

ALANKAM NOTES
AND PAPERS
1970s-1980s

PROPOSED PROJECT

A Survey of the Distribution and Numbers of Green Sea
Turtles at Select Locations in the Hawaiian Archipelago

SUBMITTED TO

University of Hawaii at Manoa Marine Option Program

DURATION

June - August 1977

PRINCIPAL INVESTIGATOR

Alan K. H. Kam, Sociology,
University of Hawaii at Manoa

PROJECT ADVISOR

George H. Balazs, Junior Marine Biologist,
Hawaii Institute of Marine Biology

PROPOSAL DATE

May 23, 1977

MOTIVATION

Having had the opportunity to work at the Hawaii Institute of Marine Biology, Kaneohe, Hawaii, as a volunteer worker since January 1976, and as a student worker during the fall 1976 semester, I have come in contact with individuals particularly concerned with research of marine resources. My close association with Mr. George Balazs has yielded a valuable introduction into the problems involved in managing marine resources without comprehensive information. His forthcoming involvement in the State-funded resource survey of the green sea turtle (Chelonia sp.) of the Hawaiian Archipelago is timely, and also provides the necessary direction for my investigations.

The green sea turtle (Chelonia sp.) is a marine resource currently exploited by local fishermen for home consumptive use in the Hawaiian Archipelago. Its former nesting grounds of certain select sandy beaches and near-shore waters used for feeding pastures have, in many cases, become the recreation centers for growing local urban populations. This ever-increasing stress upon the green sea turtle's nesting habits has resulted in fewer sightings of nesting or basking activities on the beaches of the populated southernmost Hawaiian Islands. Research conducted in the Hawaiian Islands National Wildlife Refuge (Balazs, 1976) has produced substantial data on the adult migratory colony located at the French Frigate Shoals. Laboratory studies conducted at HIMB (1972 to 1974), and a MOP-supported project (summer 1976) in the Ka'u district on the island of Hawaii, have gathered further data on the last remaining viable green sea turtle population of the United States.

The problems of conservation or utilization of valuable marine resources stem, in part, from the inadequate biological data available for particular species. To plan a comprehensive management program for perpetuating the

green sea turtle for the benefit of future generations as a food resource, for aesthetic purposes, and for scientific inquiry, basic biological information must be obtained on this unique marine reptile in its natural environment. It is essential that the State of Hawaii undertake programs of assessment of the status of currently exploited marine resources--the green sea turtle (Chelonia sp.)--to understand the State's role in control and regulation.

SPECIFIC GOALS

1. To locate aggregations of green sea turtles at specific locations in the Hawaiian Archipelago;
2. To obtain information on the relative numbers of animals in each size-category of the green sea turtle aggregations located; and
3. To identify food sources and marine habitats utilized by the green sea turtle.

RESEARCH METHODS

1. Locate. Report forms allowing people to identify areas of observed green sea turtle activity have been circulated among marine-related groups and in the MDP office. By plotting these sightings on topographical maps of Oahu, Hawaii, Maui, Kauai, Lanai, and Molokai, one is able to observe areas of recurring particular concern. Assistance by Mr. Balazs has allowed me access to the facilities of the Hawaiiana Center, 3187 Diamond Head Road, Honolulu, Hawaii 96815, and Bellows Air Force Station. These two areas of observed green sea turtle activity will allow me the opportunity to conduct

shoreline visual observations and, later, will provide a base to explore the offshore marine habitats unique to these areas, using scuba and snorkel skills. Hanauma Bay Park will be investigated to explore the possibilities of resident green sea turtles and, perhaps, night observations of turtle activity.

2. Size-category of green sea turtle aggregations. By taking a census of underwater and observed frequency occurrence of green sea turtle aggregations, the various size-categories--juvenile, sub-adult, and mature adults--will be investigated. Individual turtles, when circumstances permit handling and capture, will be measured for straight and curved carapace length and width. Physical condition of the captured turtle will be noted, along with sex of turtle. Tagging of the captured turtle's foreflippers with newly acquired Iconel tags supplied by Mr. Balazs will provide identification in future recoveries.

3. Food sources and marine habitats. Investigations of the stomach contents of dead green sea turtles have identified several Hawaiian algae. Observing direct feeding activities in nearshore areas will identify the types of algae utilized by green sea turtles. An experiment to be undertaken would involve the mechanical manipulation of a grasping tool to explore the possibility of obtaining a predigested algal sample. Marine habitats that are frequented by green sea turtles aggregates will be investigated.

EXPERIENCE

I acquired my NAUI and PADI SCUBA certification in the summer of 1976. Since then, I have been able to accompany Mr. Balazs on various expeditions, investigating observed green sea turtle activity areas. Some areas that were

explored were: 1) Moku Manu Island, 2) Mokolea Rock, Kailua Bay, and 3) Hanauma Bay (day and night). In December 1976, I was able to accompany Mr. Balazs, with transportation provided by the U.S. Coast Guard, to Kure Island, Midway Island, and French Frigate Shoals. These opportunities to directly observe research methods in action, provided a valuable introduction to obtaining data on a particular animal, the green sea turtle (Chelonia sp.) of the Hawaiian Archipelago.

REFERENCES

- Balazs, George H. "Green sea turtle migrations in the Hawaiian Archipelago." Hawaii Institute of Marine Biology, University of Hawaii.
- Carr, Archie. 1967. So excellent a fische. Garden City, New York: The Natural History Press.

Project Title: A Survey of the Distribution
and Numbers of Green Sea Turtles
at Select Locations in the
Hawaiian Archipelago

Date: 05/23/77

Project Leader: Alan K. H. Kim

Duration: 06-08/77

DETAILED BUDGET

	<u>Requested</u>	<u>Available</u>	<u>Total</u>
A. SALARIES & WAGES	\$780	--	\$780
Alan K. H. Kam, 06/01/77-08/31/77 (13 wk x 20 hr/wk x \$3.00/hr)			
B. FRINGE BENEFITS (10% of \$780)	78	--	78
Total Salaries, Wages & Fringe Benefits	<u>858</u>	<u>--</u>	<u>858</u>
C. PERMANENT EQUIPMENT	--	\$400 ¹	400
SCUBA Equipment, Binoculars			
D. EXPENDABLE SUPPLIES & EQUIPMENT			
1. SCUBA Airfills (25 x \$1)	25	--	25
2. Film and Processing (4 x \$6)	24	--	24
3. Charts (4 x \$2)	8	--	8
4. Compass	25	--	25
5. Miscellaneous	25	--	25
Total Expendable Supplies & Equipment	<u>107</u>	<u>--</u>	<u>107</u>
E. TRAVEL			
1. Airfare and Seafare			
a. Honolulu/Midway/Honolulu	220	--	220
b. Honolulu/Lihue/Honolulu	46	--	46
c. Honolulu/Hilo/Honolulu	--	60 ²	60
d. Honolulu/Lanai City/Honolulu	38	--	38
e. Sail to Lanai, Maui, Molokai	--	150 ¹	150
Total Airfare & Seafare	<u>304</u>	<u>210</u>	<u>514</u>

¹Supplied by Alan K. H. Kam

²Supplied by UH Marine Option Program

	<u>Requested</u>	<u>Available</u>	<u>Total</u>
E. Travel (Continued)			
2. Per Diem			
a. Midway (10 da x \$15)	150	--	150
b. Lihue (4 da x \$25)	100	-- ²	100
c. Hilo (5 da x \$16)	--	76 ²	76
d. Lanai City (5 da x \$25)	<u>125</u>	<u>--</u>	<u>125</u>
Total Per Diem	375	76	451
Total Travel	<u>679</u>	<u>286</u>	<u>965</u>
F. PUBLICATION & DOCUMENTATION COSTS	50	--	50
G. OTHER COSTS			
Stipend for Alan K. H. Kam, 04/01/77- 05/31/77 (2 mo x \$100/mo)	--	200 ²	200
TOTAL DIRECT COSTS (A-G)	<u>1,694</u>	<u>886</u>	<u>2,580</u>
INDIRECT COSTS (10% of A-G)	169	--	169
TOTAL COSTS	<u>1,863</u>	<u>886</u>	<u>2,749</u>

A Research Proposal Submitted to the Marine Option Program
University of Hawaii at Manoa

John McMahon, Director

TITLE:

A Survey of the Distribution and Numbers of Green Sea Turtles
at Select Locations in the Hawaiian Archipelago.

PRINCIPAL INVESTIGATOR:

Alan K.H. Kam, MOP Student, Sociology-Arts and Science;
University of Hawaii at Manoa; Honolulu, Hawaii

PROJECT ADVISOR:

George H. Balazs; Jr. Marine Biologist, Hawaii Institute of
Marine Biology, P.O. Box 1346, Kaneohe, Hawaii 96744

DURATION:

March 1977-August 1977

FUNDING REQUEST:

\$ 819.00

MOTIVATION

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The problems of conservation or utilization of valuable marine resources stems from the relative inadequate amount of biological data available in studying the particular species. To plan a comprehensive management program for perpetuating the green sea turtle for the benefit of future generations, as a food resource, aesthetic purposes, and for scientific inquiry, basic biological information must be obtained on this unique marine reptile in its natural environment. It is essential that the State of Hawaii should undertake programs of assessment of the status of currently exploited marine resources-the green sea turtle (Chelonia sp.) to understand the State's role in control and regulation.

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By taking a census of underwater and observed frequency occurrence of green sea turtle aggregations, the various size categories- juvenile, sub-adult, and mature adults will be investigated. Individual turtles, when circumstances permit handling and capture, will be measured for straight and curved carapace length and width. Physical condition of the captured turtle will be noted, along with sex of turtle. Tagging with newly acquired Iconel tags supplied by Mr. Balazs, of the captured turtle's foreflippers will provide identification in future recoveries.

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Investigations of the stomach contents of dead green sea turtles, has identified several Hawaiian algae. Observing direct feeding activities in nearshore areas will identify the types of algae utilized by green sea turtles. An experiment to be undertaken would involve the mechanical manipulation of a grasping tool to explore the possibility of obtaining a predigested algal sample.

Marine habitats that are frequented by green sea turtle aggregates will be investigated.

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REFERENCES

Balazs, George H.; "Green Sea Turtle Migrations in the Hawaiian Archipelago", Hawaii Institute of Marine Biology, University of Hawaii, Kaneohe, Hawaii 96744

Carr, Archie; "So Excellent A Fishe", A Natural History of Sea Turtles, 1967. Published for the American Museum of Natural History, The Natural History Press, Garden City, New York

FINANCIAL SUPPORT

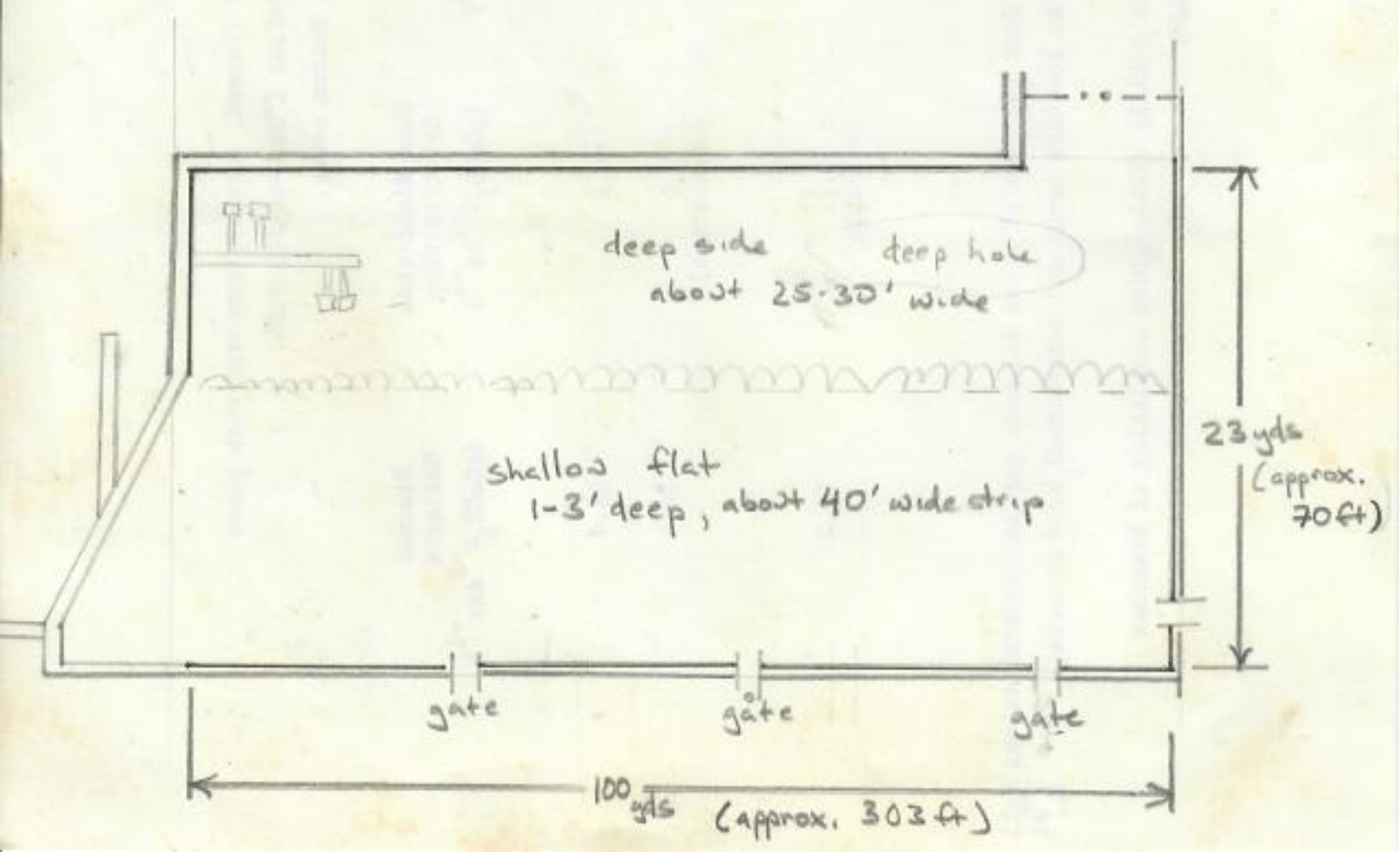
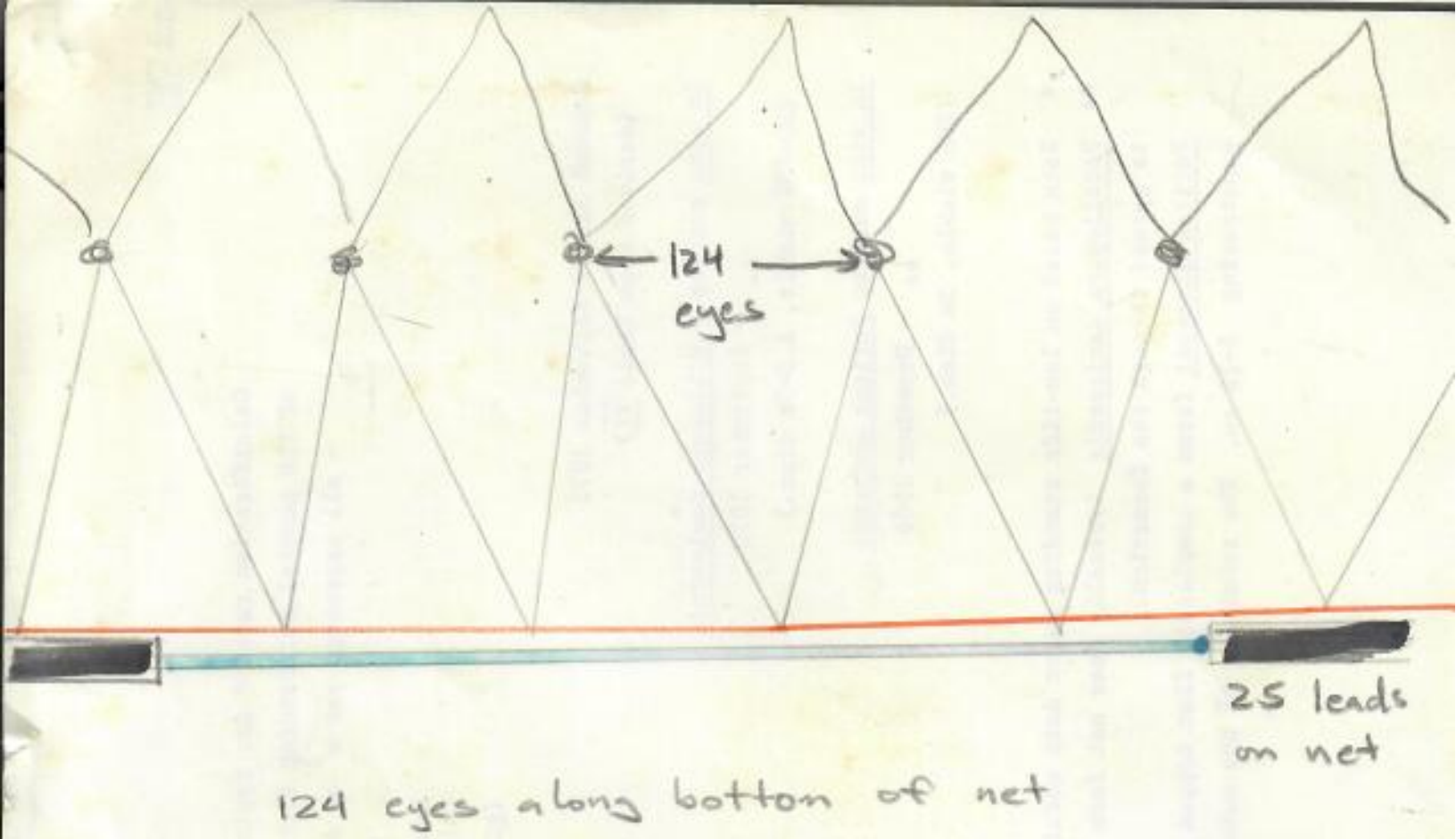
Financial support is requested from the Marine Option Program to carry out the necessary duties involved in such a study. Travel funds are sought, so that I may accompany Mr. Balazs to several of the outer Hawaiian Islands including Midway. The opportunity to gather data in these unique marine areas will provide valuable experience and help me to pursue the goals of my project.

Roundtrip Airfare to Midway Island (1) by Military Airlift Command (MAC)	\$220.00
Per diem allowance-room & food (7 days at \$ 15.00 per day)	105.00
Roundtrip Airfare to Kauai (1)	46.00
Per diem allowance-room & food (4 days at \$ 25.00 per day)	100.00
Roundtrip Airfare to Hawaii (1)	60.00
Per diem allowance-room & food (5 days at \$ 25.00 per day)	125.00
Roundtrip Airfare to Lanai (1)	38.00
Per Diem allowance-room & food (5 days at \$ 25.00 per day)	125.00
TOTAL	<hr/> \$ 819.00

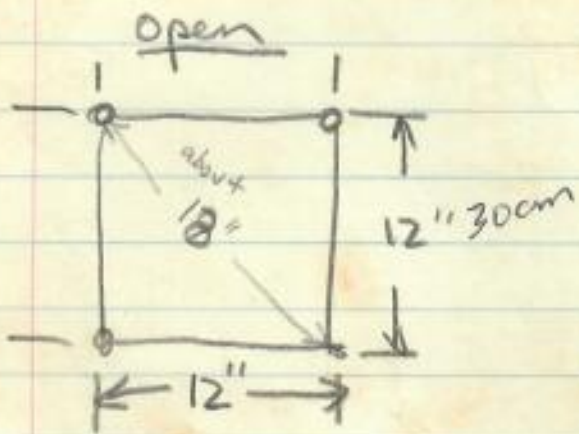
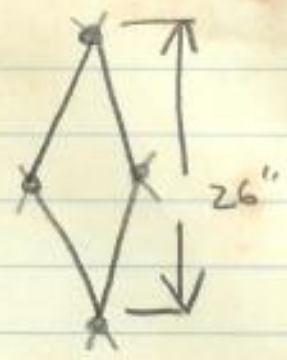
Budget Requests

Other Monies

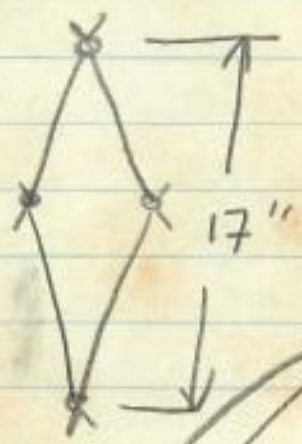
Stipend		
1/1/77-5/15/77 @ \$100/mo.	\$150.00	
5/16/77-8/31/77 @ \$200/mo.	700.00	
Travel Expenses		
Roundtrip airfare to Midway Island (1) by Military Airlift Command (MAC)	220.00	
→ Per diem allowance-room & food (7 days at \$ 15.00 per day)	150.00	
Roundtrip Airfare to Kauai (1)	46.00	
Per diem allowance-room & food (4 days at \$ 25.00 per day)	100.00	
Roundtrip airfare to Hawaii (1)	60.00	
Per diem allowance-room & food (5 days at \$ 25.00 per day)	125.00	
Roundtrip airfare to Lanai (1)	38.00	
Per diem allowance-room & food (5 days at \$ 25.00 per day)	125.00	
Roundtrip sail with Sea Trek Hawaii (1) Lanai, Maui, Molokai (5 days on schooner Machias)		\$150.00
Supplies		
Scuba Air Card (25 airfills)	25.00	
Film/Processing (2 rolls)	12.00	
Topographical Charts (4)	8.00	
Compass	25.00	
Equipment		
Scuba Equipment (personal)		400.00
Subtotal	\$1739.00	\$550.00
Overhead (10%)	174.00	
Total	\$1913.00	\$550.00



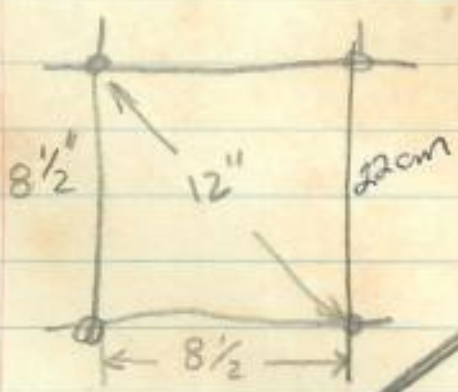
Cotton net 26"



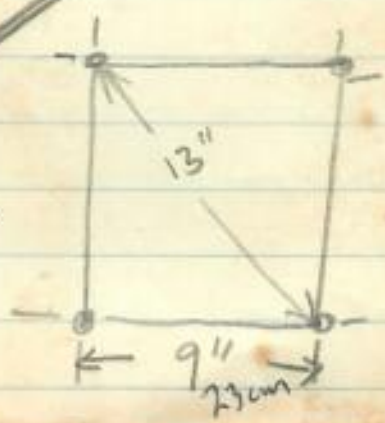
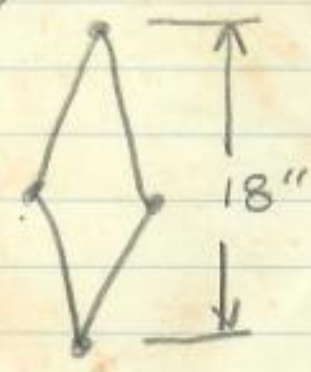
old nylon net



open



(new) nylon nets



TURTLE MEASUREMENTS - COCONUT ISLAND
28 APRIL 1980

#2498 RFL #2053 LFL

(S) 60.0 x 47.9

(C) 62.9 x 56.6

PL 49.1

HEAD 9.0

TAIL 14.5



#2500 LFL trail

#2378 LFL

2056

(S) 60.5 x 51

(C) 63.1 x 60.1

PL 47.1

HEAD 8.8

TAIL 11.5



#2499 RFL #2054 LFL

(S) 49.9 x 39.4

(C) 53.0 x 47.0

PL 41.1

HEAD 7.9

TAIL 11.0



#2497 RFL

(S) 53.4 x 43.8

(C) 56.1 x 50.1

PL 43.3

HEAD 8.3

TAIL 10.5



#2051 RFL #2495 LFL

(S) 50.2 x 41.0

(C) 52.0 x 48.7

PL 40.9

HEAD 7.8

TAIL 12.0



#2052 RFL #2496 LFL

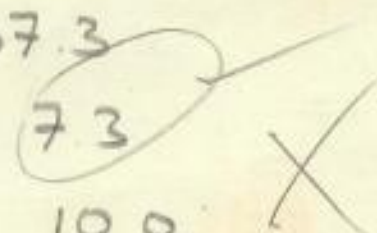
(S) 45.8 x 36.3

(C) 47.8 x 42.4

PL 37.3

HEAD 7.3

TAIL 10.0



2498 RFL
2053 LFL

(S) 600 x 47.9
(C) 62.9 x 56.6
PL 49.1
HEAD 9.0
TAIL 14.5

2500 LFL unit
2378 LFL

(S) 60.5 x 51
(C) 63.1 x 60.4
PL 47.1
HEAD 8.8
TAIL 11.5

2499 RFL 2054 LFL

(S) 49.9 x 39.4
(C) 53 x 47.0
HEAD 7.9
PL 41.1
TAIL 11.0

2497 RFL

(S) 53.4 x 43.8
(C) 56.4 x 50.4
PL 43.3
HEAD 8.3
TAIL 10.5

(S) 50.2 x 41.0
(C) 52.0 x 48.7
PL 40.9
HEAD 7.8
TAIL 12.0

2051 RFL
2495

(S) 45.8 x 36.3
(C) 47.8 x 42.4
PL 37.3
HEAD 7.3
TAIL 10.0

2052 RFL
2496 LFL

tag # 2496

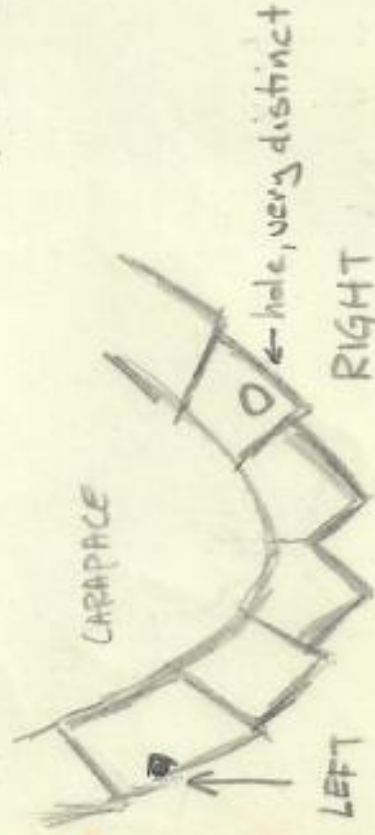
(S) 50.2 x 41.2

(C) 52.5 x 49.2

PL 41.2

Head 8.0

TAIL 12.5



hole moving to edge of margin

TREADS marking 3/3/80

fore part of front flipper

edge of margin skin beginning

dorsal portion of Frit FL

Left 3rd Lateral and 8th L. Marginal (drip)

LEFT SIDE dorsal

LEFT HIND FLIPPED Between 3rd and 4th digits

*

6 seconds run of liquid (dripping)

INTRODUCTION

Since 1974, due to efforts by concerned citizens ~~throughout~~ the State of Hawaii, regulations were initiated to help protect the green sea turtle (*Chelonia* sp.) from overexploitation. In the past sea turtles, of all sizes ~~had been~~ ^{were} hunted for home consumption and for sale in local restaurants, ~~thus~~ supporting an ^{expanding} gourmet food market. The exploitation by a growing human population had severely restricted the growth of sea turtle populations. With the passing of Regulation 36 a degree of control was created whereby the hunting of sea turtles required the issuance of a permit and the intended animal had to be 36 inches straight line carapace length.

~~174~~ The adoption of this regulation, the green sea turtles of the Hawaiian Archipelago will hopefully be allowed to grow and nest with minimum human predation upon their species.

Though regulation is an important component of resource management, scientific inquiry into the biology of the sea turtle is also essential. Research conducted in the Hawaiian Islands Wildlife Refuge (Balazs, 1976) has produced substantial data on the adult migratory colony located at the French Frigate Shoals. Laboratory studies conducted at HIMR (1972 to 1974), and a MOP-supported project (summer 1976) in the

Ka'o district on the island of Hawaii, have gathered valuable data on the last remaining viable green sea turtle population of the United States. My association with Mr. George Belazz has prompted me to search for ~~new knowledge~~ ^{some of} ~~to answer~~ ^{the} questions that surround the intriguing life system of the green sea turtle of the Hawaiian Archipelago.

SPECIFIC GOALS

1. To locate aggregations of green sea turtles at specific locations in the Hawaiian Archipelago;
2. To obtain information on the relative numbers of animals in each size-category of the green sea turtle aggregations located; and
3. To identify food sources and marine habitats utilized by the green sea turtle.

RESEARCH METHODS

1. Locate Report forms allowing people to identify ^{at intervals} ~~aggregations~~ ^{within the Hawaiian islands} of observed green sea turtle activity have been circulated among marine-related groups and in the MOP office. Conversations and interviews with fishermen, divers and sailors have brought three distinct areas of ~~particular concern~~ of green sea turtle activity to my ^{attention} ~~awareness~~. They

are: b) Bellows Air Force Station, a) Punalu'u and Kāialu'alo ~~datasets~~ on the island of Hawaii and c) the northern ^{on coast} of the island of Kauai. Initially shoreline visual observations were made and, later, when conditions permitted access to the coastal water, both ~~shore~~ and snorkel surveys were conducted.

2. Size-categories of green sea turtle aggregations.

Sampling with large mesh nets ^{located at} ~~located at~~ ^{DCNR-Div. Fish & Game} (Scientific Collecting Permit No. 78-09) allowed ^{captured specimens of} ~~sea turtles~~ ^{handled at} to be measured for their carapace length and width (straight and curved measurements), plastron length, tail length, head width and unusual body characteristics to be noted. The sea turtles were tagged with Inconel metal tags on their foreflippers and released.

3. Food sources and marine habitats.

The mechanical manipulation of a grasping tool was used to sample ^{food particles from} live, captured turtles' stomachs. The algae were identified and attempts were made to locate them in the area the turtle's were caught.

MATERIALS

TURTLE NETS : 62' x 14' cotton (26)
73' x 12' nylon (18)

a) Hawaii

On May 5-8, 1979 I accompanied Mr. George H. Balys (Hawaii Institute of Marine Biology), with MOP - support to the Island of Hawaii to test the feasibility of using large-mesh nets to sample wild populations of green sea turtles. Field trials were conducted in the Punalou and Kaiulou areas on the southeast coast of Hawaii. Area selection was based on the sea turtle expertise of Mr. Arnold L. Howard, ^{a resident} of Punalou.

The four nets that we used were made of cotton and nylon with wooden floats ^{with green} ~~red~~. Each of the two nylon nets was 73 feet long and 12 feet high. The measurement of mesh or "eye", or distance between each foot was 18 inches. The other two nets were of cotton twine, each 62 feet long and 14 feet high. Their mesh size stretched 25 inches. By joining different sections of nets together, a variety of combinations could be made to accommodate the bottom shape of the coast.

The nets were set by hand. First by lashing the into a rubber insertube and then swimming perpendicular to the shore while releasing lengths of net. On shore, the nets were fastened to a rope with an anchor securely placed within the rocks of the beach. This prevented the nets from floating away due to strong shore current. By laying the nets perpendicular to the shore, an area could be sampled of any sea turtles traveling along the coast feeding upon the algae of the coast.

Usually the nets were set in the afternoon, preferably during the beginning of ^{neap} spring tide, just before turtles ~~start~~

feeding. Then the nets were left overnight and early the next morning any turtles captured would be promptly removed. The captured turtle, along with the section of net they were entangled in were loaded into the invertable and brought to shore. While on shore, the sea turtle would be untangled from the lines of the net and measured. Measurements taken were of the turtles carapace length and width, by using a meter caliper for straight measure and a tape measure for curved measurement. Other information gathered was length of plastron or belly plate, tail length, and unusual body characteristics - missing plates, portions of fin missing or coloration. After photographs were recorded the sea turtles were tagged on their front flippers with a metal Inconel tag and then released.

Between May 5-8, on the Island of Hawaii; in the Punalu'u and Ka'ala'ala areas, the use of large mesh nets accounted for the capture, tagging and release of 15 healthy green sea turtles, along with 1 neophote. The sea turtles range in size from $16 \frac{1}{4}$ inches to $35 \frac{5}{8}$ inches (straight line carapace length). All the turtles appeared to be in excellent health - no tumors or missing limbs. All the turtles were returned to the ocean with minimum harm inflicted upon them.

HAWAII

TITLE → ?
TABLE 1

change tables to inches
↙
⑥

DATE	AREA	L	W
MAY 5, 1977	HAWAII #2	(S) 34. $\frac{1}{4}$ x	25. $2\frac{1}{4}$
		(C) 36 x	—
5/5	# 2	(S) 29. $8\frac{7}{8}$ x	24. $5\frac{1}{2}$
		(C) 32 x	31
5/5	# 3	(S) 31. $2\frac{1}{4}$ x	23. $6\frac{5}{8}$
		(C) 34.0 x	30. $\frac{1}{2}$
5/6	# 1	(S) 23. $\frac{1}{2}$ x	18. $8\frac{7}{8}$
		(C) 25. $\frac{1}{4}$ x	22. $8\frac{7}{8}$
5/6	# 1	(S) 16. $2\frac{1}{4}$ x	14
		(C) 17. $\frac{1}{4}$ x	15. $7\frac{3}{4}$
5/6	# 3	(S) 20.0 x	16
		(C) 21. $\frac{1}{2}$ x	20
5/6	# 2	(S) 22. $\frac{1}{2}$ x	18. $3\frac{3}{8}$
		(C) 24. $3\frac{3}{8}$ x	21. $6\frac{5}{8}$
5/6	# 3	(S) 27. $8\frac{7}{8}$ x	22. $5\frac{5}{8}$
		(C) 29. $\frac{1}{4}$ x	28
5/7	# 4	(S) 30.0 x	23. $3\frac{3}{8}$
		(C) 32.0 x	28. $\frac{1}{8}$
5/7	# 4	(S) 32. $7\frac{3}{4}$ x	25.0
		(C) 34. $3\frac{3}{4}$ x	31.0
5/7	# 4	(S) 28.0 x	27.0
		(C) 30. $\frac{1}{2}$ x	28. $3\frac{3}{8}$
5/8	# 3	Recapture	
5/8	# 3	(S) 18. $1\frac{1}{8}$ x	13. $6\frac{5}{8}$
		(C) 19. $3\frac{3}{8}$ x	16. $\frac{1}{4}$

Table 1 cont'd

change table to inches



DATE	AREA		<u>L</u>	x	<u>W</u>
5/8	# 3	(S)	35.6 ^{5/8}	x	26.8 ^{7/8}
		(C)	38.8 ^{7/8}	x	35.8 ^{7/8}
5/8	# 3	(S)	28.0	x	22
		(C)	30.0	x	27.3 ^{3/8}
5/8	# 3	(S)	17.0	x	14.2 ^{1/4}
		(C)	18.0	x	17.1 ^{1/8}

Mean

$$\begin{matrix} \text{L} & & \text{W} \\ \text{S)} & 26.3 \pm 6.36 & \text{X) } 21.0 \pm 4.77 \\ \text{C)} & 28.2 \pm 6.86 & \text{X) } 25.3 \pm 6.33 \end{matrix}$$

RANGE (S) 16 1/4 - 35 5/8
 - Length (C) 17 1/4 - 38 7/8

Range in (S) 14 - 27
 width (C) 15 3/4 - 35 7/8

- At the outermost limits of the net, was another anchor which was set into the bottom strata to secure the nets from drifting into shore.

RESULTS

2) BELLOW'S BEACH

The study areas selected were were two rock ^{grove} projections that were ~~located~~ at the mouths of ^{the Waimanalo drainage} ~~system~~ ^{located} on Bellows Antenna Station property. Choice of these two areas was based on information obtained by informal conversations with surfers, swimmers, fishermen and the lifeguards of Bellows Recreation Center. It seems that sea turtles were frequently observed swimming at these ^{two} particular sites, and by using nets, sampling of sea turtle aggregation might yield good results.

Initial visits to the two sites, required first some observations of sea turtle activity. Were they feeding or just traveling through the area? Was there any specific area they were appearing at in relationship to the river mouth and rock grove? What size were they? After visiting each site in turn, and getting a feel of the area, the setting of large mesh-nets proceeded.

The nets were 'set' into a large inner tube ^{with each} section fastened to ^{an} anchors. One anchor was placed in the rocks comprising the river mouth grove, thus securing the whole line of nets to shore. After this was done, the inner tube with its load of nets was pushed away from shore, while releasing the nets to fall and open into the water. This was done during late afternoon, thus leaving the net overnight to catch any swimming turtles. Early the next morning the nets would be hauled to

see if any sea turtles were entangled within its folds. If there were any, they were promptly disentangled and brought to shore to be measured, tagged, weighed and photographed. After the data was obtained, the turtle would be released back into the water, hopefully not to tangle itself in the nets again.

On this separate visit to Bellows Beach 10 green sea turtles were caught by using large mesh nets. They ranged in length from 15.0 inches to 24 inches and weight ranged between 16.5 lbs to 70 lbs. All were healthy and full-bodied with the exception of one turtle - that was missing its left front flipper, presumably from shark attack. Although it was missing a major flipper, it was able to compensate for its disability and swam about quite well.

BAPS TABLE 2

CHANGE TABLE TO INCHES →



(S) mean L (20.375 ± 2.92)
 (C) mean L (21.6 ± 3.17)
 (S) mean W (16.7 ± 2.29)
 (C) mean W (20.1 ± 2.90)

		Length		width	weight
JULY 28	# 1	(S) - 23, $3/8$	x	18, $5/8$	6 1/2 lbs.
		(C) 24, $7/16$	x	22, $3/4$	
AUG 1	# 1	(S) - 18, $3/85$	x	15	30
		(C) 19, $1/85$	x	17, $3/4$	
8/2	# 1	(S) - 22, $1/2$	x	18, $3/85$	57
		(C) 24	x	22, $3/4$	
8/2-3	# 1	(S) - 20, $1/85$	x	16, $8/85$	42
		(C) 21, $3/85$	x	20, $1/85$	
8/2-3	# 1	(S) - 22, $3/85$	x	18	52
		(C) 23, $7/85$	x	21, $3/4$	
8/2-2	# 1	(S) - 17, $3/85$	x	14, $1/4$	25
		(C) 18, $5/8$	x	17, $1/8$	
8/9	# 2	(S) - 21, $7/4$	x	18, $7/4$	55
		(C) 23, $3/8$	x	22, $1/8$	
8/10	# 2	(S) - 24, 0	x	19, $1/8$	70
		(C) 25, $2/4$	x	23, $1/8$	
8/10	# 2	(S) - 18, $7/85$	x	15, $5/8$	36
		(C) 20, 0	x	18, $1/2$	
8/10	# 2	(S) - 15, 0	x	12, $3/85$	
		(C) 15, $5/85$	x	14, $3/4$	16 1/2

RANGE LENGTH (S) 15.0 - 24.0
 (C) 15, $5/8$ - 25, $1/4$
 RANGE WIDTH (S) 12, $3/8$ - 19, $1/8$
 (C) 14, $3/4$ - 23, $1/8$

⊗ Any areas that produced a sizable number of sightings were revisited and surveys intensified.

(11)

2. KAUAI

Between August 17-24, 1977 I visited the island of Kauai to conduct a preliminary survey of green sea turtle aggregations along its coast. My principal contact on Kauai was Hubert K. H. Kam, of Kapaa who introduced me to people and places of sea turtle activity. By providing a map, through informal conversations, places along the coast were noted for their sea turtle productivity. I tried to visit as many areas as I could, but due to access problems, all were not visited.

Beginning from Haena (End of the Road) to Palaka Point, I tried to conduct ^{as many} shoreline observations along the coast ^{as I could}. This meant visiting likely looking spots and staying in one area for 15 to 60 minutes, usually inspecting coastal waters for green sea turtle activity. Sites selected were:

1. M. Lohi
2. Nualolo
3. Haena (End of the Road)
4. Haena Park Pavilion
5. Hanalei Bay (below Hanalei Bay Villas)
6. Princeville a) Pepe St
7. Princeville b) Punahoa St
7. Anini (Blue Pond)
8. Anini Pavilion
9. Pihia - Kepahi Pt
10. Kaekaanio
11. Moloan Bay

- 12. Keolu
- 13. Kapaa
- 14. Waialua
- 15. Koloa Landing
- 16. Port Allen
- 17. Makaweli - Pakala

The most profitable area I found for viewing green sea turtles was Kaalakanui, a strip of reef between ~~KEAWAHI~~ and Holoa Bay. Along its outermost edges of reef was the narrow ^{red} algae, Pterocladia sp that sea turtles ^{often} use ^{practice-courtesy} as a food source. Observations were made from a bluff overlooking the reef, which presented a commanding view of the area. Turtles could be observed through binoculars as they came up to breathe and when waves were about to break, ^{they could be} seen through the transparency of the water. On my first visit to this spot, about 7 turtles were seen and ^{upon} each subsequent visit, at least 4 were observed. There appeared to be no particular size category, large ones with heads as big as footballs and medium sized ones, 20+ inches length. Usually they were seen in the surge zone, where the waves broke upon the reef. As waves passed the turtles, some could be seen upended, apparently feeding upon the reef. Depth of water looked to be quite shallow, less than 10 ft deep. When I had a chance

to go out to the reef edge at low tide, I was quite surprised to see turtles so close to shore, about 15 feet away from me.

Another aspect of my visit to Kani was to obtain information on patterns of use of sea turtles by local citizens. In the past, because turtles were so common and easily caught, it was a simple act to go down to the beach for an hour and pick up several turtles. An old medical remedy to cure asthma and other respiratory complaints was the "imbibing" of cups of fresh turtle blood. Turtle shells because they were so bulky and cumbersome, were buried or left on the beach to be disposed of through natural processes. Only select shells were saved to be varnished or hand-painted and displayed in homes.

The meat of green sea turtles was used in a variety of ways. It could be made into steaks, dried in the sun and served as jerked meat, cooked with vegetables. Turtle meat became turtle soubagaki, and the flesh soaked in barbecue sauce to be broiled over a fire. Drying the flippers would save that protein for soup and the belly plate or plastron, put into a slow oven would "puff" up and the cartilage could be a base for soup. Before the importance of the clove plant, ^{left no} ^{because} was known, turtle fat was a good remedy for burns. By slowly melting the fat in the sun, the oils could be gathered and jarred for future use as a burn remedy.

or old Hawaiian remedy^x

For the Hawaiians, nothing was discarded. The liver was eaten and turtle fat ~~was~~ used in cooking. The intestines were eaten, though many who have tried it say it has a strong soapy flavor. A subject that was brought up involved the taste discrimination between small turtles and larger turtles. Smaller turtles were tender because they were younger while even though larger turtles had more meat, they could be stringier.

Methods of capture employed on Kauai ^{included} large mesh nets, opening, meat hooks, and ropes attached to the boat and by hand. The manner in which large mesh nets were used differed in how I imagined their usage to be. Instead of anchored them to land, nets were used to surround turtles, and then the sea turtles driven into its entangling folds. Nets were not left overnight because there were many natural prohibitions for the turtle to tangle and then drown. The dead turtle would then start to smell, chasing away any other turtles in the area. Also dead turtles were not eaten because of the smell and the breakdown of the body tissue. Another reason why turtle nets were not set overnight was because sharks were attracted to turtles caught in nets, and the nets could be ruined by shark attacks.

Conclusion
~~Discussion~~

In conclusion, I would like to say that there are ^{many} more areas in the Hawaiian Islands that should be visited to sample live, healthy green sea turtles. My findings of juvenile and mature sub-adult size sea turtles indicate that the areas I visited may or may not be used by mature sea turtles, those 36 inches or bigger. A subject that should be looked into, is to find areas where large sea turtles aggregate within the major Hawaiian Islands. Continuance of monitoring of the three areas should provide data on behavior patterns, ranging behavior and possibly resident populations. Suggest for future programs of tagging green sea turtles will provide valuable data of sea turtle populations.

The use of nets, as a method of obtaining healthy specimens of green sea turtles has proven to be highly effective. Nets restrict the passage of sea turtles along coastal areas and enable ^{the} capture and holding of unharmed specimens. Both large turtles and smaller ones can become tangled within the folds of the net. By monitoring the nets at regular intervals, ~~of the nets~~ the danger of drowning of ^{captured} sea turtles can be lessened.

By pursuing inquiry into the biology of the green sea turtle, the data thus acquired ~~may~~ be useful in ^{the} management program of this highly valuable resource. In the past, before there was any restriction, exploitation was complete.

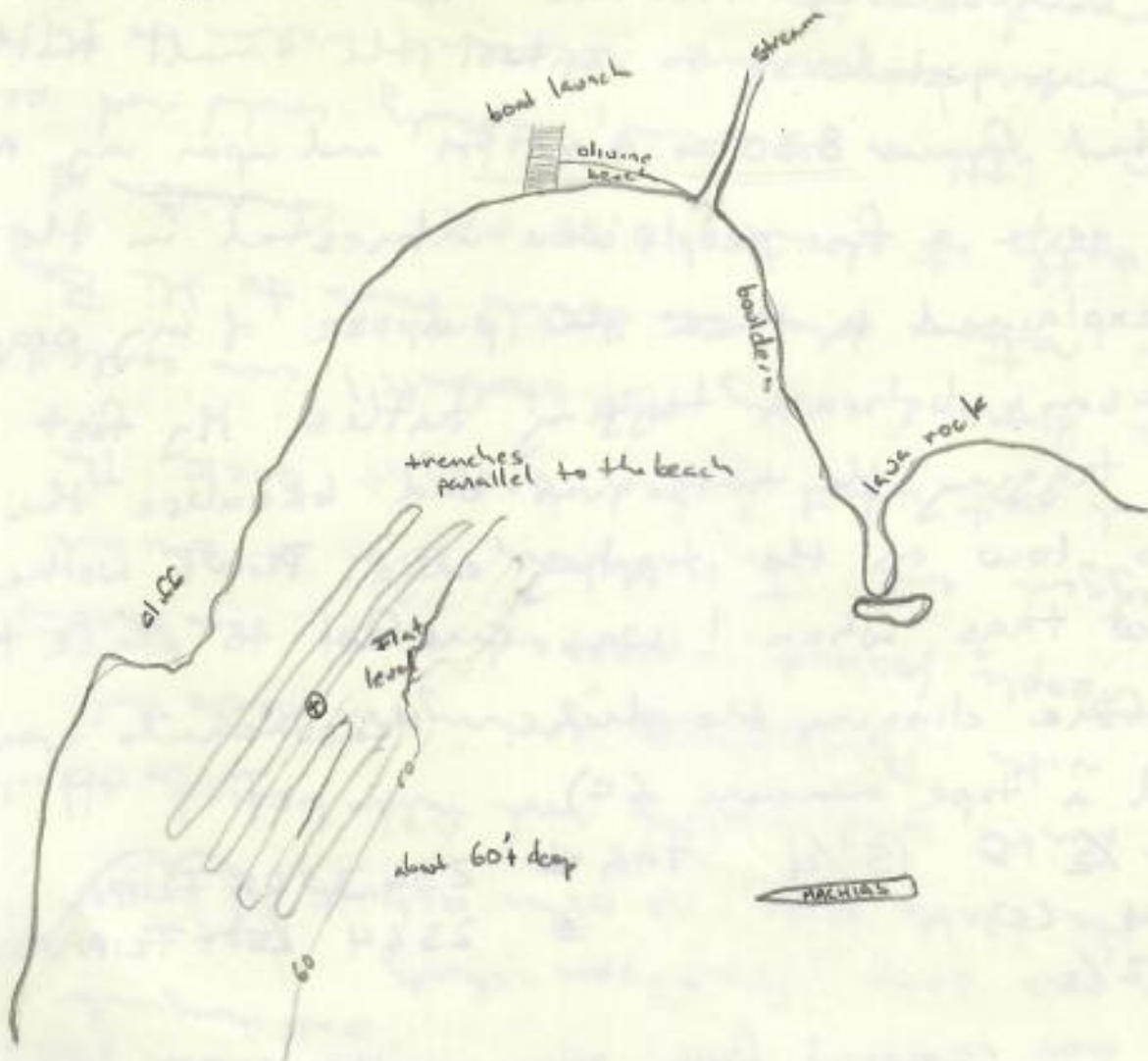
and widespread. Now, sea turtles have some protection from being overexploited and their numbers can rise once again.

GEORGE,

THIS IS JUST SOME INITIAL THOUGHT
ABOUT WHAT I HAVE BEEN DOING.
IT IS INCOMPLETE AND NOT THAT WELL
ORGANIZED, BUT SOMETHING TO BEGIN
WITH FOR CRITICIZING. HOPE YOU CAN
READ MY HANDWRITING. AND WHEN I SEE
YOU NEXT I WILL HAVE SOMETHING
MORE APPROPRIATE.

~~AB~~

HONOLOWA BAY, MAUI



TURTLE TAG REPORT

On October 9, 1977 while night diving at Honolulu Bay, Mo. from the RV 'MACHIAS' with Barbara Lee (MOP-BML) and spearing fish-who at a depth of about 25' I was able to find a green sea turtle. SCUBA gear used. The turtle was sleeping on a ledge that offered complete coverage, ledge about 3'-4' deep with a horizontal rock bottom. Bottom was solid rock with a sediment layer, no coral appeared in abundance, no sea urchins. A relatively bare area.

When I first sighted the turtle, the turtle appeared to have noticed the light shining on it, but did not swim or move from its original position. Turtle was not spooked by my presence. Debating whether or not to grab the turtle, I decided to pick it up and bring it to the 'Machias'. This was easily

cont'd



cont'd

accomplished because the 'Machias' had its Avon in the water and it was quite easy to control the small turtle. The dive lasted from 8:30 → 9:45 PM and upon my return to the ship, quite a few people were interested in the turtle. I explained to them the purpose of my project and the reasons behind tagging turtles. My first attempt at tagging the turtle was bad because the tag was too low on the trailing edge. Pliers worked well on the next tags, when I was careful to place tags further in before dinging the pliers. Measurements were obtained with a tape measure (c). note: (# 2362 rejected)

(C)	$17 \frac{1}{2}$	x	$15 \frac{1}{4}$	TAG #	2363	RT. FLIPPER
P.L.	14	(c)		#	2364	LEFT FLIPPER
TAIL	$2 \frac{1}{2}$					

Neck barnacles were removed from pelvic girdle region, but was later lost. Calcareous algae was growing on the shell with a large patch on the anterior or post central plates. Though there was some fore flipper activity while turning the turtle over, no other activity was noted. Turtle was healthy and full-bodied, all limbs intact with Polysiphonia growing in neck and pelvic areas. People looked impressed that sea turtles were being tagged and J. McMahon sort of smiled when he found out what I had brought back. The rest of the divers (mostly MOP students) were content to watch me return the sea turtle back to the Bay. Released the turtle at about 10.30 PM. Condition of water - calm, little or no wind, cloudy could not see any stars and air temperature relatively warm for the season. Pleasant weather



Report by Alan Kaw

Transmitted 9/12/77 concerning
turtle report during my absence

TELEPHONE MESSAGE: Dated 8/29/77 Time: 9:05 am

IN REFERENCE TO GREEN SEA TURTLE

CALLER: Mr. ^{deputy} KAM ^{PR off DOA} PLANT QUARANTINE STATION (#548-2672)

Whitney KAM

On August 31st 1977 I picked up a late memo informing me that someone had found a green sea turtle on the beach. By contacting Mr. Kam, he in turn put me in contact with Mr. Lawrence Beppo, ^{SPM} superintendent of the Laid Corporation Yard (City and County) [#293-5657]. Mr. Beppo handled all affairs concerning the transportation and holding of the turtle.

September 1, I traveled out to the Laid Corporation Yard to examine the carcass and to examine the remains. Mr. Beppo was quite cooperative and with the help of J. Ah Pock was shown the site of the turtle. Turtle was buried under sand and yet there was still a strong smell of decay. Uncovered the turtle. Severe decomposition with depressed plastron, liquids oozing out of hind and front portion of body. Many maggots, roaches, water louse throughout flesh. Shell plates completely off bone, shell bone separating with margins completely 'decayed'? revealing ribs structure. Front flippers, because nearer the surface were dried out while the hind flippers were soft and spongy. Body structure quite springy after decomposing physical processes.

STRAIGHT MEASUREMENT 33 ⁷/₈ x 27


Sample ~~of~~ obtained of 2 lateral plates.

I did not notice any head with the carcass and because of the stench and quite messy conditions did not pursue exploration of the surrounding soil.

By speaking to the man, sent to pick up the turtle (J. Ah. Pook) I was able to obtain the name of the family who turned in the report.

AYMOND 53-239 Kam Hwy. Punaluu



I visited the residence and spoke with Mrs. Aymond. She said the turtle was washed up on the beach behind their house on August 26. It was a large turtle, perhaps 200 lbs, full bodied, all limbs intact except that the head was missing. Further questioning revealed that perhaps the lower jaw was still attached () - but the ^(tips) ends were not joined. They described the body as being in good condition, though they noticed it was beginning to smell. Examining the turtle, the plastron was full-bodied with some give and the shell plates were described as quite dark. No barnacles, no tags and no algae on shell.

They were quite concerned and genuinely interested in green sea turtles in Hawaii. Also indicated that they had sampled turtle steaks in Florida (Mrs.) and the soup (Mr. & Mrs.) and believed that all turtles were protected because of their endangered status.

used on Kawai
July 1977
od per KAM

$\frac{3}{4}$, $\frac{5}{8}$ or 1" in diameter
Aluminum Pole (10-12' long)



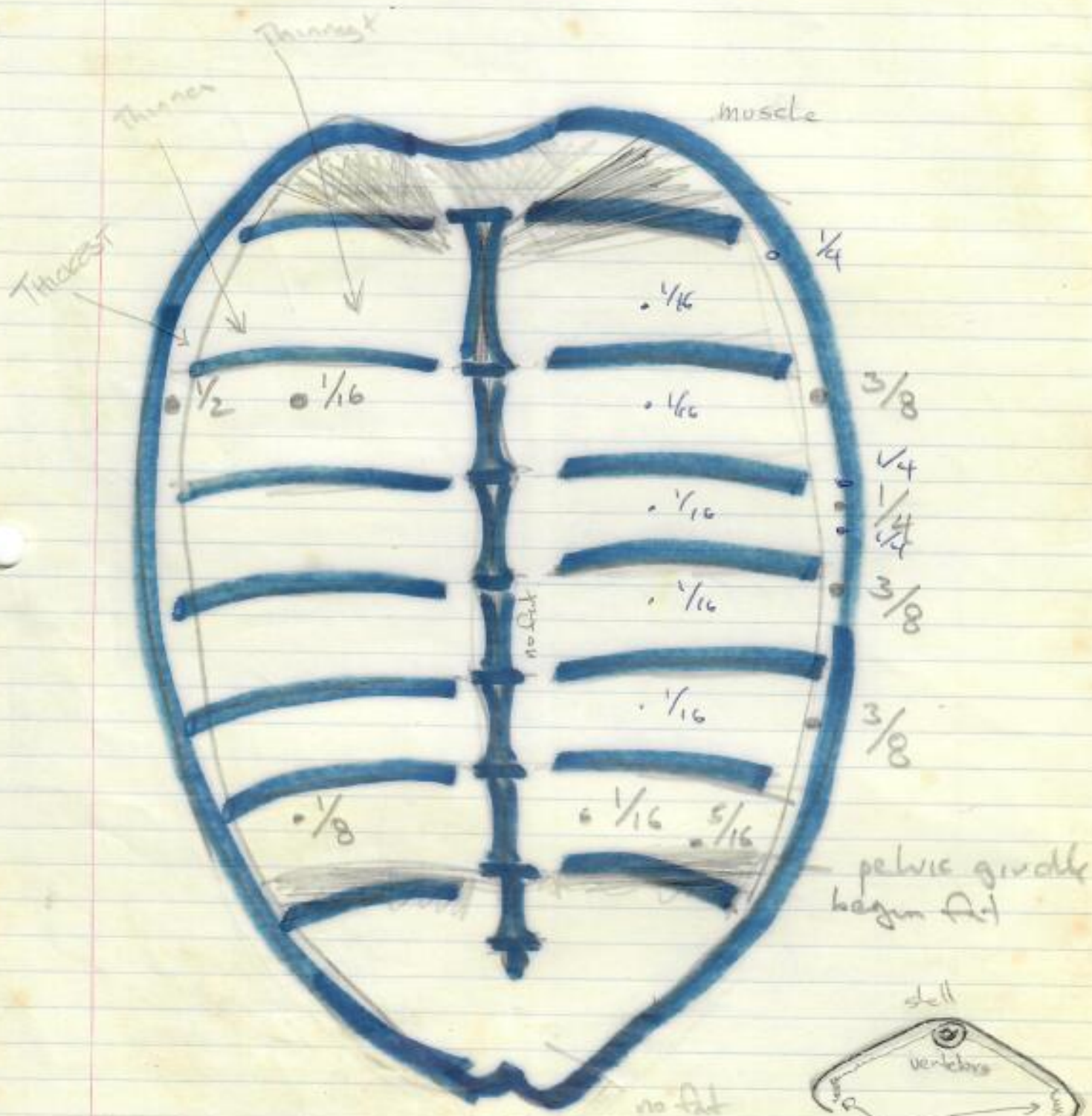
GREEN SEA TURTLE BAFS Mortality July '77
MEMORANDUM TAKEN 10/2

FRONT SECTION — 12 lbs (5.45 kg)
SPRING SCALE HAND SECTION — 4 lbs (1.80 kg)

BONES, FIN, SKIN — 1140.5 g
FRONT SECTION: FLESH — 3778.5 g
300.5 g → NECK w/ BASE without water, esophagus
BONES, FIN, SKIN — 993.0 g
HAND SECTION: FLESH — 585.0 g

	<u>R+</u>	<u>Left</u>
Acromial process		
Scapula	125.0	117.5
Coracoid		

GREEN SEA TURTLE
 BELLOWS BEACH MORTALITY (JULY 1977)



Most fat is found along edges of carapace with a deposit forming part of the pelvic girdle region

10/2/77

P.L. $20\frac{3}{4}$

Head Width $4\frac{1}{8}$

Tail $4\frac{1}{4}$

Carapace

(S) $27\frac{7}{8} \times 19\frac{7}{8}$

(C) $29\frac{1}{4} \times 24\frac{1}{4}$

* rt. side of head



12 rings



(±6)

o drill hole
9 in margin



SEPTEMBER 21ST 1977

HAWKSBILL TURTLE (from the Aquarium)

Preliminary exploration revealed metal objects in the turtle's digestive system. Removed from the stomach section was a piece of thin wire [6 ~~inches~~ inches long ] and a piece of metal resembling part of the tab, of a pop-top container []. Lower down from these articles was a section of large intestines, heavily fattened with what appeared like a large tumor. White solid material with an inner core quite dark colored with a metal object, somewhat looking like a nail. (Section removed and prepared for sample). Turtle was quite fat, with large deposits appearing on the scapula (shell side), along the intestines, along margins, by the shell ventrals, and ~~within~~ within the pelvic ~~fat~~ ^[frozen] girdle. (Samples obtained of fat and flesh from scapula) Shell prepared by allowing formalin - dibuto → mod. strong to soak into vertebral area. Plaster ~~plaster~~ placed on tin roof of boat shed



November 22, 1977

"Aquaculture from Agriculture" Ron Linsley - College of Tropical Ag.

A goal for the US Foreign Policy is to increase food production in Lesser developed countries through research and development programs in its 'land-grant' and 'sea-grant' colleges. Agriculture programs for higher institutions, or related fields (Oceanic Instit., HIOTB, Trop Ag) will now include aquaculture as a program for development to be transferred to the 2D countries. There are three fields of exploration in Agriculture a) Aquaculture / Fisheries b) Ruminants (hoofed animals) c) grain foods to be directed toward these areas: 1. South east Asia 2. Pacific region (some ^{-developing-} Trust Territory, NZ, Aust. etc) 3. Africa, Central America, Mid East, Peru, Ecuador, Panama passed over because money has already been spent in the past on political hot spots.

U.S. Department of Agriculture

[a bill was rewritten and signed, that stated aquaculture would be Federally mandated for all land grant colleges] but it Kansas or Hawaii

Aquaculture will require and get in the future more Federal money as part of the whole, greater Agriculture program of the United States.

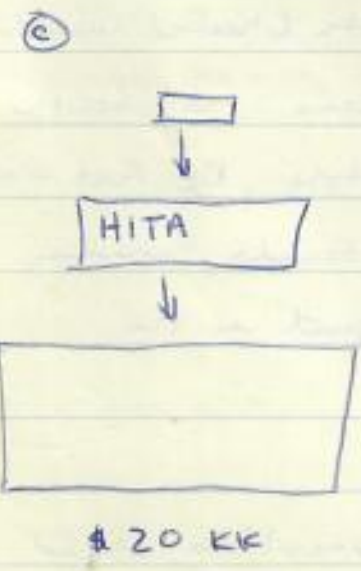
- aquaculture can be a viable component of technology transfer to Lesser Developed Countries
(these target areas have not yet been identified)

University of Hawaii greater plan of Ron Lindsey's Institute of Tropical Ag
 sen. or Rep.

Title 406 brought to Federal attention by Matsunaga (Hawaii) and others to
 establish a Tropical Institute of Agriculture



with this inception, OH gets more
 '\$' to conduct research
 College of Trop. Agr. will have an office
 of Agriculture to coordinate projects
 [no dept. of Agriculture or School of Agr.]



* 5-year program plans - money for
 1 yr projects
 2 yr projects =
 5 yr projects

Further information to be obtained in Dec 2013 or (14-15?)

SIZE OF FECAL PELLETS FOUND ON BOAT AT
BELLOWS AIR FORCE STATION

	<u>length</u> mm	<u>width</u> mm		<u>length</u> mm	<u>width</u> mm
1.	33.7 -	11.4	31.	38.8 -	23.1
2.	35.0 -	14.6	32.	57.9 -	23.4
3.	36.7 -	14.9	33.	46.9 -	24.0
4.	30.4 -	17.2	34.	38.3 -	24.1
5.	37.0 -	18.4	35.	35.6 -	24.3
6.	35.2 -	18.5	36.	43.7 -	25.2
9.	39.8 -	18.7	37.	61.4 -	25.3
7. a)	48.5 -	18.6	38.	33.2 -	25.4
8. b)	28.2 -	18.7	39.	33.2 -	25.6
10.	30.1 -	18.8	40.	34.3 -	26.7
11.	36.4 -	19.1	41.	33.2 -	26.8
12.	31.7 -	19.7	42.	46.9 -	26.8
13.	51.5 -	19.7	43.	44.2 -	27.5
14.	38.1 -	20.5	44.	33.4 -	29.1
15.	26.9 -	20.9	45.	55.5 -	30.0

16. 35.5 - 21.0
17. 37.6 - 21.0
18. 36.6 - 21.2
19. 29.3 - 21.8
20. 42.7 - 21.8
21. 36.5 - 22.0
22. 37.5 - 22.0
23. 34.2 - 22.1
24. 48.9 - 22.1
25. 44.7 - 22.5
26. 34.0 - 22.8
27. 36.6 - 22.9
28. 39.4 - 22.9
29. 38.3 - 23.0
30. 39.7 - 23.0

MONTH OF AUGUST

1977 or

1978

Turtle Soup

from Kam 11/23/77

On 'United Airlines' flight 121

[Philadelphia → Chicago ... → S.F.]

Nov. 10, 1977 1p. Philadelphia 11.00 am

my mother was served turtle soup
with her meal (soup and sandwiches)

in the coach section. Accompanying

the meal was a little card that

said it was a special soup for

that flight. Mom remembers that

card said 'turtle' and not terrapin.

The soup came with the meal, so

passengers could either have it or

not take it.

547-2211

DINING Services
Attn: Supervisor
Chung
Central Admin.

Sampling Green Sea Turtles With Nets On The Island Of Hawaii

Alan K.H. Kam

Marine Option Program - student

Introduction

In studying a marine reptile, such as the green sea turtle (Chelonia sp.) a major objective is to acquire a firm skill in sampling techniques. Though sea turtles can be captured by hand, improved and more efficient techniques should be utilized. These techniques not only must afford greater coverage of a sample area but also provide for the safety and protection of the sea turtle once captured. Thus by capturing and then tagging, measuring, and observing green sea turtle aggregations in their marine environment, basic biological data may be collected on this unique and valuable marine resource in the Hawaiian Archipelago. Data thus gathered can be useful in planning management programs to insure the survival of the sea turtle for the future benefit of the State of Hawaii for aesthetic purposes, scientific inquiry and as an exploitable food resource.

On May 5-8, 1977 I accompanied Mr. George H. Balazs (Hawaii Institute of Marine Biology) with MOP-support on a field trip to the Island of Hawaii to test the feasibility of using large-mesh nets as a method of obtaining samples of live, healthy green sea turtles. For the purpose of the field trials, areas were selected based on the experience and turtle-fishing knowledge of Mr. Arnold L. Howard, a resident of Punalu'u, Hawaii. His advice and comments provided insight into the turtle-fishing practices along Hawaii's shoreline. By showing us and explaining the various techniques in setting a large-mesh turtle net, I acquired an education

in handling and maintaining turtle nets.

Materials and Methods

The nets that were used were quite similar to local gill-fishing nets, except that the mesh or "eye" size were larger. Two nets were made of cotton twine, 62 feet long and 14 feet high with an "eye" of 26 inches. Two nets were made of nylon, 73 feet long and 12 feet high with an "eye" of 18 inches. By using the nets in varying manner, sampling could be conducted over a range of topographical conditions. The large mesh size allowed the swimming turtle to penetrate the net and become entangled within its folds. Large turtles captured in this manner were able to breathe even though their struggles gathered most of the net about their flailing flippers. There is a distinct danger from drowning, but with periodic checking of the nets, this problem can be kept to a minimum. Smaller turtles caught in nets have a greater difficulty in breathing because of their inability to pull the weight of the net to the surface to breathe. Thus by monitoring the nets, smaller turtles have a better chance of being noticed and subsequently removed from possible harm.

The nets were set by hand. First, by loading them onto a rubber innertube and then swimming perpendicular to the shore while releasing lengths of net. On shore the nets were attached to an anchor placed within the rocks of the beach. This is done to prevent the nets from becoming lost due to strong currents and rough weather conditions. By laying the net perpendicular to the shore, an area could be sampled of any turtles traveling along the coast feeding upon the algas of the reef.

The nets were left in the water overnight and any turtles caught were promptly removed the next morning. The captured turtles along with the section of net they were entangled in were loaded into the innertube and brought to shore. On the beach the sea turtles were disengaged from the folds of the net and measured. Photographs were taken and measurements recorded of data obtained: carapace length and width (straight and curved measurements), plastron length, tail length, and unusual body characteristics. Then the turtles were tagged on their front flippers using an Inconel tag. The turtles were released back to the area where they were caught after the measuring and tagging.

Results

Between May 5-8, on the Island of Hawaii; in the Punalu'u and Ka'alu'alu areas, the use of nets accounted for the capture, tagging and release of 15 green sea turtles along with 1 recapture. The sea turtles ranged in size from 16 1/4 inches to 35 5/8 inches (straight line carapace length). All the turtles appeared to be in excellent health and full bodied. The one recapture occurred in the same area the turtle was originally caught in, three days later, with two of its tags missing. It was suggested that entanglement within the nets a second time could have possibly torn out the tags. The missing tags were replaced and the turtles released into the ocean.

It was noted that by using nets, both large and small turtles could be captured. The nets were moderately easy to handle and to set. It was also noted that the use of nets caused minimal harm upon the sea turtle, though anterior portions of its body- pri-

marily the neck and immediate foreflipper region did suffer from rope burns.

Summary

As a method of obtaining healthy specimens of green sea turtles (Chelonia sp.) the use of nets proved to be highly effective. Nets provide the opportunity to restrict entry and exit of sea turtles through known feeding pastures, thus enabling for the capture of live and relatively unharmed specimen. The nets were designed specifically to capture sea turtles and excluded capture of other marine organisms, except possibly large rays or sharks. Nets are a good way to sample green sea turtle, but care must be exercised to lessen the chance of drowning of any turtles. Checking the nets a regular intervals is a good measure to insure the survival of any captured specimens.

To pursue further any attempts at studying the Hawaiian green sea turtle population, it is most beneficial to be able to employ capture methods designed to select specimens from their natural habitat. Known areas of green sea turtle aggregations can thus be sampled with nets and with the information obtained to supply data for management programs of this resource. By being allowed to use nets; capturing, tagging and release of sample populations in the Hawaiian Archipelago, migration and size ratios of the green sea turtle may be established for this Pacific area.

CHARLES WONG DOCK

NOSC Personnel

Tel # 254 - 4464

Found plastron, hind flippers, intestines
of a small turtle at (Opening to
the sea for Kaluapuhi Pond) Monday (1/2
afternoon 4.30 pm. Believes that turtle
was taken in immediate vicinity -
also indicated that he has seen
a number of sea turtles in the area
of Mokolua Rock. (From the air)

Turtle parts in plastic bag in the
freezer.

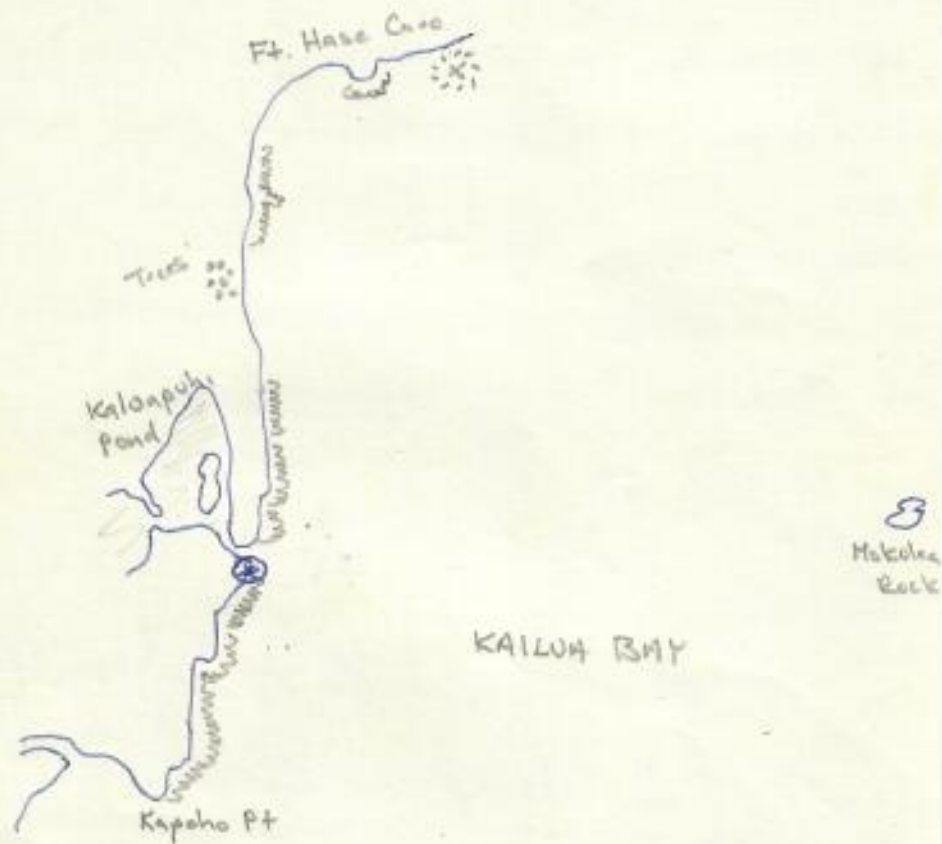
PLASTRON - $15\frac{3}{8}$ " length
left butchered on black

by alan kane

November 22, 1977

Small ovum present - preserved/
saved with kidneys.

1/77



photographed - Dissected 1/23/77 -
Codium from upper tract saved -
no stomach present - black "sponge"
through intestine - rep. sample saved

CHARLES WONG DOCK
NOSC Personnel
Tel # 254 - 4464

Found plastron, hind flippers, intestines
of a small turtle at ~~the~~ opening to
the sea for Kalapohi Pond Monday (11/22/77)
afternoon 4:30 pm. Believes that turtle
was taken in immediate vicinity -
also indicated that he has seen
a number of sea turtles in the area
of Molokai Rock. (Over the air)

Turtle parts in plastic bag in the
freezer.

PLASTRON - 15 3/8" length
left butchered on black

by Alan Kam

NOVEMBER 22, 1977

Small ovum present - preserved
saved with kidneys.



Photographed - Dissected 11/23/77 -
Codium from upper tract saved -
no stomach present - black "sponge"
through intestine - Ref. sample saved

many small crabs living in plaster
algae covered
tunicates
'OUTER SHELL'

STOMACH CONTENTS
WEIGHT OF CONTENTS 532.5 gms
of stomach tissue 223.0 gms
Total weight 755.5

'INTERNAL'

normal fat layer along internal marginal,
cutting through vertebra w/ knife blade
[bone is soft]
Even shell could be cut through

Heart: white fibrous structure in heart tissue

Edema in tissue lying underside of carapace
Liver appears small (rt. side) looks like one lobe
Spleen (1 1/2 diameter) reduced size
Intestines filled with food } decomposing
Stomach filled w/ algae }

November 25, 1977
New Kaneohe Bay Green, tumors and branches

27 lbs
Head 2 7/8
(S) 18 3/4 x 14 3/4

Soft marginals

150 upper shell
12 head
9 dorsal nt. front
4 dorsal left front
9 dorsal left rear
4 dorsal rt. rear

PLASTERS

32 ventral surface of marginals
115 Plaster "many small branches"

SAMPLES OF TUMORS RETAINED IN FORMALIN

Rt front flipper
lf front flipper
head
Hind/pelvic
? note: tumors on kidneys
lung w/lt tumor
heart

B^o his
(2) small

Ventral
Rt. front 6B
6(S)
left arm 10B
8(S)
left rear 2
RT rear 1B
10(S)

TAGS ON WOOD

number of
tags

T 101 - T 125 (25)

T 126 - T 150 (25)

T 151 - T 175 (25)

T 177 - T 196 (20)

T 238 - T 239 T 241 - T 242 T 244 - T 250 (11)

T 326 - T 350 (25)

T 351 - T 375 (25)

T 376 - T 400 (25)

T 480 - T 499 (20)

S 1102 - S 1125 [S 1103 - S 1111 - S 1113 - S 1123] ✓
(1) note + S 1102 to 1107 (20)

S 1126 - S 1150 [S 1126 - S 1150] (25) ✓

S 1201 - S 1225 [S 1201 - S 1255] (25)

S 1226 - S 1250 [S 1226 - S 1250] (25)

S 1251 - S 1275 [S 1251 - S 1275] (25)

S 1276 - S 1296²¹ [S 1276 - S 1300] (25)

145

²⁰¹
145
146

146

Total = 49 tags

Turtle is from Hawaii

January 1978

(C) $16\frac{1}{2} \times 14\frac{5}{8}$ (S) $15\frac{1}{2} \times 12\frac{3}{4}$ Head $2\frac{1}{2}$ Tail $2\frac{7}{8}$ P.L. $12\frac{1}{2}$

Weight 19 lbs

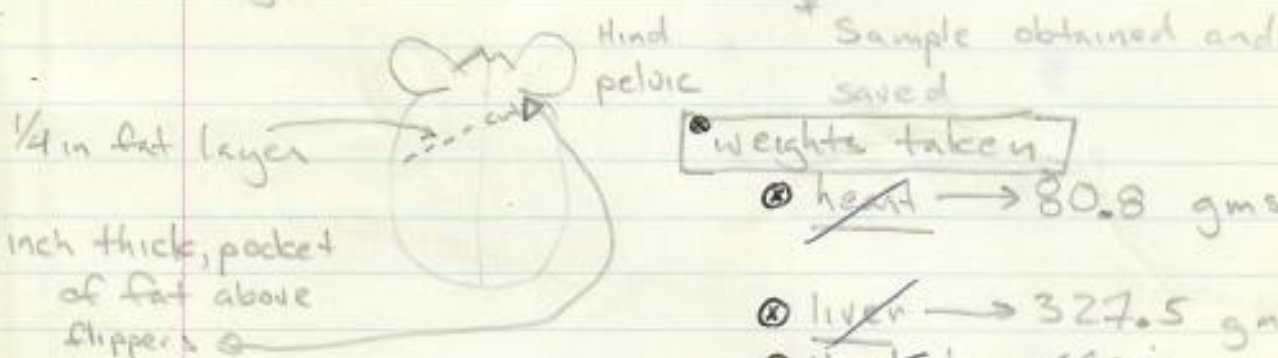
Match book forced in mouth to keep mouth open

Mortality

Dissected August 29, 1978

Calcareous algae on hind end of carapace check again visually

Algae covered shell - check again - visually



<intestine> 18 feet from exit of first stomach

	② head + neck	581.1
	② intestines	1412.0
	② plastron	525.7
	② kidney	63.0
	② lungs	115.2
FAT from pelvic and underside of carapace	②	432.7
	② R Fat Qtr	942.1
CARPAGE	②	890.0
	② LF Front Qtr	949.4

- a) Contents of ~~1st and 2nd stomach~~ ^{1st and stomach material} 176.0
 b) ~~just 1st stomach material~~ ⁽¹⁺²⁾ 97.8

↓

some slimg material in portion of intestines following previous section. (usually digested algae material?)
 in this section

- c) intestine contents 735.1
 d) intestine wall material 312.8

$$\begin{array}{r}
 21 \\
 2.176.0 \\
 97.8 \\
 735.1 \\
 312.8 \\
 \hline
 1321.7
 \end{array}$$

measure 9/11

Stomach

156.1

?

contents

1160.2

KAU mortality, measured 9/11

(S) $20 \frac{5}{8}$ Width injury *

(C) $22 \frac{3}{8}$ Width injury *

Head $3 \frac{1}{8}$

Tail $5 \frac{3}{8}$

Weight 48 lbs

* Width injury: left side of carapace

Skin blemishes, small diam.

PL. Small indentations
pock marks



#10 Rt marginal
doubled



1 gram = 0.035 oz
 100 g = 3.527 oz
 1000 g = 2.2046 lbs

10/17/78

1st and 2nd?

STOMACH
 INTESINES

450 g
 4876 g
 326

PLASTRON 1208 g
 CARAPACE 3168.5 g
 w/ fat

HEAD w/ attached vertebrae 1552.5 g

LIVER / heart 903.0 g

Kidney
 lung

RIGHT FRONT FLIPPER whole
 tissue
 remainder Right Front

2899.0 g
 1849.0 g
 893.0 g
 2733

166 g

LEFT FRONT FLIPPER whole
 tissue
 remainder Left Front

3106.0 g
 2049.0 g
 867.5 g
 2916.5

187.5 g

HIND QUARTER whole
 tissue
 remainder Hind Qtr.

2384.0 g
 932.0 g
 1365.0 g
 2297.0

87 g

Fat taken from carapace 818.5 g
 new weight for CARAPACE 2350.0 g

HEAD
 STOMACH
 INTESINES
 PL

3168.5

CARAPACE
 LIVER / INTESINES
 RIGHT FRONT
 LEFT FLIP
 HIND QTR

Juice and bones?

Return
Harris
and note

~~lot~~
~~DATE~~
collect spores

5/7/80
Page of
30 GB-120

REMARKS: (Note any and all subsequent handling of sample)

2497

2 tags

(S) 19 x 15 1/2

[TUAMOTU]

(C) 19 7/8 x 18 1/8

PL 15 3/8

HEAD 3

TAIL 3 1/2

WEIGHT 30 lbs.

left trailing tag
placed within a
scale - scale growing
and forcing tag
at an odd angle



2052

2 tags

(S) 15 7/8 x 12 3/8

(C) 16 3/8 x 14 1/2

PL 12 3/4

HEAD 2 5/8

TAIL 3 3/8

WEIGHT 18 lbs

[other small one]

?

check
2496 left
on flap?

11/15 MEASUREMENTS

3 TAGS
Page of

REMARKS: (Note any and all subsequent handling of sample)

2 tags

X # 2054 LFL
(S) $19 \times 15 \frac{1}{8}$
(C) $20 \times 17 \frac{3}{4}$

PL $15 \frac{1}{2}$
HEAD $3 \frac{1}{8}$
TAIL $4 \frac{3}{8}$

WEIGHT 34 lbs

stubby tail, nail?

golden brown

X # 2500 LFL
(S) $22 \frac{3}{8} \times 18 \frac{7}{8}$
(C) $23 \frac{1}{8} \times 22 \frac{1}{4}$

PL $17 \frac{1}{4}$
HEAD $3 \frac{1}{4}$
TAIL $5 \frac{1}{4}$

WEIGHT 52 lbs

[big eye]

X # 2498 RFL change tags?
further out

(S) $21 \frac{1}{2} \times 17 \frac{1}{4}$
(C) $22 \frac{5}{8} \times 20 \frac{1}{4}$

PL $17 \frac{3}{8}$
HEAD $3 \frac{3}{8}$
TAIL $4 \frac{1}{4}$

WEIGHT 56 lbs

2 TAGS

X # 2051 2 TAGS

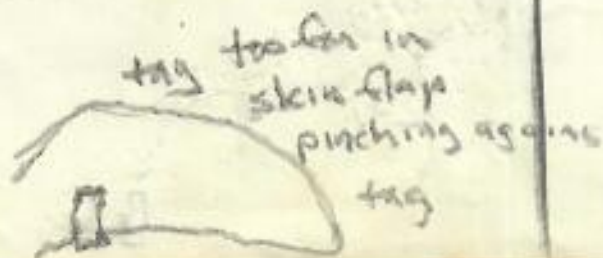
(S) $17 \frac{1}{2} \times 14 \frac{1}{4}$
(C) $18 \frac{1}{8} \times 16 \frac{7}{8}$

PL 14

HEAD 3

TAIL $3 \frac{5}{8}$

WEIGHT 25 lbs



[1 of a pair, by itself]

* Thick, very green fat on carapace
(about 1/2 inch)

* very yellow fat among the mesentery
between intestines

* Paired immature gonads preserved, the right side in Formalin w/ attached kidney tissue

Should be $\leq 10\%$
more like 5%
for small tissue

CONTENTS OF STOMACH + INTESTINES

Algae observed in stomach found throughout the intestines, also found were sponges.

- STOMACH (1+2) saved by freezing
- Sample obtained from intestines
1 - 1 1/2 feet from stomach (in band)
- Sample of intestines frozen

GREEN TURTLE mortality

Bellows Air Force Station

notes: found 18 July 1979, washed
up on beach by boat house (BAFS)
about 1500' (high tide)

contact made with SGT. TUBBS

preliminary survey 19 July 1979

(S) $30 \frac{3}{4} \times 23 \frac{1}{4}$

(C) $32 \frac{1}{4} \times 30 \frac{1}{4}$

PL $24 \frac{1}{8}$

Turtle missing its head, front flippers
hind flippers, and tail.

RT

LF side



femur 'sheared'

ventral view

10/5/79 measured

X
TAG NO. 2498 RFL
2053 LFL

(C) 61.2 x 55.0

(S) 58.5 x 46.8

PL 47.5 cm

HEAD 8.9 cm

TAIL 15.0 cm

X
TAG NO. 2378, 2500 LFL
2056 RFL

(C) 63.5 x 60.2

(S) 60.4 x 51.1

PL 47.5

HEAD 8.9

TAIL 13.3

Pl strongly depressed

X TAG NOS. 2079 RFL
2054 LFL

(C) 52.8 x 47

(S) 50.0 x 39.2

PL 40.8

HEAD 7.4

TAIL 11.5

LF posterior
marginal 'soft'

TUAMOTU
TAG NOS. 2497 RFL
2081 LFL

(C) 55.5 x 49.8

(S) 52.6 x 42.7

PL 42.6

HEAD 8.1

TAIL 9.5

X TAG NOS. 2051 LFL
2495 RFL

(C) 51.0 x 48.0

(S) 48.8 x 39.8

PL 39.8

HEAD 7.8

TAIL 11.0

TAG NOS. 2496 LFL
2052 RFL

(C) 46.0 x 40.8

(S) 44.1 x 35.2

PL 36.3

HEAD 7.7

TAIL 8.5

11926

measured 22 June 1979

(S) $16\frac{1}{2} \times 13\frac{1}{4}$

(C) $17\frac{1}{4} \times 15\frac{3}{8}$

HEAD $2\frac{5}{8}$

TAIL $3\frac{1}{2}$

PL $13\frac{7}{16}$

TAG NOS. 2496 LFL
2052 RFL

(A)

48.6
(S) $19\frac{1}{8} \times 15\frac{1}{4}$

(C) 20×18

HEAD 3

TAIL $4\frac{1}{4}$

PL 16

TAG NOS 2499 RFL
posterior central 2054 LFL

lifting, swimming

(D)

(S) $23\frac{1}{8} \times 19\frac{3}{8}$

(C) $24\frac{1}{4} \times 23\frac{1}{4}$

HEAD $3\frac{3}{8}$

TAIL $5\frac{1}{2}$

PL $18\frac{1}{4}$

TAG NOS 2056 RFL 2378 LFL
2500 LFL hand

(E)

(S) $23\frac{3}{4} \times 21\frac{1}{2}$

(S) $22\frac{1}{2} \times 18\frac{1}{4}$

HEAD $3\frac{1}{2}$

TAIL $5\frac{1}{2}$

PL $18\frac{5}{8}$

TAG NOS tags in hand
to read due to growth of skin

(F)
2053 LFL
+ RFL

(S) $18\frac{5}{8} \times 15\frac{1}{4}$

(C) $19\frac{1}{4} \times 18\frac{1}{8}$

HEAD 3

TAIL 4

PL $15\frac{1}{2}$

TAG NOS.

2495 RFL
2051 LFL

(B)

(S) $20 \times 16\frac{3}{8}$

(C) $21\frac{1}{8} \times 19$

HEAD 3

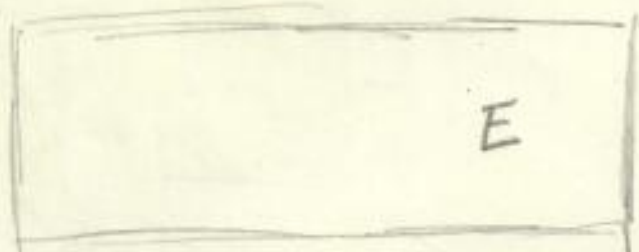
TAIL $3\frac{3}{4}$

PL $16\frac{1}{4}$

TAG NOS

(*) hand - 2081 LFL tracking
2497 RA

(C)



AMPHIPODS - none

TAG # 2052R 2496L

(S) $16\frac{1}{4} \times 13$

(C) $16\frac{3}{4} \times 14\frac{7}{8}$

Head $2\frac{5}{8}$

Tail $3\frac{5}{8}$

PL $13\frac{1}{8}$

Amphipods

Weight 22 lbs

April
1979

~~2019~~ 2054L

(S) $19\frac{1}{4} \times 15$

(C) $20\frac{1}{4} \times 18$

3

$4\frac{3}{8}$

$15\frac{3}{8}$

36 lbs

TAG # 2795R 2051L

(S) $18 \times 14\frac{5}{8}$

(C) $18\frac{5}{8} \times 17\frac{5}{8}$

HEAD 3

TAIL $4\frac{3}{8}$

PL $14\frac{5}{8}$

Weight 30 lbs

2056R 2500L

$22\frac{5}{8} \times 19\frac{1}{8}$

$23\frac{1}{2} \times 22\frac{5}{8}$

$3\frac{3}{8}$

$5\frac{1}{2}$

$17\frac{5}{8}$

60 lbs

LF TAG # 2497RV

(S) $19\frac{1}{2} \times 16$

(C) $20\frac{5}{8} \times 18$

Head 3

Tail $3\frac{3}{4}$

PL $15\frac{7}{8}$

Weight 37 lbs

2081

~~2018R + 2053C~~

$22\frac{1}{4} \times 17\frac{7}{8}$

$23\frac{3}{8} \times 21$

$3\frac{1}{4}$

$5\frac{3}{4}$

18

66 lb

2053L

TAG 2051
2495

13 entries

W-S CI853

x 9/15/74 - 5.1 cm

x 11/13/74 - 8.6 ^{2 months}

x 10/5/79 - 48.8 ~~50.7~~
61

x 4/13/75 - 13.0 ⁷ mos

x 6/18/75 - 16.2 ⁹ mos

x 9/21/75 - 21.6 ¹² mos

x 3/14/76 - 27.3 ^{17.75} mos

x 10/23/76 - 32.7 ^{24.75}

x 10/17/77 - 37.8 ^{36.75}

x 5/4/78 - 40.6 ^{43.25}

x 11/15/78 - 44.4 ^{49.5}

x 4/2/79 - 45.7 ⁵⁴

x 6/22/79 - 47.3 ~~56.7~~
⁵⁷

~~4 yr 9 month tank~~

TAG 2051
2495

W-S CI 853

9-15-74 (2) 5.1 1.75
11-13-74 (2) 8.6

11-13-74 (5) 8.6 .88
4-13-75 (5) 13.0

4-13-75 (2) 13.0 1.6
6-18-75 16.2

6-18-75 (3) 16.2 1.8
9-21-75 21.6

9-21-75 (5.75) 21.6 .99
3-14-76 27.3

3-14-76[?] (7) 27.3 .77
10-23-76 32.7

10-23-76 (12) 32.7 .43
10-17-77 37.8

10-17-77 (6.5) 37.8 .43
5-4-78 40.6

5-4-78 (6.5) 40.6 .61
11-15-78 44.4

11-15-78 (4.5) 44.4 .29
4-2-79 45.7

4-2-79 (2.7) 45.7 .59
6-22-79 47.3

6-22-79 (3.5) 47.3 .43
10-5-79 48.8

Tags 2056
2500
2378

straight carapace
length 100 ^{cm}
photo red x

(large?)

DAY 1				
x 9/1/72 - 5.2 cm		x 7/24/74 - 36.8	23 mons	months (absolute)
9/15/72 - 5.7	x	x 3/2/75 - 42.2	30.2 mons	18 months
10/13/72 - 7.6	x	x 6/18/75 - 45.1	33.7 mons	
11/10/72 - 9.5	x	x 9/21/75 - 46.4	36.7 mons	
12/8/72 - 10.8	x	x 3/14/76 - 49.5	42.5 mons	
x 1/5/73 - 11.8	4 months	x 10/31/76 - 53.3	50 mons	
4/3/73 - 14.6	x	x 10/17/77 - 54	61.5 mons	
x 5/3/73 - 15.2	8 months	x 5/4/78 - 55.2	68 mons	
6/5/73 - 16.8	x	x 11/15/78 - 56.8	74.2 mons	
x 8/30/73 - 21.5	12 months	x 4/2/79 - 57.5	78.7 mons	12 11 12 12 132
x 12/21/73 - 27.3	15.7 months	x 6/22/79 - 58.7	81.4	8yr 9mo 3d
x 4/18/74 - 34.6	19.7 months	10/5/79 - 60.4	84.9	85

12
48
7160
58
90

8.5
8.5 cm/yr
5/0

31
100
48
85
133

TAG 2056
2500
2378
cm/month

^{Captive}
GRAPH
+
Hivth? type



9-1-72	(4) 5.2	1.65	(4)	9-21-75	(5.75) 46.4	(42.45)
1-5-73	(4) 11.8			3-14-76	49.5	.54
1-5-73	(4) 11.8	0.85	(8)	3-14-76	(7.5) 49.5	(49.95)
5-3-73	(4) 15.2			10-31-76	58.3	.51
5-3-73	(4) 15.2	1.57	(12)	10-31-76	(11.5) 58.5	(61.45)
8-30-73	(4) 21.5			10-17-77	54.0	.04
8-30-73	(3.7) 21.5	1.57	(15.7)	10-17-77	(6.5) 54.0	(67.95)
12-21-73	(4) 27.3			5-4-78	55.2	.26
4-18-74	(4) 34.6	1.82	(19.7)	11-15-78	(6.25) 56.8	(74.2)
		↓ <i>prop</i>		11-15-78	56.8	.26
4-18-74	(10.5) 34.6	.72	(30.2)	11-15-78	(4.5) 56.8	(78.7)
3-2-75	42.2			4-2-79	57.5	.16
3-2-75	(3.5) 42.2	.82	(33.7)	4-2-79	(2.7) 57.5	(81.4)
6-18-75	45.1			6-22-79	58.7	.44
6-18-75	(3) 45.1	.43	(36.7)	6-22-79	(3.5) 58.7	(84.9)
9-21-75	(3) 46.4			10-5-79	60.4	.49

6yr 9mo 3wk
7yrs. 1mo 1wk

GOLDSMALL
TAG 2054
2499

17 entries

DAY 1

x 8/9/72 - 5.1 cm		x 12/21/73 - 33.0	17 17
8/16/72 - 5.5	α	x 4/18/74 - 38.7	20.5 21
9/6/72 - 7.2	α	x 7/24/74 - 40.6	23.5 24
9/13/72 - 7.7	α	x 3/2/75 - 43.2	31.5
10/11/72 - 8.8	α	x 9/21/75 - 43.8	37.8 38
11/8/72 - 9.6	α	x 3/14/76 - 44.5	43.5 44
x 12/6/72 - 10.2	4mons	x 10/23/76 - 46.4	50.75 51
1/3/73 - 12.0	α	x 10/17/77 - 47.0	60.75 63
x 4/3/73 - 15.4	8mons	x 5/4/78 - 47.3	69.25 70.5
5/3/73 - 17.7	α	x 11/15/78 - 48.3	75.5 76
6/5/73 - 20.0	α	x 4/2/79 - 48.9	80.0 81
x 8/30/73 - 26.7	13	x 6/22/79 - 48.9	83.0 83
		x 10/5/79 - 50.0	6yr 10mo 2wk 86 87 months

Gold Shell
Tag 2054
2099

cm/month

8-9-72 (4) 5.1	1.27	9-21-75 (5.75) 43.8	.12
12-6-72 (4) 10.2		3-14-76 (7.25) 44.5	
12-6-72 (4) 10.2	1.30	3-14-76 (7.25) 44.5	.26
4-3-73 (4) 15.4		10-23-76 (12) 46.4	
4-3-73 (5) 15.4	2.26	10-23-76 (12) 46.4	.05
8-30-73 26.7		10-17-77 (6.5) 47.0	.05
8-30-73 (3.75) 26.7	1.68	10-17-77 (6.5) 47.0	.05
12-21-73 33.0		5-4-78 (6.25) 47.3	.16
12-21-73 (4) 33.0	1.43	5-4-78 (6.25) 47.3	.16
4-18-74 38.7		11-15-78 (4.5) 48.3	.13
4-18-74 (3.25) 38.7	.58	4-2-79 (2.7) 48.9	0
7-24-74 40.6		4-2-79 (2.7) 48.9	0
7-24-74 (7.7) 40.6	.34	6-22-79	
3-2-75 43.2		6-22-79 (3.5) 48.9	6yr 10mo 2wk
3-2-75 (6.6) 43.2	.09	10-5-79 50.0	.31
9-21-75 43.8			

drop ↓

2498
2053
L.GIN

		cm/month		
10-15-73	(9) 5.1	1.77	10-17-77	(6.5) 50.8 .25
7-19-74	21.0		5-4-78	52.4
7-19-74	(4.75) 21.0	1.85	5-4-78	(6.25) 52.4 .35
12-10-74	29.8		11-15-78	54.6
12-10-74	(2.75) 29.8	1.16	11-15-78	(4.5) 54.6 .42
3-2-75	33.0		4-2-79	56.5
3-2-75	(3.5) 33.0	1.83	4-2-79	(2.7) 56.5 .26
6-18-75	39.4		6-22-79	57.2
6-18-75	(3) 39.4	↓ drop ↘	6-22-79	57.2
9-21-75	40.0	.20	10-5-79	(3.5) 58.5 .37
9-21-75	(5.25) 40.0			
3-14-76	42.5	.48		
3-14-76	(7.25) 42.5	.58		
10-23-76	46.7			
10-23-76	(12) 46.7	.34		
10-17-77	50.8			

2498
TAG 2053
LGIN

14 entries

DAY 1

x 10/15/73 - 5.1 cm		x 6/22/79 - 57.2	67.95 68
x 7/19/74 - 21.0	9 mons	57.8	68
x 12/10/74 - 29.8	14 13.75 mons	x 10/5/79 - 58.5	68 72 months
x 3/2/75 - 33.0	16.5 7		
x 6/18/75 - 39.4	20 20 mons		
x 9/21/75 - 40.0	23 mons		
x 3/14/76 - 42.5	28.25		
x 10/23/76 - 46.7	35.5		
x 10/17/77 - 50.8	40.25 47.5		
x 5/4/78 - 52.4	50.25 54		
x 11/15/78 - 54.6	60.25		
x 4/2/79 - 56.5	64.75 65		

12
6
72

13 MARCH 1981

0900 Lv. Coconut Island

from C. + G.S. map 4134 → 10W 19359

proceed to "Pork Chop reef" appears that Heeia-Kea glass-bottom boat sees reef as scenic area.

- Passed up area to examine Waihole-Waikane study area, anchored on WW shoreside of reef ~ 10' SW snorkeled seaward following contour of reef 6 turtles swimming (2 swim from resting position on ledge)

Was able to grab 1 turtle (70-80#) but got away,

grabbed another small turtle 20-25# and was able to board it.

Survey of "Porkchop" reef

2 reefs ~ 3-4' top drops down to 20' feet

① 1 turtle sighted swimming

② 6 turtles sighted - 2 swimming

4 coming out from ledges. too fast to catch up. P. compressa exhibits similar characteristics as W-W, ledges smoothed by turtle PL, vestigial in coral, also tamped down appearance, coral water deep on one side



10' Red buoy



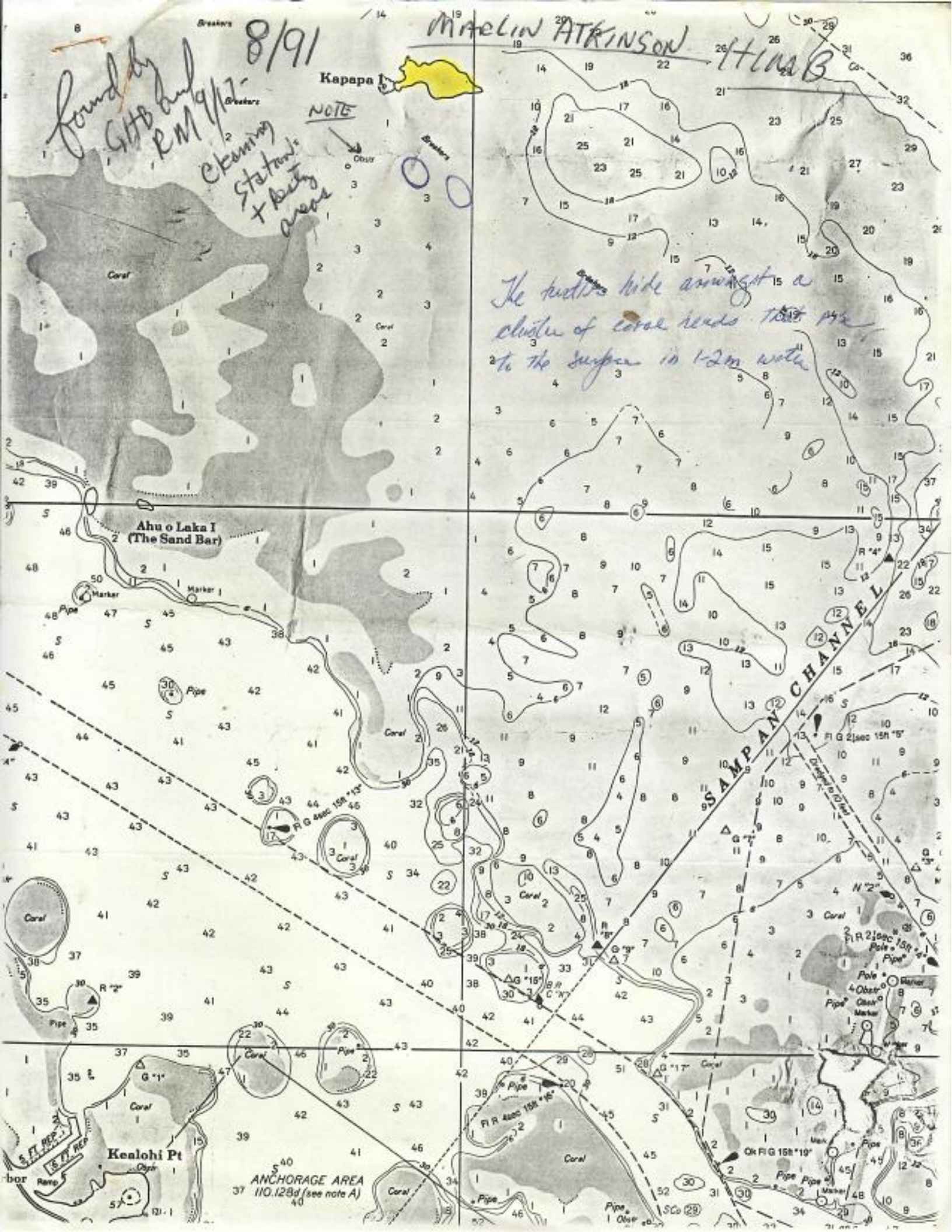
MARLIN ATKINSON

HINA B

found by GHD and PM 9/17-8/91

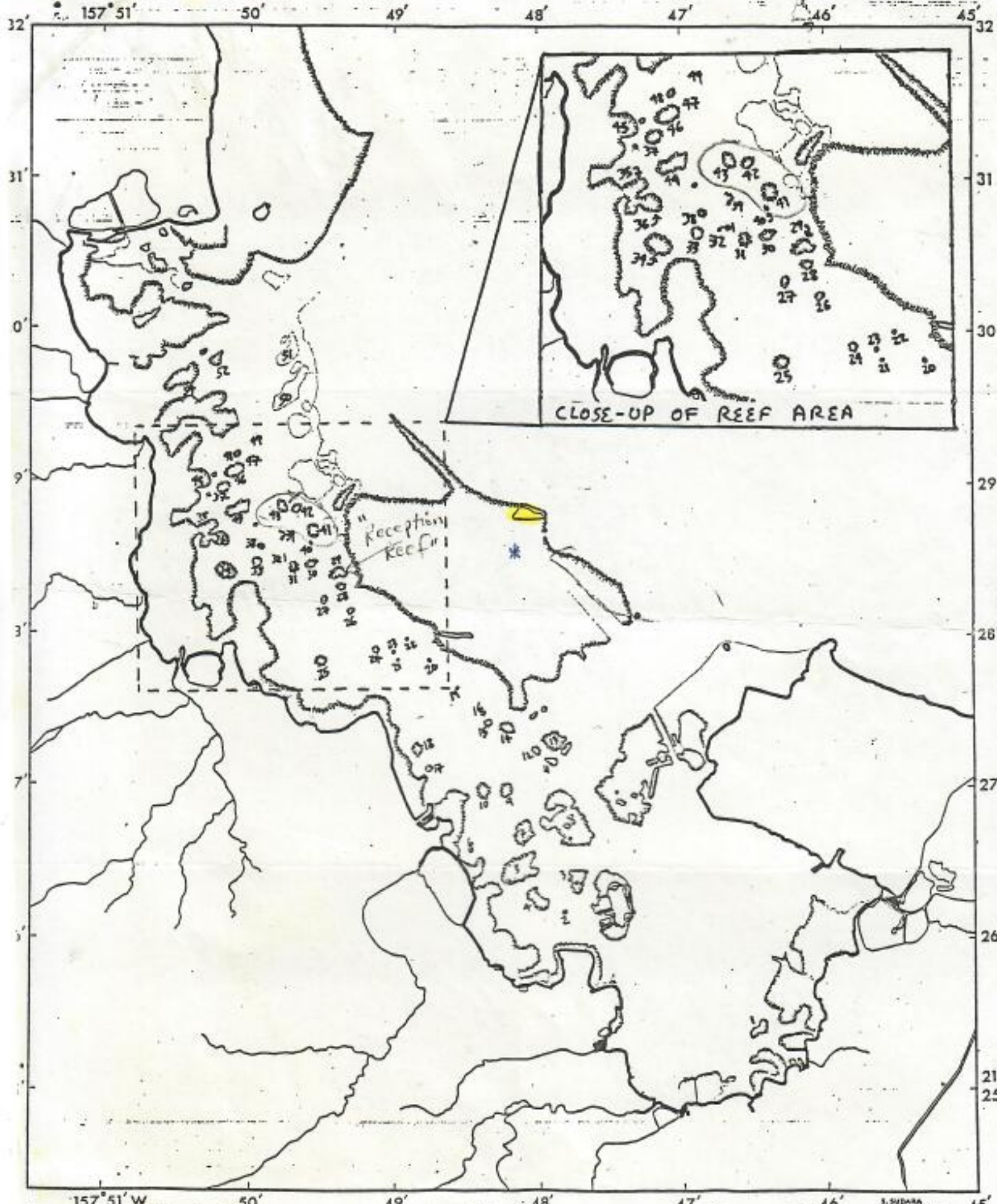
cleaning stations + party areas

NOTE



The ~~hull~~ ^{hull} ~~side~~ ^{side} amongst a cluster of coral heads that rise to the surface in 1-2m water

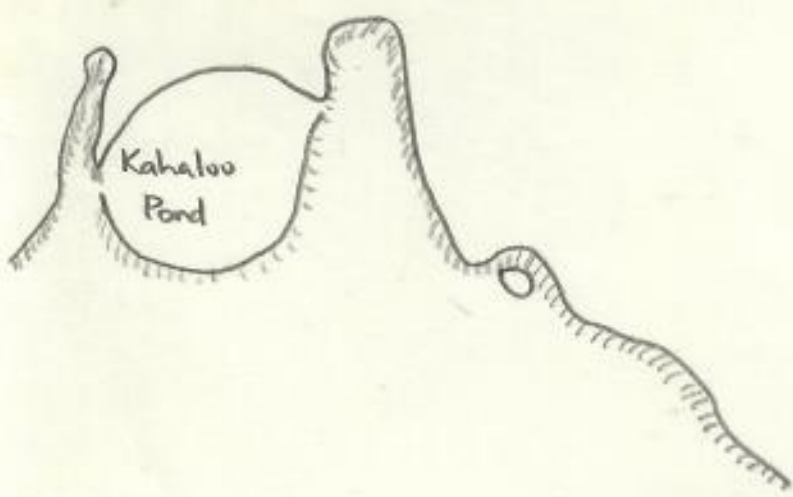
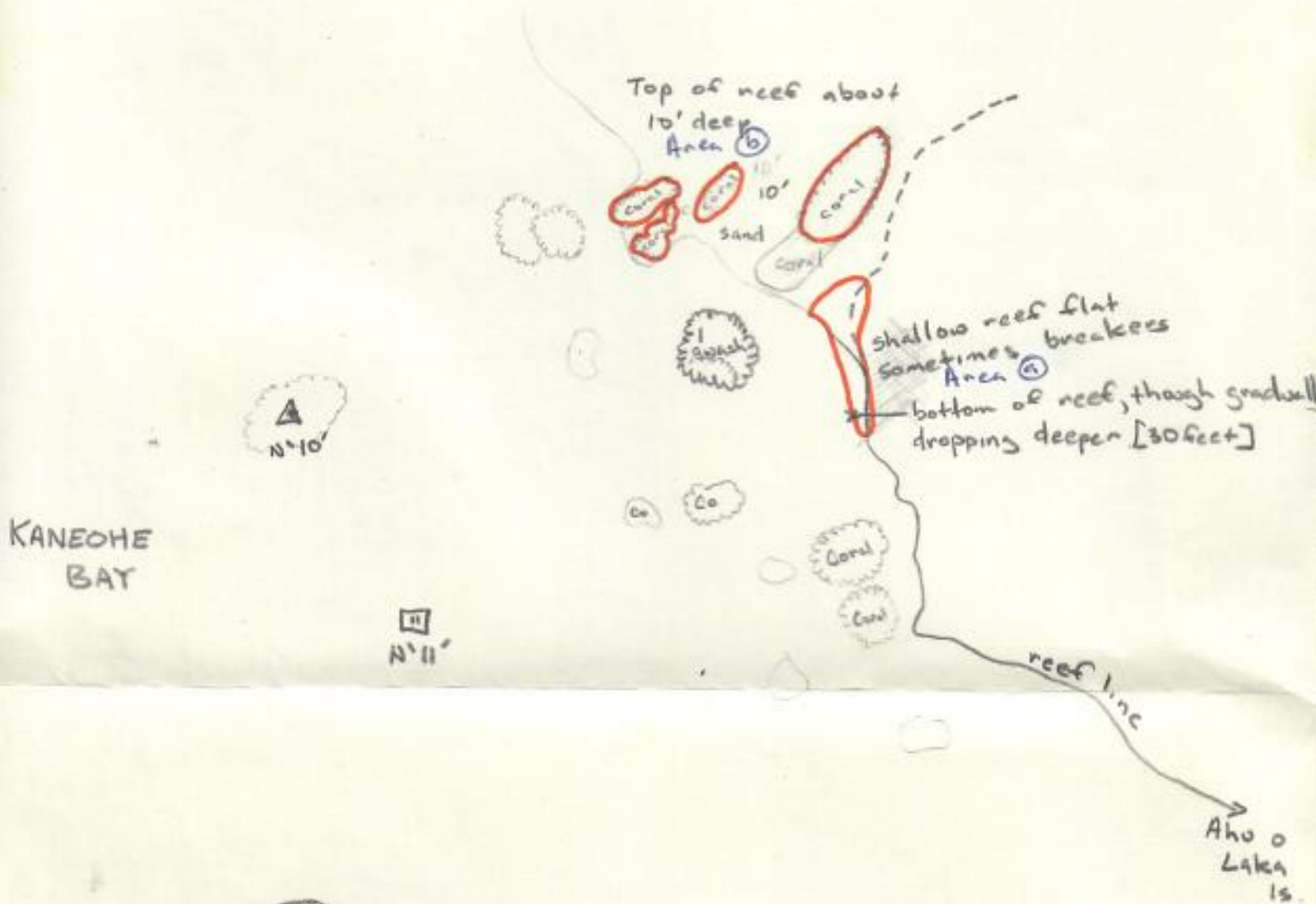
ANCHORAGE AREA 37 110.129d (see note A)



157° 51' W 50' 49' 48' 47' 46' 45' S. SUDARA MAPWORKS © 2007

Source: BILL TVEER

STUDY AREA



Area surveyed by snorkeling or by Scuba

AREA B

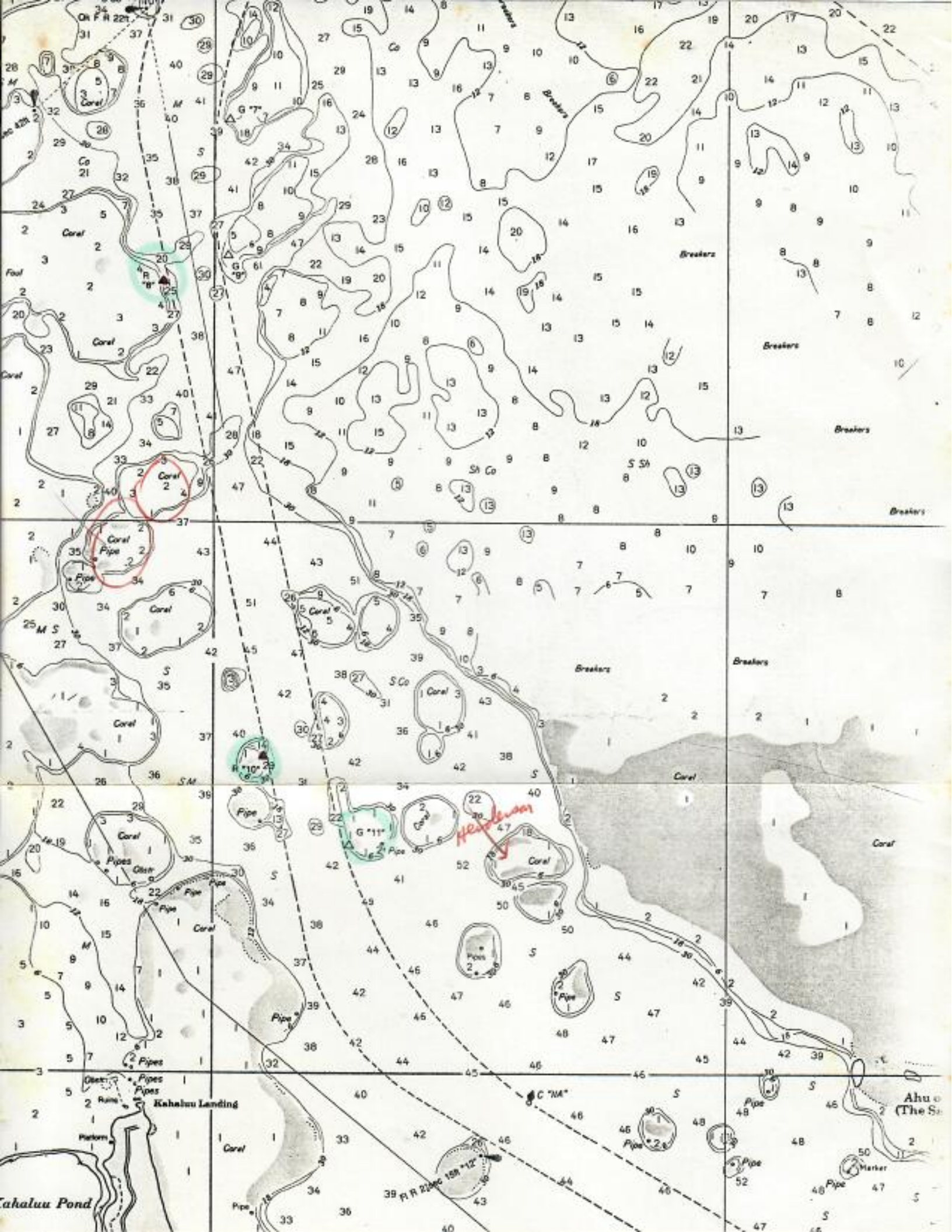


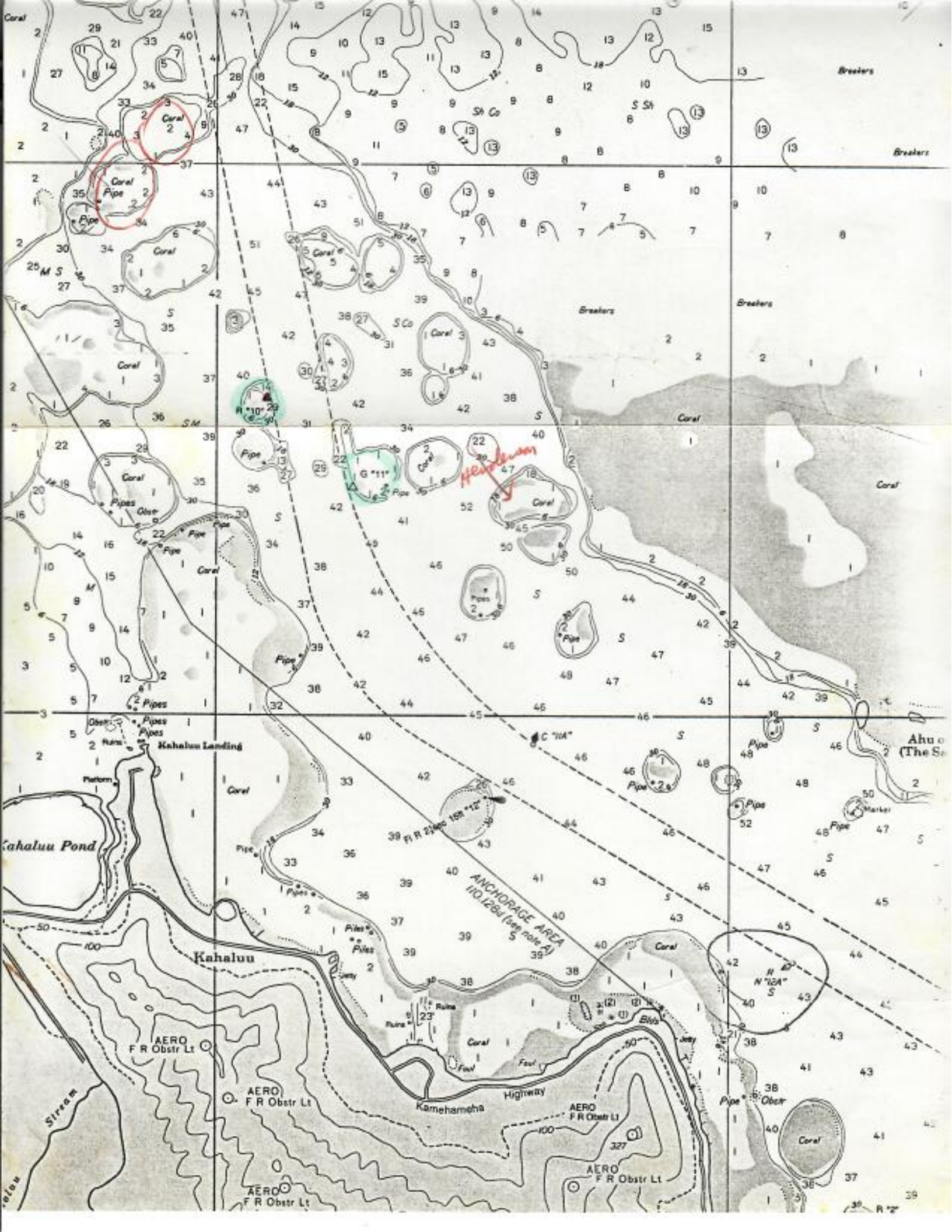
Corals

Pocillopora demicornis small coral, small in number
light, fragile.

Porites lobata

* Porites compressa dominant coral species





Hee 47-857

47-266 Kama lity

THURSDAY, MAY 4, 1978

0930 Unable to contact Mr. Kaweto because he is out on the ocean looking for squid - Leave Coconut Is. to meet him. He owns small 16' wooden skiff, white, high bow with outboard motor mounted through hull. ^{Johnson 20} Pass channel markers \square and \triangle and follow reef nearest shore. Low tide 6.30 am ht. 0 high tide 1.10 pm ht. +2.1. Our course is winding through the patch reefs until we came into a cove-like area, surrounded by porites reef and open to the sampan channel



As soon as Mr. Kawelo felt that we were over the right spot he sighted a small floating turtle. He pointed it to me and after a few more moments the turtle dove. 1000. No other sightings were made in the area.

The area is enclosed, with a low tide depth of about 20' and high tide of about 20-30 feet. While I was there I could barely see the bottom. water was cloudy, looked like a hard flat bottom. G.K. says that when he trolls in this spot it is necessary to bring in line to avoid boozing on the bottom - indicator of a rise? G.K. also believes that the small turtles sleep here, says his sons who dive in this area see turtles nesting in ledges. When asked if anyone laid gill nets here, G.K. said no.

G.K.

Said that in the past, fishermen would lay turtle nets, as the channel turned right catching large turtles

2 MAY 1978

SUBJECT: floating turtle found inshore channel
between Kualoa Park and Waikane, by
George Kawelo, Sr. (about 60's)
47266 Kam Hwy (1 mile past Heeia pier, left
side of road, 2 concrete driven
Tel. # 239-7162

while trolling 5/1/78. He called Fish +
Game who told him to call HIMB. I received
call at 0815 and went to pick up dead
turtle at 0900. The turtle was bloated,
plates beginning to separate, smelly. Though
GK showed me small puncture wound on
marginal plate behind of neck, it did not
look substantial, plates were lifting.

TAG Nos. # 2493 # 2394

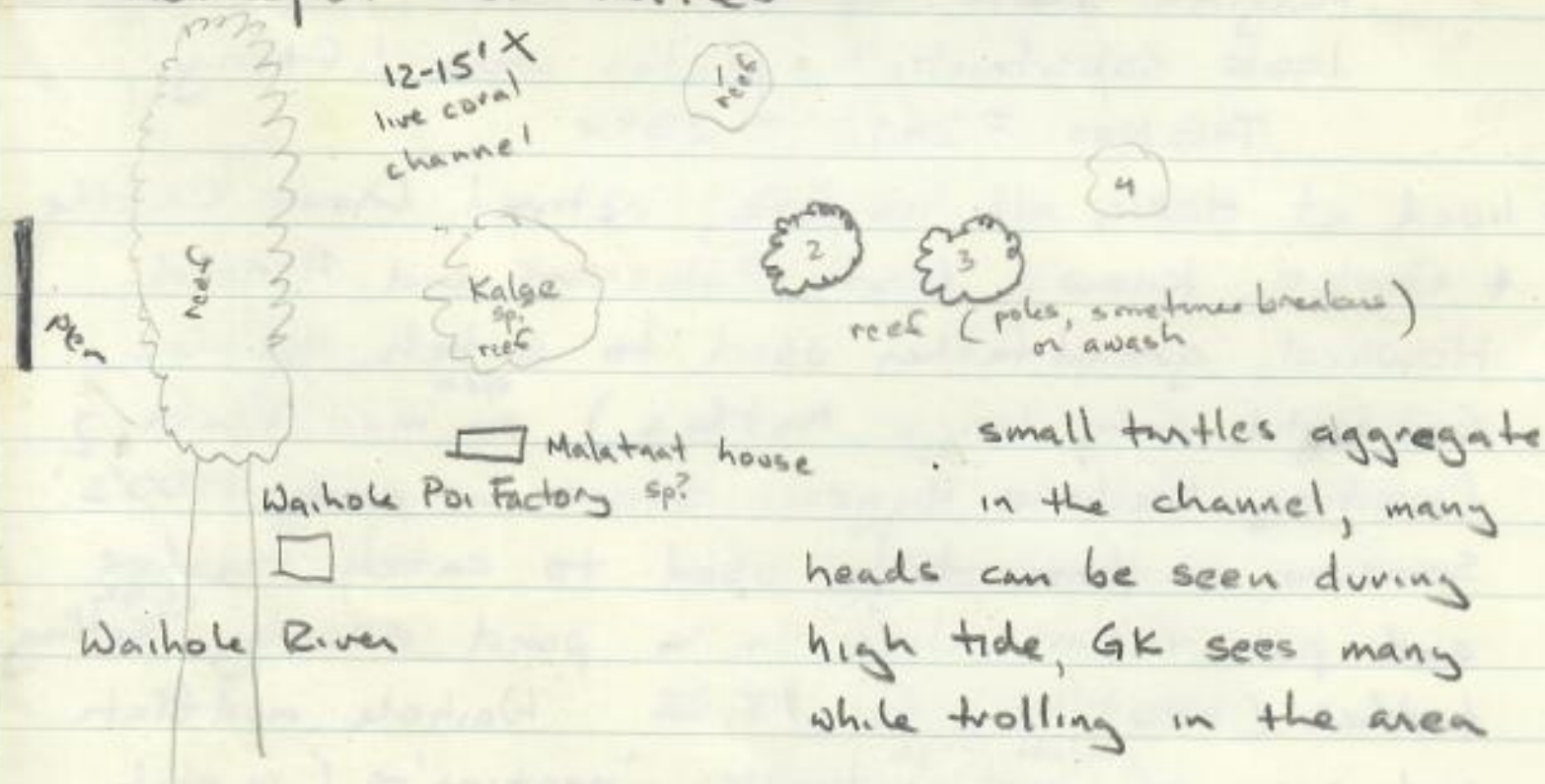
* lived at Heeia all his life, retired from Castle
+ Cooke, knows Lester Zukeram and Arnold
Howard, grandfather used to catch turtles
(caught only large turtles) on ^{open} mod flats 2
fronting Waihole Hygienic Store in early 1900's.
Someone in those days used to catch turtles
and put them alive in a pond nearby, ^{by GK} selling
turtles (200+ lbs) for \$5.00. Waihole mod flats
and area of ^{adult, large} mating turtles, 'nesting' → (in early
days there were no mangroves, beach was fine sandy
mod), People used to drag the mod-bottom

2 shank hook



with hooks to snag any turtles. Later in the ^{area} Chinese fishermen set surround nets for awa, and mullet and incidentally caught turtles. They slit the turtle's throats and tossed them aside, did not eat turtle but killed the turtle because it destroyed fishing gear. Hawaiian fishermen in the area not wasting food would gather the dead turtles that washed on the beach and butcher them, eating the still good flesh.

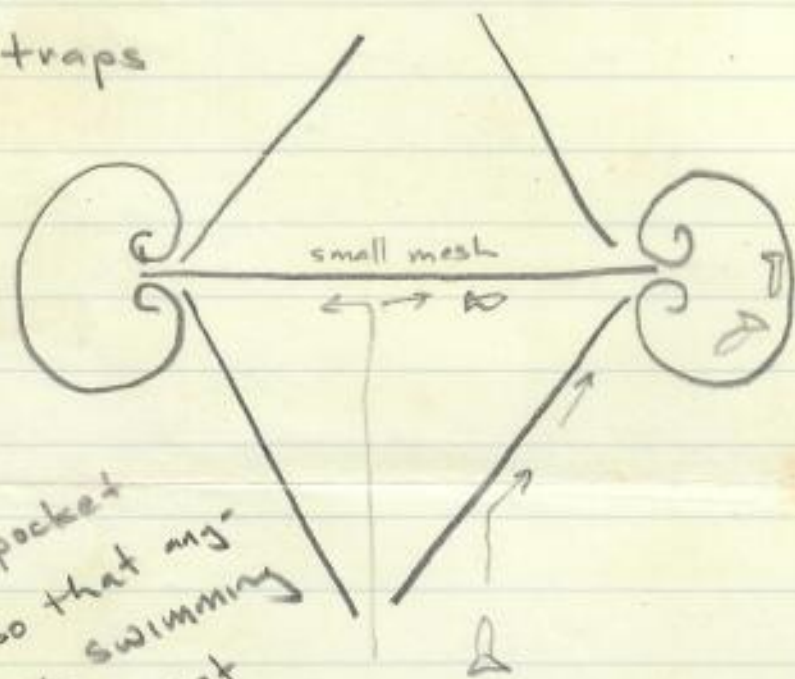
** hot spot for turtles



codium edule

turtle food: limo wāwae'iole (codium) thicker, harder
limo 'ala'ola softer type of codium
? (red fragrance)
? codium rediaae alaula

fish traps



fish do not gill on the nets but rather they get directed to the circle cages and get turned inwards, never leaving the confines

pocket so that any thing swimming along the net will get turned into the pocket.

turtle use: 1 day dry in sun - jerked then wrapped in leaves and placed in an imu.