

FRENCH FRIGATE SHOALS
1981 EXPEDITION 27
25 MAY - 18 JUNE 1981

G.H. BALAZS BOOK 2 TC 90-118

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G.H. BALAZS

Narrative (25 MAY 1981 - 18 JUNE 1981) EXPEDITION 27

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NUMBER OF FEMALES PER NIGHT (page 103)

MAPS OF WHALE-SKATE pages 68-6
MAP OF GIN ISLANDS page 66
MAPS OF EAST ISLAND pages 64

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Turtles Recovered or Tagged BASKING ON EAST
BUT NEVER SEEN NESTING page 99



FRONT FLIPPER WIDTH - (NAIL DIGIT SCALE TO 6th SCALE, POSTERIOR) page 7

COMPOSITION BOOK

9 3/4 IN. x 7 1/2 IN. (24.8 cm x 19 cm)

NUMBER OF NESTERS SEEN EACH NIGHT DURING STUDY PERIOD (BAR GRAPH) p. 19

AVAILABLE AS:

- No. 09-9130 (1130) 60 SHEETS COLLEGE RULED & MARGIN
- No. 09-9132 (1130-P) 60 SHEETS COLLEGE RULED & MARGIN
- No. 09-9134 (1143-X) 100 SHEETS COLLEGE RULED & MARGIN
- No. 09-9132 (1130-P) NUMBERED PAGES

NODDY TERN DENSITY COUNTS - ^{Made in U.S.A.} page 36

VERNON McMILLAN, Inc., ELIZABETH, N.J. 07208

25 MAY 1981

MONDAY

Depart Honolulu ~ 10:20 AM in
 Bob Justman's Beechcraft 18
 fitted with two aerial cameras. Crew
 includes Mechanic - Rob
 Shallenberger and Greg Vaughn. Direct
 flight to Nihoa over Hawaii. Along
 the way I noted: tanker off Honolulu
 Harbor that was leaking a small
 amount of oil; pipeline or trench extending
 off of Barber's Point underwater (photo);
 Kahala Pt power station. Basking sands
 and Nohili ditch (photo).
 Talked to Sheila Conant over Nihoa (photos);
 Flew transects over Necker - noted
 Easy Rider offshore. While approaching
 FFSS we passed low over the
 Ana Riley fishing boat heading east.
 overflew Disappearing - noted one
 basking turtle and two mothers with
 pups. Gin had many turtles
 aggregated around it, particularly on
 the east side. Took numerous
 photos of East Island. Saw turtles
 in the water and on shore around
 East, W-S & Trig. Shallenberger
 reported seeing turtles around
 Shark. Landed at Terns about 2:30 PM.
 Personnel include Beth Flint, Beth
 Shesky, John Andre & Ruth Itner.

CRAIG HARRISON

25 May Unloaded and started organizing gear.
 MONDAY Personnel indicate that a few turtles
 have been basking every day on Tern Is -
 3 site - East End ② South Beach ③ North
 cove. Beth S. reports that she has
 identified 12-13 different turtles that
 have basked on Tern - too hard to tell
 if they are males or females. No tags
 noted. Copulation seen close
 to reshore (recall that Beth Flint sent
 a photo of turtles ^{last season} copulating - was this
 taken off Tern?)

Reported that no pits have been dug
 on Tern as yet.

On 22 May personnel visited the
 various islands - counted 60 turtles
 basking along Whale-Skate.
 During the evening Justina fired
 off flares for test. Mine flared, but
 didn't illuminate. Anchor lights
 from ~~two~~ two boats noted to the
 northeast; Cromwell with Jed Hirota
 reported to be ~ 10 miles offshore. At sunset
 I walked to east end of runway - no turtles
 seen basking or in the water.

26 MAY 1981 Aiplane departed ~ 10 AM.

TUESDAY

Eric on Jaysan reports that the
 first nest of the year was dug yesterday -
 at the island's NE end.
 They see 4-7 turtles basking

26 MAY 81

TUESDAY

each day. During the day I finished organizing and packing all gear - set of 2 antennas - wire couplings needed to be replaced. Also helped Beth F. straighten out directional antenna that is being used to track sooty terns (two at present).

Departed Tern for East at ~ 4:15 PM. One adult turtle seen just off Tern. Arrived ~ 4:45 PM. Noted one turtle basking on Round Is. Mullet not present. East has 10 turtles basking along the N sand point - ~~19~~ ¹ male were found to be females - some tagged.

At ~ 6 PM I walked around the Island - Noted Cheropodium growing profusely in area where slab was removed. Some Noddy's nesting - and a Laysan Albatross being fed by parent. Substrate is hard packed.

Graybacked terns noted, but no sootys. Frigatees roosting on Pyramid. Tagged some of the basking turtles at NEP-SEP. Dinner - Saimin & C-Ration bean and meatballs.

Monitored the island from ~ 11 PM - 2:30 AM. Turtles hurt your ankles - and toes when tagged. Right hand sore - almost got a blister from tagging.

27 MAY 81
 WEDNESDAY "Ticks" are numerous - many ^(Disease carriers? - Look up Amerson Sooty Tern abandonment articles) crawled into tent shortly after dark - Beth Flint also reports seeing many more on Tern than last year.

12 noon - KVAI Radio reported "that gear of missing SCUBA diver was found 60-80' water off Haena - experienced - had been teaching a student - several "tiger sharks" seen (in the area - without found in shreds - numerous teeth marks".

ENTER "GARDEN PLANTATION RESTAURANT" in Kawai book
 ALSO - KENAI & PAPULOW in violation of Nabali plan - DLNR

May 25-26

LONG-TERM
 Recovery Summary -

10 NESTERS, 3 of which were tagged - 30%

19 baskers, 8 " " " " - 42%

(11 females, 4 " " " (-36%)

(7 males, 3 " " " (-43%)

29 Turtles / TAG ENCOUNTERS, 11 ^{were} tagged - 38%

28 May
 Thursday

Consider two types of recovery rate calculation:

- 1.) Percent of turtles encountered that already have tags (as above); and
- 2.) Back computing, that is, what percentage of the turtles (females) ever tagged in one season (year) have subsequently been recovered?

27 May Found letter in bottle at 3:30 PM washed up next to basking female. Sept 27, 76 at 15° 01' N, 95° 56' W
PANAMA TO LA

Cement block 2 clusters of 4
central ones - 92cm x 244cm

Noted some shavings from young albatrosses -
Are tubular objects "quills" from feathers?

Miss Lisa Phillips
c/o A.J. Noon
24 MACAULAY ST.
COORPAROO
BRISBANE, QUEENSLAND

Slept from ~ 7:30 PM - 10 AM. Monitored turtles and composed letter to Army Corps on Barking Sand boat ramp proposal.

28 May 81 Slept from ~ 4:30 - 10 AM. Wind Thursday and sea has calmed down.

Notes on possible articles for preparation:
"Seabird breeding assemblages on East Island"
(Compare with photo counts from aerial survey)
Different Subspecies:
What is difference between species & subspecies?
Japonica? Agassizi? Carrinegra?

28 MAY 81 1) BASK 2) carapace color? 3) Plastron color?
 Thursday 4) shell shape 5) PL color change 6) no
 breeding migrations outside Hawaii

~~Tag~~ Tag recovery records of Hawaiian monk seals
 Rocky offshore islets -
 need Hawaii Visitors Bureau marker (for seaward)
 ENTANGLEMENT SYNTHETIC DEBRIS IN HINWR
 (Consider bottles ashore - always have caps on)

Motored to Tern Is. at 11:15 AM, returning
 at ~ 5 PM. Justman's airplane
 landed about 3:45 PM from Midway.
 Rob reports seeing 27 clustered together
 north of Sand Island, Kure, just inside
 reef in green water.

29 MAY 81 Slept from ~ 5 AM - 10:30 AM. Hot and
 FRIDAY sunny outside, with light wind NE.
 Light rain last night caught me at
 the other end of the island.

Consider focusing more attention on
 Sea Turtles in Hawaii - UNIQUE
 RESOURCE. MEDIA CAMPAIGN. Enhance enforcement
 protection. Posters. Permanent signs. Land basking
 unique.

29 M
 FRIDAY

Sand Poi
 Caretaker
 SW shore
 SNEP
 NE shore
 TOTAL

SP-NEP
 SW shore
 SEP
 NE shore
 NEP
 TOTAL

29 MAY 1981. Cromwell anchored close to Shoals last FRIDAY night - personnel visited Tern Island this morning.

Concrete "Pyramid" has 10-15 frigates roosting at night. NO nesting by this species. Several pieces of wood and metal are now visible around the island, having surfaced since clean-up project.

4 PM seal and turtle count for Rob Schallenberger to compare with aerial photographs.

Seals:

Sand Point	A	SA	P	SWP	
(Area 1)	2 or 1 ⁺ 1 ⁺ offshore	0	3	1	
SW shore ^(A2)	11 ⁺ 7 ⁺ offshore	1	11 ⁺ 7 ⁺ offshore	9 ⁺ 7 ⁺ offshore	
SNEP ^(A3)	4	1	5	2	
NE shore ^(A4)	6	3	3	2	
TOTAL-	24	5	23	15	= 52 ANIMALS

Turtles:

SP-NE shore ^{Area A}	5 basking	5 offshore (copulation)	
SW shore ^{A-B}	3 "	1 offshore	
SEP ^{A-C}	27 basking	8 offshore but inside reef	
NE shore ^{A-D}	3 basking		
NEP ^{A-D}	0		
TOTALS-	46	14	= 60 Turtles

WRITE above on EAST IS. maps and send to Rob.

29 MAY 81
FRIDAY

Consider - Sooty tern colony shifts over the years from East, W-S, Trig.

- Coralline algae on tags makes it harder to read numbers - inscriptions
- Noted "hole" in flaps healed up where some Inconel tags were placed. This must be due to poor clinching of locking mechanism, resulting in tag popping open and eventually sliding off.

Presence of barracks or coralline algae may provide clue to foraging pasture of origin.

Ticks - chigger bites represent a serious problem of turtle research at East

- Reported that "Wicked Wahine" and "Salty II" are at Disappearing Is. Light seen in the direction of Guin all night. Vessel seen through telephoto at ~ 8 AM, 30 MAY 1981

Justinian's plane did aerial photography 10 - ~ 12 noon.

NOTE - When covering nest, female's alternate with front flippers.

30 MAY
SATURDAY

1st
amblyplex
teflon

ABRANSON

30 MAY 1981 Airplane departed for Honolulu at 2:15 PM
SATURDAY

Question: How many tagged turtles - baskers on Trig, W-S, bins have ever showed up later at East Island.

3:45 PM depart for Whale-Shale assessment - fairly calm seas. Arrive 4:10 PM.
Noted fishing boat moving back and forth by Falke house.

(Need to compute tag recovery rate (%) of Whale-Shale-encountered turtles.

TAG WRITE-UP: FOR ADULTS IN WHICH NO FURTHER GROWTH WILL OCCUR ^{as with certain other marine animals}

There are two basic sets of problems related to the tagging of sea turtles. The first area is the integrity of the material from which the tag is manufactured. Corrosion can result from the effects of sea water, or the biochemical environment that exist where the tag comes in contact with the turtles body tissue, and fouling organisms (algae, barnacles, etc) that grow on the tag's surface. Breakage of the tag can result if the tag material does not have sufficient strength to withstand impacts normally encountered during the sea turtles life history, such as biting by other turtles during courtship, and resting excavation and

about
Antiflex
Teflon

ABRASION WITH UNDERWATER SUBSTRATE - WEARING

⑧ size of turtles being tagged

⑥ if bend in tag is squeezed slightly with pliers, the "spring" action is eliminated.

⑤ Tag size

⑦ Two views

- ④ Apply early in nesting season, then check later
- ⑤ Apply later, by passing abuse from nesting that season

filling which on land.

31 MAY 81 SUNDAY

The second set of problem, in sea turtle tagging deals with loss of tags due to failure of the tissue where the tag is affixed to the body. This would include tearing through the flesh, necrosis and sloughing. The causes of these failures will be discussed later. Third, set - failure of the tag's locking mechanism.

Also - ① Size of tag (increased drag for larger tags) and shape (star line) ② Special problems of female's wacking shell when nesting; and Male's biting one another (ie tag placement)

③ To minimize tearing, having the tag too tight may be better than too loose.

④ Length of time available for tag application. Consider - Ehrhart and Meylan comments about "limits" of tagging results.

6/83-41

1 JUNE 81 Monday

Many different turtles were up to nest last night.

At 11:40 AM At Navy Pt 3, with one engine shut off, flew low (~500') over East Island out of the east - went over Lakerouse and circled back for another pass over East Island then departed in the direction of Whale-Island.

John Andre reports that since December, when the people were stranded on Bin, a Navy plane has flown over every so often. Happened once when they were at East.

No. 15745

LAYSAN ALBATROSS CENSUS

SE end to pole -	239	DEAD -	18
Pole to NW end -	<u>133</u>	" -	<u>2</u>
	372		20

BLACK-FOOTED ALBATROSS CENSUS

6/23-4:30 AM SE end to pole -	799	DEAD -	33
Pole to NW end -	<u>360</u>	" -	<u>13</u>
	1159		46

FRIGATE BIRDS -

YOUNG IN NEST -	76	(several w/ 2-3 young per nest)	ROOSTING OR MIGRATORY RED-FOOTED -
EGGS IN NEST -	6		"

TURNSTONES -

MASKED BOOBY'S

YOUNG -	69
ON/EGGS -	2

PLOWERS -

~~BROWN~~ NOODYS

YOUNG - (slab only 1)	+ 3 MAJOR GROUPS equaling 112 eggs & (mostly eggs) + 15 16 = 10 Young
EGGS - (slab only 28)	

RED-FOOTED -	1
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GRAY-BACKED TERNS

YOUNG -	- 8
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SHEARWATERS

ACTIVE BURROWS -

TROPIC BIRDS - ~ 10 ADULTS

RAYS -

GRAY REEFS -

Little Gin -

6/3 6 young Black-footed albatross; 4 others dead
 7 Masked Booby young; 6 on eggs
 10-20 noddy terns - eggs & young

Gin -

6/3 17 Masked Booby young

Seabird References:

Nelson - "Biology of Seabirds"

"Aircraft (hazards collisions with birds)"

1 June 81. Motored to Tern at ~ 10:30 AM -
Monday. Stayed until ~ 5:30 PM.

Provided John Andae with tag numbers 5216 - 5221 (6 total) and pliers for possible tagging turtles nesting on Tern Island.

Ruth reports 14 pits now on the island. Tried to make radio contact with Kilauea Pt., but no answer.

What do turtles do in the ocean that is similar to their land/resting activities?

Dig into sandy bottom area? - such as reported by the ^{high} school boy at Midway?

Need - Ghost crab reference file for John Andae
Design small study to determine mortality rate of hatchlings from crabs on Tern's south beach.

Do hatchlings still disorient and go onto runway or underquarters?

Consider number of days turtles keep coming back to nest without having success (ie 2815).

For as many turtles as possible, the tags are being "upgraded" to reduce or eliminate the "spring" action. The 5100 series tags are locking perfectly. They seem to cause less response from the turtle when applied.

2 JUNE 1981
TUESDAY

probably due to their being sharper - penetrates quicker and easier. There is still the problem of the edges of the tag applicator pliers pinching and hurting the turtle when the tag is squeezed tight (with the pliers) to lock it.

The 3700 series tags (shiny and original order) many times need to have the locking tip bent over more, as well as expand the curved end.

No juvenile turtles have as yet been seen at/on East Reef, or anywhere else around the island. No juveniles were seen off whale-skate - however they have not been seen here for a few years (need to last expedition, no $\frac{8}{2}$ year of a capture). At the same time, there may have been an increase in the number of juveniles seen off the north shore of Tern Island.

Could any of these events be due to changes in sooty tern populations? Does Caulerpa and other algae still grow on East Reef? Need to check for presence. The erosion of East, or changes in currents over East Reef could also be an influencing factor.

3 June ¹⁹⁸¹ Wednesday

Turtle female ^{transmitter} ~~145~~ has been seen 2 nights ashore trying to nest. This was not known until tags were read. Previously I had I.D'ed her by designation "white spot" due to depigmented area in 1st central scute.

Note: Greater emphasis should be made of difficult field-living conditions on East Island - for example - bug (chiggers, ticks), heat, small tent, demands of nighttime work, little to do during the day.

Lots of nesting activity in Area 17 last night. why? Turtles involved included TC's
Previously on TC's dug in this area.

Do other researchers refrain from double tagging because of problems in having to pay "double" rewards.

Left for Gin Islands at ~ 2:30 PM.

On Little Gin I noted the scarcity of Black-footed Gooneys (see seabird counts p14). Numerous bottles were in the low center part of the island - apparently these were used to spell-out rescue message by Keola shipwreck people. A Net snarl washed up on the beach had 2 types

of netting - I sampled each (Trawl net?).

4 JUN
Thursd

4 June 81 Sometime between 12-2 AM a monk seal pup was
Thursday born in Area near beach berm - SEVERAL
turtles had been nesting in this area.

Consider possibility of terrestrial insect conducting some
"cleaning" activity on basking turtles - particularly
at night - Note insects (?) I saw on
dry male baster tag 3131, 2593 & AMKx25.

Gin Island had changed shape - was being
washed-over at narrow sandbar in the center.
The detached "Sand Islet" to the north was not
present.

1.0 FEB 2003

At ~ 10 AM a juvenile turtle crawled out
to Bask on the Sand Point - near an
adult female that was already out.

At ~ 10:30 AM I measured it as
follows:

PL-36.3cm S-45.2 x 35.9

RECOVERY
TAGS!

3135

vigorous turtle. Healed hole in 3rd
later on the left.

3136

seal
interfer

4 June 81 Yesterday I noted that turtle had dug
Thursday into the bank on Area 8 and
exposed bottle dump site - lots of
glass/rubbish present. Sea-water erosion
is also exposing this buried material.

Also noted Gekko on pole during the
night.

On 6/3 at ~ 1PM I saw a juvenile
turtle swimming along the reef ledge
off area 9/N.E.P. Adult turtles also in
the area.

Does Acropora compose portions of island substrate.

Departed for Tern at ~ 10:45 AM.

Tried to call Lin in the afternoon -
first no answer from Noreen, Kilavea,
then no answer at home. Returned
to East about 6 PM. Still
no Mullet ^{IS} present. At ~~low~~ tide
this morning there was only
enough sand exposed for one seal to
lay on.

When I returned to East, the seal pup
was slightly in wave-wash next to
log pier, area 3. Seemed to be shivering -
cold, so I carried it up to high
ground. No other seals in the area except
wean pup; - mothers with pups are all
down in Area 1-2.

20

Pup brought by tent in early morning, then into shade of canvas at ~ 9:30 AM.

5 JUNE 81 Observations of sleeping seals in shade 32°C
FRIDAY

SEAL PUP PHYSIOLOGY -

HEART BEATS - 1) 88 per minute
2) 85
3) 95
4) 88
5) 85

RESPIRATION - 1) 7 in 65 sec.
2) 7 in 60 sec
3) 6 in 70 sec
4) 7 in 65 sec
5) 7 in 60 sec

Weight - 29.5 lbs

6 June
Bat

Seal urinated by tent; defecated when back at Tent - Ruth saved feces - dark brown

John and Ruth visited W-5 at ~ 12 noon to check for weather seals that may have ~~been~~ lost or had still-born pups. They also surveyed Round Island.

Tick noted by eye of seal. John reported later that he found two ticks - one by eye filled with blood. He believes it came from the seal.

Question - Can they transmit disease to seals?

Ask Beardsley/Montgomery about Tick genus.

5 June 81
FRIDAY

← reverse →
"EGGS TO ALGAE" concept
"ALGAE TO EGGS"
for article: The story of "Hawaii's spectacular" green sea turtle

Note that coralline alga has been present on several of the recovered tags to such an extent that the numbers - inscription can't be read. Scraping is necessary in these cases (ie 2803 TC66)

6 June 81 TC 63 area 3 and TC 67 area 5 laid eggs
Bat AM and covered their nest very close to
mothers w/pups - no adverse response
noted.

At 11 AM I saw copulating pair and 3-4
males in East cove. Two mounting
simultaneously for a period. Passed
the turtles when I departed for
Tern Island. I watched
female and male pair wash close to shore,
then female would swim them out in to
deeper water. If she wanted to
terminate copulation it seems to me that
she would have let herself wash ashore.
These females are presumably "late
arrivals". If this is the case, it is
interesting that I don't see more than
one copulating pair at a time. They must be

6 JUNE 81

Saturday

arriving individually. Before leaving East, I saw a school of ~50 spinner porpoise off the SW reef (where ship anchored (the Easy Rider). Past Round Island off the north reef I saw bottlenose dolphin - perhaps 30. I watched after them, but they moved off. When I changed course, they reversed path swimming back to (the area where I first saw them. Fish for food present? When I arrived at Tern, the plane had already landed. These 'Hoyes' and Stan working Craig MacDonald were aboard. Seal seems to be doing five-
more defecations and urinations.

Plane departed ~1 PM - messages sent with seal "Harai" for Barbara Kulgis. Got my mail, ate hot dogs for lunch and returned to East at ~6 PM. Used newer (and much lighter) Boston Whaler with Evenrude engine because starter motor on "East Island Express" was corroded and shorting.

At ~6:30 PM I saw a copulating pair and 7-8 males off of areas 9-11.

Nesting excavations on East thus far seem to be biased heavily to the beach top "rim" areas. Is this

7 JUN
SUNDAY

7 JUNE 81

SUNDAY due to early portion of breeding season, with later re-nestings being more bold (moving inland)?

1 PM single copulating pair seen outside patch reef to the ONE of East Island's Drifted onto patch reef - low tide present.

4:30 AM Report from Tern Island that Stan and Therese found transmitter 196 ^(FREQ. 496) on the ocean bottom near Larish's study area - screws, plate intact - encrusted with coralline algae.

Note that a number of TC entries are not showing up as "LAY" but are subsequently being seen basking - Are they 1) being missed by me 2) going to another island or 3) dumping all eggs in the water OR 4) never ready to lay in the first place?

Between 3-6 AM I saw the mother seal with a black pup (about Harvi's size) and a gray fat pup. They swim together and haul out together - But the mother sometimes makes half-hearted aggressive gestures at the fat pup. I did not see either one nurse. There is a definite

7 JUNE 81
SUNDAY

preference for the black pup. The mother has green algae on pelage ~~and~~ and is not very fat (but not skinny either).

8 JUNE 81

Monday

Pup born to very large female in Area 5 last night. At ~10 AM a copulating pair was present on the Sand Point (photos taken roll 4).

Motored to Tern about 11 AM. - Plane landed about 12 noon with two Geologists, Craig MacDonald, Jason Abamine, Bob Justman and his wife Honey.

On two occasions (now, while in the boat) I have seen Manta rays. Several seen while on the way to Gin Islands, and one seen this afternoon when returning to East (seen being Round & East).

Returned to East via tagging on W-5 at ~6:30 PM.

NOTE: Isolated fieldwork is a currency of sorts that becomes validated (has an international exchange basis) only when results have been written and disseminated through reports - publications.

Richard H. SAMS

GEOLOGIST

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8 JUNE
Monday9 JUNE
Tuesday

2 PM 6/9 - Heard a "protect humpback whales" advertisement on KVAI by UH Seagrant. 2.5

10:30 AM
8 JUNE 81 Monday Radio report with Bob Schulmeister indicated that single-sideband radio had "gone-out" this evening. Earlier Bill Bilmartin had called from here.

9 JUNE 81 Tuesday Juvenile turtle seen off East Reef at ~ 1 PM.
Noted the first albatross (a black-footed) in the water this year.
- Dried up pieces of what appear to be young seal intestines found along the beach of area 15.
- Found a "squid" tangle that measures ^{153 cm} 7'.
- While on Tern Island yesterday, I found a piece of plumice at the beach crest near the Old Signal Power building.

40-50% recovery rate still leaves the majority unaccounted for. Run through possible explanations again, as follows: (See George Hughes for comparisons)

- * 1. Human predation on adults
 2. Natural mortality of adults
 3. Combinations of 1 & 2 of the above: RECRUITMENT RATE IS 50-60%
 4. Tag loss w/ scars or loss sites undetectable
 5. Nesting on cycles greater than 4 years (increased tag initiation)
 6. Later arrivals - ∴ inadequate monitoring
 7. Earlier arrivals - one or two nestings and then departure.
 8. Bask, but don't nest
- * Indication that investigative law law enforcement needs to be undertaken. How many "unaccounted" turtles are there? Consider, then, possible numbers taken per pasture.

Article Title:

9 JUNE 1981 "Some Aspects of the (Breeding) (Reproductive)
TUESDAY (Biology) (Ecology) of Male Hawaiian Green
Turtles"

10 JUN
WEDNES

"Late Arrivals" nesting on East could in part be females that became dissatisfied nesting at Gin Islands.

Inco

Although all turtles may be in the breeding area at the beginning of the season, some turtles may not be ready to lay eggs until later (consider ^{tag} 5099).

Question: With reduced mortality in the population, and subsequent increased recruitment to the breeding colony, would average size of the adult females increase or decrease?

Consider: 1.) Turtles can mature at a range of sizes, but the average size smaller than turtles that have already reached maturity.

2.) Reduced mortality should give an ^{increased} influx of smaller sized turtles

3.) As time goes by, the overall average size should increase due to growth of the turtles following maturity.

POSSIBLE ANSWER TO QUESTION:

For a period of time (length unknown) after reduction of mortality, the average size would decrease - later it would increase as the pool of adults breeding becomes large in proportion to number of recruits.

11 JUN
Thursda

KAREN
 FASTER GENERATION TURN-OVER
 WHEN FASTER TIME TO MATURITY?
 SLOWER WHEN SLOW?

10 JUNE 81, Consider heat tolerance of Chelonia turtle
 WEDNESDAY basks while turtle is basking. Also -
 lengthy exposure (several hours) while turtle is
 nesting.

Inconel Turtle tag recoveries expected this 1981 season:

- 1.) 2- and 4-year cycles from 1977 - (total=)
- 2.) 3-year cycles from 1978 - (total=)
- 3.) 2 year cycles from 1979 - (total=)

Consider - whole, or pieces of hatchling, or
 post-hatchling turtles, showing up
 in the regurgitated albatross
 castings. Feeding starts in late Jan(?), so Sept. "hatchlings"
 would be ~ 4-5 months old.

Fisher and Fisher 1972 ("Oceanic Distribution",
 Wilson Bulletin 84:7-27) list the primary
 albatross-feeding grounds as between
 "lat. 30° and 45° N and long. 140° and 160° E".
 see also page 29 following -

Car's interesting intervals based on
 beach appearance (to beach appearance, or
 egg clutch to egg clutch)?

Noisy propeller airplane flew over this morning - couldn't see it.
 11 JUNE 81 Motored to Tern at ~ 10:30 AM; anchored
 Thursday off north cove. Cromwell off shark
 island at ~ 12 noon - Boston whaler
 fishing for opelu - using net.
 I walked Tern Beach counting

11 JUNE 81 Thursday

Thursday nesting pits - Two basking turtles seen -
 one female, head toward the ocean, at
 the very eastern end of the south
 beach (tag 5212 - applied at 50° east 30m)
 and a male on the sand bar at the
 eastern side of the island.

Returned to East via Trig about 5:30 AM.
 Waded up gill net (salmon & squid) collected
 from Trig beach.

12 JUNE 81

Friday

1:30 PM - juvenile turtle
 Whaler anchor is set.

Albatross casting inspected that contained ^{small} eggs,
 presumably fish. Some of these are apparently
 indigestible.

Craig MacDonald found a concentration of lobsters about
 1/4 - 1/2 mile off East in the direction of Tern.

Consider - article for ELOPANO confined to
 tag recovery of work seals and closely
 related biology. This could be the
 following: 1.) Date of ^(Ref.) initial tagging, status,
 location, and all subsequent recoveries I
 have made.

2.) Incorporation of significant recoveries
 (ie movements) that have been made for these
 animals by others. ^(Ref.)

3.) Seals recovered with pups (age at
 pupping ^{tells you} (maximum age of pupping))

12 JUN

FRIDAY

12 JUNE 81
FRIDAY

- 4.) Growth rates (total body length) - use log on east as the indicator.
- 5.) Total ^(ref.) numbers tagged at FFS number I have recovered (by island considering island fidelity).

Continued from Fisker (1973) pages 222-223: "The presence of man-made compounds in these albatrosses demonstrates pollution of the pelagic North Pacific. Although the contaminants may originate on a worldwide basis, and be distributed globally, the heavily populated and industrialized shores of Japan and western North America, and to a lesser extent the eastern islands of Hawaii, probably contribute the most pollutants to this region. Residues originating in Japan are swept eastward by prevailing winds and the Oyashio and Kuroshio water currents into the primary albatross-feeding grounds, between $30-45^{\circ}\text{N}$ and $140-160^{\circ}\text{E}$ (Fisher & Fisher 1972). Part of the eastward-trending North Pacific Current turns southward between long. 150° to 160°W and washes the eastern Hawaiian Islands. Materials added here are transported westward along the north side of the westward-trending Equatorial Current until the latter joins the Kuroshio Current near 20 or 25°N and 140°E . North American wastes move westward to the albatross-feeding grounds in two ways: (1) a counterclockwise gyre of water in the Gulf

12 JUNE 81
FRIDAY

of Alaska mixes with the North Pacific Current in the neighborhood of 45° to 58° N and 150° to 160° W, and (2) the southward-trending California Current turns west at about 20° to 30° N to contribute to the clockwise Hawaiian Gyre and to the westward current, eventually contributing to the Kuroshio Current."

13 JUNE
SATURDAY

Just before sunset, the captain (acting) of the Cromwell (Bill) and a crewmember brought a Zodiac ashore in area 5. They left after about 15 minutes. Cromwell anchored about 1 mile off, in the direction of Fakesouse. Ofelu net only used during the day. Trapping for Kona Crab also being conducted.

13 JUNE 81
SATURDAY

Motored to Tern at ~ 11:30 AM. Craig & lobster people were setting traps about $\frac{1}{4}$ mile away along East Reef extending to the NW. They will be marking 300 lobsters. Operations office and ET were at Tern. ET repaired radio. Ate Lumpia. Returned to East via Whale-Skate stopping at 6 PM.

14 JUNE
SUNDAY

Consider: Turtles dig into sand underwater, such as fengle above water's edge the other night. How do turtles get buried into bottom at King Bay? Loggerhead at Caravel Channel?

13 JUNE 81 Consider article title: Males "biting" during
SATURDAY courtship-copulation. Has this been described?

BIOLOGICAL INFORMATION + POLITICAL ACTION
= Conservation results (i.e. - Species Survival)

Biopolitical , Biopolitician
Biopolitics - "The art of using biological
information (as ^{the} a base of power, or influence)
to achieve certain objectives".

Are there any Pearl & Hermes females recoveries
for EAST ISLAND?

Consider "Brownish" turtles that come up to
nest every so often (i.e. TC 108)

14 JUNE 81 Reburied TC 101 (W-5) eggs
SUNDAY at ~ 11:30 AM from Area 7 to
Area 1 near cement "East Island" marker.
138 - 3 broken = 135 eggs. Original
site was below bank and therefore
would have been inundated by high
tides later this month.

Motorol to Tern at ~ 1 AM - very strong
trade winds. Called Jim at ~ 3 PM

14 JUNE 81 Lobster people report only catching 12.
 SUNDAY None went in their traps.
 MacDonald said "ones in area may have been" "traumatized" by their presence. No sharks seen as yet.

15 JUNE 81 Stayed on East Island all day;
 MONDAY Cromwell off Lakerouse in the morning, and then left this area.

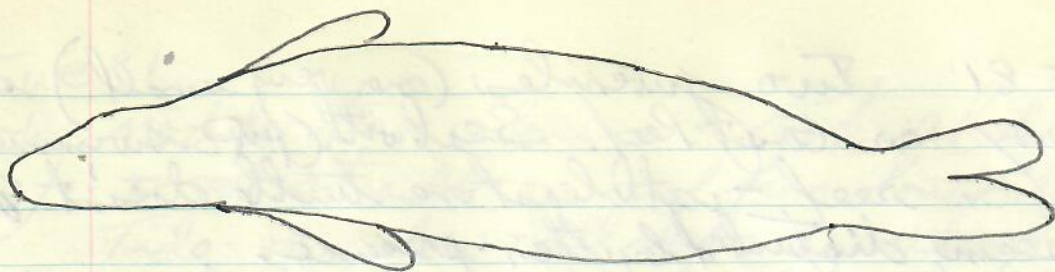
At ~ 5PM a very small juvenile was seen feeding on East Reef. Yellow and brownish tan color.

Two - 3 monk seals with black pups are resident to East Reef area - This was an exception during previous years. Is present today due to absence of gray reef sharks?

16 JUNE 81 At sunrise, or shortly before, I saw a
 TUESDAY small tiger shark circle an ~~orange~~ orange buoy drifting past East Island. Very little wind, calm seas, and hot all day long.

16 JUNE
 TUESDAY

17 JUNE
 WEDNESDAY



16 JUNE 81 Colm, almost glassy water, over East
TUESDAY Reef - 2 juveniles seen feeding back
and forth.

Consider - LUNAR CYCLE. The year, and
in 1980, I have pretty much followed a
full cycle - no moon to full moon.

Motored to Tern at ~ 2:30 PM to pack
6 drums for loading on the Cromwell
tomorrow. Returned via tagging at
Whale-Skate at ~ 6 PM.

17 JUNE 81 At about 6:30 (shortly after sunrise)
WEDNESDAY I observed a black-footed albatross,
roosting offshore, take to flight as
a shark surfaced & splashed to grab it.

17 JUNE 81 Two juveniles (one very small) seen
 WEDNESDAY on East Reef. Seabird with pup swimming
 on reef - at least one turtle doesn't seem
 seem disturbed by their presence.

Pick up two more regurgitations - fresh.
 More seem to be present during the past day or
 two. Yesterday morning was the first of
 black footed (albatross) taking flight
 and landing in the water.

Motored to Tern about 3 PM.
 Lobster people are at patch reefs on the
 way to Round Island - Stan later reported
 that they saw one small turtle
 while diving.

Richard Uchida, Bernard Ito and Howard
 disembarked from Cromwell
 this morning - 6 drums of my gear were
 loaded. Ship departed for Laysan Island
 at 4 PM.

Packed the remainder of my gear at Tew-
 ate steak & Opakapaka dinner.
 Returned direct to East Island at ~ 7:45 PM.
 Full moon tonight.

A different type of Portulaca now also on East?

Monitored turtles until 3:30 AM - then
 slept until ~ 9 AM. Cold during
 the early morning hours. Counted

18 JUNE
 Thursday

18 JUNE 81

Thursday

noddy tern colonies - took photos of TC59 straddled on reef from low tide. Tides very low - all reefs considerably exposed. Counted seals. one turtle (3732 - 5216 (new)) just returning to the sea from nesting.

Walked out onto East Reef - bare - noted Halimeda and Caulerpa present. Apparently the reduction in sooty terns, and associated reduction of fecal fertilizing matter, has not impacted this site.

Packed up all gear and departed east about 1030 AM. Motored by Bare Island to count seals. Noted that even with this low tide, Mullet Island is not present. Started to approach Trig to count nesting pits, but exposed coral and sun glare prevented landing in the short time available.

Arrived at Tern about 11 AM - hauled boat and packed all gear.

Three items left at Tern for a later airplane. Ted Murphy of HIG (Klaus Wirke) was on plane to install a solar panel on the tide gauge.

Plane departed about 2:15 PM - many sooty fledglings at the end of the runway. After takeoff we

18 J
THURS

NODDY TERN DENSITY COUNTS:

1. AREA 2 colony - approx. 20' by 20' area = 400ft²
25 eggs, 3 young
14.3ft² per bird egg or young
2. Concrete-slab Area colony - approx. 25' by 20' area = 500ft²
26 eggs, 3 small young
17.2
3. AREA 7-8 colony - A) approx. 20' by 15' area = 300ft²
14 eggs, 6 young
15.0
B) approx. 10' by 15' area 150ft²
14 eggs, 5 young
7.9
4. S.P. colony 25' by 15' = 375ft²
39 total
(possibly 29^{eggs} & 10 young)
9.6

18 JUNE 81
 Thursday observed a large tiger shark in
 the shallow water before Trig. Took
 aerial photos of Trig and Whale-Skate.
 Along the outer slope of the barrier reef
 off Trig, Whale-Skate, and beyond
 I saw several groups of (black dorsal)
 rays consisting of 10-20 individuals.
 Is this what Rob saw at Kure? And
 Schulmeister near Trig?

Direct flight to Honolulu, arriving at
 about 5:45 PM.

Discussions with Ted Murphy during
 the return indicated that:

- 1.) Current patterns are very set from
 year to year. Much may be
 known about the Pacific region
 with respect to transport - see
 Stouffer for guidance.
- 2.) "Areas of convergence" (Logmyer^{SP}?) are
 from differing wave patterns meeting -
 this is pronounced in the Atlantic,
 (forming lines of Sargassum weed), but
 not so much in the North Pacific.
- 3.) Turtles hatching at FFS may, by
 month, be spreading out and living at many
 sites in the Pacific.
- 4.) Many of the hatchlings from FFS may
 perish on the high seas, with

18 JUNE 81 only some being transported into the
 THURSDAY main Hawaiian Islands; - for eventual
 growth and return to FFS to breed.

6 JULY 81 Talked to Ruth Etnier via Noreen on Kauai.
 MONDAY TC 114 seen in shallow water off East Is.
 a few days ago - seen swimming with another
 turtle (not copulating). Tern Island
 reported to have decreased - only about
 3 new diggings per week now. They
 saw a turtle on Tern digging, but
 she did not lay eggs.
 Craig MacDonald anchored out 20
 lobster-larvae collectors between Tern
 and Trig prior to his departure on
 June 28th.

Schulmeister reports that he read tag ♀ 1206
 on Tern 6/31; Also 3703 on Tern
 He tagged 5221 ♀ after she dug 5
 unsuccessful pits in soft sand at the
 eastern end of Tern.

90-TC

10 FEB 2003

(Continued from TC Book No. 1)

TAGS-
5141R
5142C
5143R

S-

C-

DATE/TIME

AREA

ACTIVITY

ORIG. TAGGED ^{BASK} 5/29 SEP

Remarks

Barns on carapace
- note sprayed

DATE/TIME

6/9/81 3:30pm

2

Nest-LAY

6/9/81
6/10

*TAGS- ~~2740 RFL~~

- Recovery -
~~3802 LFL 2nd~~

~~Tc - 91~~

ENTERED NO. 126

~~2741 LFL~~
~~5379 RFL 2nd~~

10 FEB 2003

S-89.2 x 66.8

C-

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/9/81 11:30 AM	4	Nest	1st Big Barn on left margin.
6/10 3 AM	5	NEST-LAY	part of Right hind and portions of carapace missing. Small TMS on shoulder Flipper width - 15.4 cm

42 ✓ TC

10 FEB 2003

TAGS-

5376 RFL ²⁰⁰²

~~5376 RFL 2002~~

S-

C-

DATE/TIME

AREA

ACTIVITY

REMARKS

DATE/TIME

6/9/01 ^{TUES.} 11:30 AM

SP ✓

Nest ✓

6/10 ^{wed}

TAGS-

TC-93

S-

C-

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/10 ^{wed} 4AM	SP-1	NEST	TC sprayed - tag present

94-TC //

10 FEB 2003

TAGS-

~~5391 RFL~~
~~5392 LFL end~~
~~3807 LFL~~
~~3808 RFL end~~

S - 92.3 // x 69.3 //

C-

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/10 11PM wednesday	7	NEST-LAY	
6/15 11PM	SEP	BASKING	

DATE/TIME

~~6/11~~

~~6/12~~

~~6/7~~

TAGS - 5377 ~~RFL~~^{and}
5394 ~~LFL~~
5322 ~~RFL~~
3811 ~~RFL~~^{2nd}

~~TC-95~~
10 FEB 2003

ENT. NO. 208

S-95.5

C-

orig. tagged 6/6 11pm Instnet

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>
6/11 Thursday 2 AM	SP	NEST
6/12 6/11 1 AM - 5 AM	SP	NEST-LAY

REMARKS

end of SP

6/7/83

16

lay

TC 2

S-95.9

~~5322 RFL~~ ~~5394 LFL~~ ~~5322 RFL~~

7195 R 3rd scale (new)

96-TC

10 FEB. 2003

TAGS-

5256 LFL

5144 RFL

3813 RFL^{END}

S-

C-

DATE/TIME	AREA	ACTIVITY
6/12 ^{FRI} 1:11 AM - 5 AM	6	NEST LAY
6/12 11 AM	SP (SW)	Basking
6/15 2 PM	NEP	Basking
6/15 ^{MON} 11:30 AM	SP (southwest side)	→
Rec. 6/1/86	area 36	EAST-N

orig. tagged 7/29 BASK SEP

REMARKS

very domed carapace; small ^{met} tail; ^{bar} on head and carapace.

Thick-domed - Bar also on plastron - PHOTO ROLLS but may not have turned out due to coupling of telephoto

DATE/TIME

6/12/81

TAGS- 5402A

TC - 97

10 FEB 2003

S-

C-

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/12/81 2AM	16	<u>BASK AND</u>	Very fresh copulation scars in waxy skin. Appears exhausted. Moved only a small distance when tagged. Dog some sand at just above water's edge. Copulation seen just before dunk off East Reef. STAYED THERE DAY UNTIL 11 AM THE NEXT MORNING.

98-Tc/

10 FEB 2003

TAGS-5179/
5180/
5181/

ENT.
46

S=

C-

ORIG TAGGED 5/30 EAST-BANK

DATE/TIME	AREA	ACTIVITY
6/12 Friday 2 AM	6	Nest
6/13	16	XXXXXXXXXX
6/17 2 PM	10	BASKING

Remarks

DATE/TIME

6/12/03
~~6/13/03~~
 6/15/03
 6/16/03

ENT. NO.
429

TAGS-
~~5380 LFL~~
~~5403 RFL~~
~~3814 LFL 2nd~~

~~TC - 99~~

10 FEB 2003

S- 93.6 x 71.9

~~orig. tagged 6/10 ANZ BASK~~

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/12/81 ^{Friday} 5:00 PM	8	NEST-LAY	Flipper width - 15.7 cm
6/14/81 ^{Monday} 5:00 PM	NEP	BASKING	
6/15 5:00 PM	NEP	BASKING	
6/16	NEP	SS	

Found 1 ~~I~~ wks dead 5-29-89
5380/5403 GIN IS. PFS by
Mitch Craig. 2 tags on file.

100 - TC ✓
cancel 0 FEB 2003

TAGS -
5207 ✓
5208 ✓
3815

ENT. NO. 412 3815
5207

S-

C-

DATE/TIME
6/12 ~~FRIDAY~~ 5 AM ✓

AREA
5 ✓

Activity
NEST ✓

orig. tagged 6/11 ^{cap?} AV3 2 AM ✓
REMARKS
TC needs to be sprayed
low carapace - light colored

DATE ✓
6/12 ✓
6/13 ✓

TAGS-

~~5361~~ LFL

~~5404~~ ^{not} seen

~~5405~~

ENT
473

~~Te~~ -101

10 FEB 2003

S- 100.7 ~~x~~ 74.3

C-

DATE/TIME

AREA

ACTIVITY

ORIG. TAGGED ~~6/8~~ W S BASK

REMARKS

~~6/12/81~~ ^{FRIDAY} STAND

~~SP~~

~~NEST-LAY~~

I laid on ~~her~~ back

Needs to be ~~sprayed~~.
Digging INTO Bank

~~6/13~~ ^{SAT.} 11:30pm

~~7~~

~~NEST-LAY~~

low to water; below bank,
need to move eggs.

6/14 11:30am - Dug out

138 (of which 3 broken) -

Transplanted to A.I. near
Cement "EAST ISLAND" marker -
STAKE IN GROUND.

102-TC //

10 FEB 2003

Previous Recoveries No. 72

- Recovery -

* TAGS -

~~2254 RFL~~ ~~3228 LFL~~
~~5409 RFL~~ ~~2253 LFL~~

S-92.7 x 69.6

orig. recovered 5/27 Bask-688
C-

DATE/TIME	AREA	ACTIVITY	REMARKS	DATE/TIME
6/12/81 Friday	5	NEST-CAY	2253 & 2254 Dongling Flipper width - 15.6 cm	6/13/81
6/16/81 2PM wed	SEP	BASKING		6/13/81
6/17/81 2PM	SEP)		6/15/81
				6/16/81

EAST 2 JULY 77-N; EAST 24 JUNE 79-N

TAGS- ~~5080~~ ~~3816~~ ~~LFC~~ ^{2nd}
~~5081~~ ~~3817~~ ~~RFC~~ ^{2nd}

~~TC~~ - 103

18 FEB 2003

S- 89.9 x 75.0

~~Orig. Tagged 5/27 BASK NEP~~
 C-

DATE/TIME	AREA	ACTIVITY	REMARKS
6/13 ^{Saturday} 1 AM - 3 AM	6	NEST-LAY	Flipper width - 16.5 cm
6/13 Time:	1/4 mile from east along NW Reef	By STAN Underwater	TAG seen too. - at ~ 11 AM - "swimming"
6/13 7 PM	NEP	BASKING	
6/15 2 PM	NEP	»	
6/16 2 PM	NEP	»	

104-TC ✓

18 FEB 2003

10170

TAGS- 521RFL ✓

382LFL ✓

ENT. # 223

orig. tagged 6/1 ^{basking} nesting - EAST
C-

Previous

S- 91.2 x 70.9

DATE/TIME	AREA	ACTIVITY	REMARKS	DATE/TIME
6/13 ^{sat.} 6:11 AM - 3 AM	17 ✓	Nest at Pyramid		6/13 ^{sat.}
6/13 11:30 AM	14 ✓	Nest - City	Just west of Pyramid	6/13
6/14 ^{Sunday} 7 PM	NEP ✓	Basking		6/16
6/16 2 PM	NEP ✓	(S)		

x TAGS - 2240 - RECOVERY -
3231 5411 RFL 2nd

TC-105

18 FEB 2003

Previous Recoveries No. 73 5384 RFL 2nd

orig. Recovered 6/10 BASK NEP
C-

S-101.1 x

DATE/TIME	AREA	ACTIVITY	REMARKS
6/12 SAT. 6 AM	5	Nest-LAY	sprayed 105 on
6/13 7 AM	NEP	BASKING	right only; tag 5411 not locked?
6/16 2 PM	NEP		This tag could have been 5412 instead of 5411.

East 28 June 77 - N; East 25 June 79 - N

106-TC //

18 FEB 2003

ENT. NO. 298

TAGS-3731 //

5425RPL^{3rd}

3820CPL //

ENTERED

S- 87.6 x 71.9

C-

DATE/TIME
6/13 SAT
11:30am //

AREA
4 //

ACTIVITY
NEST-LAY //

ORIG. TAGGED 5/26 BASK //

REMARKS

Flipper 15.2 cm
RPL //

L-square
(turtle?) //

DATE/TIME

6/14/03

6/17 //

X TAGS - ~~3232 RFL - Recovery -~~

~~3827 LFL~~

~~5375 RFL~~

~~TC-107~~

18 FEB 2003

ENTERED NO. 141

S- 94.6 x 73.2 C-

ORIG. Recovered ~~6/1~~ Bask

DATE/TIME	AREA	ACTIVITY	Remarks
6/14/88 ^{SUN} 6 AM	I	Nest-Lay?	Noted yellow "spot" on 2nd Lateral Right - need photo while Basking (just anterior of f7)
6/17/2001	NEP	Basking	photo - ROLL 6

108-TC/

18 FEB 2003

TAGS- 3824 PFL²⁰⁰
5427 LFL
3836 LFL²⁰⁰

ENT: #235

S- 97.7 x 77.5 C-

DATE/TIME

AREA

ACTIVITY

REMARKS

DATE

6/14/81 3 AM

5P

NEST

Brownish -
(Need photos)
Taken

Possibly an old TC
number that
didn't get tag -

6/14
6/15

6/16 12:30 AM

4

NEST-LAY

Applied 3824 & 5427
TC number not sprayed
PHOTOS - ROLL 6 BEFORE TC SPRAYED
FLIPPER - 16.4 cm

TAGS - 5429 ~~RFL~~
3828 ~~RFL~~ 2nd
3831 ~~RFL~~

~~TC-109~~

18 FEB 2003

ENT. NO. 414

S-89.5 x

C-

<u>DATE/TIME</u>	<u>AREA</u>	<u>ACTIVITY</u>	<u>REMARKS</u>
6/14 ^{SUN} 11:30am	7	NEST	Digging into Bank
6/15 3am		NEST	

100-TC
18 FEB 2003

- RECOVERY -

* TAGS - 3213 LFL
5436 RFL
(new)
3837 RFL 2nd

ENTERED NO. 140 (TC 36 JUNE 1979)
MOVIES

S - 94.6
(94.5)

x 72.4)

C -

DATE/TIME	AREA
6/15/81 ¹⁴ 235/101	6
6/15 AM - 6/16 AM	17

Activity

NEST

NEST-LAY (by tent first)

Remarks

knotted in RFL

Fl. Apper - 16.3cm

DATE

6/15

6/17