

**Ministry of Marine Resources
Marine Resource Research Division**

**Report on Assessment and Documentation of Sea
Turtles conducted in three Turtle Nesting Islands**



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Table of Contents

1. Introduction:.....	3
2. Objectives:	5
3. Survey duration.....	5
4. Survey Areas;.....	5
5. Materials and Methods.....	5
6. Result	5
6.1. <i>Mojeidi</i>	5
6.2. <i>Awkan</i>	7
6.3. <i>Muserie</i>	8
7. Tagging of Sea Turtle	9
8. Practical Training to New Team Members	11
9. Documentation.....	11
10. Discussion	11
11. Row data from each Island.....	12
12. Reference	14

1. Introduction:

Marine turtles are some of the oldest surviving reptiles on the planet, and have inhabited the tropical seas and oceans of the planet for millions of years. Recently, mankind's actions, in particular in the 19th and 20th centuries, have brought many populations to the brink of extinction. Sea turtles and their products have been used by coastal communities for thousands of years as a basis for food and a host of other uses. Today, turtles are also key components of non-consumptive uses such as tourism, education and research activities. Turtles are also irreplaceable ecological resources, in that they function as key individuals in a number of habitats, and can play the role of indicator species for the relative health of their environs. These habitats have a tangible value to society, in that they also support commercial fish and invertebrates (found in seagrass beds, open oceans and coral reefs, among others) which are valued by mankind. Turtles can act as model flagships for conservation programs, and because the conservation of turtles and their habitats addresses vast and diverse marine areas, they indirectly protect the complex and interconnected world on which humans depend. Marine turtles reproduce by laying eggs along sandy coasts. As is the case with other reptiles, the sex of hatchlings is dependent on temperature during incubation, particularly during the third and fourth weeks.

Globally, there are seven species of sea turtle: the leatherback *Dermochelys coriacea* (Family Dermochelyidae), loggerhead *Caretta caretta*, hawksbill *Eretmochelys imbricata*, olive ridley *Lepidochelys olivacea*, Kemp's ridley *Lepidochelys kempfi*, green *Chelonia mydas* and the flat back, *Natordepressus* (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). Of these, the green, and hawksbill are the most common in Eritrea, with the loggerhead, leatherback and olive Ridley infrequently seen, and with virtually no recorded nesting.

Marine turtles are some of the oldest surviving reptiles on the planet, and have inhabited the tropical seas and oceans of the planet for millions of years. Recently, mankind's actions, in particular in the 19th and 20th centuries, have brought many populations to the brink of extinction. There are several key physiological features that are common to all sea turtle species

and which set them apart from other Testdines, such as non-retractile limbs, extensively roofed skulls, limbs converted to paddle-like flippers, and salt glands to excrete excess salt. As is the case with other reptiles, the sex of hatchlings is dependent on temperature during incubation, particularly during the third and fourth weeks.

As mature animals in breeding condition, all species of marine turtle embark on a reproductive migration to their natal area, most commonly at intervals of two to five years for Green, Loggerhead, Hawksbill (Miller 1996; Hamann *et al.* 2002) and Flatback Turtles (Pendoley Environmental 2008a, 2008b; Limpus 2009). Flat back Turtles do not have a known oceanic migration phase as hatchlings, instead developing in shallow coastal waters (Musick and Limpus 1996). There is evidence that some Flat Back Turtles engage in long-distance migrations between feeding grounds and nesting beaches (Parmenter 1994). This has been confirmed by recent satellite tracking programs in Western Australia, which have shown Flatback Turtles migrate to foraging grounds 50 to 1500 km from their nesting beaches (Pendoley 2006).

When reproductively active, males and females migrate to mating grounds typically offshore from the nesting beach. Mating may also occur along migratory corridors en route to the natal area. Following mating, male turtles often return to foraging areas, while females remain at the nesting area for egg laying (Limpus 1993, 2009). Marine turtles are oviparous, laying multiple clutches in each season. Between nesting events, the females move to inter nesting areas offshore while they form the next clutch of eggs (approximately two weeks). This period is termed the 'inter nesting period'. In most species, inter nesting grounds are located close to shore; in some, they have been found to be pelagic (Blumenthal *et al.* 2006). Females typically lay one to ten clutches of eggs over a two- to three-month time frame (see review by Hamann *etal.* 2002; Limpus 2009). After laying the last clutch of eggs, the females return to their foraging grounds to prepare for their next breeding migration, typically after an interval of two to five years (remigration interval).

There are many islands in the Eritrean red sea known for turtle nesting and Mojeidi Island is one of them. In addition to the natural threats to turtles, poaching eggs and slaughtering adult turtles by village inhabitants are very common. This time assessing the status and documenting the current situation of marine turtles is very necessary.

2. Objectives:

- ✓ Asses the current status of marine turtles
- ✓ assess the current situation of the island
- ✓ Tagging turtles when laying eggs
- ✓ Documentation of turtles
- ✓ Assess the corresponding shore
- ✓ To train new members of the team on turtle research and tagging

3. Survey duration

- ✓ The survey was accomplished from the 13th - 19th of May, 2017.

4. Survey Areas;

- ✓ Mojeidi island
- ✓ Awkan
- ✓ Muserie

5. Materials and Methods

The materials needed are measuring tap, torch, video and steal camera, tag, steal road to find a nest, datasheet and pencil ... etc.

The whole island will be surveyed and the number of nests, number of eggs on each nest, number of hatchling, all measurements on adult turtles ...etc. will be recorded. Turtles will be tagged when they finish laying eggs. While turtles lying egg the whole process will be recorded by video and steal camera.

6. Result

The survey was taking place in May, 2017 in Mojeidi, Awkan and Muserie Island. The surveyors observed each island along the coast. Around 105 nests were excavated by the surveyors in order to monitor number of eggs laid, measuring length width of carapace (both alive and discarded sea turtle) and tagging of female turtle. There was also an assessment on the laid eggs; how many of them are hatched, unfertilized, rotten, and number of young dead in the nest as well as dead in the egg. From 105 excavated nests 25 of them were with recently laid eggs, and 3 with newly hatched young inside.

6.1. Mojeidi

Mojeidi Island is located about 82miles south east of Massawa. The Island has a navy camp but is few in number. The eastern and western part of the island is almost rocky but its southern and northern part is sandy and known for turtle nesting. Within Mojeidi Island four nesting sites

where selected and a number of samples were taken for assessment purpose. Some of the sites were with course substrate while others are with fine sand. The difference in particle size of the sediment makes a difference in the probability of hatching eggs. The smallest particle size could keep the optimal temperature for hatching of eggs and easy for turtles to dig the ground to lay eggs. In this island there was an average of 79 eggs per nest that includes unfertilized, rotten and hatched successfully.



Common turtle nesting site along Mojeidi island

Rot=rotten, **Hat**=hatched, **Unf**=unfertilized,



Figuer.1. Average egg hatched per nest in Mojeidi island

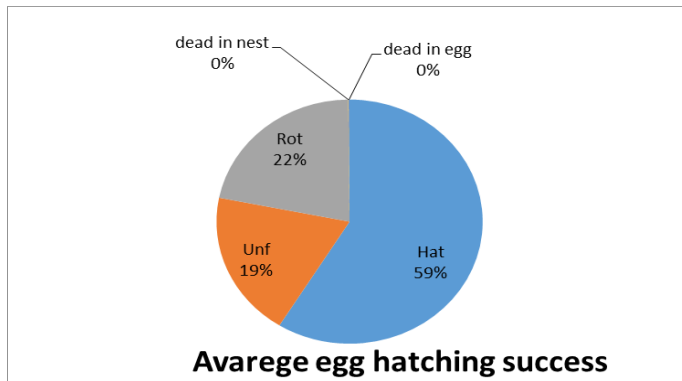


Table 1. Number of nests and trials in each site within Mojeidi Island

	no. sites				
	site 01		site 02	site 03	site 04
	new	old			
Nest	70	362	7	12	34
Trial	145		12	39	25

Two Hawksbill turtles were discarded in **site 04** and their length width measurements were as follows

CCL=54, CCW=52 and CCL=73, CCW=65cm

In this survey not only counting number of laid eggs through excavation but also counting number of nests as well as trials was included.

6.2. Awkan

It is located in the western side of Mojeidi, and around 1km away from Mojeidi. The north east western part of Awkan is a beach in which sea turtle can nest. A lot of coral rubles are intermixed with the sand makes a little bit difficult for structuring eggs hole.

Figure.2, Average egg hatched per nest in Awkan Island

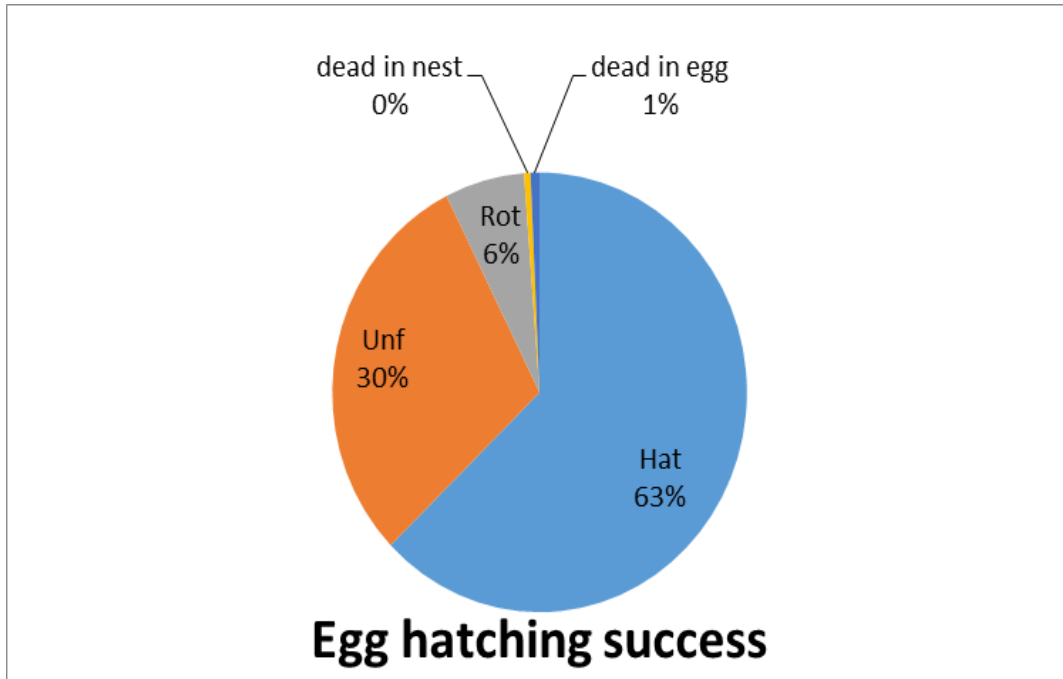


Table 2. Number of nests and trials in each site within Awkan Island

	counting no. nest	
	Old	new
Nest	68	48
Trial	59	

6.3. Muserie

Muserie is located about 50miles south east of Massawa. It is a large island larger part rounded by rock with small sand beaches. Large eastern part of the island is covered by dense mangrove forest dominated by *Avicina marina* but there is also *Rizophora macurnata*. The small sandy beaches are common turtle nesting sites. During the survey there was many new and old nests.

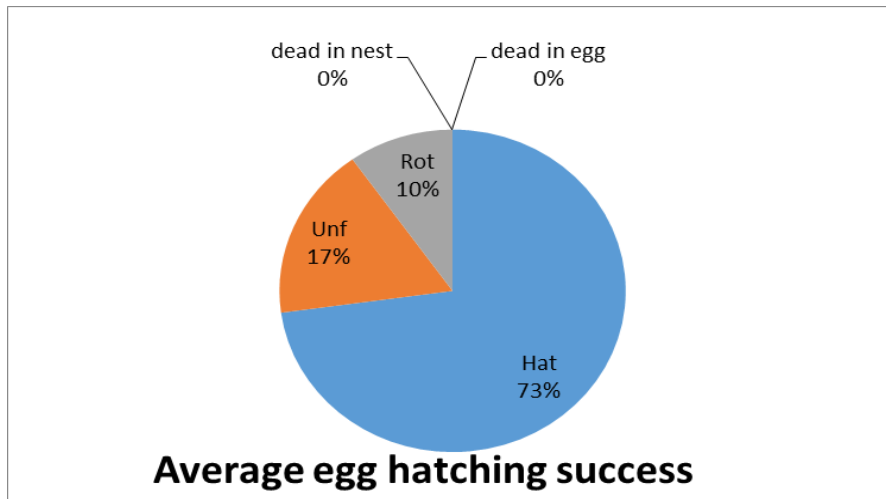


Table 3. Number of nests and trials in each site within Awkan Island

	counting no. nest	
	old	new
Nest	6	4
Trial	3	

7. Tagging of Sea Turtle

The main purpose of tagging is to mark the turtle with specified number and country name to follow its pass or destination site while it is returned to the sea. The island where tagging is performed is known for its nesting site but their feeding site may be in different seas or oceans. From previous information's there were turtles caught in Eritrean red sea with their tag from different countries and the information was send to the countries. This information is very important for conservation of sea turtles with coordination of other countries and used for other scientific studies.

During the survey four sea turtle species were observed and all of them were Hawksbills. They were laying eggs in their nest during the night time. The three turtles were tagged and their tag numbers were recorded. In table 3 the fourth turtle is the one with previously tagged and there is no need to tag it again but all necessary measurements were taken. All the turtles caught when they finish laying eggs and after all necessary data taken, they all released to the sea carefully. All the tagged turtles were from Mojeidi Island.



Tagging a Hawks bill turtle



Turtle while returning to the sea after laying egg and tagged

N.B. CCL=curved carapace length, CCW= curved carapace width, SCL= straight carapace length, SCW= straight carapace width

Table 6. Measuring strait and curved carapace

turtle no	Units (cm)				tag no.	
	CCL	CCW	SCL	SCW	Arabic	English
1	70	64	62	53	728	188
2	65	59	60	46	729	189
3	72	63	66	54	730	190
❖ 4	69	65	62	51	661	161

8. Practical Training to New Team Members

In addition to the survey of sea turtles, new members of the team got an opportunity to practical training how to find turtle nests, how to find turtle while laying eggs, to differentiate rotten egg, un fertilized egg and successfully hatched eggs, to take all necessary measurements (CCL, CCW, CCL, CCW) and other important information's related to turtle survey from experienced team members. The new team members practiced practically for every activity. The practical training was enjoyable and comprehensive and the trainers acquired a basic understanding on sea turtle survey.

9. Documentation

Preparing a full documentary film for sea turtle is very important to enhance knowledge of the coastal people and helps for better conservation. In addition, this makes easy understanding about sea turtle life cycle for marine science students. Parallel to sea turtle survey and training, documentation activity was also part of the field trip. After finding a sea turtle out of water to lay eggs, full video and photos were taken for the whole process from digging the ground to returning to the sea. Every activity done during the survey of sea turtle was documented.

10. Discussion

The average number of eggs in the islands was 79 eggs per nest. In all the islands surveyed more than 50% of the eggs were hatched successfully and this is an appreciable number. If this all hatchlings could reach the water line successfully, it would be good enough to continue their generations without fear to extinction. In almost all sampled nests there was no hatchling dead in the nest, this indicates that when the hatchling emerges out of their nest, their burden begins by birds waiting them over their holes specially the sooty gulls and other natural threats like desiccation if they miss their way. The hatchling emerges from the nest during sun set to avoid predation and desiccation but the birds wait till the beach became dark. From our observation, if this birds finds them while they are coming out of their ground, even a single hatchling could not reach the sea i.e. they all been eaten. Sea turtle's life is full of obstacles, starting from egg to adult. The hatching success depends on temperature, soil type, distance from the shore line, predators... etc. After eggs been hatched predation continued until death, humans hunt their eggs and meat, natural threats, habitat distraction, nesting site distraction or development ...etc. are some of the difficulties facing sea turtles in their life. In Mojeidi Island even though there are navy members in the island, we have observed numerous nests even close to their camp. From our previous observations in other islands, we have observed few sea turtle carapaces along the coast. This indicates there are low threats to sea turtles in that island from the navy members. The same as the previously written literatures by the Ministry of marine resources researchers, from our observation Mojeidi Island is a nice nesting site for sea turtle. The nesting season of sea turtles in Eritrean islands is mostly on March and April.

11. Row data from each Island

Table 7. Number of Hat, Unf, Rot, dead in nest, dead in egg at a given excavated nest in Mojeidi

no. excavate nest	site 01			dead in nest	dead in egg	site 03			site 04		
	Hat	Unf	Rot			Hat	Unf	Rot	Hat	Unf	Rot
1	35	9	7	0	0	40	12	6	62	16	4
2	42	4	3	0	0	6	26	44	74	21	3
3	44	10	31	0	0	23	15	115	71	21	23
4	63	35	15	0	0						
5	80	3	21	0	0						
6	45	9	18	0	0						
7	47	12	13	0	0						
8	56	5	15	0	1						
9	53	43	9	2	0						
10	90	21	40	0	1						
11	14	2	19	0	0						
12	40	7	26	0	0						
13	37	27	16	0	0						
14	58	8	1	0	0						
15	65	15	1	0	0						
16	23	17	24	0	0						
17	42	11	1	0	0						
18	38	2	6	0	0						
19	51	27	9	0	0						
20	38	20	35	0	0						

21	60	12	15	0	0							
22	36	17	5	0	1							
23	34	6	0	0	0							
24	18	8	41	0	0							
25	60	15	4	0	0							
26	45	5	9	0	0							
27	66	13	5	0	0							
28	36	15	35	0	0							
29	14	8	32	0	0							
30	26	9	3	0	0							
31	9	2	29	0	0							
32	66	30	0	0	0							
33	70	38	7	0	0							
34	53	27	1	0	0							
35	69	20	10	0	0							

Table 8. Number of Hat, Unf, Rot, dead in nest, dead in egg at a given excavated nest in Awkan Island

no. excavated nest	Hat	Unf	Rot	dead in nest	dead in egg
1	40	18	7	0	0
2	56	9	10	0	0
3	66	34	17	0	0
4	68	38	3	0	2
5	93	30	2	5	0
6	61	49	3	0	0
7	59	52	0	0	0
8	68	16	12	0	1
9	56	20	4	0	4
10	60	32	4	0	0

Table .9. Number of Hat, Unf, Rot, dead in nest, dead in egg at a given excavated nest in Muserie Island

no. excavated nest	Hat	Unf	Rot	dead in nest	dead in egg
1	99	11	7	0	0
2	84	17	9	0	0
3	70	25	21	0	0
4	66	23	6	0	0

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