FRENCH FRIGATE SHOALS

BALAZS

1995, 96, 97

Refurbish
5-3 EXPEDITION #41 22-25 SEPT 95
Deployed ~~#~~ 22132 ♀ BACAZS & RICE
AT EAST 9/23/95
-Blood from hatchlings (plasma) DEPLOY 9/23/95 2305 GMT EAST
- PACKED CELLS FOR DNA
6 on 6 off Refurbished
Tygon to TOP 6/95

1996 EAST MONITORING

P.58

1997 EAST MONITORING

Need Glue in Symposium articles

SKOTCHKOTE Electrical Coasting, Part Number 054007-14853.

1995 DAILY TOTALS - P. 116-117

~43° ideal

1995 Soil Temp. Graphs P. 110 -

1997 TAGS Cromwell 5/23/97 122C - 200C
701C - 999C
127T - 150T
Flight 6/20/97 152T - 600T
600T - 900T

9/5/97 - TO TERN FFS by me
TAGS =

DAILY TOTALS - EAST 1997 page 56

2

Tim Allison

Date: 08 Jun 97 16:20:22 EDT
From: LEIGHTON TAYLOR <71740.2116@CompuServe.COM>
To: George Balazs <gbalazs@honlab.nmfs.hawaii.edu>
Subject: pop tarts from the past

The Pop-Tart Papers

JON CARROLL

I HAVE TASTED of the fruit of the tree of ignorance and lo, I am sorely troubled. I have joined America only to discover that it is coming apart. I have achieved oneness with my brothers and sisters born during the Nixon administration, and I have felt their pain.

The pain is on the roofs of their mouths. It is the Pop-Tart pain. The package warns of it explicitly. And I have said unto them, lo, there once was a green and golden land where food was not dangerous. Food was not a weapon.

I understand that my discussion here today might seem like the curious notes of a person who has just seen toothpaste emerge from a tube, or was striving to understand the diverse components of the common cheeseburger. Touchingly naive, perhaps, or so far behind the curve as to be a danger to society.

But, as I said last week, I had never eaten a Pop-Tart. It is the fastest- growing breakfast food in the world (not the actual Tart -- the category); it is the foodstuff of America on the go. It has apparently replaced the doughnut. What was the matter with the doughnut that it needed to be replaced?

I selected the blueberry Pop-Tart. In so doing, I actually selected:

Blueberry filling (corn syrup, dextrose, high fructose corn syrup, crackermeal, modified wheat starch, partially hydrogenated soybean oil, dried blueberries, dried grapes, citric acid, natural and artificial blueberry flavors, soy lecithin, red No. 40 and blue No. 2), enriched wheat flour, sugar, partially hydrogenated soybean oil, corn syrup, dried whey, dextrose, high fructose corn syrup, salt, leaven (baking soda, sodium acid pyrophosphate, monocalcium phosphate, calcium sulfate), corn cereal, water, gelatin, niacinamide, reduced iron, blue No. 1, blue No. 2, red No. 40, color added, vitamin A palmitate, pyridoxine hydrochloride (vitamin B6), riboflavin (vitamin B2), thiamin hydrochloride (vitamin B1) and folic acid.

The Tart laid bare.

IT IS ASTONISHING that so much stuff could go into a confection

that is barely thicker than a baseball card. Maybe that's why they have to reduce the iron; great chunky bits of iron would rise above the surface of the Pop-Tart and gouge holes in the delicate membranes of the mouth.

I had encountered Pop-Tarts only on television. There, they look plump as all get-out, oozing with marginally appealing colored goo. In real life, they are svelte little wallet-sized wafers rattling around in aluminum foil packets inside a box far too big for its contents.

Pop-Tarts are the color of the walls in veterans hospitals. They are smeared with a congealed frosting that resembles a substance that, were you to find it on the floor, you would take your cat to a veterinarian.

On top of the frosting are sprinkles of blue No. 2 and red No. 40. They taste a lot like integers.

INSIDE THE POP-TART is a strip of filling. The strip is a great deal thinner than, say, the layer of jam that an average person would put on a piece of toast. Indeed, it is hard to tell by taste alone when one has achieved enough inwardness to have reached the berryosphere, as breakfast cosmologists call it.

Pop-Tarts are space food. Pop-Tarts are what we'll eat on the moon. Desperately have I searched for an expiration date; there is none. Pop-Tarts are edible forever. After the apocalypse: cockroaches and Pop- Tarts.

They taste like lard-flavored cardboard. That is the whole truth. That won't matter on the moon, when the airless atmosphere plunges to minus 200 degrees. We'll be grateful for Pop-Tarts then; Pop- Tarts and a loaded revolver.

On the box it says: ''Carton made from 100% recycled paper. Minimum 35% post-consumer content.'' Prose from the moon! I can only pray that that eerie pink glow is the Exit sign.

It's so nice to encounter dried whey; it makes me remember Little Miss Muffett

This is Major Tom to Ground Control, I'm spinning in my suit, I'm eating one more Tart, I'm coming home again to you, sweet Marie. Is this thing on?

EPEDITION #41

22 Sept 95 Depart Lagoon drive ~8 AM - MAX,
Friday Bob Justman, Mark Rice.

Objectives

1.) Retrieve data loggers
2.) one Sat. tracks on female (or male)
3.) Gonads from dead hatchlings
4.) Blood from hatchlings for 1.) plasma - Thane sexing
2.) RBC's for DNA
5.) Skin biopsies for DNA
6.) Trace hatchling flippers
7.) Sample fish

Head Phone – Inner wire TO AF
outer wire to GND

Sea 222
(206) 771-2182

GND SPKR Remove AF

Head Phone

Kimberly Berger Sammish
1554 W. LK. Samm. PKWY. SE.
Bellevue, WA 98008
(206) 558-9088
~~(206) ? 5623198~~

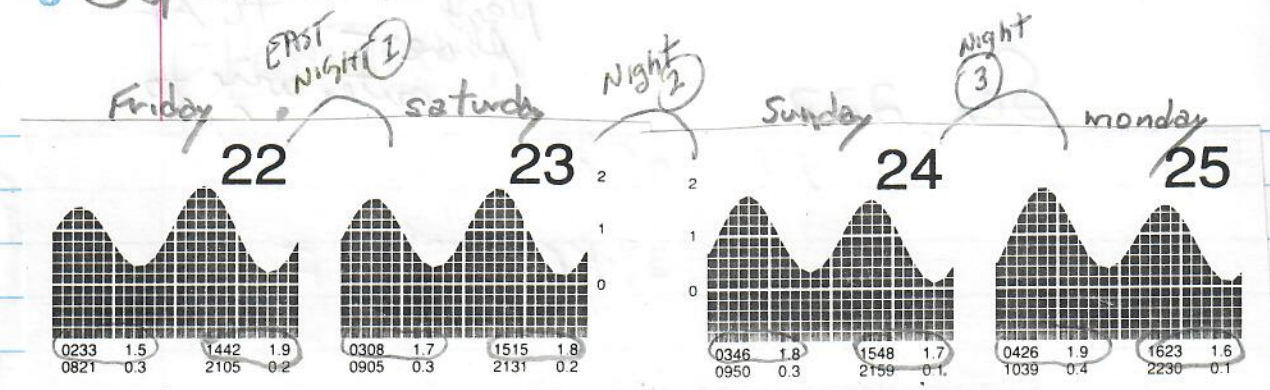
Until Nov. 17

USFWS-Tern Island
P.O. BOX 50167
Honolulu, HI 96850

Dremel TOR RUN April 1997

Dremel ID	TTL run 1	TTL run 2	mean run time	
Dremel 1	24	20	22	
Dremel 2	23	29	26	
189840	15	12	13.5	
189842	20	33	26.5	
189844	23	*	23	not charged for second run.
189841	23*	*	23	only runs on low.
189843	25	32	28.5	
~~return GHE~~	~~21~~	~~34~~	~~27.5~~	

6 September 95



1997

Hobodata loggers and Onset stowaways

Started 5/21/97, 1200-1210h

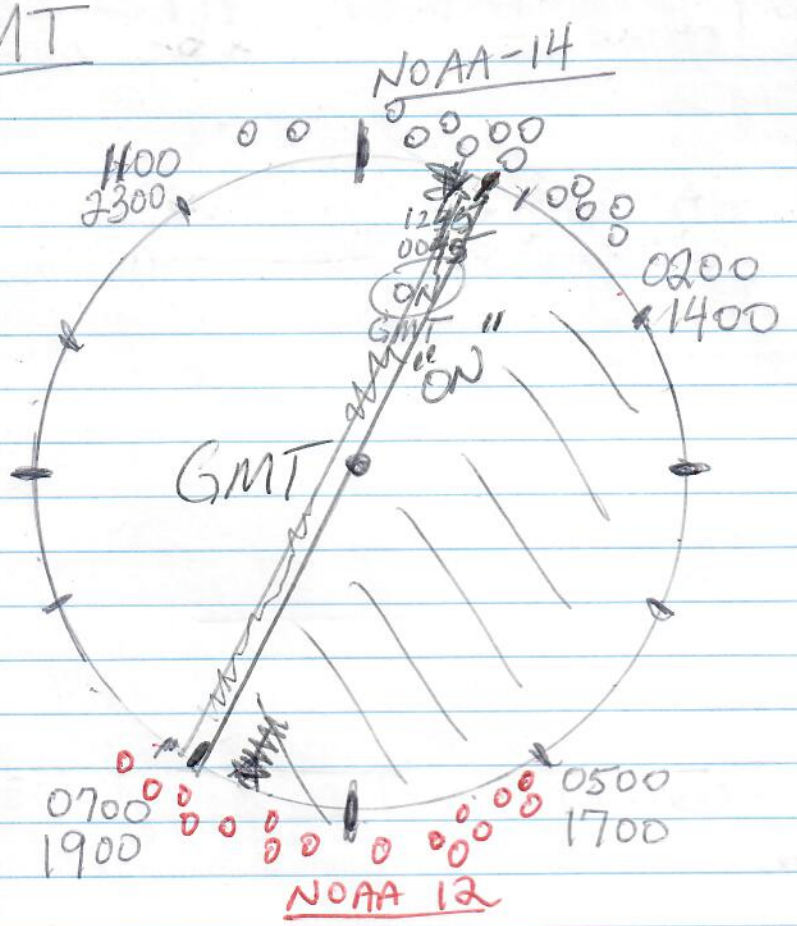
Hobologgers (3.2 hours = 240 days of data)

S/N #	Tag #	GHB ID
16592	BBA476	E1
17476	BBA471	E5
17475	BBA477	E3
17474	BBA475	E6
17473	BBA478	E4
17472	BBA499	E2
17471	BBA474	E8

Onset stowaways (3.2 hours = 1059 days of data)

S/N #	Tag #	GHB ID
71049	Z960	E7
122325	Z957	T3
122324	Z959	T2
71042	Z956	T4
0499	Z958	T1

PlOTS ARE
GMT



GMT − 10 hours = HST

GMT 1230 − 10 hours = 0245 OR 1445 HAWAII TIME
GMT 0030 − 10 hours =

EAST IS. 23.8 N 166.2 W

date	object	beacon	rise	tca	set	el
20Sep95	NOAA-14	1707.0000	00:22:34	00:30:21	00:38	82
20Sep95	NOAA-14	1707.0000	02:06:24	02:11:22	02:16	7
20Sep95	NOAA-11	1707.0000	02:51:50	02:55:16	02:58	3
20Sep95	NOAA-10	1698.0000	03:54:54	04:02:14	04:09	46
20Sep95	NOAA-11	1707.0000	04:27:09	04:34:51	04:42	62
20Sep95	NOAA-12	1698.0000	05:05:47	05:12:51	05:19	32
20Sep95	NOAA-10	1698.0000	05:36:07	05:42:10	05:48	13
20Sep95	NOAA-11	1707.0000	06:09:52	06:15:37	06:21	10
20Sep95	NOAA-12	1698.0000	06:46:03	06:52:46	06:59	21
20Sep95	NOAA-14	1707.0000	11:16:50	11:21:15	11:25	5
20Sep95	NOAA-14	1707.0000	12:54:24	13:02:22	13:10	83
20Sep95	NOAA-14	1707.0000	14:37:02	14:42:21	14:47	8
20Sep95	NOAA-11	1707.0000	15:22:33	15:24:57	15:27	1
20Sep95	NOAA-10	1698.0000	16:19:41	16:27:03	16:34	40
20Sep95	NOAA-11	1707.0000	16:58:09	17:06:03	17:13	60
20Sep95	NOAA-12	1698.0000	17:31:38	17:38:53	17:46	28
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20Sep95	NOAA-11	1707.0000	18:40:00	18:46:05	18:52	12
20Sep95	NOAA-12	1698.0000	19:11:42	19:18:40	19:25	24
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28Sep95	NOAA-11	1707.0000	16:59:57	17:07:50	17:15	60
28Sep95	NOAA-12	1698.0000	17:57:18	18:04:56	18:12	55
28Sep95	NOAA-10	1698.0000	18:07:15	18:13:17	18:19	14
28Sep95	NOAA-11	1707.0000	18:41:48	18:47:52	18:53	12
28Sep95	NOAA-12	1698.0000	19:38:28	19:44:25	19:50	12
28Sep95	NOAA-14	1707.0000	22:48:54	22:53:44	22:58	7

29Sep95	NOAA-14	1707.0000	00:25:51	00:33:39	00:41	88
29Sep95	NOAA-14	1707.0000	02:09:58	02:14:43	02:19	6
29Sep95	NOAA-11	1707.0000	02:43:36	02:44:56	02:46	0
29Sep95	NOAA-10	1698.0000	03:37:58	03:45:03	03:52	30
29Sep95	NOAA-11	1707.0000	04:16:44	04:24:20	04:31	46
29Sep95	NOAA-12	1698.0000	05:09:52	05:17:02	05:24	35
29Sep95	NOAA-10	1698.0000	05:18:05	05:24:48	05:31	21
29Sep95	NOAA-11	1707.0000	05:58:34	06:04:59	06:11	15
29Sep95	NOAA-12	1698.0000	06:50:26	06:57:00	07:03	18
29Sep95	NOAA-14	1707.0000	11:19:54	11:24:35	11:29	5
29Sep95	NOAA-14	1707.0000	12:57:43	13:05:40	13:13	88
29Sep95	NOAA-14	1707.0000	14:40:32	14:45:37	14:50	7
29Sep95	NOAA-10	1698.0000	16:02:39	16:09:46	16:16	27
29Sep95	NOAA-11	1707.0000	16:47:44	16:55:29	17:03	44
29Sep95	NOAA-12	1698.0000	17:35:47	17:43:09	17:50	32
29Sep95	NOAA-10	1698.0000	17:42:28	17:49:25	17:56	25
29Sep95	NOAA-11	1707.0000	18:29:03	18:35:39	18:42	17
29Sep95	NOAA-12	1698.0000	19:16:02	19:22:53	19:29	22
29Sep95	NOAA-14	1707.0000	22:39:13	22:43:05	22:46	4
30Sep95	NOAA-14	1707.0000	00:15:02	00:22:51	00:30	68
30Sep95	NOAA-14	1707.0000	01:58:12	02:03:48	02:09	9
30Sep95	NOAA-10	1698.0000	03:14:47	03:21:08	03:27	17
30Sep95	NOAA-11	1707.0000	04:04:40	04:12:03	04:19	34
30Sep95	NOAA-12	1698.0000	04:48:49	04:55:26	05:02	21
30Sep95	NOAA-10	1698.0000	04:53:21	05:00:37	05:07	38
30Sep95	NOAA-11	1707.0000	05:45:41	05:52:34	05:59	21
30Sep95	NOAA-12	1698.0000	06:28:00	06:35:10	06:42	32
30Sep95	NOAA-14	1707.0000	11:10:11	11:13:40	11:17	3
30Sep95	NOAA-14	1707.0000	12:46:53	12:54:51	13:02	69.
30Sep95	NOAA-14	1707.0000	14:29:08	14:34:57	14:40	10
30Sep95	NOAA-10	1698.0000	15:39:17	15:45:33	15:51	14
30Sep95	NOAA-11	1707.0000	16:35:34	16:43:06	16:50	32
30Sep95	NOAA-12	1698.0000	17:14:35	17:21:20	17:28	19
30Sep95	NOAA-10	1698.0000	17:18:02	17:25:27	17:32	45
30Sep95	NOAA-11	1707.0000	18:16:23	18:23:25	18:30	22
30Sep95	NOAA-12	1698.0000	18:53:55	19:01:17	19:08	36
30Sep95	NOAA-14	1707.0000	22:29:56	22:32:27	22:34	1

NOAA 12 = 16 good passes
NOAA 14 = 14 " "

See p. 49 previous gray book

9/22/95 ~2pm

4 Data loggers excavated on TERN

+10 cm in place 130pm

in place BBA 500 17470 just east of Tern #2

in place BBA 479 16593 just before pole Tern #4

BBA 472 17468 — Tern #1 (tennis court)

+ 1 unit found, but not screen and nylon, eroded = BBA 480 16591

Moved by resting ~~turtles~~ shallow

ALL 12 Loggers Records every 3.2 hours (up to 240 days)

43 HATCHLINGS MEASURED AT
EAST ISLAND, FRENCH FRIGATE SHOALS,
SEPTEMBER 22-25, 1995

STRAIGHT CARAPACE LENGTH (mm)	CURVED CARAPACE LENGTH (mm)
48.4	50.0
49.4	52.0
48.3	50.0
48.9	52.0
51.7	54.0
48.7	50.0
50.2	51.0
52.1	55.0
52.3	53.0
51.5	55.0
50.6	52.0
51.4	54.0
50.9	54.0
51.6	53.0
51.5	52.0
52.6	55.0
50.5	52.0
50.8	52.0
51.6	53.0
48.7	50.0
50.0	52.0
51.1	54.0
52.2	53.0
51.2	53.0
48.4	51.0
44.3	47.0
48.0	49.0
50.4	51.0
47.0	48.0
48.8	51.0
45.4	48.0
51.0	54.0
52.4	55.0
53.1	56.0
51.4	54.0
51.7	55.0
53.2	55.0
52.6	54.0
53.0	56.0
50.7	52.0
53.9	55.0
52.8	54.0
52.1	53.0

1245 GMT 9/23/95 → "ON" 0245 HST 9/23/95 #22132

9/23/95 Saturday

P 22132

JUNE 1995 MOTOTOOL = "62" → 4th Cat RIGHT
white paint still visible
ST 3 60N, 60off
Sym 209043

CCL = 106 cm
SCL = 98.0
TRANSMITTER - Refur 6/95
LFL A770 ~~6/13/95~~
RFL A771
TYGON - full length on antenna.

TAGGED NESTING EAST 6/11/95

RH U773* ← DNA ID Label
LH A769

EAST Is. DNA 6mm skin biopsy left shoulder labeled "62" into powdered salt

Deploy = Release SEP 1:05 PM 9/23/95 Sat.
GMT = 2305 9/23/95

went to EWA Beach Oahu area

"FINISH" Resin used as last coat. Delayed due to lack of fiberglass cloth - Steve Barkley brought it in from Tern.
Above turtle found false nesting ~ 1130 pm SEP. Large quantity of sand shoveled against sides of box to prevent turtle from tipping box over.
No other turtles up this night.

BROWN CARD IN RESIN = "22132"
CALL 808-943-1240
808-395-6409

Turtle very calm in box - very little moving around.

MOTOTOOL 62 = ORIGINALLY ENCOUNTERED 1995 =

ORIGINALLY TAGGED =

- LIGHTS

Need - - Small cryovials
- Table & full-size chairs that do not sag in butt!
Small Refrigerator that runs on Propane
- Constant flow pipette.
- hatchling tags for Tern/EAST
Turtle Material for Kimberly Berger
- "BARNACLE ID
- "PEARLESCENT" color of blood (w/neon?)
- PLASMA/PACKED Cell RATIO =

Date: Wed, 27 Sep 1995 13:03:02 -1000 (HST)
From: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
To: Thane Wibbels <BIOF009%UABDPO.BITNET@cmsa.Berkeley.EDU>
Subject: Fedex #~~4434131531~~ 6837595365

Thane- It goes out in a few hours. The following is sample list for plasma in the cryovials:

Clutch	No. hatchlings	Vial nos.
1	13	13-15
2	6	28-33
3	10	43-52
4	9	53-61
5	4	62-65
6	9	69-77
7	6	78, 80-84

There are also 16 cryovials for individual hatchlings, not associated with one another in a clutch, that were collected. In addition, the fedex contains 1.6 cc microcentrifuge tubes containing packed cells with SDS added. The numbers on these vials matches up with the plasma samples.

Data loggers, and downloaded data, will be sent to you separately so you can see results and re-check calibation. All 12 loggers recorded data, however, a couple were dug up by nesting turtles, therefore measured the elevated surface temperatures. We've just now finished graphing data for Tern Island (clean white coral sand) and I'm very suprised at how low the overall temperatures were (not over 27 degrees).

Best regards, George

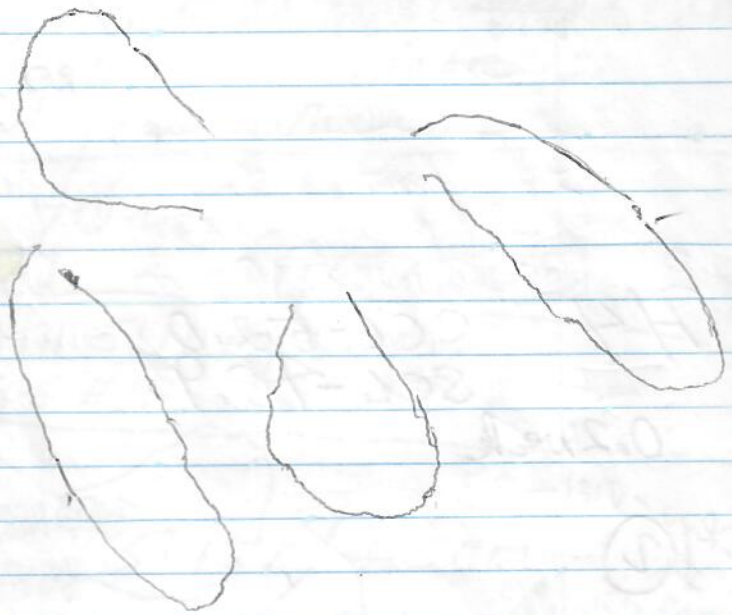
85 & 86 > POOLED -
34 & 36 > Retained in A2

---

43 CCL/SCL
+ 6 TRACING

HATCHING found on Island traced 9/23 SAT. AM AT CAMP.
Heart punctures Taken

9/22 AM - 9/23 PM H1 CCL-50.0
SCL 48.4



H2 CCL-52.0
SCL-49.4

Lithium Heparin granuals

Packed cells centrifuge in 1.6cc vial stored w/ SDS solution

PLASMA taken after 5-10 min spin in micro centrifuge → into liquid nitrogen

SAT. MORNING
9/23/95

0.2cc heart

H3 cryo-vial #1

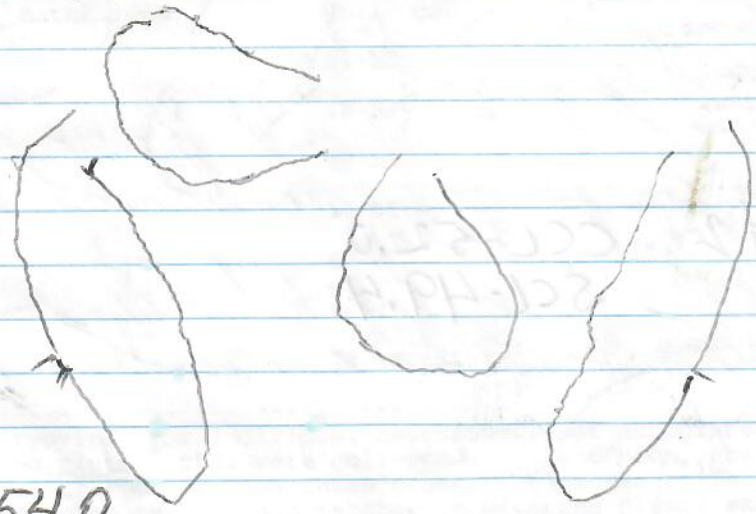
CCL- 50.0
SCL - 48.3

H4

CCL-52.0
SCL-48.9

0.2 neck

cryo-vial #2



H5 cryo vial #3

CCL- 54.0
SCL- 51.7
0.2 neck

EAST 5/8" 25 gauge
1/2" 26 gauge 9/23/95

DATALOGGER EXCAVATION - Saturday late afternoon

9/23/95 E1 (1) 16592 FF2 BBA474 (5pm) out (+10cm) ∴ 60cm

* (2) 17472 E2 BBA499 FFS#8 Denise 5:05 P out ~~[illegible]~~ 50cm west of stake ∴ reburied by others

(8) E8 BBA478 2STAKES 17471 50cm (FFS#7 Denise)

E3 (3) 17475 BBA471 FFS #11 5:10P / 50cm

* (4) 17473 ~~[illegible]~~ 5:15P / +5cm ∴ 55cm
E4 FFS#9 ~~BBA~~ west of stake reburied by others

E5 (5) (BBA475) + Blue Tag # FFS#12
17476 5:24P 50cm

E6 (6) (BBA477) = Blue Tag # 5:40P / 50+cm 17474

site washed wet? from waves (7) BBA473 (17469) DEPTH = _____ need measure to knot
E7 Tied to STAKE - WATERS edge ~ 12469 FFS 5

30

ALL NECK

9/23/95 SAT. 8:30pm [IN TURTLE BOX for Bleeding/LAB]

CRYO VIAL

4 unnotable → steve found wandering (single)

5 "

6 Blood bright red-pink color [DUE COLOR TO NEON LIGHT?]

7 unnotable

8 Blood bright red-pink color

9

10

11

12 ← clutch # 1

Assume individuals not same clutch

0.2 cc from each

13 – Different Clutch – picked up on N-E end at 2200hrs. 9/23/95 SATURDAY

TO 25 — 13 turtles

9/24/95 Sunday 10 am ↓ excavated hatchlings

26 > nearest to Data Log "6"

27

28 – 33 ← Clutch #2 6 Turtles

34 > combined sample from 3 turtles (for diagnostic Test) FIBRO PAPILLOMA

35

36 " " " 5 " " " "

NO VIAL w/39 — 39 sample indiscarded " " " "

CLUTCH #3 → New Clutch nearest data log "7"

43 → 52 10 Turtles

New clutch – data log "7"

53 – 61 ← clutch 4 9 Turtles

9/24/95 Sunday

1800 hrs. CLUTCH 5 4 Turtles

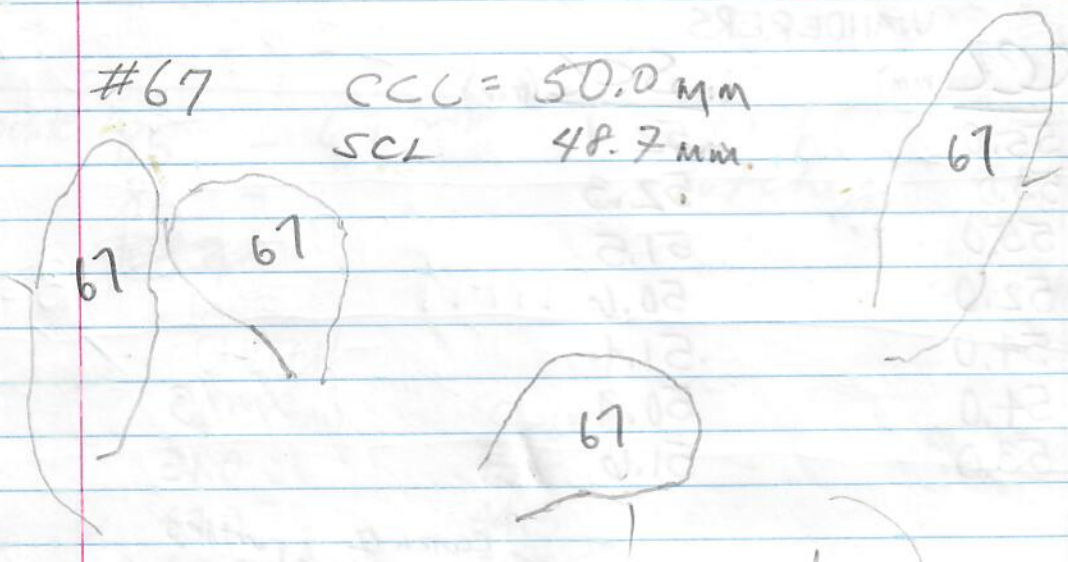
62 – 65 → By data Logger #2

66, → 67

Individuals picked up on the ground in vegetation (south End)

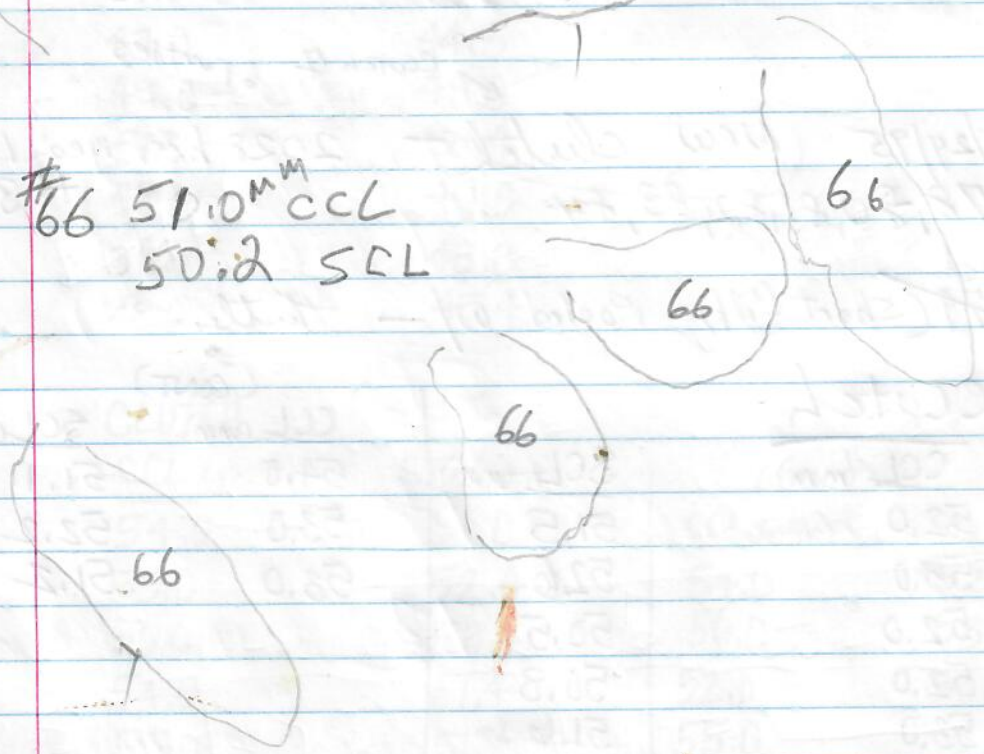
#67 CCL = 50.0 mm

SCL 48.7 mm.



#66 51.0 mm CCL

50.2 SCL



9/24/95 PM

Thrown out

NO VIAL WITH 68

#68 Wanderer (+ Pooled = ~~Turtles~~)

TAGS
G401 - G501 Days
G301 - 400

New clutch – near Logger #3

clutch 6

69-77 – 9 Turtles

WANDERERS

CCL (mm)	SCL (mm)
55.0	52.1
53.0	52.3
55.0	51.5
52.0	50.6
54.0	51.4
54.0	50.9
53.0	51.6

clutch 7 6 Turtles

9/24/95 New clutch – 2028 hrs. near Logger #3
78, 80, 81, 82, 83, 84

79 missing
Discarded
~~79~~ (short fill) Pooled w/ – turtles

NO vial 79

clutch

CCL (mm)	SCL (mm)
52.0	51.5
55.0	52.6
52.0	50.5
52.0	50.8
53.0	51.6
50.0	48.7
52.0	50.0

(CONT)

CCL (mm)	SCL (mm)
54.0	51.1
53.0	52.2
53.0	51.2

9/24/95 Sunday AM
0010
False crawl nesting on SP
CCL = 98cm
TAGS Applied = G411 RFL
G412 LFL
G413 LH
G414 RH

Composite 85 - 6 Turtles same clutch
86 - 2 clutches for fibropapillomas
Diagnostic testing

CLUTCH

CCL (mm)	SCL (mm)
51.0	48.4
47.0	44.3
49.0	48.0
51.0	50.4
48.0	47.0
51.0	48.8
48.0	45.4

CLUTCH

CCL (mm)	SCL (mm)
54.0	51.0
55.0	52.4
56.0	53.1
54.0	51.4
55.0	51.7
55.0	53.2

(CONT)

CCL (mm)	SCL (mm)
54.0	52.6
56.0	53.0
52.0	50.7
55.0	53.9
54.0	52.8
53.0	52.1

EXPEDITION #41

9/25/95 Depart EAST ~ 1030AM.
Monday Steve Barkley picks us up.

Depart Tern 1PM.

Weeds on East.

Summary

		No. hatchling Turtles	Vials
Clutch	1	13	(#13-25)
	2	6	(#28-33)
	3	10	(#43-52)
	4	9	(#53-61)
	5	4	(#62-65)
	6	9	(#69-77)
	7	6	(#78, 80-84)
		57	
		+	
Misc. individuals =		16	
		73	TOTAL PLASMA

+ 4 composite VIACs

22132 Deployed 9/23/95 2305 Hours

25

9 Months Transmission

IN TENT

22132 Date : 23.09.95 14:10:24 LC : 3 IQ : 60
Lat1 : 23.788N Lon1 : 166.210W
235 00 00 00
00 00

22132 Date : 23.09.95 18:13:45 LC : 1 IQ : 58
Lat1 : 23.781N Lon1 : 166.187W
240 00 00 00
00 00

ON TURTLE IN THE SEA

22132 Date : 24.09.95 05:22:14 LC : B IQ : 00
Lat1 : 23.834N Lon1 : 166.185W
243 1020 00 00
00 00

22132 Date : 26.09.95 01:05:21 LC : 0 IQ : 50
Lat1 : 23.824N Lon1 : 166.162W
248 144 243 87
00 01

22132 Date : 26.09.95 06:21:35 LC : 3 IQ : 68
Lat1 : 23.871N Lon1 : 166.242W
241 25 211 87
00 00

22132 Date : 26.09.95 13:37:23 LC : 2 IQ : 58
Lat1 : 23.866N Lon1 : 166.223W
241 71 34 566
01 06

22132 Date : 26.09.95 17:08:09 LC : 2 IQ : 68
Lat1 : 23.864N Lon1 : 166.208W
240 63 34 566
00 00

22132 Date : 27.09.95 00:55:21 LC : 2 IQ : 58
Lat1 : 23.833N Lon1 : 165.967W
248 51 49 236
00 00

22132 Date : 27.09.95 13:21:10 LC : B IQ : 00
Lat1 : 23.498N Lon1 : 165.769W
242 18 53 394
00 01

22132 Date : 27.09.95 16:47:03 LC : B IQ : 00
Lat1 : 23.631N Lon1 : 165.718W
241 90 53 394
00 00

22132 Date : 27.09.95 18:28:52 LC : A IQ : 00
Lat1 : 23.605N Lon1 : 165.637W
243 55 53 394
00 00

22132 Date : 28.09.95 13:10:10 LC : B IQ : 00
Lat1 : 23.190N Lon1 : 165.436W
242 55 67 4192
00 40

Date: Thu, 28 Sep 1995 06:27:47 -1000
From: Thane Wibbels <biof009@uabdpo.dpo.uab.edu>
To: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
Subject: Re: Pivotal temp.

Here are a few data points on pivotals, but realize that pivotals are probably variable between populations (if not between clutches).

Morreale et al.1983 Science 216:1245, in greens from Tortuguero found that nests averaging less than 28 C produced males and those greater than 29.5 produced mostly females.

Spotila et al., 1987 Herpetolgica 43: 74, in greens from Tortuguero found that nests less than 28.5 produced males and those greater than 30.3 C produced females.

The advent of the small dataloggers will probably greatly increase our ability to determine accurate pivotal (i.e. we have a lot of research to do).

22132 Date : 28.09.95 14:56:39 LC : A IQ : 07
Lat1 : 23.210N Lon1 : 165.384W
242 10 83 246
00 02

22132 Date : 28.09.95 18:04:09 LC : 1 IQ : 50
Lat1 : 23.302N Lon1 : 165.345W
242 35 83 246
00 00

22132 Date : 29.09.95 02:14:38 LC : B IQ : 00
Lat1 : 23.124N Lon1 : 165.240W
245 115 117 172
00 00

22132 Date : 29.09.95 05:18:11 LC : 1 IQ : 56
Lat1 : 23.112N Lon1 : 165.211W
240 272 117 172
00 00

22132 Date : 29.09.95 17:43:59 LC : 2 IQ : 50
Lat1 : 22.899N Lon1 : 165.079W
242 44 68 298
00 00

22132 Date : 30.09.95 04:54:37 LC : 1 IQ : 56
Lat1 : 22.671N Lon1 : 164.956W
245 67 104 199
00 00

22132 Date : 30.09.95 06:40:48 LC : B IQ : 00
Lat1 : 22.520N Lon1 : 164.833W
240 821 104 199
00 00

22132 Date : 30.09.95 12:59:26 LC : A IQ : 08
Lat1 : 22.616N Lon1 : 164.987W
241 30 79 263
00 00

22132 Date : 30.09.95 17:18:43 LC : A IQ : 00
Lat1 : 22.446N Lon1 : 164.740W
241 116 79 16391
00 24

22132 Date : 01.10.95 01:53:10 LC : A IQ : 08
Lat1 : 22.229N Lon1 : 164.584W
244 104 100 207
00 00

22132 Date : 01.10.95 04:30:58 LC : 0 IQ : 58
Lat1 : 22.161N Lon1 : 164.532W
241 87 100 207
00 00

22132 Date : 02.10.95 14:09:30 LC : B IQ : 00
Lat1 : 21.624N Lon1 : 163.966W
241 05 76 262
00 01

22132 Date : 02.10.95 18:17:58 LC : A IQ : 00
Lat1 : 21.642N Lon1 : 163.994W
241 94 68 8318
02 00

22132

X = plot it please

X 22132 Date : 03.10.95 17:53:52 LC : A IQ : 00
Lat1 : 21.373N Lon1 : 163.845W
242 116 57 335
00 00

22132 Date : 04.10.95 01:19:58 LC : A IQ : 08
Lat1 : 21.327N Lon1 : 163.761W
245 82 126 164
00 00

X 22132 Date : 04.10.95 13:49:59 LC : 0 IQ : 50
Lat1 : 21.176N Lon1 : 163.742W
241 30 87 239
00 00

X 22132 Date : 05.10.95 01:07:59 LC : 2 IQ : 58
Lat1 : 21.155N Lon1 : 163.626W
246 16 136 151
00 00

X 22132 Date : 05.10.95 04:46:41 LC : 2 IQ : 66
Lat1 : 21.140N Lon1 : 163.611W
241 75 136 151
00 00

X 22132 Date : 05.10.95 06:26:18 LC : 1 IQ : 58
Lat1 : 21.123N Lon1 : 163.588W
241 12 136 151
00 01

22132 Date : 05.10.95 17:12:29 LC : 0 IO : 50
Lat1 : 21.060N Lon1 : 163.501W
242 05 80 255
00 00

X 22132 Date : 06.10.95 00:57:33 LC : 3 IQ : 68
Lat1 : 21.029N Lon1 : 163.410W
246 47 116 176
00 00

22132 Date : 06.10.95 13:25:50 LC : 0 IQ : 60
Lat1 : 21.068N Lon1 : 163.342W
241 07 101 207
00 02

22132 Date : 06.10.95 18:32:40 LC : A IQ : 00
Lat1 : 20.974N Lon1 : 163.155W
243 105 101 207
00 01

X 22132 Date : 07.10.95 00:50:10 LC : B IQ : 00
Lat1 : 20.957N Lon1 : 163.035W
246 94 119 172
00 00

22132 Date : 07.10.95 04:01:58 LC : B IQ : 00
Lat1 : 20.934N Lon1 : 163.003W
242 131 119 172
00 00

22132 Date : 08.10.95 05:19:22 LC : 1 IQ : 50
~~Lat1 : 22.881N Lon1 : 152.605W~~ Lat2 : 20.763N Lon2 : 162.511W
240 16 125 163
00 00

22132 Date : 10.10.95 01:55:08 LC : 0 IQ : 58
Lat1 : 20.504N Lon1 : 161.479W
241 32 128 160
00 00

22132 Date : 10.10.95 04:35:43 LC : 2 IQ : 60
Lat1 : 20.542N Lon1 : 161.406W
240 46 128 160
00 00

22132 Date : 10.10.95 12:51:26 LC : Z IQ : 10
Lat1 : 20.749N Lon1 : 161.588W Lat2 : 20.886N Lon2 : 162.217W
239 35 91 199
00 01

22132 Date : 10.10.95 17:03:05 LC : B IQ : 00
Lat1 : 20.689N Lon1 : 160.990W
239 97 91 199
00 00

22132 Date : 10.10.95 18:43:58 LC : B IQ : 00
Lat1 : 20.711N Lon1 : 160.935W
240 161 83 10406
01 36

22132 Date : 11.10.95 01:43:05 LC : B IQ : 00
Lat1 : 20.812N Lon1 : 160.765W
242 154 113 182
00 02

22132 Date : 11.10.95 14:15:03 LC : A IQ : 00
Lat1 : 20.837N Lon1 : 160.948W
240 08 92 224
00 01

22132 Date : 11.10.95 16:41:58 LC : 0 IQ : 50
Lat1 : 21.044N Lon1 : 160.516W
240 06 92 224
00 01

22132 Date : 11.10.95 18:21:28 LC : 1 IQ : 58
Lat1 : 21.103N Lon1 : 160.478W
243 67 94 224
00 00

Plot 22132 Date : 12.10.95 01:32:42 LC : 0 IQ : 58
Lat1 : 21.211N Lon1 : 160.325W
243 148 109 188
00 00

22132 Date : 12.10.95 05:35:15 LC : Z IQ : 10
Lat1 : 20.914N Lon1 : 161.733W Lat2 : 21.313N Lon2 : 159.995W
240 05 109 188
00 01

22132

22132 Date : 12.10.95 14:05:22 LC : A IQ : 00
Lat1 : 21.383N Lon1 : 160.004W

240 10 82 250
00 01

22132 Date : 12.10.95 17:57:17 LC : Z IQ : 10
Lat1 : 21.139N Lon1 : 159.113W

241 53 82 250
00 00

Plot

22132 Date : 13.10.95 01:22:49 LC : 2 IQ : 68
Lat1 : 21.384N Lon1 : 159.762W

243 105 99 207
00 00

22132 Date : 13.10.95 05:09:33 LC : 0 IQ : 50
Lat1 : 21.381N Lon1 : 159.670W

240 929 2147 207
00 00

22132 Date : 14.10.95 01:07:48 LC : A IQ : 00
Lat1 : 21.293N Lon1 : 159.375W

244 88 94 218
00 00

22132 Date : 14.10.95 04:46:52 LC : 0 IQ : 50
Lat1 : 21.294N Lon1 : 159.353W

239 08 94 218
00 00

22132 Date : 14.10.95 06:34:00 LC : B IQ : 00
Lat1 : 21.271N Lon1 : 159.295W

239 915 94 218
00 01

Plot

22132 Date : 14.10.95 17:17:08 LC : 2 IQ : 50
Lat1 : 21.340N Lon1 : 159.049W

240 99 73 275
00 00

22132 Date : 15.10.95 01:00:41 LC : A IQ : 08
Lat1 : 21.428N Lon1 : 158.860W

245 98 114 182
00 00

22132 Date : 15.10.95 04:26:19 LC : 0 IQ : 58
Lat1 : 21.424N Lon1 : 158.781W

241 52 114 182
00 00

22132 Date : 15.10.95 06:13:52 LC : B IQ : 00
Lat1 : 21.093N Lon1 : 158.487W

241 967 114 182
00 00

Plot

22132 Date : 15.10.95 16:55:06 LC : 2 IQ : 66
Lat1 : 21.477N Lon1 : 158.480W

241 78 86 236
00 00

22132

Plotted

22132 Date : 15.10.95 18:34:00 LC : 1 IQ : 58
Lat1 : 21.487N Lon1 : 158.442W
243 67 86 236
00 00

Plotted

22132 Date : 16.10.95 18:13:26 LC : 1 IQ : 50
Lat1 : 21.460N Lon1 : 158.263W
244 181 90 222
00 00

22132 Date : 17.10.95 13:10:16 LC : B IQ :
Lat1 : 21.289N Lon1 : 158.020W
239 157 93 223
00 00

22132 Date : 18.10.95 05:01:40 LC : B IQ : 00
Lat1 : 21.310N Lon1 : 158.014W
241 236 144 148
00 00

22132 Date : 19.10.95 06:18:30 LC : B IQ : 00
Lat1 : 21.307N Lon1 : 158.032W
240 109 204 104
00 01

22132 Date : 19.10.95 17:08:09 LC : B IQ : 00
Lat1 : 21.307N Lon1 : 158.054W
238 236 194 108
00 00

22132 Date : 19.10.95 18:44:05 LC : B IQ : 00
Lat1 : 21.212N Lon1 : 157.973W
240 71 194 108
00 02

22132 Date : 20.10.95 05:55:53 LC : B IQ : 00
Lat1 : 21.360N Lon1 : 157.982W
239 371 193 108
00 00

✓ 1 22132 Date : 20.10.95 16:42:14 LC : B IQ : 00
Lat1 : 21.222N Lon1 : 158.141W
237 295 288 72
00 01

✓ 2 22132 Date : 21.10.95 03:56:46 LC : B IQ : 00
Lat1 : 21.298N Lon1 : 158.098W
240 202 205 102
00 00

✓ 3 22132 Date : 21.10.95 05:38:17 LC : B IQ : 00
Lat1 : 21.310N Lon1 : 158.010W
239 186 205 102
00 01

32

22132

4 22132 Date : 22.10.95 01:22:30 LC : B IQ : 00
Lat1 : 21.357N Lon1 : 157.972W
242 679 217 96
00 00

5 22132 Date : 22.10.95 17:47:25 LC : B IQ : 00
Lat1 : 21.408N Lon1 : 158.172W
236 776 231 90
00 00

6 22132 Date : 23.10.95 06:34:26 LC : B IQ : 00
Lat1 : 21.308N Lon1 : 157.920W
237 655 202 103
00 00

Plot

7 22132 Date : 24.10.95 04:29:29 LC : A IQ : 00
Lat1 : 21.374N Lon1 : 157.803W
240 1120 210 98
00 00

8 22132 Date : 24.10.95 16:59:30 LC : B IQ : 00
Lat1 : 21.305N Lon1 : 157.955W
239 302 169 122
00 01

9 22132 Date : 25.10.95 04:09:59 LC : B IQ : 00
Lat1 : 21.304N Lon1 : 158.022W
239 188 291 71
00 00

Plot

10 22132 Date : 25.10.95 16:36:16 LC : A IQ : 00
Lat1 : 21.301N Lon1 : 158.039W
235 94 198 105
00 00

11 22132 Date : 26.10.95 05:27:46 LC : B IQ : 00
Lat1 : 21.304N Lon1 : 158.035W
237 206 179 116
00 00

12 22132 Date : 26.10.95 17:51:39 LC : B IQ : 00
Lat1 : 21.252N Lon1 : 157.968W
236 457 195 106
00 00

13 22132 Date : 28.10.95 06:26:03 LC : A IQ : 00
Lat1 : 21.325N Lon1 : 158.001W
240 39 116 180
00 00

Plot

1 22132 Date : 28.10.95 06:26:03 LC : A IQ : 00
Lat1 : 21.325N Lon1 : 158.001W
240 39 116 180
00 00

2 22132 Date : 28.10.95 12:55:31 LC : B IQ : 00
Lat1 : 21.185N Lon1 : 157.957W
239 46 153 135
00 00

3 22132 Date : 28.10.95 18:47:09 LC : A IQ : 00
Lat1 : 21.414N Lon1 : 158.312W
240 720 153 135
00 00

4 22132 Date : 29.10.95 06:00:24 LC : A IQ : 00
Lat1 : 21.305N Lon1 : 158.018W
241 86 102 204
00 00

5 22132 Date : 29.10.95 16:53:37 LC : A IO : 08
Lat1 : 21.355N Lon1 : 158.137W
238 405 180 113
00 00

plot 6 22132 Date : 30.10.95 05:43:45 LC : A IQ : 00
Lat1 : 21.280N Lon1 : 158.114W
236 105 140 145
00 00

7 22132 Date : 30.10.95 16:27:12 LC : B IQ : 00
Lat1 : 21.300N Lon1 : 158.127W
235 149 168 121
00 00

8 22132 Date : 31.10.95 14:01:43 LC : A IQ : 00
Lat1 : 21.299N Lon1 : 158.027W
235 20 1178 49152
03 08

plot 9 22132 Date : 01.11.95 06:39:00 LC : A IQ : 00
Lat1 : 21.373N Lon1 : 157.945W
236 911 81 259
00 00

10 22132 Date : 02.11.95 04:34:52 LC : A IQ : 08
Lat1 : 21.342N Lon1 : 158.007W
238 66 163 123
00 00

9 22132 Date : 01.11.95 17:23:34 LC : A IQ : 08
Lat1 : 21.278N Lon1 : 158.029W
237 251 217 93
00 00

11 22132 Date : 02.11.95 17:00:24 LC : B IQ : 00
Lat1 : 21.308N Lon1 : 157.926W
236 308 261 77
00 00

plot 12 22132 Date : 03.11.95 16:41:27 LC : A IQ : 00
Lat1 : 21.307N Lon1 : 157.988W
240 124 114 180
01 00

plot 13 22132 Date : 05.11.95 13:07:50 LC : A IQ : 00
Lat1 : 21.304N Lon1 : 158.019W
239 90 155 131
00 00

plot 22132 Date : 06.11.95 12:57:59 LC : 0 IQ : 50
Lat1 : 21.339N Lon1 : 158.009W
239 27 89 231
00 00

plot 22132 Date : 08.11.95 05:45:22 LC : 2 IQ : 60
Lat1 : 21.306N Lon1 : 158.022W
241 82 80 264
01 00

22132

22132 Date : 08.11.95 18:13:50 LC : A IQ : 00
Lat1 : 21.239N Lon1 : 158.018W
239 06 107 192
00 02

22132 Date : 13.11.95 13:20:04 LC : A IQ : 08
Lat1 : 21.303N Lon1 : 158.027W
236 54 142 145
00 00

22132 Date : 15.11.95 04:53:15 LC : A IQ : 00
Lat1 : 21.307N Lon1 : 158.017W
236 138 98 212
00 00

22132 Date : 15.11.95 13:01:09 LC : A IQ : 08
Lat1 : 21.308N Lon1 : 158.018W
234 105 157 130
00 00

X 22132 Date : 19.11.95 05:06:19 LC : A IQ : 00
Lat1 : 21.291N Lon1 : 158.014W
239 252 85 248
00 00

22132 Date : 23.11.95 05:18:13 LC : A IQ : 00
Lat1 : 21.325N Lon1 : 157.943W Lat2 : 21.392N Lon2 : 157.622W
239 60 110 193
00 00

22132 Date : 26.11.95 05:54:04 LC : A IQ : 00
Lat1 : 21.325N Lon1 : 158.001W
236 05 107 194
00 01

22132 Date : 30.11.95 13:38:29 LC : 3 IQ : 60
Lat1 : 21.303N Lon1 : 158.025W
235 68 147 138
00 00

22132 Date : 02.12.95 05:21:29 LC : 1 IQ : 50
Lat1 : 21.307N Lon1 : 158.011W Lat2 : 20.947N Lon2 : 159.690W
236 57 157 132
00 00

22132 Date : 04.12.95 18:43:00 LC : A IQ : 00
Lat1 : 21.312N Lon1 : 158.015W
237 07 345 58
00 00

22132 Date : 11.12.95 16:14:48 LC : 0 IQ : 60
Lat1 : 21.238N Lon1 : 158.008W
237 11 162 124
00 01

22132 Date : 15.12.95 05:40:36 LC : 2 IQ : 50
Lat1 : 21.308N Lon1 : 158.021W
237 81 68 311
00 00

22132 Date : 18.12.95 18:45:18 LC : 0 IQ : 50
Lat1 : 21.296N Lon1 : 157.887W
236 1154 201 99
00 00

22132 Date : 22.12.95 06:27:33 LC : A IQ : 00
Lat1 : 21.302N Lon1 : 158.005W
237 49 106 197
00 00

22132 Date : 23.12.95 18:31:55 LC : 2 IQ : 60
Lat1 : 21.291N Lon1 : 157.940W
235 1205 123 164
00 00

22132 Date : 26.12.95 17:26:18 LC : A IQ : 00
Lat1 : 21.375N Lon1 : 158.076W
236 268 119 171
00 00

22132 Date : 27.12.95 17:09:12 LC : A IQ : 00
Lat1 : 21.306N Lon1 : 157.907W
237 411 132 153
00 00

22132 Date : 28.12.95 04:15:59 LC : 1 IQ : 50
Lat1 : 21.307N Lon1 : 158.013W
235 41 116 177
00 00

22132 Date : 28.12.95 13:36:28 LC : 2 IQ : 58
Lat1 : 21.300N Lon1 : 158.019W
234 40 121 167
00 00

22132 Date : 30.12.95 13:15:45 LC : 1 IQ : 50
Lat1 : 21.310N Lon1 : 157.999W
235 26 155 128
00 00

22132 Date : 31.12.95 17:20:21 LC : 0 IQ : 58
Lat1 : 21.305N Lon1 : 158.017W
234 113 164 119
00 00

22132 Date : 02.01.96 16:34:37 LC : 0 IQ : 50
Lat1 : 21.257N Lon1 : 158.033W
229 91 158 127
00 01

22132 Date : 05.01.96 17:07:47 LC : 0 IQ : 50
Lat1 : 21.300N Lon1 : 158.012W
233 37 230 85
00 00

22132 Date : 06.01.96 06:01:12 LC : 2 IQ : 50
Lat1 : 21.301N Lon1 : 158.028W
234 52 91 223
00 00

22132 Date : 07.01.96 13:30:29 LC : A IQ : 08
Lat1 : 21.313N Lon1 : 158.021W
231 84 275 72
00 00

22132 Date : 08.01.96 13:17:09 LC : 2 IQ : 50
Lat1 : 21.307N Lon1 : 158.018W
232 126 333 59
00 00

22132 Date : 10.01.96 16:59:39 LC : A IQ : 00
Lat1 : 21.300N Lon1 : 158.021W
232 80 232 84
00 01

22132 Date : 12.01.96 05:31:18 LC : A IQ : 00
Lat1 : 21.305N Lon1 : 158.028W
235 145 102 203
00 00

22132 Date : 13.01.96 17:40:20 LC : A IQ : 00
Lat1 : 21.342N Lon1 : 157.922W
237 556 138 148
00 00

22132 Date : 14.01.96 04:46:01 LC : A IQ : 00
Lat1 : 21.307N Lon1 : 158.020W
234 75 120 174
00 00

22132 Date : 15.01.96 13:44:18 LC : A IQ : 00
Lat1 : 21.298N Lon1 : 158.011W
234 68 223 89
00 00

22132 Date : 16.01.96 05:40:17 LC : A IQ : 00
Lat1 : 21.303N Lon1 : 158.024W
236 65 77 269
00 00

22132 Date : 18.01.96 04:57:08 LC : A IQ : 00
Lat1 : 21.353N Lon1 : 157.946W
236 32 198 101
00 00

22132 Date : 18.01.96 17:24:47 LC : B IQ : 00
Lat1 : 21.333N Lon1 : 158.052W
233 55 119 170
00 00

22132 Date : 19.01.96 17:05:20 LC : 1 IQ : 50
Lat1 : 21.286N Lon1 : 157.933W
233 05 223 89
00 02

22132 Date : 20.01.96 05:54:57 LC : 1 IQ : 50
Lat1 : 21.304N Lon1 : 158.022W
235 69 292 68
00 00

22132 Date : 22.01.96 17:43:46 LC : A IQ : 00
Lat1 : 21.358N Lon1 : 158.201W
236 08 115 177
00 02

22132 Date : 23.01.96 13:56:44 LC : B IQ : 00
Lat1 : 21.280N Lon1 : 157.884W
237 184 120 170
00 02

22132 Date : 09.01.96 13:07:56 LC : 1 IQ
Lat1 : 21.305N Lon1 : 158.028W
233 63 451 43
00 01

22132 Date : 08
Lat1

22132 Date : 20.01.96 16:46:26 LC : A IQ : 08
Lat1 : 21.295N Lon1 : 158.063W
233 31 117 172
00 00

22132 Date : 22.01.96 05:12:09 LC : 0 IQ : 50
Lat1 : 21.324N Lon1 : 157.991W
237 111 101 204
00 00

22132 Date : 24.01.96 13:44:46 LC : B IQ : 00
Lat1 : 21.301N Lon1 : 158.005W
236 158 97 212
00 01

22132 Date : 25.01.96 04:05:41 LC : B IQ : 00
Lat1 : 21.299N Lon1 : 158.012W
236 160 84 253
00 02

22132 Date : 25.01.96 13:35:38 LC : A IQ : 00
Lat1 : 21.306N Lon1 : 158.015W
201 608 11006 11391
01 26

22132 Date : 27.01.96 05:02:26 LC : 3 IQ : 66
Lat1 : 21.310N Lon1 : 158.016W
233 108 358 56
00 00

22132 Date : 27.01.96 17:29:43 LC : A IQ : 00
Lat1 : 21.301N Lon1 : 158.013W
232 90 122 165
00 00

22132 Date : 28.01.96 17:09:18 LC : 3 IQ : 60
Lat1 : 21.304N Lon1 : 158.025W
232 152 116 179
00 00

22132 Date : 29.01.96 16:48:01 LC : A IQ : 08
Lat1 : 21.305N Lon1 : 158.027W
231 53 283 70
00 01

22132 Date : 30.01.96 05:37:35 LC : A IQ : 00
Lat1 : 21.335N Lon1 : 158.028W
234 07 79 33032
00 00

22132 Date : 30.01.96 18:02:54 LC : A IQ : 00
Lat1 : 21.297N Lon1 : 158.143W
232 07 148 136
00 02

22132 Date : 01.02.96 06:36:02 LC : A IQ : 08
Lat1 : 21.329N Lon1 : 158.005W
230 50 190 106
00 00

22132 Date : 03.02.96 13:38:32 LC : 1 IQ : 50
Lat1 : 21.309N Lon1 : 158.016W
228 61 285 69
00 01

22132 Date : 03.02.96 16:37:31 LC : 1 IQ : 58
Lat1 : 21.290N Lon1 : 158.014W
227 32 285 69
00 00

22132 Date : 03.02.96 13:38:32 LC : 1 IQ : 50
Lat1 : 21.309N Lon1 : 158.016W
228 61 285 69
00 01

22132 Date : 03.02.96 16:37:31 LC : 1 IQ : 58
Lat1 : 21.290N Lon1 : 158.014W
227 32 285 69
00 00

22132 Date : 08.02.96 05:43:46 LC : A IQ : 00
Lat1 : 21.306N Lon1 : 158.018W
237 56 74 286
00 00

22132 Date : 08.02.96 16:29:00 LC : 0 IQ : 58
Lat1 : 21.310N Lon1 : 158.031W
233 73 122 165
00 00

22132 Date : 12.02.96 05:54:56 LC : A IQ : 00
Lat1 : 21.301N Lon1 : 158.012W
229 108 240 86
00 00

22132 Date : 15.02.96 06:26:42 LC : A IQ : 00
Lat1 : 21.337N Lon1 : 158.126W
227 21 121 173
00 00

22132 Date : 15.02.96 17:17:30 LC : A IQ : 00
Lat1 : 21.355N Lon1 : 157.989W
225 162 468 43
00 02

22132 Date : 16.02.96 16:55:08 LC : 1 IQ : 50
Lat1 : 21.301N Lon1 : 157.941W
226 269 8587 35266
03 00

22132 Date : 17.02.96 18:17:30 LC : 0 IQ : 60
Lat1 : 21.341N Lon1 : 157.852W
229 649 1110 2066
00 00

22132 Date : 20.02.96 06:20:09 LC : A IQ : 00
Lat1 : 21.286N Lon1 : 158.006W
222 43 234 88
00 00

22132 Date : 23.02.96 05:14:12 LC : B IQ : 00
Lat1 : 21.198N Lon1 : 158.379W
225 654 209 98
00 00

22132 Date : 24.02.96 17:22:26 LC : B IQ : 00
Lat1 : 21.337N Lon1 : 157.919W
224 180 253 79
00 01

22132 Date : 25.02.96 16:54:30 LC : B IQ : 00
Lat1 : 21.299N Lon1 : 157.985W
226 1365 230 88
00 00

22132 Date : 26.02.96 04:09:07 LC : B IQ : 00
Lat1 : 21.292N Lon1 : 158.080W
230 352 174 117
00 00

22132 Date : 01.03.96 16:46:24 LC : B IQ : 00
Lat1 : 21.288N Lon1 : 158.035W
228 06 163 124
00 01

22132 Date : 02.03.96 05:43:37 LC : B IQ : 00
Lat1 : 21.239N Lon1 : 157.881W
232 693 97 216
00 00

22132 Date : 05.03.96 13:04:35 LC : A IQ : 00
Lat1 : 21.293N Lon1 : 158.020W
228 38 159 128
00 00

22132 Date : 06.03.96 05:51:39 LC : A IQ : 00
Lat1 : 21.311N Lon1 : 157.994W
229 14 82 65270
02 00

22132 Date : 07.03.96 17:55:09 LC : B IQ : 00
Lat1 : 21.312N Lon1 : 158.098W
228 295 222 91
00 00

22132 Date : 09.03.96 01:26:38 LC : A IQ : 00
Lat1 : 21.389N Lon1 : 158.052W
231 05 173 121
00 02

22132 Date : 12.03.96 13:29:09 LC : A IQ : 00
Lat1 : 21.308N Lon1 : 158.020W
232 121 204 100
00 01

22132 Date : 19.03.96 06:11:25 LC : B IQ : 00
Lat1 : 21.301N Lon1 : 157.978W
232 229 83 254
00 01

22132 Date : 23.03.96 13:09:48 LC : A IQ : 00
Lat1 : 21.304N Lon1 : 158.027W
227 85 2554 39
00 00

22132 Date : 24.03.96 06:00:18 LC : A IQ : 00
Lat1 : 21.305N Lon1 : 158.023W
230 82 95 222
00 00

22132 Date : 28.03.96 04:31:05 LC : A IQ : 00
Lat1 : 21.297N Lon1 : 157.998W
232 77 124 165
00 00

22132 Date : 30.03.96 16:17:10 LC : 0 IQ : 50
Lat1 : 21.240N Lon1 : 157.960W
231 552 182 113
00 04

22132 Date : 05.04.96 06:39:43 LC : A IQ : 00
Lat1 : 21.350N Lon1 : 158.027W
237 40 62 338
00 00

22132 Date : 06.04.96 17:04:50 LC : A IQ : 00
Lat1 : 21.312N Lon1 : 158.026W
232 93 125 162
00 01

22132 Date : 11.04.96 13:05:54 LC : B IQ : 00
Lat1 : 21.306N Lon1 : 158.020W
234 28 143 139
00 00

22132 Date : 13.04.96 05:26:41 LC : B IQ : 00
Lat1 : 21.319N Lon1 : 158.002W
238 75 62 335
00 00

22132 Date : 14.05.96 01:15:34 LC : 1 IQ : 58
Lat1 : 21.309N Lon1 : 158.050W
238 713 24601 40767
02 44

22132 Date : 14.05.96 05:48:06 LC : 1 IQ : 58
Lat1 : 21.302N Lon1 : 158.018W
241 66 73 285
00 00

22132 Date : 15.04.96 17:05:50 LC : B IQ : 00
Lat1 : 21.301N Lon1 : 157.954W
234 813 255 78
00 00

22132 Date : 16.04.96 01:17:30 LC : B IQ : 00
Lat1 : 21.296N Lon1 : 157.995W
237 175 379 53
00 00

22132 Date : 24.04.96 14:04:38 LC : A IQ : 00
Lat1 : 21.313N Lon1 : 158.032W
237 37 104 190
00 00

22132 Date : 25.04.96 04:22:59 LC : A IQ : 00
Lat1 : 21.351N Lon1 : 158.014W
239 06 55 379
00 01

22132 Date : 27.04.96 13:31:00 LC : A IQ : 00
Lat1 : 21.312N Lon1 : 158.022W
237 81 110 180
00 00

22132 Date : 28.04.96 13:19:21 LC : A IQ : 00
Lat1 : 21.300N Lon1 : 158.044W
239 34 128 153
00 00

22132 Date : 04.05.96 06:08:02 LC : A IQ : 00
Lat1 : 21.244N Lon1 : 158.031W
235 151 93 223
00 00

22132 Date : 04.05.96 16:54:13 LC : A IQ : 08
Lat1 : 21.272N Lon1 : 158.050W
233 316 300 66
00 00

22132 Date : 04.05.96 18:36:16 LC : 0 IQ : 58
Lat1 : 21.299N Lon1 : 158.044W
235 901 300 66
00 00

22132 Date : 06.05.96 13:34:56 LC : 1 IQ : 50
Lat1 : 21.308N Lon1 : 158.021W
234 83 337 59
00 00

22132 Date : 13.05.96 13:58:21 LC : 1 IQ : 60
Lat1 : 21.314N Lon1 : 158.027W
237 110 100 202
00 00

22132 Date : 17.05.96 06:23:02 LC : A IQ : 00
Lat1 : 21.338N Lon1 : 158.003W
240 31 75 277
00 00

22132 Date : 17.05.96 13:16:53 LC : A IQ : 08
Lat1 : 21.327N Lon1 : 158.021W
239 107 340 58
00 00

22132 Date : 18.05.96 16:46:42 LC : A IQ : 00
Lat1 : 21.307N Lon1 : 158.023W
237 143 133 150
00 01

22132 Date : 21.05.96 04:55:18 LC : A IQ : 00
Lat1 : 21.320N Lon1 : 158.006W
242 38 68 308
00 00

22132 Date : 21.05.96 17:26:14 LC : A IQ : 00
Lat1 : 21.321N Lon1 : 157.865W
239 114 101 200
00 02

22132 Date : 23.05.96 13:50:32 LC : 0 IQ : 50
Lat1 : 21.306N Lon1 : 158.015W
241 19 168 119
00 02

22132 Date : 24.05.96 13:40:53 LC : A IQ : 00
Lat1 : 21.306N Lon1 : 158.022W
242 71 128 155
00 01

22132 Date : 25.05.96 13:28:40 LC : 1 IQ : 50
Lat1 : 21.305N Lon1 : 158.023W
240 45 149 134
00 00

22132 Date : 25.05.96 17:38:27 LC : B IQ : 00
Lat1 : 21.316N Lon1 : 158.113W
239 723 149 134
00 00

22132 Date : 02.06.96 01:10:27 LC : Z IQ : 00
Lat1 : ??????? Lon1 : ????????
240 20881 333 39577
02 58

22132 Date : 25.06.96 05:34:21 LC : Z IQ : 00
Lat1 : ??????? Lon1 : ????????
242 38 65 314
00 00

from late sept 95 TO MAY 96 (9 MONTHS)

42

22132 Date : 06.07.96 17:17:14 LC : Z IQ : 00
Lat1 : ??????? Lon1 : ????????
241 183 63282 18532
01 26

Date: Thu, 05 Jun 97 02:01:47 -0700
From: chuck_monnett@mail.fws.gov
To: gbalazs@honlab.nmfs.hawaii.edu
Subject: Tern Island activities

George--

Spoke with Tim today. He just got in from East. Everything is going well. He will send you some details/data via inmarsat.

In the mean time, he counted 47 turtles on 3 June and predicts a large increase in the next few days. He thinks it will be a good year based on what he is seeing.

He has recovered two sattelite tags:

Syst. 209043 22132
ST3 6/6 9/23/95
SCL 98.0

	Left hind	Right hind
Turtle #1	A769	U773
Turtle #2	U204	U205

A770, A771

4804
Syst. 5920
8/25/93
SL 90.4

1997

Date: Tue, 6 May 1997 06:21:21 -1000 (HST)
From: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
To: Marc Webber <marc_webber@mail.fws.gov>
Cc: Chuck Monnett <chuck_monnett@mail.fws.gov>,
Beth Flint <beth_flint@mail.fws.gov>
Subject: Mototool marks on Tern Island nesters

In the package that will be dropped off to you today will be two mototools, two chargers, two No.131 bits (one brand new, one used) a hawksbill scute for practice (with the number "T33" on it), four "touch up" paints (the kind with the brush inside), four cans of the kind of spray paint we have always used, and a dispenser container of betadine. The workers on Tern can select to use the kind of paint they like best (spray or brush). A drop of betadine should be placed on the end of the bit after each marking. Note that, as per East Island protocol, care should be taken to not mototool so deep that the scute is cut through. The engraving is only shallow, just deep enough to allow paint to settle into.

I will get back to you shortly on the probably scheduling for the flights in August. From the observations so far sent to me, it would appear that the season will not be a large one. George

1997

Date: Mon, 5 May 1997 06:35:58 -1000 (HST)
From: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
To: Marc Webber <marc_webber@mail.fws.gov>
Cc: Chuck Monnett <chuck_monnett@mail.fws.gov>,
Beth Flint <beth_flint@mail.fws.gov>,
Jerry Wetherall <jwethera@honlab.nmfs.hawaii.edu>
Subject: Suggested protocol for recording tagged turtles nesting on Tern Island

Corrected copy-- please use this version.

As promised, I present here protocol guidelines for achieving our high-priority Tern Island green turtle research objective for the 1997 nesting season, as agreed upon at our recent meeting. The objective can be stated as follows: "To estimate the number of turtles that change their island of nesting within French Frigate Shoals between nesting seasons as well as within a nesting season." Jerry Wetherall will use the resulting information to modify, as may be needed, certain assumptions in his model to monitor trends in the Hawaiian green turtle nesting population.

One of the factors motivating us to immediately pursue this work is the present near disappearance of Whale-Skate Island due to erosion, and the fact that a considerable number of nesting turtles had been tagged there during the 1980's. Nesting turtles have been extensively tagged on East Island since 1973. However, during recent years no checks have been made of turtles nesting on Tern Island to determine the degree of switching from East Island.

Protocol: One person should monitor the Tern Island south shore beach once nightly throughout the 1997 nesting season to encounter and examine as many nesting turtles as possible and appropriate. No disturbance to monk seals should occur. Each turtle will be checked for the presence of flipper tags. Tags that are found should be scrapped clean of fouling growth and the number (including alphabet prefix, if present) positively read and recorded. Only one tag on each turtle needs to be read, if there is no doubt as to the accuracy of the reading. Tags present on the hind flippers (when present) will be easier to read. The date, time and stage of nesting by the turtle should be recorded, along with any tumors that may be noted during the brief encounter to check for and read tags. It is not envisioned that it will be necessary for the person to wait for a particular stage of nesting to accomplish the tag check.

Each turtle encountered will also be examined briefly for the presence of a mototool engraved number on the fourth lateral scute of the right side of the carapace. Such numbers may be found any time after monitoring starts on East Island during late May or early June. If a fresh mototool number is seen, it should be recorded and no examination for the presence and reading of tags will be required.

All turtles that are encountered that do not have a fresh mototool number, whether flipper tags are present or not, should be given a mototool number. The number should be approximately 3-4 cm in height on the fourth lateral scute on the right side of the carapace. The numbers will be consecutive with a "T"-prefix. Paint will be applied to the engraving in the same manner as routinely conducted on East each season. The Dremel mototools, chargers and small containers of paint will be supplied to Marc Webber by GHB for immediate transport to Tern Island.

The monitoring walks on Tern should occur approximately one hour after high tide, except when high tide comes before dark (dark= sunset + 50 minutes). When the high tide comes before dark, the walk should occur 1-2 hours after dark. Note that tides at FFS are almost equal (8 minutes difference) to the basic tide values commonly published for Honolulu Harbor.

All of the above recommendations are subject to modification pending feedback from FWS personnel as the monitoring on Tern progresses and additional experience is gained doing the work.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*************************************
*       George H. Balazs, Leader    *
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*  National Marine Fisheries Service *
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*         2570 Dole Street          *
*   Honolulu, Hawaii 96822-2396 USA *
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George -

6/14/96

Please find enclosed 2 coolers of eggs, 8 eggs per cooler, for 16 eggs Total. Moto-Tool numbers and a Tag number is written on the cooler. These eggs were hand picked at the ~~moment~~ precice moment of their plumet from their mothers cloaca. Both sets of eggs were collected on June 4th 1996. They were buried to the top of the cooler on June 5th and a wet rag was placed ~~on top~~ inside the cooler on top of the soil. On june 13th they were dug up and slowly brought back to tern island. On tern they were kept inside the main building in a dark corner till being flown out on June 15th. Kim + I hope they reach you alive and healthy after their long and perilous journey.

I have also sent the sattalite tag from turtle J-91. This was retrived on June 9th with no problem. Tags from the turtle are

7560 LFL	97.5 cm CCL
7561 L34	91.5 cm SCL
7562 RFL	No Tumors
7563 R34	
7564 RHF	

We have finished taking all the biopsy samples you gave us bags for. If you want us to take more there is a flight on June 25th that you could send more salt bags on. Unless things slow down considerably I do not think we will have time for more biopsys. There were 66 turts up on 6/12, 70 on 6/13! We are both having very full nights getting all the turts identified. We are averaging 25-30 new id's each night. Kim + I are b- stunned that it is such an awesome year. Our goal is to get over 100 turts up in a night. Think we can do it?

One problem we are having is with tags. Hopefully everything get worked out and more tags are coming on the 15th. You gave us 600 tags originally. On 6/14 we had 160 left. There are 100 on Tern that we can also use. If the tags made it on the plane then this isn't a problem. If they did not get sent up then we can start conserving tags & hopefully get more up on the 25th. Sorry we didn't give you more warning but we didn't expect the turtles to take such a quick leap in numbers.

Kim & I are both doing great ~~the~~ out here. Kim has fallen over twice now trying to tag turtles and has both times landed on her butt in a turtle pit. She is very embarrassed about both instances so you should refer to it often. I have been pondering the question of whether La Perouse could be hollow with aliens living in it & secretly coming out at night to collect data on humans. Its great to be back on East island!

I should add that Kim has been doing a great job, especially with there being so many turtles to tag. I think she has tagged more than me. Next time I'm on East I am taking the good pliers & leaving her an old rusty pair!

Hope your having as much fun in the main islands as we are ~~out~~ out here.

Aloha,

Tim

Author: Joyce Sisson at ~NMFS-HONO
Date: 6/10/97 9:23 AM
Priority: Normal
TO: George Balazs
Subject: INMARSAT

Date: Tue, 10 Jun 1997 04:44:39 +0000 (GMT)
From: 493138280@msg.por
To: cus328@cbox.aor
ff2h014:GHB- East tags U128, U140, W268, 3152, F818, W503 8179,
8217, A581, G209, A769, A770,
A771, U773, 10544, 10545, A671, U763, A928, A929, A930, U179,
W691, W692, 8140, A211,
U303, U304, U576, U187, U188, W449, U838, U839, 10120, F704, F705,
F706, U215, 9681,
U141, U142, Y627, Y628, Y629, U219, U220, 6183, 6192, U63, U645,
U88, U89, U90, A273,
10188, U331, U344, 2231, U133, U134, W58, F749, F750, F807, U185,
U186, W80, 10347,
10348, F307, G100, G145, G146, W838, W839, F472, 9289, 9312, A734,
2692, 5244, 9243,
U83, A314, A376, U429, U549, 6695, F84, F85, A855, A277, A278,
A374, U471, U472, 9277,
9342, U425, U426, U321, U540, U542, U204, U205, F729, F756, F409,
F416, F417, A293, 13 55
A294, U558, U559, U535, U536, F952, W495, W498, F739, A224, A225,
U410, U160, U161,
A431, A742, 5340, U164, U683, U480, U481, W394, F249, F341, F342,
U988, 8181, 8182,
F188, A731, F141, F244, A648, A576, A577, W627, U324, W497,
3590, 8244, F820.
East turts up:new 5/30-6/7 23:23, 31:22, 31:16, 40:19, 47:23,
47:19, 64:35,48:27,
61:24.
Tern tags W891, W875, U198, A968, 9547, 1043, A995, 10445, W586, 13 81
3402, A953, F862,
W880, 10295, U324, U325, W889, W888, W857, A984, W989, 9148, W895, 13
86
U308, U305,
W761,
Tern turts up:new 5/26 - 6/8 2:2, 8:8, 11:10, 5:3, 4:3, 9:7, 12:7,
8:5, 13:6, 7:4, 8:5, 9:6,
14:7,18:11.A&T

Molo Molo Molo Molo Molo

0 = NOT IN database

Old tags from 6/8-6/11 JATA 11/8375,254

U452, U453 U564 W841 U609 3587 U55 U56 9346 9347 A500 3173 8215 8207 U687 U637 U684 U515 U516 U815 U781 U816 A373 U372 U361 W809 A846 U210 U211 U460 U461 F490 F494 F488 7951 7952 U391 U392 A216 4281 4270 10549 A837 A710 U771 9290 9270 A901 U826 W122 W123 F543 8249 8247 A631 10201 A892 U878 8158 A937 F721 F722 U250 U251 U350 U360 W755 W754 A329 A938 U349 U343 U495 U496 A572 6078 A847 F272 F587 U172 U173 5460 5459 7508 7506 7507 7505 U80 U81 W172 F204 G183 F205 10630 Y926 F759 F760 A322 A321 U402 U403 2235 3145 A610 F773 F774 F775 F776 A536 U981 A538 A537 F65 F66 F68 F67 F577 U612 U613 10084 10083 A842 A357 U766 W26 G143 U465 U464 10038 10042 F501 F716 F718 F717 A720 A784 U692 A749 A750 F160 A575 U459 3182 5291 3723 U322 U323 9263 9262 A695 A696 W727 U813 U812 U814 10270 10181 F712 F713 3777 5233 F5663807 3591 U711 U639 6055 6092 F331 F333 U326 U333 334 9528 9529 A627 U440 U441.

10/16/85 Paldau 80.0 SL

To: George Balazs, National Marine Fisheries Service June 14, 1997
From: Tim Clark, Tern Island
Re: Turtles

Hi George. The season is going real well. Tons of turtles up. Allison is up to moto #390. That's 350 turtles on East so far. We have had 90 turts on Tern.

We have found the two motos you sent ahead of us. They were in a box in the corner of the tag room. We now have plenty of engraving power, especially since the new turts up seem to have slowed down. We have under 200 tags left on East. That should get up through the season unless they decide to have a second surge of new turts up.

I am returning the two satellite tags. I wrote which turtle they came from on the end of the transmitter. Allison and I have agreed to split the bonus 50/50. Cash is preferable.

We have started doing the walks on tern at midnight each night. We feel that we are getting more turtles this way. Doing it one hour after high tide put the walks either too early or too late on half the walks.

I am sending copies of our daily totals so far. Also a list of old tags from East Island. Biopsies are about half done. We are waiting to finish them when the turtles slow down.

Data loggers went in the beginning of the season. I am not sure if all of them were working. I couldn't see the light on a couple of them. We may also have found the one lost last year. A turtle dug it up so I replaced it in case it is still recording data.

The basking beach is loaded. Usually 200-250 turtles basking every day! Mitch has been recording moto#'s of tern and east turtles that have gone to the other islands. I can get that from him and send it via NMARSAT if you want it now. Just let me know.

I saw an interesting mating going on a few days ago. A female was halfway hauled out of the water west of the generators with a male mating with her. A second male was pushing against the first trying to dislodge it. When finally the first male got off the female, the second male started mating with her. Then more turtles came over and started trying to push the second male off. I don't know how many males she mated with in a row, but I checked around 10:00 and a different male was mating with a male biting its flipper. The biter was opening large wounds on the males flipper, and the mating male had red blood dripping all along its left front flipper. I have never seen so many males mate with a female, or seen so many males attracted to a female. She must be releasing some sort of very strong pheromone to get that kind of attention.

Time for me to get to bed. The sun is rising and my coffin is beckoning. If you need anything else from us please let us know.

Aloha,

Tim Clark

Tim Clark

48

Author: Joyce Sisson at ~NMFS-HONO
Date: 6/20/97 9:36 AM
Priority: Normal
TO: George Balazs
Subject: inmarsat

George, I resent the 6/19 message today. It may have gotten lost yesterday because I put 5 attachments on the one message.
Joyce

Fri, 20 Jun 1997 04:50:34 +0000 (GMT)
From: 493138280@msg.por
To: cus328@cbox.aor
FF2H028
Hi George,
I never received your inmarsat message of 6/19. Here is an up to date list of totals & tags.
Tern totals: 6/15-19:3 6/16-15:4 6/17-21:4 6/18-17:4
East totals: 6/15-78:8 6/16-77:10 6/17-74:12 6/18-81:10!!

6/6/89 T53KBAY
73.5 cm

East tag #'s 6/12-6/15:
Y328, Y326, Y327, 10159, 10160, W211, W212, U421, U422, U376, A385, A342, U745,
U746, 9271, 6148, U143, U144, U854, U855, U779, U799, U798, W265, U330, U332, A628,
U855, U851, 6111, 6112, 6091, 5542, 9304, U305, A392, U393, U306, A689, A688, A782,
U855, U851, ~~6121, 6112,~~ 6091, 5542, 9304, U305, A392, U393, U306, A689, A688, A782,
F254, F997, F996, U519, U520, W280, W380, U719, 10324, 10498, 11636, 11635, 11638,
11637, G93, A359, 10193, W175, W176, U263, W350, 6273, G73, F199, W115, F761, F762, A912.

Tern tags #'s 6/7-6/18: WS WS WS
A419 6234 U682 U681 F376 10423 ~~9752 10280~~ 6171 W212 W983 9660 9691 WS
W22 W23 01577 3752 F318 F320 F319 6603 6604
AV

Tern

CCL 77.0
Kawela, Molokai
2/26/83

Date: Tue, 20 May 1997 01:42:21 +0000 (GMT)
From: 493138280@msg.por
FF2H007
George.Sattag turtle seen on East 0507,0515,sex,ID unknown. 1st probable nest Tern 05/06, 16 more to date. On Trig 05/13 @1730: 21 basking turtles, 3-5 probable nests. On East 05/15 @ 1530: 199+ turtles basking, 12-15 prob. nests.MAS

To: George Balazs
From: Tim Clark
Re: Turtles, of course

June 30, 1997

Hi George,

Wow! The season is almost over. It's incredible how quickly these short seasons go. Especially with the number of turtles we have had. We have been busy with one thing or the other every night. Now its time to catch a breath and dive into the data, report, and clean-up.

We will be closing camp on July 2nd. That will give us 34 days total on East. We could have closed earlier but logistically with the plane and other peoples schedules the 2nd became the most practical date. We are happy for the extra days since it will allow us to finish tagging some of the turtles we only put one or two tags on. I am sorry I did not get extra tags from you earlier. I thought the numbers of new turtles would drop sooner and quicker than they did, especially after our experience with the same thing last year. No turtles went without tags this year, but a number of them have only one hind flipper tag. The day the new tags arrived we had one tag left in the atoll! Besides the tags, our needs list is pretty small. We have finished all the biopsies and most turtles have tumors, ccls and scls completed.

The data is in pretty good shape. We have been able to keep on top of it throughout the season. Unfortunately last week something happened and some of our times were lost and we are getting an error message in those cells. I am re-entering those times and hope it does not happen again. I have no ideal what caused it, especially since it seems to have just lost times at random. Please keep the disc I sent you in case something else happens. Always good to have a backup off island.

Some new tags for you: U189, U190, W400, 6955, 5546, F304, F563, 10250, 8250, U104, U247, 9779, 9780, W951 and W844. Those are from June 24 - 27.

Both satellite tagged turtles came up and nested a few days after you asked us to stake the nests. I saw both of them lay and staked them. One laid at the parallel and perpendicular logs and should be easy to find and excavate. The other laid between bush 1 and 2. That stake has been dug up twice since then. I have put it back in the same area but it seems useless to me. I don't think you will be able to identify that nest with any reliability. We used to put flagging tape in the nest of turtles we wanted to identify. I am sorry I forgot about doing that. In the future you might want to suggest that to the turtle people so that you know the nest you excavate is the one belonging to the turtle that laid.

I also saw a turtle basking on East with fiberglass from an old satellite tag. The tag was gone but the turtle was a male. I hope that helps you identify it. It was also missing 3/4 of its left front flipper. I figured that occurred after you put the transmitter on. I hope you didn't sat tag a turtle missing a flipper!

I am worried about the sudden drop in the number of turtles up every night. It occurred very suddenly and has not let up. We had 93 on 6/21 then the numbers fell to 71, 50, 56, 50, 41, 59, no data, and I think 58 on 6/30. Radios have not been working well so the last couple of nights I couldn't hear her very well. I have asked Mitch if he has seen any more turtles basking on the other islands. He said the numbers are about the same with no noticeable increase. I hope the next couple of nights will bring an increase in numbers again.

A couple of camp notes while I am thinking of them. The mototools are not working as well this year. One has been dead all season, one only works on low speed, and a number of them are running slower than they should. If there is any way to replace the batteries I think it would help a lot.

Thanks for the gloves. They are so nice compared to the cotton gloves we used to use. With the number of tags we have applied their comfort and protection are greatly appreciated. On the down side, I think we have both stopped using the metal penlights and have switched to a plastic one that was out here. I love the beam on the metal one, but having one clenched in the teeth all night begins to hurt. The plastic one has more give and is easier to put up with all night.

I don't know how often you get dead turtle up here, but you might want to consider sending up some supplies for doing necropsies. I don't remember what you use to cut up the turtles at NMFS but I used a kitchen knife. Kind of flimsy and not too sharp. Also some sort of bone saw and a little formalin would be nice. The necropsy took longer than I thought it would. Melissa could not help till 3:00 and it was dark by the time we finished. I had to put off the humerus till the next day. I felt bad about it but Melissa didn't think it would make a difference. I hope it didn't mess up the treatment of the bone.

Allison has been great to work with this year. She loves being on East and has been doing an outstanding job with all the work we have had. You should definately try to recruit her for camp again next year.

That's all for now. I will be flying back to Oahu on July 10th. It will be sad leaving this place again. Hopefully the plane will break down and be unrepairable for another month. If not I will see you soon.

Aloha,

Tim

I know you have been wanting the data from Mitch. Sorry we have not gotten it to you sooner. I had to go through all his census forms and find where he wrote moto #'s. Here they are!

Date	Island	Moto #'s
6/3	Whale Skate	T55, T60, T82
6/9	trig	T64
6/9	whale skate	T55, T95, T67
6/12	whale skate	V226, V246, T123, T87
6/13	gin	V286, V254, V304, V322, V93
6/14	tern	T66, T145
6/14	trig	T118, T92
6/14	whale skate	T86
6/18	tern	T45, T100, T117
6/18	trig	T92, T64, T41, T139, V293
6/19	gin	V291, V54, V286, V199
6/20	tern	V174, T100, V434
6/20	trig	T173, V276, T122, V293, T128, T84, T92, T43, T113, T70
6/20	whale skate	T85, T159, T162, T161, V236, T147, T46, V346, T95, T86, T123, T52
6/27	little gin	V482
6/27	gin	V419, V435
6/28	tern	T77, T174, T124, T161
6/28	trig	T64, T91, V101
6/28	whale skate	V236, T116, T54

Date: Sun, 06 Jul 1997 20:55:19 -1000
From: Ursula Keuper-Bennett <howzit@turtles.org>
To: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
Subject: Two Sighting Reports

Aloha and FYI,

1997

Tutu - U 521 first sighted July 1st morning dive and has been seen most dives thereafter including this afternoon. The lettering 'J329' was not seen on her carapace right posterior. While there is some algae, it is more likely the paint has worn off in the interim. Tutu's tags were not read. This is a visual (profile) sighting. She knows us. We know her. Has been at Honokowai since 1990.

Also, McTaggert, F 765 was sighted in the pm dive of July 4th by Peter who read her tags. She was not around in 1996 and we assume she was at the FFS. Has been at Honokowai since March of 1992.

Take care

To: George Balazs
From: Tim Clark
Re: Dead turtle ~~V438~~ 583T/V438

June 23, 1997

A sea turtle was found dead on East Island, French Frigate Shoals on June 20, 1997. She was removed to Tern Island where a necropsy was performed. Tissue and crop samples as well as the left and right humerus were sent to National Marine Fisheries Service, Honolulu laboratory.

Turtle V438 was first seen June 18, 1996 at 2129 hours. She was observed crawling and digging egg chambers until 0628. She was tagged (583T LHF), had no old tags, no tumors, and measured 99 cm curved and 92 cm straight carapace lengths. A biopsy sample was taken.

On June 19 turtle V438 was sighted at 2114 between the parallel log and the old machinery on the east side of the island. She stayed in the same location without moving all night. On the morning of June 20 she was examined at 1000 and found dead.

V438 was taken to Tern Island on June 20 and placed in a container of water and ice in the woodshop. A necropsy was performed on June 21 by Tim Clark and Melissa Shaw. Samples were taken from all major organs and preserved in 10 % formalin. Crop contents were removed and frozen. The front flippers were removed but the humerus were not extracted until June 23. The left and right humerus were frozen. Eggs were abundant but only three had shells. No internal tumors were present and the organs looked normal.

No external tumors.
NMFS ID IS 583T/V438
SCL = 92.0 cm
CCL = 99.0 cm

Research on Protected Species

George Balazs is at Pula'au, Moloka'i assessing the incidence of fibropapilloma as part of the annual health monitoring of Moloka'i's turtle population.

Field personnel at French Frigate Shoals have begun moving weaned Hawaiian monk seal pups from Trig Island to Gin Island in an effort to alleviate high pup mortality at Trig from attacks by sharks and adult male seals. Approximately 19 of the 24 pups born at Trig this year have died.

The field camp on Lisianski Island is being disbanded. Personnel on Laysan Island will remain an additional 3 weeks to tag and measure weaned seals.

1997

East Island Turtle Report, 1997
U.S. Fish and Wildlife Service
Allison Veit
Tim Clark

I. General Monitoring

The 1997 turtle season was a short season consisting of only one month of monitoring. There were 481 nesting green sea turtles (*Chelonia mydas*) identified on East Island during this time as calculated from the ID data.

Turtle Camp began on May 30, 1997 and went through July 1, 1997 consisting of 33 nights of monitoring. Each night ideally consisted of five turtle walks around the island at 21:00, 23:00, 1:00, 3:00, 5:00, and 7:00 (sunset to sunrise). This schedule was often impractical this year due to the large numbers of turtles. Walks often lasted up to three hours. Due to the duration between walks, it is possible that some turtles that were up crawling or digging false pits were not seen. However, it is unlikely that those turtles that actually nested were not recorded as being up.

There were 591 possible nests recorded on East Island during the season. Eggs were witnessed for 149 of these nests. Turtles were seen covering egg chambers (patty-caking) for 148 nests and backfilling 294 nests.

II. Data Notes

Identification data is recorded in the DBASEIII file EASTID97.DBF. This includes tag numbers applied and measurements taken for nesting females in the 1997 season on East Island. It also includes tumored turtle information. Sighting information is recorded in the DBASEIII file ESTSIG97.DBF. This file contains the turtle activity for each night of monitoring.

Moto-tool numbers V40 through V518 were used during the 1997 season. One turtle was not engraved with a moto-tool number. This turtle was identified by a tag number and designated UK1 in the ID and sightings files. In the sightings file the tag is also recorded in the VERTAGNO column. V411 was engraved on two separate turtles. In the ID and sightings files they are identified as 411A and 411B. V411 is used in the sightings file when it is unknown which turtle was on land.

Due to the large number of turtles tag this season F-, -T, and -C tag series were used. The following table lists the tag series and the island on which they were applied. Tern Island is included in the table for convience, since one walk a night was conducted where any new turtle without a tag received one hind flipper tag.

Tag series	Island applied
F939 - F999	Tern Island
122C - 200C	East Island
581C - 658C	Tern Island
659C - 999C	East Island
127T - 150T	East Island
152T - 800T	East Island
801T - Current	Tern Island

The following tags were misapplied and recovered: F995, 131C, 172C, 173C, 591C, 671C, 759C, 849C, 877C, 917C, 922C, 993C,146T, 165T, 208T, 426T, 455T, 518T, 538T, 632T, 669T, 683T, and 777T.

The following tags were misapplied and lost: 143C, 916C, 975C, 995C, 427T, 526T, 539T, 757T, and 776T

III. Tumors

There were forty-six tumored turtles identified during the 1997 season. They were listed as V62, V79, V113, V122, V129, V137, V141, V159, V160, V161, V182, V219, V223, V239, V243, V250, V257, V260, V279, V283, V292, V316, V348, V354, V355, V363, V383, V391, V393, V395, V399, V404, V408, V413, V427, V428, V441, V448, V453, V455, V474, V484, V502, V512, V516, and T160. Tumor location and size are found in EASTID97.DBF.

IV. Biopsy samples

Biopsies were taken from 47 turtles for genetic studies. A 6 mm circular sample was taken with a leather punch from the hind flipper. Sixteen of the turtles biopsied had old tags. The remainder had never been tagged. None of the turtles had tumors. The moto-tool number and old tags are as follows: V41 (U140 RHF), V43 (A581 LHF), V44 (U773 RHF), V46 (A928 LHF), V49 (U303 RHF), V53 (F705 RHF), V54, V58 (Y628 LHF), V59 (U220 RHF), V60 (U645 LHF), V67, V69 (F750 LHF), V92 (F729 LHF), V95, V99, V100 (F84 LHF), V104 (F739 RHF), V108 (A432 LHF), V113 (U164 LHF), V122, V125, V131 (U977 LHF), V142, V152, V186, V207, V212, V257, V278, V284, V327, V349 (U452 LHF), V400, V410, V423, V431, V434, V438, V446, V447, V451, V454, V456, V457, V458, T55 (F952 LFL), and T136. Biopsy information is listed in EASTID97.DBF under the comments.

V. Data loggers

Four data loggers were buried on Tern Island and eight were buried on East Island to measure sub-surface temperatures during the nesting and hatchling season. East island data loggers were designated E1-E8. Tern Island data loggers were designated T1-T4. The data loggers were buried 40 cm deep at various locations around the islands. The dates they were buried are as follows: May 31 - E1, E2, E3, E4, E6, E7, and E8. June 1 - E5. June 2 - T1, T2, T3, and T4. Each data logger is tied to a stake and a map of approximate locations of the data loggers accompanies this report and is on file in the Tern Island office. The data loggers were left in the ground at the termination of turtle camp to be recovered at a later date.

VI. Miscellaneous Notes

Two satellite transmitters were recovered from turtles. One from turtle V44 on 5/30 and the other from V91 on 6/3. The shell under the transmitter on both turtles was in excellent condition.

Nests from V44 and V91 were staked for excavation later this season. The nests dug by V44 were marked on 6/17 and 6/28. The nest dug by V91was marked on 6/16. Precise locations of these staked nests is recorded in the field notebooks for those nights.

A turtle was found stranded on 6/7 by the north seawall on Tern Island. She was tagged, measured, engraved with moto-tool number T104, a biopsy sample was taken, and she was released.

Our tag supply began to dwindle in the middle of the season. Starting on 6/14 only two hind flipper tags were placed on each turtle. Starting 6/16 only one hind flipper tag was placed on each turtle. New tags arrived on 6/24 allowing us to resume placing four tags on each turtle.

Turtle V438 died while crawling on East Island on 6/19 and was found dead on the morning of 6/20. She was tagged 583T LHF on 6/18. She had no old tags nor tumors, and was measured 99 cm curved carapace and 92 cm straight carapace lengths. A necropsy was performed on 6/21. Tissue samples from all major organs, a crop sample, and the left and right humerus were sent to George Balazs for further analysis.

A male turtle with old fiberglass on its carapace, possibly from an old satellite transmitter, was seen basking on East Island on 6/20. He had tags U651 RHF and U652 LHF and was missing one half of his left front flipper.

Tern Island Green Sea Turtle Night Surveys, 1997

Nightly surveys of nesting green sea turtles were conducted during the 1997 turtle season. A walk was conducted every night at midnight on Tern Island. The walk began on South Beach at the barracks, included East beach and ended at Shell beach. The time sighted and the general stage of nesting was recorded for any turtle identified during the walk. Turtles were checked for moto-tool numbers. If the turtle did not have a number, one was engraved on the third lateral scute on the right side of the carapace. Tern Island turtles were given a "T" prefix during the 1997 season. New turtles encountered were also checked for tumors and any old tags were recorded. If the turtle had no old tags one hind flipper tag was applied.

The methods used this season differed from the original protocol in two ways.

1. Nightly walks were supposed to occur one hour after high tide. This turned out to be impractical since a high tide early in the evening would cause walks to occur before most of the turtles had a chance to start nesting. If the high tide occured late in the night, the walk was too close to morning, when a second walk was undertaken by a Fish and Wildlife Service staff or volunteer to search for and mark possible nest that occured during the night. After discussion with the Honolulu FWS office and George Balazs a midnight walk was approved.

2. No tags were supposed to be applied in the original protocol.

To: George Balazs
From: Tim Clark
Re: Dead turtle ~~V438~~ 583T/V438

June 21, 1996

A sea turtle was found dead on East Island, French Frigate Shoals on June 20, 1996. It was removed to Tern Island where a necropsy was performed. Tissue and crop samples as well as the left and right humerus were sent to National Marine Fisheries Service, Honolulu laboratory.

Turtle V438 was first seen June 18, 1996 at 2129 hours. She was observed crawling and digging egg chambers until 0628. She was tagged (583T LHF), had no old tags, no tumors and measured 99 cm curved and 92 cm straight carapace lengths. A biopsy sample was taken.

On June 19 turtle V438 was sighted at 2114 between the parallel log and the old machinery on the east side of the island. She stayed in the same location without moving all night. On the morning of June 20 she was examined at 1000 and found dead.

V438 was taken to Tern Island on June 20 and placed in a container of water and in the woodshop. A necropsy was performed on June 21 by Tim Clark and Melissa Shaw. Samples were taken from all major organs and preserved in 10 % formalin. Crop contents were removed and frozen. The front flippers were removed but the humerus were not extracted until June 23. The left and right humerus were frozen. Eggs were abundant but only three had shell. No internal tumors were present and the organs looked normal.

No external tumors.

NMFS ID IS 583T/V438

SCL = 92.0 cm
CCL = 99.0 cm

EAST 1997

DAILY TOTALS
NESTING GREEN TURTLES
FRENCH FRIGATE SHOALS, 1997

33 nights

Island: East 1997 N/P/M

Date	# Turtles Up	# New Turtles IDed	# Nests	Invest.	Comments
5/30	27	23	1/3/2	T.C./A.V.	First night turtle camp! Neit Retrived sat tag from V44 Tim Clark & Allison
5/31	31	22	4/3/4	T.C./AV	Young pup lost its mom. Raising it in tent. It loves Rice Dream
6/1	31	16	3/2/3	T.C.	The aliens came to visit. Good to see old friends again!
6/2	40	19	6/0/6	T.C.	One tiger shark in lagoon. Has big knob protruding behind dorsal fin.
6/3	47	23	1/3/9	T.C.	Retrived sat tag from V91
6/4	47	19	2/3/13	AV	Beautiful calm night - sky full of star - one amazing shooting star! I love turtle camp
6/5	64	35	5/2/10	AV	What a night - Turtles, turtles & more turtles First Tiger kill - BFAL chick
6/6	47	27	0/3/8	AV	I saw no nests, sad - sad.
6/7	61	25	4/2/8	AV	Took refuge under a bush during squall. Beautiful moon after sunset
6/8	64	33	4/11/10	T.C.	Occasional showers, turtles enjoyed playin in the mud.
6/9	60	27	1/1/5	T.C.	First walk taking 3 hrs, Beautiful night. the moons coming back!
6/10	66	24	3/0/12	T.C.	First night radio has worked this season, saw my first BFAL fledge. Tiger got it 30 seck
6/11	67	28	3/4/9	T.C.	The last pup came by to say hi. wants more rice dream.
6/12	64	17	7/1/8	ACV	Beautiful moonlite night.
6/13	63	15	3/5/11	AV	
6/14	62	15	4/0/5	AV	Took dead male weaner away from adult male mating with it!
6/15	78	10	11/8/8	AV	RECORD TURTLE NIGHT! Low on tags (Tags/Turt)
6/16	76	10	5/6/6	T.C.	Heard turtles talking. Reason so many up - planning to overrun Tern Island. Have to warn th
6/17	74	12	6/4/13	T.C.	Today found out turts. are pissed at humans Out for revenge. They are developing weapons! Oh-no
6/18	80	10	4/6/9	T.C.	I'm winning! New record! Beat that Allison!
6/19	90	4	4/8/7	T.C.	Turtle V438 found dead in desert
6/20	70	8	2/5/7	AV	Wet wet, windy nights - Yuk. Female up without REL, fresh wound.
6/21	90	15	5/10/7	AV	Record night in the History of turtle camp! Don't feel bad Tim - Lots of RAIN
6/22	71	4	10/5/17	AV	3 new moms & pups - A pretty slow night.
6/23	50	6	5/4/6	AV	using last 20 tags tonight Quiet night - What happened to all the tu
6/24	56	6	6/7/11	T.C.	Not fair! Allison did all the turtles!
6/25	50	3	8/4/16	T.C.	I think stars are alive. that's why they twinkel so much. It's like a heart beat.
6/26	41	3	3/6/11	T.C.	Don't know what happend to the turtles. Getting worried. Sang turtle love songs all night.
6/27	59	3	7/7/19	T.C.	My last night on East! I'll miss it. Good bye turtles! Come visit in Texas!

Island: E

Date	#
June 28	
June 29	
June 30	
July 1	

Island: EAST

Date	# Turtles Up	# New Turtles IDed	# Nests	Invest.	Comments
June 28	58	7	5/4/11	ACV	The last 4 nights of turtle camp 1997.
June 29	58	6	4/5/14	ACV	Saw a ship/boat in the distance Injured MABO on spit - broken wing
June 30	61	5	6/8/3	ACV	Sat. turt. # V44 Nested - Staked Windy, wind
July 1	~~60~~ 58.	1	7/8/6	ACV	What a wonderful experience - I will miss. My nights on East Isl. FFS
		19			

1996 EAST MONITORING

5/28/96 - PM with Kimberly Berger and Tim Clark
Computer/DBIII training at HL.
4th/2t. RIGHT/
Mototool Prefixes =
1989 = W, 1990 = C, 1991 = L
1992 = U, 1993 = S, 1994 = Z
1995 = X X-1 thru X__, then
no prefix.

1996 Choices (one stroke) J, N or V

5/29/96 KBAy training w/ K.B. & T.C. (DME,)
Wed.

From: Timothy Ragen 5/30/96 6:52PM (319 bytes: 4 ln)
George Balazs
ect: TURTLE AT FFS
---------- Message Contents ---------- 5/29/96 1700h
in water off East IS
George,
Mitch sent a message that they sighted a satellite-tagged turtle at FFS yesterday. Do you want them to try and get id info on turtle? (I assume yes). Tim

6/2

6/14/9
Frido

] From:
George
ject: Pe

Ma
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out
whe
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Nic

~~Three~~ Four key areas =
(1) Monk Seals

(2) Genetic Samples

(3) Incubating eggs

(4) take off sat. transmitter

Need
- ~~Small~~ Flashlites
- Gloves / Medicated spray / lysol / pliers / needle nose / TIDE Chart / Sex ratio paper / Y. Swimmer papers / Styrofoam
- saw / eye protection / clock

TAGS G333 - G400, G501 - G999

6/2/96 Sunday - Flight to Tern
Steve Barbley
Kimberly Berger
Tim Clark

6/14/96 PHONE PATCH (via NICK) with TIM.
Friday

] From: Shawn Murakawa 6/13/96 2:18PM (1223 bytes: 17 ln)
George Balazs
ject: People at Tern

---------- Message Contents ----------

Marc Webber had called regarding an Inmarsat message that Tim Clark had sent. Tim's message reads "GHB, have sattag-tags:7560-3, 66 turts on 6/11!Need tags-200 left.TC"

Marc then called a little while ago. He said that Tim and/or Kimberly radioed him to ask if he was able to get a hold of more tags. I explained to Marc that you were on A/L and that I've been trying to get a hold of you (through Marc's cellular). Marc stated that Tim/Kim would like to get at least 400 tags. They are worried that they're going to run out of tags. Could you please call him or Nick tonight on whether or not we'll be able to drop off tags before tomorrow morning's flight at 7:00. Marc's home number is 486-2442 and Nick's home number is 941-5448.