Evaluation of Marine Mammal Sighting Data and Compiled Records to Formulate Effective Mitigation Measures for Conservation in Myanmar

Introduction

Whales, dolphins, and porpoises are classified under the order Cetacea and are collectively referred to as Cetaceans. According to the 2022 reports from the Cetacean Specialist Group of the International Union for Conservation of Nature (IUCN), 93 species of Cetaceans (including whales, dolphins, and porpoises) have been identified. Based on data from surveys, compiled records, and global maps of Cetacea distribution, it has been observed that Myanmar's coastal waters, stretching 2,832 kilometers along the shoreline, are home to over 25 species of whales, dolphins, and porpoises. Department of Fisheries is working to ensure the success of activities related to the conservation and protection of marine mammals, as well as bycatch reduction. These efforts include issuing directives to prevent endangered marine mammal species, conducting marine mammals sighting surveys, organizing research expeditions, and promoting awareness-raising activities. Furthermore, as part of the Ayeyarwaddy River conservation efforts, from 2002 onwards, research has been carried out regarding the spread and occurrence of Irrawaddy dolphins between Mandalay and Bhamo City along the upper Ayeyarwaddy River. The department is also working on solutions to the risks faced by the Irrawaddy dolphins through various methods. So, this report aims to provide recommendations to support the success and effectiveness of efforts to reduce marine mammals bycatch in Myanmar.

Materials and Methods

The data and information included in this report are derived from the Regional Department of Fisheries along the coastline to the Environment and Endangered Aquatic Animal Conservation Unit. These include information on whale, dugong, dolphin, and Porpoise, which have been provided by the Regional Department of Fisheries, as well as data on species occurrence, distributional ecology, and fisheries interactions of cetaceans' surveys conducted by the Department of Fisheries. Additionally, the report includes public awareness programs from the Regional Department of Fisheries, educational poster campaigns, and the outcomes of directives and instructions issued by the Fisheries Department.

The methods were used SPSS Software for Frequency Data Analysis and Descriptive statistic based on the distribution of marine mammal sightings and awareness activities by region, as well as the use of ArcGIS Software to generate maps of the areas where marine mammal sightings were found during research expeditions. These methods are compared and presented alongside the implementation of awareness activities in the most frequently observed townships, districts, states, and regions.

Results

The Structure of Myanmar coastal Zones

The Coastal zones of Myanmar can be subdivided into three main areas, namely Rakhine Coast, Ayeyarwaddy Delta and Tanintharyi Coast. The Rakhine Coastal Zone is bounded by the Bay of Bengal in the west and the Rakhine Coast stretches 740 km from the Naff River to Mawdin Point. The upper part of the coastline is shallow and deltaic. The southern part is more or less rocky. Continental shelf down to 200 – meter depth is narrow compared to other areas. The Deltaic Coastal Zone consists of the entire river-mouth areas of three major rivers, Ayeyarwaddy, Sittaung and Thanlwin. It is bounded by the southern waters of the Adman Sea of the BOB. The Taninthary Coastal area is the longest coastal zone of Myanmar and is bounded by Andaman Sea in the west. It's also included Myeik Archipelago and Andaman Sea. Myeik Archipelago extends from Mali Island to Similand Island and contains about 800 islands covering an area of about 34,340 square kilometer and is lying up to 30 km off shore. Coral reef surrounds the outer islands and mangroves cover much of the inner island. Depending on the diverse coastal resources in Myanmar, Marine Mammal species also vary in their living habits based on region.

Marine Mammal Information from Complied Records by Species

The information and data related to this topic are derived from accidental bycatch, stranding, and release into the sea of marine mammals. This information is not directly related to the occurrence and distribution of marine mammals in the natural marine environment. However, these data should be prioritized and considered when conducting educational or research activities for the protection and conservation of marine mammals, particularly in townships

(a) Dolphin

From 2002 to 2024, among the 97 reported dolphins, 67 Irrawaddy dolphins were reported in the Ayeyarwaddy River, and these reported number of dolphins that collected due to stranding and entanglement in fishing nets along the river route in the upper part of Myanmar. Additionally, out of 30 dolphins of other species, 17 were in the Ayeyarwaddy Region, 3 in the Bago Region, and 1 in Mon State. In total, above 21 dolphins were safely released back into the sea.

(b) Dugong

The dugong (Dugong dugon) species can be found in areas along the Rakhine coastline of Myanmar, where seagrass beds are abundant. Records of strandings have been reported since 1966. Between 1989 and 2018, 12 dugong sightings were reported. Of these 12 dugongs, 5 were dugongs with unknown fishing gear involved, 2 were caught in driftnets, 1 was caught in a bottom drift net, 1 was caught in a seine net, and 4 were caught in shark and ray nets. (The 4 dugongs in shark and ray nets were caught between 1989 and 1998, before restrictions on shark and ray fishing were imposed.) The reported sightings have come from Gwa Township, Thandwe Township, and Taungup Township in Rakhine State, and from Shwe Thaung Yan sub-Township, under Pathein Township in the Ayeyarwaddy Region.

(c) Porpoise

The porpoise species found in Myanmar is the Finless Porpoise (*Neophocaena phocaenoides*), and between 2012 and 2024, reports have been sent regarding up to 10 porpoises. Among these 10 porpoises, 1 porpoise in 2017 and 2 porpoises in 2018 from Mon State ware safely released back into the sea**.**

(d) Whale

According to the information of the Environment and Endangered Aquatic Animal Conservation Unit under Department of Fisheries, from 2005 to 2024, up to 58 whales were reported to have been stranded. In 2016, a whale stranded on Man Aung Island in Rakhine State, and in 2023, another whale stranded in Shwe Thaung Yan Sub-township under Pathein Township, Ayeyarwaddy Region. These two whales were successfully released back into the sea. Records show that the remaining 56 whales, after being stranded, died.

Marine Mammal Information by Species

In the Ayeyarwaddy Region, there are 21 Dolphins, 4 Dugongs, 5 Porpoises, and 14 Whales; in Rakhine State, there are 2 Dolphins, 9 Dugongs, 1 Porpoise, and 24 Whales; in Tanintharyi Region, there is 1 Dolphin and 10 Whales; in Mon State, there are 3 Dolphins, 4 Porpoises, and 7 Whales; in Bago Region, there are 5 Dolphins; in Yangon Region, there are 2 Whales; and in the upper part of Myanmar, within the Ayeyarwaddy River, there are 65 Irrawaddy dolphins. In total, there are 178 marine mammals reported. Of these 178 marine mammals, 26 were safely released back into the sea.

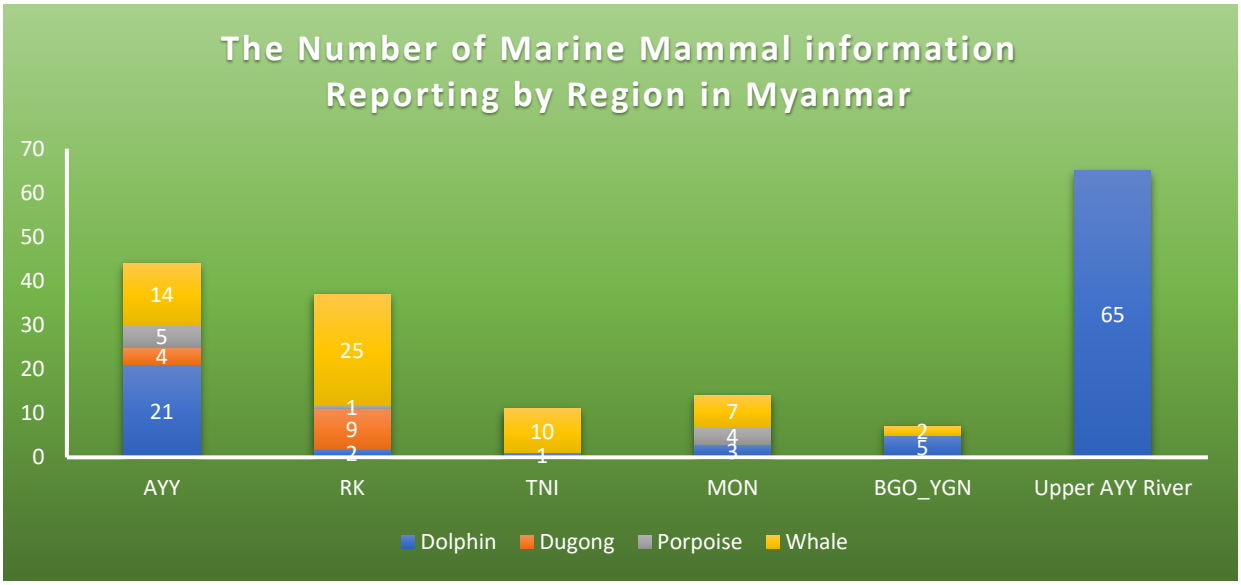
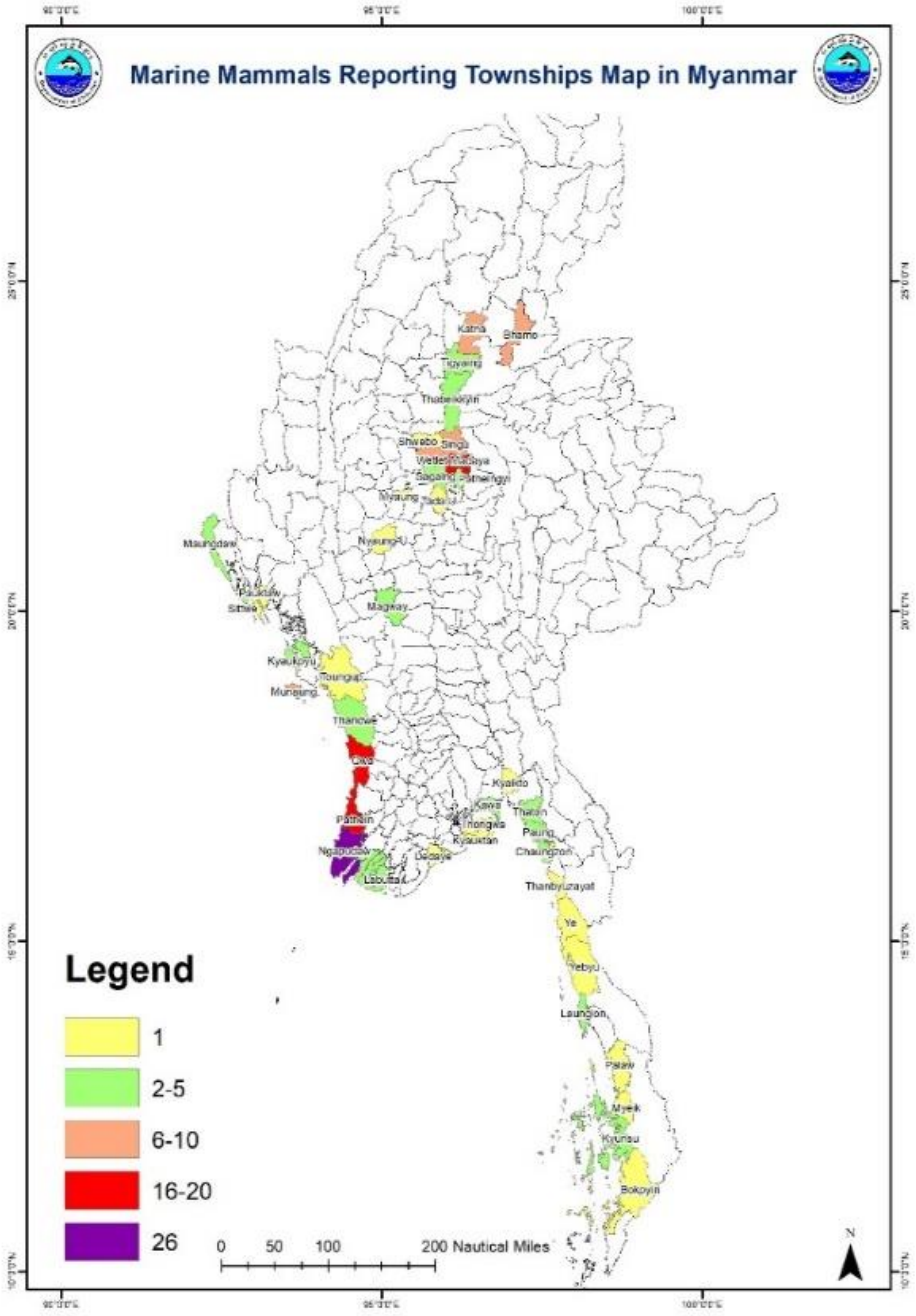


Figure (1): the number of Marine Mammal Information Reporting by Region in Myanmar

According to marine mammals' information received from the Regional Department of Fisheries, it was reported that along the Ayeyarwaddy River in Upper Myanmar, in Mandalay Region, Madayar Township, approximately 16 Irrawaddy dolphin species were reported, while in Sintgu Township, around 6-10 dolphins were reported. In Thapait Kyin Township and Pathein Gyi Township, about 2-5 dolphins were also reported. Additionally, in the Sagaing Region, in Wetlat Township and Katha Township, around 6-10 dolphins were reported, and in Htee Chaint Township and Sagaing Township, about 2-5 dolphins were reported. Moreover, reports from Magwe Township also reported of up to 2-5 dolphins. (All of these above data is not represented to the distribution and abundance of Irrawaddy dolphin in this township, only show stranding and

bycatch data.) Furthermore, it was noted in a research sighting trip conducted by Fauna and Flora International in January 2025 that approximately 7 Irrawaddy dolphins were observed that 1 in the waters within Magwe District and 6 in the water within Mandalay District, as documented in their report. (This is the report submitted to the Department of Fisheries with Myanmar language.)



Map (1) Showing The number of Marine Mammal information received by Township in Myanmar

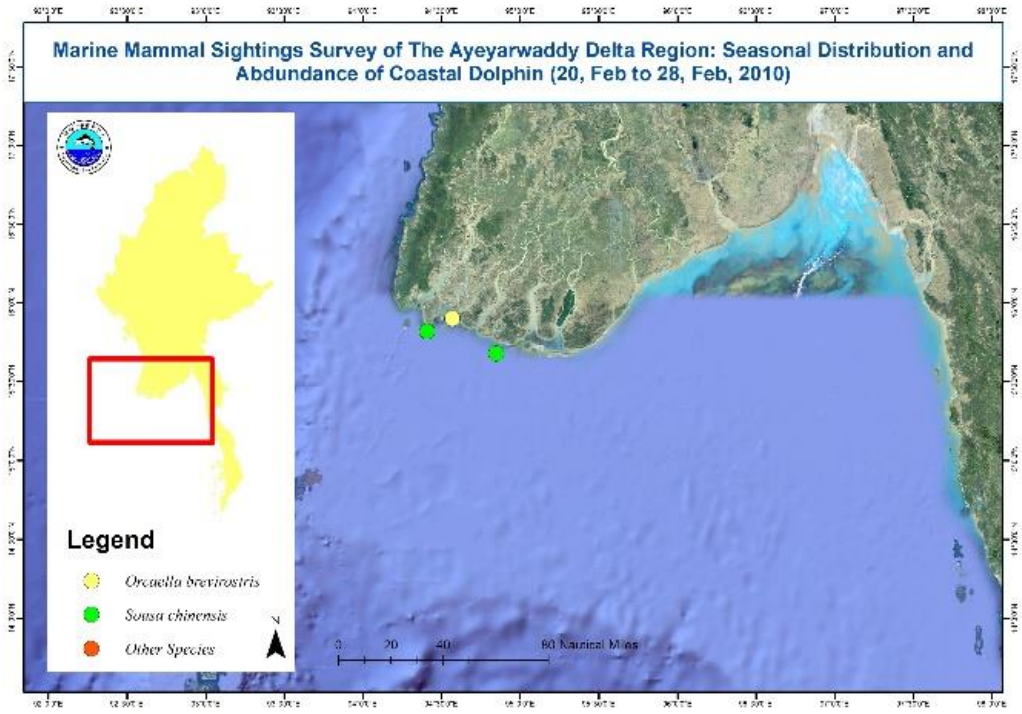
Along the coastline of Myanmar, the highest number of 26 Marine Mammals information have been received from Ngaputaw Township in the Ayeyarwaddy Region. The second-highest number between (16-20) has been reported from Pathein Township from Ayeyarwaddy Region and Gwa Township from Rakhine State, with the third-highest number between (6-10) reported from Manaung Township. The reports have been sent to the Department of Fisheries (Head Office). Other townships along the coastline have also submitted reports, including Maungtaw Township, Kyaukpyu Township, and Thandwe Township in Rakhine State; Latputta Township in the Ayeyarwaddy Region; Kawa Township in the Bago Region; Thaton Township, Paung Township, and Chaungzon Township in Mon State; and Longlone Township, Myeik Township, and Kyunsu Township in Tanintharyi Region. Marine Mammal reports with information have been submitted from these areas, with the number of animals ranging between 2 and 5.

Marine Mammal Sighting Survey Results

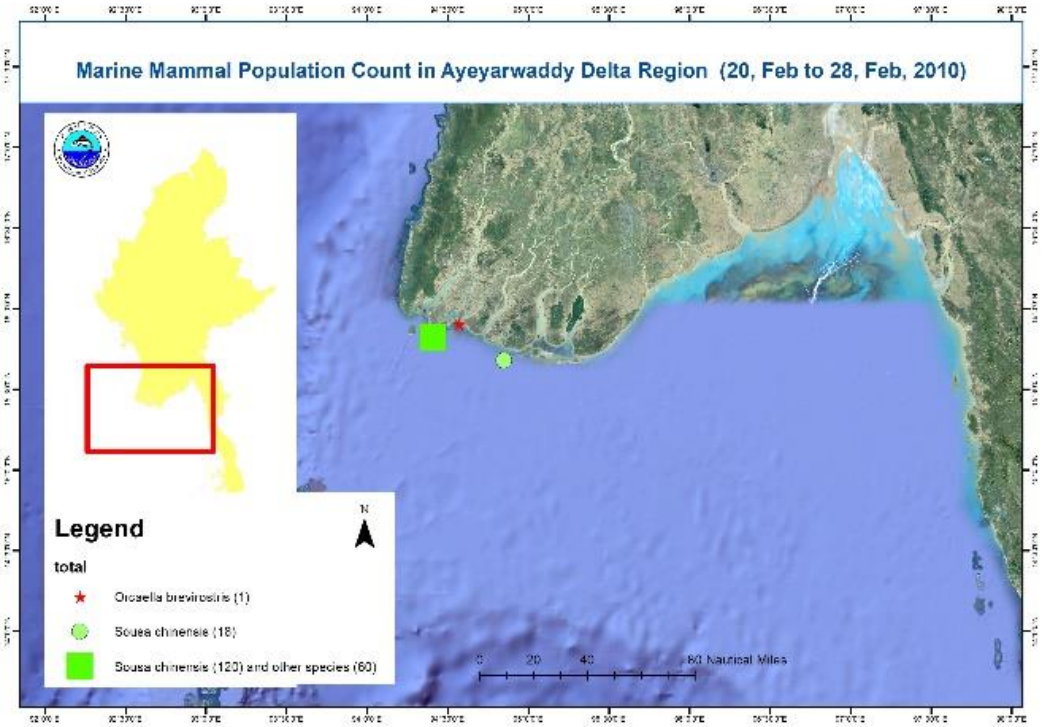
A lot of research expeditions related to marine mammals have been conducted along the Myanmar coastline.

(a) Ayeyarwaddy Delta Region

Among the research trips, from February 20th to February 28th , 2010, research was conducted along the coastline of the Ayeyarwaddy delta region, including the sighting survey of Irrawaddy dolphins and other dolphin species, as well as the conditions of their population and distribution. One Irrawaddy dolphin was found at the Ywe River Mouth, and between Thetkal Thaung River Mouth and Pathein River Mouth, a total of 120 Indo-Pacific Humpback Dolphins and 60 Pantropical Spotted Dolphins, which are CITES Listed species, were also observed. Additionally, between the Ayeyarwaddy River and the Pyanmalauk River, 16 Indo-Pacific Humpback Dolphins and 2 Pantropical Spotted Dolphins were found.



Map (2) : Seasonal Distribution and abundance of Coastal Dolphin in Ayeyarwaddy Delta Region



Map (3) : Coastal Dolphin Count in Ayeyarwaddy Delta Region

From November 2nd to 7th, 2016, a research study was conducted in the Mainmahla Island area within the Bokalay River, focusing on Irrawaddy dolphins sighting. Based on interviews with local Fishermen, it was discovered that the Irrawaddy dolphins live in the region only from December until April, before the rainy season begins. During this trip, there was no opportunity to document the Irrawaddy dolphins, but efforts were made to educate local fishermen on the conservation of Irrawaddy dolphins and the protection of endangered marine mammal species.

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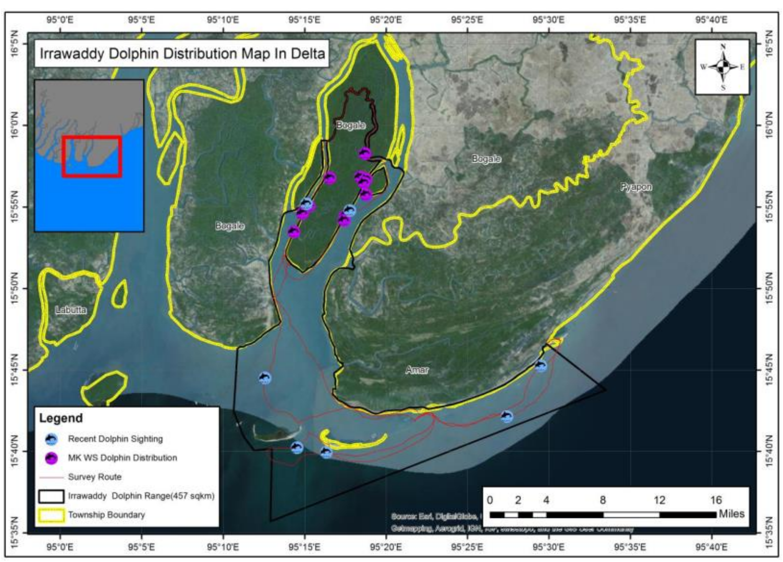
Figure (2) : Awareness Activities on Conservation of Marine Mammal during the Mainmahla Island Trip in November 2nd to 7th, 2016

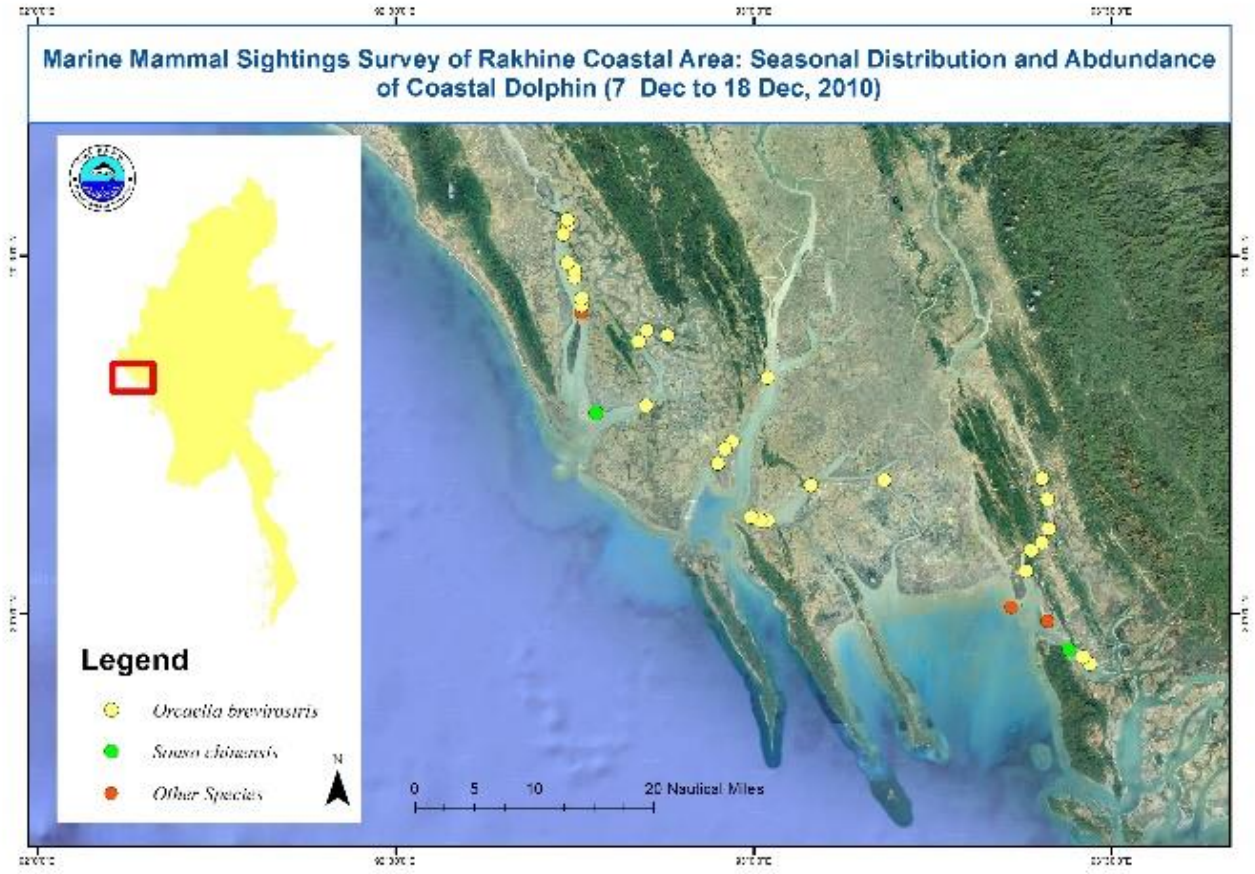
Another research trip conducted from January 5th to January 10th, 2018, recorded a total of approximately 19 Irrawaddy dolphins: 7 near Gayet Gyi Island, 1 near Gadongalay Island, 4 between Gadongalay Island and Gadon Gani village, and 7 within the Bogalay River.



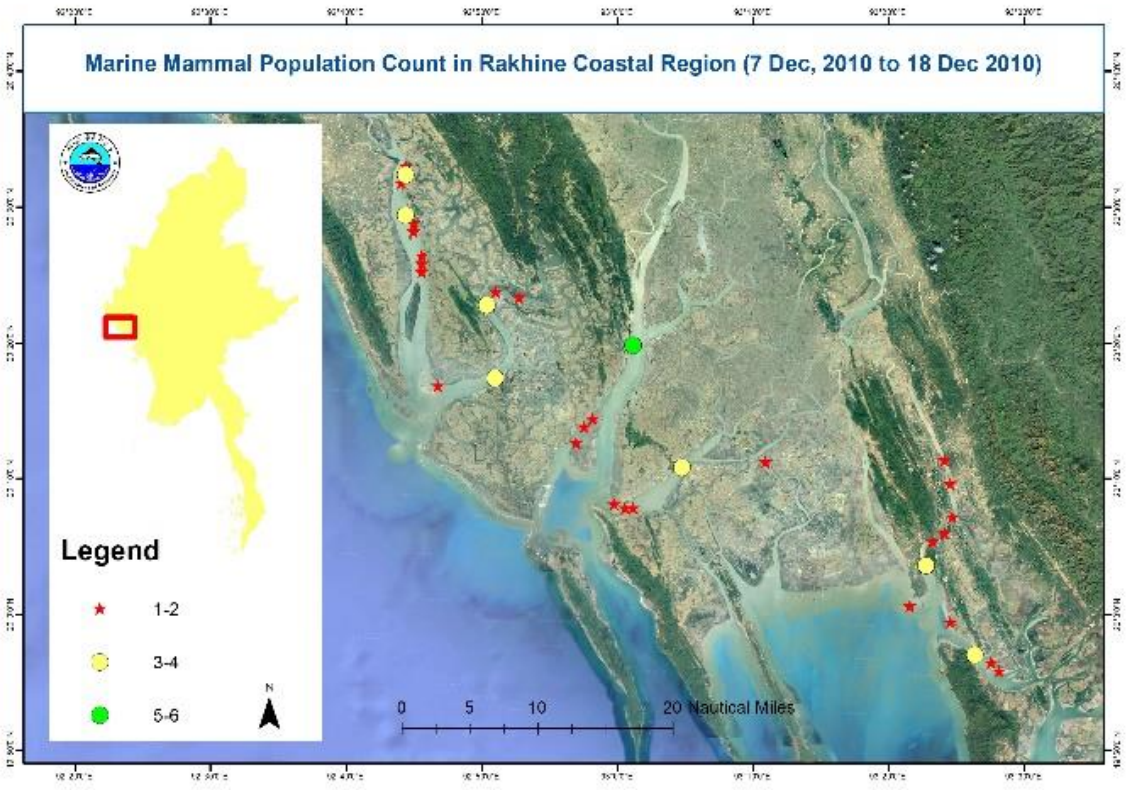
Map (4) Seasonal Distribution and abundance of Irrawaddy dolphin during the Mainmahla Island Trip in 5th to January 10th, 2018.

(b) Rakhine Coastal Region

From December 7th to 18th December, 2010, research was conducted on the distribution and abundance of Irrawaddy dolphins, including other dolphin species along the Rakhine coastline, specifically in the May Yu River, Kala Dan River, and Myaebon River areas. It was found that the Irrawaddy dolphins inhabit in the rivers are and the Indo-Pacific Humpback Dolphins in the river mouths (Coastal area). During the trip, the Irrawaddy dolphins were observed 30 times (with an average of 2 individuals per sighting, minimum 1 individual to a maximum of 5 individuals). This means that around 58 Irrawaddy dolphins, 5 Indo-Pacific Humpback Dolphins, and 4 dolphins that are difficult to identify were observed and recorded. The details of dolphin sightings, habitat and abundance conditions can be seen in the map below.



Map (5) : Seasonal Distribution and abundance of Coastal Dolphin in Rakhine Coastal Region



Map (6) : Coastal Dolphin Count in Rakhine Coastal Region

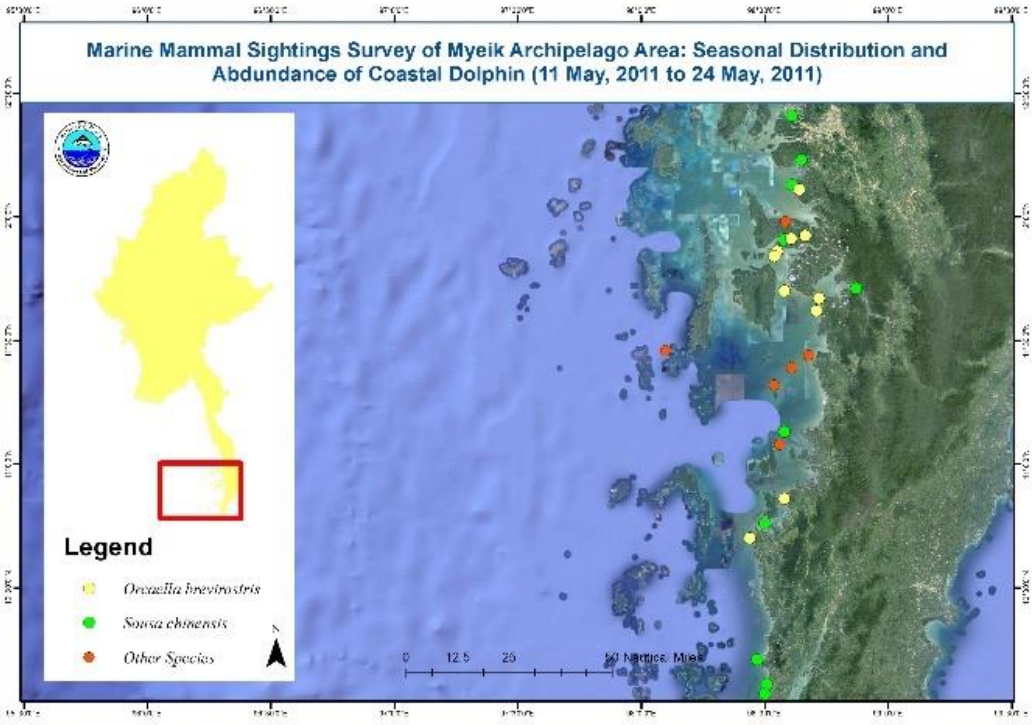
In addition, from March 18th, 2015, to February 24th, 2017, as documented in the 'Occurrence of Marine Fauna in Offshore Northwest Myanmar Report' by the Environment Resources Management (ERM) team, will be discussed. This report presents the frequency and population counts of marine species encountered over the three-year period. However, these numbers cannot represent the population of the marine species in Rakhine Area and can only provide an indication of the distribution and the species that inhabit in Myanmar. Therefore, only the species discovered and the frequency of their occurrences as identified will be discussed.

The report indicates that 15 species of marine mammals were found in Offshore Northwest Myanmar. These species include Bryde's whale, Humpback whale, Omura's whale, Sei whale, Indo-Pacific bottlenose dolphin, Pantropical spotted dolphin, Spinner dolphin, False killer whale, Long-beaked common dolphin, Melon-headed whale, Risso's dolphin, Short-finned pilot whale, Sperm whale, striped dolphin, and Common bottlenose dolphin.

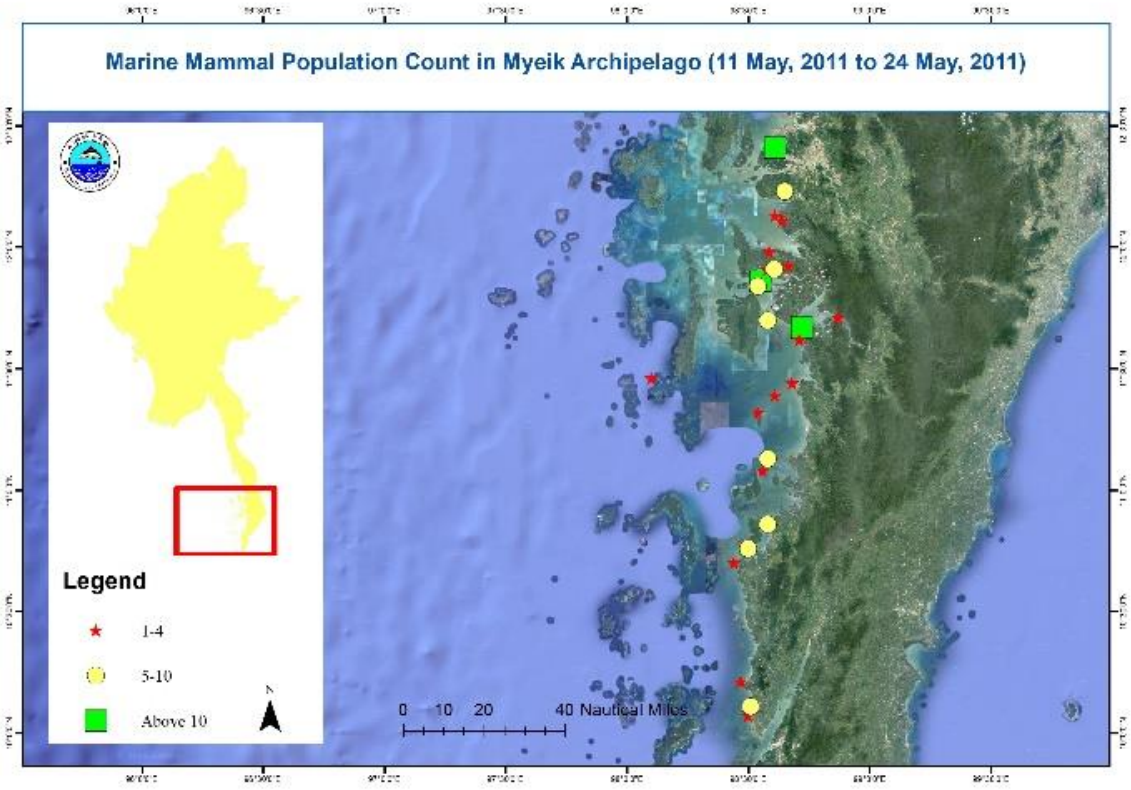
Environment Resources Management (ERM) reported that the most frequently encountered species by number of sightings was the spinner dolphin (n = 168), followed by Bryde's whales (n = 62) and Risso's dolphin (n = 28). The remaining 12 species were each sighted on fewer than ten occasions.

(c) Tanintharyi Coastal Area

From May 11th to 24th, May, 2011, research was conducted on the distribution and abundance of Irrawaddy dolphins and other dolphin species along the rivers and coastlines of the Myeik Archipelago. During this expedition, Irrawaddy dolphins were observed 10 times (with an average of 6 dolphins per sighting, ranging from a minimum of 1 dolphin to a maximum of 15 dolphins), Indo-Pacific Humpback Dolphins were observed 10 times (with an average of 5 dolphins per sighting, ranging from a minimum of 2 dolphins to a maximum of 15 dolphins), and unidentified dolphin species were encountered 6 times. In total, approximately 59 Irrawaddy dolphins, 53 Indo-Pacific Humpback Dolphins, and 7 unidentified dolphin species were recorded. The sightings, habitat conditions, and abundance of the dolphins during the expedition can be reviewed in the maps provided below.



Map (7) : Seasonal Distribution and abundance of Coastal Dolphin in Myeik Archipelago



Map (8) : Coastal Dolphin Count in Myeik Archipelago

In the research paper by Brian D. Smith and Mya Than Tun, published in 2008, which was studied from February 23, 2015, to March 6, 2015, in the Myeik Archipelago reported that Indo-Pacific bottlenose dolphins (n=15, mean group size=14.9, median=10.0, range=5-70; the largest group was a single detection but spread out in numerous subgroups), Indo-Pacific humpback dolphins (n=3, mean group size=10.8, median=15, range=8-20); spinner dolphins (n=4, mean group size=105.8, median=97.5, range=60-168), Irrawaddy dolphins (n=1, 12individuals), finless porpoises (*Neophocaena phocaenoides)* (n=1, five individuals), Bryde's whales (n=1, three individuals including a small calf).

So, the report means that the largest group of dolphins recorded in the study was the spinner dolphin group, which reached over 100 individuals. The Indo-Pacific humpback dolphins and Irrawaddy dolphins, with group sizes ranging from 5 to 20 individuals.

Marine Mammal Notifications and Instructions of Department of Fisheries

In order to conserve and protect marine mammals, the Department of Fisheries has issued Notification No. (1/2018) and (5/2022) instructing that no one shall capture, kill, injure, possess, transport, transfer, sell, or export to foreign countries any (12) CITES listed Marine Mammal species, whether whole or in part of their bodies, without proper documentation. In case any marine mammal is accidentally caught alive, it must be released immediately. Failure to comply with the instructions will result in action being taken in accordance with the Myanmar Fisheries Law.

In addition, the following activities have been carried out to obtain accidental bycatch information in order to ensure the success of the Marine Mammal Mitigation Measure;

(a) Marine Mammal species identification guide and their characteristics.

(b) Erecting Educational Poster for “Marine Mammal Conservation”.

(c) Awareness raising activities related with the conservation of Marine Mammals.

(d) In order to reduce the accidental bycatch of marine mammals in commercial fishing operations, the 'Guidelines for the Releasing of Marine Mammals' are being distributed.

(e) When the Marine mammal accidental bycatch, the information of injuries, release and death have to report with the provided form.

Figure (3): Guideline and Poster for Marine Mammal Conservation from Department of Fisheries.

In addition, fishery operators in Myanmar who are engaged in fishing activities are informed in advance that, in the future, they will need to carry out fishing gear modifications, including the use of reflective rope, color rope and reflective net in the trawl net, purse seine, drift net, and longline, as well as the installation and use of devices that emit sound waves. The Department of Fisheries will implement these fishing gear modifications once reliable research and studies on marine mammal bycatch reduction have been completed.

Public awareness raising activities for marine mammal conservation

Department of Fisheries conduct 211 times of public awareness raising training and erected educational poster in 29 townships along the coast between 2022 and 2024 on the marine mammal conservation, bycatch reduction and fisheries resources conservation.

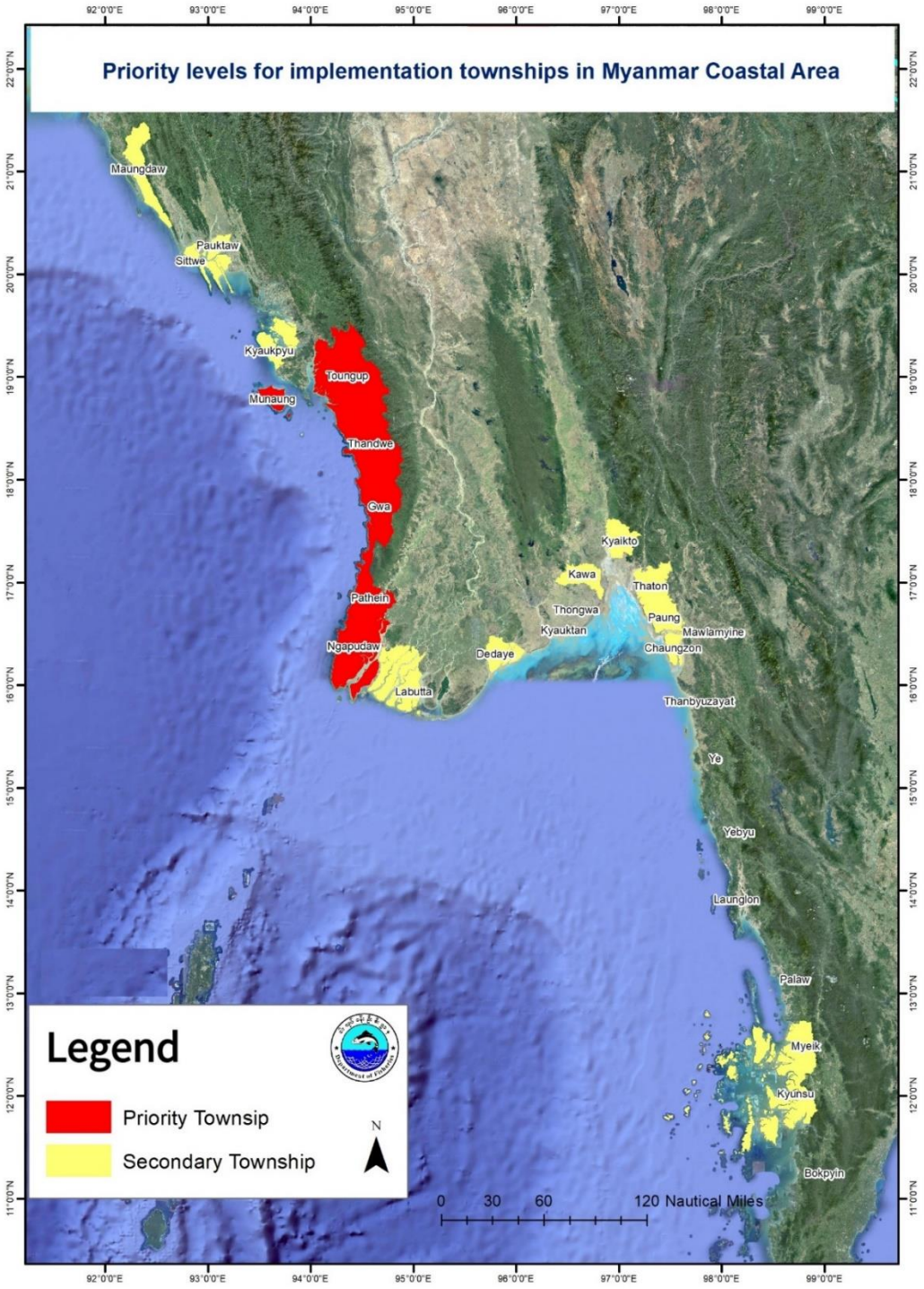
Discussions and Conclusions

According to records of accidental bycatch in some fishing gears, stranding data, and released data, as well as findings from sighting survey on the distribution and habitat of marine mammal species, marine mammals are found to be widely spread along the coastline of Myanmar. However, areas such as Manaung Township to Mawtin Point along the Rakhine coast are identified as priority areas. And area from Maungtaw Township to Sittwe Township, Latputta Township to Chaungzone Township (Gulf of Mottama), and Myeik and Kyunsu Townships are identified as secondary areas. These areas should be prioritized for awareness-raising activities and research initiatives for marine mammal conservation.

In addition, Township Officers from the Department of Fisheries along the coast of Myanmar should collect for educating fishermen engaged in nearshore fishing activities, compiling lists of fishing gear and marine mammal species with a high risk of interaction. Through this, it is possible to implement research plans that will help to reduce the accidental bycatch of marine mammals by making necessary modifications to fishing gear based on the type of fishing gear used.

As the Fisheries Department, the Regional Department of Fisheries in the coastal area provides Safety at Sea Training to Offshore Fishermen annually. It is essential to include a subject in these training sessions that can share knowledge related to marine mammals, such as Marine Mammal Protection and Conservation, and ensuring the provision of information. Whether from

nearshore or offshore fishing operations, efforts should be made to develop and implement plans to address accidental bycatch, release, and death of marine mammals.



Map (9): Priority level for the implementation of marine mammal conservation area.

The Department of Fisheries will need to be adapted and used fishing gear modification which is conducting international research and trials to reduce accidental bycatch of marine mammals such as using of reflective ropes, colored ropes, and weak ropes in the near future. To ensure that these fishing gear modifications are evidence-based, research should be initiated on the fishing gear currently in use in Myanmar. (For example, a comparison of the impact on marine mammals and total catch rate between fishing vessels using colored rope or nets in purse seine fishing gear and those not using such colored rope or nets)

Based on the information regarding the occurrence and distribution of marine mammal sightings along the coastline of Myanmar, data on bycatch in fishing gear, deaths and releasing marine mammals back to the sea, the proposed activities aim to enhance the effectiveness of the marine mammal conservation efforts currently being implemented in Myanmar.

Research and Development Division
Department of Fisheries, Myanmar
marineresources2@gmail.com
Office (36), Panita Road, Ottara Thiri Township, Naypyitaw

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