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## Unprecedented decline in the catches of mobulids: an important component of tuna gillnet fisheries of the Northern Arabian Sea

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### ABSTRACT

Mobulid rays are found both in coastal and offshore waters of Pakistan and other Indian Ocean countries. Five species including giant manta, spinetail mobula (devilfish), shortfin devil ray, Chilean devil ray and smoothtail mobula are known to occur in Pakistan. These rays are caught as bycatch of pelagic gillnets which are used for targeting tuna and tuna like species in Pakistan. Mobulids were found to be quite common in bycatch prior to May 2015, however, there was an unprecedented decrease in landings of mobulids at Karachi Fish Harbour (where major sampling was done) and other landing centers along the coast of Pakistan. Although there is ban imposed on catching of mobulids in Pakistan since 2016, but there is need for taking immediate management measures by IOTC because of vulnerability of mobulids to fishing pressure and considering their decrease landings in Pakistan as well as other Indian Ocean countries.

### INTRODUCTION

Mobulids rays belonging to family Myliobatidae (which includes eagle and manta rays) are important component of pelagic ecosystem in coastal and offshore waters. Following the taxonomic review of White *et al.* (2018), five species of mobulids are reported from Pakistan which include giant manta (*Mobula birostris*), spinetail mobula or devilfish (*M. mobular* including *M. japonica*), shortfin devil ray (*M. kuhlii* inclusive of *M. eregoodootenkee*), Chilean devil ray (*M. tarapacana*) and smoothtail mobula (*M. thurstoni*). Mobulids are caught in Pakistan as bycatch of surface gillnets which are aimed for catching tuna and tuna like species. Although found both in coastal and offshore waters, mobulids are more common in neritic area off the coastline. They are not found in the deltaic creeks of the Indus Delta as well as along the shallow coastal waters along Pakistan coast.

Mobulids were studied as part of the general fish fauna of Pakistan. A number of authors have included these species in their list of sharks or fishes from Pakistan (Ahmad and Niazi, 1975; Anonymous, 1955; Day, 1889; Di Sciara *et al.*, 2016; Hoda, 1985, 1988; Hussain, 2003; Jalil and Khalil, 1981; Khan and Quadri, 1986, Misra, 1962,; 1969; Psomadakis *et al.*, 2015; Qureshi, 1957; Zugmayer, 1913). Tombazi (1934) narrated an excursion aiming to hunt whale sharks but ended up in killing a giant mobulids which was named as *Dicerobatis eregoodoo* but this later on described by Whitley (1936) as *Indomanta tombazii*. The status of this species is uncertain (Eschmeyer, 2018) but from the size it appears to be *Mobula birostris*. Anonymous (1955) mentioned landing of a giant ray( *Myliobatis nichofii*) from Ormara in April, 1949. Examination of the photograph reveals that it was also *Mobula birostris*.

Mobulids are considered to be important because of their small and dispersed population, slow reproduction, late maturity, long lives, making them one of the most conservative elasmobranch species. They are facing threat of overfishing which is

believed to seriously their stocks throughout the world oceans. Despite their importance, almost no information available for this important group of marine animals from Pakistan. Separate statistical data is not recorded in Pakistan. In the present paper the an account of the fisheries of mobulids in Pakistan is presented alongwith their status, management regime and conservation aspects.

### FISHERIES OF MOBULIDS

Mobulids are caught in pelagic gillnets being used for catching tuna and tuna like species along Pakistan coast. Fishing boats and fishing gears being used for catching tuna are described in detail in Moazzam (2011, 2012, 2013). A major part of the information about the fisheries of mobulids in Pakistan is generated through Saves Our Seas Foundation funded project entitled “Developing Conservation Strategy for Mobulids found in waters of Pakistan” implemented by WWF-Pakistan during 2013 and 2015. Under the project landing data has been collected from two major fish landing centers of Pakistan which cater to about 80 % of commercial landings of Pakistan including tuna and tuna like species as the bycatch of pelagic gillnet vessels.

Analysis of the commercial landings revealed that mobulids were used to occur almost throughout the year along Pakistan coast (Fig. 1). Their peak landings at Karachi Fish Harbour were observed to be between August and October with maximum recordings in October. Poor landings were observed during January and February. An unprecedented after May 2015 was noticed in the landings of mobulids although there is no major change in the fishing practices along Pakistan coast.

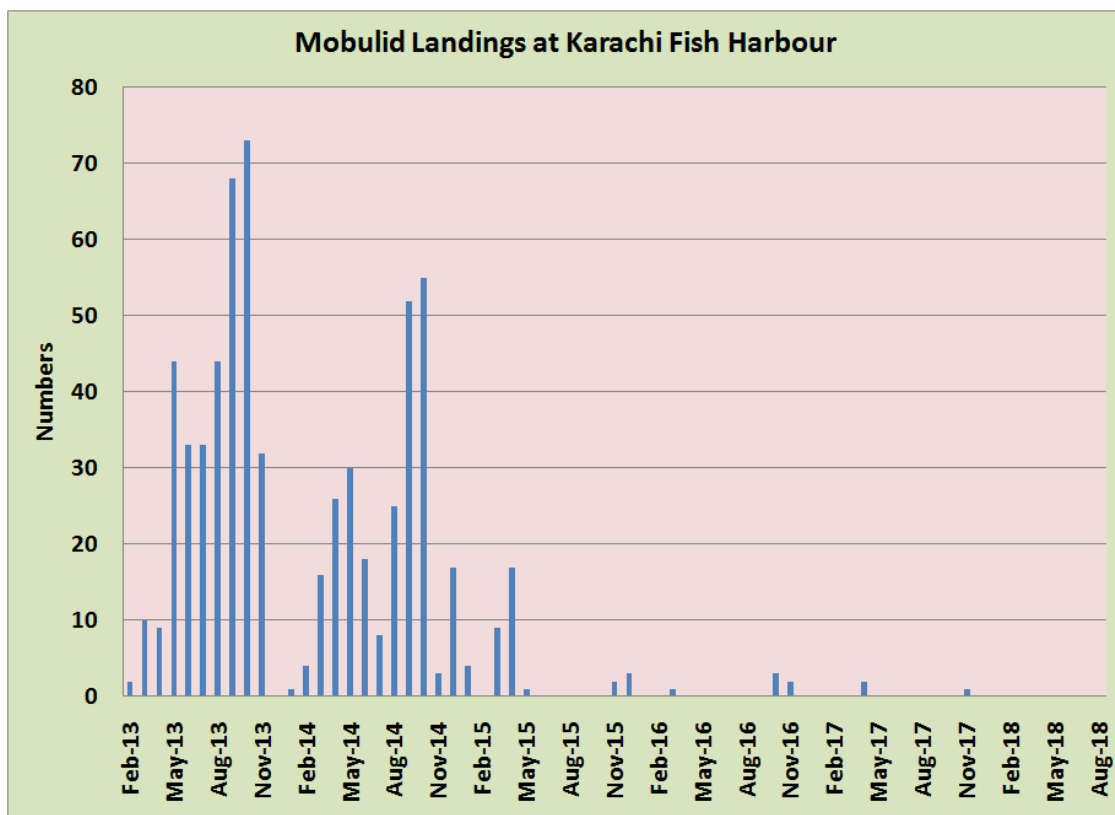


Fig. 1. Landings of mobulids at Karachi Fish Harbour

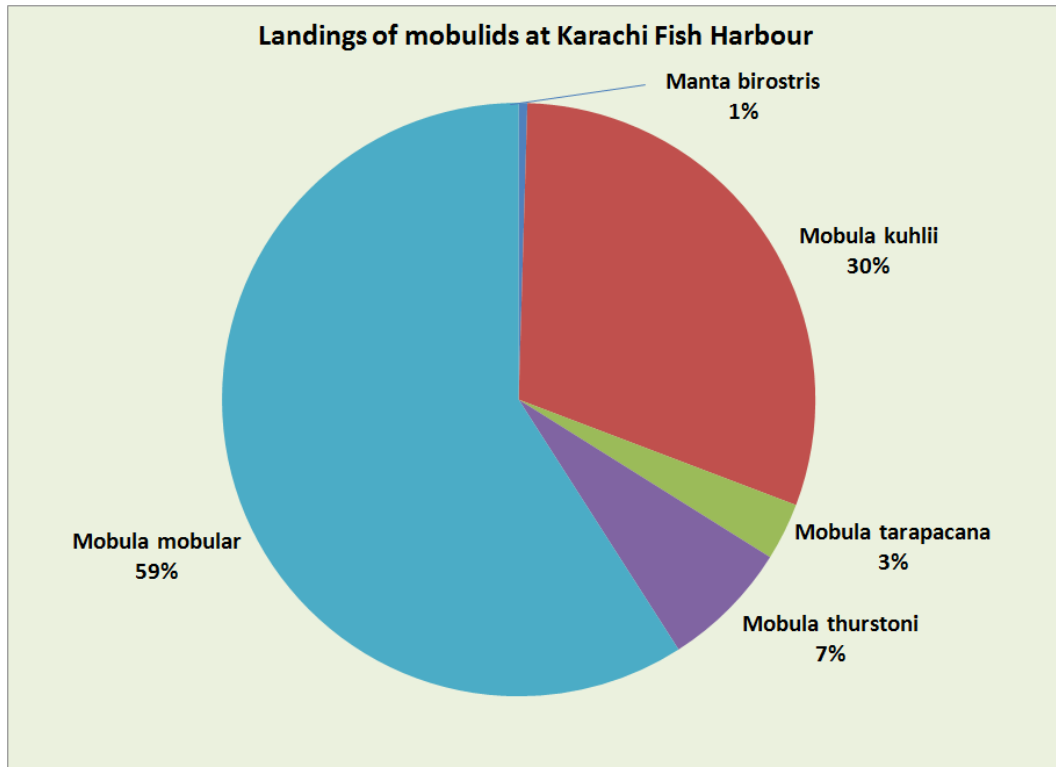


Fig. 2. Species Composition of mobulids at Karachi Fish Harbour

### SPECIES COMPOSITION

The study revealed that Spinetail mobula (*Mobula mobular*) was the most common species (Fig. 2) followed by shortfin devil ray (*M. kuhlii*) and smoothtail mobula (*M. thurstoni*). Chilean devil ray (*M. tarapacana*) is among the rarely occurring mobulids. Giant manta (*M. birostris*) was recorded only on three occasions in the commercial fishing operations.

A marked distribution of mobulid species was observed. Some species were observed throughout 2013 to 2015 whereas others were observed very rarely during the study.

#### ***Mobula birostris* (Walbaum 1792)**

Giant manta (*M. birostris*) was observed on three occasions during the study period (May 2013 to August 2018). According to the fishermen, this species used to be quite abundant about 25 to 30 years back but because of overfishing, giant manta are seldom caught or observed by fishermen. Although there was no aimed fisheries for manta in the area but these were caught mainly as bycatch of gillnet fisheries. Fishermen used to take out liver for extraction of oil for smearing the hulls of the fishing boats whereas meat used to be dried and sent to fish meal plants in located Karachi.

#### ***Mobula mobular* (Bonnaterre 1788)**

Spinetail mobula (*M. mobular*) which includes *M. japonica* (now considered as a synonym) was observed to be the most dominating species of mobulid found along the coast of Pakistan. It was observed on 379 occasions during February 2013 and August 2018. This species used to be found throughout the year with marked increase in occurrence between June and October during 2013 and 2014, with maxima was observed in September 2013 (Fig. 3), however, since April 2015, its landings at Karachi Fish Harbour started to decrease to report of one or two specimens

annually. This was the only species which was observed in June 2018 when its two specimens were landed at Karachi Fish Harbour.

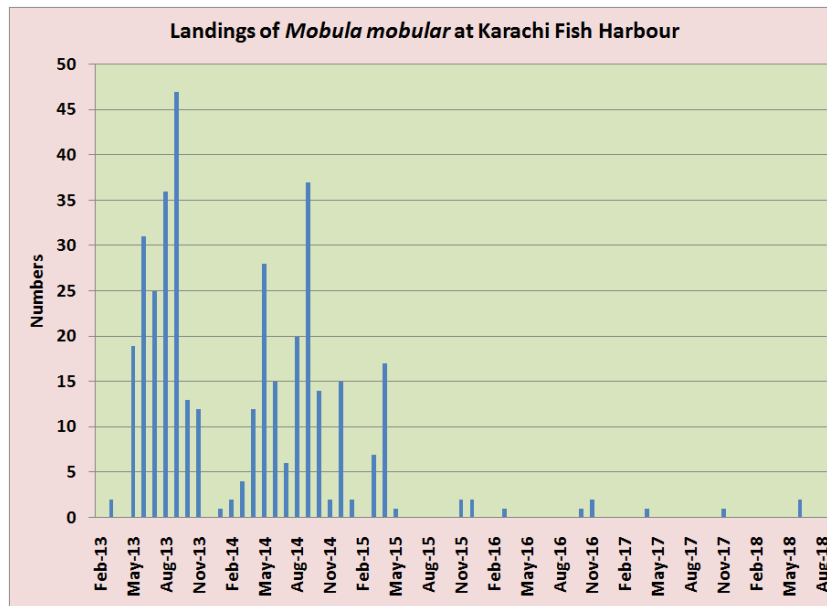


Fig. 3. Landings of spinetail mobula (*Mobula mobular*) at Karachi Fish Harbour

***Mobula kuhlii* (Valenciennes 1841)**

Shortfin devil ray (*Mobula kuhlii*) which includes *M. eregoodootenkee* (now considered as a synonym) is the second most common species of mobulid found in Pakistan. It was observed on 194 occasions during February 2013 and August 2018. Its peak of abundance was also observed in October 2013 (Fig. 4). This species was found more abundant during 2013 whereas its landings were observed to have declined since 2014 and no specimen was observed during 2018. This species has distribution from southwest coast of Africa, to south Africa and Indo-Pacific area and known from Red Sea, Arabian Sea and the Persian Gulf to South Africa and the Philippines, north to Vietnam, south to northern Australia.

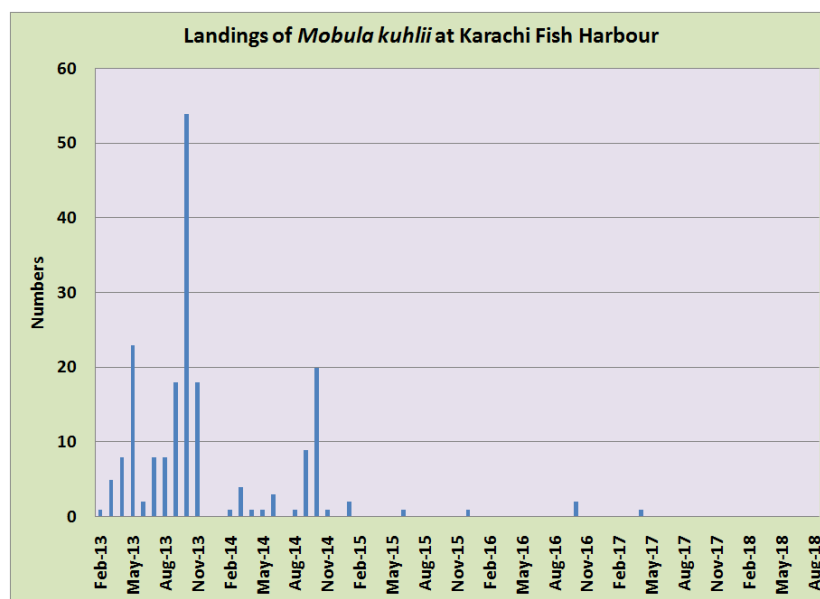


Fig. 4. Landings of shortfin devil ray (*Mobula kuhlii*) at Karachi Fish Harbour

### ***Mobula tarapacana* (Philippi 1892)**

Chilean devil ray (*Mobula tarapacana*) was observed to be a rare species noticed on 17 occasions during the study period. Its 4 specimen were observed during October 2013 whereas only 3, and 2 specimens were seen at Karachi Fish Harbour in March 2013 and March 2015 respectively (Fig. 5). No specimen was observed at Karachi Fish Harbour after May 2016. This circumtropical species is found in Indian, Atlantic and Pacific Ocean, however, not commonly found along the coast of Pakistan.

### ***Mobula thurstoni* (Lloyd 1908)**

Smoothtail mobula (*Mobula thurstoni*) is the third most common species of mobulid found in Pakistan. It was observed on 45 occasions during the study. It was observed to have a patchy seasonal distribution with maxima in October 2014 when 21 specimens of this species were observed whereas in the remaining period it was found on a few occasions (Fig. 5). Since December 2014, this species was not observed. It is also a circumtropical species. It is considered to be a coastal species found mainly near the coast.

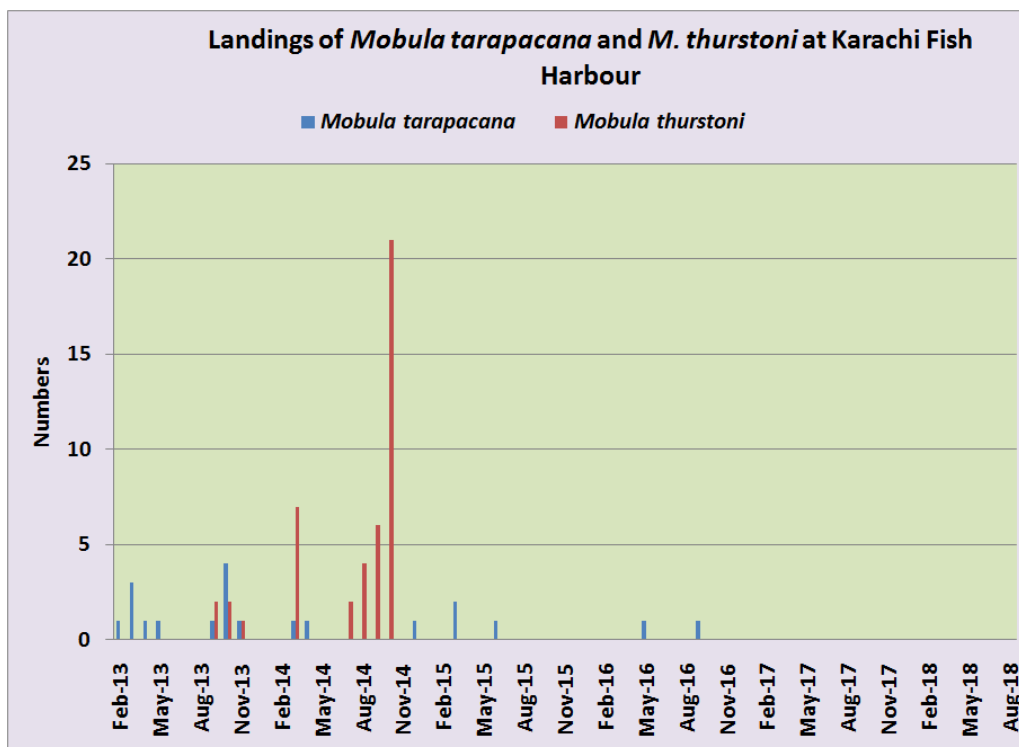


Fig. 5. Landings of Chilean devil ray (*Mobula tarapacana*) and smoothtail mobula (*Mobula thurstoni*) at Karachi Fish Harbour

### **MANAGEMENT MEASURES**

It is evident that landings of mobulids has decreased substantially during last five years (February 2013 to August, 2018) which is evident from number of specimens recorded from Karachi Fish Harbour (Fig. 6). The situation is not different at other landing centers along Balochistan coast. Although there is no major change in the fishing effort (remained around 700 pelagic get net vessels), still this unprecedented decrease in landings of mobulids is noticeable.

Considering that mobulids are disappearing in the commercial landings, WWF-Pakistan persuaded two maritime provincial governments of Pakistan (Sindh and

Balochistan) to legislate laws for protection of these species. Accordingly through a notification (No. 5(3)SO(FISH)/ L&F/16 dated 16-05-2016), Government of Sindh has put a ban on catching of a number of species including species listed in CITES. This notification puts a ban on catching of all mobulid species in waters of Sindh, as well. A similar ban was imposed by Government of Balochistan vide a notification No. SO(Coord)Fish/2-1/2013/3148-54 dated 08-09-2016) through which catching, retention, marketing and trade of mobulid rays was banned. WWF-Pakistan now working very closely with the provincial, federal government authorities and other stakeholders to ensure that effective implementation is made on the legislations banning mobulids fisheries in Pakistan.

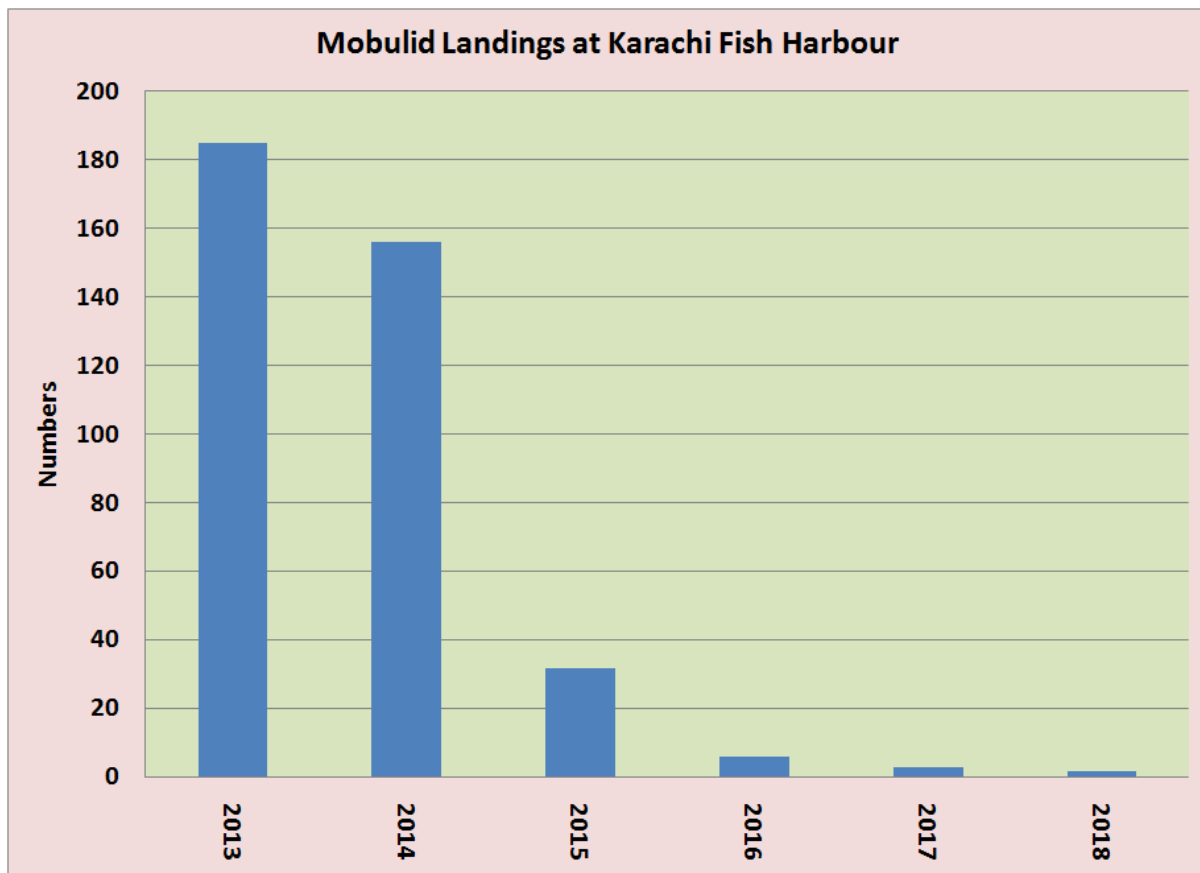


Fig. 6. Number of mobulids landed at Karachi Fish Harbour (2013-2018)

WWF-Pakistan has initiated a programme for creating awareness about the mobulids among general public including students, commercial fishermen, coastal communities, sport fishermen, divers and other stakeholder regarding protection of these important species. In this context identification charts, communication materials, news items are published and seminars etc. are regularly been arranged.

It is worth pointing out that at the 22nd Session of the Indian Ocean Tuna Commission (IOTC), Proposal L, 'On the conservation of mobula and manta rays caught in association with fisheries in the IOTC area of competence' was deferred (IOTC-2018-S21-PropL) considering that there is no specific research that indicates an association of mobulids with surface fisheries, requesting the Scientific Committee of the IOTC to review the status of manta and mobula rays and their interactions with IOTC fisheries and to report this to the Commission in 2020.

The study from Pakistan indicates that the stocks of mobulids have severely depleted since 2015 which can be attributed to the slow growth, extremely low fecundity, increased interaction with fishing operations and possibly climate change. Considering that the population of mobulid rays has decreased alarmingly, at least in Pakistan whereas the situation in other Indian Ocean Countries is not very different (Shahid *et al.*, 2018), therefore, it is emphasized that Indian Ocean Tuna Commission may immediately adopt robust conservation and management measures including those suggested by Shahid *et al.*, 2018.

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