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The Inventory, Governance, and Conservation Status of Shark Landed in TPI Pantai Utara Central Jawa Tengah

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Abstract

Sharks have a role as the top predator in the ecosystem whose job is to maintain the balance of the ecosystem. The existence of sharks is difficult for the ecosystem, if the shark has difficulty extinction then the balance of the ecosystem becomes difficult. The extinction of sharks is increasing due to human activities and the higher market demand for shark fins. The purpose of this study was to inventory, manage, and conservation status of sharks landed at TPI Pantai Utara Jawa Tengah. Sampling was done by purposive sampling, namely the fleet that landed sharks in TPI Pantai Utara Jawa Tengah. This research was conducted from June to September 2019. Based on the research results, five types of sharks were obtained, namely *Carcharhinus brevipinna*, *Carcharhinus longimanus*, *Carcharhinus sealei*, *Chiloscyllium punctatum*, and *Alopias pelagicus*. From information obtained from fisheries in various TPI Pantai Utara Jawa Tengah, for small scale fisheries, all parts of sharks will be used, in general, fishermen sell sharks to collectors as a whole. While for large-scale fisheries/factories, they generally only use shark fins and move them back to the ocean where their fins have been taken. Based on the challenging status of IUCN, 1 species is included in the critical category, 1 type is included in the threatened category, 2 types are included in the vulnerable category, and 1 type is included in the near-threatened category.

1 Introduction

One of the potentials of natural resources that has a high diversity in the north coast is a type of shark. Sharks have the role of a top predator in the aquatic ecosystem that serves to maintain the ecosystem balance. The existence of sharks is very important to the ecosystem, if the shark is experiencing conservation then the balanced ecosystem becomes disturbed. Globally the shark population is experiencing considerable decline and if no conservation measures are feared, shark populations can experience extinction.

Indonesia is very rich water with 118 species of sharks from 25 different tribes. Over time with the less controlled fishing and shark landing activities in Indonesia, the available shark species continue to decline in popularity. Some sharks have even been endangered. In March 2013 at the 16th meeting "The Conference of the Parties to The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (COP16)" Several types of sharks such as Rican Sharks (*Carcharhinus longimanus*), and hammerhead sharks (*Sphyrna lewini*, *Sphyrna mokarran*, *Sphyrna zygaena*) are officially entered in Appendix II CITES.

One of the potentials of natural resources that has a high diversity in the north coast is a type of shark. Shark Fishing (Elasmobranchii) is one of the most important fishery commodities in the world. Sharks have an important ecological value in the ecosystem of corals and oceans. Sharks are one of the top-level predators of the food chain that determines the balance and controls the food nets that are complex under them. The reduced number of sharks in an ecosystem will have an impact on changing the natural setting in a community structure that results in the disruption of the equilibrium of an ecosystem (Graham et al. 2010). Excessive shark arrest can be a problem because most sharks have sluggish growth characteristics, long periods of prolonged gonads as well as low fecundity so that excessive arrest can lead to a high population decline (Blaber et al. 2009 and Graham et al. 2010). One of the potentials of natural resources that has a high diversity in the north coast is a type of shark. Shark Fishing (Elasmobranchii) is one of the most important fishery commodities in the world. Sharks have an important ecological value in the ecosystem of corals and oceans. Sharks are one of the top-level predators of the food chain that determines the balance and controls the food nets that are complex under them. The reduced number of sharks in an ecosystem will have an impact on changing the natural setting in a community structure that results in the disruption of the equilibrium of an ecosystem (Graham et al. 2010). Excessive shark arrest can be a problem because most sharks have sluggish growth characteristics, long periods of prolonged gonads as well as low fecundity so that excessive arrest can lead to a high population decline (Blaber et al. 2009 and Graham et al. 2010). In addition to the ecological values, sharks have high economic value in both domestic and international markets. The FAO Data reported that Indonesia is the world's largest shark producing country with a contribution of approximately 12.31% of total world production (Fahmi and Dharmadi, 2013). Sharks are used as export commodities for the use of fins, leather, meat, and internal organs (Dulvi et al. 2014).

Sharks are known as one of the wild and ferocious marine animals among the life forms in the sea. In addition to his violence, it turns out that sharks save some human benefits. Like common fish types that have potential animal protein values, sharks are also regarded as versatile animals, because many of their body parts can be utilized like fins, meats, skins, hearts, and other parts of the body (Wibowo and Susanto, 1995). For example, shark meat can be processed into salted fish, jerky, meatballs, shredded, sausage, silage flour, surimi, and Pindang. Making food products like this is usually done after the reduction of urea content. Shark fin is used for SOP material, the teeth are used for decoration and also made accessories, while the liver is used for the manufacture of fish oil. Sharks are known as one of the wild and ferocious marine animals among the life forms in the sea. In addition to his violence, it turns out that sharks save some human benefits. Like common fish types that have potential animal protein values, sharks are also regarded as versatile animals, because many of their body parts can be utilized like fins, meats, skins, hearts, and other parts of the body (Wibowo and Susanto, 1995). For example, shark meat can be processed into salted fish, jerky, meatballs, shredded, sausage, silage flour, surimi, and Pindang. Making food products like this is usually done after the reduction of urea content. Shark fin is used for SOP material, the teeth are used for decoration and also made accessories, while the liver is used for the manufacture of fish oil. During this time the arrest against Sharks is only limited as a byproduct of other fish types that are the main goal of catching. However, the shark results from year to year experienced a considerable increase. Sharks caught today can be utilized as optimally as possible. Sharks are often caught by some of the catch tools such as floating gills nets (drift gill net), Rawai surfaces (surface longline), basic Rawai (bottom longline), and shark nets (trawling nets). Although shark fishing in Indonesia is only as a side business (bycatch) of other fisheries businesses,

the production it produces shows significant value. The increasing economic gains gained from this commodity make this species endangered (Arrum et al., 2016).

Shark conservation Status based on IUCN data, 1 species including highly endangered categories (critically endangered), 5 species of endangered categories (endangered), 23 species including the extinct vulnerable category (vulnerable), as well as 35 species belonging to the almost threatened category (near threatened). Setiati, et al (2016) have been monitoring sharks sold in the north coast TPI of Central Java in 2016 and recorded as many as 10 types, which belong to 6 families. Based on the International Union for Conservation of Nature (IUCN) Sharks sold in the TPI Pantai Utara Jawa Tengah, there are 5 categories namely Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC). Research on the inventory, governance, and the status of the species of shark that is landed in TPI Pantai Utara Jawa Tengah is important to be done considering the rise of the arrest in nature, so feared will threaten the survival of sharks. The results of the research presented are expected to meet the needs of data and information in the efforts of shark conservation in the north coast of Central Java.

2 Method

Observations were conducted in several TPI Pantai Utara Jawa Tengah, such as TPI Tambaklorok, TPI Tasik Agung, TPI Tanjungsari, and TPI Bajomulyo unit I. Observation was conducted in June – September 2019. The observation material is a sample of shark that is sold at TPI Pantai Utara Jawa Tengah. Shark sampling that is landed at the fish auction site is performed in purposive sampling that is shark sampling is done on all fishing fleet that gets caught in the form of a shark and anchored in TPI Pantai Utara Jawa Tengah in June-September 2019. Each 1 time each TPI. The parameters observed and measured to know the types of sharks sold in the TPI Pantai Utara Jawa Tengah is the number of shark types, morphometric characters include Total length of shark (PT) and the weight of sharks (B), as well as the number of males and females in each type. The sample identification process was conducted at the biology Laboratorium of the FMIPA University of Semarang. Sharks are identified by reference to White et al. (2006).

3 Results and Discussion

Sharks were landed on the north coast of TPI of Central Java in June – September 2019, a total of 5 types included in three orders, three families, and three genera. Some of these sharks are *Carcharhinus Brevipinna*, *Carcharhinus longimanus*, *Carcharhinus signatus*, *Chiloscyllium punctatum*, and *Alopias pelagicus*. The number and type of fish are obtained through a purposive sampling method with the capture of shark type that is done on all fishing fleet that gets caught in the form of a shark. The following is the result of an inventory study of shark type which is landed in TPI Pantai Utara Jawa Tengah (Table 1).

Order	Species	Local name	N	Sex		Size	
				♂	♀	BH (cm)	BW (kg)
Carcharhiniformes	<i>Carcharhinus brevipinna</i>	Cucut lanjaman	26	11	15	150±45.7	5.1±0.9
	<i>Carcharhinus longimanus</i>	Hiu koboi	4	2	2	77±61.3	2.4±1.7
	<i>Carcharhinus sealei</i>	Hiu lanyam	7	4	3	83±44.7	2.1±0.9
Orectolobiformes	<i>Chiloscyllium punctatum</i>	Hiu batu, cucut dolok	19	9	10	80.1±15.2	2.2±0.2
Lamniformes	<i>Alopias pelagicus</i>	Hiu tikus	6	4	2	179.8 ±160.5	9.5±5.9
	Total		56	25	31		

Table 1: Types of sharks that are landed on the north coast of Central Java

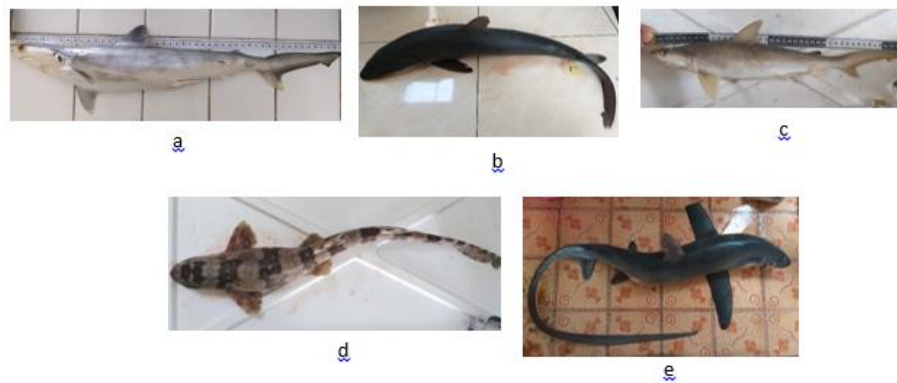


Figure 1: Sharks are landed in TPI Pantai Utara Jawa Tengah (a) *Carcharhinus Brevipinna* (b) *Carcharhinus Longimanus* (c) *Carcharhinus Sealei* (d) *Chiloscyllium punctatum* (e) *Alopias pelagicus*

3.1 Description of Inventarized Shark Type That TPI Pantai Utara Jawa Tengah

a. *Carcharhinus brevipinna*

The specific characteristics of this species that are seen from the bottom direction *Carcharhinus brevipinna* have a muzzle that is short and rounded wide, the first back fin is very high and the size of more than half the muzzle distance to the base of the back fin, there is a stroke between the fins. Habitat of these species in archipelago waters, continental exposure, and deep-sea borders (Tubir), from tidal areas to 280 m (Fahmi & Dharmadi, 2013).

b. *Carcharhinus longimanus*

Carcharhinus longimanus or commonly referred to as “hiu koboy” has a common feature among which is the first back fin and the chest fin is very wide and round at the edges, in the adult sharks the tip of the white ends while on a black juvenile shark, there is a stroke between the back fin, has a short and rounded muzzle, the upper tooth is a wide triangle while the lower bottom tooth (White et al 2006).

c. *Carcharhinus sealei*

Special features of the species *Carcharhinus sealei* known by the name “cucut lanjaman”. This shark has the characteristic of the first dorsal fin rather high and curved taper, the second dorsal fin blackish or black on the ends, and the other fins are plain. Habitat of this species is found to live off the coast close to the mainland (White et al 2006).

d. *Chiloscyllium punctatum*

Species *Chiloscyllium punctatum* has a common characteristic of lean body and tail, both dorsal fin almost as large as the edges of the back and have cupping, the base of the anus fin is much shorter than the tail fins, so long as the body does not have scars when the adult body color or faint brown stripes while the juveniles usually have dark spots. Habitat *Chiloscyllium punctatum* the base of coral waters and muddy waters, ranging from tidal areas to depths of 85 m (Fahmi & Dharmadi, 2013). This species can be found in the west part of Indonesia such as Java and Sumatera. It includes a strong fish and is capable of surviving without water for 12 hours.

e. *Alopias pelagicus*

Alopias pelagicus or who have a local name “hiu tikus” has a common characteristic of the upper tail size of most of the body, the shape of the curved head in the part between the eyes, has a rather wide eye and its position almost in the middle of the side of the head, the base of the first fin is closer to the rear end of the chest fin than with the belly fin. Habitat *Alopias pelagicus* surface to a depth of 152 m. (White et al., 2006).

3.2 Governance

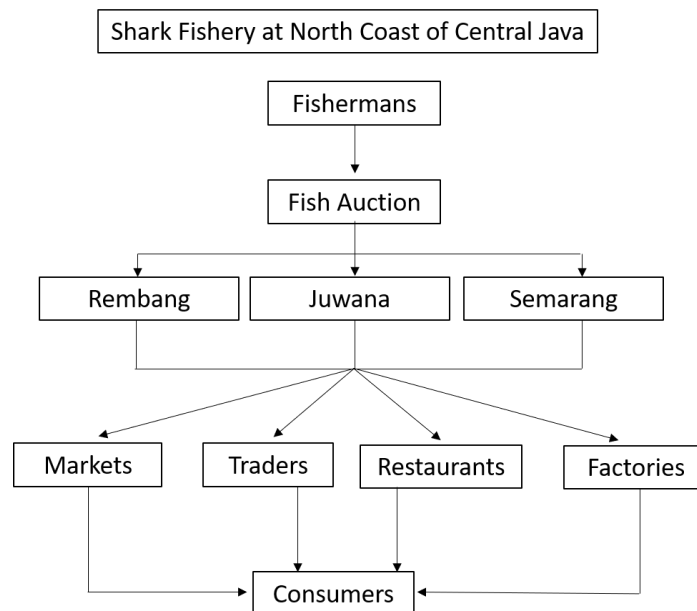


Figure 2: Governance System Chart at TPI Pantai Utara Jawa Tengah

From the information obtained from fishermen in various TPI Pantai Utara Jawa Tengah, for small-scale fisheries, all parts of the shark will be utilized (fins and meat), in general fishermen sell sharks to spindles (whole-body). Then the presses will process and sell them according to the demand of processing companies as well as food sellers restaurants from sharks. As for large-scale fisheries/factories, generally, only utilize the shark fin and throwback into the sea shark body that has been taken in the fins, it is in because that shark products produced by large-scale fisheries is a bycatch,

so they choose to take the most profitable part to avoid the use of fish palkas that many of the side-capture products (like sharks) and prefer the use of fish hatch for their main catches (such as tuna).

3.3 Ship

The fishing fleet that operates on the north coast of Central Java, among others, is a boat without a motor, outboard motor, and motorboat, with a mileage of 3-12 miles. As the condition of overfishing in the north coast of Central Java is influential in decreasing the amount of arrest and production of the catches, there has been a transition of arrest efforts to the line > 12mil with a fleet size > 30 GT (fishing ground area) to the waters of Bengkulu/Sumatra, Kalimantan and Sulawesi), which is concentrated in the fish catches of the export or high value. Currently, the arrest fleet has been equipped with modern navigation equipment and a fish cooling machine on board (Imam Triarso, 2012).

3.4 Capture Equipment

Shark capture equipment commonly used by fishermen on the north coast of Central Java is longline. This capture device does not specifically catch sharks but is devoted to the catches of tuna and marlin. Longline consists of several parts, among others:

1. Mainline

The main strap serves as the seat of the rope. The common ingredient of Pantura fishermen for the main rope is nylon. The size for the main strap is 6 mm in diameter. Main strap Length One set Rawai drift reaches 3 km.

2. Branch line

A branch cord is a rope that grasped on the main rope and serves as a place to strengthen the fishing rod. The material used by the longline fisherman Pantura to the Rawai Drift Branch strap is polyethylene with a diameter of 3 mm. The average length of the branch strap is 17 meters.

3. Floater

A floater is a tool used to hold the fishing rod remains in the desired position. Also, the buoy serves as a marker of Rawai's existence. The ingredient used by the fisherman Pantura is Styrofoam.

4. Floater line

The floater line is a rope that connects the main strap with the buoy. The buoy also serves as a determinant of the depth and position of Rawai drifting in the waters.

5. Hook

A hook is where the bait depends. The fishing rod material used is steel with a length of 4.

3.5 Conservation Status of Sharks Landed on The TPI Pantai Utara Jawa Tengah

On an international scale have been quite a lot of international bodies that focus on protecting sharks. One of the international bodies that are very concerned about the resource is the IUCN (International Union for Conservation of Nature) which formed the Shark Specialist Group (SSG) in 1991, as part of the Special Survival Commission. The following is a type of shark that is landed in TPI Pantai Utara Jawa Tengah based on its conservation status according to IUCN and CITES (Table 2).

No	Species Name	Local Name	IUCN	CITES
1.	<i>Carcharhinus brevipinna</i>	Cucut lanjaman	VU	-
2.	<i>Carcharhinus longimanus</i>	Hiu koboi	CR	Appendix II
3.	<i>Carcharhinus sealei</i>	Hiu lanyam	VU	-
4.	<i>Chiloscyllium punctatum</i>	Hiu batu, cucut dolok	NT	-
5.	<i>Alopias pelagicus</i>	Hiu tikus	EN	Appendix II

Table 2: Sharks Conservation Status Landed on the TPI Pantai Utara Jawa Tengah
Source: IUCN and CITES

On an international scale have been quite a lot of international bodies that focus on protecting sharks. One of the international bodies that are very concerned about the resource is the IUCN (International Union for Conservation of Nature) which formed the Shark Specialist Group (SSG) in 1991, as part of the Special Survival Commission. The following is a type of shark that is landed in TPI Pantai Utara Jawa Tengah based on its conservation status according to IUCN and CITES (Table 2).

Carcharhinus Longimanus in IUCN belongs to the category Critically Endangered (critically). According to the IUCN (2020), Critically Endangered is a category given to species that face a very high risk of extinction in nature.

Alopias pelagicus or who have a local name “hiu tikus” have high economic potential. This species in the IUCN belongs to the category Endangered (EN). In general, almost all parts of the body of *Alopias pelagicus* sharks are utilized. Fins are the most sought after body parts because they have quite high economical value, especially for large size. The fins are commonly used as food ingredients to be served in restaurants at expensive prices as shark fin soup or exported to overseas. Shark meat is commonly utilized for consumption in the form of marinated or smoked, usually, shark meat products are only marketed locally and only a small portion is exported. Shark bones have a high economical value that is utilized as raw material and cosmetics, usually the bones are dried and exported to various countries. Also, the skin can be used as a raw material of leather handicrafts or used as a snack.

Some shark types have conservation status in categories Vulnerable (VU) among other *Carcharhinus brevipinna* (“Cucut lanjaman”) and *Carcharhinus sealei* (“Hiu lanyam”). This category is given to sharks that are feared to have a high risk of extinction in nature. The number of individuals in this type of shark is very alarming, with a long reproduction period and giving birth to only 1-2 tails annually.

Chiloscyllium punctatum or “hiu batu” is a type of shark that has conservation status in the category of almost endangered (Near Threatened) because this type is believed to have the risk of extinction in the very high nature.

One type of shark that has high economic potential is Hiu tikus (*Alopias pelagicus*). Based on ministerial Regulation No. 34 of 2015 *Carcharhinus longimanus* (“Hiu koboi”) and *Alopias pelagicus* (“Hiu tikus”) Categorized into Appendix II CITES. It is necessary to conserve the conservation action of the species appendix CITES so that the species trade will not threaten the sustainability of its natural habitat.

To know the conservation status of the types of sharks that are landed in the TPI Pantai Utara Jawa Tengah, data is presented in table 2. The Status of conservation of the types of sharks based on the IUCN, among others, is Critically Endangered (CR), Endangered (EN), Vulnerable (VU), and Near Threatened (NT). As for the CITES, the type of shark is based on the list of Appendix II or not threatened by extinction, but maybe endangered if the trade continues without arrangement.

4 Conclusions

The types of sharks are landed in TPI Pantai Utara Jawa Tengah total of 5 types of *Carcharhinus brevipinna* (Cucut lanjaman), *Carcharhinus longimanus* (Hiu koboi), *Carcharhinus sealei* (Hiu lanyam), *Chiloscyllium punctatum* (Hiu batu), and *Alopias pelagicus* (Hiu tikus). The most widely discovered shark is the family Carcharinidae. Based on the category of conservation status in IUCN, 1 type belongs to the category Critically Endangered (CR), 1 type belongs to Category Endangered (EN), 2 types belonging to category Vulnerable (VU), and 1 type belongs to category Near Threatened (NT).

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