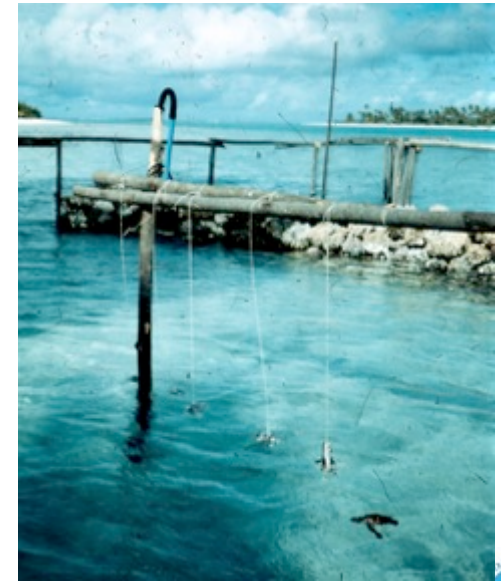




**Presents its:**  
**ELEVEN YEARS SURVEY OF GREEN  
SEA TURTLE NESTING ON TETIAROA  
ATOLL IN FRENCH POLYNESIA**



# Marlon Brando turtle conservation on his atoll of Tetiaroa since 1974





Since 2004, te mana o te moana is on site for scientific nesting survey with Environment Direction of French Polynesia government authorization and under Dr. Cécile Gaspar supervision





And since 2014 with The Brando resort and Tetiaroa Society support



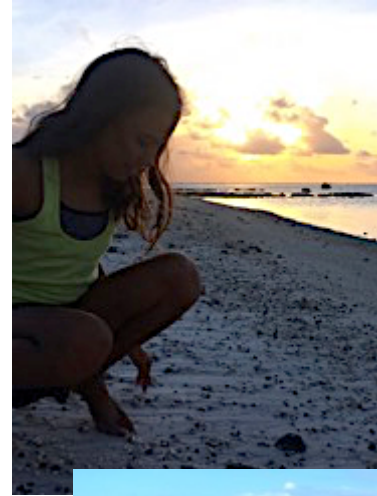




# Thanks to the support of the Brando Family and SA frangipani



Reva



Manea



Teihotu



Rebecca

Miko

Tumi





# Since 2014, with the support of the Brando Eco-resort, Tetiaroa Society and prestigious visitor like Barack Obama



The Polynesian non profit organization **Te mana o te moana** («spirit of the ocean») created in 2004 is working on research, education and conservation of the marine environment. In addition to setting up a dedicated sea turtle care center on the island of Moorea, and providing educational programs for the local schools -over 80.000 children raised- one of its major achievement is the green turtle nesting (*Chelonia mydas*) , long term monitoring on **Marlon Brando's atoll : Tetiaroa**, conducted since 2007.

## Tetiaroa atoll specificity

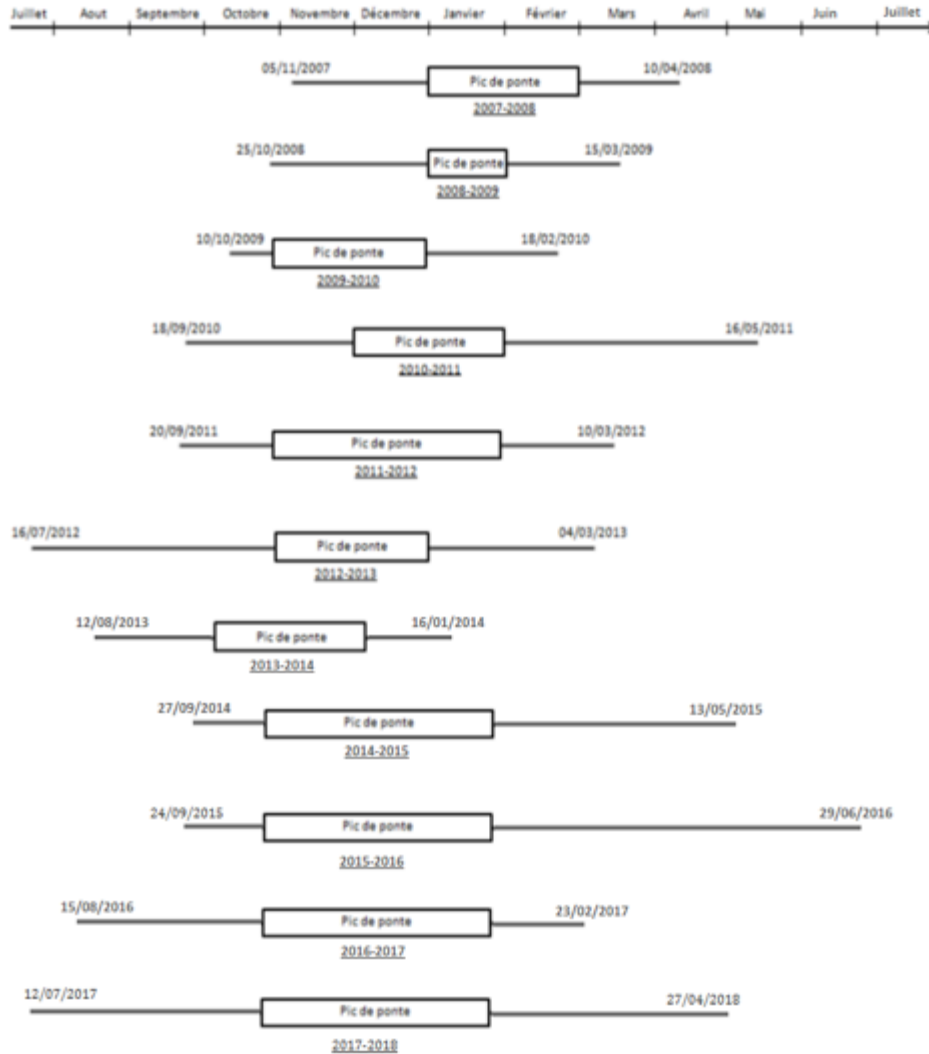
The atoll of Tetiaroa ( 17° 0.585' South, 149° 33.653' West) lies 30 miles north from the main island of Tahiti and is comprised of 12 islets or “*motu*” surrounding a sparkling lagoon. Its reef barrier extends over 25 kilometers and its inside lagoon cover 27 km<sup>2</sup> for 6 km<sup>2</sup> of land area. Nesting sites vary from fine sand to very rough coral debris.

## Material and method

- ◆ Typical beach surveys with night and day observation. 2 biologists/survey
- ◆ Sampling effort varies from once a week to daily surveys depending on the year and *motu*.
- ◆ Data parameters taken : GPS position, false crawls, distance to sea, sand parameters, solar exposition, depth of nests, number of nesting attempts, female CCL, eggs count...



# Nesting season's progress from 2007 to 2018



Monthly distribution of nesting events 2007-2018

- ◆ Earliest track : July 12<sup>th</sup>
- ◆ Latest track: June 29<sup>th</sup>
- ◆ Pick of nesting season : November-January
- ◆ Longer season: 289 days (2017-2018)
- ◆ Shorter season: 128 days (2009-2010)





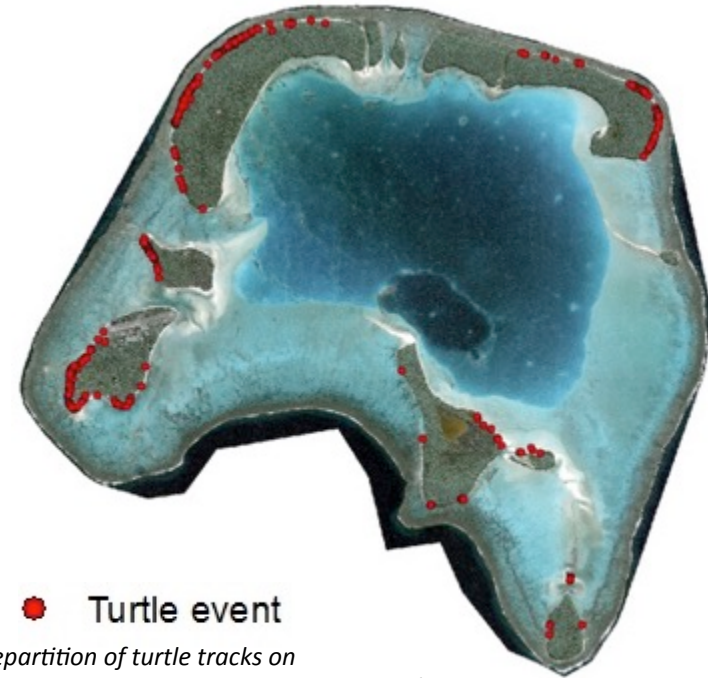
# Turtle tracks parameters

- ◆ More than **11.300 kilometers** of beach survey over 11 years
- ◆ Tracks on **8** of out 12 *motu*
- ◆ **3** main sites (*motu*) on Tiaranu, Oroatera and Onetahi.

Total: **10** km of linear beaches

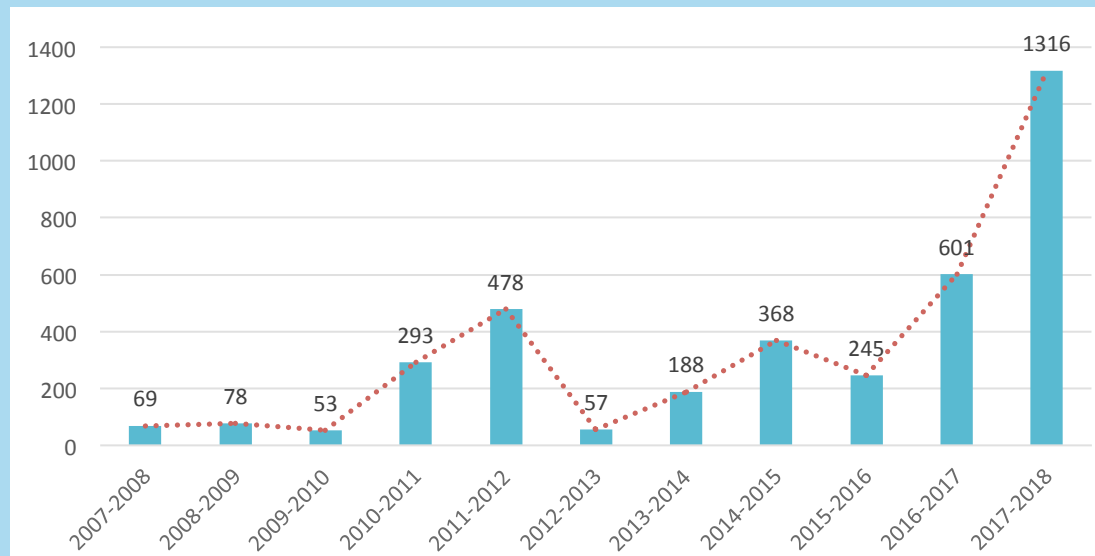
- ◆ More than **3740 tracks** counted in 11 years and over **1488 nests** with eggs witnessed for a total of over **119.500 eggs** laid

- ◆ Nesting attempts record on same track: **12** times
- ◆ The average width of the tracks observed is **97.5** cm



Repartition of turtle tracks on 8 of the 12 *motu* of Tetiaroa atoll -2016/2017

Yearly turtle events on Tetiaroa

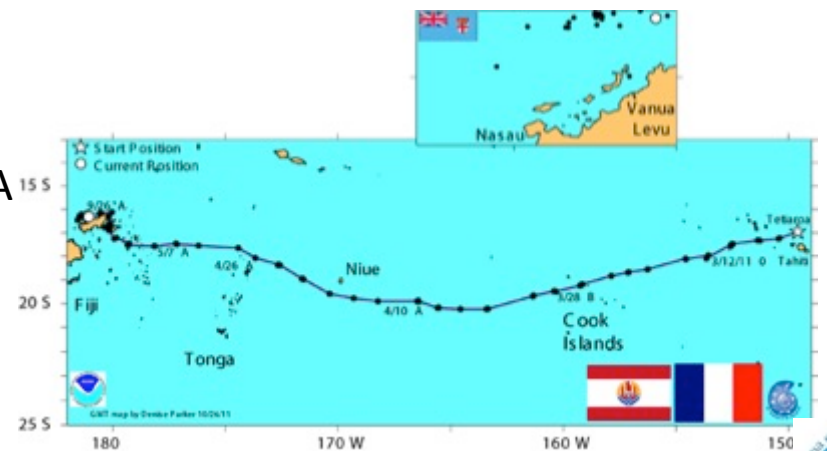


# Female characteristics

- ◆ **145** female identified and tagged since 2010
- ◆ **96** identified in 2017-2018
- ◆ CCL from **85** to **118** cm
- ◆ From **3** to **12** tracks per female per season
- ◆ Nesting intervals: from 10 to 17 days with on average: **12.57** days
- ◆ 8 females (whose 7 in 2017-2018) observed nesting on 2 different *motu*, Onetahi, Tiaraunu and/or Horoatera
- ◆ Photo identification of each female with TORSOII method
- ◆ Satellite tracking in partnership with NOAA and George Balazs/Denise Parker / DIREN
- ◆ **8** tracking programs showing direct tracks to the west and mainly around Fiji from 2011 to 2018



Vaimiti turtle reaching out the lagoon after satellite tagging March 2<sup>nd</sup> 2012  
CCL 85 cm – weight 98 kg



Vaimiti migration route: 208 days transmitting –over 3500km covered





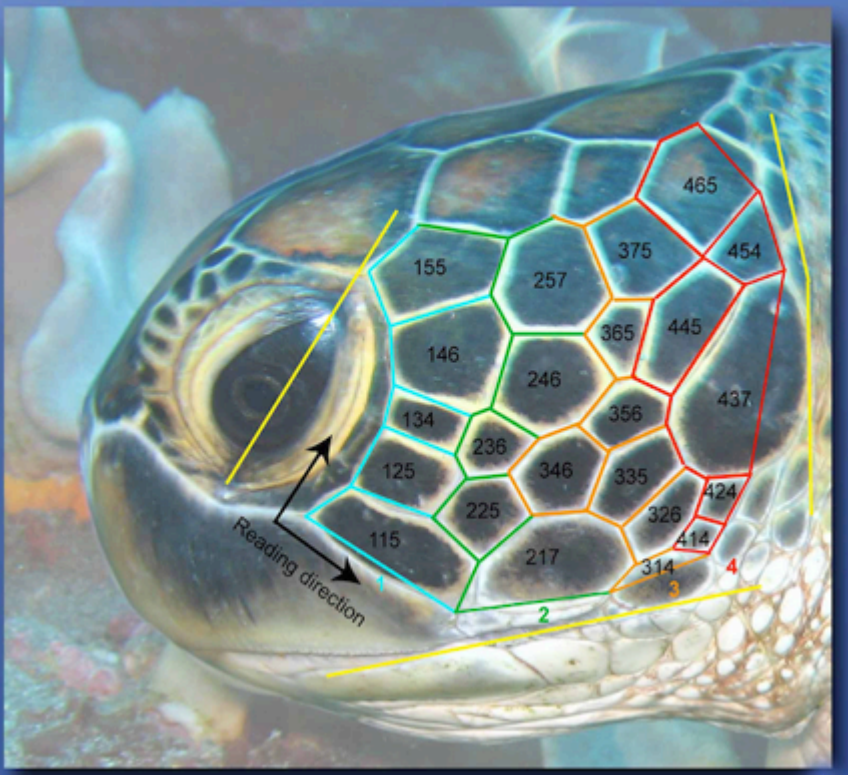
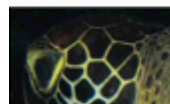
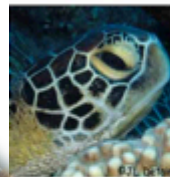


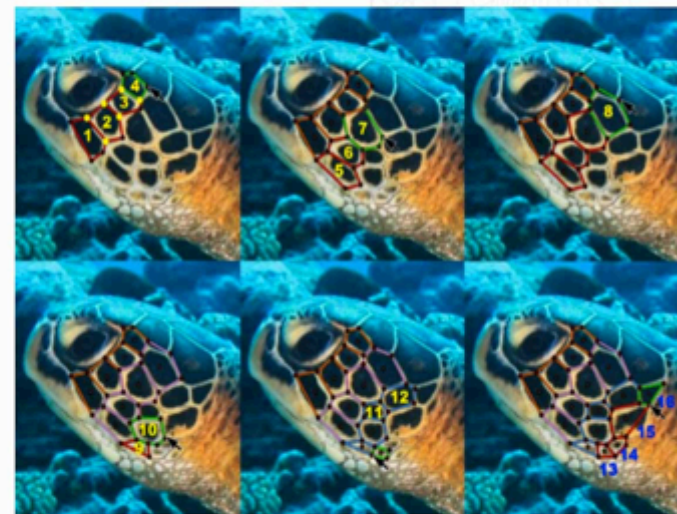
Photo Identification

Photo identification for green turtles  
 Easy for scuba divers in some areas without any disturbance on the animal



Aide à la photo identification :

Dessinez les contours des écailles les unes après les autres à l'aide de votre souris en cliquant sur les sommets de chacune d'elles. Suivez l'exemple ci-dessous ou visualisez le didacticiel :



Quelques définitions :

# Female characteristics

## The example of « Remu »



« Remu turtle » (algae in Tahitian) nesting event

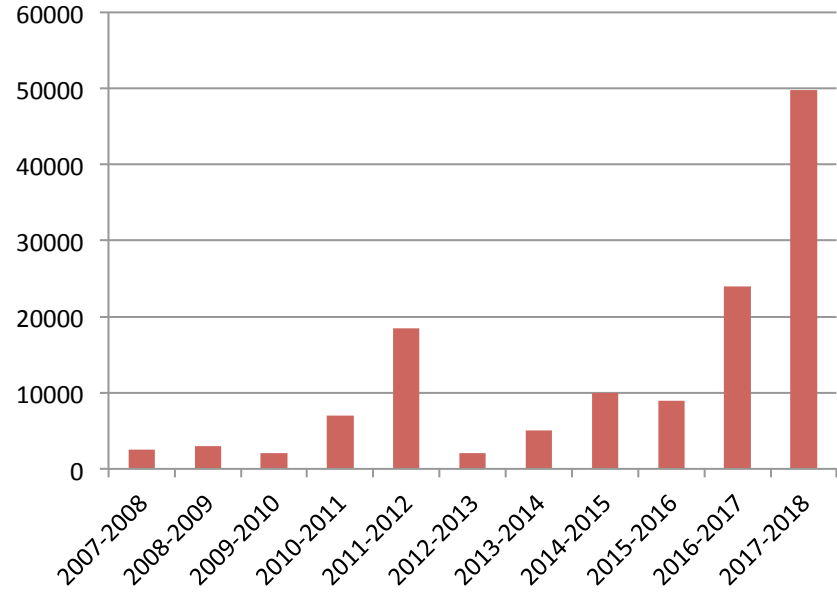
- ◆ Curved carapace length: **102.4** cm
- ◆ Curved carapace width: **93** cm
- ◆ **10** tracks during 2016-2017 season
- ◆ **9** confirmed nests + **1** single track with no attempt on a total beach distance of **800** meters from October 24<sup>th</sup> 2016 until February 16<sup>th</sup> 2017
- ◆ A total of **652** hatchlings
- ◆ Average alive babies observed per nest: **82.1**





# Progress of finding on nests and hatchlings from 2007 to 2018

- ◆ over **120'000 hatchling** in 11 years
- ◆ **79.0** hatched eggs/nest
- ◆ **92.97 %** of hatchling success
- ◆ **4.5** unhatched eggs/nest
- ◆ Average depth of nest: **61.3** cm
- ◆ Incubation from **51** days to **80** days
- ◆ Main predators: crabs and hermit crabs
- ◆ Thermologgers in partnership with Dr. Jacques Olivier Laloe. **50 Thermologgers** have been deployed for the 4th season and parameters are currently analyzed



Minimum numbers of live hatchlings per year (based on empty egg shells and live hatchlings observation)



Interesting findings during nest excavation



# Nesting and hatchling predation

- ◆ The main predators are : crabs, hermit crabs and rats





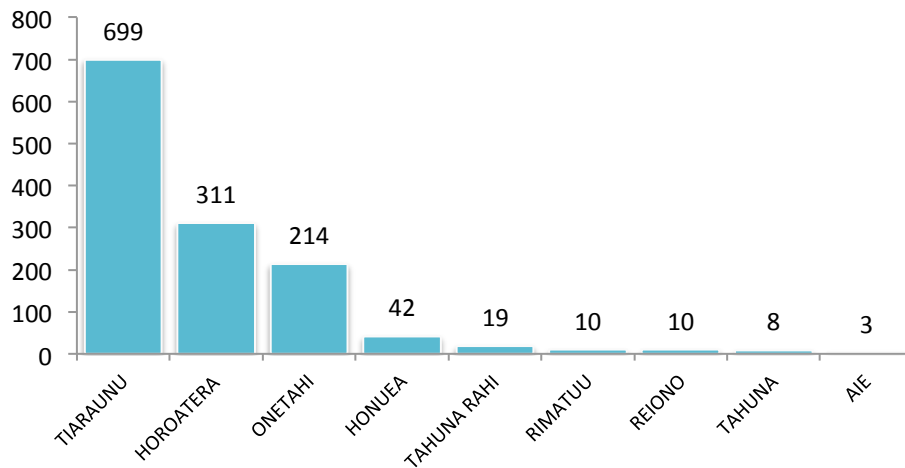
# Nesting season 2017-2018

◆ More than **3300** kilometers have been covered during 632 surveys

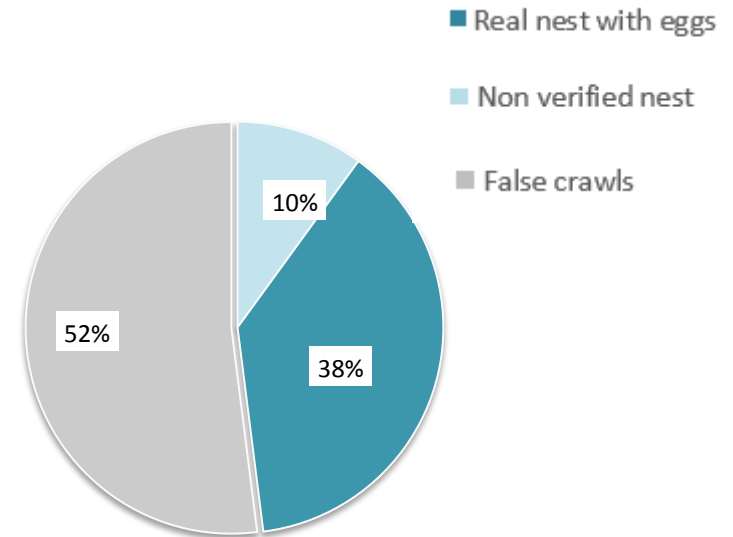
◆ On **1316** crawls :  
 - 690 are false crawls  
 - 503 are real nest event with eggs  
 - 123 are not verified

<i>Motu</i>	Number of surveys	Effort (km)
Onetahi	299	1619
Tiaraunu	163	1180
Oroatera	56	248
Autres	114	258
<b>TOTAL</b>	<b>632</b>	<b>3305</b>

◆ **3** main *motu* : Tiaraunu, Oroatera and Onetahi



Number of tracks per motu



Different types of nesting event



# Nesting season 2017-2018



◆ At least, **37 516** eggs hatched on 482 nest (average : 86,4 eggs/nest).

◆ **91%** hatching success

◆ **7** albino hatchlings were found

◆ **873** emergent were found blocked in their nest

**23** were sent to our clinic in Moorea



*Hatchlings of this seasons*

	Number of hatched eggs	Number of unhatched eggs	Number of eggs laid
<b>Digged nest</b> (TN3) (N=482)	37 516	3 464	40 980
<b>Total nest</b> (TN3 + TN2 + TN1) (N=626)	49 489	4 597	54 086
<b>Percentage</b>	<b>91,5%</b>	<b>8,5%</b>	<b>100%</b>



# Medical care of injured or deformed hatchlings at the te mana o te moana sea turtle clinic in Moorea

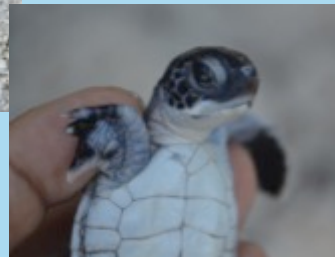
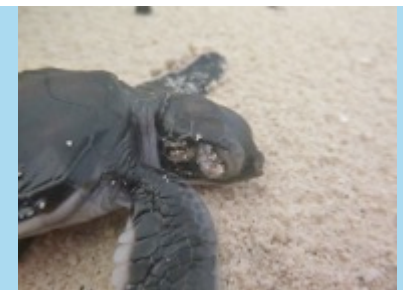
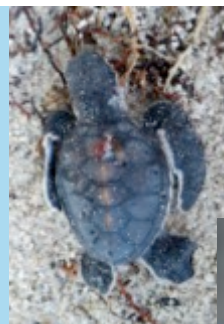
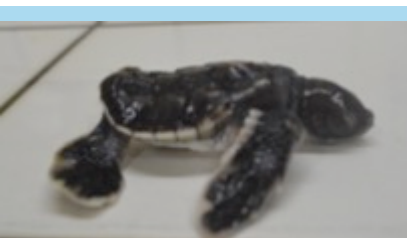
Different cases observed:

Hatchling still in nests:

- blocked under roots or coral pieces
- deformed in nest
- dehydrated
- genetic abnormalities
- predation by ants, crabs, hermit crabs, rats



Hatchling crawling on the sand to reach the water: predation by rats crabs, hermit crabs, coconut crabs, birds



Hatchling turtles in rehabilitation phase at the Moorea sea turtle clinic





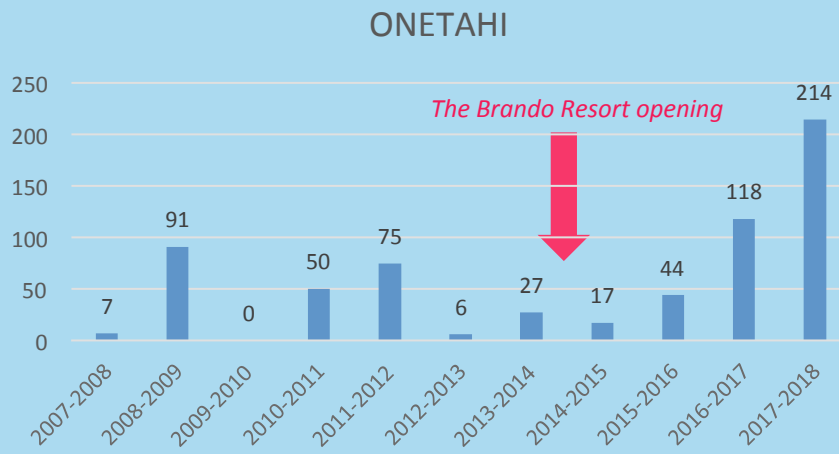


80 injured or deformed hatchlings found in Tetiaroa have been successfully rehabilitated and released from te mana o te moana sea turtle clinic in Moorea



# The Brando Resort on motu Onetahi

- ◆ Uninhabited from 2004 to 2013, this atoll is now welcoming The Brando Resort that opened in July 2014
- ◆ Because of the turtle nesting, the villas have been specially pushed far back from the beaches
- ◆ In addition, the resort has set up particular light policies for turtle nesting season
- ◆ Surprisingly, the nesting events are concentrated, this year, in front of the villas on the west coast
- ◆ The number of tracks have been multiplied by **7** since the hotel opened. Annual variability is taken into consideration also as well as poacher dissuasion
- ◆ Season 2016-2017: **214** tracks and **101** confirmed nests: **47 %** of nesting success
- ◆ **6955** empty shell found for **7639** eggs layed: **91 %** of hatchlings success





# Tetiaroa Society et the Conservation and Management

## use plan CASUP



- ◆ Since 2014, Tetiaroa Society is managing an ecostation for worldwide researchers, built by The Brando resort on Onetahi motu, in order to develop research programs and the conservation plan for the atoll
- ◆ Since 2016, Tetiaroa Society has signed an agreement with the owners of the atoll, SA Frangipani, to manage the conservation plan and actions for the atoll.
- ◆ Sea turtles are endangered species, specially protected by the French Polynesian laws. The green turtles are under B category. The non for profit foundation te mana o te moana, has obtained all research permits for its programs on sea turtles, and its missions has been strengthen since 2014 by Tetiaroa Society, SA Frangipani and The Brando resort in order to continue its scientific monitoring on the long term.



# Acknowledgment and fundings:

Te mana o te moana biologists, veterinarian and volunteers  
The Brando resort and Tetiaroa Society volunteers  
and:



Mireille and Richard Bailey  
Carl Swanes



