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The State of Eritrea
Ministry of Fisheries

وزارة الثروة السمكية
دولة إرتريا

*Eritrea's Coastal, Marine
& Island Biodiversity
Conservation Project*



*Research and Statistics
Division
Megafauna Group*

Incidentally Caught Sea Turtles

By Industrial Shrimp and Fish Trawlers Operating on the waters of the Eritrean Red Sea

(1996-2004)

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ABSTRACT

A seven-year (1996, 1999, 2000, 2001, 2002, 2003 & 2004) incidentally caught turtles data was collected from booklets recorded by the MCS Division of the Ministry of Fisheries. The data included the date of catch, species type, position of catch, depth, time of trawling and condition of the incidentally caught turtles. The data is simply analysed by Microsoft Excel and charts are used to explain the result. From the result it is possible to identify the specific years, months and depth of different sizes of turtle caught; and the percentage survival rate of turtles in the different years and type of species of turtle. Although the fishing effort has increased in the past years the number of turtles caught incidentally has shown dramatic decrease due to different reasons. It is possible to appreciate from the data collected that the five species of sea turtles are found in the Eritrean Red Sea. Green and Hawksbill are the major turtles incidentally caught in the past seven years. Generally the percentage survival rate of the incidentally caught turtles is 79 %. The number of turtles was higher in the months of May, June, July and November as the fishing intensity is more in these periods of the years but due to the closure season the turtle incidental catch was found low during the months of August and September. Since trawlers operate mainly in neither shallow nor deep most of the turtles were caught in the 31-60 meter depth range.

INTRODUCTION

Seven species of sea turtles representing two families, Cheloniidea and Dermochelyiidea are the only living members of what has been a large and diverse marine radiation of cryptodridian turtles (Meylan, 1999). Five of them 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 coriacea*).

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 turtle (Maria and Thome, 1999).

Although sea turtles have been known to survive and flourish up until very recent times, their number are 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 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 (Molly *et al.*).

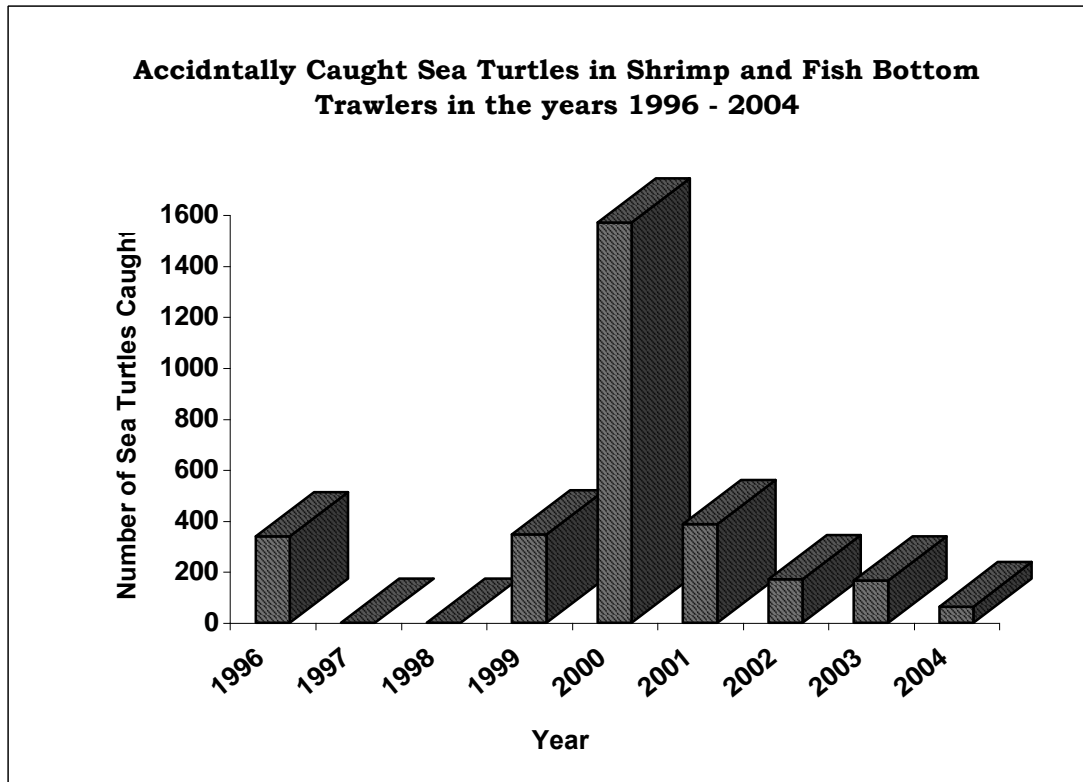
Incidental catch in fisheries is widely recognized as a major mortality factor for sea turtle. Because sea turtles are exceptional breath-hold divers, there was initial skepticism about the estimated number of sea turtles caught and killed by inadvertent capture in trawls. Sea turtles forcibly submerged in any type of restrictive fishing gear would eventually suffer fatal consequences from prolonged anoxia and /or seawater infiltration of the lungs (Molly and Blair, 1995). Several gear types, including shrimp and commercial fish trawl and fish seines are known of injury and mortality (Charles, 1999). The first two are major concern with the Eritrean fisheries.

The purpose of this report is to:

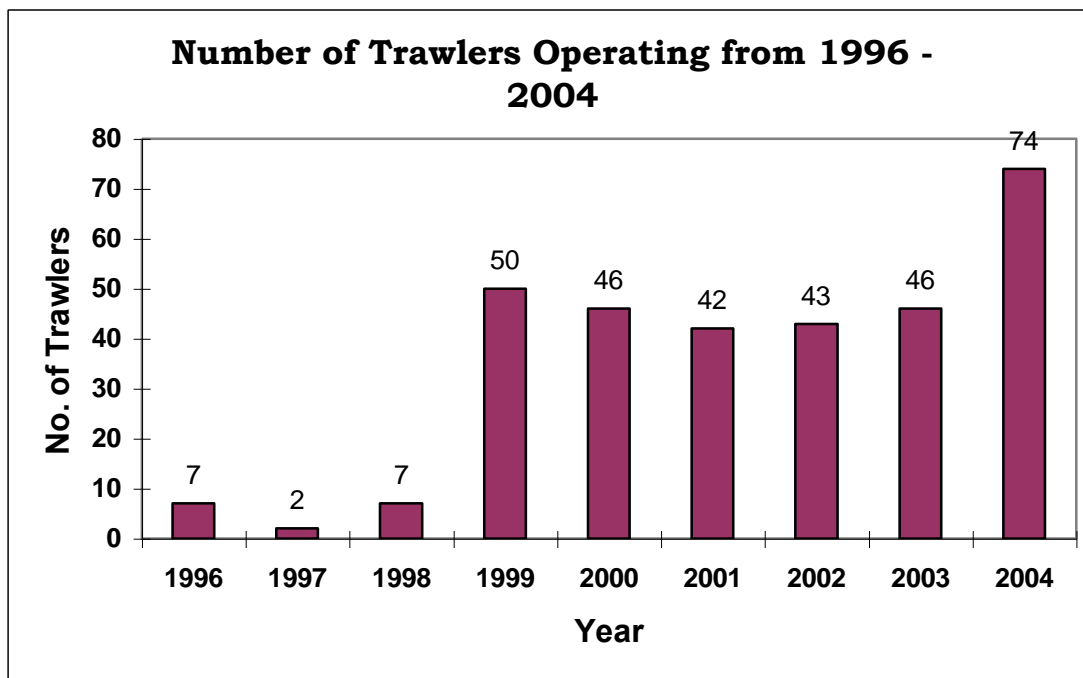
1. Assess the potential threat of fish and shrimp trawlers to sea turtle populations.
2. Observe and identify regions of the sea where the threat is high.
3. Identify the species of turtles caught incidentally.
5. As part of the conservation programme to see what possible remedy is needed.

RESULT

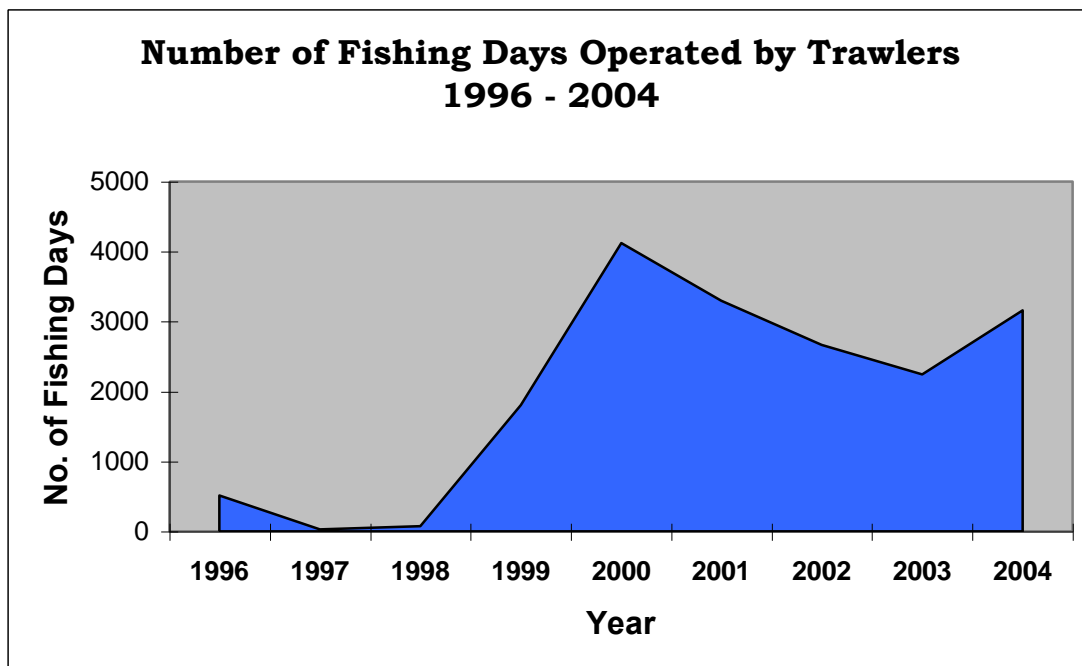
A total of 3039 sea turtles were caught incidentally during the past 1996 – 2004 fishing trips of the fish and shrimp trawlers operating on different fishing grounds (see site map of turtles caught). 1819 Green, 106 Hawksbill, 8 Loggerhead, 2 Olive ridley and 39 Leatherbacks were accidentally caught. The rest 1065 turtles were unidentified. From the total number of turtles caught 635 were dead and 2404 were alive. From all recorded caught turtles only 2 Greens were found tagged (Oman).



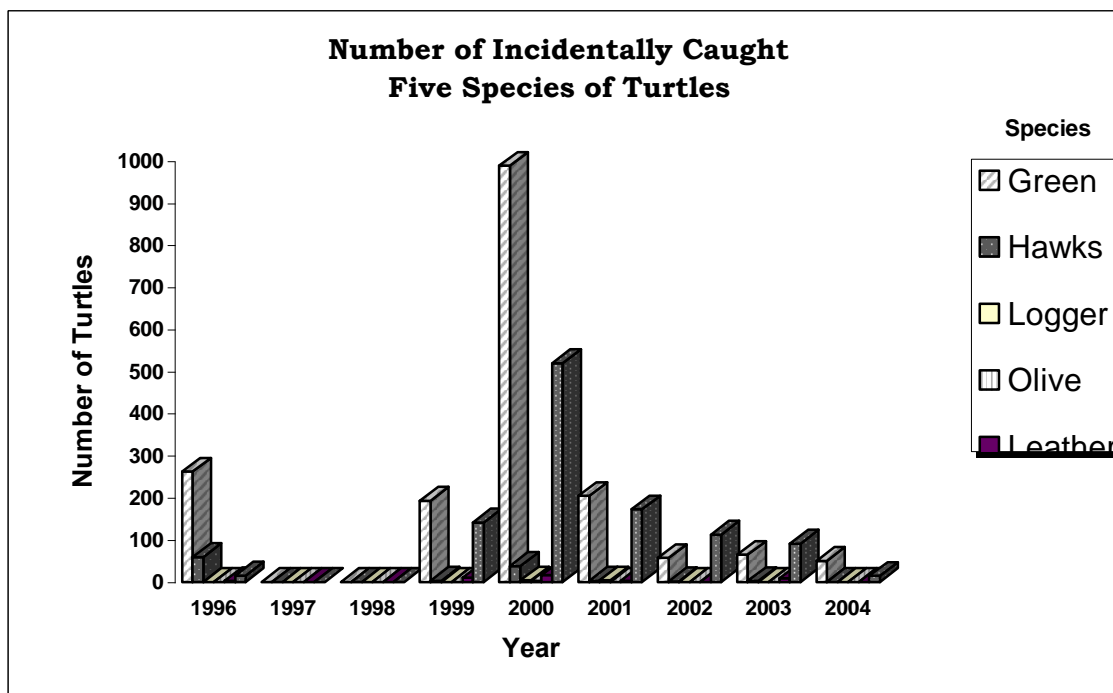
Graph 1. *Incidentally caught turtles during the years of 1996 – 2004.*



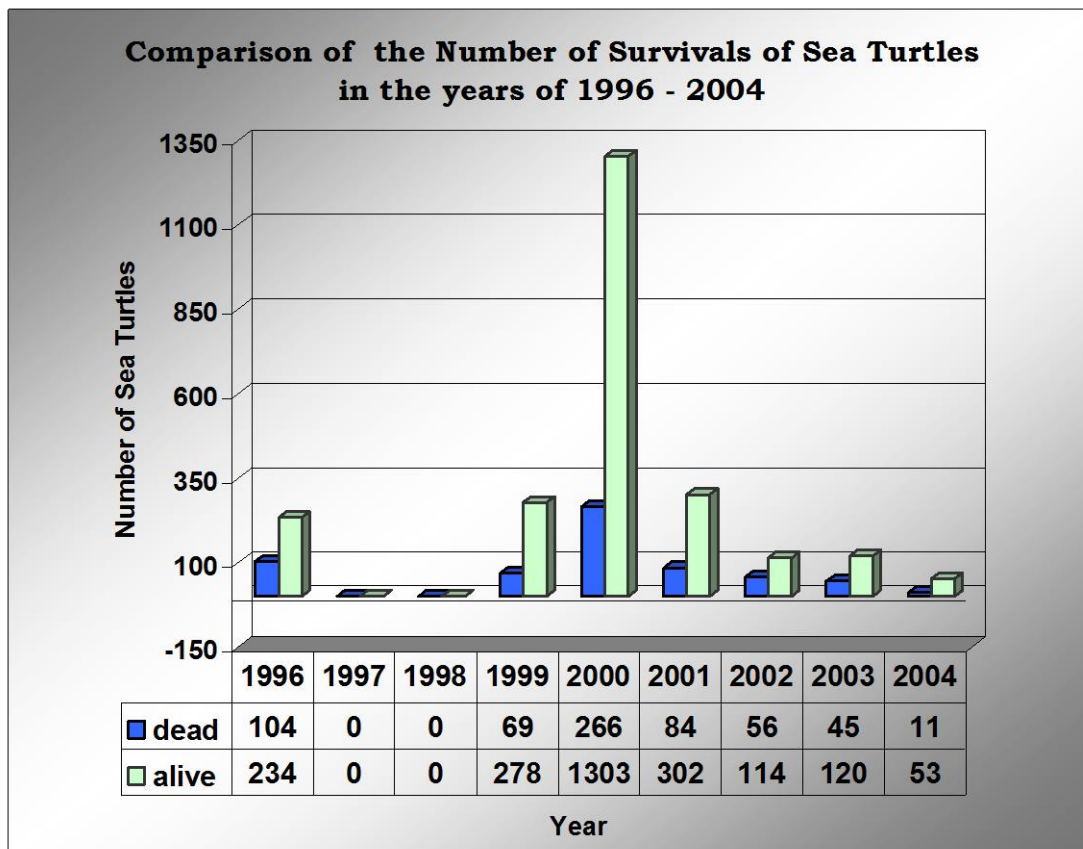
Graph 2. *Number of Trawlers Operating during the years of 1996 – 2004.*



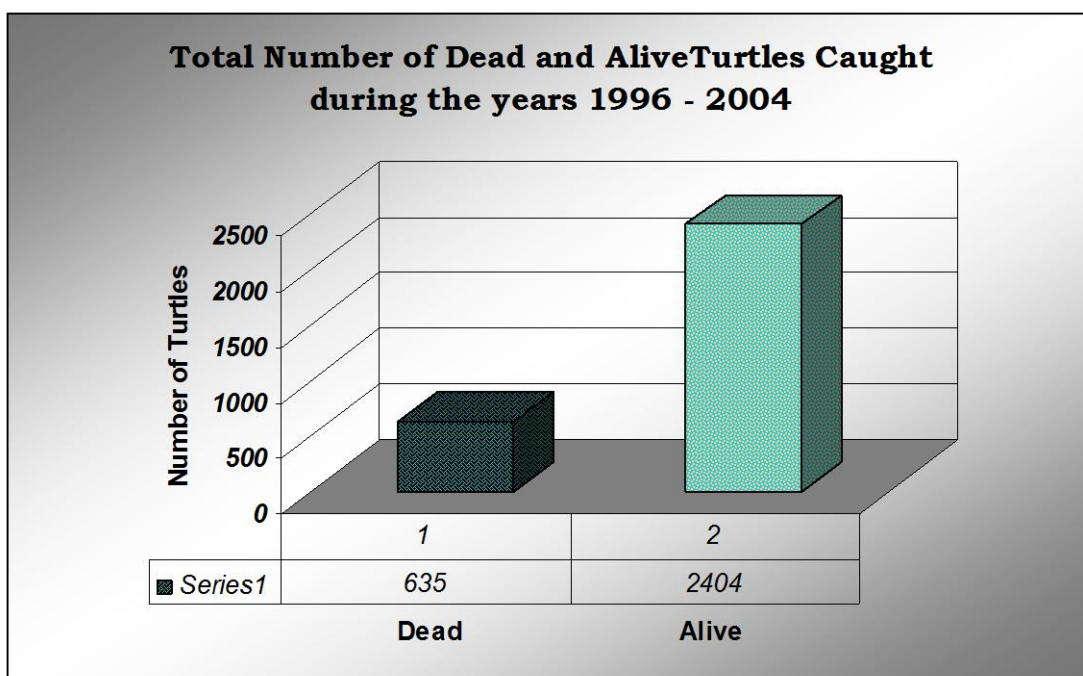
Graph 3. Fishing Days done by the Trawlers during the years of 1996 – 2004.



Graph 4. Incidentally caught turtles by species during the years of 1996 – 2004.



Graph 5. *Dead and Alive incidentally caught turtles during the years of 1996 – 2004.*

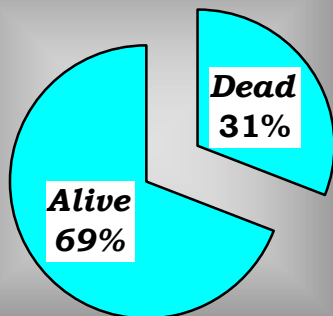


Graph 6. *Total Dead and alive incidentally caught turtles during the years of 1996 – 2004.*

Table. Summary of sea turtles caught in shrimp and fish trawlers in the year 1996-2004

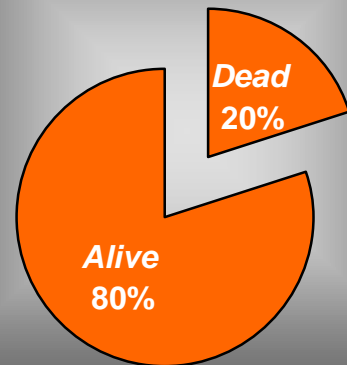
YEAR	SPECIES OF SEA TURTLES						Total no. of Turtles	Tagged	Condition		Survival Rate (%)
	Green	Hawksbill	Loggerhead	Olive ridley	Leatherback	Unidentified			Dead	Alive	
1996	262	59	0	0	2	15	338	0	104	234	69.2
1997	–	–	–	–	–	–	–	–	–	–	–
1998	–	–	–	–	–	–	–	–	–	–	–
1999	193	3	0	0	10	141	347	0	69	278	80.1
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	106	8	2	39	1065	3039	2 Green	635	2404	79

**Percentage Survival of Turtles
1996**



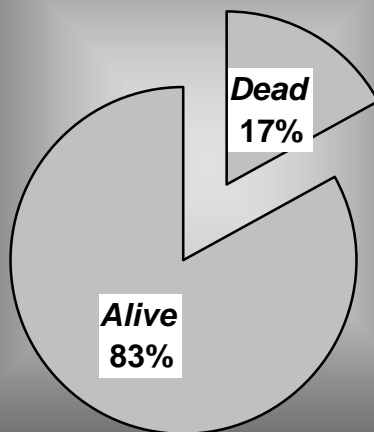
A

**Percentage Survival of Turtles
1999**



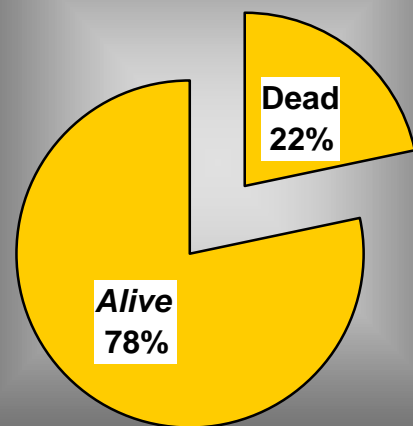
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**Percentage Survival of Turtles
2000**

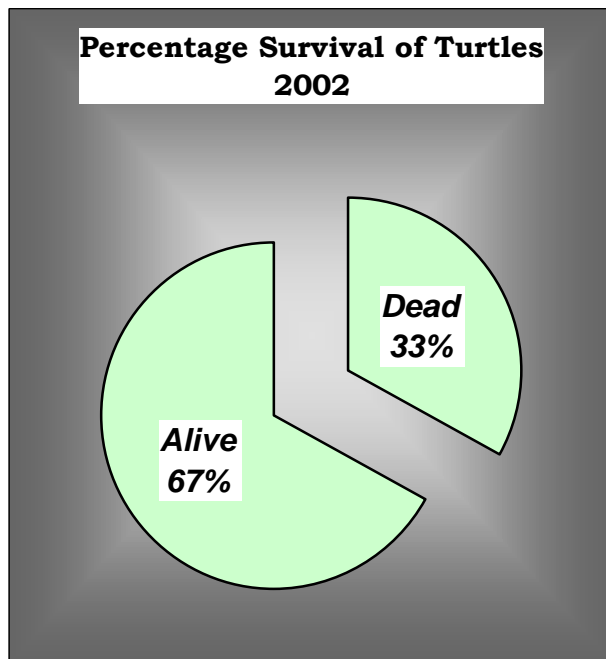


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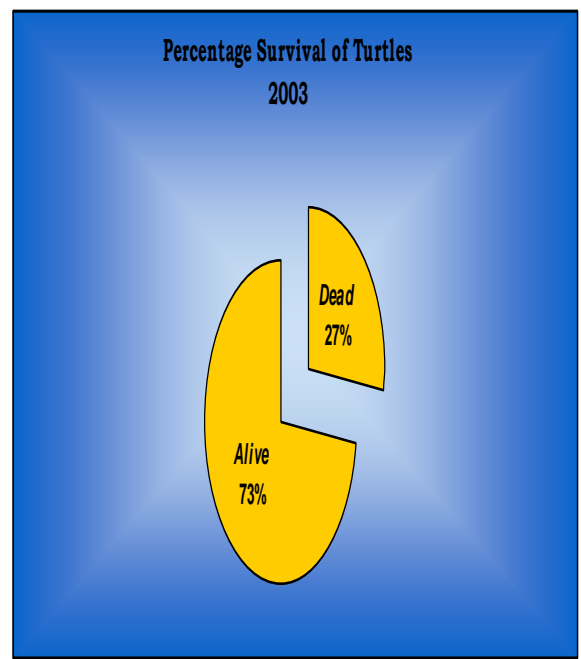
**Percentage Survival of Turtles
2001**



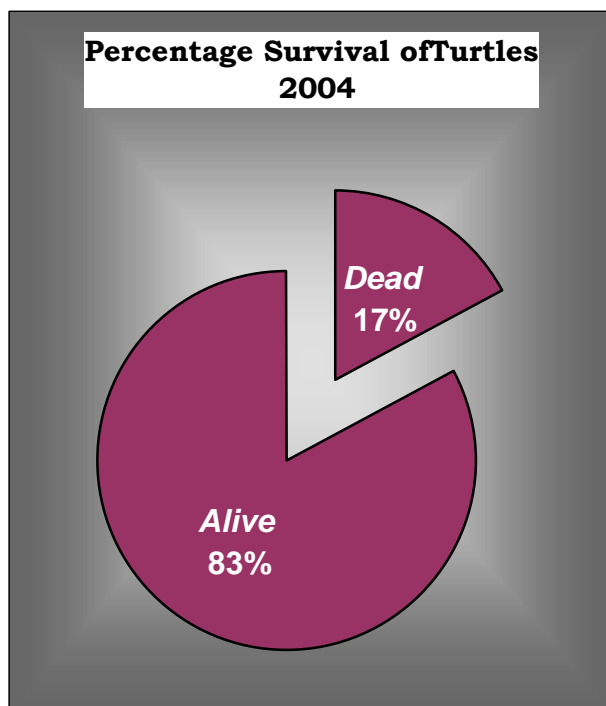
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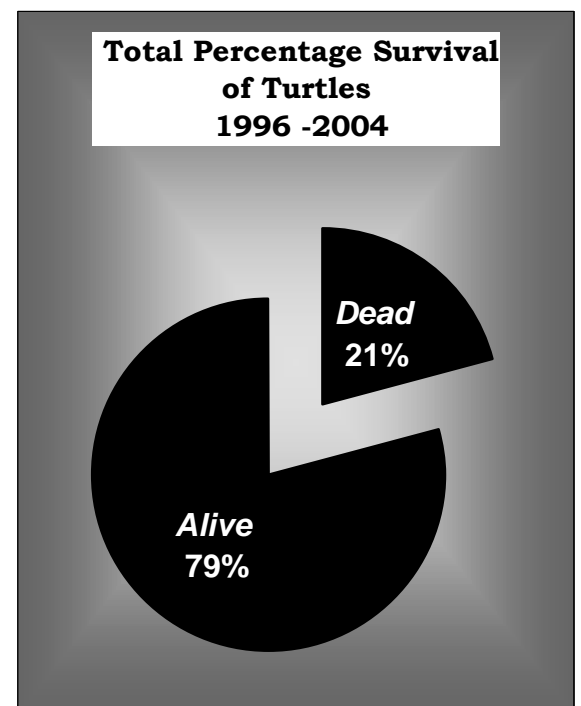
E



F



G



H

Fig 7. *Percentage survival of incidentally caught turtles in 1996 (A), 1999 (B), 2000 (C), 2001 (D), 2002 (E), 2003 (F), 2004 (G) and Total 1996 – 2004 (H).*

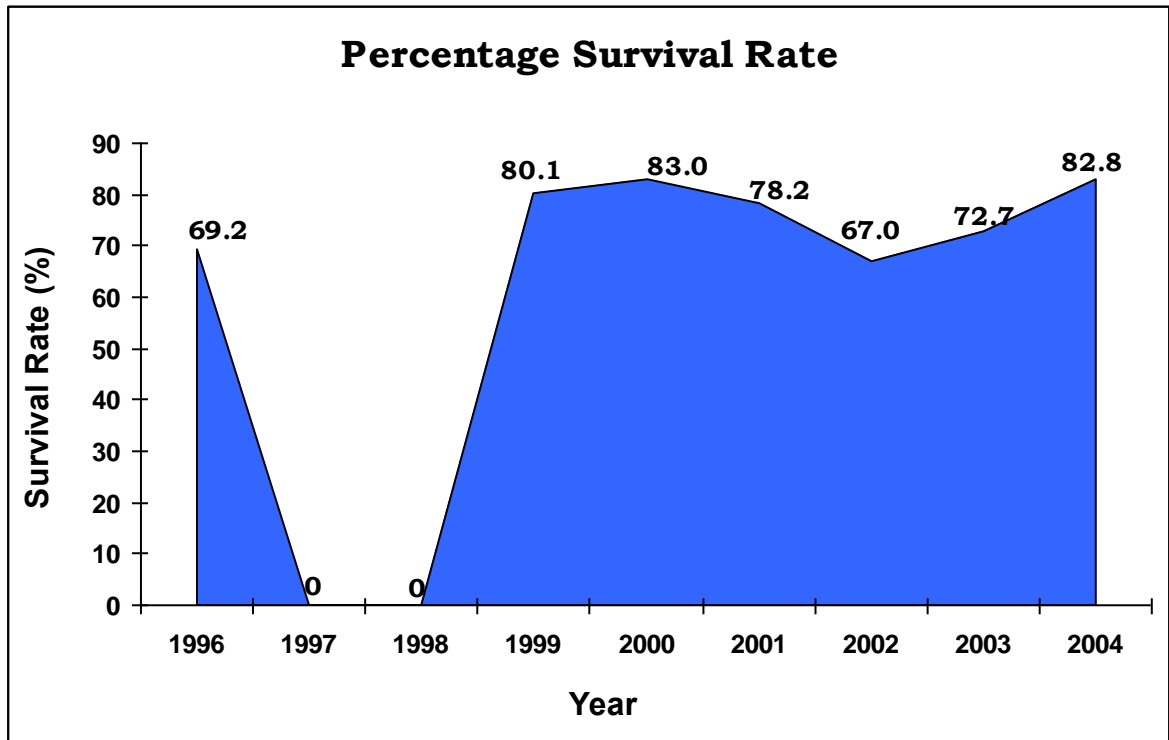


Fig 8. Percentage survival rate of incidentally caught turtles from 1996 – 2004.

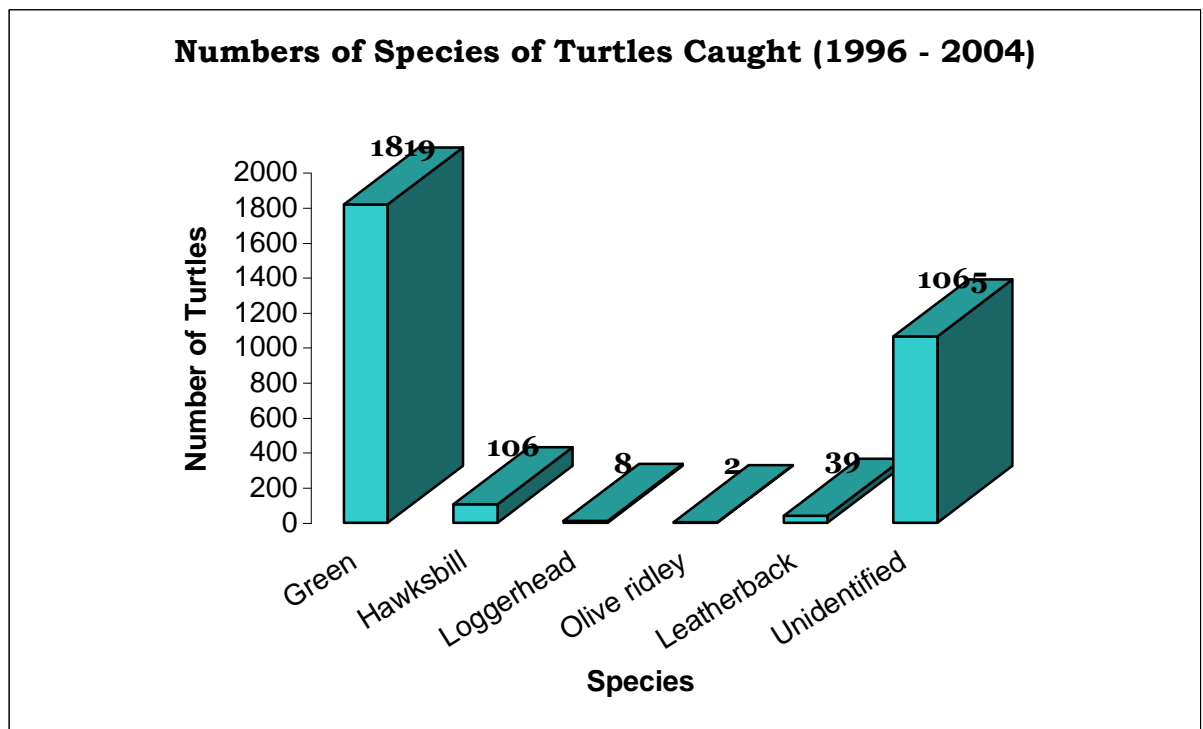


Fig 9. Incidentally caught turtles by species in 1996 – 2004.

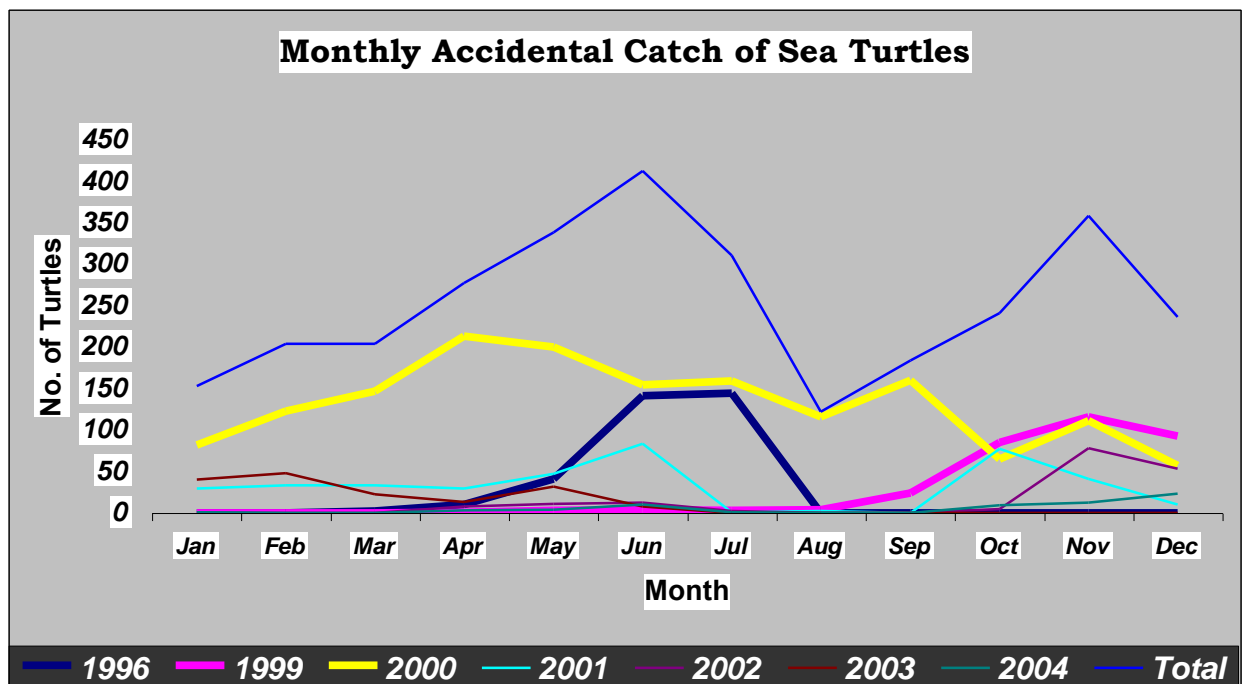


Fig 10. Monthly number of caught turtles (1996 – 2004.)

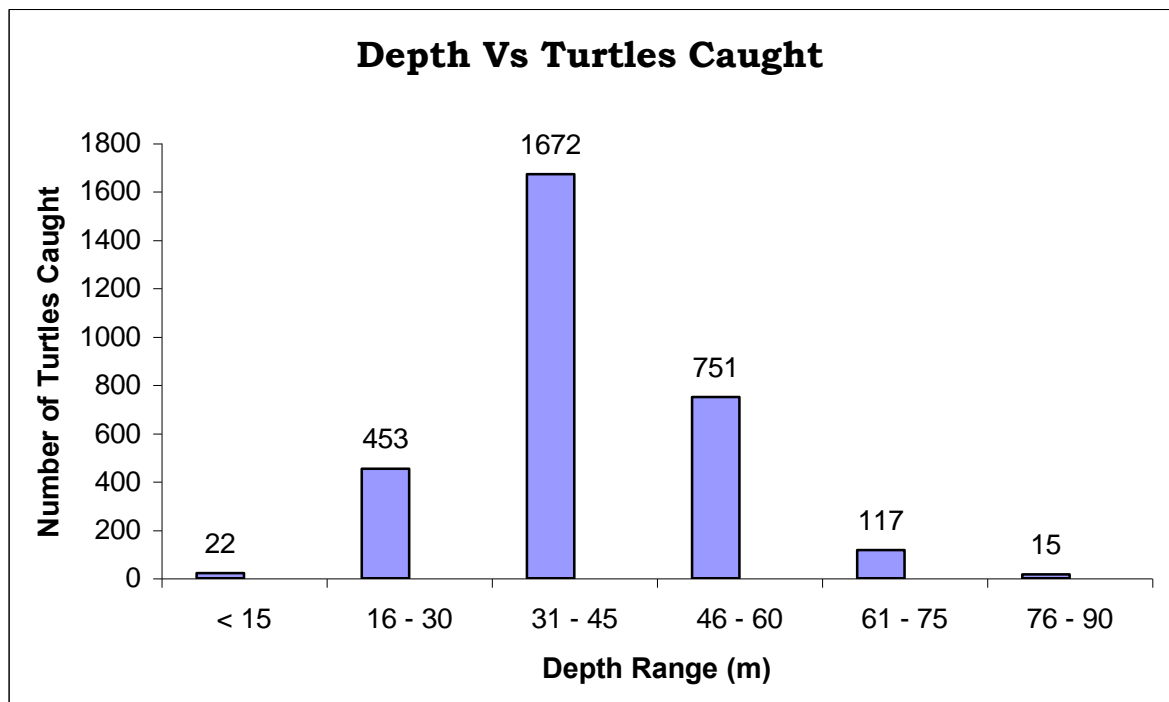


Fig 11. Total number of caught turtles in different depth ranges (1996 – 2004.)

DISCUSSION

Although the number of trawlers and fishing effort (fishing days) has been increasing from since 1999 the number of incidentally caught sea turtles have shown dramatic decrease (see figure 1, 2 and 3). This could be due to the lack of well-trained surveillance officers (specially in 2003 and 2004 many navy personnel were participating in the inspection) and also due to the types of trawlers operating. In 1999–2001 trawlers from Saudi fisheries (Al Sarawat *et al.*) which were mainly operating near coral reef areas and other shallow waters were catching several sea turtles comparing to Egyptian trawlers which mainly trawl in deeper waters to fish shrimp, lizardfish and threadfin breams.

From the data collected from booklets filled by inspectors on board it is possible to show that the five species of turtles exist in the waters of Eritrean Red Sea and are incidentally caught in the trawl nets of the industrial shrimp and fish trawlers. As seen in figure 9 more Green turtles were caught comparing to the rest succeeded by Hawksbill turtle. Quite few numbers of the three (Loggerhead, Olive ridley and Leatherback turtles) were incidentally caught.

Percentage survival rate of the entangled turtles was lowest in 1996 (69 %) and highest in 2000 and 2004 (83 %) (Figure 7 & 8). Percentage survival rate was zero as there were very few trawlers operating with low fishing effort (figure 3) i.e. no record of turtle death. Monthly incidental catch of turtles was higher in May, June, July and November; but in August and September was found to be low (figure 10), this could be due to the fishing intensity which is low during the months of August and September as there was no fishing (closure season). Since fishing effort is not the same for all the years and months it is difficult to discuss the trend of incidental catch.

Figure 11 shows that most of the numbers of incidentally caught turtles was in the 31 – 45 cm and next in 46 – 60 cm depth ranges. This is because of the frequency operation of the trawlers in these areas of depth ranges (neither shallow nor deep). 22 turtles were caught in the very shallow depth range (<15 cm) which shows that trawlers had been violating the <18 meter restriction trawling regulation.

CONCLUSION

Current information indicates that the main source of sea turtle mortality in our area are trawling, long lines and gill/entanglement nets (southern red sea region) .So far the threat to sea turtle is highly seen in shrimp trawling as it is bounded to the main shrimp fishing ground between islands in which migration to nest is highly seen.

The threat to sea turtles with the existing number of fishing vessels is quite high if the condition is to continue with out any monitoring programme. The time taken for each trawl vary from one vessel to another and in day and night. On average it ranges from below 1 hour to 6 hours. So there is high probability that a turtle would die if caught in the very beginning of the trawl, because sea turtle can stay under water for a maximum of 45 minutes only.

The existing Eritrean fisheries regulations state that fishing vessels operating in Eritrean waters must use TED's in all trawl nets to reduce the mortality of turtles and other Megafauna. Under trawl regulations, turtles and other megafauna are totally prohibited from being taken either at sea or on beaches, and every effort must be made to avoid catching them. In the event of incidental catches, turtles and other megafauna must be returned to the sea immediately, whether dead or alive (Gebremariam *et al.*, 1997). Although trawlers crew do return the turtles caught to the sea, it is usually after the more valuable fish catch is sorted. By the time the trash fish (including turtles) are dealt with, considerable time has elapsed and some turtles may have suffocated under the weight of the fish in the trawl.

Behind all the economic forces although implementation solutions to conserve turtles might be complex, nevertheless, action is urgently needed to halt the situation and turn it around. Otherwise the extinction of local population and even species is inevitable.

Data collected on Bycatch between April and July 1996 show that turtles are included in less than 10% of all trawls recorded but, because of their very large size, they can form as much as 35% of the discard. Turtles are ninth in order of magnitude by species groups, when considering the percentage of Bycatch (Gebremariam *et al.*, 1997).

However the reliability of the Surveillance Officers in identifying the species still needs to be verified. Resuscitation and releasing sea turtles that are dead or actively moving should be advised over the stern part of the boat at a time the trawling stopped or engine gear is in neutral position to avoid recapture and injury by the engine.

Possible Incentive Measures to Encourage Adoption of TED's Technology by Trawler Companies (Gebremariam *et al.*, 1997):

1. Vessels operators could be made pay a certain amount of money (fines, royalty) for any turtle caught dead or alive during trawling, as an incentive to take avoidance or protective measures to reduce turtle Bycatch.
2. Based on research and trawler monitoring results, seasons could be defined and areas demarcated where TED's must be deployed.
3. Vessels /crews/ management of industrial trawlers complying with regulations and assisting in the process of identifying turtle areas and seasons could be rewarded in other ways for this assistance (e.g. reduced license fees), as opposed to fines for turtles caught.
4. TED's management workshops, which must be attended by crews and operators alike, could be implemented to educate these people in the correct and efficient deployment of TED's.
5. TED's manufacture capability could be established in Eritrea to provide suitable TED's as required by the industrial fishing industry.

RECOMMENDATIONS

The following few points can be recommended for the conservation management of sea turtle.

- ◆ Inspectors should get training to make them aware the sea turtles are valuable recourses and very much endangered.
- ◆ Strong and efficient legislations and enforcement measures that restrict fishing activity in areas where sea turtle concentrate e.g. all trawlers forced. Restriction to fish in authorized zones and trawl 4 miles far from island and 8 miles from the main land for which the chance for sea turtle to be caught is very low.

- ◆ Implementation of turtle excluding devices (TED's).
- ◆ Both the local and foreign fishing vessels have to be inspected on regular bases.
- ◆ Setting clear long-term monitoring and management programme for the Conservation and continuation of sea turtle as a resource by the project in Coordination with the RDS.
- ◆ Assessing the existing Data base (**ERIFIDASY**) and analyzing the threat.

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