Ministry of Marine Resources
Marine Resources Research Division

Incidentally Caught Sea Turtles by Industrial Trawl Fishing Vessels from January to May 2019

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1. Introduction

Globally, there are seven species of sea turtle: the leatherback Dermochely scoriacea (Family Dermochelydae), loggerhead *Caretta caretta*, hawksbill Eretmochely simbricata, olive ridley *Lepidochely solivacea*, Kemp's ridley *Lepidochely skempi*, green *Cheloniamydas* and the flat back, *Natator depressus* (all in the Family Cheloniidae). The World Conservation Union (IUCN) lists the green, loggerhead and olive ridley as 'Endangered', the leatherback, Kemp's ridley and hawksbill are listed as 'Critically Endangered', and the Flatback is listed as data deficient, whereby there is insufficient data to determine its status (PERSGA, 2004).

Around the world the survival of all species of Sea Turtle is threatened by a variety of man-induced factor, including the direct and indirect harvest of adults and juveniles, threat to eggs and hatchling, the degradation or loss of nesting habitat and pollution of seas. In fact no threat is as pervasive and devastating to declining population as persistent take of adults and juvenile sea turtles (Maria and Thome, 1999).

Although sea turtles have been known to survive and flourish up until very recent times, their numbers have been drastically reduced to the point that all remaining species of turtles are considered either threatened or endangered on a worldwide basis. Undoubtedly, human interference is the cause of these collapses. The challenges that sea turtles now face range from loss of nesting beaches and foraging habitats to mortalities on the high seas through intense pelagic fishing practices. They are also harmed by increasing loads of non-biodegradable waste and pollutants that the oceans and coastal zones now receive (Lutcavage *et al*.1995).

Incidental catch in fisheries is widely recognized as a major causing mortality of sea turtles. Because sea turtles are exceptional breath–hold divers, there was initial skepticism about the estimated number of sea turtles caught and killed by inadvertent capture in trawls. Sea turtles forcibly submerged in any type of restrictive fishing gear would eventually suffer fatal consequences from prolonged anoxia and /or seawater infiltration of the lunges (Lutcavage *et al*.1995). Several gear types, including shrimp and commercial fish trawling and fish seines are known causes of injury and mortality.

Five of the seven species of Sea Turtle in the world are known to exist in the Eritrean Sea namely, Loggerhead (*Caretta caretta*), Green turtle (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Olive ridley (*Lepidochelys olivacea*) and Leatherback (Dermochelys coricea)**.** Of these, the green, and hawksbill are the most common in Eritrea, while the loggerhead, leatherback and olive Ridley infrequently seen, and with virtually no recorded nesting (Bjorndal *et al*., 1995). Three species - green, hawksbill and olive ridley nest. The main threats to turtles in Eritrea are disturbance of nesting and foraging habitats, incidental net captures (gillnets and trawlers) poaching of meat and eggs, lack of adequate protection and enforcement, limited awareness and land -based development and pollution (ECMIB, 2007).

Table. Summary of sea turtles caught in shrimp and fish trawlers in the year 1994 – 2004.

YEAR	SPECIES OF SEA TURTLES						Total No. of Caught Turtles	Tagged Turtles	Condition		Survival Rate (%)
	Green	Hawksbill	Loggerhead	Olive ridley	Leatherback	Unidentified			Dead	Alive	
1994	_	_	_	_	_	_	26	_	_	_	_
1995	_	_	_	_	_	_	164	_	_	_	_
1996	262	86	22	1	2	78	451	0	159	292	63.3
1997	_	_	_	_	_	_	_	_	_	_	_
1998	_	_	_	_	_	_	_	_	_	_	_
1999	193	3	0	0	10	141	347	0	69	278	80.1
2000	989	38	4	2	16	520	1569	0	266	1303	83.0
2001	204	3	4	0	3	172	386	0	84	302	78.2
2002	57	1	0	0	0	112	170	1 Green	56	114	67.0
2003	64	2	0	0	8	91	165	0	45	120	72.7
2004	50	0	0	0	0	14	64	1 Green	11	53	82.8
2003 - 2004	**1819**	**133**	**30**	**3**	**39**	**1128**	**3342**	**2 Green**	**690**	**2462**	**78**

Data Source: Fisheries Statistics Unit, Research & Statistics Division, Ministry of Fisheries – Massawa

2. Objective

1. Assess the threat of fish and shrimp trawlers to sea turtle populations
2. Observe and identify fishing grounds with highest threat to sea turtles
3. Identify the Sea Turtle species incidentally caught by trawlers
4. As part of the assessment to check if the inspectors are conscious and recording incidentally caught sea turtles in booklets

3. Materials & Methods

All the data were collected from the booklets filled by inspectors and research staff onboard of shrimp and fish trawlers. The data was analyzed by Microsoft Excel and figures are used to explain the results in very simple way. A form was prepared to collect the data that included the date of catch, species type, position of catch and fishing block, bottom type, depth, time of trawling, Morphometric measurements, condition of the incidentally caught turtles and data recorders. The materials used to collect the data are measuring tab, identification guide and book let.

4. Result

Even though there is no confirmation that indicate all the incidentally caught sea turtles are recorded in each vessel, from all 119 fishing trips of the shrimp and fish trawlers operating in different fishing grounds of the Eritrean Red Sea 48 incidentally caught Sea Turtles are recorded from January to May, 2019. Out of the 119 fishing trips, 53 trips were made by small trawlers (around 10 fishing days per trip) and the 66 trips were by large trawlers (20 fishing days per trip). Of the five existing species of sea turtle in the Eritrean Red Sea four species namely green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricate*), loggerhead (*Caretta caretta*) and olive ridley (*Lepidochelys olivacea*) were recorded as incidental catch i.e.17 Green, 21 Hawksbill, 1 Loggerhead, 4 Olive ridley and 5 unidentified turtles were reported. From the total number of turtles caught only 4 turtles were dead and the rest 31 were returned to the sea alive. From all the fishing blocks, higher records of incidentally caught turtles were in block 7 and block 5 respectively. In fishing blocks 6, 8, 9, and 10 relatively are with few numbers of sea turtles record. From the incidentally caught sea turtles there was no record of tagged turtles. The bottom types were those incidentally caught sea turtles recorded are muddy. More than half of the reported sea turtles caught were from vessels having Research staff on board.

Table.1. Number of Sea Turtles incidentally caught in each fishing blocks from January to May, 2019

Serial. No	Turtle name	Number of turtles caught	condition		Fishing Block Number					
			Alive	Dead	Block .5	Block .6	Block .7	Block .8	Block .9	Block .10
1	Green turtle	17	16	1	6	1	6	3	0	1
2	Hawksbill	21	19	2	12	0	6	2	1	0
3	Olive ridley	4	3	1	0	0	2	0	2	0
4	loggerhead	1	1	0	0	0	1	0	0	0
5	un Identified	5	4	1	1	0	4	0	0	0
Total Number		**48**	**43**	**5**	**19**	**1**	**19**	**5**	**3**	**1**

Sea Turtle species recorded

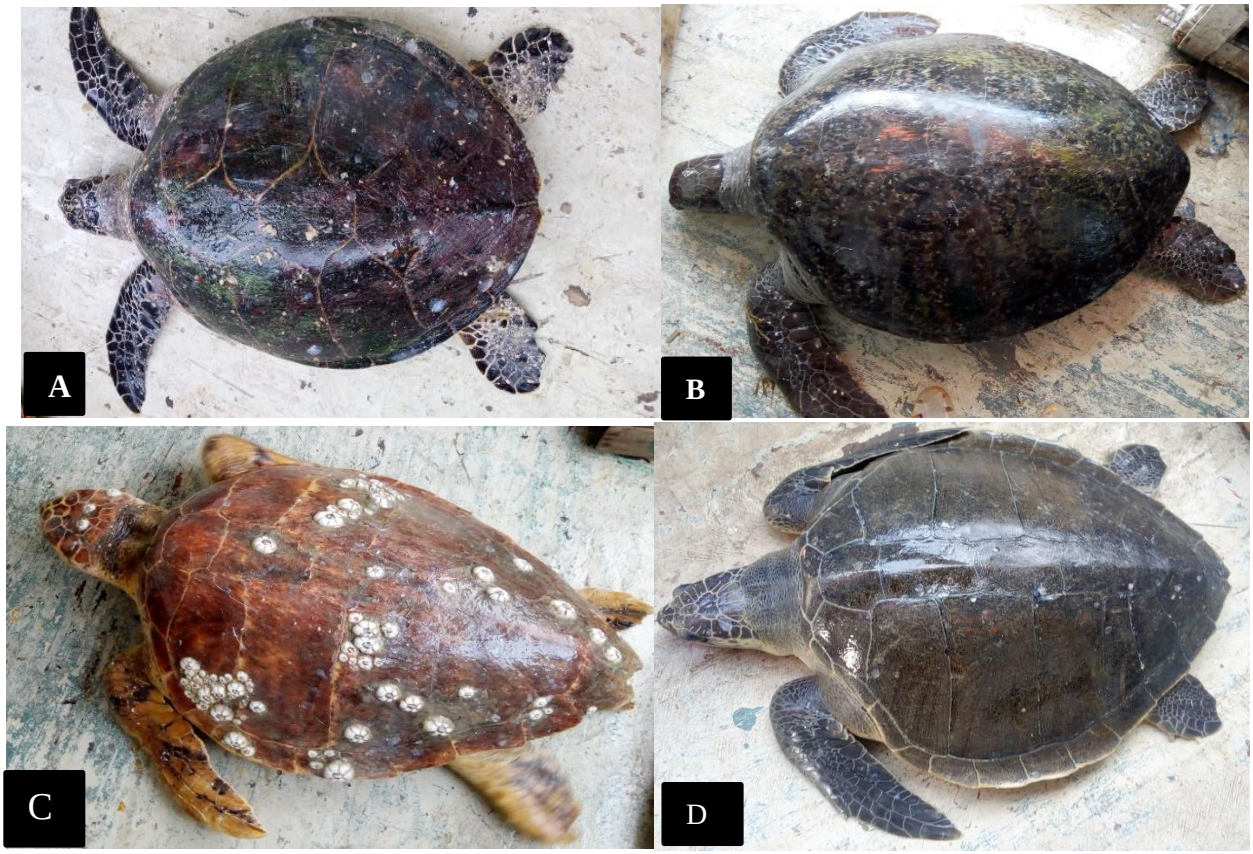
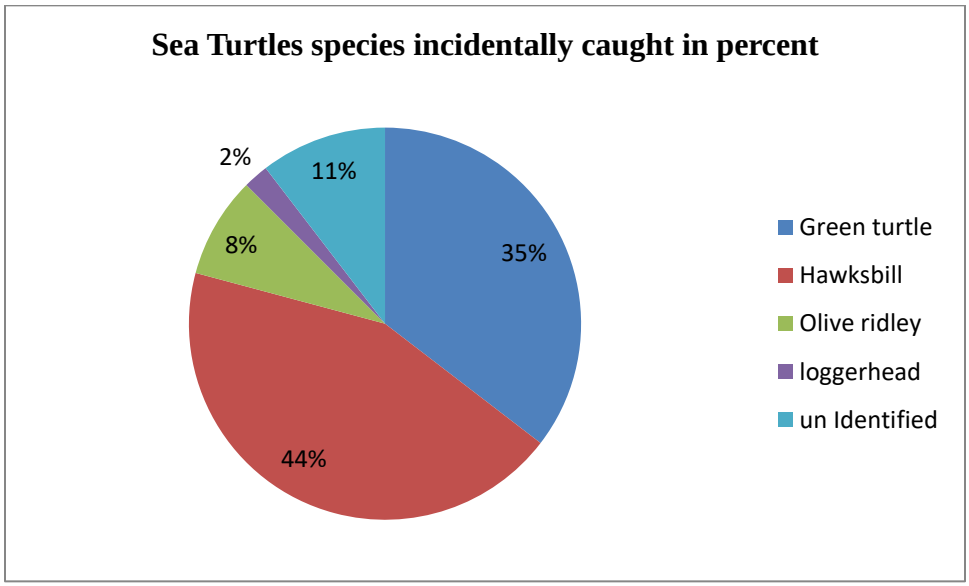
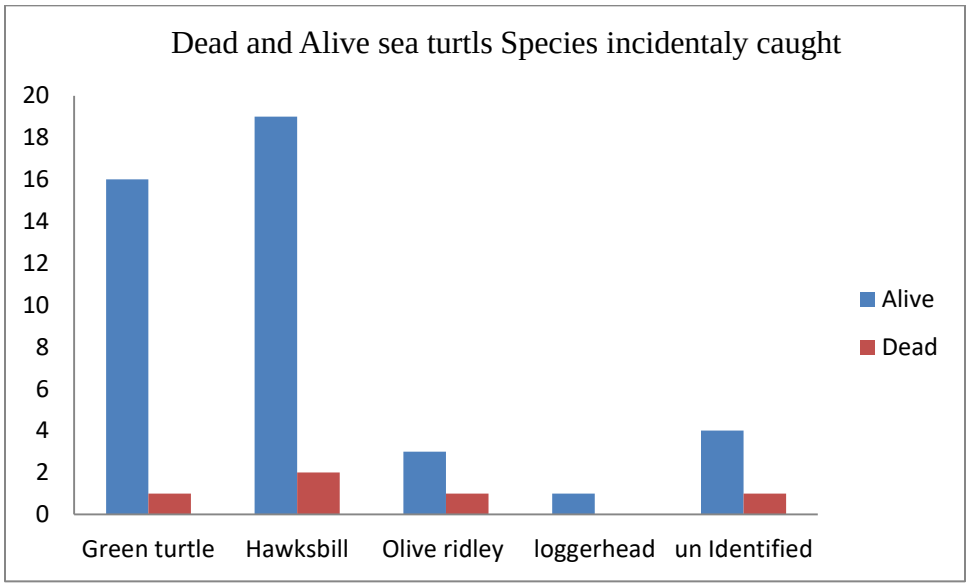


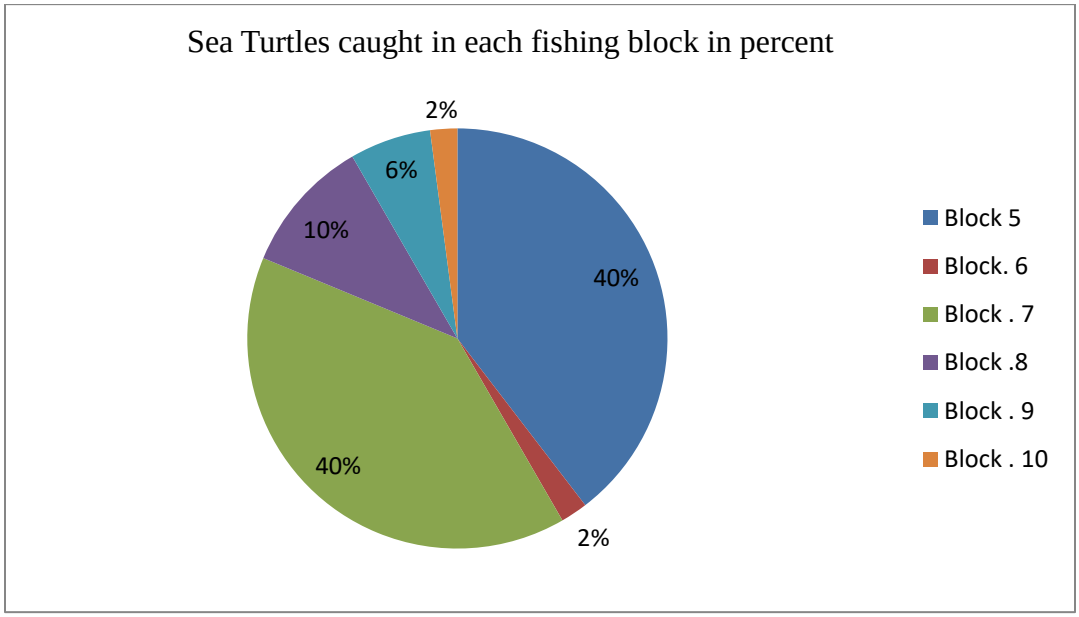
Photo. **A**. Hawksbill (Eretmochelys imbricate), **B**.Green (Chelonia mydas) **C**.Loggerhead (Caretta caretta) **D.** Olive ridley (Lepidochelys olivacea)



Figure,1. Percentage of each sea turtles species incidentally caught, with Hawksbill and Green turtle recorded high respectively.



Figure,2. Number of dead and alive sea turtles incidentally caught, showing few turtles are dying during the process



Figure,3. Sea Turtles caught in each fishing block in percent, showing higher records in block 7 and lowest in block 10.

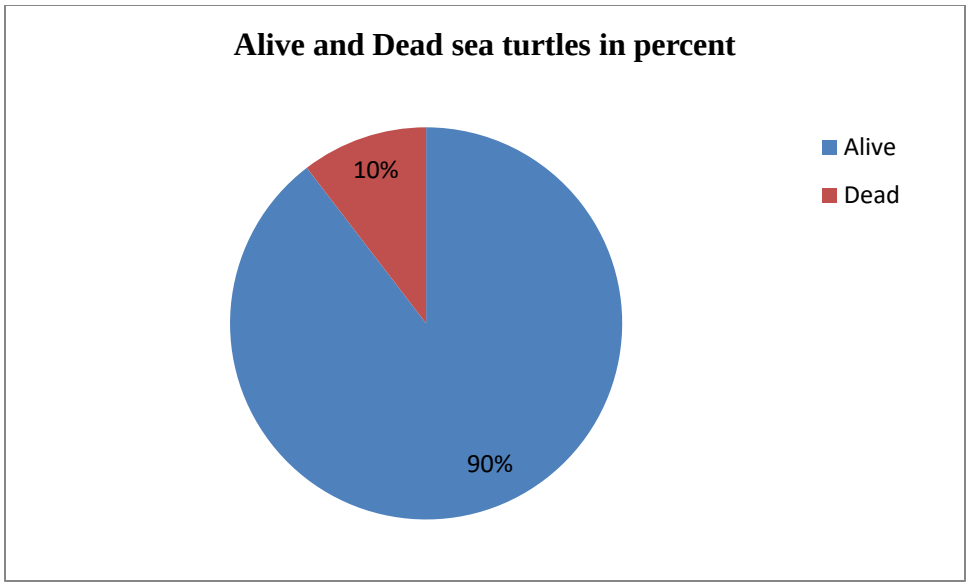
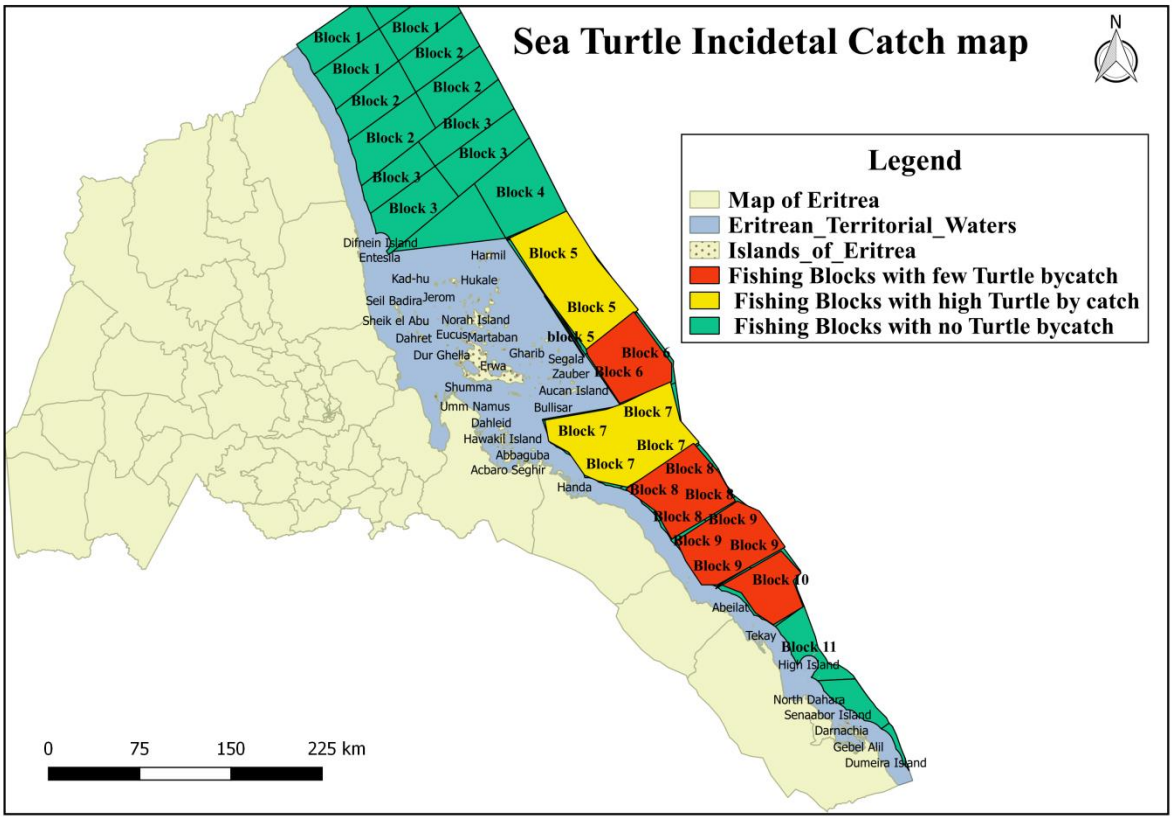


Figure.4. Alive and Dead Sea turtles in percent with 90% of them recorded alive

5. Discussion

Industrial shrimp and fish trawlers have been actively working in Eritrean waters since long time ago. Inspectors from the Ministry were traveling on board vessels throughout their fishing trip to record every catch (both retained and discarded), depth, position, date, substrate type etc. in each trawl made in predesigned booklets. In addition, inspectors monitor every vessel to fish on allowed fishing locations. The data recorded by inspectors on board vessels farther helps researchers to manipulate for different purposes. As mentioned in the introduction, in the past years inspectors were recording every turtles caught incidentally by industrial trawl fishing vessels (A total of 3342 sea turtles were caught incidentally during the nine years of record between 1994 – 2004 fishing trips of the shrimp and fish trawlers operating in different fishing grounds of the Eritrean Red Sea). From the past few years the recoding of incidentally caught turtles was drastically reduced to null. In 2018 from January to March no records of sea turtles were found in booklets except two turtles which were reported by one Research staff. As the result report was written as recording sea turtles caught incidentally by trawl fishing vessels is insufficient. In 2019 from January to May 48 sea turtles were reported. From the data collected from booklets filled by inspectors and research staff on board it is possible to confirm that the four species of sea turtles (Hawksbill (Eretmochelys imbricate), Green (Chelonia mydas), Loggerhead (Caretta caretta), Olive ridley (Lepidochelys olivacea)) from the five species exist in the Eritrean Red Sea are incidentally caught in industrial shrimp and fish trawlers. Hawksbill Turtle (44%) followed by Green turtles (35%) were caught higher compared to olive ridley (11%) and Logger head (2%) with few sea turtles (8%) unidentified. Both Hawksbill and Green turtles covers 79% of the incidentally caught sea turtles by trawlers and both of them are known to nest in many Eritrean Islands and coastal lines. In addition to the distractive nature of trawl nets, in Eritrean Sea the nesting season for the most common Sea Turtles Hawksbill and Green turtles over laps

with the industrial trawl fishing season (October to May). A number of turtle nesting Islands are close to the fishing grounds (map 1) i.e. the possibility increases when turtles move from their feeding ground to their nesting site. Generally the number of sea turtles is expected to increase around Eritrean islands (especially in the nesting sites) from November to April to prepare and nest. The impact of bottom trawlers on incidental catch like sea turtle increase in the absence Turtle Excluding Device (TED). 90% (43) (Figure.4.) of the incidentally caught Sea turtles were returned to the sea Alive but 10% (5) were returned dead. The reason most of the caught sea turtles return to the sea is because most of the inspectors and crews of the vessels are conscious to return the sea turtles to the sea as fast as possible in a safe way after the net hauled on board vessel. As shown in figure.3. 80% of the sea turtles were caught in fishing block seven (7) and five (5). Both fishing block seven (7) and five (5) are the most frequently visited (fished) by industrial trawlers which can increases the possibility of catching sea turtles. In addition to that, these fishing blocks have high number of Islands connected with relatively shallow waters.



Map.1. Eritrean fishing blocks and Sea Turtles incidentally caught by industrial trawlers in each fishing block from January to May 2019.

6. Conclusion and Recommendation

The industrial trawlers are known to catch turtles incidentally worldwide although some mitigation measures are active nowadays. Similarly the Industrial bottom trawlers in the Eritrean waters are incidentally catch sea Turtles from the very begging. The reporting of sea turtles in booklets from trawlers was drastically reduced and became zero in 2018 fishing season (January

to April). In 2019 (January to May) even though there is no confirmation that all the caught sea turtles are recorded, relatively a change has been observed (48 sea turtles reported). Most of the reported sea turtles are from vessels having Research staff on board. This suggests that, the recording of incidentally caught Sea Turtles in industrial trawlers is still incomplete. This indicates that there is still a need to raise the awareness and give obligation to inspectors and their close leaders on information gathering about incidentally caught Sea Turtles. Although most of the reported incidentally caught Sea Turtles are identified, for better results and comments given by some inspectors and research staff shows, short courses regarding identification and other related information on sea turtles, and distributing colored identification guide is necessary. The Research Division of the Ministry of Marine Resources and the Regulatory Department of the Ministry (especially MCS unit) should prepared consensus workshop to have a common understanding on protecting endangered species in the Eritrean red sea. For easy data collection a separate data sheet for Sea Turtle incidental catch should be prepared and distributed with booklets for each inspector.

Reference

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