although it is expected to interview 25% of the total fishers in each community, some villages had higher percentages, but some had lower mainly due to availability of fishers to be interviewed. The questionnaire is composed of three main sessions such as: Respondent background and fishing effort, Marine Mammal Sightings/trends, bycatch, stranding, and perception about dolphins and porpoises included in the interview. Recognizing high biodiversity of the gulf, the interviews also integrated questions on stranding and bycatch of other marine megafauna including rays, sharks, and sea turtles. For identification of animals, the researchers applied identification cards. Each interview was facilitated by 2-3 researchers (at least one experienced researcher was included in each session) and took about 25-45 minutes.

### 2.1.3 Data Analysis

The field data were enumerated into Excel as soon as the data collection was completed. The quantitative data were analyzed in Excel using descriptive statistics. To analyze qualitative data, the team mainly applied thematic analysis by coding the data using Excel. For each piece of qualitative information, different codes were assigned from a standardized list of codes to identify the main theme covered by that piece of information. Then, they were quantified and evaluated the insights provided by the data. For spatial information, the estimated coordinates of events were identified on Google Map and then the maps were developed on QGIS (3.10.3-A Coruña).

# 3 RESULTS

## 3.1 Local Ecological Knowledge and Rapid Bycatch Assessment

The local ecological knowledge and rapid bycatch assessment (LEK & RBA) interviews were conducted with 189 fishers from 11 coastal villages of the GoM. The overview of estimated bycatch events and historical distribution of marine mammals through stranding events reported in the interviews were mapped in Figure 3.5. In general, the marine mammals were distributed along the east coast of the gulf as well as accidental deaths from bycatch in SFF is recorded in the area except in the Bilin Township.

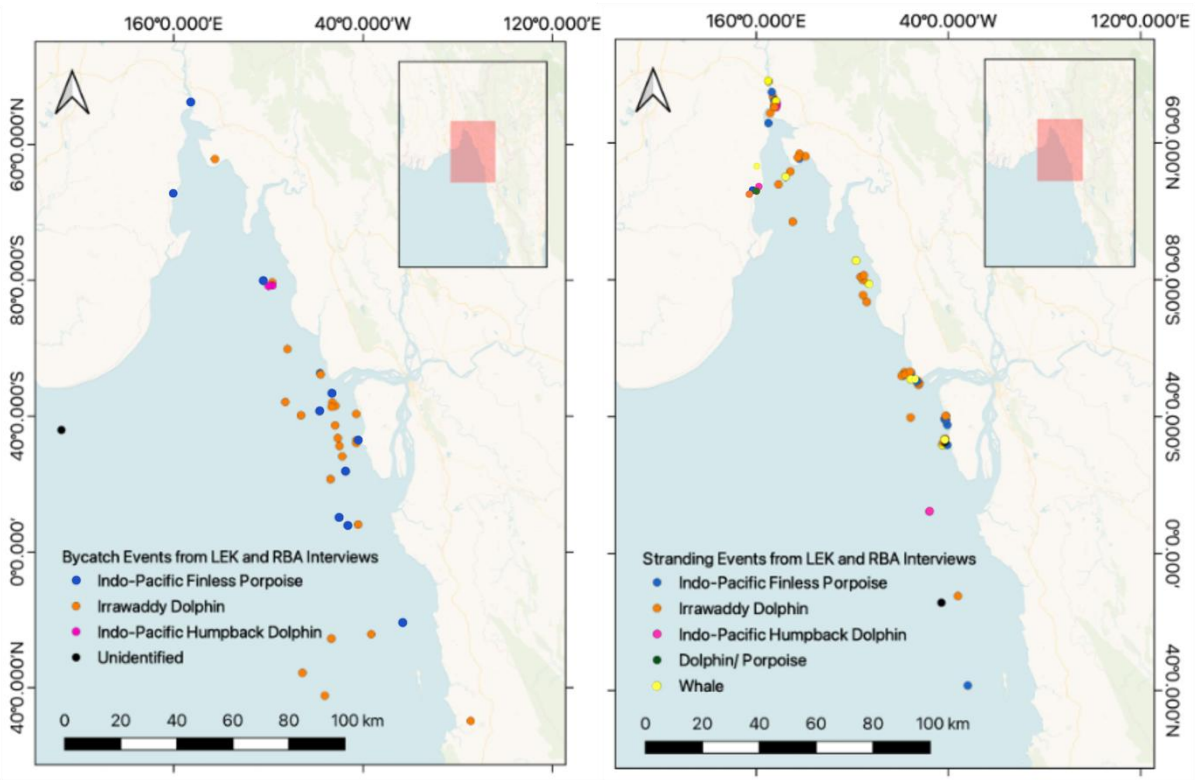


**Figure 3.5.** Estimated locations of bycatch and stranding events recorded in the LEK and RBA interviews from 2019 to 2022.

### 3.1.1 Marine Mammal Bycatch in the Gulf of Mottama

A total of 133 bycatch events were recorded through LEK & RBA interviews of which 71 were Irrawaddy dolphins, 45 were finless porpoises, 12 were humpback dolphins and 5 were unidentified species.

As shown in Table 3.4, the highest bycatch events (n = 42) were in Wae Pa Tan village (Paung Township) where both small and medium scale fisheries are operating in both nearshore and offshore fishing areas. It was followed by Aung Kan Thar village of Thaton Township with 26 events recorded, and Zee Gone with 23 bycatch events. In all villages except Kyauk Seik and Zee Gone villages, Irrawaddy dolphins were the most threatened by the incidental deaths in SSFs.

However, the bycatch to finless porpoises is more common in Zee Gone and Kyauk Seik villages. Significant numbers of bycatch of humpback dolphins were recorded in Zee Gone and Aung Kan Thar.

**Table 3.4.** Rate of marine mammal bycatch of different cetaceans in each study village.

| Village | Np | Ob | Sc | Others | Total |
|---|---|---|---|---|---|
| Zee Gone | **11** | 8 | 3 | 1 | **23** |
| By Laung | 0 | 0 | 0 | 0 | **0** |
| Kyauk Seik | **12** | 4 | 1 | 1 | **18** |
| Wae Pa Tan | 8 | **32** | 1 | 1 | **42** |
| Zee Gone (Paung) | 4 | 5 | 0 | 0 | **9** |
| Aung Kan Thar | 7 | **11** | **6** | 2 | **26** |
| Taw Ka Mar | 0 | 6 | 1 | 0 | **7** |
| Sut Pa Nu | 1 | 3 | 0 | 0 | **4** |
| Gwa Thaung | 0 | 1 | 0 | 0 | **1** |
| Koe Tae Su | 1 | 1 | 0 | 0 | **2** |
| Milauk | 1 | 0 | 0 | 0 | **1** |
| **Total** | **45** | **71** | **12** | **5** | **133** |

**Note:** Np (Indo-Pacific Finless Porpoise), Ob (Irrawaddy Dolphin), Sc (Indo-Pacific Humpback Dolphin)

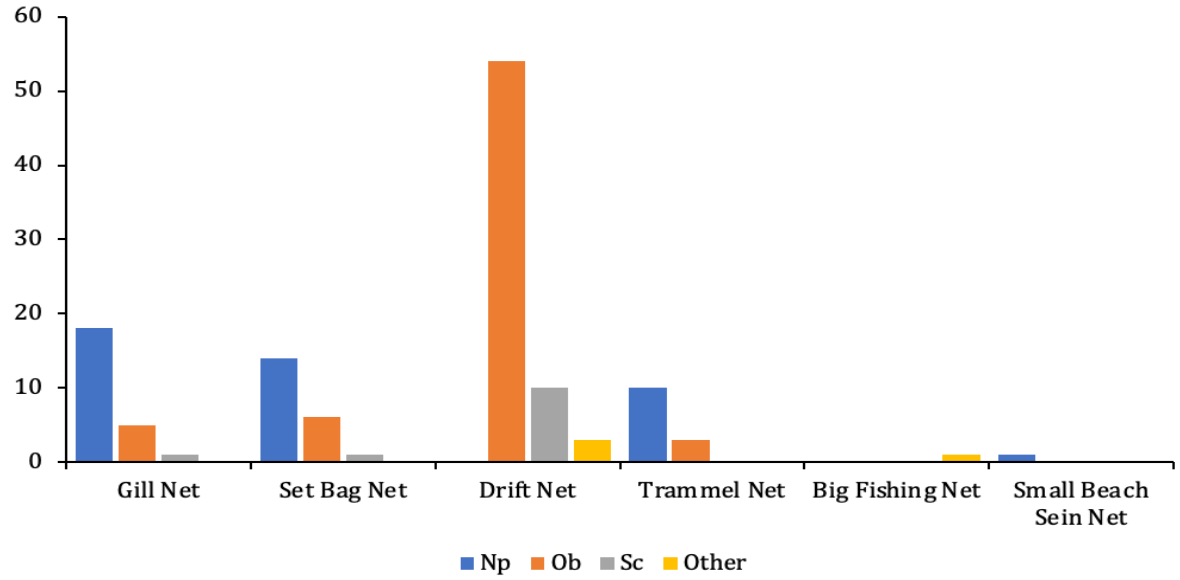


**Figure 3.6.** Major fishing gears contributing to the bycatch of marine mammals in the study area.

The top three most important fishing gears for SSFs in the study village are tabulated in Table 3.5. The drift nets were most important fishing gears followed by set bag nets and trammel nets. The three major fishing gears which caused the accidental death of Irrawaddy dolphins were drift net (n = 54), set bag net (n = 6) and gill net (n = 5) as shown in Figure 3.6. For finless porpoises, gill net (n = 18), set bag net (n = 14) and trammel net (n = 10) were major causes of deaths from bycatch.

**Table 3.5.** Top 3 most important fishing gears in each study area.

| Villages | Gear 1 | Gear 2 | Gear 3 |
|---|---|---|---|
| Zee Gone | Set Bag Net | Gill Net | - |
| By Laung | Trammel Net | - | - |
| Kyauk Seik | Drift Net | Trammel Net | - |
| Wae Pa Tan | Drift Net | - | - |
| Zee Gone (Paung) | Set Bag Net | Drift Net | - |
| Aung Kan Thar | Drift Net | - | - |
| Taw Ka Mar | Drift Net | Long Line | Set Bag Net |
| Sut Pa Nu | Drift Net | - | - |
| Gwa Thaung | Drift Net | - | - |
| Koe Tae Su | Drift Net | Set Bag Net | - |
| Mi Lauk | Drift Net | - | - |

#### 3.1.1.1 Reported Consumption

The study recorded the consumption of bycaught marine mammals in the fishing communities on the eastern bank of the gulf. The highest consumption was in the form of food, which is highest in Wae Pa Tan (n = 25), Zee Gone (Paung) (n = 13) and Aung Kan Thar (n = 11). The consumption as food is not only within communities but also traded to other communities with high monetary values. Mostly, if the animals were caught far from shore, the fisher deskin and beheaded the animals to maintain the freshness of the meat. Traditionally, the meat is consumed by cooking raw meat or dried meat. In recent years, diverse dishes were created by the communities such as making salad with the fins, fermenting the head to last longer and taste better, and creating curry with internal organs. In addition, the unsaturated fatty oil produced from skin and bones of marine mammals are used for ointment and other medicinal purposes.

This consumption pattern is expected to be higher in demand as these dishes are also served in some local restaurants. Therefore, the study also recorded some anecdotal data indicating that there were target hunting of marine mammals in the area to fulfill the higher demands.

**Table 3.6.** Reported number of respondents on how the community consumes meat or parts of cetaceans in the study area.

| Village | Use as medicine | Use as food | N/A |
|---|---|---|---|
| Zee Gone | 7 | 7 | 3 |
| By Laung | 2 | 6 | 1 |
| Kyauk Seik | 1 | 5 | 0 |
| Wae Pa Tan | 2 | **25** | 2 |
| Zee Gone (Paung) | 0 | **13** | 1 |
| Aung Kan Thar | 1 | **11** | 0 |
| Taw Ka Mar | 0 | 2 | 5 |
| Sut Pa Nu | 0 | 0 | 6 |
| Gwa Thaung | 0 | 1 | 1 |

| | | | |
|---|---|---|---|
| Koe Tae Su | 1 | 2 | 11 |
| Mi Lauk | 1 | 0 | 0 |

### 3.1.2 Local Ecological Knowledge on Marine Mammal Distribution in the Gulf of Mottama

#### 3.1.2.1 Marine Mammals Strandings in the Gulf of Mottama

According to the strandings and sighting records of marine mammals in the Gulf of Mottama, it is indicated that different species of marine mammals (as in Figure 3.5) in the past 20 years. Not only small cetaceans but also whales were recorded stranding in the area, and they are shown in Table 3.7. Zee Gone (Chaung Zone), Zee Gone (Paung), and Koe Tae Su (Bilin) were the villages where higher numbers of marine mammals were recorded. In addition, it is well-noted that the whales were traveled and/or stranded up to Kyaik Hto the uppermost part of the gulf.

**Table 3.7.** Recorded stranding events of marine mammals in the Gulf of Mottama.

| Village | Np | Ob | Sc | Dolphins/ Porpoises | Whales | Total |
|---|---|---|---|---|---|---|
| Zee Gone | 3 | 5 | 1 | 2 | 4 | **15** |
| By Laung | 0 | 0 | 0 | 0 | 0 | **0** |
| Kyauk Seik | 1 | 0 | 0 | 0 | 3 | **4** |
| Wae Pa Tan | 1 | 6 | 0 | 0 | 2 | **9** |
| Zee Gone (Paung) | 8 | 6 | 0 | 0 | 0 | **14** |
| Aung Kan Thar | 0 | 7 | 0 | 0 | 1 | **8** |
| Taw Ka Mar | 2 | 4 | 0 | 0 | 0 | **6** |
| Sut Pa Nu | 0 | 0 | 0 | 0 | 1 | **1** |
| Gwa Thaung | 0 | 0 | 0 | 0 | 0 | **0** |
| Koe Tae Su | 3 | 6 | 0 | 0 | 1 | **10** |
| Mi Lauk | 1 | 2 | 2 | 2 | 1 | **8** |
| **Total** | **19** | **36** | **3** | **4** | **13** | **75** |

#### 3.1.2.2 Observed Trends in Abundance

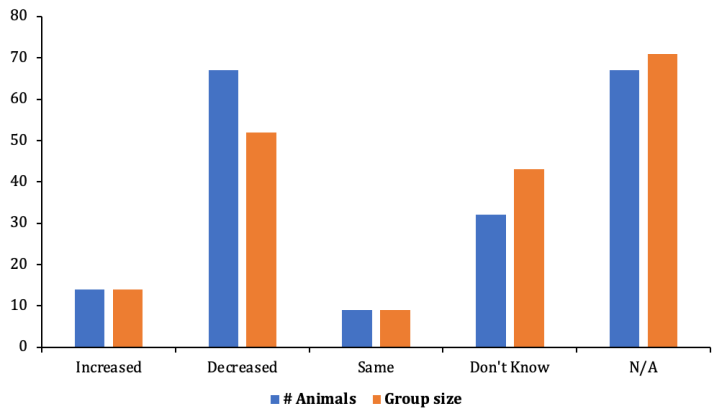


**Figure 3.7.** Response frequency on the trend of observation of marine mammals (number and group size).

According to the experiences of the respondents, the majority of the responses highlighted that the number of marine mammals and the group size were decreasing. The major causes assumed by the respondents were due to shallower water columns for the animals to travel to the upper part of the GoM as result of changes in hydrological process of the rivers and tidal systems in the gulf, heavy sedimentation process from erosion.

### 3.1.2.3 Feelings about Marine Mammals

According to the interviews, higher percentages of respondents stated they favored marine mammals as 51 respondents (27%) stated they like a lot and 83 respondents (44%) stated they just like them. There is no record of respondents who strongly dislike marine mammals but 11 (6%) disliked them. However, 22 (about 12%) stayed neutral on their feelings on the marine mammals.

The reasons for their preference are tabulated in Table 3.8. Most of the participants favor the dolphins and porpoises due to their aesthetic, adorable and charismatic behaviors (n = 96). The study also suggested some people (n = 20) believed that dolphins and porpoises save people in dangerous situations such as during storms or protected from predators like sharks. In addition, some of the respondents like the animals they felt emotionally connected with the dolphins (n = 17). Even the people who stated they did not care or like the marine mammals believed they have rights to survive as other animals and they key reasons they dislike is because they are scared of the animals.

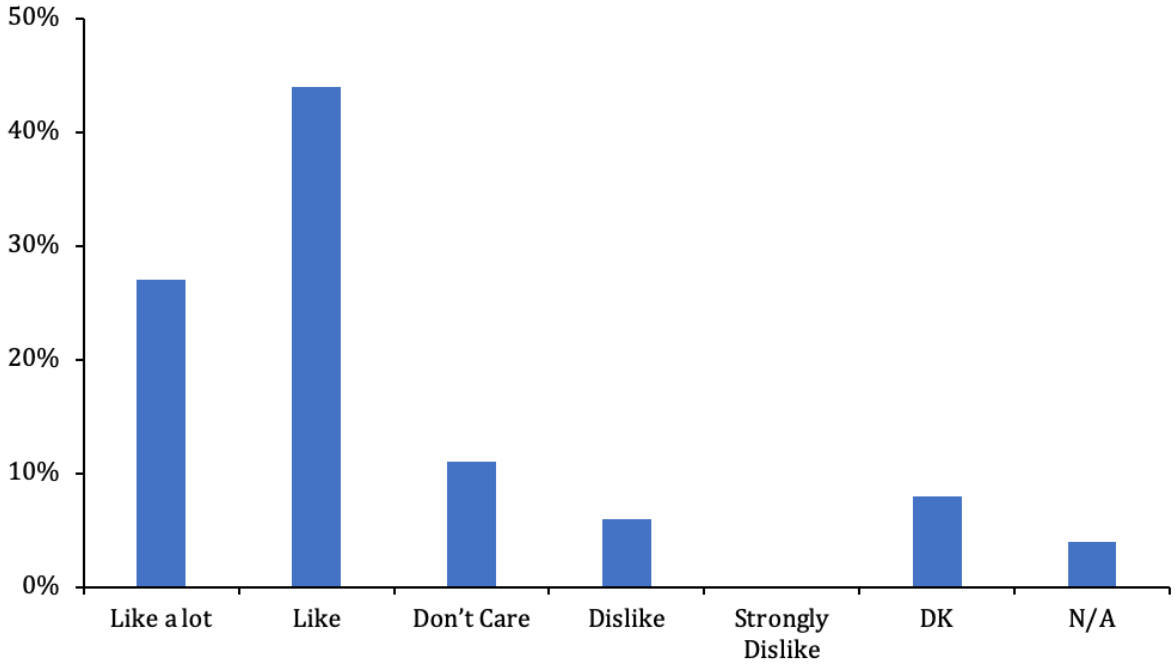


**Figure 3.8.** Percentage of responses on how the respondents feel about marine mammals.

### 3.1.2.4 Perceptions about Marine Mammals and their Conservation

In accessing the community perspectives on the importance of conservation of marine mammals, 46 of respondents (24%) presumed conservation is very important and 100 respondents (53%) stated conservation is necessary or important for the sustainability of marine mammals in the gulf. Only a few respondents do not recognize the importance of

conservation as shown in Figure 3.8. Relatively high number of people do not have opinions on the questions mainly because they do not understand the terms conservation or have belief that they do not have enough information to provide their perspectives.

The arguments stated by the respondents are shown in Table 3.9. Similar to the respondent's reasons for the likability of the dolphins/porpoises, most of the people (n = 42) stated they want to conserve marine mammals because they are adorable, charismatic, and a pleasure to watch them swimming or living freely in the water. The cultural beliefs and folklore about dolphins saving people's lives, spiritual beliefs against killing dolphins motivate the community to protect marine mammals. Some of the participants recognized the animals as rare or endangered with various threats including bycatch and therefore, they felt responsibility to take conservation actions and some respondents stated they are willing to participate in such actions as well.

On the other hand, some of the respondents stated that unlike other fish, the dolphins and porpoises are large and strong creatures and so, they can protect against their danger without the need of conservation activities. In addition, some people think that conservation of the animals would not be effective as they are consumable goods with high demands in the communities. Therefore, there were diverse opinions of communities on the conservation of marine mammals but most of them have positive perspectives or acceptance on the needs of conservation interventions for the existence of marine mammals in the gulf.

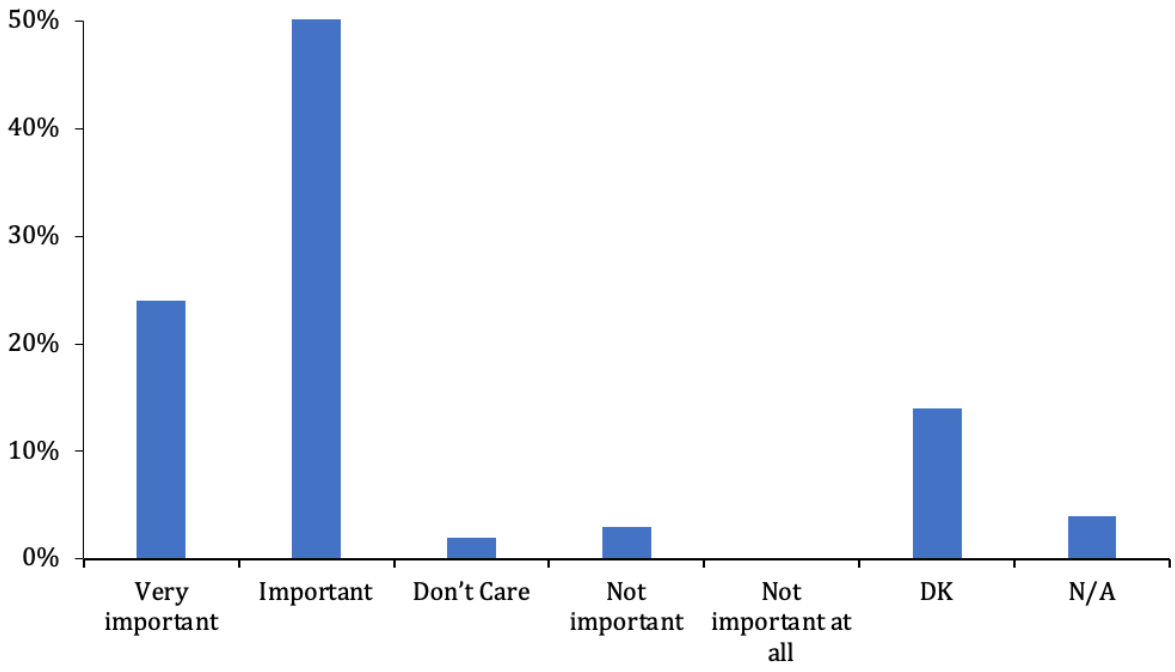


**Figure 3.9.** Percentage of responses on perception of the respondent on the importance of conservation of marine mammals.

**Table 3.8.** Arguments from the respondents on their feelings on marine mammals

| Level of Feelings | Feelings on marine mammals: Arguments | Kyaik Hto | Bilin | Thaton | Paung | Chaung Zone | Total |
|---|---|---|---|---|---|---|---|
| **Like a lot and like** | Adorable behaviors | 14 | 4 | 14 | 39 | 25 | **96** |
| | Do not harm to human | 6 | 2 | 0 | 6 | 11 | **25** |
| | Save people lives | 6 | 2 | 1 | 0 | 11 | **20** |
| | Emotionally connected | 4 | 1 | 3 | 1 | 8 | **17** |
| | Similar to human | 3 | 0 | 1 | 6 | 3 | **13** |
| | Hesitate to harm the animals | 3 | 0 | 0 | 4 | 3 | **10** |
| | Rare species | 3 | 0 | 2 | 1 | 0 | **6** |
| | Like to interact with marine mammals (such as feeding fish) | 0 | 0 | 1 | 3 | 1 | **5** |
| | Wish to see them survive | 1 | 1 | 0 | 3 | 0 | **5** |
| | Indicators of the health of the sea | 1 | 0 | 1 | 2 | 0 | **4** |
| | Different from other marine species | 1 | 0 | 0 | 0 | 2 | **3** |
| | Like dolphin meat | 0 | 0 | 1 | 2 | 0 | **3** |
| | Charismatic and smart | 2 | 0 | 0 | 1 | 0 | **3** |
| | Spiritual belief (such as killing marine mammals will bring bad luck) | 1 | 0 | 0 | 0 | 2 | **3** |
| | Protect from danger (such as sharks) | 0 | 2 | 0 | 0 | 3 | **5** |
| | Big | | | | | | |
| **Don't care** | Don't care | 1 | 0 | 2 | 6 | 3 | **12** |
| | Do not harm to human | 0 | 0 | 0 | 5 | 2 | **7** |
| | Only enjoy personally | 1 | 0 | 0 | 0 | 0 | **1** |
| | Save people lives | 0 | 0 | 0 | 0 | 1 | **1** |
| | Scared of marine mammals | 0 | 0 | 0 | 1 | 0 | **1** |
| | Like to eat dolphin meat | 1 | 0 | 0 | 0 | 0 | **1** |

| Level of Feelings | Feelings on marine mammals: Arguments | Kyaik Hto | Bilin | Thaton | Paung | Chaung Zone | Total |
|---|---|---|---|---|---|---|---|
| | Do not like to eat dolphin meat | 0 | 0 | 0 | 1 | 0 | **1** |
| | Wish to see them survive | 0 | 1 | 0 | 0 | 0 | **1** |
| | Emotionally connected | 0 | 0 | 0 | 1 | 0 | **1** |
| | Dolphin meats are demanding and higher prices | 0 | 1 | 0 | 0 | 0 | **1** |
| | No willing to kill dolphins | 0 | 0 | 0 | 1 | 0 | **1** |
| **Dislike** | Scared of marine mammals | 3 | 2 | 0 | 2 | 1 | **8** |
| | Wish to see them survive | 0 | 1 | 0 | 0 | 0 | **1** |
| | Do not like the dolphin meat | 0 | 1 | 0 | 0 | 0 | **1** |

**Table 3.9.** Perceptions and arguments on conservation of marine mammals

| Level of Perceptions | Perceptions on conservation of Marine Mammals: Arguments | Kyaik Hto | Bilin | Thaton | Paung | Chaung Zone | Total |
|---|---|---|---|---|---|---|---|
| **Very important and important to conserve** | Value the existence of marine mammals | 12 | 3 | 3 | 11 | 13 | **42** |
| | Do not harm the people | 6 | 2 | 5 | 13 | 12 | **38** |
| | Save or help people from dangers in the sea | 9 | 3 | 5 | 15 | 4 | **36** |
| | Rare or endangered species | 9 | 3 | 4 | 9 | 6 | **31** |
| | Emotionally connected | 1 | 0 | 1 | 8 | 8 | **18** |
| | Do not want to kill | 3 | 1 | 4 | 1 | 5 | **14** |
| | Important for the ecosystem | 5 | 0 | 3 | 9 | 6 | **23** |
| | Want to participate in bycatch response | 4 | 1 | 0 | 3 | 1 | **9** |
| | Do not like to eat dolphin meat | 2 | 0 | 1 | 1 | 2 | **6** |
| | Indicator of the health of the sea | 0 | 0 | 3 | 0 | 0 | **3** |
| | Threatened from bycatch in fishery | 0 | 0 | 1 | 2 | 0 | **3** |
| | Big and strong | 1 | 1 | 0 | 0 | 0 | **2** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Spiritual belief on saving the animals | 0 | 0 | 0 | 0 | 1 | **1** |
| **Don't care** | Playful and charismatic | 0 | 0 | 0 | 0 | 1 | **1** |
| | Do not harm the human | 0 | 0 | 0 | 0 | 1 | **1** |
| | Do not want to kill | 0 | 1 | 0 | 0 | 0 | **1** |
| | Important for the ecosystem | 0 | 0 | 0 | 0 | 1 | **1** |
| **Not important to conserve** | Consumable animals are difficult of conserve | 1 | 0 | 0 | 0 | 0 | **1** |
| | Big and strong and do not need protection | 0 | 1 | 0 | 0 | 0 | **1** |

# 4 DISCUSSION

The session discussed the key achievements, insights, limitations, and challenges in implementing activities from 2019 to 2022. Then, the recommendations are provided and activities in 2023 are also proposed in the session. The summary of the discussion is shown in Table 4.1.

The key discussions are as follow:

- In application of local ecological knowledge or traditional knowledge, the accidental mortality rate of small cetaceans in the SFFs are recorded and it will support baseline information in implementing sustainable and ecosystem approached fishery management actions in the GoM.
- The team effectively communicated and built trust with local communities in the hotspots of marine mammals which are essential for further conservation activities.
- Working together with the community is more challenging if there is not enough trust with the research team especially for sensitive issues such as bycatch in fishing activities.
- The synergic impacts of COVID 19 and travel restrictions from political instability, imposed delay in implementing research activities.
- Working with fishing activities needs extra efforts in coordinating with fishers as most of them are fishing year-round.
- The distinguishable conservation threats are identified as bycatch in SFFs and consumption of the marine mammals (which may drive forward target hunting if the consumer demands are higher). However, the threats are required to be quantified to effectively advocate for conservation actions.

## 4.1 Outlook for 2023

**Estimate annual mortality rate from LEK & RBA:** In 2023, the LEK and RBA interview will be expanding to the southern part of the gulf. In completion of the study, the team will estimate the annual mortality rate of small cetaceans due to SSF. The results will then be share with different stakeholders and government institutions for advocating the conservation of marine mammals from bycatch imposed by SSF.

**Assessment for mitigation of bycatch in SSF:** The research data suggested that the SFF is impacting significant threats in bycatch of marine mammals in the fishing gears. Therefore, MCCL will develop assessment on opportunities to mitigate the bycatch and the community perceptions on such interventions.

**Build capacity of youths and local people:** As MCCL is envisioned to be an independent youth-based group of multidisciplinary youths which embraced diverse values and passions for conservation, the team will keep working more inclusively by providing opportunities to wider spectrum of youths. MCCL will continue to work with alumni of MCCL and open more spaces for local youths outside of the network. The youths will be opened to more opportunities to participate in research and community awareness activities.

**Further funding opportunities for continuous efforts:** The marine mammal research and conservation activities need sustainable funding support to implement the activities successfully and continuously. Therefore, engaging with different organizations and funding sources are one of the priorities in 202

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