

# Sea turtle satellite tracking- techniques and results

**Based on:** Balazs, G. H., R. K. Miya, and S. C. Beavers. 1996. Procedures to attach a satellite transmitter to the carapace of an adult green turtle, *Chelonia mydas*. In J.A. Keinath, D.E. Barnard, J.A. Musick, and B.A. Bell (comps.), Proceedings of the Fifteenth Annual Symposium on Sea Turtle Biology and Conservation, February 20-25, 1995, Hilton Head, South Carolina, p. 21-26. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC- 387.

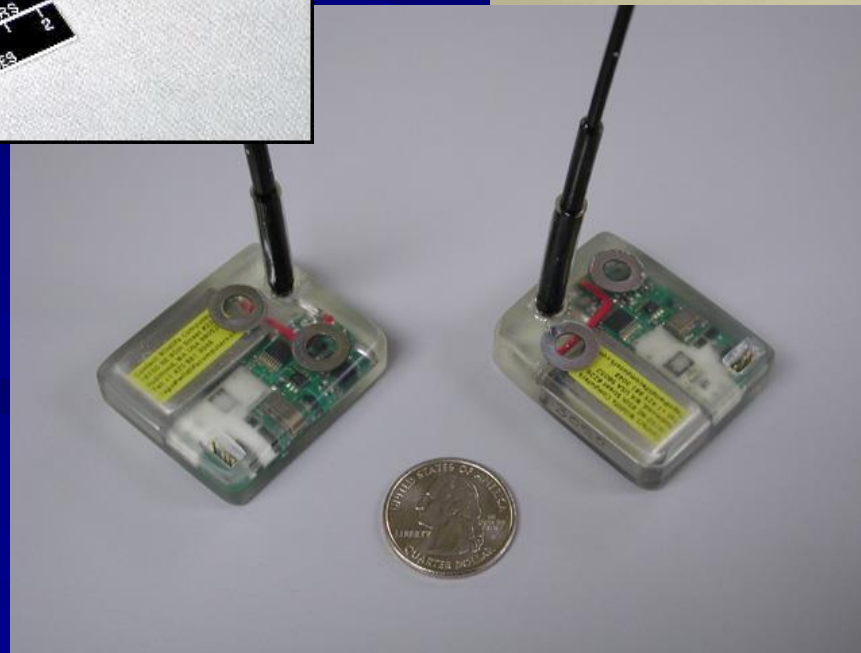
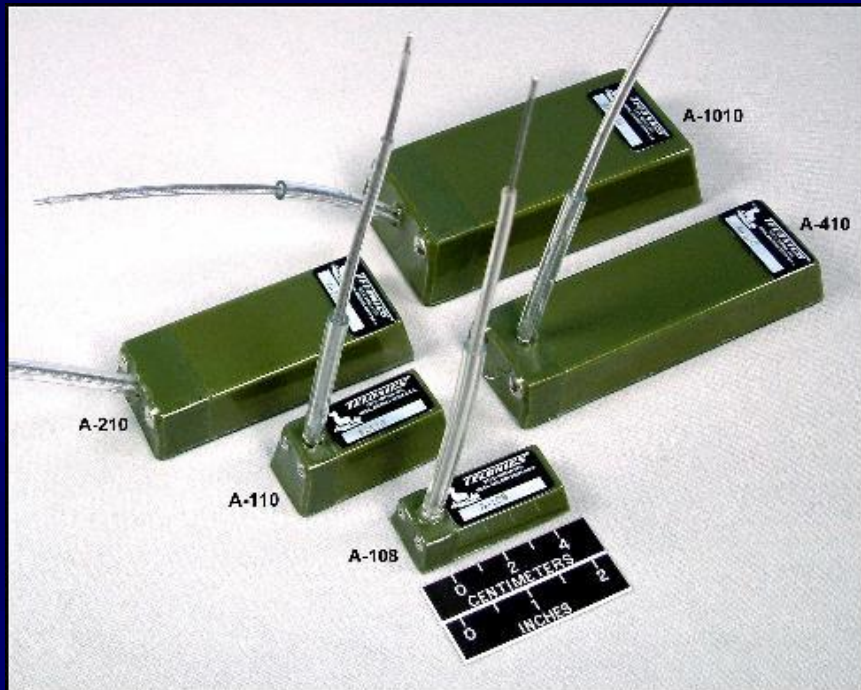
Modified by Denise M. Parker March 2006



# Supplies



# Transmitters (PTTs)



# Prepare Shell





# Elastomer















# Set on Shell











# Fiberglass and Resin Attachment







**Surfboard  
Laminating  
Resin**  
Polyester

**FIBERGLASS HAWAII**

CAUTION: Flammable liquid. Vapors harmful—see SDS panel.  
KEEP OUT OF REACH OF CHILDREN

32 FL. OZ. (0.95 L)

**Catalyst**  
MEK Peroxide

**FIBERGLASS HAWAII**  
CAUTION: Flammable liquid.  
Vapors harmful—see SDS panel.  
KEEP OUT OF REACH OF CHILDREN

16 FL. OZ. (0.47 L)









# Putting on Fiberglass











# Creating “Castro” Roll















# Release



# Websites

Sites for Argos and transmitter information

- <http://www.argosinc.com>
- <http://www.telonics.com>
- <http://www.wildlifecomputers.com>

Examples of turtle tracking

- <http://www.seaturtle.org>
- <http://www.cccturtle.org>
- <http://turtletrax.org>
- <http://www.sprep.org/turtles/topics/tracking.htm>

# What to do

- Collect and compile Argos data
- Mapping
  - Hand mapping
  - Internet on-line options
  - Other options
- Assess positions for “accuracy” and finalizing maps

# Example of raw Argos Data

58846 Date : 02.03.08 01:21:22 LC : 0 IQ : 50  
Lat1 : 13.580S Lon1 : 164.655W Lat2 : 17.658S Lon2 : 177.298E  
Nb mes : 005 Nb mes>-120dB : 000 Best level : -128 dB  
Pass duration : 322s NOPC : 2  
Calcul freq : 401 636830.3 Hz Altitude : 0 m  
00 00

58846 Date : 02.03.08 03:00:39 LC : A IQ : 06  
Lat1 : 17.658S Lon1 : 177.268E Lat2 : 24.498S Lon2 : 146.948E  
Nb mes : 003 Nb mes>-120dB : 000 Best level : -134 dB  
Pass duration : 184s NOPC : 1  
Calcul freq : 401 636890.6 Hz Altitude : 0 m  
00 00

58846 Date : 02.03.08 12:37:57 LC : Z IQ : 00  
Lat1 : ??????? Lon1 : ????????? Lat2 : ??????? Lon2 : ?????????  
Nb mes : 001 Nb mes>-120dB : 000 Best level : -126 dB  
Pass duration : ???s NOPC : ?  
Calcul freq : 401 636830.3 Hz Altitude : 0 m  
01 7958

# On-line Mapping

- <http://www.seaturtle.org/maptool/index.shtml>
  - Excellent flexibility and multiple options available to plot
  - Can plot bathymetry, SST, and other oceanographic features
  - Need to be a seaturtle.org user – simple registration
  - Good output overall best on-line option

SEATURTLE.ORG Maptool - Netscape

Back Forward Reload Home Search Netscape Print Security Shop Stop

**Base Map**

Projection	Mercator
Buffer	<input checked="" type="checkbox"/>
Min Lat	0
Max Lat	12
Min Lon	135
Max Lon	150
Lock	<input checked="" type="checkbox"/>
Land	<input checked="" type="checkbox"/>
Water	<input type="checkbox"/>
Rivers	<input type="checkbox"/>
Country Names	<input type="checkbox"/>
Map Scale	plain
Gridlines	<input type="checkbox"/>
Convex Hulls	<input type="checkbox"/>
Scale Length	100 km
Borders	Marine
Coastline	solid
Pen Width	0.1
Inset Map	none

**Layers**

Bathymetry	<input checked="" type="checkbox"/>
Color Table	relief
SST	
Global SST	
Chlorophyll	
Relief	<input type="checkbox"/>
Topo	<input type="checkbox"/>
Contours	<input type="checkbox"/>
	100 min
	500 max

Please post questions, comments and suggestions to the [GIS and Maptool](#) forum.

Download: [PostScript File \(1MB\)](#)

136° 138° 140° 142° 144° 146° 148° 150°

12° 10° 8° 6° 4° 2° 0°

100 km

GMT 2005 Mar 11 13:24:30 seaturtle.org/maptool Projection: Mercator

[Acknowledging Maptool](#)

Please be sure to properly cite the bathymetry and SST source data if these are used in your maps.

**Maptool: Layers**

**Bathymetry**

A bathymetry grid is available as a layer in your maps. These data are from the GEBCO Digital Atlas or ETOPO2 Global 2' Elevations datasets distributed by the British Oceanographic Data Centre and NOAA's National Geophysical Data Center. The source grid has a one (GEBCO) or

Document: Done

# Other Mapping Options

- GMT – General Mapping Tool
- <http://gmt.soest.hawaii.edu/>
  - Requires Unix server or Windows version is available
  - Some programming needed; either C++ or DOS
  - Very flexible and map output is determined by programming
- ArcView
  - ERSI product <http://www.esri.com/products.html>
  - Requires some knowledge of product and database set up to input data
  - Wide variety of GIS tools and geographic data sets available

# Data Crunching

- Daily – input data by hand into Excel or Word and save as a text file – data should be set up as longitude, latitude, identifier (date and LC)
- Weekly or longer – Cut and paste each daily Argos file into one text file. Convert data either with Argos Data converter in the Seaturtle.org website or as outlined in handout.
  - Data should be sorted by ID number and a new text file should be created for each ID with data setup as above
  - Data should be compiled consecutively to create final tracks
  - Either only LC 1, 2 and 3 data should be used in maps or researcher needs to use judgment to determine which data points to map



# FINAL MAP:

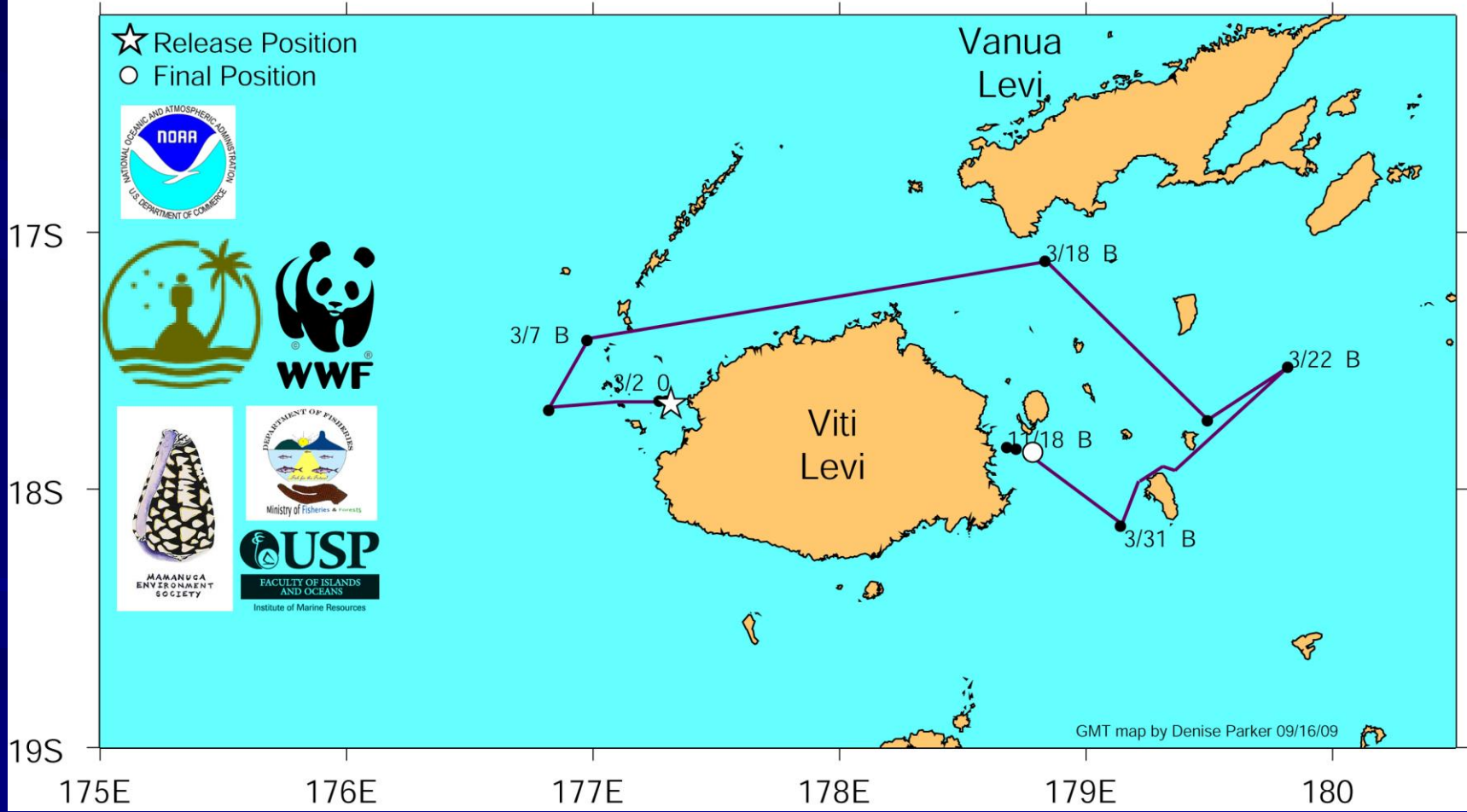
2008 movement of post-nesting hawksbill turtle, Adi Mamanuca, ID 58846

ST-20 transmitter Duty Cycle: 6/48 CCL: 79.0 cm

Date Deployed: March 2, 2008 Days Transmitting: 270 days

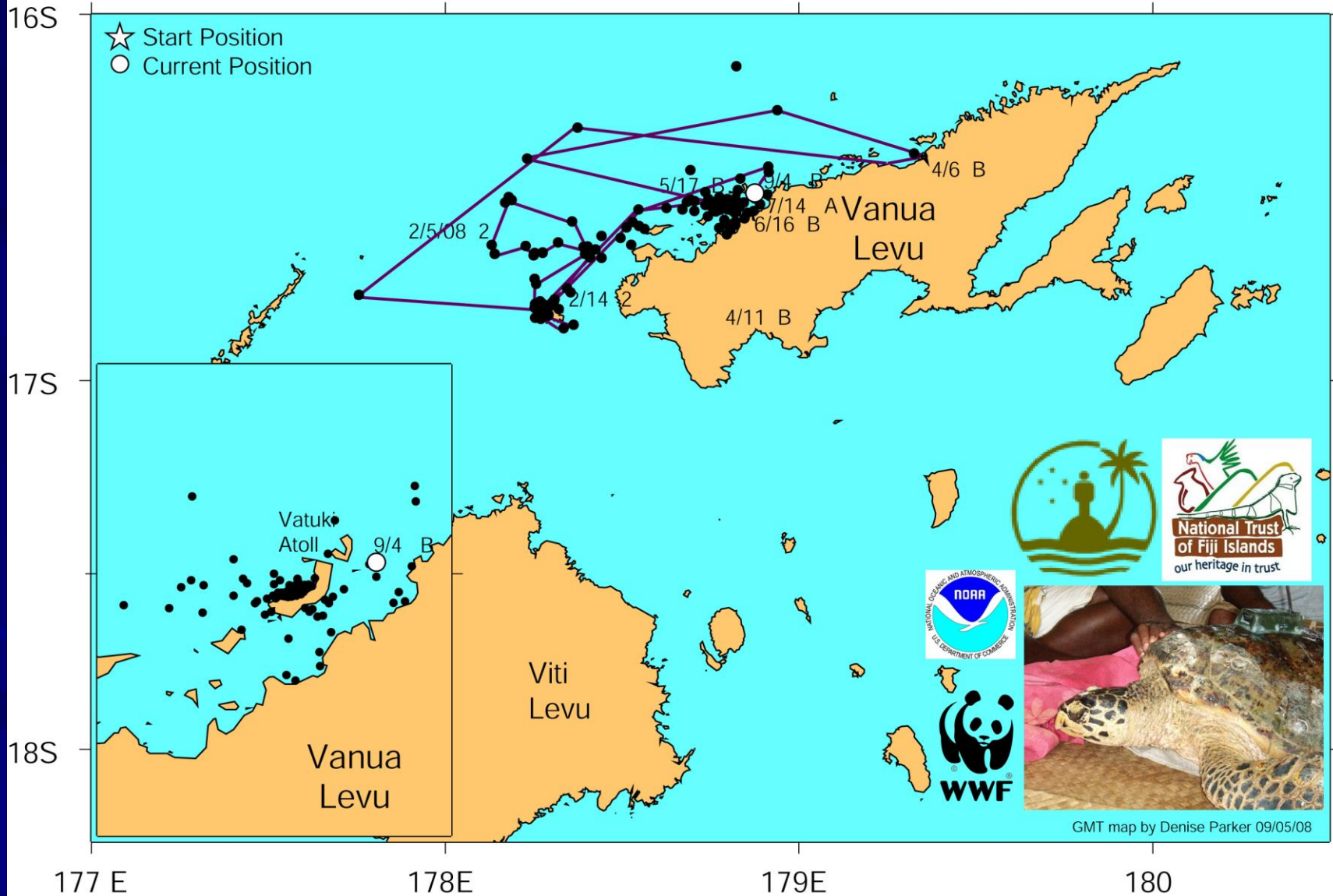
Released from Treasure Is, Mamanuca, Fiji

Distance traveled: 629 km



Update as of 9/5/08:

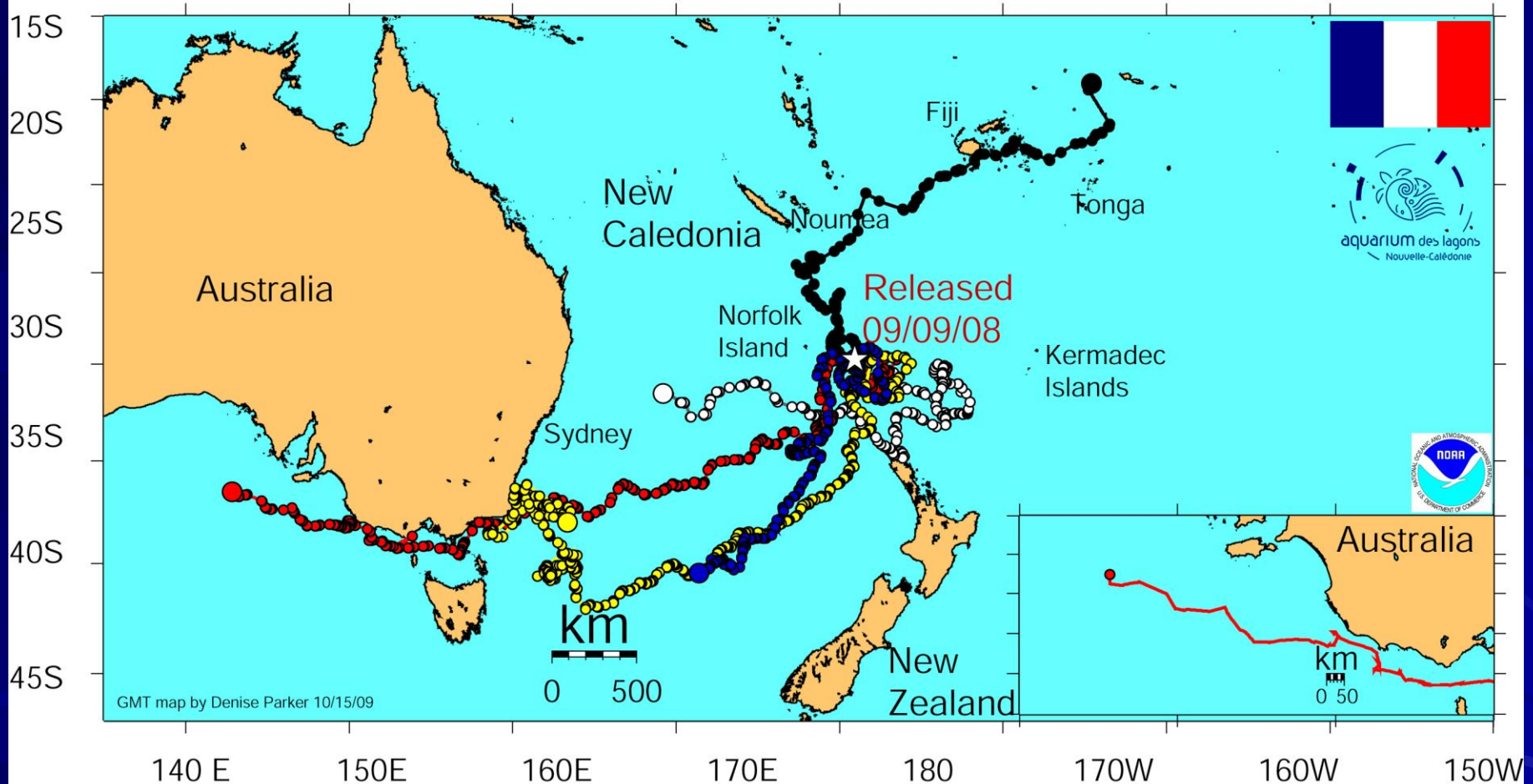
2008 movement of post-nesting hawksbill turtle, Marama ni Yadua, ID 19603  
ST-20 transmitter Duty Cycle: 6 hrs on, 48 hrs off CCL: 88.0 cm  
Date Deployed: January 13, 2008 Days Transmitting: 235 days  
Released from Denimanu, Yadua, Fiji



# 2008-2009 Movement of juvenile loggerhead turtles released from Maritime Nationale Patrouilleur la Glorieuse

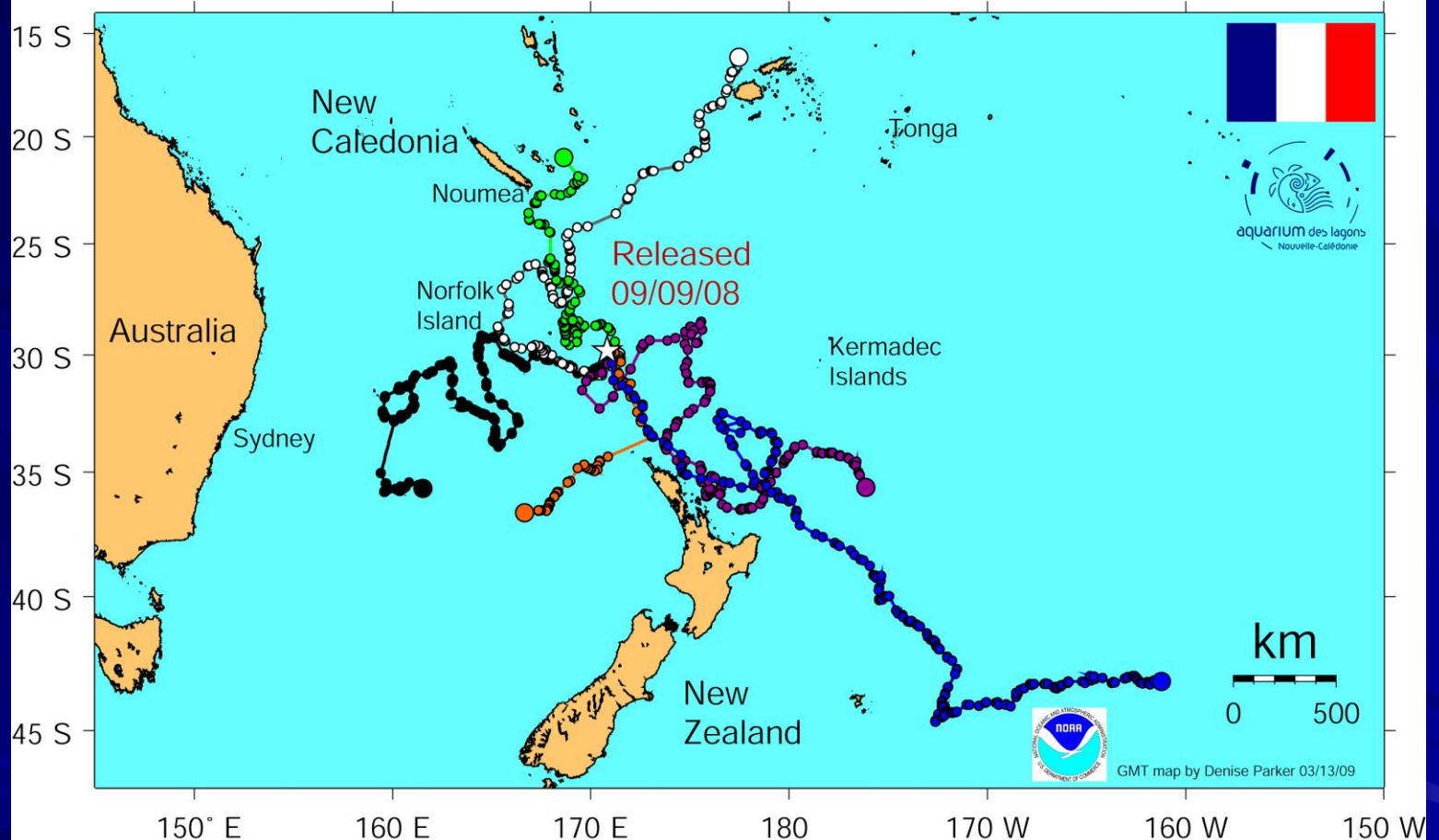
Hatched at La Roche Percee, Nouvelle-Caledonie and raised by the L'Acquarium des Lagons

SPOT5 transmitters 6/42



- 1 - ● 29060, 27.2 cm, XP28; End 3/12/09, 184 d, 4725 km
- 4 - ○ 53759, 29.2 cm, XP01; End 2/22/09, 166 d, 4139 km
- 5 - ● 53757, 27.0 cm, XP04; End 4/23/09, 226 d, 5514 km
- 6 - ● 53747, 29.7 cm, XP29; End 8/24/09, 349 d, 6641 km
- 8 - ● 53762, 27.8 cm, XP09; End 2/26/09, 170 d, 3590 km

FINAL MAP:  
 2008-2009 Movement of juvenile loggerhead turtles  
 released from Maritime Nationale Patrouilleur la Glorieuse  
 Hatched at La Roche Percee, Nouvelle-Caledonie and raised by the L' Aquarium des Lagons  
 SPOT5 anterior 6/42



- 26 - ● 50150, 27.4 cm, XP84; \*End 1/20/09, 133 d, 3483 km
- 28 - ○ 22980, 28.5 cm, XP21; \*End 12/18/08, 100 d, 3294 km
- 29 - ● 22275, 27.1 cm, XP18; \*End 1/25/09, 138 d, 3648 km
- 30 - ● 50137, 25.5 cm, XP13; \*End 1/7/09, 120 d, 1224 km
- 38 - ● 50148, 32.0 cm, XP23; \*End 11/30/08, 82 d, 1907 km
- 39 - ● 53767, 29.3 cm, XP77; \*End 4/3/09, 206 d, 3481 km

THE END



...OR JUST THE BEGINNING