Migration Paths of Adult Female Green Turtles Detected by Satellite Telemetry

By

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Abstract

Study on migration paths of adult female green turtle was conducted by using satellite telemetry in the Gulf of Thailand during the year 2000. Five post nesting green turtles were attached, four from Khram Island, Chonburi Province and one from Mannai Island, Rayong Province. The results of this study found four different of migration patterns; The first pattern was found from 2 female which were attached at Khram Island, they still stayed around the nesting area. The second pattern was found from one turtle that was attached at Mannai Island, she traveled pass through the Gulf of Thailand heading to the south. The third pattern from another 2 female, one went to the southeastern coast of the Gulf to Vietnam Peninsula after that she traveled to the east cross South China Sea to the north of Sabah of East Malaysia, the other one went to the same direction as the first one but stopped travel and October she stayed around the Rong Island of Cambodia until the last signal. The fourth pattern from the female turtle which was captured by accident after releasing she swam cross the Gulf to the western coast and went down. Results from this study can be pointed that the female turtles which coming to nest in the Gulf of Thailand migrated long distances from different feeding grounds and habitats but still in the region.

Key words: satellite tracking, telemetry, migration, green turtle, Gulf of Thailand

Introduction

Sea turtle is one of the important protected marine animals under the CITES agreement in the Asean Region, each Asean Member Country has established his own program on the conservation and management. Sea turtles are highly migratory species which can move from water of each country to another, the information of research studies on feeding, foraging habitats and migration patterns of these animals in each country are still unknown in this region.

The satellite telemetry is one of the methods which is used for study the migration paths and foraging habitats of sea turtles in many areas. The aim of this study also used the satellite telemetry for adult female green turtles in the Gulf of Thailand.

Methods

- Equipment used

Two models of satellite transmitters called PTTs (Platform Transmitter Terminal) with a salt switch option that assures synchronization of the Argos transmission with surfacing. The switch also suppresses transmissions while the unit is under water, thus saving power and maximizing operational life of the configuration. The power savings associated with the salt-water switch (Suppressing transmissions while the animal is under

water) is additive to the power savings associated with duty cycling.

- First model PTT from Telonics : ST-18 (Model A-400); Weight 200 gram; Duty cycle / day: 8 hours on and 16 hours off; Power sending 0.5 watt. (Fig. 1)
- Second model PTT from New Zealand : KiwiSat101; Weight 600 gram; Duty cycle / day : 24 hours; Power sending 1.0 watt. (Fig. 2)

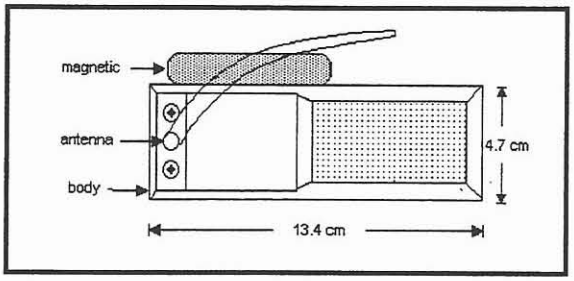

Figure.1 PTT from Telonics type ST-18

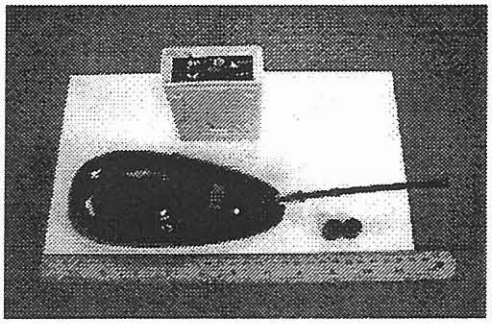

Figure.2 PTT from New Zealand type KiwiSat 101

The longer the turtle remains on the surface while the receiving satellites were overhead, the better accuracy of the fixes obtained. As told by the Argos to the users, the fixes are assigned to six location classes (*i.e. 3, 2, 1, 0,* A and B), according to the estimated accuracy of the locations obtained. For classes *3, 2* and *1* Argos gives the degree of accuracy (for one standard deviation) as 150m, 350m, and 1 km. Respectively.

- Turtle tagging

PTT is glued at the dorsal carapace of the turtle after her last nesting (or nearly the last) on the beach. Before releasing to the sea each turtle was measured the carapace length(CCL)and weight then tagged with microchip (PIT tag) and inconel tags.

Four post nesting from Khram Island and one incidental capture from Sriracha, Chonburi Province and one post nesting from Mannai Island, Rayong Province were done in the year 2000.

Table. 1 Tagging on green turtle by PTTs in The Gulf of Thailand in the year 2000

Name	Species	Microchip No.	Incon el No.	ID code of PTT	CCL weight (cm) (kg)	Date	Time releas ed
1.Samprea ng	Green turtle	116 835 593A	TH04 93	16724	91x104 125	18/5 /00	11:20
2.Sri Koa Khram	Green turtle	116 874 117A	P0039	28534	85x98 115	29/6 /00	10:40
3.Sri Sattahip	Green turtle	116 918 551A	P0040	28533	86x94 90	29/6 /00	10:55
4.Sri Chonburi	Green turtle	116 911 111A	P0041	28532	89x100 130	29/6 /00	11:05
5.Chao Samut	Green turtle	116 911 594A	TH05 57	16723	86x98 110	12/9 /00	10:25
6.Sri Racha	Green turtle	115 222 122A	TH05 59 TH05 60	29679	76x84 59	3/11 /00	09:20

Results

Sampreang

The first turtle we attached by Telonics ST-18 (ID code no. 16724) after the fourth nesting on 18 May 2000. She had not finished nesting for the season yet so she came to nest again. She started to migrate on 20 May 2000 heading to the south. She went pass through the Gulf of Thailand in 27 days and reached Kuala Terangganu in Malaysia and then passed to Pahang heading to the Malaga strait. The last signal we received she stayed at Malaysian Peninsula which closed to Singapore. Total distances about 1,226 Kilometer within 48 days. (Fig.3)

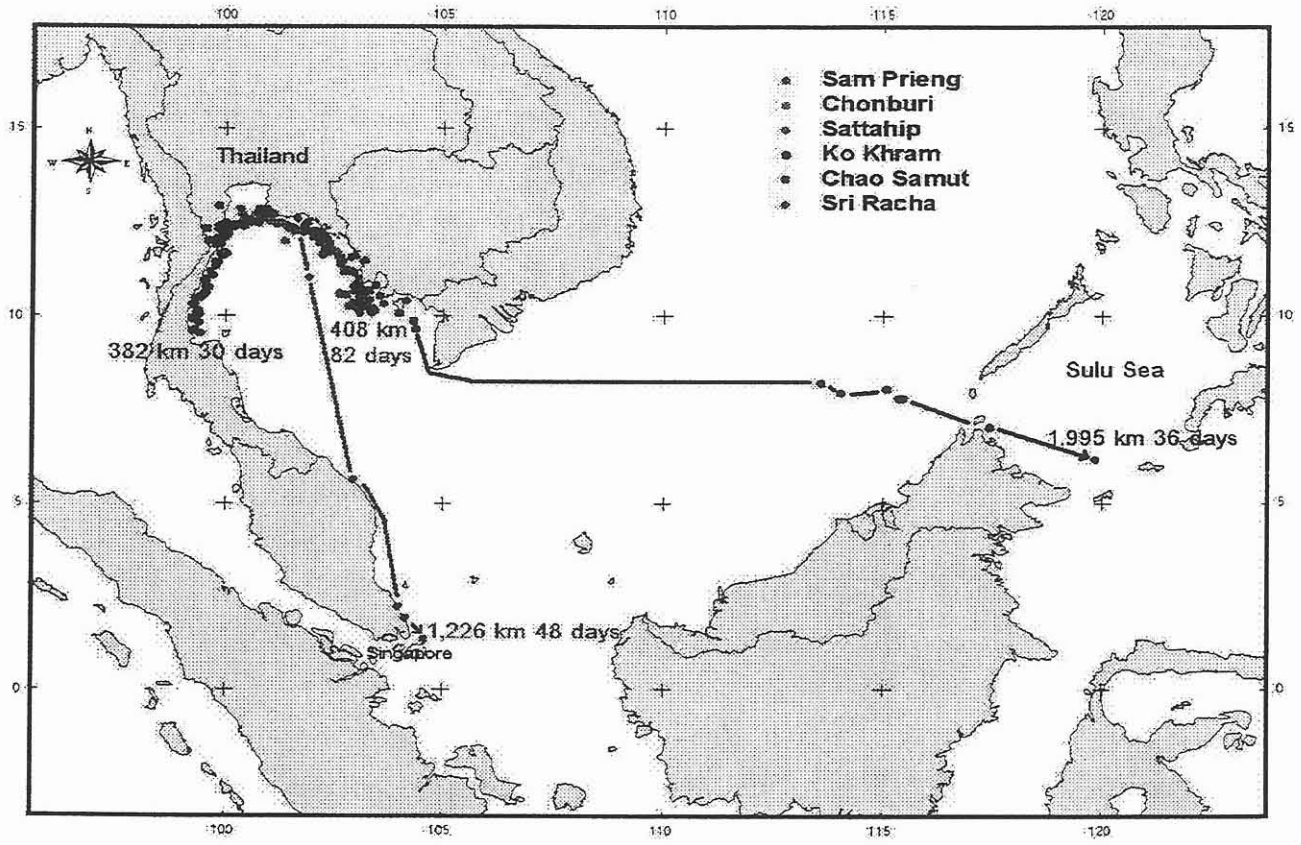

Figure. 3 Map of the migratory routes of adult female green turtles attached by satellite telemetry in the year 2000 from the Gulf of Thailand

Sri Koa Khram

She was attached by Telonics ST-18 (ID code no. 28534) on 29 June 2000 at Khram Island in Chonburi Province after released she still stayed around Khram Island about 5 days and started heading to the southeast pass through Trat Province, Thailand and Cambodia waters, then she went down to Vietnam Peninsula after that she traveled to the east cross South China Sea to the north of Sabah of East Malaysia and Sulu Sea on 8 Aug. within 36 days. The last signal on 17 Aug. showed that she stayed around the Islands in Sulu Sea. Total distance of the further route was about 1,995 kilometer. (Fig.3)

Sri Sattahip

She was attached by Telonics ST-18 (ID code no. 28533) on 29 June 2000 at Khram Island in Chonburi Province. The signal

of this turtle could receive only 2 times in 9 days and she still stayed around Khram Island (Fig.3)

Sri Chonburi

She was attached by Telonics ST-18 (ID code no. 28532) the same day as Sri Koa Khram and Sri Sattahip on 29 June 2000. The signal could detect only 11 times in 40 days. She still stayed around Khram Island. (Fig.3)

Chao Samut

She war attached by KiwiSAT101 (ID code no.16723) on 12 September 2000 at Khram Island, Chonburi Province. The first 2 days she started to go to the west and then she designed to come back to the releasing area. On 17 Sept. she began to travel again but this time she went to southeast passed Rayong, Chantaburi and Trat Province. Passed Thailand to Cambodia on 25 Sept. and still went down not far from the shore, on 3 October she stayed around the Rong Island of Cambodia until 4 Dec. (last signal) she still stayed there. Total distance of the further route was about 408 kilometer. (Fig.3)

Sri Racha

She was attached by KiwiSAT101 (ID code 29679) on 3 November, this turtle was caught by incidental and rearing in the outdoor pool about 5 months at Sriracha District, Chonburi Province. After releasing she started to swim cross to the western coast of the Gulf closed to the shore of Prachaup Khiri Khun Province and then went down. The last signal on 18 Dec. showed that she stayed around the islands of Chumporn Province. Total distance of the further route was about 382 kilometer. (Fig.3)

Discussion

Results of this study showed that the adult female turtles which coming to lay their eggs in the Gulf came from different feeding grounds and habitats, these turtles migrated long distances from different places of their foraging habitats to the nesting ground in the Gulf of Thailand. This paper presents the ordinary data of the migration patterns of adult female green

turtles which traveled back to the feeding and foraging habitats after nesting. For further studies in more details on some behaviors such as navigational abilities breathing and swimming behavior will be discussed in subsequent publications.