

Book 2

2 of 2

LIBRARY OF
GEORGE W. DALAZ

FRENCH
FRIGATE
SHOALS

1974

Sept 21
SATurday

T80 $\frac{7}{9}$; T27 $\frac{7}{14}$; T110 $\frac{7}{14}$; T17-2 $\frac{7}{16}$;
T34 $\frac{7}{10}$; T64 $\frac{7}{10}$; T65 $\frac{7}{16}$; T5 $\frac{7}{14}$

Thick bird guano around stakes (some).

Fish caught, 1500, SW reef -

all 17 ~~0~~ anal spines - scaleless chin -

Sex	Length	wt	% fill	Status
M	33	35	10%	D. Fish parts
F eggs	32 $\frac{1}{2}$	32	0	
F eggs	32 $\frac{1}{4}$	33	0	
?	27 $\frac{1}{4}$	17 $\frac{1}{2}$	20%	D. Fish parts
M	25 $\frac{3}{4}$	14 $\frac{1}{2}$	0	
?	—	—	0	

EX T89 $\frac{7}{3}$ area 1 (fire pit) - 18 no devel;
8 partial; 2 live.

T88 $\frac{7}{2}$ Sand point - 38 live healthy
compliment near surface; 23 partial; 3 no
devel; 1 dead-hatched.

Sept
Sun 22
0200

Survey around Island revealed 1 live hatchling
SEPC lots of roosting frigates, only
sounds are from shearwaters.

0800-1000
EX

T71 $\frac{6}{13}$ sand point - 9 hatched-dead; 4 live;
6 partial developed; 2 no development

T53 $\frac{6}{7}$ sand point - 7 partial; 11 hatched-dead;
1 no development; 1 live.

T49 $\frac{7}{15}$ - 2 white tyigid eggs removed - 1 opened, live
embryo w/ yolk sac - other egg reburied right by
stake.

1800 ft. 18
 1700 ft. 17
 1600 ft. 16
 1500 ft. 15
 1400 ft. 14
 1300 ft. 13
 1200 ft. 12
 1100 ft. 11
 1000 ft. 10
 900 ft. 9
 800 ft. 8
 700 ft. 7
 600 ft. 6
 500 ft. 5
 400 ft. 4
 300 ft. 3
 200 ft. 2
 100 ft. 1

m
 loc
 m
 loc

Sun
Sept 22
1100

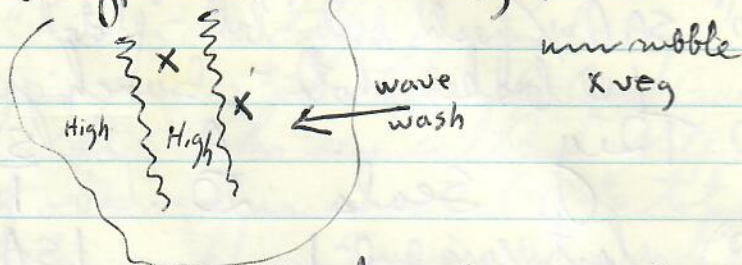
Little Gin -
Seals

A
3

SA
3

Pup
1

Tracks on narrow end - 4 recent pits, none ^{look} good.
5 plants - 2 Types - 1 succulent, 4 other.



Swell on Gin - didn't land - few seals.
detached sand island gone - didn't land.

Caught Ulua between Gin - h. Gin off reef -
37" 48 1/2 lbs, female eggs photos
for Pete Major, stomach had digested trigger
fish part ~ 80% - contents 1/2 lbs

EX Nylon^{fish} line broke off East - Big Ulua.
T8 6/28 - 28" deep 7 no develop; 3 partial
(bodily decomposed)

T27 6/30 - 27" 12 no develop; 13 partial
bodily decomposed (minimum)

T3292 7/12 faint indentation - 29"
41 live deep and scattered; 20 hatched dead
18 partial level; 3 no develop.

////// Hereafter all EX appear only in table
unless special notes required.

2300 ^{1 no devel.} and 48 - live hatchling dug from emergence pocket
adjacent to T2 6/3 area 8.

Monday whale-skate

Sept. 23/6

Seals $\frac{A}{17}$ $\frac{SA}{21}$ $\frac{P}{18}$

1230⁴⁵
NO SIGNS
OF NESTING

SAA500 and heal nose injury; several seals molting; 3 SA may be last year's pup; pups w/ gran - seem spooky; SA w/ fresh belly bite - photo.

1400

TRig

Seals $\frac{A}{20}$ $\frac{SA}{11}$ $\frac{P}{0}$

NO SIGNS
OF NESTING

last year's pup - 1

1 SA w/ fresh mouth bite (photo)

pairs - 1

1 ♀ bosker - light brown-reddish shell, many photos close up.

Sand Islet gone.

1800

Round-Mullet
Reefs

Blue	female-eggs	14 1/2 lbs	28 1/4"	50% full-triggers
White	"	8 lbs	22"	5% digest fish
White	"	NOT TAKEN	25 3/4"	♀

Sept 24

0030 Tuesday

Bright lights on Tern-nest.

Seal crushing of hatchlings?

Shearwaters burrowing into nests?

0800

Caught 9'6" Tiger Shark - dropped in cable - bite on 4" Gray (stomach gone) Tiger had 1/2 of gray; Shlipes lobster; Turtle plastron scute, skin and bone (?).

Reported 1 more live hatchling on Tern Is.

Sept 25

Ed Rollison out.

Wed. 0900

Blues-
SW reef

12 lb	25 1/2"	Male	50% Triggers
6 1/2 lb	20 1/4"	Female	80% Triggers
6 1/2 lb	19 3/4"	male	80% Triggers

Wed
Sept 25
0900
500

9:45-9/2
Sept 26
Thurs
0030
0200
1100

1400-1
2200

Sept 27
Friday
Leve

wed
Sept 25
0900

Banacuda 6lbs 28 1/2" 1 partially digested fish (?)

1500

SW reef 65 1/2 lbs white 44" 50% full female
1 octopus and trigger fish, unidentified jaws
1 blue 21" 50% trigger male

15 white regrowing from 15" 21" taken by Coast Guard
all stomachs empty, taken near sand beach w/ octopus part.

9/24-9/25

"Good" nest observed in area 7 (4 pits total)
occurred during night on Tern - P. shore patch.

Sept 26

3 newly hatched turtles by high tide

Thursday mark - broken spot in skull, bleeding

0030

Ghost crab sitting near - watching. Crab w/ 3 small fish

0200

9/26 T2 7/17 hatched

1100

Small turtle caught NE East reef C1 432, 333, 34F
Curved 16 1/2 x 15 1/4 straight 15 3/4 x 13 1/4 18 3/4 lbs

→ Seals A-5 SA-7 P-1

EM 7/17 T56 area 1 - sand point (part of tent)

1400-1800

2 white - 1 ^{2 1/2 KUWES} 30" sep unknown - 10% dig. fish parts -

Deep H₂O off SW reef - school came up - 1 blue included - Photo

40" female SW reef, 10% crab parts

♂ gray reef shark - squid beaks in stomach 50"

2200

EMT 11 07/15 - 13 removed from under large coral chunk, all placed on ground out of sight of water - stretching of neck, yawning - slow movement until in view of ocean - then rapid grant. EMT 17-2 7/16

Sept 27 -

SW reef 40" white ♂ 10% dig. Trigger fish

Friday -

" " 38" blue ♀ 80% dig " "

♂ gray shark 49" 2 trigger fish

Several juveniles always sighted off East Reef.

(TV-HCS)

Saturday (2200 Friday Sept 27) Seal Measurement This page

80-100 fairy terns censused on Fa Perouse linacle.

Sept 28 T108 7/12 sand point EM noted - 6 turtles showing at surface, photos taken, animals (bulge) pushed from bottom surface animals motionless - Temp 26°C - 1300 - 31°C

0100 Turtles big shoved from bottom - correlated with big waves - noise of coral - can hear when laying on sand - movement upward comes at ~ 5 to 10 minute intervals

0530 (13 showing) Several turtles completely out of sand, motionless - movement still from bottom - Moons down - all came out ~ 50, all but ~ 10 entered water at closest side. Upon emergence all animals moved very slow, or not at all, stretched necks upward for 3-4 minutes before starting to move

1200 Seal vomit by felled pole contained cephalopod parts. Caught turtle East Reef CI 435, 436, 437 F Curved 16 3/4 x 15 1/4 straight 16 1/4 x 13 weight - 17 3/4 lbs.

1800 1 Blue - ♂ 26" 20% tiger fish

Sept 29 2 adult seal - 82"; seal regurgitation - 2 fish ~ 7" 3 octo ~ 10"

Sunday 2 - Gray shark 50" each - stomachs empty.

Monday T121 C1864 - 2 pits area 17 and return

Sept 30 sub-adult seal (no tag) - 66" visited W-5, photo of ♂(?) barker w/ tumors - tail 1/2 adult length

Oct 1 Blue - 18 lbs 29" ♀ 10% trigger roundhead

Tuesday Blue 16 1/2 lbs 26" ♀ 80% " SW East

white 38 1/2 lbs 38" ♂ 5% dig fish "

" 30 lbs 33" ♂ 5% " " "

" 35 lbs 36" ♂ 5% " " "

50" gray shark - ♂

club school ~ 40 fish, large

WEDNESDAY Oct 2 EAST IS. Seals A 5 SA 9 P 2

EAST IS. 1500h-

Seal measurements

Oct 2, WED. Seals A 15 SA 11 P 2 + 4 on detached sand islet
Oct 3, THURS. early morning hours 81 turtles out of caged T65 area 5.
70 whale-skate (rain)

Seal Toge 956-64"; 1036-66" - observed skull injury 212.
adult ♀s 96" and 98". Very little humus on most sections
of whale-skate. East Seals - A754 = 69"

Oct 4, FRIDAY A-8 SA-12 P-3
0900 49" white Uluva 113 lbs SW East Reef, ♀, ♀, EEL IN BODY CAVITY!
1700 Whale-Skate

Seals A 19 SA 10 P 5 A ♂ 86" and 83"
40 foraging turtles 2 w 1/4 & 1/2 tail missing.

Oct 5, Sat. 0900 W-S skate starting from S end - 600' to main vegetated section; 2445' to end of veg section; 2575' total length of Island. Starting from N end - veg zone 85' wide; first wide section 170' wide; by boat anchorage - 80' wide.

Less than full size male - 7'6".
1600 35" white ulua, SW reef, ♀, ♀; Gray shark, ♂, 50", ~12" eel in stomach. P flowers and turnstones range all over post Island (Scavengers). Adult ♀ seal seen with pup during summer (1 scar) now on East w/ or nearby.

Oct 6, SUN Possible reasons for hatchlings being left behind underground in nest: (1) late hatching (2) obstructed by non or partially developed eggs (3) obstructed by isolated pieces of coral, vegetation, etc. (4) Lack of vigor to keep up with main group. (5) sub group of main complement moving in wrong direction Sand point (shorter due to erosion) 275

⑥ analysis of mat function in changing ability?

Oct 7, MONDAY 55" Gray Shark - ♀, 4 ♀ embryos, 8 part. digested trigger fish, 1-7" squirrelfish; 1- Gray head (only) taken.

MONDAY
Oct 7

8-green w/ stripes reef fish take of 5 shore reef - stomach contents included crab parts, ^{Carapace} small fish part, urchin spine, p-frag coral pieces. Observations of seal populations suggest that SA are more abundant, pups are few.
Seal Tag 787 - 77"

Oct 9
WednesdayOct 8
TUESDAY

Seal Tag 1034 - 60"
Excavation of sand point nests difficult if not impossible due to absence of moisture - no real rain during 3 week visit.

1500

Turtles hatched for SP - clean and dirt free.
Turtles hatched in areas w/ humus - caked with soil and often deformed shape.

Two hatchling found with 1 front limb not functional.
Depression in ground over nest results from hatching of eggs and/or ascent of hatchlings. Seems probable that variation^{in time of depression} between substrates and moisture/vegetation conditions exists.

Oct 9
WEDNESDAY

Birds on East include juvenile plumage red foots (some with fungus), blue face and Frigates. Noddy Terns have chicks of all ages. Shearwaters have chicks with abundant fungus. During evening and early morning hours many shearwaters are out on ground.

Area 14 shows obvious signs of erosion - cement slab partially washed away and plumbing exposed. Areas 11-12-13, long stakes for ground wire attachment are present just above high tide mark - on beach slope. Obtain information on stake locations - also possibly old photographs - sources would include NMFS, State Fish and Game (R. Walker), Coast Guard (Stan).

Oct 10
Thursday

Oct 9
Wednesday

Navy^{POIC} Area 16 has formed concrete chunks
under the soil. Area 13 orange painted
large coral chunk under soil.
It would appear that much of remaining "alteration"
to island is under the ground and not readily
apparent.

1500 h

Seals - adults 7; subadults 12; pups 2.
Release man (-) } hatchling on shore at
NEP - juvenile (brown head) frigate
observed diving at hatchling, picked up,
"mouthed" several times while flying over-
head - returned to roost of nearby log
at which time dropped hatchling. Retrieved
by me and released. Few minutes later,
apparently same bird picked up different
hatchling further out, exhibited same
behavior before roosting and dropping turtle.
Clay? - block plastic thrown into
water was also picked up. 5-8 other
juvenile frigate (also some adults high
overhead) showed no interest in
hatchling in water, however, they did
chase birds while turtle in mouth.
First hatchling retrieved bit out at
me - angry.

Oct 10

Thursday Depart for Hono - Boat all
gear secured -

70 NOV 28 →

Sea Water Temperature off Tern - 25°C

Dec 3, 74

Tuesday

observations by Hollison -

3 adults in water off whale-skate

2 adults in water off East

NO basking

Dec

Ti Dec 12, 74 Depart FAA ~ 8:45 AM

Tom & LAURAS Husband Pilots

HAROLD

TAILWIND

188 km

Thursday

1300 lbs ∴ no stop at Kawai

aerial survey at 11:30 AM

Turtles

Seals

Disappearing Sandspit

0

31

0

2

Little GIN BLK FT ALBATROSS COLONY

1 in lagoon

5

GIN

0

11

Sandpits

0

5

Round-billed BLK FT BY CAMP SITE

0

1 + 6 = 7

East

0

12

Whale-skate

0

39

Trig

2 baskers

24

Shark

is it present?

—

Not observed

Tern

0

0

Many Photos w/ 20 exp 64 ASA

Sea Water 25.5°C off Tern

Dec 12, 74

Survey of birds on Tern

Used sweep net for January visit:
 Several pairs laid out formalin.
 ASKED to photo any Basking turtles.

Few, Ruddy turnstones -

2 fairy terns -

~ 5 Redfoot boobies - 2 w/ juvenile plumage -

1 frigate (small amount of juvenile color)

Laysan Albatross on Eggs - ~ 175-195

Black foot albatross on Eggs - ~ 30-40

Black foot tag numbered 757-39297

Good seas (inside shoals) -

Last week 1974
 in December

Rollison observations - observed two
 small turtles (~1 1/2') by tide gauge, Tern Is.

JAN 14, 1975

See Jan 15 correspondence from Rollison concerning
 12 boskers on W-S, 8 on Trig - appear subadult size

Feb 2

See Feb 3 correspondence from Rollison -
 2 turtle just off dock - Tern Is. NOT turtles
 GIN - L. GIN - Adult between GIN & East.
 No Turtles on East. -

clutches vs
cove incompile
Table w/ KNOWN
egg counts
NESTSINCUBATION
PERIODS -
EM VS POCK

correlation between clutch size and turtle size
Decreasing number of eggs w/ successive clutches?

Area

3

5

4

8

7

11

7

3

5

7

7

4

5

2

12

5

5

12

9

6

13

7

5

10

4

4

12

8

12

Range 16-32"

eventual mortality

Not in calculation

Surface EM

TNo.	Area	ORIG date	incheg-Depth	live	Hatched-DEAD	PARTIAL	NO	EGG COUNT
UNK	3	UNK	-	0 0	0	7	1	92
UNK	5	UNK	-	9 9	0	1	0	90
UNK	4	UNK	-	6 6	0	1	9	84
UNK	8	UNK	-	45 ^(6 deep) 6	0	7	5	82
UNK	7	UNK	-	36 ^(6 deep) 6	0	10	7	77
UNK	11	<6/1	-	21 ^(10 deep) 10	0	5	2	83
32	7	6/2	-	6 6	1	9	7	126
UNK	3	UNK	-	5 5	0	7	3	85
UNK	5	UNK	-	2 2	0	2	5	91
UNK	7	UNK	-	6 6	3	2	3	86
UNK	7	UNK	-	47 ^(17 deep) 17	0	6	3	74
54	4	6/8	M-24"	16 16	0	7	3	111
5	5	6/7	H- 20	46 46	3	9	2	40
69	2	6/11	23"	44 ^(35 out 8") 9	3	4	1	108
74	12	6/13	L-25"	11 11	2	4	2	81
UNK	5	UNK	20"	3 3	-	7	1	89
UNK	5	UNK	26"	31 ^{6 out 6"} 25	0	0	0	75
44	12	6/4	L-23"	2 2	1	0	24	73
UNK	9	UNK	LM-19"	41 41	1	1	3	54
33	6	6/4	MH-21"	0 0	0	11	15	101
23	13	6/2	L-24"	5 5	0	11	8	76
16	7	6/9	MH-21"	9 9	0	18	4	107
56	5	6/7	MH-19"	0 0	1	22	17	60
48	10	6/8	LM-19"	4 4	0	0	0	96
UNK	4	UNK	M-23"	14 14	0	0	4	82
UNK	4	UNK	LM-24"	0 0	5	9	3	83
22	12	6/2	LM-25"	7 7	0	2	9	82
2	8	6/3	Sand ^M -16"	14 14	0	14	1	71
13	12	6/4	LM-22"	0 0	0	5	1	84

caught in wire

POSS MISS

UNKNOWN OR 6/14

Adj to POSS MISS

6/2 MICROPHONE

6/3

6/4 PROBE

TNO.	AREA	ORIG DATE	Depth	live	dead	partial	NO	SURFACE	ORIG EGG COUNT
78	B	6/13							
9/19/74									
1	SP	6/13x	—	barely 1	3	26	4	66	—
89	SP	7/3 ^{fine pit} x	—	2 2	0	8	18	72	—
88	SP	7/2x	—	38 ^{healthy near surface}	1	23	3	63	—
49	SP	6/5		Can't locate					—
H	SP	6/20		Can't locate					—
71	SP	6/13x	—	4 4	9	6	2	79	—
53	SP	6/7x	—	1 1	11	7	1	80	—
90	SP	6/30		Can't locate					—
97	SP	7/1							—
8	SP	7/13							12
49	SP	7/13							—
8	1	6/28x	L-28"	0	0	3	7	90	—
27	1	6/30x	L-27"	0	0	13	12	75	—
32-2	1	7/12	L-29"	41 ^{deep scuffs}	20 ^{52.1}	18 ^{15.4}	3 ^{2.6}		117
80	16	7/9	MH-19"	1 1	0	7	31	1.0 7.1 31.6	98
23	15	7/13	M ^{Surface Chunks} —	5 5	1	16	4	4.4 11.7 2.9	137
110	15	7/14	ML-24"	2 2	0	10	5	1.6 2.0 4.0	125
15	14	6/9	M-26"	0 0	0	11	9	9.6 7.9	114
72	14	6/11	Can't locate						103
76	12	6/13	ML-26"	0 0	0	8	11	5.7 7.8	140
22	12	6/15x	ML-28"	0 0	2	1	9	88	—
87	12	6/17	ML-23"	0 0	0	14	10	13.3 9.5	105
46	2 ^{Subsample}	7/14x	L-21"	0 0 ^{deformed head 19 centrals}	0	9	61	30	—
17	2	7/2	M-22"	0 0	0	13	3	12.0 2.8	108
27	3	7/14x	M-28"	11 11	7	11	5	66	—
69	3	7/8x	ML-24"	0 0	8	4	1	67	—
54	3	7/12x	ML-26"	0 0	22	9	10	59	—

TNO	Area	orig date	Depth	live	dead	partial	No	surface FM	egg count
36	3	7/4	ML-27"	0 0	0 0	6	5.6	4 ^{3.7}	107
39	5	6/17x	MH-26"	0 0	4	0		1 ⁹⁵	—
27	17	6/16	ML-25"	0 0	1 ^{1.9}	4	3.8	3 ^{2.8}	106
47	17	7/2x	veg. below surface M-31"	8 8	13	1		3 ⁷⁵	—
41	17	7/5	M-23"	1 1	1 ^{2.1}	0	0	2 ^{2.1}	94
74	17	7/9x	ML-26"	4 4	0	15		5 ⁷⁶	—
43	17	7/7	M-23"	1 1	0 ^{2.4}	0	0	0 ⁰	41
UNKN	8	unknown	MH-23"	48 ^{cut} 54 ⁶	0	9		32 ⁵³	—
46	1	7/2x	ML-27"	2 2	2	6		12 ⁷⁸	—
105	17	7/9	MH-26"	0 0	10 ^{7.2}	10	7.2	4 ^{2.9}	138
70	5	6/11x	MH-24"	0 0	13	22		49 ⁷⁶	—
57	5	7/11x	M-24"	1 1	0	0		3 ⁹⁶	—
56	6	7/4	ML-24"	0 0	3 ^{2.6}	7	6.1 ^{8.7}	1 ^{8.7}	114
78	6	7/6x	H-24"	0 0	3	26		4 ⁶⁷	—
92	6	6/29x	ML-21"	0 0	0	5		10 ⁸⁵	—
16	6	7/2x	M-28"	0 0	5	38		16 ⁴¹	—
39	5	7/12x	M-22"	0 0	2	3		1 ⁹⁴	—
21	5	6/30	H-25"	0 0	7	22		12 ⁵⁹	—
98	5	7/16	ML-21"	14 14	0 ^{17.5}	0	0	0 ⁰	80
33	5	6/17	can't locate						—
84	5	6/15	ML-23"	0 0	5 ^{3.4}	29	20	22 ^{15.2}	145
65	5	7/4x	ML-20"	0 0	0	8		38 ⁵⁴	—
64	12	7/10	L-22"	0 0	0	7		24	38
62	12	7/15x	ML-27"	2 2	0	1		3 ⁹⁴	—
UKN	11	6/22- 6/27	ML-21"	0 0	1	0		1 ⁹⁸	—
18	11	6/30 AREA	L-22"	0 0	0	0		120	infertile
9	11	7/11x	L-26"	0 0	0	0		1 ⁹⁹	—
82	6	7/10x	ML-24"	2 2	2	3		4 ⁸⁹	—
95	6	6/30	MH-24"	0 0	9 ^{6.3}	40	28.2	13 ^{9.2}	142

TNo.	AREA	ORIG DATE	DATE ⁵⁰¹	Depth	live	dead	partial	No	FF66 Count	TNo.
102	6	7/3		MH-20"	0 0	2	20	4	74	391
83	6	6/15		H-17"	0 0	0	0	93	Inf	58
85	6	6/18		MH-	Can't Locate					33
54	6	6/30		MH-25"	0 0	1	3	6	90	66
42	6	7/2		H-30"	7 4	6	4	5	78	32
94	6	6/30	stake 16	H-	Can't Locate				131	34
65	6	7/16		ML-21"	6 6	3	3	2	86	63
53	6	7/4		MH-19"	0 0	11	6	2 ^{2.5}	81	74
62	7	7/2		L-24"	0 0	4	2	0	94	74
46	7	6/4		—	Can't Locate					34
22	7	7/10		—	Can't Locate					34
58	10	6/2		L-22"	0 0	0	10	19	71	36
2	13	6/3		Sand M-16"	0 0	0	14	1		37
89	15	7/14		M-22"	0 0	6	2	9	83	80
111	12	7/15		L-28"	12+2=	14	28	26	32	32
23	11	6/30	stake 23	ML-27"	0 0	1	16	16	67	32
72	12	7/6		M-23"	2 2	0	3	9	86	85
87	11	7/4		ML-21"	0 0	1	6	2	91	15
40	11	7/11		L-21"	1 1	3	3	2 ^{2.1}	93	8
106	11	7/9		M-25"	0 0	0	16	9 ^{7.6}	118	4
101	11	7/3		M-22"	0 0	3	4	11	82	95
89	10	6/19		M-22"	0 0	1	1	12	86	98
86	9	6/16		Can't	Locate					83
40	9	6/28		ML-25"	0 0	9	3	4	84	2
39	9	6/29		Can't	locate					17
5	9	7/2		L-24"	0 0	2	15	7	76	56
63	8	7/6		H-23"	0 0	15	5	0	80	8
2	SEP	7/3		Sand M-25"	28 28	3	2	0	67	56
25	16	7/7		Sand-30"	0 0	0	5	19	76	8

Cont	T NO.	AREA	Orig Date	90° Depth	live	Dead	partial	NO	surface	EGG COUNT
Fertile	391	16	7/5 X	Sand MH-24"	0 0	0	1	3	96	-
	58	14	7/6 X	L-18"	0 0	2	31	25	42	-
	33	4	6/29 X	L-23"	0 0	7	0	10	83	-
	66	5	7/7 X	M-25"	D 0	11	0	10	79	-
	32	13	7/2 X	ML-21"	0 0	0	7	46	47	-
	34	12	6/28 X	ML-27"	0 0	1	0	1	98	-
	63 (SECOND ONE)	12	6/8 X	ML-27"	0 0	2	5	3	90	-
	44 (SECOND ONE)	12	6/4 X	ML-24"	0 0	0	4	22	74	-
	74 ^{KSIDE}	12	6/13 X	L-25"	0 0	1	0	2	97	-
	34	12	7/10	ML-22"	2 2	0 ^{2.9}	3 ^{4.4}	1 ^{1.5}		68
	34	12	6/14 X	L-23"	0 0	4	1	0	95	-
	34	12	6/2 X	L-21"	0 0	0	3	5	92	-
//										
	82	5	6/14	Can't Locate						-
	5	5	6/20 X	M-23"	0 0	9	4	1	86	-
	32-2	5	6/30 X	MH-26"	0 0	6	4	3	87	-
	85	5	7/2	Can't Locate						-
	15	5	7/5 X	MH-25"	0 0	0	3	0	97	-
	8	15	6/16	Can't Locate						-
	42	6	6/20	Can't Locate						-
	95	5	7/15 X	HH-24"	2 2	26	5	6	61	-
	98	6	7/2 X	H-26"	0 0	0	14	22	64	-
	83	6	7/10	Can't Locate						-
TUNK	2	6	7/13 X	ML-21"	0 0	14	55	4	27	-
	17-2	5	7/17 X	H-19"	8 8	0	6	3	83	-
	UNK	5	7/16	MH-20"	9 9	1 ^{9.9}	16 ^{15.5}	6 ^{5.8}		103
	UNK	5	UNK	MH-23"	4 4	0	4	2	90	-
	56	1	7/17 X	Sand M 23"	1 1	0	16	12	71	-
	8	16	7/14 X	Sand MH 31"	3 3	0	1	4	92	-

T.No.	AREA	Orig Date	depth	live	dead	Partial	NO	EGG Count	
17-1	16	7/5	Sand ML-30"	0	0	6	44	50	-
47	17	6/18	Can't locate			stake knocked over			-
47	17	6/5	Sand ML-24"	0	0	46	2	52	-
192	5	7/29	MH-28"	86	0	7	12	11.4	105 eggs
40	11	6/16	Can't locate						-
32	7	6/19	Can't locate			stake knocked over			-
86	7	7/12	H-16"	0	5	10	28	57	-
63	8	7/18	Can't locate						-
107	5	7/9	H-23"	6	55	2	6	30	-
5	4	7/14	M-23"	1	16	5	0	78	-
UNKN	4	UNKN	M-25"	81	0	5	2		-
94	WS	7/11	HH-23"	0	23	13	4		-
C1845,846	A1-WS	7/10	MH-25"	0	9	66	7	5.3	133
C1847	A12-WS	7/10	Can't locate						-
UNMARKED	A11-WS	7/11	H-25"		49	8	17		-
C1848	A9-WS	7/11	Can't locate						-
UNKN	A9-WS	UNK	Sand ML-31"	61	61	0	5		sand sample
C1849	A8-WS	7/11	coral GRANET 19"	0	4	26	3		-
C1853	A5-WS	7/15	H-24"	13	13	1	3	3.2	94 T205-
C1850	A2-WS		Can't locate						93
88	16	6/17	MH-20"	0	0	4	39	57	-
73	5	7/31	L-24"	3	0	6	4	87	-
21	4	6/17	ML-24"	0	5	32	13	10.3	126
27	3	7/29	M-26"	18	0	1	7	74	-
103	3	7/6	ML-21"	0	4	13	18	65	-
104	1	7/8	L-19"	0	0	17	32	14.3	119
100	1	7/2	L-20"	0	0	20	16	21.5	17.2
108	SP	7/12	Sand L-24"	1	0	21	11	18.6	113
UNK	SP	UNK	Sand L-21"	2	0	22	6	70	-
UNK	1	UNK	L-25"	0	1	3	2	94	-
99	1	7/2	L-18"	0	0	8	15	6.6	121

TNO.	Area	Orig DATE	50' depth	live	dead	partial	NO	EGG count
100 ^{trans}	1	8/2	L-16"	9	1	2	0	92
32 ^{trans}	1	7/16	L-17"	0	3	34	10	108
No trans	1	7/14	L-18"	0	2	21	2	94
17	17	6/14	Can't locate	- knocked over				-
56 ✓	1-SP	6/20 x	sand - 32"	0	0	0	4	96
42 ✓	5	7/16 x	H-25"	0	0	32	7	113
73 ✓	5	7/8 x	H-24"	0	0	5	4	2
41 ✓	16	8/4 x	ML-27"	35	35	0	1	20
UNKN ^{erosion nest}	Sand pit	UNKN	sand	15	0	3	10	-
48 ✓	2	8/2	L-25"	9	9	0	1	6
UNKN ^{erosion}	Sand point	UNKN	sand	0	0	0	0	0
65 ✓	5	7/29 x	ML-22"	1	1	0	2	2
109	5	7/30	H-23"	6	6	0	2	110
117	5	8/3	M-23"	3	3	1	30	10
98 ✓	5	8/1	L-23"	11	11	0	3	2
85	5	7/16	L-22"	Shells decomposed				-
53 ✓	1-SP	7/15	sand	Can't locate				-
49 ✓	SP	7/15 x	sand-25"	3	3	4	16	11
90	SP	7/12	sand-25"	0	0	0	48	16
109	SP	7/12	sand-25"	0	0	0	3	105
UNKN ^{pos 5}	6	8/11 x	rotting veg	44	44	2	7	2
88 ✓	SP	7/15 x	ML-21"	3	3	8	34	2
UNKN ✓	5	UNKN	H-28"	12	12	4	0	20
UNKN ✓	5	UNKN	H-25"	3	3	20	11	30
5 ✓	6	8/10 x	H-23"	46	40	2	0	4
80 ✓	5	8/5 x	ML-22"	7	7	1	15	20
UNKN ✓	sand point	UNKN	sand-26"	12	12	0	3	4
49 ✓	sand point	7/3 x	Can't locate					-
97 ✓	sand point	7/16 x	sand-26"	0	0	0	0	2

304mm 3-52mm
753mm

83

TNO	AREA	orig Date	orig Depth	live	dead	Partial	NO	sur-face 2m	Egg Count
UNKN	5	UNKN	H-21"	66	0	6	1	87	-
56	6	7/30	H-26"	39	0	19	9		-
UNKN	5	UNKN	H-22"	24	1	5	3	47	-
44	11	8/3	ML-21"	10	1	6 ^{6.3}	1	11	95
UNKN	sand point	UNKN	sand slip	44	0	9	8	79	-
32-2	4	8/10	M-26"	84	0	0	0		-
17-2	5	7/31	Can't locate (No eggs?)						-
UNKN	5	UNKN	H-19"	0	0	9	14	77	-
121	6	8/7	H-19"	1	0 ^{1.7}	3 ^{5.2}	10 ^{17.2}		58
65	6	8/12	L-20"	9	0 ^{11.3}	5 ^{6.2}	2 ^{2.5}		80
112	9	8/11	H-24"	77	2	2	0		-
86	9	8/6	MH-25"	30	1	0	26	43	-
(Trans) 107	1	8/9	L-12"	3	0	6	4		13
110	13	7/29	Can't locate - stake intact - poss no eggs						-
83	13	8/2	ML-24"	10	0	0	114		infertile 101
85	5	7/30	ML-19"	0	1	9	10	80	-
83	5	8/15	H-26"	10	0	0	90		infertile
2	5	8/1	MH-22"	0	6	29	64		-
118	5	8/4	H	Can't locate - good stake - poss no eggs					-
ci 840 57	5	8/6	MH-27"	83	0	0	1		-
70	6	8/2	ML-23"	5	1	9	39	46	-
74	6	8/6	MH-24"	12	0 ^{2.5}	7 ^{14.6}	1 ^{2.1}		48
62	6	8/8	ML-25"	3	2	4	2	89	-
111	6	8/7	H-25"	104	1	11	10		126
95	6	8/13	H-24"	86	8	8	5		-
106	11	8/3	ML-25"	107	1	16	21		-
63	8	8/1	H	51	3	3	1		-
113	8	7/30	H-17"	0	0	0	55	45	-
UNKN	17	UNKN	MH-26"	0	0	20	11	69	-

All nests including egg counted
 Egg count $\bar{x} = 104.9$ $\sigma = 22.5$ $n = 50$ Range =
 * hatched but dead + dead eventual $n = 166$ $\bar{x} = 7.9$ $\sigma = 11.0$ excluding infertile Range = 7.5%
 NO DEV + partial $n = 169$ $\bar{x} = 20.0$ $\sigma = 21.1$ excluding infertile nests Range = 19.1%
 Total of 4 completely infertile nest. 73.4% surface emergence

Counted nests -
 hatched dead + dead eventual $n = 36$ $\bar{x} = 6.4\%$ $\sigma = 9.8\%$ Range = surface emergence -
 NO DEV + partial $n = 36$ $\bar{x} = 18.9\%$ $\sigma = 18.5\%$ Range = 74.7%

Transplants
 hatched dead + partial $n = 6$ $\bar{x} = 2.6\%$ $\sigma = 4.2\%$ surface emergence
 NO DEV + partial $n = 6$ $\bar{x} = 27.7\%$ $\sigma = 15.6\%$ 69.7%

12/14/24 calculate all non-counted nests using \bar{x} for egg count to determine surface emergence, hatched but dead, no devel. and partial developed.

* Not including - some nests excavated too early; whale-skate nests; very low number nests; transplants, and erosion nests.

Notes - More SA ^{Tops} during latter part of intensive study
10/3 Pups weaned together subsequently stay together
Many adults in good body conformation - some pregnant?

Seal Tag Summary May 30, 74 -

<u>Date</u>	<u>IS</u>	<u>TYPE</u>	<u>TAG NO</u>	<u>date</u>
6/1/74	WS	A	(P) A914	7/10
6/3	E	A	(P) A451	7/10
6/6	E	SA	(P) A756	7/10
6/7	R	SA	(P) A954	7/10
6/7	R	A	698	7/10
6/7	WS	A	A797	7/10
6/11	E	SA	(P) A104	7/10
6/12	WS	SA	(P) A754	7/10
6/12	WS	A	(WS) A797	7/10
6/12	WS	A	(WS) A914	7/10
6/12	E	SA	(P) 958	7/10
6/14	E	SA	(E) 756	7/10
6/17	E	SA	(P) A909	7/10
6/17/6/18	E	SA	(P) A923	7/10
6/28	WS	A	(P) A954	7/10
6/28	TRIG	SA	(E) 756	7/10
6/28	E	SA	(E) A797	7/10
6/30	E	SA	(P) A757	7/30
6/30	E	SA	(E) A909	7/30
6/30	WS	SA	(E) A451	7/30
6/30	E	A	(E) A787	7/30
7/4	E	SA	(P) A787	7/30
7/5	TRIG	SA	(E) A923	7/30
7/7	E	A	(E) A451	7/30
7/7	E	SA	(P) A1045	7/30
7/8	WS	A	(P) 922	7/30
7/8	WS	A	(P) 907	7/30
7/9	E	SA	(E) A451	7/30
7/8	WS	SA	A918	7/30

6' 1" 72" 10/7

Belly SCAR

A209

A906

yellow plastic removed

~~6' 1" 72" 10/7~~

6' 5" SA 77" 10/7

Ⓢ Is. of previous observation.

Ⓟ red; animal previously observed during 1973.

— ← yellow; - newly observed during 1974 study.

Date	IS	Type	Tag NO
7/10	WS	A	(E, TRIG) 923—
7/10	WS	A-SA	A 673*
7/10	WS	SA	(WS) A 918—
7/10	WS	A-SA	(E) A 756—
7/10	WS	A	(P) A 215*
7/10	WS	A	(WS) A 907—
7/10	WS	SA	(E) 922—
7/10	WS	A	(P) A 920*
7/10	WS	?	— 690*
7/11	WS	SA	(P) 902*
7/11	E	SA	(P) 766*
7/14	E	SA	(P) 786*
7/14	E	SA	— A 1033*
7/15	WS	A	(WS) 902—
7/16	E	SA	(E) 757—
7/16	E	SA	— 921*
7/27	WS	A	(WS) 920—
7/27/30	F	SA	(E) 757—
8/3	^{DIS} WS	^A A	(P) A 8*
8/3	WS	SA	(P) 916*
8/3	E	SA	10/960" on 5' (P) A 1034*
8/4	E	SA	(P) 775*
8/4	E	SA	(E) 1034—
8/6	E	SA	(E) A 1045—
8/6	E	SA	(WS) A 754—
8/7	E	SA	(P) A 1091*
8/7	E	SA	(E) A 1045—
8/7	E	SA	(P) A 975*
8/9	WS	A	— A 788*

<u>DATE</u>	<u>IS</u>	<u>TYPE</u>	<u>TAG NO</u>
8/9	WS	SA	(WS) A916-
8/9	WS	SA	(WS) A914-
8/9	WS	SA	(P) A915*
8/9	WS	SA	A967*
8/9	WS	SA	(P) 1032*
8/9	WS	SA	(P) A926*
8/13	F	SA ^{80"} _{on} 6'8"	(E) A775-
8/13	F	SA ^{74"} _{on} 6'2"	A763*
8/13	E 75" 6'3" 9/20	SA 71" 5'11"	(E) A757-
8/13	F	SA ^{75"} _{on} 6'3"	A774*
8/13	F 69" _{on} 5'9" 10/3	SA ^{66"} _{on} 5'6"	(WS, E) A754
8/14	WS	SA	A987*
8/14	WS	SA	(WS) A918-
8/14	WS	SA	(WS) 915-
8/12	TRIG	SA ^{dead} _{65"} 5'5"	A904*
<hr/>			
9/10/74	F	SA	A754
9/21	F	SA	1041
9/23	W-S	SA	A500
10/3	W-S		64" 956
10/3	W-S		66" 1036
10/3	W-S		Head scar 212
10/3	E		69" 754
10/7	E		77" 787
10/7	E		60" 1034

Substrate temperatures

Sand point - depth 19" 26.5°C (dry to 4 inches)
 Area 1 - " 19" 28°C
 area 17 - " 19" 28°C
 area 5 - " 19" 27°C (need recheck)

Humus - Veg? - Darker color? responsible for
 elevated temperature?
 8/13
 8/A

OBSERVED EMERGENCE OF HATCHLINGS

DATE ORIG OBSERVED EM	AREA	TC NO.	STAKE TC	DATE	ELAPSED DAYS	AREA	EXCAV. DATE	COMMENTS
7/8		UNKN	UNKN	-NONE		3	7/18	
7/14		UNKN	UNKN	-NONE		5	7/18	
7/30		UNKN	UNKN	-NONE		4	7/31	
7/30		UNKN	UNKN	-NONE		8	7/31	
8/1		UNKN	UNKN	-NONE		7	8/2	Subsequent complaint of 39 close to surface Sub. complaint 30 close to surface
8/1		UNKN	<6/1			11	8/2	
8/2		T32	126 eggs	6/2	61	7	8/7	
8/3		UNKN	UNKN	-NONE		SW SHORE W-5	Notable to locate 8/14	
8/3		UNKN	UNKN	-NONE		3	8/3	
8/3		UNKN	UNKN	-NONE		5	8/3	
8/6		UNKN	UNKN	-NONE		7	8/6	
8/6		UNKN	UNKN	-NONE		7	8/6	
8/6		T54	111 eggs	6/8	59	4	8/13	
8/7		T5		6/7	61	5	8/13	
8/7		T69	108 eggs	6/11	57	2	8/12	
8/6		T74		6/13	54	12	8/13	Stake retained opposite side for further check of stake
8/7		UNKN	UNKN	-NONE		5	8/7	
8/8		UNKN	UNKN	-NONE		5	8/12	
8/9		T44		6/4	66	12	8/14	
8/10		UNKN	UNKN			9- X	8/14	
8/10		T33	101 eggs	6/4	67	6	8/14	poss
8/10		T23		6/2	69	13	8/14	
8/10		T16	107 eggs	6/9	62	7	8/14	
8/12		T56		6/7	67	5 or 6?	8/14	
8/13		T48		6/8	66	10	8/14	
8/9		UNKN	poss	6/14	unkw	66	8/14	
8/14		UNKN	miss adjacent to poss miss	6/14	unkw	71	9/22	
8/14		T27	microphone	6/2	70	12	8/14	No real emergence peak ever noted - 1500 of 8/14
8/13		T2		6/3	70	8	9/27	

DATE ORIG OBSERVED	EM/HAT TC NO.	STAKE TC DATE	ELAPSED DAYS	AREA	EXCAV. DATE	Comments
8/14	T13	6/4	68	12	9/22	Temp. PROBE
8/14	T78	6/13	59	6	9/25	

9/19/74 EXPEDITION

page 59	T1	6/13		Sand point	9/20	Friday
page 66	T89	7/3		area fine pit	9/21	
9/21 page 60	T88	7/2	approx	Sand point	9/21	38 mm surface
—	T49P	6/5		Sand point	9/21	can't locate
—	H	6/20		Sand point	9/21	few decomposed
page 66	T41	6/13		sand point	9/22	can't locate
page 66	T53	6/7		sand point	9/22	
—	T90P	6/30		sand point	9/22	can't locate
—	T97	7/1	10/5	sand point	9/22	can't locate; stake retained
—	T8	7/13	18 eggs	Sand point	9/22	can't locate should recheck
—	T49	7/3		Sand point	9/22	can't find
9/22 page 60	T49 HAT 10/2	7/15		sand point	9/22	stake retained & removed, topped
page 63	T8	6/28		area	9/22	egg yolk present, reburied
—	T27	6/30		area	9/22	
HEREAFTER EX COUNTS IN TABLE ONLY	T32-2	7/12		area	9/22	

9/22	T89	7/14	80	15	9/28	
—	T80	7/9		16	9/23	
—	T23	7/13		15	9/23	
—	T110	7/14		15	9/23	125 eggs
—	T15	6/9		14	9/23	
—	T72	6/11		14	9/23	can't locate
—	T76	6/13		12	9/23	
—	T22	6/15		12	9/23	
—	T87	6/17		12	9/23	
—	T46	7/14		2	9/24	sub sample

Dg teorig
OBSER. F.A./H.A.

	TC NO	TC stake Date	ELAPSED Days	Area	E. Cas. Date	Comments
-	17 ⁸⁰⁹	7/2		2	9/24	
-	27	7/14		3	9/24	
-	69	7/8		3	9/24	
-	54	7/12		3	9/24	
-	36	7/4		3	9/24	
-	39	6/17		5	9/24	
-	27	6/16		17	9/24	sub sample
-	47	7/2		17	9/24	
-	41	7/5		17	9/24	
-	74	7/9		17	9/24	
-	43	7/7		17	9/24	
-	UNKN	UNKN		8	9/24	48 out of pock on 9/22
-	46	7/2		1	9/25	
-	105	7/9		17	9/25	
-	70	6/11		5	9/25	
-	57	7/11		5	9/25	
-	56	7/4		6	9/25	114 eggs
7/17 18 7/16 16 9/25 16						
-	92	6/29		6	9/25	
-	16 ⁽¹⁶⁵⁾	7/2		6	9/25	
-	39	7/12		5	9/25	
-	21	6/30		5	9/25	
9/26	2	7/17	J-51mm 3-53mm 3-52mm 71	5	9/29	
-	98	7/16		5	9/26	
-	33	6/17		5	9/26	could locate
-	84	6/15		5	9/26	ground wire
-	65	7/4		5	9/26	
-	64	7/10		12	9/26	1 enlarged egg
-	62	7/15		12	9/26	ground wire

<u>Date orig</u> <u>over JEM</u>	<u>TC NO</u>	<u>TC stake</u> <u>Date</u>	<u>Elapsed</u> <u>Days</u>	<u>area</u>	<u>Date</u> <u>Scan</u>	<u>Comments</u>
-	UNK	6/22-6/27		11	9/26	
-	18	6/30		11	9/26	general area
-	9	7/11		11	9/26	
9/26	56	7/17	71	area - SP	9/29	front of Tent
9/26	111	7/15	73	12	9/28	13 live removed
9/26	17-2	7/16	2-54mm 2-56mm 3-55mm 1-50mm 1-53mm	5	9/29	103 eggs
-	82	7/10		6	9/27	
-	95	6/30		6	9/27	142 eggs
-	102	7/3		6	9/27	
-	83	6/15		6	9/27	
-	85	6/18		6	9/27	can't locate
-	54	6/30		6	9/27	
-	42	7/2		6	9/27	
-	94	6/30		6	9/27	131 eggs can't locate
-	65	7/16		6	9/27	4-53mm 2-54mm
-	53	7/4		6	9/27	81 eggs
-	62	7/2		7	9/27	
-	46	6/4		7	9/27	can't locate shell casings
-	22	7/10		7	9/27	can't locate
-	58	6/7		10	9/27	
9/26	108	7/12	76	SP	10/1	113 eggs
-	XX	7/15		12	9/28	Big coral on top
-	23	6/30		11	9/28	1 painted AIBING PHOTO
-	72	7/6		12	9/28	Ground wire
-	87	7/4		11	9/28	
-	40	7/11		11	9/28	93 eggs
-	106	7/9		11	9/28	118 eggs
-	101	7/3		11	9/28	
-	89	6/19		10	9/28	

Date orig OBSERV	EM/HA	TC NO	TC stake date	Elapsed Days	area	Date EX	Comment
-		86	6/16		9	9/28	Cont Locate
-		40	6/28		9	9/28	
-		39	6/29		9	9/28	Cont Locate
-		5	7/2		9	9/28	
-		63	7/6		9	9/28	
-		2	7/3		SEP	9/28	1 pea egg 1-8pc
9/28		27	7/29	2-54mm 1-55mm 6-52mm	3	10/1	6-51mm 8-52mm 8-53mm
9/29		41	8/4	1-54mm 2-51mm 4-53mm 6-4-50mm 1-49mm 2-49mm 8-52mm 1-54mm 3-53mm 56	16	10/2	
-		25	7/7		16	9/29	
-		391	7/5		16	9/29	
-		58	7/6		14	9/29	ground wire large 3 small eggs
-		33	6/29		4	9/29	
-		66	7/7		5	9/29	
-		32	7/2		13	9/29	
-		34	6/28		12	9/29	
-		63	6/8		12	9/29	ground wire
-		44	6/4		12	9/29	second
-		74	6/13		12	9/29	ground wire second
-		34	7/10		12	9/29	152mm ground 1-54mm wire
-		34	6/14		12	9/29	ground wire
-		34	6/2		12	9/29	ground wire
-		82	6/14		5	9/29	cont locate
-		5	6/20		5	9/29	
-		32-2	6/30		5	9/29	
-		85	7/2		5	9/29	Cont locate
-		15	7/5		5	9/29	
-		8	6/16		15	9/29	cont locate
-		42	6/20		6	9/29	cont locate
-		95	7/15		5	9/29	

Date orig obs. JEM/HK	TCNO	TC stake Date	Elapsed Days	area	Date EX	Comments
-	98	7/2		6	9/29	
-	83	7/10		6	9/29	can't locate
-	UNK	7/13		6	9/29	ground wire
-	UNK	UNK		5	9/29	50mm 47mm (centrals)
-	17-1	7/5		16	9/29	2-49mm
-	8	7/14		16	9/29	
9/29	192(42)	7/29	49-1 51-12 53-22 55-4 50-3 52-11 54-31 56-25	62 16	9/30	105 eggs
-	47	6/18		17	9/30	stake knocked over
-	47	6/5		17	9/30	
-	40	6/16		11	9/30	can't locate
-	32	6/19		7	9/30	can't locate - knocked over
-	86	7/12		7	9/30	
-	63	7/18		8	9/30	can't locate
-	107	7/9		5	9/30	
-	5	7/14		4	9/30	
-	UNKN	UNKN	50-1 52-14 54-23 56-1 51-7 53-25 55-9		9/30	near 32-2 8/10
-	88	6/7		16	10/1	
-	73	7/31		5	10/1	
-	21	6/17		4	10/1	126 eggs
-	103	7/6		3	10/1	
10/1	48	8/2	4 live in cage 10/1	60	10/3	heads out
-	104 trans	7/8		1	10/1	119 eggs
-	100 trans	7/2		1	10/1	93 eggs
-	UNK	UNK		Sand point	10/1	Between 97 7/1 & 90 8/9 fairly fresh near 41 6/4
-	UNK	UNK		1	10/1	
-	99 trans	7/2		1	10/1	121 eggs
-	100 trans	8/2	1-48mm 2-53mm 4-51mm	1	10/1	92 eggs
-	32 trans	7/16		1	10/1	108 eggs
-	NOT trans	7/14		1	10/1	94 eggs

*** } Same nest

Date orig obs. EM/HAT	TC NO	TC stake date	Elapsed Days	area	Date EX	Comments
10/2	17	6/14		17	10/11	cont locate
10/2	65	7/29	cage 81 live-10/3	5	10/4	1-55mm knicked over wire cage
10/2	98	8/1	65	62	10/4	1-49 3-52 2-50 1-55
-	56	6/20		5 across to 12	10/4	shells decomposed
10/2	117	8/3	1-52mm 1-54mm	60	10/2	1-52mm 1-50mm
-	42	7/16		5	10/4	poss HAT 10/2
-	73	7/18		5	10/2	
10/2	88	7/15	cage	5	10/2	
- UNKN	UNKN	UNKN	3-52 2-54 2-55 5-53 2-51 1-50	80 Sand point	10/5	1-59mm 1-56mm 1-57mm 10/2 wire cage - 14 43 live-10/4
10/3	UNKN	UNKN	11-51mm 4-54mm 1-49 10-52mm 1-55mm 1-48 10-53mm 6-50mm	Sand point	10/2	Eroded bank of S hatchlings showing near T84
-	UNKN	7/12	possibly 109	6 Rotting veg near surface	10/5	11
-	109	7/30	2-53mm 1-56mm 2-55mm	Sand point	10/4	Trans H. O Eroded nest - 29 parasites (open) to A eggs good cond.
-	85	7/16		5	10/4	1 giant (16eg)
-	53	7/15		5	10/4	shells decomposed many appear hatched
10/4	97	7/15		10 SP	10/4	cont locate
-	49	7/15	1-51 1-52	Sand point	10/4	cont locate
-	90	7/17		Sand point	10/4	
-	109	7/12	eggs in relatively good condition	Sand point (NO EM?)	10/4	2 giant / low H ₂ O
* 10/4-10/5	5	8/10		56	10/6	
10/4-10/5	56	7/30		57	10/7	
10/4-10/5	44	8/3		63	10/7	HEAD Showing
* 10/4-10/5	80	8/5		61	10/7	cage 95 eggs
10/4-10/5	32-2	8/10	11-52 15-55 1-50 31-53 1-56 28-54 6-51	61	10/6	CAGE HEAD showing
*** 10/5	UNK	UNK	Between 107 & 104 8/4	4 Bout 10/4 - many under cage	10/6	CAGE Head showing cage 10/6-99mm
-	UNK	UNK		5	10/6	
-	UNK	UNK		5	10/6	
* 10/6	5	8/10	8-52mm 14-53mm	14-53mm 5-55mm	10/6	
10/6	121	8/7		60	10/8	58 eggs
10/6	65	8/12	1-56 1-55 3-53 1-51 2-54 1-52	55	10/8	80 eggs

Date only observed	HAT	Tc No	Tc stake date	ELAPSED DAYS	area	Date EX	comments
10/6		112	8/11	56	9	8/10	1-51 23-54 16-52 8-55 24-53
10/6		63	8/14	53	9		110 eggs
**		80	8/5	1-55mm 1-54mm	5	10/6	1-48mm
***		UNK	UNK	1-53mm 1-49mm			1-45mm 1-54mm
-		49	7/8	1-51mm 2-53mm 3-54mm 1-59mm 3-56mm	Sand point	10/6	1-59mm 1-55mm
-		H	7/31		Sand point	10/6	cont locate
-		49	7/29		Sand point		stake returned
-		97	7/16		Sand point		stake returned
-		49	8/12		Sand point	10/6	stake returned
-		90	8/9		Sand point		stake returned
-		115	8/1		Sand point		109 eggs
-		104	8/7		Sand point		stake returned
-		107	8/9		Sand point		92+14 eggs stake returned
10/6		UNK	UNK	14-55mm 2-52mm 6-54mm 2-56mm 9-53mm 3-57mm	Sand point	10/8	36 live 10/7 1-52 2-53 CAGE
10/7	POSS HAT	2	8/1	67	5	10/9	
-		UNKN	UNKN	1-52mm 9-55mm 5-53mm 2-56mm 5-54mm 3-57mm	5	10/7	
-		UNKN	UNKN		5	10/7	Adjacent to 118 8/4
10/7		95	8/13	55	6	10/9	86 live
10/7		63	8/1	67	8	10/9	
10/7	NEAR TUB	UNKN	UNKN				
-		17-2	7/31		5	10/8	cont locate
-		UNKN	UNKN		5	10/8	
10/8		74	8/6	63	6	10/9	48 eggs
10/8		68	8/8	61	6	10/9	
10/6		86	8/6	61	9	10/8	1-51 12-54 6-52 2-55 9-53
10/8		UNKN	UNKN				
-		107 trans	8/9		13	10/8	13 Still have YOLK SAC DID NOT EM 13 eggs
-		110	7/29		13	10/9	cont locate - good
-		83	8/2		13	10/9	stake - poss no eggs 101 eggs TO P107

Marked location of whale-skate nests

Date	TC or TOG	area	
7/10	C1845, 846	area 1	* 133 eggs ± 5
7/11	" 847	area 12	*
7/11	" 848	area 8	*
7/11	" 849	area 8	*
7/11	" 850	area 2	* 93 eggs
7/11		area 11	*
7/12	T94	area 1	*
7/15	T205, C1853	area 5	* 94 eggs
7/			

Date orig obsen EM/HT	TCNO	TC stake DATE	ELAPSED DAYS	AREA	DATE EX	COMMENTS
-	85	7/30		5	10/9	red shell and bone in pit
-	83	8/15		5	10/9	90 all no develop
-	118	8/4		5	10/9	capit locale - good stake - poss no eggs
-	57 ^{c1840}	8/6		5	10/9	dug into chamber - 83 live
-	70	8/2		6		
<hr/>						
-	111	8/7		6	10/9	42 eggs dug into chamber
-	106	8/3		11	10/9	9" deep - no indentation 107 live - dug into chamber
-	113	7/30		8	10/9	at 10" - No indent at surface. only 55 no develop - good condition
-	UNKN	UNKN		17	10/9	
↓ stake left on East IS > 10/9/74 excluding sand point (P. 105)						
	88	8/13		17		
	116	8/1		17		Heads at surface
	89	8/9		17		
	46	8/7		17		109 (+5?) eggs
	88	7/29		16		Heads at surface
	17-2	8/8		15		poss HATCH/EM
	120	8/6		5		
	73	8/13		5		
	85	8/12		6		
	165 = T16	8/11		6		
<hr/>						
	106	8/15		11		
	-63	8/14		9		
	122	8/10		9		
	56	8/12		1		
	119	8/5		1		
	179	6/14		17		stake removed
	17	8/17		17		stake probed over - buried
	17	8/17		17		stake probed over - buried

Entered twice

stake removed
stake probed over -
buried
stake probed over -
buried

Whale Skate TC and TAG

TC	SEX	orig status	orig TC date	CI/FW	curved	straight
-	F	N	7/10	845; 846	39 x 35 ³ / ₄	
-	F	N	7/11	847	39 x 34 ³ / ₄	
-	F	N	7/11	848	39 ¹ / ₂ x 38 ¹ / ₄	
-	F	N	7/11	849	38 ¹ / ₂ x 38	
-	F	N	7/11	850	36 x 32 ³ / ₄	
-	F	N	7/11	.	36 ⁵ / ₈ x 36	
200 ^{AV}	F	N	7/12	851	41 ¹ / ₄ x 37 ¹ / ₂	
94 ^{white}	F	N	6/30 ^{Book 1}	794; 795	39 ¹ / ₄ x 36 ³ / ₄	
202 ^{AV left only}	F	N	7/12			
203 ^{AV}	M	B	7/14			
204 ^{AV}	M	B	7/14	852	37 ¹ / ₄ x 35 ¹ / ₄	
205 ^{AV}	F	N	7/15	853	37 ¹ / ₄ x 34 ³ / ₄	

C1853 Report from R. W.
9/11/74 Princeville, KAUAI
MR. J. HERBER
Tel 826-6198 ext 38
P.O. Box 368
LITUKE, KAUAI
96766

Tom
Kelfel -
Biologist
ON KAUAI 9/16

Mike Fujimoto

TC	SEX	ORIG STATUS	orig TC date	CI / FW	curve	straight
110	F	N	7/14	843 ^F 854 ^F	39 x 37	37 $\frac{1}{4}$ x 29 $\frac{1}{2}$
111	F	UNKNOWN	unreadable unknown	844	39 x 37 $\frac{1}{2}$	37 $\frac{1}{2}$ x 29 $\frac{1}{2}$
112	F	N	7/29	855	36 $\frac{1}{4}$ x 33 $\frac{1}{2}$	
113	F	N	7/30	858	37 $\frac{3}{4}$ x 35	36 $\frac{1}{4}$ x 27 $\frac{1}{2}$
114	(Same as H)					
115	F	N	8/1	859	36 $\frac{1}{4}$ x 35 $\frac{1}{2}$	34 $\frac{1}{4}$ x 28 $\frac{1}{2}$
116	F	N	8/1	860	39 $\frac{3}{4}$ x 38	38 x 28 $\frac{1}{2}$
117	F	N	8/3	861	39 x 37 $\frac{1}{2}$	37 $\frac{1}{4}$ x 29
118	F	N	8/4	862	36 $\frac{1}{4}$ x 33 $\frac{1}{2}$	34 $\frac{3}{4}$ x 27 $\frac{1}{2}$
		B	8/5	—	841 x 41 $\frac{1}{2}$	39 $\frac{1}{2}$ x 33 $\frac{3}{4}$
119	F	N	8/5	863	37 $\frac{3}{4}$ x 35	35 $\frac{3}{4}$ x 28 $\frac{1}{2}$
120	F	N	8/6	865 ^F	38 $\frac{1}{4}$ x 36	36 $\frac{1}{2}$ x 28 $\frac{1}{2}$
121	F	N	8/7	864	—	—
122	F	N	8/10	867	37 ^{at injury} x 29	35 $\frac{1}{2}$ x 27 $\frac{3}{4}$ ^{at injury}
123	F	N	8/10	868 ^F	38 $\frac{1}{2}$ x 35 $\frac{1}{4}$	37 x 28 $\frac{1}{2}$

<u>Date</u>	<u>area</u>	<u>TC</u>	<u>Comments</u>
8/13	area 6	T95X	+ v. ✓
8/13	area 17	T88X	* ✓
8/14	area 9	T63X	* ✓
8/14	area 5	T83X	<u>110 eggs</u> ✓
8/14	area 11	T106X	* ✓

date	area	TC	comments
8/5	area 5 ^{changed to 5/8/14}	80 X	* ✓
8/5	area 1	T119 X	* ✓
8/6	area 9	T86 X	* ✓
8/6	area 5	T57 (840) X	* ✓
8/6	area 6	T74 X	* <u>48</u> eggs ✓
8/6	area 5	T120 X	* ✓
8/7	sand point	T104 X	* ✓
8/7	area 17	T46 X	* <u>109</u> (+5? eggs) ✓
8/7	area 6	T111 X	* <u>113</u> eggs ✓
8/7	area 6	T121 X	* <u>58</u> eggs (+19 ea) ✓
8/8	area 6	T5 or T62 ^{probably}	* ✓
8/8	area 15	T89 ^{most likely} could be T17-2	* ✓
8/9	area 17	T89 X	* ✓
8/9	sand point	T107 X (A1 13 trans)	* <u>92</u> (+14) = <u>106</u> eggs ✓
8/9	sand point	T90 X	* ✓
8/10	area 9	T122 X	* ✓
8/10	area 4	T32-2 X	* ✓
8/10	area 6	T5 X	* ✓
8/11	area 6	T84 X	* ✓
8/11	area 9	T112 X	* ✓
8/11	area 6	T16 = (165) X	* ✓
8/12	area 6	T85 X	* ✓
8/12	area 1	T56 X	* ✓
8/12	area 6	T109	* ✓
8/12	area 1	T17 X	* ✓
8/12	sand point	T49 X	* ✓
8/12	area 6	T65 X	* <u>80</u> eggs ✓
8/13	sand point	T109 X	* ✓
8/13	area 5	T73 X	* ✓

Date	area	IC	EGGs, comments	Date
7/29	area 13	T110 X	*	7/14
7/29	area 11	T112 X	* ^{not staked} ^{by Round and log E}	7/14
7/29	sand point	T49 X	* ^{offload} ²⁰⁹ * likely log	7/14
7/29	area 16	T88 (098)	*	7/14
7/29	area 3	T27 X	*	7/14
7/29	area 5	T65 X	*	7/14
7/29	area 5	T42 X (T192)	* 105 eggs	7/14
7/30	area 5	T109 X	* ^{2/100c - 1 broken}	7/14
7/30	area 5	T85 X	* 117 egg	7/14
7/30	area 6	T56 X	*	7/15
7/30	area 8	T113 X	*	7/15
7/31	area 5	T73 X	*	7/15
7/31	area 5	T17-2 X	*	7/15
7/31	sand point	H (T114) X	*	7/15
8/1	area 5 across TO area 12	T98 X	* likely	7/16
8/1	sand point	T115 X	*	7/16
8/1	area 5	T2 X	* likely	7/16
8/1	area 8	T63 X	* likely	7/16
8/1	area 17	T116 X	*	7/16
8/2	area 6	T70 X	*	7/16
8/2	area 17	T100 X	* ^{transplanted} ^{to area 1}	7/16
8/2	area 13	T83 X	* ^{101 eggs}	7/17
8/2	area 7	T48 X	*	7/17
8/3	area 11	T106 X	*	7/17
8/3	area 11	T44 X	* ^{95 eggs}	7/17
8/3	area 5	T117 X	* ^{95 estimate} ^{not official egg count}	7/18
8/4	area 16	T41 X	*	7/18
8/4	area 5	T118 X	*	7/18

marked location of nests ^{date} 7/13-7/14 on

Date	area	TC	Eggs, comments
7/14	area 5	T95 X	* ✓
7/14	area 6	T165 (16) X	mapped * ✓ Not staked - nest immediately inland of T94 (3/17) ✓
7/14	area 15	T89 X	* ✓
7/14	area 16	T8 X	* ✓
7/14	area 2	T46 X	* ✓
7/14	area 4	T5 X	* ✓
7/14	area 1	NOT observed	Saw through Binoculars 93 (H1) eggs * ✓ transplanted from end of Sand point
7/14	area 15	T110 X	* ✓ 125 eggs ✓
7/14	area 12	T111 (Tunread) X	* ✓
7/15	area 12	T62 X	* ✓
7/15	area 1	T53 X	by tent corner * ✓ right next to T56 9/20
7/15	Sand point	T49 X	* ✓
7/15	Sand point	T88 X	mapped 7/16 * ✓ opposite flag - check with nest
7/14	area 3	T27 X	* ✓
7/16	area 5	T42 X	* ✓
7/16	area 5	T85 X	* ✓
7/16	area 5	T17-2 X	* ✓ 103 egg ✓
7/16	Sand point	T97 X	* ✓ almost certain ✓
7/16	area 6	T65 X	* ✓
7/16	area 5	UNKNOWN X	may be T21 * ✓ not staked ✓ 6-8' Right of pole from T39 7/12
7/16	area 5	T98 X	* ✓ 80+5 eggs ✓
7/16	area 5	T32 X	108 eggs * ✓ transferred to area 1 ✓
7/17	area 5	T2 X	* ✓
7/17	area 1 (Sand point?)	T56 X	* ✓ Tent corner stake block #2 to T56 7/17 = 14' 10"
7/17	area 17	UNKNOWN X	Not staked ~ 3' seaward of T47 7/12 * ✓
7/17	Sand point (uncertain location)	T100 X	6 paces W of T97 7/1 * ✓ not marked yet possible take ✓ not staked
7/18	area 8	T63 X	* ✓
7/18	area 5	T73 X	* ✓ stake located just SW of T21 7/30

7/27/18

No NESTED

Misc Notes made prior to study-

Turtle contact with ocean bottom -

Awareness of bottom - surface distance & slope - ^(Sonne)

Bottom for sleeping - feeding -

Feed in shallow (area) on bottom -

Maximum depth obtainable - Usual depths utilized -

Surface dangerous from standpoint of predation, however, heat at surface except possibly in the presence of wind (heat loss from evaporation vs heat gain from radiant energy -

at what size is animal capable of moving at will?

Fat storage in juveniles?

How long for, without food?

Average speed - no. of days, considering currents, etc.

at $1\frac{1}{2}$ knot per hour, FFS - Honolulu = ~ 15 days.
however, stops could be made at Necker, Nihoa, Niihau - Kawai. - Consider Johnson Island.

Kauai to FFS interaction ~ 380 miles -
To other islands much shorter between channels.

Notes on the formation of migration patterns 8/24/74

Ascension Island - last and youngest IS formed.



Differences - ① Island to Island rather than continent to Island. ② Islands along route still exist above water, however, some have sunk (shoals and banks of today).

Questions - Previous size of NWHI [P;H]? sink of land masses? Wind and current at time [?] of HA formation? Rate of formation of Island? Uniform rate? Longer distance between FFS and next suitable nesting site [presently Nihoa]. Geologic time of first HA formation vs appearance of sea turtles.

abundance of algae at P-H Midway area? Current-temperature changes between Kure and Midway?

Why leave PH area [assuming oldest site: point of origin] to breed on other IS? fewer predators as predators increased, animals became adapted to go further? Wind-current pattern in agreement for hatchling with Brazil-Ascension, assume PH original at one time, for whatever reason [unable to locate on intensification], turtle did not stop at FFS but rather continued on to Necker which may have had suitable beach. after nesting, return to PH area was made.

Eggs hatched, young drifted to PH. These animals would then be fixated on Necker at time of reproduction - no desire to stop at FFS.

as time passes, some animals may then in turn pass up Necker and proceed to Kawai [Kawai - other major IS interactions appears easy to explain]. Kawai represents a new IS, lots of coral sand beaches. Eggs are layed and ① Female returns to PH area ② Some Females for some reason (to tired) do not return but rather stay in area or at least around these large islands, find food etc. ∴ not desire to make long travel. Eggs on Kawai beach hatch, currents keep them in area or move them back up chain. Some return at adult size (however with advent of man number are greatly reduced). Fixation on major IS beaches produces a major IS population that does not have to migrate great distances [or else when population was high some animals made the full seasonal trip between PH area and majors].

Question - Resident populations at PH are of great interest.

Previous section attempts to explain population of major with sea turtles, nest on major beaches, - all from oldest site (PH) to newest site (majors). Next area of consideration is the development of a major IS to FFS and return pattern. Some of turtles hatched in major would be imprinted for FFS [seems unlikely that animals hatched in major would be imprinted for FFS] and periodically travel back and forth to that site for reproduction. why? Migratory station theory - SA ended up around majors therefore at maturity was motivated to go to FFS. Therefore two patterns of successful development for immatures - 1 group stays between Midway and FFS islands and develops; 2nd group gets to majors, develops, and returns to FFS. Presence of very small around majors can be explained by the presence of some nesting in these islands by the group while formed there. Possibly only some adults get to majors, accidentally or on purpose, like it (food) but periodically must return to FFS. In any event the newer islands (majors) would seem to be the sites for movement and development of newer

turtle populations (resting; feeding) since most of NWHI have become small and less hospitable. That this has not been allowed to occur has probably been the result of habitat and the accompanying pressures of their development.

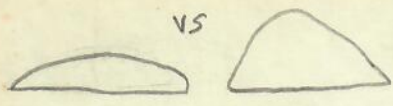
Summary of two important points on rogers - 1. Turtles originate at FFS arrive as SA and mature there; 2. Some get there as adults and stay on.

Question - position of sun at departure time from rogers at P:H? Population numbers at P:H and others during breeding-nesting season vs other seasons [Dec Jan]

Average 5 nesting emergences at 2 week intervals - 10 weeks total - most all arrive by completion of first month (?) of nesting.

Carr (1952) - emergence extends over a 48 h period

"lock" forms as tunneling approaches surface.



- Survival benefit - ?
- wedge in holes
 - shark predation
 - velocity through H_2O
 - intestinal capacity
 - egg capacity
 - conserve heat (mass)
 - increase heat (surface area)

color for back-ground blending?

appear of very young turtles down-wind?

