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Characteristics and the appearance of new whale sharks (*Rhincodon typus*) as a unique phenomenon in the Kwatisore waters within the Cenderawasih Bay National Park area, Papua

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ABSTRACT

Research on whale sharks (Rhincodon typus) was conducted from September 1st to December 20th, 2020 in Kwatisore waters. Kwatisore waters are within the conservation area of the Cenderawasih Bay National Park and have specifications for the number of whale sharks and the appearance of new individuals. The appearance of whale sharks individuals takes place every day around the boat life net area that is anchored in Kwatisore waters. This study aims to assess whale shark aggregation, particularly the total appearances and number of individual appearances in eight boat life net units. The number of appearances and the number of individual whale sharks is very dependent on the catch of anchovies by each boat life net unit and the feed of anchovies given by the fishermen. The results showed that there were 499 appearances of whale sharks consisting of 15 individuals, of which 13 individuals were identified, while 2 were new individuals who had not been identified. The new individual for ID 182 is named Yan Maruanaya and ID 183 is named Bram Maruanaya. The percentage of whale sharks appears during the period of September to December 2020 is 100% male with a length of 3 to 6 m.

INTRODUCTION

The whale shark is one of the largest fish species in the shark group and is a rare species and has different biological characteristics from other shark groups. Whale sharks have inherited characteristics, such as large size, slow growth and sexual maturity, long life, susceptive to exploitation and live in tropical and warm seas (Colman, 1997). Whale sharks are included in the Chondrichtyes Class, Elasmobranchii Sub-class, Orectolobiformes Order, and the Rhincodontidae Family, Rhincodon Genus and Rhincodon typus Smith species, 1829. Rhincodon typus is referred as a whale shark because of its huge size compared to other shark

species and its similar blunt head shape like a whale. Whale sharks have a broad and flattened head, large gill lines and first dorsal and a pattern of white dots and lines on their skin that tend to be greyish (Casandra, 2014; Compagno, 2002). This animal has a fairly high visual ability and pelagic habitat (Colman, 1997). Whale sharks are a species that migrates from protected areas to endangered areas (Sequeira et al., 2012). They have a circum-global spreading, so regional studies are needed to determine the global habitat of whale shark populations (McKinney et al., 2012).

The pattern of white dots on the body of a whale shark is unique because individuals have different patterns of spots so that it is used as basis in identifying an individual in the whale shark community (Casandra, 2014; Colman, 1997; Speed et al., 2007). The appearance of whale sharks in Indonesian waters occurs in several places and is seasonal, while in the waters of Kwatisore, which is in the conservation area of the Cenderawasih Bay National Park. This park is located on the edge of the Pacific Ocean so that it is rich in diversity of natural resources (Ben Gurion & Anwar, 2017). The appearance of whale sharks in Kwatisore waters occurs every day and takes place throughout the year so that it is a unique phenomenon and can be developed into a whale shark attraction for marine tourism destinations (Ben Gurion & Anwar, 2017; Toha, Anwar, et al., 2019; Zuzy & Saputra, 2017).

The emergence of whale sharks is related to the availability of anchovies (Stolephorus sp.), so it makes Kwatisore waters as a feeding area for whale sharks and main habitat throughout the year (Casandra, 2014; Enita et al., 2017). Estimates of the environmental services of whale sharks and the economic value of fisheries at Cenderawasih Bay National Park can be as high as Rp. 35.5 trillion (Zuzy & Saputra, 2017). Meanwhile in Taiwan, diving to see whale sharks costs US $ 3,900 - US $ 4,000 (Cruz et al., 2013).The existence of whale sharks is increasingly rare and includes endangered species, due to anthropogenic impacts that include fishing so that CITES and CMS include whale sharks in appendix 1 and 2 lists (Marsaoly, et.al., 2014). Therefore, there must be agreements between countries that mutually acknowledge the coordination management and joint assessment of migratory populations of whale sharks because they have wide-range migration area (Rowat, 2007).

In Indonesia, whale sharks are assigned full protection status through the Decree of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 18/KEMEN-KP/2013 concening the Determination of Full Protection Status for Whale Sharks (Rhincodon typus). The protection status of the whale shark is an important tool in every conservation policy and planning so as to avoid the risk of extinction.The appearance of individual whale sharks in Kwatisore waters, both identified and new individuals and their behaviour patterns that appear on the surface every day and stay throughout the year require serious attention in the management of the national park and build local community participation so that the appearance of whale sharks is an important prospect for development. Whale shark ecotourism based on indigenous peoples, thus providing added value for the improvement of the local community's economy.

The aim of this research is to study the whale shark aggregation, especially the total number of appearances and the number of individuals around the boat life net area anchored in Kwatisore waters. The appearance of whale sharks based on the number of individuals is important information in recording the total number of individuals who live and migrate for the period each year in Kwatisore waters.

MATERIAL AND METHODS

Study site. The whale shark aggregation research was carried out in Kwatisore waters, where the Kwatisore waters as a whole are within the Cenderawasih Bay National Park conservation area. The research location only focused on Kwatisore waters because whale sharks only appear in these waters. Data on the rise of whale sharks were taken from September 1st to

December 20th, 2020, on eight boat life nets anchored in Kwatisore waters. The map of the research location is shown in Figure 1.

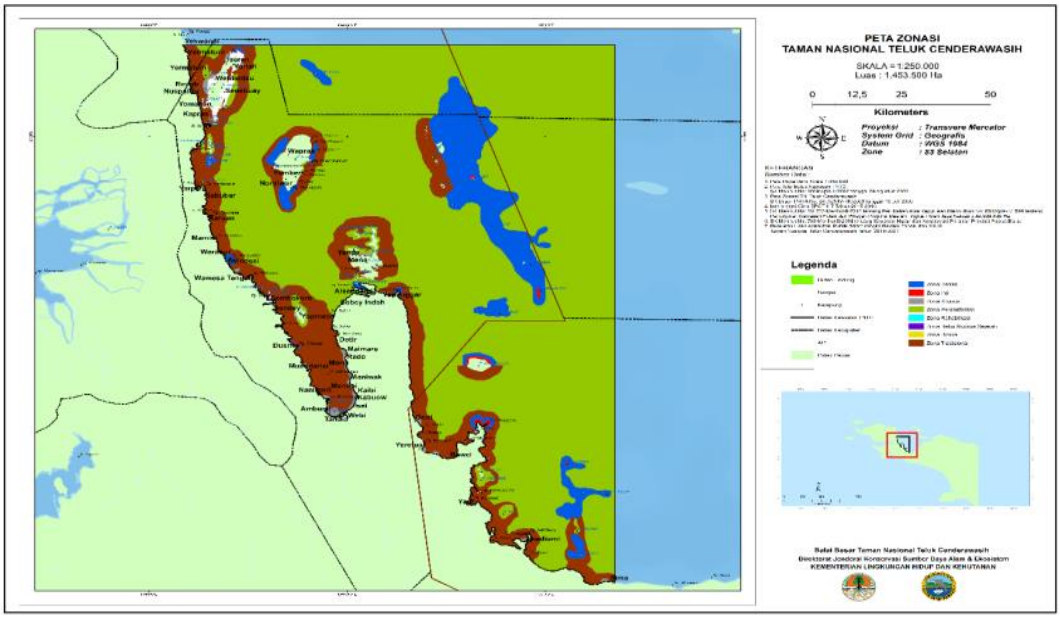

Figure 1. Study site. Cenderawasih Bay National Park map and research location in Kwatisore waters.

Number of whale shark appearances. To determine the number of whale shark appearances, records of the time of appearance of the whale sharks are recorded in the morning, afternoon and evening around the boat life nets which is anchored in Kwatisore waters. The recording was carried out using a guidebook which was divided among the fishermen in 8 units of boat life nets. Meanwhile, to assess the presence of individual whale sharks, a photo identification technique (Photo ID) was carried out on all of them that appeared using the Cannon G-12 underwater camera. The coordinates of the location of the boat life nets that are anchored in Kwatisore waters are using the Garmin GPSmap 62s.

Data Collection Technique. The recording of the appearance of whale sharks on the surface of the water is carried out on boat life nets that are scattered in Kwatisore waters, especially when the whale shark rises to consume food around the boat life nets. The recording was done manually, by record the number of whale sharks that appeared and circled around the boat life nets in the morning, afternoon and evening.

Individualal identification. The identification of individual whale sharks is carried out based on the pattern of white spots on the body of the whale shark, where the pattern of white spots differs between individuals. The individual photographic identification (Photo ID) technique of whale sharks is carried out in the following ways (Casandra & Noor, 2014):
a. The left side of the last gill or fifth gill to the tip of the pectoral fin (pectoral fin).
b. The right side of the last gill or fifth gill to the tip of the pectoral fin (pectoral fin).

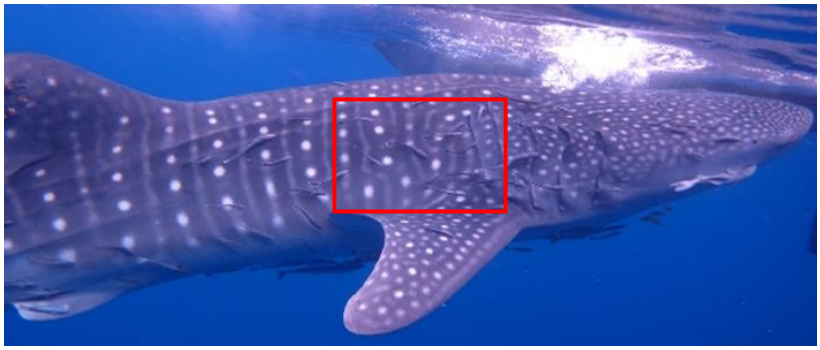

Figure 2. ID Photo Technique

Furthermore, each individual whale shark Photo ID is identified using a technique, which is transferred to the "Intelligent Individual Identification System Version 2.0" (I3Sv2) software. The nformation about marks, scars, size and sex is needed to determine the condition of the whale shark (Macena & Hazin, 2016).

Population characteristic of whale shark. The population characteristics of the whale shark are limited to size and sex. The whale shark size is determined by comparing the size of the whale shark with body size, namely by swimming parallel to the whale shark and estimating its size. While the sex of the whale shark was observed visually, by looking directly at the clasper (male anatomy structure) which extends as much as two which are located near the anal fin, while female whale shark does not have a clasper. The shape of the clasper is shown in Figure 3.

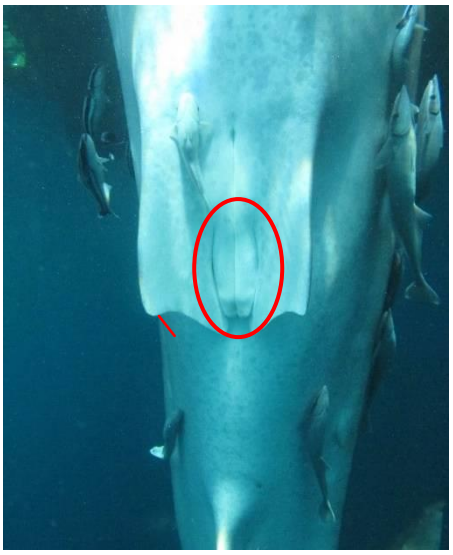

Figure 3. Clasper form

Data analysis

Spatial analysis. The daily movement of whale sharks in each different boat life nets shows the movement of whale sharks locally. Each whale shark coordinates that appears or rises on the surface of each boat life nets is recorded using GPS (Global Positioning System). The spatial analysis was carried out using the coordinate data of the appearance of the whale sharks at the time of the study so that the distribution of the whale sharks in Kwatisore waters could be mapped.

Population characteristic of whale shark. The percentage distribution of the size of whale sharks that has been identified is then calculated using a formula according to (Casandra & Noor, 2014) and (Didi et al., 2015):

$$\%N = \frac{ni}{N} \; x \; 100\%$$

Explanation as follow:
%N : Percentage of whale sharks in length of i meter
n_i : The number of whale sharks with a length of i meter
N : Total number of identified whale sharks
Meanwhile, to assess the percentage of sex (male and female) whale sharks that have been identified, it is calculated using a formula according to (Casandra & Noor, 2014) and (Didi et al., 2015):

$$\%J = \frac{ni}{N}\ x\ 100\%$$

$$\%B = \frac{ni}{N}\ x\ 100\%$$

Explanation as follow:
J : Percentage of male whale sharks
n_i : The number of male whale sharks
%B : Percentage of female whale sharks
n_b : Number of female whale sharks
N : Total number of identified whale shark

The relationship between the presence of the whale shark and the time it appeared. To determine the relationship between the presence of whale sharks at morning, noon and night with the month of observation, a Chi-square test was carried out based on contingency analysis, then calculated χ2 counts and compared with χ2 tables (Sudjana, 1996; Tiro, 1999)

RESULTS AND DISCUSSION

Whale Shark in the Perception of Local People Kwatisore. Kwatisore is administratively located in Nabire Regency, where Kwatisore waters are part of the Cendrawasih Bay National Park area which has an area of only 380,920 ha or 26% of the total area of this National Park. The indigenous people who live in Kwatisore Village call the whale sharks in their local language as Hiniotanibre fish. Hinotanibre has the meaning of "Sea Ghost" because it is very large and appears suddenly. The indigenous people think that if they go to sea to catch fish and find the hiniotanibre fish, it will bring bad luck so that people choose to cancel fishing and return to their villages. The belief of indigenous people in whale sharks as Hinotanibre or sea ghosts which then make the community activities to not catch or disturb whale sharks so they are protected from anthropogenic activities. The view of the whale shark as a sea ghost has an important meaning in protecting species or individuals so that their existence is preserved in Kwatisore waters.

Whale Shark Appearance. The daily appearance of whale sharks in Kwatisore waters is closely related to feeding activities. The appearance of whale sharks is concentrated in boat life nets because during the fishing process per day, it catches fishes and mostly the anchovies (Stolephorus sp.). After being caught, anchovies are usually placed in a container made of net in size of 4 x 3 meter and kept alive. Keeping them alive is an attraction that makes the whale sharks appear every day and go around even hit the net contain of anchovies with its snout.

Research studies on the appearance of whale sharks in the boat life nets area of Kwatisore waters show an increase in the number of appearance and also the new individuals. The daily appearance of whale sharks in Kwatisore waters is closely related to the catch of anchovy and the feed of anchovies given by the fishermen. Whale sharks appear in waters because they are attracted by the concentration of pelagic fish (Stewart, 2013). The whale sharks individual eat anchovies (Engraulis australis) in a vertical position near Whale Island, in New Zealand's Plenty Bay (Duffy, 2002). Whale sharks are a susceptible species; therefore the insight of their habitat is required in planning and managing their behaviour effectively (McKinney et al., 2012).

The number of whale sharks indicates that there are new individuals every year in Kwatisore waters. (Toha, Anwar, et al., 2019) explained that from 2011 to August 2018 the total number of whale sharks individual that identified in Kwatisore waters were 179 individuals. Furthermore, the study of Toha et al., (2018) and Toha et al., (2019) showed the addition of 30 new individuals. Meanwhile, the monitoring results of the Nabire 1 Region National Park

Management Division reported that in September 2020 a new individual was found. Whale sharks from Ningaloo Reff, Western Australia migrate horizontally and enter Indonesian waters (Wilson et al., 2006).

The increasing frequency of whale sharks appearance in Kwatisore waters is due to increased catches of anchovy Yasmina et al., (2017). The whale shark individuals that appear on each boat life nets are individuals who have been identified as regular inhabitant in Kwatisore waters. This shows that the whale shark individuals inhabit the Kwatisore waters as their permanent habitat. The appearance of whale sharks in Kwatisore waters shows the number of individuals is more than one and as a form of aggregation Maulida et al., (2018). Whale sharks appear in the waters because they are attracted by the concentration of pelagic fish. Meanwhile, the migration pattern of whale sharks is related to ecological aspects, especially filtering food (Pedro et al., 2014; Stewart, 2013). Whale shark aggregation in the Gulf of Mexico occurred during the minimal chlorophyll with a concentration of 0.18 mg m-3, but in 2009 it was around 10.75 mg m-3 and in 2009 it was around 5.04 mg m-3 McKinney et al., (2012). Furthermore, Sea Surface Temperature (SST) can be used to predict the probability of whale sharks existence Pedro et al., (2014). The presence of whale sharks in the Archipelago of São Pedro and São Paulo (ASPSP) is related to the abundance of plankton and They are making the ASPSP as a feeding area during migration in oceanic waters Macena & Hazin, (2016).

The Existence of whale sharks in Kwatisore waters with a year-round or very long settling time indicates that Kwatisore waters are a habitat for whale sharks due to the availability of abundant food. The appearance of whale sharks in Kwatisore waters is due to the availability of anchovy which is one of the main food, where the abundance of anchovy catch is due to both species having a preference for the same feeds, while the reduced number of boat life nets and anchovies causes less appearance of whale sharks (Prihadi et al., 2017; Yasmina et al., 2017). Wind direction parameters, currents and chlorophyll A have a significant correlation with the appearance of whale sharks in Cenderawasih Bay because they are thought to be related to food abundance Ardania et al., (2018).

The whale sharks in Kwatisore waters are unique because they migrate to international waters outside of Indonesia's territory and return to Kwatisore waters. The installation of IWRM as satellite markers on six whale shark individuals in Kwatisore waters from May 2011 to June 2012 shows that whale sharks swam out of Kwatisore waters to waters east of the Philippines and returned to Kwatisore waters (Stewart, 2013). Whale sharks are classified as a fish with long migration distance pattern (Froese & Pauly, 2006) and return to their habitat areas after several years (Robinson et al., 2017). The appearance of whale sharks in East and South Africa in coastal areas has the period from October and November to May (Rowat, 2007). Meanwhile in Taiwan, the whale shark season occurs from March to June (Cruz et al., 2013).

In general, the appearance of whale sharks in eight boat life nets units indicates a local distribution, which is within a day the same individual of whale shark can appear in one unit of boat life net but can also move to another unit. The local distribution of whale sharks is very dependent on the availability of the anchovies stored in the net containers and the activities of fishermen in boat life nets who provide or dispose of anchovy as food for consumption by the whale sharks. It is indicated that whale sharks in Kwatisore waters swim at a depth of 100-200 m and sometimes reach a depth of 1,800 m (Toha et al., 2018). The appearance of whale sharks is shown in Figure 4, while the feeding of anchovies by fishermen and the feeding behaviour of whale sharks are shown in Figure 5 and position of whale shark appearance in Figure 6.

Figure 4. The appearance of whale shark in the boat life nets

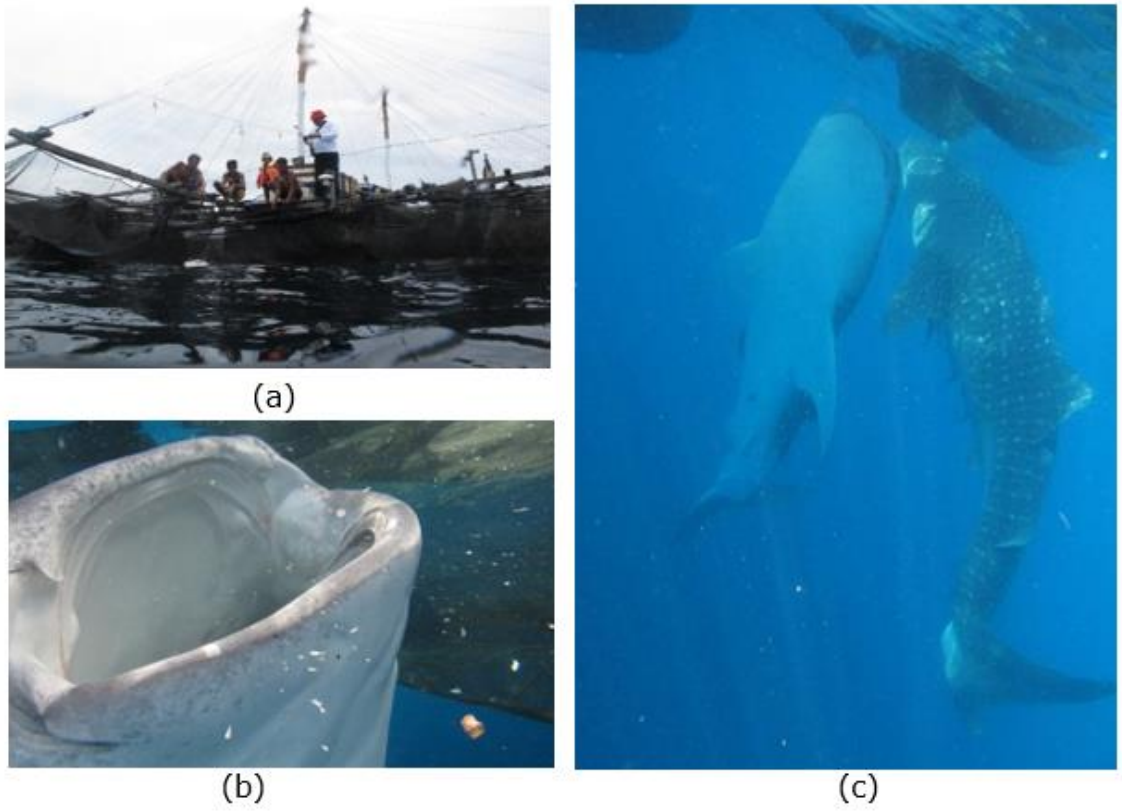

Figure 5. (a) Whale sharks feeding anchovy by fishermen, (b) Whale shark mouth opening, and (c) whale shark vertical position when consuming anchovies

In consuming the anchovies that given by the fishermen the whale sharks eat in a vertical position and pull the food in (Figure 5c). The catch of anchovies greatly determines the number of whale sharks appearances. The more anchovies catch, the more whale sharks appear, with a very long time spent in the Boat life net area.

In general, the presence of whale sharks in the boat life nets area shows a different number of appearances between each unit with different duration of hours spent in the area. The length of the whale shark in an area of boat life nets highly depends on the catch of anchovies and the feeds of anchovy by fishermen to

the whale sharks. The number of whales occurring in the boat life nets area based on the month of observation and the duration of survival time in the boat life nets area is shown in Table 1 and Figure 7.

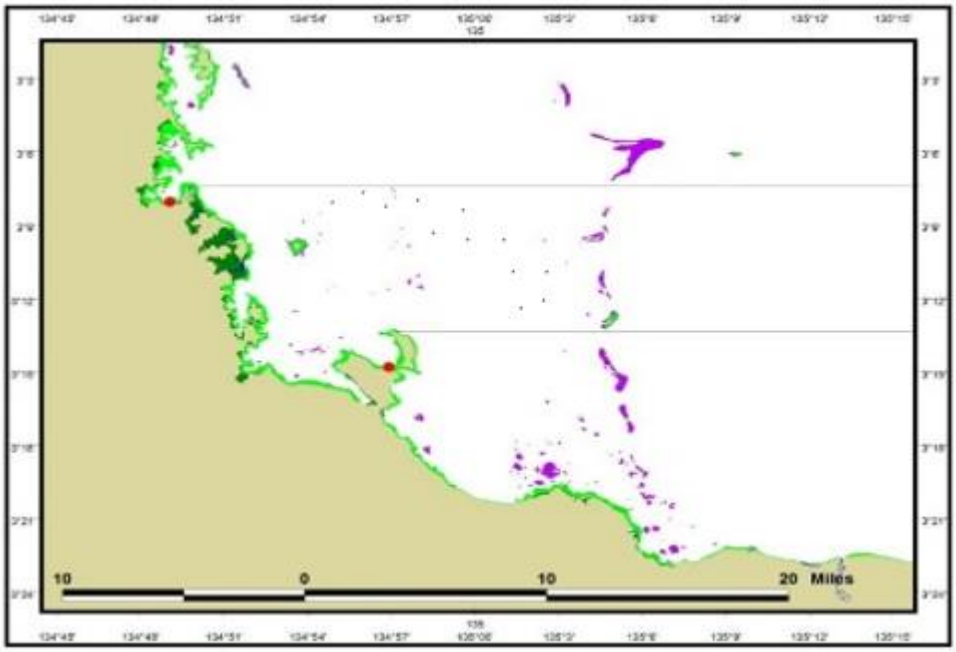

Figure 6. Position of whale shark appearance

Table 1. Amount of whale shark appearance based on month observation and duration

Boat life nets unit name	Coordinate	Month	Number of Whale Sharks (Appearances)	Duration
1	*2*	*3*	*4*	*5*
Cahaya Pinrang 1	S 03^0 15’ 49,88” E 135^0 02’ 3,76”	September	15	3 to 18 hour
		October	14	1 to 20 hour
		November	20	4 to 15 hour
		December	15	3 to 10 hour
Cahaya Pinrang 2	S 03^0 17’ 37,33” E 135^0 00’ 0,80”	September	12	1 to 17 hour
		October	20	2 to 26 hour
		November	11	4 to 18 hour
		December	18	3 to 10 hour
Cahaya 55	S 03^0 18’ 25,61” E 134^0 5’ 46,73”	September	21	2 to 18 hour
		October	12	1 to 16 hour
		November	22	5 to 20 hour
		December	19	3 to 14 hour
Cahaya Riski	S 03^0 18’ 24,11” E 135^0 00’ 8,31”	September	16	5 to 9 hour
		October	14	4 to 13 hour
		November	19	6 to 14 hour
		December	15	4 to 16 hour
Cahaya Ipa	S 03^0 17’ 16,23” E 134^0 95’ 6,36”	September	10	2 to 11 hour
		October	11	3 to 8 hour
		November	18	2 to 6 hour
		December	8	4 to 13 hour
Dua Putri	S 03^0 23’ 05,24” E 135^0 06’16,48”	September	10	3 to 10 hour
		October	14	5 to 14 hour
		November	12	4 to 12 hour
		December	9	1 to 6 hour

1	*2*	*3*	*4*	*5*
Cahaya Rifki	S 03^0 23’ 76,33”	September	16	3 to 15 hour
	E 135^0 05’79,50”	October	19	3 to 10 hour
		November	22	4 to 15 hour
		December	14	1 to 7 hour
Cahaya Maros	S 03^0 24’ 98,32”	September	21	3 to 12 hour
	E 135^0 05’33,39”	October	24	2 to 8 hour
		November	17	4 to 9 hour
		December	11	2 to 14 hour
Total of Apperance			499	1 to 26 hour

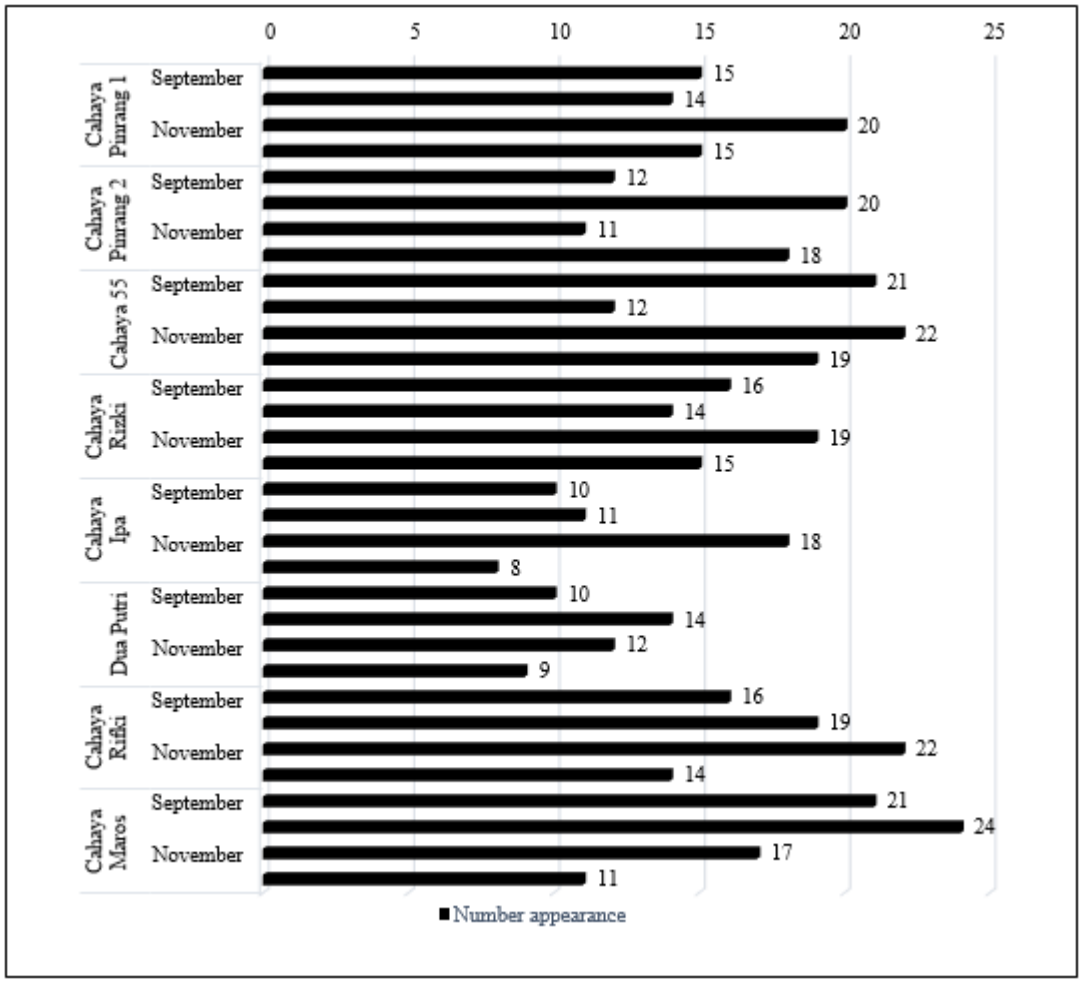

Figure 7. Amount of whale shark appearance of eight unit boat life nets

During September to December 2020, the total appearance of whale sharks in Kwatisore waters is 499 with a length ranging from 3 m to 6 m. The number of appearances ranged from 9 to 24 with a duration ranging from 1 hour to 26 hours. The length of time the whale sharks stay on the surface of the waters in the boat life nets highly depends on the amount of anchovy catch and feeds of anchovy by fishermen in boat life nets. The appearance of whale sharks in Kwatisore waters is supported by suitable and positive bioecological conditions and the availability of feed resources (Murdani et al., 2018).

The whale sharks that appear in two or three individuals on a boat life nets in Kwatisore waters to consume anchovy given by fishermen form a queuing pattern, where the large whale sharks first eat anchovies while the other whale sharks swim around the boat life nets area. After

some time, the large whale sharks moved around, so the smaller ones rose to replace the big ones and start consuming, while the big ones swam around the boat life nets. Whale sharks consume food in a queue pattern so that there is no fighting over food between individualals. Whale sharks tend to be solitary, but if there is food available in their aggregation area, the whale sharks tend to congregate (Didi et al., 2015). In Kwatisore waters, whale sharks always show aggregation at one point, where the appearance of more than one individual (Maulida et al., 2018). The appearance of whale sharks on the southernmost island of Santa Maria shows that in 2008 there were 302 appearances (Pedro et al., 2014). The appearance of whale sharks in Kwatisore waters only in the period from September to December 2020 shows the number of appearances is more than the appearance in the southernmost island of Santa Maria.

Population Characteristic of Whale Shark. The characteristics of the whale shark population that appear on the surface of Kwatisore waters show that it is dominated by male. The appearance of whale sharks during the period of September to December 2020 is 100% male and 0% female. This illustrates that there are more males, while females do not appear during the period from September to December 2020. Research studies of whale sharks at Cendrawasih Bay National Park found that the population characteristics of whale sharks are male, while female sex appears at certain times. Casandra, (2014) explained that the composition of the whale shark population observed in this national park was 76% were immature males, with an average size of 4.4 ± 1.3 m, while 24% were females with an average size of 4 m. In 2015, the appearance of whale sharks was dominated by male and immature whale sharks as much as 83% (lpsplsorong, 2020). In Ningaloo reef waters in Western Australia from 1995 to 1997, out of 325 whale sharks that appeared, 84.6% were male (Norman & Stevens, 2007). The majority of whale sharks found in tourist activities in Mozambique are male (74%) (Haskell et al., 2015).

The size of the whale sharks that appeared during the study period, ranged from 3 to 6 m. the individuals sizes of 3.5 m are less than sizes of 5 m and 6 m. In general, the appearance of long whale sharks that are dominated by small sizes indicates that Kwatisore waters are a nurturing area for whale sharks.

The Relationship between the appearance of whale sharks and time. The appearance of whale sharks every day is closely related to the time to consume anchovies in the boat life nets. In general, whale sharks appear more frequently in the morning than in the afternoon and evening. It is related to feeding time of this whale sharks. The total number of whale sharks based on appearance time can be seen in Table 2.

Table 2. Amount of whale shark appearance based on time

Months	Appearance Time		
	Morning	Afternoon	Evening
September	98	8	15
October	103	5	20
November	122	6	13
December	78	12	19
Total	401	31	67

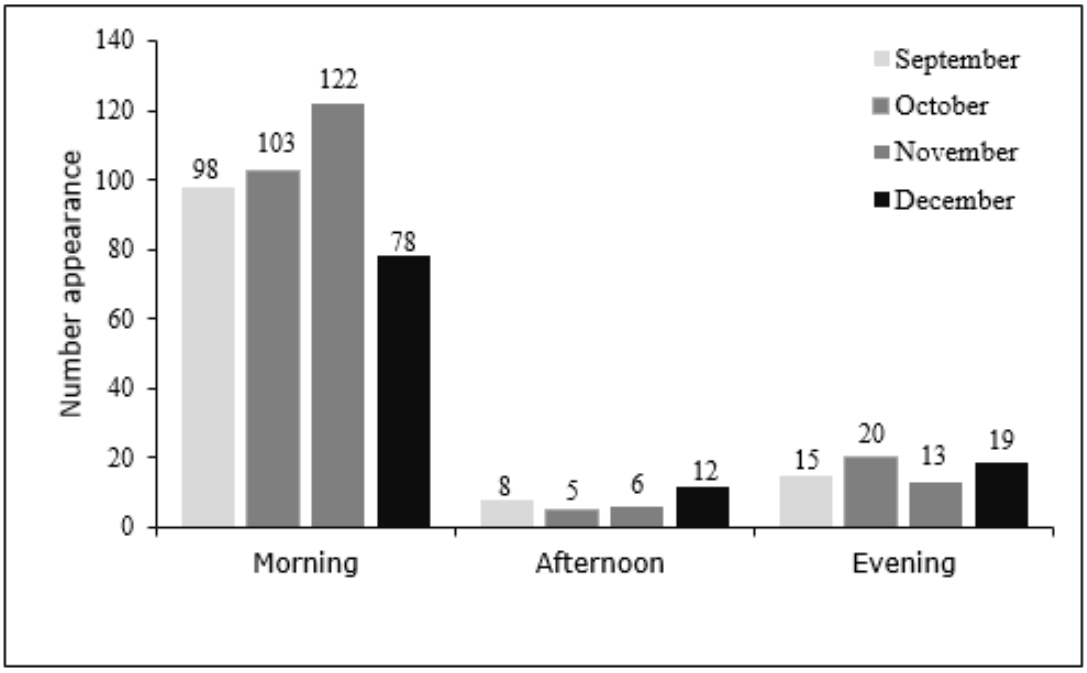

Figure 8. Amount of whale shark appearance on morning, afternoon, and evening

The results of the chi-square statistical test to determine the relationship between the presence of whale sharks in the month of observation, namely September, October, November and December and the time of appearance in the morning, afternoon and evening showed that χ^2 count was 7.69 while χ^2 table was at the confidence level. 0.99 is 16.8. Statistically, it shows that there is no significant relationship between the month of observation and the appearance of whale sharks in the morning, afternoon and evening. This illustrates that the appearance of whale sharks to the surface of the waters does not follow a certain month but the appearance of whale sharks can occur every month in the morning, afternoon or evening.

Identified individuals and pppearance of new individuals. Kwatisore waters have unique specifications because the number of individual of whale sharks over time indicates the increase of new individuals. (Toha et al., 2019) explained that from 2011 to August 2018 the total identified individual of whale sharks in Kwatisore waters were 179 individuals. Meanwhile, the monitoring results of the National Park Management Region 1 in Nabire reported that in September 2020 a new individual was found with ID number 181 and named Ben Saroy. This shows that every year there is an addition of new individuals. The addition of a new individual of whale shark in Kwatisore waters is an important phenomenon that gives meaning in maintaining and managing the Cendrawasih Bay National Park area. The whale sharks identified in Kwatisore waters come from one species, namely *Rhincodon typus*, where *Rhincodon typus* in Kwatisore waters has a genetic relationship with *Rhincodon typus* in the Indo-Pacific (Toha et al., 2018). In the Indian Ocean, it was reported by 20 organizations that 16 whale shark individuals came from 11 countries (Rowat, 2007).

During research from September to December 2020, the total number of whale shark occurrences was 499 appearances with male types, whereas of these 499 appearances consisted of 15 individuals' size of 3 - 6 m in length, with a duration spent around the boat life nets area ranging from 1 up to 26 hours. Based on body size, the whale sharks that emerge to the surface of Kwatisore's waters are classified as young stage. The appearance of the Whale sharks' size classified as the young stage category indicates that Kwatisore waters are a nurturing site. The body length of the whale shark is categorized as adult male is 7-8 m and adult female is > 10 m, while the immature category is ≤ 2.99 m, the young stage category is at 3.90 - 5.40 m and the adult category is 8.05 - 10.26 m (Joung, et al., 1996; Compagno,

2001). Female whale sharks in size of 3.40 - 7.60 are categorized as females who have not yet entered sexual maturity, while females reach adulthood at a size of about 12 m (Murdani et al., 2018).

The length of time the whale sharks stay in the boat life nets area is very much determined by the catch of anchovies and the activity of fishermen in providing anchovies to the whale sharks. This illustrates that some whale sharks have site fidelity to Cendrawasih Bay National Park waters in general and Kwatisore waters in particular (Toha et al., 2018). Research in the reef waters of Ningaloo in Western Australia in 1995, showed sharks ranged from 3 to 12 m and an average of 7 m, whereas in 1997 it was 2 - 13 m with an average length of 7.2 m and 1997 was around between 4.5 - 12 m with an average length of 7.6 m (Norman & Stevens, 2007).

The total number of whale shark occurrences continuously showed that 15 individuals were identified by their ID numbers as in Table 3 A, while 2 individuals were newbie who had not been identified so far as in Table 3 B.

Table 3. Images based on photos (IMG) of whale sharks in the left and right positions, identification results (WS ID), sex and description of the length and condition of the whale sharks.

A Identified Individual

No.	Image	Left/Right	ID WS	Sex	Description
1.	IMG 0577 IMG 0582	L R	ID 143	Male	Length 4,5 m; flawless and no scars found
2.	IMG 0590 IMG 0592	L R	ID 176	Male	Length 5 m; flawless and no scars found
3.	IMG 0596 IMG 0602	L R	ID 181	Male	Length 4 m; no scars found
4.	IMG 0616 IMG 0620	L R	ID 135	Male	Length 5 m; no scars found
5.	IMG 0627 IMG 0630	L R	ID 039	Male	Male 6 m long; there is a tag mark on the dorsal fin
6.	IMG 0643 IMG 0648	L R	ID 179	Male	Male 5 m long; no scar or injuries were found
7.	IMG 0670 IMG 0678	L R	ID 047	Male	Male 5.5 m long; there is a mark on the dorsal fin and it always appears
8.	IMG 0697 IMG 0703	L R	ID 138	Male	Male 3 m long; the left pectoral fin has a small wound
9.	IMG 0716 IMG 0719	L R	ID 174	Male	Male 3.5 m long; there is a cut scar near the left eye
10.	IMG 0996 IMG 998	L R	ID 140	Male	Male 5 m long; no injuries or scars were found
11.	IMG 1009 IMG 1018	L R	ID 136	Male	Male 5 m long; This individual was named Sumar
12.	IMG 1021 IMG 1031	L R	ID 159	Male	Male 4 m long; this individual was named Yalgal
13.	IMG 1057 IMG 1061	L R	ID 013	Male	Male 4 m long; This individual was named Djati

B New Individual

No.	Image	Left/Right	ID WS	Sex	Description
1.	IMG 0680 IMG 0684	L R	ID 182	Male	Estimate 5 m length; New Individual named YAN MARUANAYA
2.	IMG 0689 IMG 0690	L R	ID 183	Male	Estimate 5 m length; New Individual named BRAM MARUANAYA

The process of determining the individual is carried out through the location of the white dots pattern on the back of the 5th gill cover to the base of the back of the pectoral fin, which is then identified using the I3Sv2 software. Especially for two new individuals, the Photo ID in the field in the left and right positions is shown in Figure 9.

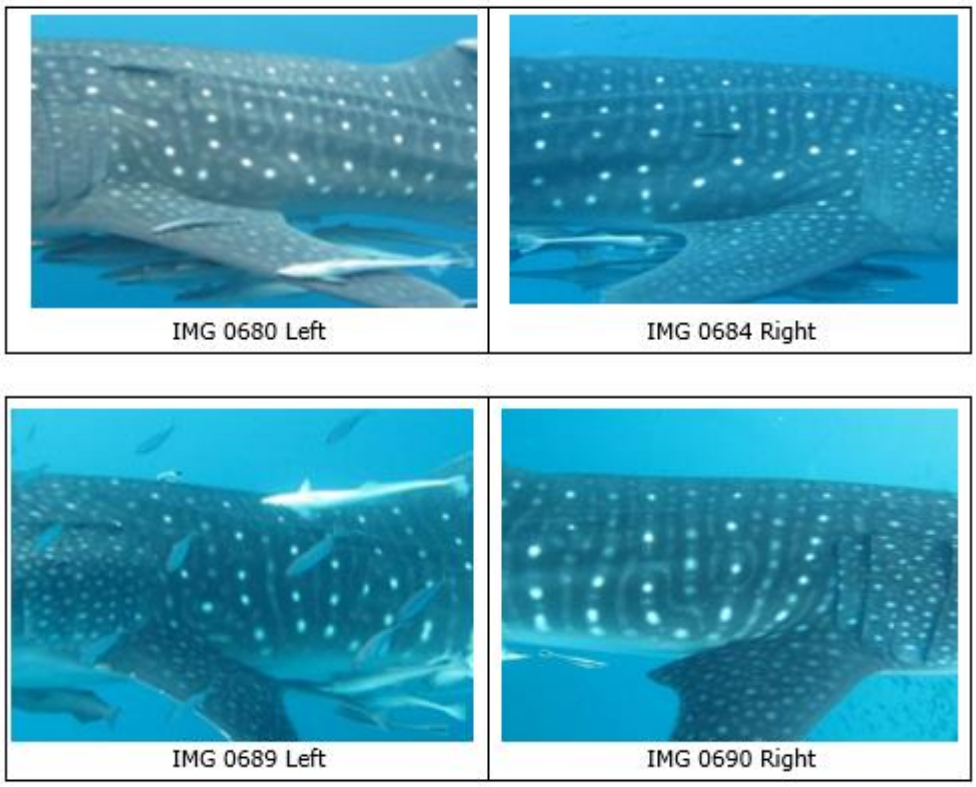

Figure 9. Photo IDs of two new individuals of whale sharks

Based on the Photo ID in Figure 7 above, it can be made as the basis for further analysis using the I3Sv.2 program. The results of the analysis show that the two individuals are newbie because the patterns of spots are different from the patterns of spots that have been previously identified. The results of the analysis using the I3Sv.2 program for two new individuals are shown in Figures 8.a and 8.b.

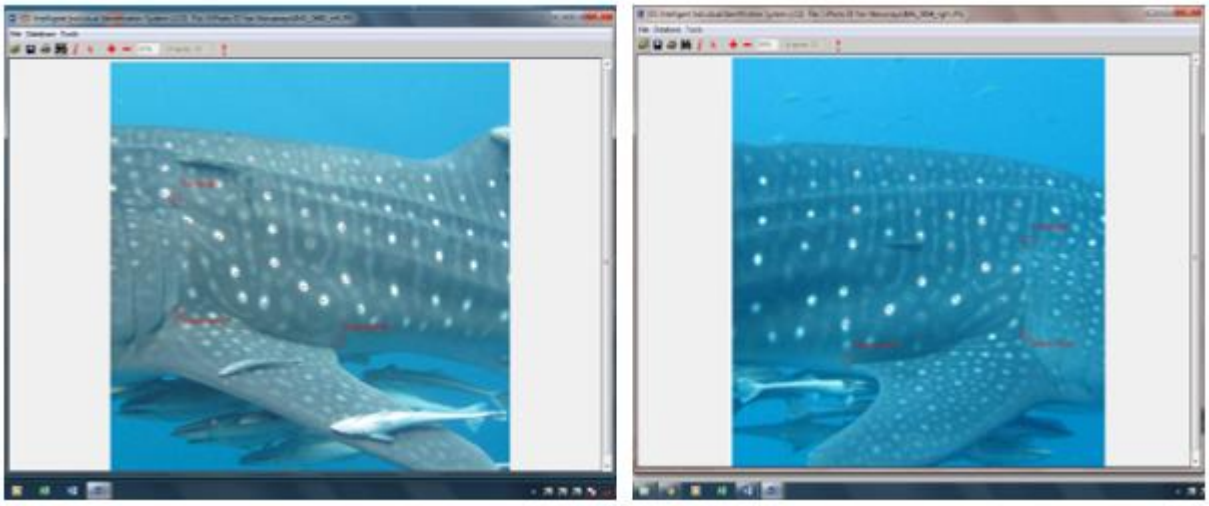

Figure 10. Individualals identified as new individualals and named Yan Maruanaya (a) and Bram Maruanaya (b).

The presence of new individuals of satisfied sharks in Kwatisore waters was documented on November 17, 2020. The presence of new individuals indicates an in-migration of whale sharks from other areas to Kwatisore waters. It makes Kwatisore's waters the only waters in Indonesia that are rich in individual of whale sharks. Accumulation of all identified whale sharks in Kwatisore waters according to Table 4.

Table 4. Number of identified whale shark in Kwatisore waters and Cendrawasih Bay National Park area.

No	Number	Source	Description
1.	179 individuals	(Toha et al., 2019)	From 2011 to August 2018
2.	1 new individual	A new individual Report on the Management of I Nabire Region of National Park (unpublished)	Monitoring in September 2020 and a new individual named Ben Saroy
3.	2 new individuals	Result of the research	Photo ID dated 15 - 17 October 2020; ID 182 was named Yan Maruanaya; ID 183 is given the name Bram Maruanaya
Total 182 individual			

CONCLUSION

There are 499 whale sharks that appear during September to December 2020 in Kwatisore waters with a body length of 3-6 m and duration of appearance about 1 to 26 hours. The duration of the whale sharks' survival time in boat life nets is mainly determined by the number of the anchovy stored in the net container and the feeding activities of the whale sharks by the fishermen. The appearance of whale sharks is dominated by male individual. A total of 499 whale shark appearances consisted of 15 individuals, of which 13 individuals were identified while the other 2 were new individuals. The new individuals are named Yan

Maruanaya for ID 182 and Bram Maruanaya for ID 183. The addition of new individuals is a form of migration into Kwatisore waters.

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