Jurnal Ilmu dan Teknologi Kelautan Tropis Vol. 11 No. 1, Hlm. 117-122, April 2019
p-ISSN : 2087-9423 http://journal.ipb.ac.id/index.php/jurnalikt
e-ISSN : 2620-309X DOI: http://dx.doi.org/10.29244/jitkt.v11i1.24774

ID THE MANTA : MANTA SIGHTINGS IN MANTA SANDY – RAJA AMPAT, WEST PAPUA-INDONESIA

ID MANTA : KEMUNCULAN MANTA DI SITUS MANTA SANDY – RAJA AMPAT, PAPUA BARAT - INDONESIA

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ABSTRACT

Manta ray (Mobula alfredi and Mobula birostris) is an endangered species that protected by international and national law. This species is vulnerable because of commercial fisheries and anthropogenic threats. These threats have impacted the species population worldwide. Raja Ampat is home for both species of the manta ray, and the area is protected with conservation status. Manta Sandy is located in Dampier Strait, is a popular dive site in Raja Ampat visited by thousands of tourist per year. It is vital to ensure the manta sightings in this area to maintain the tourist volume for local economic benefits. Utilization of photo ID and mark-recapture technique conducted to document the spots on the belly of manta ray that identify a unique pattern of each fish. This study conducted in low season from July to August 2018 for 15 days from 08.00-16.00 used two cameras of go pro hero 4 with extra battery power. The result documented time of manta sightings and species characteristic (size, sex, species, behavior, and color morphology). The camera trap recorded four manta rays where the two of them were new identified individuals.

Keywords : mark-recapture, monitoring, elasmobranch

ABSTRAK

Pari manta (Mobula alfredi dan Mobula birostris) adalah spesies langka yang dilindungi oleh hukum internasional dan nasional. Spesies ini vulnerable karena perdagangan perikanan dan ancaman aktivitas manusia. Ancaman ini telah berdampak pada populasi pari manta di seluruh dunia, Raja Ampat adalah rumah bagi kedua spesies pari manta, dan daerah tersebut dilindungi dengan status konservasi. Manta Sandy terletak di Selat Dampier, adalah situs penyelaman populer di Raja Ampat yang dikunjungi oleh ribuan turis per tahun. Sangat penting untuk memastikan kemunculan manta di daerah ini untuk mempertahankan jumlah wisata untuk keuntungan ekonomi lokal. Pemanfaatan ID foto dan teknik mark-recapture dilakukan untuk mendokumentasikan bintik-bintik pada perut pari manta yang mengidentifikasi pola unik dari setiap individu. Penelitian ini di lakukan di musim timur dan musim barat di tahun 2018 selama 45 hari dari pukul 08:00-16:00 menggunakan dua kamera go pro hero 4 dengan daya baterai ekstra. Hasilnya mendokumentasikan waktu kemunculan manta dan karakteristik spesies (ukuran, jenis kelamin, aktivitas dan morfologi warna). Kamera jebak merekam 68 individu pari manta di mana 17 adalah individu yang baru diidentifikasi.

Kata kunci : *mark-recapture, pemantauan, elasmobranch*

I. INTRODUCTION

Manta rays are subclasses of Elasmobranchii. Genus Manta knew consists of only one species of (monotypic), since the year 2009, the genus re-evaluated and decided is composed of two species of, that is a Reef Manta (Mobula alfredi) and Oceanic Manta (Mobula birostris) (Marshall *et al.*, 2009). Manta rays genus is a larger size and non-toxic like other stingrays because they do not have stings on their tails and they do not have a defense tool like teeth thus relying on its swimming ability to escape from its

enemies. Mobula alfredi and Mobula birostris have a low level of fecundity. These rays play an important ecological role in the waters to stabilize the ecosystem (Deakos *et al.,* 2011).

Manta rays have a hydrodynamic body shape, large fins, can swim far, more than 250 km per week, with a swimming speed of more than 14 knots and can dive to a depth of 200 m (Sadili, 2015). To get oxygen manta rays must swim continuously, just like sharks. Mobula alfredi and Mobula birostris are planktivorous fish or animals that consume microscopic organisms, especially zooplankton. Manta rays eat by filtering through gill (filter feeders) (Sadili, 2015). Marine waters that have abundant plankton populations are preferred places for manta rays (Nurcahyo, 2016). The cephalic lobes helped in improving efficiency, with drain water into the mouth and inserting more plankton. Gill drains the water out, filter plankton and distribute it into the body. Manta rays can adjust how to eat with environmental conditions. If zooplankton is present in the water column, manta rays will swim with their mouths open. If zooplankton is concentrated on the surface of the water and at some place, they will swim, jump and spin even "torpedoing" to get abundant food (Sadili, 2015). Mobula birostris is more solitary than Mobula alfredi, but Mobula birostris is often seen doing aggregation in large numbers for feeding, mating, or to cleaning. The behavior of manta rays cleans themselves with silence somewhere to let small fish eat parasites or dead skin all over the body (Nurcahyo, 2016). Body position is rather leaning forward, mouth and gills open, fins move slowly to compensate for buoyancy.

A cleaning station is a self-cleaning place of manta rays. This cleaning station is in the form of coral mounds and hollows where there are many small cleaning fishes including Wrasse fish (Labroides dimidiatus, Labroides bicolor, Thalassoma lunare), Sunburst butterfly fish (Chaetodon kelinii) and sergeant Mayor fish *Abudefduf* spp.. This behavior is a demonstration of symbiotic mutualism. Manta rays are clean from parasites, while fish get feed. Mating behavior of the Manta is unique. Before mating, first Manta does the courtship. This courtship process takes around 48 hours (2 days), and the male Manta is seen marching like a Manta train. When the Manta feels sufficient for the courtship process, the mating process is carried out. The mating process only takes a short time of about 30-60 seconds with the style belly to belly. Manta rays breed with ovoviviparous with a pregnancy period of 1 year 12 days, while female Manta gives birth to 1-2 children per 5 years. Manta's population does not mate before 15 years of age. The sign of marriage in a female is a bite wound on the fin that can indicate the time of sexual maturity and how often it has mated (Sadili, 2015).

The genus Manta are pelagic fish with its existence spread out in tropical waters and subtropical waters from 36^{o}S to 40^{o}N (Bigelow and Schroeder, 1953), it even swims till the edge of the country regulatory limits. It is spreading in Indonesia includes are from the Hindian Ocean and South China Sea (Nurcahyo, 2016). In Indonesia, manta rays often can be found in waters that have good living corals and haven't been disturbed by catching activities, start from the West Sumatra Sea, South of Java, Bali, Nusa Tenggara, Eastern Kalimantan, South China Sea, Banda Sea, Sulawesi Waters, Maluku and Papua (Nurcahyo, 2016). A number of these aggregation areas are famous for diving and snorkeling, including Manta Point and Manta Bay in Nusa Penida; Karang Makassar, Manta Alley, and Mawan in Komodo; Manta Ridge, Manta Sandy, Eagle Rock, Wayag Lagoon, Blue Magic, and Magic Mountain in Raja Ampat (Hani, 2018).

Target fisheries for this species do currently exist in several countries, including the Philippines, Mexico, Mozambique, Madagascar, India, Sri Lanka, Brazil,

Tanzania, and Indonesia. Many Manta parts are used for local and exported for the Asian medicinal market, has resulted in dramatic increases in fishing pressure for mobulids, including manta's, throughout Southeast Asia and East Africa, causing a switch from subsistence fisheries to commercial export fisheries. Regional population declines have been recorded in areas where the species has been fished, including South China and Sulu Seas, Philippines, Indonesia and on the west coast of Mexico. As a result of these population declines and this species inherent vulnerability to depletion, it is assessed as vulnerable in waters of the Gulf of California, west coast of Mexico and Southeast Asia. Globally this species is considered Near Threatened by observed population declines in several parts of its range (Marshall, 2006).

Indonesia has fully protected both species of manta rays under the Ministry of Marine Affairs and Fisheries KEPMENKP/ No.4/2014. Furthermore, according to (Hani, 2018), region Komodo and Raja Ampat also fully protected both species manta rays under the establishment of shark and ray sanctuary within their marine protected areas. Besides considering its rare aspects and potential extinction of manta rays, its economical aspect is also being considered. The International Trades Convention on Plants and Wildlife CITES on CoP CITES the 16th on March 2013 in Bangkok has placed manta rays into Appendix II (CITES, 2013). Fears of a threat of danger of extinction manta rays are not only happening in Indonesia but also occur globally. Also, IUCN World Conservation agencies have also listed manta rays in the category of "vulnerable" (IUCN, 2011).

II. RESEARCH METHODS

2.1. Statement of Problems

In recent years the number of manta rays has dropped dramatically because of poaching and illegal export for products of manta rays. Meat, skin, cartilage and the gill rakers are the main products for commercial trade. Some body parts of this fish are commercialized for different purposes, including the skin for shoes and wallets, the cartilage for food supplements, and the gill rakers for traditional medicine particularly in Asian countries (Dewar, 2002; Heinrichs *et al*., 2011). These commercial trade threats manta rays population that bring severe impact to the extinction of the species (KKJI, 2015).

2.2. Location

Data collection was conducted in Manta Sandy, Raja Ampat. Raja Ampat is located in Eastern Indonesia. Raja Ampat regency is one of the districts in West Papua, Indonesia. The capital of this district is located in Waisai. Raja Ampat islands consist of 4 islands, Misool, Salawati, Batanta dan Waigeo. Manta Sandy is located in the Dampier Strait. Manta Sandy is a popular tourist site for manta rays watching tourism in Raja Ampat (Hani, 2018).

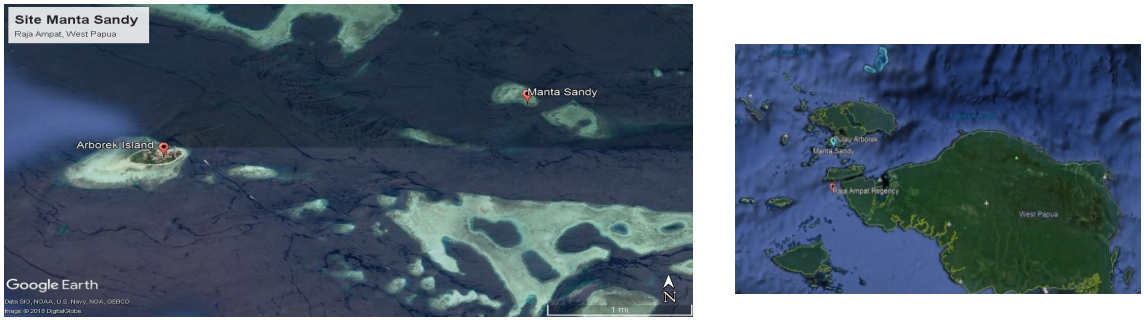

Figure 1. Study location (Google earth, 2018).

2.3. Material and Technique

The study conducted from in low season of tourists from July to August 2018. This research utilized two underwater digital cameras of GoPro Hero 4 with extra battery power and scuba equipment. Data collected for 15 days from 8 am to 5 pm.

Specific photo-ID surveys were conducted with photographs of the ventral surface of manta rays and utilize branchial gallery of Conservation International Indonesia and utilize Capture-Mark Recapture (CMR). Furthermore, we also collected data on the size, sex, species, behavior, and color morphology of documented manta rays.

III. RESULTS AND DISCUSSION

There are four manta rays that have been recorded during this study with two new individuals recorded. All the documented manta rays are Mobula alfredi and the time of sighting between 9 am - 11 am WIT.

3.1. Manta-1

The sightings of Manta-1 recorded through the camera trap on July 31st, 2018, from 09:55 to 13:00 WIT. The results of identification showed that this manta ray is a female with chevron color morphology.

It has a long tail with the natural mark on the left pectoral fin. The size estimation is 4m-6m. This manta ray resighted on the camera trap on August 2, 2018, at 10:47 to 10:50 WIT with cleaning activities.

3.2. Manta-2

We documented this manta ray on August 2nd, 2018 at 11:05 to 14:32 WIT. This is a female manta ray with black color morphology and an estimation size of 5-6m. This manta ray was doing cleaning activity during the observation.

3.3. Manta-3

This is a female manta ray with the size of 4m-6m recorded on August 4th, 2018, from 10:23 to 11:04 WIT. This manta ray had chevron color morphology and recorded on cleaning activity. Based on the branchial gallery, this manta ray has not been recorded and identified as a new ID.

3.4. Manta-4

This manta ray recorded through a camera trap on August 15th, 2018, at 09:34 to 09:35 WIT. A male manta ray with black color morphology. Estimation size of 3m-4m with cleaning activity recorded. This manta is identified as a new ID because it has not been recorded in the branchial gallery.

The result of this study shows the number of manta ray sightings in low season. During this season the sightings of this species considered as low. According to (Setyawan *et al*., 2018), manta ray move based on the seasonal weather where during July-August they travel to the north part of Waigeo for better weather and food. Based on the satellite tag that has been deployed by Conservation International Indonesia, the aggregation of manta rays in Manta Sandy is mainly for cleaning, where this study also confirmed the related activity.

Table 1. Summary of photo identification.

	Species	Sex	Size	Color Morph	Time of Sightings
Manta-1	*M. alfredi*	Female	4 m – 6 m	Chevron	09:55 to 13:00 WIT
Manta-2	*M. alfredi*	Female	5 m – 6 m	Black	11:05 to 14:32 WIT
Manta-3	*M. alfredi*	Female	4 m – 6 m	Chevron	10:23 to 11:04 WIT
Manta-4	*M. alfredi*	Male	3 m – 4 m	Black	09:34 to 09:35 WIT

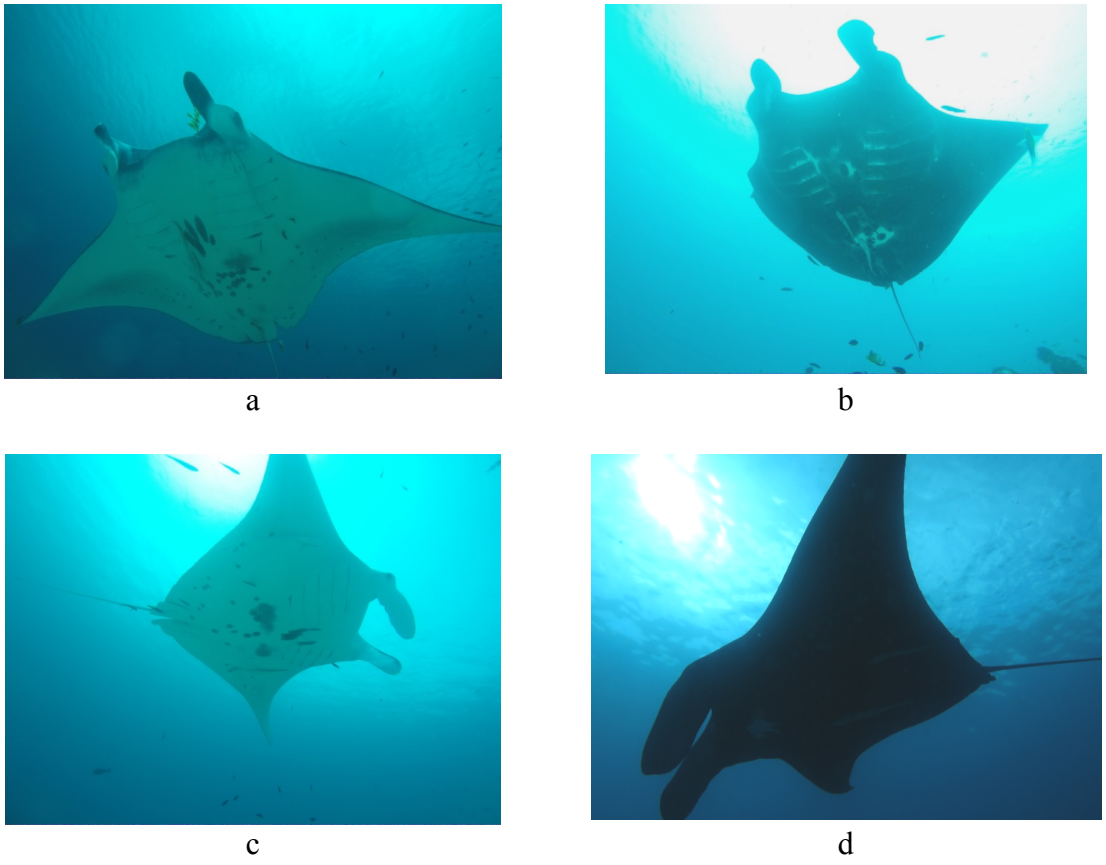

Figure 2. Documented manta rays: a. Manta-1, b. Manta-2, c. Manta-3, d. Manta-4.

IV. CONCLUSIONS

The result of camera trap had identified two new ID of manta rays. The number of sighting are low which only showed four individuals and recorded from 09:30 to 11:00 WIT. Both color morph is documented where the four of them are identified as Mobula alfredi. This study also confirmed the aggregation of this area as a cleaning station of a manta ray.Further monitoring on the high season is important to be conducted to identify manta ray sightings at a different period. According to, there are three main motivation factors of manta ray tourists including "to see manta rays in their habitat, to view this endangered species, and to interact with the fish". By conducting a further study, the result will contribute to the recommendation of the best time for manta sightings for the tourists in manta sandy.

ACKNOWLEDGMENTS

Acknowledgments to also the CCMRS IPB for choosing this article to be published through The 2nd International Conference on Integrated Coastal Management and Marine Biotechnology 2018 (ICMMBT 2018).

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Received : 02 January 2019
Reviewed : 18 January 2019
Accepted : 23 March 2019