

KANEOTE

SANBONIC 43
GEORGE BALAZS FILE
+ TURTLE TAGGING
KBAY

1980s

FILE

1990s

Geo. Balazs

ALICE & BOB
+ TURTLE TAGGING 1990s
KBAY

Pro. Baulay &

11-14-91 THE HONOLULU ADVERTISER A2

Kaneohe Bay oysters polluted

Tests show them to be nation's most toxic

By Kevin Dayton
Advertiser Capitol Bureau

Tests of oysters harvested in Kaneohe Bay this summer showed they contained higher levels of two toxic pesticides than oysters taken from any other test site in the nation, researchers said yesterday.

The "extremely high" levels of dieldrin and chlordane in the oysters is particularly alarming because those chemicals interfere with fish reproduction, said Carl Honig, a spokesman for the Kaneohe Bay Task Force.

"What we have observed is a decline in the bay fishery," Honig said. Aggressive fishing and chemical contamination may have combined to clobber the bay's ecosystem just as it was recovering from sewage dumping in the 1960s and 1970s, he said.

Bruce Anderson, deputy director for environmental health for the state Health Department, said it is not particularly surprising the chemicals showed up in high levels here because they were used extensively in Hawaii for years as ground treatment to kill termites.

Anderson said he oysters are quick to accumulate contaminants, more so than other fish and shellfish.

Anderson said according to a department toxicologist, dieldrin and chlordane are not thought to affect reproductive systems of wildlife. But they are of con-

cern and were banned by the Environmental Protection Agency in the 1970s and 1980s because they probably cause cancer in humans, Anderson said.

He said the Health Department will study the results of the latest tests done by California experts in cooperation with the Kaneohe Bay Task Force. The state will consider doing its own testing, but there is a risk to humans who eat marine life that contain the chemicals, Anderson said.

Honig said dieldrin and chlordane probably washed out of the house lots were they were used and into the two streams, and will now linger in the environment.

"You're talking decades. We're going to have these things around for many, many years from now," he said. The testing "tells us that we have a major water quality problem."

Cynthia Hunter, assistant researcher for the Hawaii Institute of Marine Biology, said the tests were done on about a dozen oysters she collected near the Waikiala Fish Pond wall between the outfalls of



Anderson

the Kawa and Kaneohe streams.

The tests at the Long Marine Laboratories at the University of California at Santa Cruz detected 99 nanograms (ng) of dieldrin per gram of dry weight of the oysters, Hunter said. (A nanogram is one-billionth of a gram.)

Of the mollusks taken from 92 test sites across the country in 1988, the next highest amount of dieldrin was 39 ng found in oysters from the Mississippi River, Hunter said.

For chlordane, the oysters from Kaneohe Bay showed 155 ng. The next highest levels of chlordane contamination were 140 ng found in oysters from Galveston Bay, she said.

"The fact that these are old, huge drainages on the Mainland I think is pretty impressive," she said.

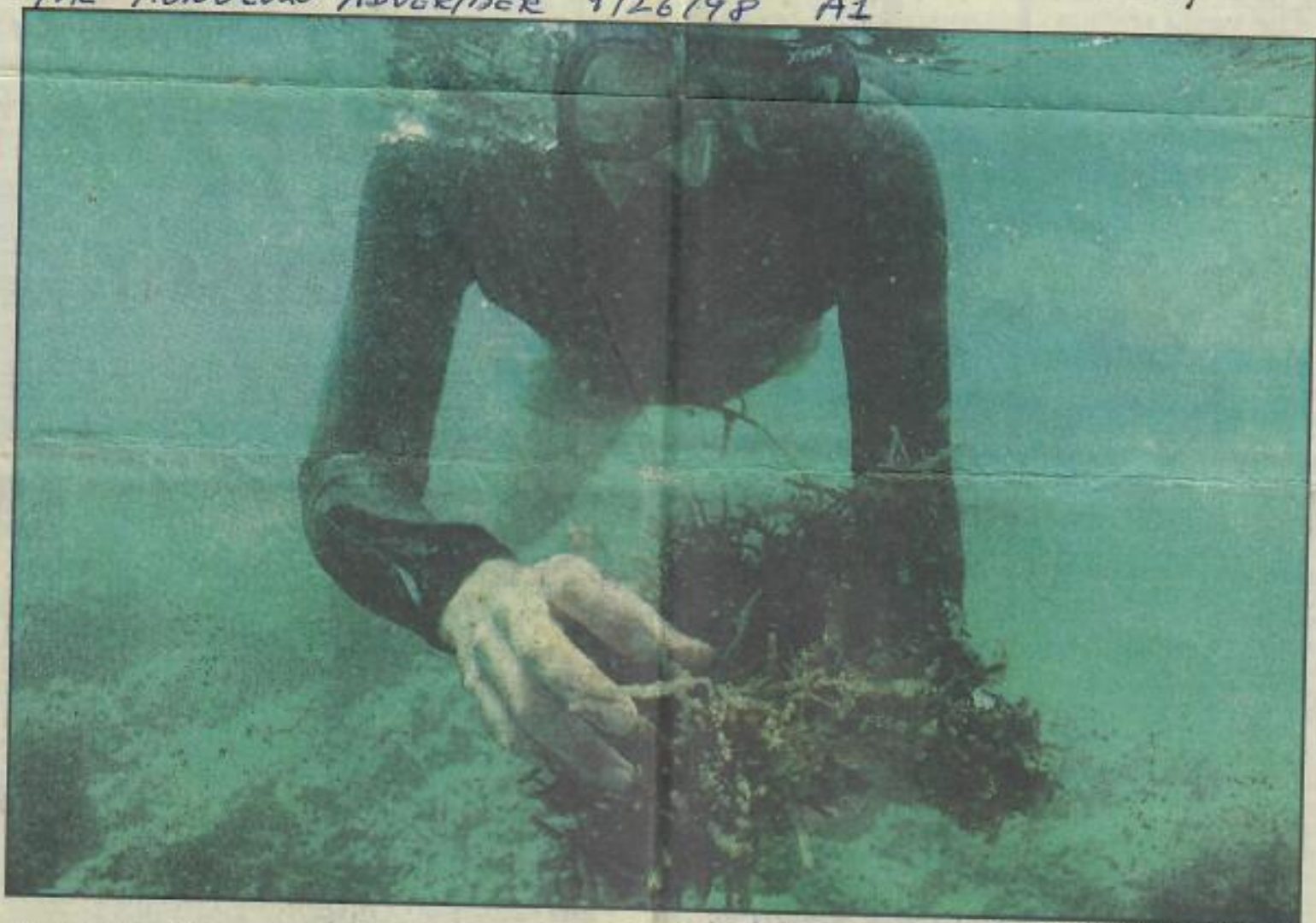
Mark Stephenson, an associate water quality biologist for the California Department of Fish and Game, said he volunteered his time to help with the testing because the mouth of the Kaneohe Stream has become "a virtual desert."

The levels of chemical contamination found in the testing are "really high. Nobody knows what kind of implications there would be for indigenous fauna," he said.

He said the findings suggest a need for much more detailed studies of pollution in the bay.

Marine 'tumbleweed' spreads across Kaneohe Bay

THE HONOLULU ADVERTISER 9/26/98 A1



David Eckert, a state aquatic biologist, holds some "tumbleweed" algae in Kaneohe Bay, Hawaii's alien seaweed threat is growing. David Scull / The Honolulu Advertiser

Invasion of alien seaweeds threatens coast environment

By Jan TenBruggencate
Advertiser Science Writer

The aggressive marine weed *Kappaphycus alvarezii* is spreading in mats in central Kaneohe Bay, driving rootlike parts into the coral below and dense, forked branches upward, rigid as hard plastic.

Sometimes it forms big clumps that break free in the current. They roll like marine

tumbleweeds, shedding pieces, each of which can grow into a new patch.

This so-called tumbleweed alga is one of a half-dozen alien seaweeds causing problems along Hawaii's coastlines. They are the result of both inadvertent introductions and purposeful ones. But in each case, no one realized how much trouble the weeds would cause, and no one knows how to get rid of them.

Part of the problem is a lack of research money.

The state Department of Land and Natural Resources has control of the state's nearshore waters, its forests and other lands, but has limited funds to do even basic research into threats to native ecosystems.

Under his department's Hot Spot program, state land chairman Mike Wilson seeks to combine the forces of dif-

ferent agencies to fight particular problems. Kaneohe Bay, home to the tumbleweed and several other problem seaweeds, is one such area.

"We can't do everything that we should be doing, so we try to focus our efforts on a few key issues," said Dave Eckert, a state aquatic biologist. His colleague, coral

See Seaweed, Page A2

Seaweed: 'It may be changing the ecosystem'

OM PAGE ONE

Researcher Dave Gulko, said that while *Kappaphycus* hasn't spread throughout the bay, there are signs that it could be developing into a frightening influence in the marine environment.

It may be changing the system, literally, from coral and algae to a three-dimensional algae. It basically chokes what's underneath by blocking out light," Gulko said. Monica Woo, a University of Hawaii graduate student in biology, is studying *Kappaphycus* for her master's thesis.

"Because it's such a strong competitor, it is able to persist where other algae can't. It's able to take over things and grab to them," she said. Each little piece that breaks off appears capable of forming a new patch or rolling clump, she said.

Hardly anything in Hawaiian waters appears to feed on it, although small mollusks called limpets may eat its surface tissue, making it susceptible to parasites. Woo said she has a few months of research left, but has no illusions about the pest's place in the environment.

"It's ugly and I want it to go away," she said.

Other pests take root

Most people don't think of seaweeds as dangerous aggressors. But like the tumbleweed ga, they can be fast-growing and ready to take advantage of changing conditions in the



David Scull / The Honolulu Advertiser

Monica Woo, a graduate student at the University of Hawaii-Manoa, uses this cage to isolate and study tumbleweed algae on an infested reef in Kaneohe Bay. "It's ugly, and I want it to go away," she said.

kind of plant gelatin. Add sugar and juice to make a pudding," Abbott said.

Still another edible Kaneohe pest is *Gracilaria salicornia*, an introduced relative of the

native manauca and the introduced ogo. It has spread from the shore to the middle of Kaneohe Bay, forming clumps in what was once sandy bottom, and competing with

native seaweeds in other areas. This marine plant, sometimes called rubusta in fishmarkets, is fatter than manauca and is brittle, growing 3 to 4 inches tall. Its flavor is somewhat dif-

ferent from its more popular relatives, and it is less often used in sashimi and poke.

Algae love sewage

Some algae become problems not because of normal growth habits, but because of how they respond to environmental changes. Two green algae are known for responding quickly to nutrients in the water, just as plants respond to fertilizer.

The green bubble alga, *Dicotyphaeria cavernosa*, had burgeoned by the mid-1970s in Kaneohe Bay, where pipes dumped sewage into the bay. It retreated once the sewage was redirected into much deeper water offshore.

However, the bubble algae have been increasing recently. It might simply be old sewage sediments on the bay floor providing nutrients, or there could be another food source.

Another aggressive native is the sea lettuce, *Ulva fasciata*. Normally a small part of the marine environment, it can expand its range dramatically in the presence of nutrients — especially nitrogen. It has been a problem on Maui's south shore.

"If there is nitrogenous material in the water, it's a problem, but if you take away the nitrogenous material, it goes away," Abbott said.

Other pests take root

Most people don't think of seaweeds as dangerous aggressors. But like the tumbleweed alga, they can be fast-growing and ready to take advantage of changing conditions in the nearshore environment, crowding out corals and native algae on which Hawaii's complex marine communities depend for food and shelter.

One of the worst is a red alga called *Hypnea musciformis*, most commonly found off Maui and off Ewa on Oahu.

"It grows with wild abandon and it seems to have no controlling factor," said Steve Coles, a marine biologist with the Bishop Museum.

It has spread to all the islands except Kahoolawe, and was found at the little Northwestern Hawaiian Islands islet of Necker during a recent visit of the National Marine Fisheries Service research vessel Townsend Cromwell.

Isabella Abbott, a University of Hawaii botanist and Hawaii's premier seaweed expert, said it can reproduce sexually, but also by hitchhiking. Tiny hooks on its limbs catch onto other seaweeds or passing debris, and the rose-colored *Hypnea* moves on. Often, it washes up on beaches, where you see its pink stems piled at the high-water mark.

"It makes a wonderful fertilizer, but it'd break your back to get enough to make a difference," Abbott said.

Like the tumbleweed alga, *Hypnea* was brought to Hawaii because it's edible.

"You can boil it and make a

Hanging out on the sandbar

Honolulu Advertiser

9-15-98 C1



Above: Jeff Gilmore throws some hot dogs on the grill at the Kaneohe reef sandbar. The metal table was specially made for the location. **Below:** Tom Stone dives down to scrape the bottom of his 20-foot sloop, Honu. The sandbar, he says, offers a pristine panorama of one of the world's magnificent bays. **Right:** The sandbar is a popular place for some relaxing fishing.



By Will Hoover
Advertiser Staff Writer

They call it "the sandbar." Or "the sand flats." Hawaiians know it as *Ahu O Laka*, the "altar of Laka," goddess of hula.

It's one of Oahu's most popular recreational spots. But, technically, it's not actually on this island.

Located in the center of Kaneohe Bay off Kahalu'u, the sandbar can be "a fairly large sandy beach or a very shallow sandy area, depending on the tides," said Carole McLean, executive director of the Friends of He'eia State Park, about a mile away. "People have been coming out to it for ages."

"In the middle of the bay is this sandbar, which runs about a half mile to a mile in length," explained Tom Stone, who is among sand bar regulars. "It's like having an inland lake, but with access to the ocean."

At low tide, the lagoon edge of the barrier reef sometimes emerges above sea level. Most often, though, regulars are content to wade around on the soothing soft sand in waters that range from ankle- to knee-deep. On weekends, they make the sandbar into sort of a water-carpeted lanai, setting up beach chairs and even grills, anchoring rafts and fishing poles in the sand, floating their provisions in water-proof sacks.

Stone pitched a tent there once. Rock bands have performed on the sandbar, which can be reached by boat or — if you're a hardy paddler — a surfboard or paddleboard.

Photographs by **DAVID SCULL**

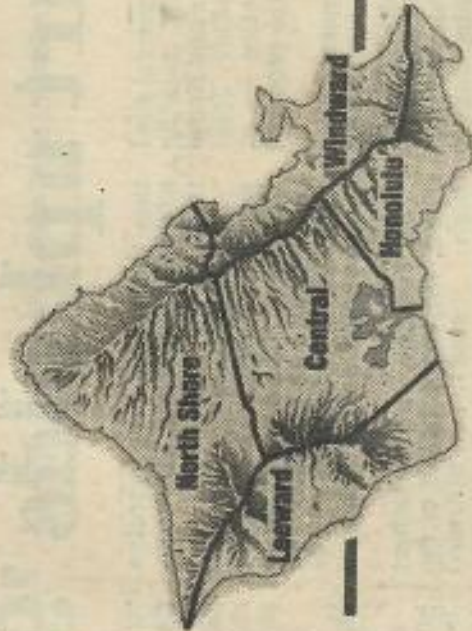
The Honolulu Advertiser



The Honolulu Advertiser

OAHU

Covering the districts of Waianae / Ewa / Waialua / Ko'olau Loa / Ko'olau Piko / Honolulu



Kaneohe Bay bill advances

Plan would limit, eventually cut, commercial use

By Curtis Lam

Advertiser Windward Oahu Bureau

A state House committee has endorsed a bill that would limit the amount of commercial activity in Kaneohe Bay, a move that one tour boat operator says will be "devastating" to his business.

The House Ocean Recreation and Marine Resources Committee advanced HB 967, which calls for the implementation of the 1982 master plan for Kaneohe Bay. The plan essentially calls for no increase in commercial operations in the bay and an

eventual reduction in activity.

The bill now goes to the House Judiciary Committee for further debate. An identical bill has been introduced in the Senate.

The master plan was drawn up by the Kaneohe Bay Task Force, which was created in 1990 by the Legislature after years of dispute between recreational users and commercial operators in the bay.

The state by law was to have used the plan as the guideline for developing rules for the bay, but many bay users say the guidelines have not been implemented and commercial activity has been allowed to grow.

Gretchen Gould, a member of the task force, said an example of such growth was the granting of an operating permit by the state Boating Division last summer to Mid Pacific of Hawaii Inc.

to anchor its 160-foot Royal Princess in Kaneohe Bay. The Royal Princess has a seating capacity of 300 passengers, but the master plan restricts passenger capacity to 150.

Rep. Cynthia Thieleen accused state Boating Administrator Dave Parsons of violating the law that sets limits on passenger capacity based on the master plan. She said Parsons should have been aware of the 150-passenger limit and not granted the permit.

But Parsons said the permit was issued after consulting with the state Attorney General's Office. He said his interpretation of the law is that it sets limits on how many passengers can be taken out per trip, not the potential capacity of a boat.

Sig Schuster, Mid Pacific of Hawaii vice president, said his

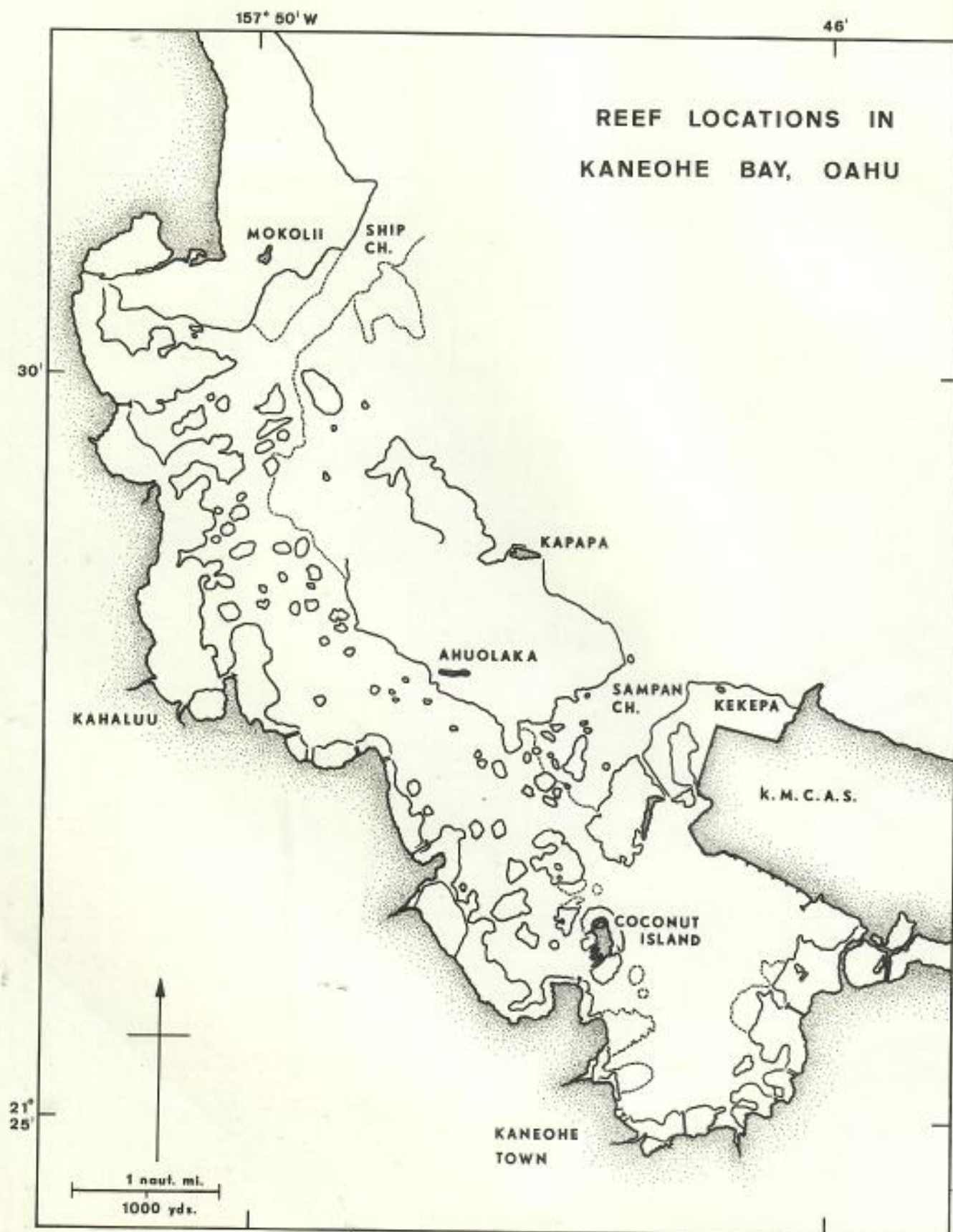
company has invested \$3 million in its Kaneohe Bay operations. HB 967, therefore, would "be devastating to our employees."

Schuster said the firm needs to load 125 passengers a day just to break even, and if he isn't allowed to exceed 150 to make up for the slow periods his business would be hurt.

"We need the ability to even out," he said.

But several Windward residents testifying at yesterday's hearing maintained that Kaneohe Bay is an important natural resource that needs to be preserved, not overused by commercial activity.

"It seems that the bay is being pushed beyond its carrying capacity. This must not happen," said Sierra Club spokeswoman Lola Mench.



MAP I. Reef Locations in Kaneohe Bay. K. M. C. A. S. is the Kaneohe Marine Corps Air Station; dotted line represents reef areas below 10 feet; solid reef lines represent reefs at or near surface. Adapted from U. S. C. & G. S. Chart 4134 and aerial photographs.

- UH develops deep-sea camera system **A-4**
- Where do Central Oahu drivers go? **A-4**
- Foes say Polaris engines are dangerous **A-5**

Protesters rally against Kaneohe Bay ban

□ An effort to protect the environment may put people out of work

By Lee Catterall
Star-Bulletin

More than 100 fishermen, commercial boat operators and their supporters rallied yesterday to protest what they said is a proposal to ban their activities in Kaneohe Bay.

"These people need the bay to earn a living. They need it to survive in Hawaii," said Joe Pickard, spokesman for a group called People Against Closure of Kaneohe Bay.

Pickard said he fears the Kaneohe Bay Task Force, a group appointed by Gov. John Waihee to review environmental concerns in the area, will recommend a ban to the Legislature.

Members of Pickard's group held signs and lined Kaneohe Bay Highway next to Heeia Kea Boat Harbor.

Task Force member Peter Nottage said it is considering recommendations to the Legislature for further restrictions on commercial activities in the bay but not an outright ban.

Nottage said the task force is expected to decide on its recommendations in October.

The state Legislature last year banned commercial operations in Kaneohe Bay and Hawaii Kai on Sundays



By Denise Oso, Star-Bulletin
About a hundred people lined Kaneohe Bay Highway next to Heeia Kea Boat Harbor yesterday because they fear a state task force will recommend a ban on fishing and commercial boating in Kaneohe Bay.

and thrill-craft activity in the two areas on Saturdays and holidays.

Nottage said the task force is considering further restrictions or a ban on "high-impact" commercial activities such as jet skis or thrill-craft.

"We haven't resolved everything but we're getting there," he said.

Pickard said commercial boat operators and pleasure boaters have been sharing the harbor peacefully. He said those proposing a ban on commercial operations have unfairly accused them

"They've got to realize that there's a tremendous number of people that really need the bay for survival."

While the bay is used mostly by pleasure boaters, Pickard said eight commercial boating companies employ 185 people, and half of the employees are of Hawaiian descent.

Nottage, a member of the yacht club, denied that club members want the bay to be their private enclave.

"I don't know where Joe's coming from," he said.

'The bay helps us live,' Kaneohe protesters

By Richard Sale
Advertiser Staff Writer

They lined the road at the entrance of Heeia Kea Boat Harbor, carrying signs, waving at each car that came into sight, delighted when the horns honked in support.

All of them were dressed in white T-shirts that said on the back: "People Against the Closure of Kaneohe Bay."

It was a scorching day. The masses of green-gold foliage crowded down to the water that could be heard lapping against the pier. There was a glittering field of parked cars and then came the fishing and pleasure boats with names like "Dreamer" and "SH-Bop," quietly riding the waves in their little courts of water.

"I'm happy to see the protest, to see the people getting together, and coming out. I think it's a step in the right direction," said John B. Goody, chairman of the Kaneohe Bay Task Force, the very group the protesters had targeted.

The protesters, led by Joe Pickard, are a group of boat operators and fisherman concerned about what they say are state attempts to curtail commercial fishing and commercial recreational uses of the bay.



Sign wavers try to get the attention of passing motorists at the

According to a statement given reporters by the protesters, a few citizens, "most of whom reside along the waterfront or belong to the local yacht clubs," have made claims that the commercial operators are ruining the reefs, dumping sewage into the bay, or overfishing it by using huge gill nets.

"Fishing is Our Lifestyle," and "The Bay Helps Us Live" were two signs to be seen.

Particularly troublesome to some Task Force members are seeking to ban net fishing completely by October.

"I fish here three or four times a week and they want to stop net fishing for at least

Pickard

ters say

the decline of the water quality of the Bay, due chiefly, not to commercial recreation or local fishing, but "serious defects in sanitation."

In Kaneohe "we have 10,000 using cesspools... an extremely high density," he said. Sewage and pollutants from the pools leak into watershed and get into the bay.

He blames developers, saying, "It's a perfect example of development without first having the proper infrastructure."

Another cause is urban runoff, he said.

Long-time Kaneohe resident Harry Lau, who was "born and raised here" and knows "this land better than anybody else," agreed.

Lau, in his 60s, said chemicals are doing the damage.

"Chlorine is killing the coral," he said and it also damages the fish.

And some of the chlorine comes from locals who use Clorox to fish, he said. (Clorox bleach, poured into the water deprives the fish of oxygen causing them to die and float to the surface.)

The government, he said, has waited too long to try and solve the bay's problems.

But Goody is optimistic. "There's been real growth of understanding between the task force and the local members of the community."

"Goody, he's a real good guy," said Pickard, the protesters' spokesman.

Advertiser photo by Bruce Asato

entrance to Heeia Kea Boat Harbor.

two years," said Sam Malainai, a local resident.

But the rumor of a ban mystifies Goody: "There is absolutely no plan to ban net fishing. No one on the task force wants to ban net fishing. All we are discussing is perhaps limiting the length of the nets."

He explained that some

mooring gill nets are 2,000 feet long and are left out all night. The mesh of the net is so small even tiny fish are caught and killed, as well as sea turtles.

"Is a 2,000-foot net really needed for a family?" he asked.

But, according to Goody's colleague, Dr. Carl Honig, the task force's chief concern is

Turtle ID: N642 Date: 01/31/91 Time(24hr): 1230
 Island captured: OAHU Location: Kaneohe Bay
 Species: CM Sex: U
 Method of capture: Hand Weight: 8.0
 Straight carapace length: 69.2 Straight carapace width: 54.2
 Curved carapace length: 75.0 Curved carapace width: 70.0
 Notch carapace length: 68.9 Plastron length: 54.1
 Width of the head: 10.3 Width of right front flipper: 11.9
 Total tail length: 14.0 Vent length: 9.0

] UpRec [] DnRec [PgUp] Up 5 Recs [PgDn] Dn 5 Recs
 1Scr 2Scr 3Scr 4Scr Add Edit Del View Indx Find Quit
 View the main screen

Turtle ID: N642 Date: 01/31/91
 Recovered (Y/N): N
 Tags Applied (Y/N): Y

 Comments: Samples Report:
 Mark Reef; Tumors: Front flippers -
 multiple lobes of tumors ringing
 both shoulder area; Mouth - 1-#1 jaw
 hinge, raspy breathing; HF - patch;
 Leaches present.

] UpRec [] DnRec [PgUp] Up 5 Recs [PgDn] Dn 5 Recs
 1Scr 2Scr 3Scr 4Scr Add Edit Del View Indx Find Quit
 View the descriptive screen

*Geo,
 Sample w/ tumors @ K Bay*

Turtle ID: N642				Date: 01/31/91			
Tumors found (Y/N/U): Y				Tumor ranking (0-4): 3			
Lt. Eyes		Rt. Eyes		Front Flippers			
Size 1: 2	Size 2: 2	Size 1: 2	Size 2: 2	Size 1: 1	Size 2: 13		
Size 3: 0	Size 4: 0	Size 3: 0	Size 4: 0	Size 3: 10	Size 4: 0		
Hind Flippers		Neck		Mouth			
Size 1: 0	Size 2: 1	Size 1: 0	Size 2: 15	Size 1: 1	Size 2: 0		
Size 3: 0	Size 4: 0	Size 3: 0	Size 4: 0	Size 3: 0	Size 4: 0		
Tail/Cloaca		Seams/Scutes		Internal			
Size 1: 1	Size 2: 0	Size 1: 0	Size 2: 0	Size 1: 0	Size 2: 0		
Size 3: 0	Size 4: 0	Size 3: 0	Size 4: 0	Size 3: 0	Size 4: 0		

] UpRec [] DnRec [PgUp] Up 5 Recs [PgDn] Dn 5 Recs
 1Scr 2Scr 3Scr 4Scr Add Edit Del View Indx Find Quit
 View the tumor screen

Turtle ID: N642		Date: 01/31/91	
Tag no.: N642	Date: 01/31/91	Tag Type:	Tag Position: L23
Tag no.: N643	Date: 01/31/91	Tag Type:	Tag Position: R34
Tag no.: N644	Date: 01/31/91	Tag Type:	Tag Position: LHF
Tag no.:	Date:	Tag Type:	Tag Position:
Tag no.:	Date:	Tag Type:	Tag Position:
Tag no.:	Date:	Tag Type:	Tag Position:
Tag no.:	Date:	Tag Type:	Tag Position:
Tag no.:	Date:	Tag Type:	Tag Position:

] UpRec [] DnRec [PgUp] Up 5 Recs [PgDn] Dn 5 Recs
 1Scr 2Scr 3Scr 4Scr Add Edit Del View Indx Find Quit
 View the tag screen

George Balazs
Southwest Fisheries Center
2570 Dole Street
Honolulu, Hawaii 96822-2396

March 26, 1990

Algae Identifications

2-89, Oahu, rinsed feces in 10% formalin

<u>Amansia glomerata</u>	80%
<u>Gelidiella acerosa</u>	10
<u>Pterocladia</u> sp.	10
Much highly digested matter	

3-2-89, Tag 3487-88, rinsed feces of green turtle

<u>Codium arabicum</u>	40%
<u>Amansia glomerata</u>	5
<u>Codium edule</u>	45
<u>Gelidiella acerosa</u>	10

4-27-89, Kailua Bay, Oahu, SL-41.0, Kelce

<u>Hypnea musciformis</u>	70%
<u>Hypnea nidifica</u>	20
<u>Codium arabicum</u>	5
<u>Codium edule</u>	5
<u>Halophila ovalis</u>	1
<u>Bryopsis</u> sp.	Trace
<u>Caulerpa taxifolia</u>	Trace
<u>Laurencia nidifica</u>	Trace
<u>Spyridia filamentosa</u>	Trace

5-4-89, Kiholo Pond (turtle forage), Hawaii

Halophila ovalis

This is a very plastic species. It changes from a nearly oval blade to a very long thin narrow blade. In the past this thin variety of Halophila ovalis, which can be found in Kailua Bay off Kailua Beach Park, was placed into another species and into a variety of H. ovalis. I am leaving it as H. ovalis to avoid confusion. I will keep a portion of the sample to study further, but I am reasonably sure this is the indeed the case.

5-16-89, Kaneohe Bay, Oahu, Tag 2538, Green Turtle stomach flush

* Vanvoorstia spectabilis Harv. 100%

This sample was identified by Dr. Bill Magruder, Bishop Museum. I had not seen this species before and used his help. He was very interested in it since this is only the second time the species has been reported from Hawaii. This very large netted red alga lives in high surge at the edge of the reef. It is related to Martensia, a delicate netted blade that lives in calm bays. Bill would like to know more about where this turtle was captured (exactly) in hope of finding more of this species for the Bishop Museum herbarium collection. I gave him the information as was on the sample jar.

5-16-89, Kaneohe Bay, Oahu, Tag Y170, Green Turtle stomach flush

<u>Halimeda discoidea</u>	30
<u>Jania capillacea</u>	30
<u>Hypnea cervicornis</u>	20
<u>Laurencia nidifica</u>	20
<u>Ceramium</u> sp.	Trace
<u>Gelidium</u> sp.	Trace
Terrestrial grass	Trace
Amphipod	One

SUMMARY

RHODOPHYTA

Amansia glomerata C. Ag.
Ceramium sp.
Gelidiella acerosa (Forsskal) Feldmann and Hamel
Gelidium sp.
Hypnea cervicornis J. Ag.
Hypnea musciformis (Wulfen) C. Ag.
Hypnea nidifica J. Ag.
Jania capillacea Harvey
Laurencia nidifica J. Ag.
Pterocladia sp.
Spyridia filamentosa (Wulfen) Harvey
* Vanvoorstia spectabilis Harv.

CHLOROPHYTA

Bryopsis sp.
Caulerpa taxifolia (Vahl) C. Ag.
Codium arabicum Kutzing
Codium edule Silva
Halimeda discoidea Decaisne

SEAGRASS

Halophila ovalis (R. Br.) Hook

* New for our master list.

George Balazs
Southwest Fisheries Center
2570 Dole Street
Honolulu, Hawaii 96822-2396

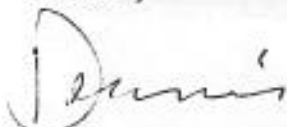
March 26, 1990

Dear George,

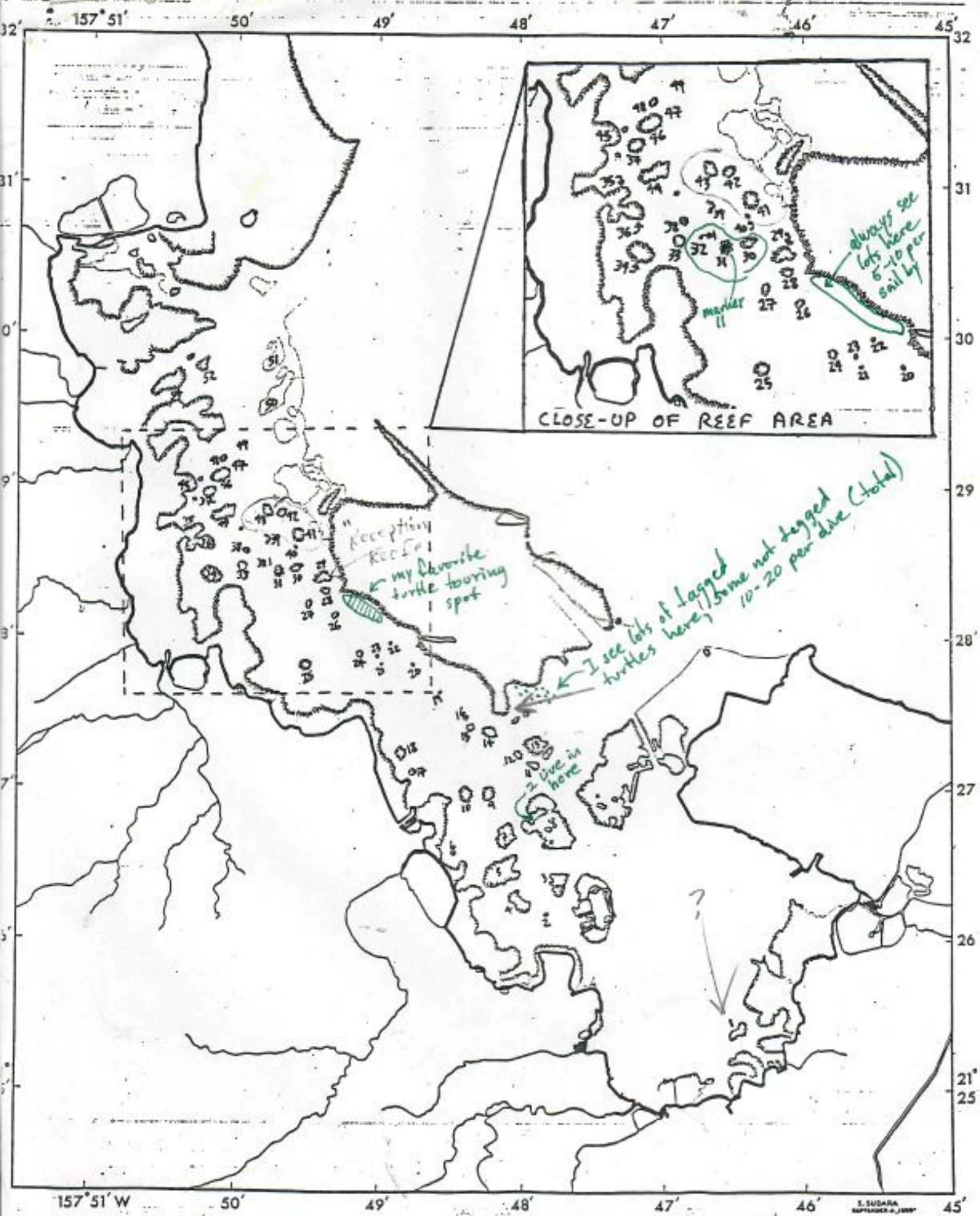
You now have 57 samples to your credit. These last few samples were not taken from the 57 as I explained in the last letter. I will package these samples and send them separately from this letter as usual.

Please notice that you found an additional species for your sea turtle menu, Vanvoorstia spectabilis Harv. Bill Magruder, Bishop Museum, identified it for me, since I had never seen it before and thought he would be interested. It is not a new species record for the islands, but is only the second time it has been collected. Bill said he would contact you to find out more so he could possibly go out and collect some fresh material for the museum. Also, see the note on Kiholo Pond. I have collected Halophila ovalis like this in Kailua Bay (very thin long blades) and it is also in the 4-27-89 sample of yours from Kailua Bay, but I will retain a small subsample for further study, to be sure.

Aloha,



Dennis J. Russell



157° 51' W

50'

49'

48'

47'

46'

S. SUDARA
SEPTEMBER 9, 1988

45'

SOURCE: BILL TVEER

Summary of turtles tagged in Kaneohe Bay, Oahu on Friday 12/07/90.
Data compiled by George Balazs.

National Marine Fisheries Service
2570 Dole Street
Honolulu Hawaii 96822-22396

Tag No.	Length	Straight (cm) Notch	Width	Curved (cm) Length	Width	Tumor Ranking	Comments
Expedition date 12/07/90							
N400, N507, Z207	63.8	63.6	50.1	70.0	64.0	2	Recaptured, previously tagged July 1990 and Sept. 5, 1990. Two pictures taken of 4 barnacles taken off. N400 had 3 barnacles on it, all removed. Two small barnacles on plastron, 1cm and .5 cm, both left on. Tumors present. Mark Reef
N556, N557	43.3	42.7	34.6	46.5	41.0	0	A.O.L. captured, 22-VB, 10-DB Released Mark Reef, water temperature 25 C. No

Tag No.	Length	Straight Notch	Width	Curved Length	Width	Tumor Ranking	Comments
Expedition date 12/07/90							
N558, N559	48.7	48.6	38.8	53.0	47.0	2	Ahuolaka (A.O.L.) Left jaw hinge likely fish hook injury, possible new tumor growth on hook injury area. 2-VB, 1-DB. Released Mark Reef.
N560, N561, N562	59.9	59.0	48.5	64.5	62.0	2	Stephanolepas muricata barnacles present in fore margins on front flippers. Mark Reef capture. Tumors present, w/ leeches and eggs. 12-DB, 23-VB, 4.0 largest. RHF healed.
N563, N564, N565, Z241	79.8	79.4	61.3	88.0	81.5	2	Mark Reef; 2DB,
N566, N567	48.6	48.1	39.3	52.0	48.0	1	Mark Reef capture, Tumors present. Barnacles: 1VB, 2DB. Both flippers numerous, suspicious gray patches.
N568, N569	49.8	49.8	39.4	53.0	47.0	2	SCA present. #2 tumor on right eye. Mark's Reef.

23
 Summary of χ turtles tagged and recaptured at Mark Reef, Kaneohe on 01/02/91.

National Marine Fisheries Service
 2570 Dole Street
 Honolulu Hawaii 96822-22396

Tag No.	Straight (cm)		Curved (cm)		Tumor Ranking	Comments
	Length	Notch	Length	Width		
Expedition date 01/02/91						
N576, N577	63.4	62.8	68.0	63.0	3	Tumors present; Score: <u>3</u> Seawater temp. = 23 C. <u>Mark Reef</u>
N578, N579	46.3	46.2	50.0	42.5	1	Tumor Score: <u>1</u> ; 5DB Mark Reef
N580, N581	45.5	45.3	48.0	45.0	2	Tumors Score: <u>2</u> ; Mark Reef.
N582, N583	45.5	45.0	48.0	43.0	0	Mark Reef
N584, N585	44.7	44.2	48.0	43.5	0	Mark Reef
N586, N587	46.0	45.8	49.0	43.0	3	Tumors Score: <u>3</u> . 4VB, 5DB, Mark Reef

Tag No.	Straight (cm)		Curved (cm)		Tumor Ranking	Comments
	Length	Notch	Length	Width		
Expedition date 01/02/91						
N588, N589, N590	69.0	68.7	74.5	67.0	1	Tumors present - Score: <u>1</u> ; 11 DB, largest barnacle 4.4 cm. 1-#1 patch Rt. eye. Mark Reef.
N591, N592	41.9	41.4	44.0	38.5	0	Mark Reef
N593, N594	39.4	38.8	41.5	37.5	0	Clean - Likely new recruit. Mark Reef
N595, N596	43.6	43.1	46.5	41.0	0	Mark Reef
N597, N598	57.4	57.2	62.0	54.0	1	Tumor score: <u>1</u> 6VB, 8DB; Mark Reef.
N599, N600	44.8	44.5	47.5	47.2	1	Tumor score: <u>1</u> ; 4DB, 8VB; Mark Reef.
Y726, Y727	41.1	40.7	43.0	39.5	0	Mark Reef
Y728, Y729	54.1	53.8	58.0	48.5	1	Tumor score: <u>1</u> ; Mark Reef.
Y730, Y731	39.8	39.2	42.0	37.5	0	Mark Reef
Y732, Y733	53.2	52.9	58.0	53.0	0	Suspicious smooth bump Left eye, not cataloged as tumor. Mark Reef
Y734, Y735	44.5	44.1	47.0	42.5	0	L. eye suspicious bump, not cataloged as tumor. 1DB, 2VB, Mark Reef.

Tag No.	Straight (cm)		Curved (cm)		Tumor Ranking	Comments
	Length	Notch	Length	Width		
Expedition date 01/02/91						
Y853, Z55	37.3	37.0	39.5	35.0	0	→ Resighting; Mark Reef
Y884, Y885, Z70	53.4	53.3	57.0	51.0	2	→ Resighting; Tumor Score: <u>2</u> Mark Reef.
Y891, Y892, Z75	52.9	52.7	57.0	50.0	1	→ Resighting. Barnacles on tags removed and saved. 6VB, 10DB, Tumors Present, Score: <u>1</u> Mark Reef.
Y904, Y905	38.7	38.5	41.0	36.5	0	→ Resighting 6/15/90. Mark Reef.
Y907, Z82	52.1	---	56.0	48.5	3	Tumor Score: <u>3</u> 2nd S.R. missing healed. Barnacle removed from Y907 tag and shell, all measured. VB: 10 + 24 others - all small. Beak: 3, DB: 6, HP: 1. Mark Reef <i>Resights</i> →
Y909, Z84	38.7	38.0	41.0	36.5	0	CA covering Z84, → Resighting 6/20/90. Mark Reef

333
11111
22

Gene
Please call me
Goo.



University of Hawaii at Manoa

Department of Zoology
Edmondson Hall • 2538 The Mall
Honolulu, Hawaii 96822

9/26/90

Dear George—

Please check with Gene Nitta
to see if Mike McCartney has
discussed this with him.

Without Mike's help the big
commercial operators would still
be on the best reefs and turtle
areas. This was at his urgent
request. Dall is a friend of his
and a supporter of commercial
operations without "thrill craft and

other toys" but we urged that
NMF5 would have to agree too.
In the meanwhile he still anchors
and plays volleyball on the sand
spit near Reception reef about
11:30am - 12:30pm daily.

Please ask Gene and then let
me or Jokiel know.

Makalo,
Emy



University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O.Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346

Cable Address: UNIHAW

September 25, 1990

Senator Mike McCartney
The Hawaii State Senate
State Capitol, Room 218
Honolulu, HI 96813

Dear Senator McCartney:

RE: operation of Captain Bob's Picnic Sail in Kaneohe Bay.

On 11 September 1990 a meeting was held at the Hawaii Institute of Marine Biology in regards to specific problems faced by Captain Robert Dall, President, All Hawaiian Cruises, Inc. in his efforts to comply with the new new ORMA recreational regulations. Attending were Senator Mike McCartney, Captain Robert Dall, Dr. Ernst Reese and Dr. Paul Jokiel.

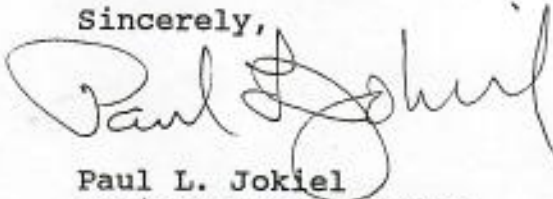
The central issue is that Captain Dall is the only commercial operator who is facing extreme difficulty in modifying his operation to fit the new regulations. The sailing characteristics of his catamaran, location of glass viewing box amidships and location of the forward ramp are suitable to the original operating area, but are not suitable for operation in possible new locations. The new locations available to him do not allow viewing or safe unloading of snorkelers. Also, he is facing a marketing package that will require some time to re-establish for the next season if changes are made. Since Capt. Dall has a "passive" operation, he is having difficulty running tours in areas occupied by jet ski, water ski and sail surfer operations. He convinced us that he is working towards solutions to these real problems, but will need more time to reconcile many aspects of his operation with current regulations.

Capt. Dall's operation is highly regarded as a non-intrusive activity, and he has always been seen as a very responsible operator. He does not operate jet ski, water ski or sail surf equipment. He runs a small operation that is largely under sail rather than power. The Friends of Heeia, various community groups and the other recreation craft operators all seem to support the appeal of Barefoot Bob.

Capt. Dall made a strong case that he needs more time to bring his operation into compliance, and wants additional time to work out solutions to the problem. He had documentation from most of the other operators that they support his appeal. They seem to be content to allow him to operate at his original location for a short extension of time. Ultimately, the solution must emerge in the proposed review by the new Kaneohe Bay Task Force.

We have subsequently discussed this situation with Dr. Cindy Hunter of HIMB, who is familiar with the situation and is in agreement with our analysis. In sum, we do not oppose a temporary extension of the existing operation of Captain Bob's Picnic Sail in view of the hardships that the company will face due to the unique nature of the operation. Our only concern is that we do not erode the existing regulations by making this one exception. It is not clear how such a "interim waiver" can be accomplished.

Sincerely,



Paul L. Jokiel
Assistant Researcher

cc: Reese, Hunter, Helfrich

Table --Green turtles, *Chelonia mydas* hand captured and tagged at Kawelo Reef, Kaneohe Bay, Oahu.

Date	Tag No.	Carapace length (in centimeters)		Comments
		Straight	Curved	
7/8/78	2423, 2424, 2425	60.3	63.5	GB & AK. ^a <i>Codium</i> and "red filaments" from stomach.
10/11/79	3278, 3279	60.5	65.0	AK.
10/12/79	3280, 3281	64.8	69.0	AK.
12/18/79	3295, 3296	53.3	57.2	--
3/13/81	3330, 3331	45.3	48.2	AK. Released at Bellows.

^aGB - George Balazs; AK - Alan Kam.



University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O. Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346

Cable Address: UNIHAW

26 July, 1990

George Balazs
National Marine Fisheries Service
2570 Dole Street
Honolulu, HI 96822-2396

Dear George:

I received your "test" correspondence this morning--a two day delivery time is not bad!. The address apparently works, but I wonder if:

HIMB
Coconut Island
Hawaii 96744

might not be even better? "Coconut Island" provides a good cue for postal officials as well as local fisherman and might assure proper delivery of more tags. I am sorry that this didn't occur to me earlier--have you already had the tags made?

I look forward to seeing you and your "turtle team" out here again soon.

Yours sincerely,

PHILIP HELFRICH
Director

PH:clh

The Hawaii Marine Laboratory

ROBERT W. HIATT²

INTRODUCTION

THE COCONUT ISLAND BRANCH of the Hawaii Marine Laboratory was officially opened on April 21, 1951, with an exhibit of research in progress and equipment utilized in the marine sciences. The Hawaii Marine Laboratory is an integral part of the University of Hawaii and consolidates under one name the long-established Marine Biological Laboratory at Waikiki Beach, the biological laboratories devoted to marine sciences on the main campus of the University, and the newly constituted branch at Coconut Island. The Laboratory operates for both teaching and research, with the Waikiki branch and the classrooms and laboratories on the main campus of the University devoted primarily to instruction, and the Coconut Island branch devoted exclusively to research. These new facilities greatly enhance the effectiveness of both the academic program in marine and fishery biology leading to the bachelor's, master's, and doctor's degrees, and the research program in marine sciences of the graduate students and regular staff. Physical separation of instruction and research has now been achieved so that neither interferes with the other. A well-integrated instructional program in marine biology may now be carried out throughout the year at the reef edge at the Waikiki branch, while research projects may proceed without interruption throughout the year at the Coconut Island branch.

The generous loan of unexcelled facilities for marine research by Messrs. Allan Chase, Edwin Pauley, Harold Pauley, Poncet Davis,

and Samuel Mosher made it possible to establish the Coconut Island branch. Through funds provided by Mr. Edwin Pauley and the University of Hawaii, this Laboratory and associated ponds and aquaria have been completed and put into operation.

The Laboratory operates throughout the year, but more space is available for visiting investigators during the regular academic year than during the summer period.

Since the Coconut Island branch has been established for strictly research purposes, only persons prosecuting some specific study leading to eventual scientific publication, or an assistant of such a person, will be accommodated. Naturally, staff members of the University of Hawaii will have priority for available space. A cooperative agreement entered into by the University of Hawaii and the University of California for the purposes of mutual assistance in marine research in the central Pacific provides second priority to interested members of the staff of the latter institution. The remaining space is available to other marine scientists. All requests for space must be made on an application form available from the Director. Visiting investigators are welcome and all possible aid will be provided them by the staff of the Laboratory. Such laboratory facilities and housing as are available to visiting investigators bear no fee, except where expendable supplies are concerned. A brochure describing the Laboratory and the regulations for visiting investigators is available from the Director.

COCONUT ISLAND BRANCH

Location: Coconut Island, known to Hawaiians as Moku-o-Ioe, is situated in the pro-

¹Contribution No. 8, Hawaii Marine Laboratory.

²Department of Zoology and Entomology, University of Hawaii. Manuscript received June 15, 1951.

tered waters of Kaneohe Bay, about 15 miles from Honolulu, and about 200 yards off the windward shore of Oahu (Fig. 1). Containing a total of 18 acres of land, this verdant island is surrounded by numerous lagoons and ponds dredged in the fringing reef. Kaneohe Bay, about 15 square miles in extent, opens broadly to the sea over a protective, elevated reef. The northeast trade winds sweep directly into the bay, thus forcing a rapid exchange of the bay and oceanic waters, which provides for ranges of salinity varying from brackish conditions close to stream mouths to almost normal ocean conditions in the more open areas.

Much of the peripheral region of the bay, especially near the mouths of intermittent streams, is muddy. The organic content of these sandy and muddy areas is high, and it supports an extensive marine fauna. The central part of the bay consists of many channels of varying widths surrounding coral platforms which reach the surface of the water at low tide. Each coral platform is fringed by an extensive growth of corals, principally *Pocillopora* and species of *Acropora*, comprising the finest development of coral growths in the Hawaiian Islands. The eroding tops of these coral platforms contain isolated coral heads interspersed with a fine, silty sand composite. The sides of the channels below 4 fathoms and the bottoms of the channels at an average of 7 fathoms consist of very fine silt. There are many coral heads and intervening sandy areas on the fringing reef platform surrounding Coconut Island, thus providing one of the richest collecting grounds in Hawaii. Contributing greatly to the varied ecological streamlines in the vicinity of Kaneohe Bay are the true oceanic conditions found just outside the bay, within half an hour's boat trip from the Laboratory.

Panora and floor Hawaii is situated at the extreme eastern periphery of the richest faunal area known, the Indo-Pacific. Over 2,000 species of invertebrates and over 500 species of fish inhabit the reef and inshore areas. The

Laboratory and its environs offer ideal facilities for studies on all phases of the biology of tropical and subtropical fish, turtles, and invertebrates. Comparatively little is known about the biology of such animals so there is great latitude in the selection of research problems. The zooplankton of the bay waters and the marine waters just outside the bay is exceedingly varied and abundant in contrast with the oceanic waters farther from shore. The finest oceanic bird rookery in the Hawaiian Archipelago, excepting some of the Leeward Hawaiian Islands, is located just outside Kaneohe Bay on the islet of Moku Manu: a half-hour boat trip from the Laboratory places the observer upon an unparalleled outdoor laboratory for studies on several species of terns, shearwaters, petrels, boobies, and frigate birds.

Hawaiian shores abound in algae of all major groups. Especially abundant are chlorophyte genera such as *Ulva*, *Cladophora* (a variable genus with many representatives), *Codium*, *Gracilaria*, and *Hypnea*. The last four genera offer special possibilities as subjects for physiological research. *Cladophora* because it is large-celled and filamentous, *Codium* and *Gracilaria* because they are unicellular, and the unicellular *Hypnea* because it produces abundant calcareous deposits. Among the Phaeophyceae prominent genera are *Ectocarpus*, *Sargassum*, *Padina*, and *Sargassum*. The red algae are represented by many genera, perhaps the most abundant of which are *Laurencia*, *Blasiverruca*, *Lagaria* (mostly calcareous), and the corallines. The agnathous genus *Gelidium* is of special interest. The blue-green algae and the diatoms are, of course, abundant.

Provision: The buildings, ponds, docks, and repair facilities occupy the leeward fringe of Coconut Island. In addition to the laboratory itself, there are a residence hall, net house, dock, marine railway, six tidal ponds of varying dimensions and depths (Fig. 2), a battery of large glass-fronted aquaria, and five large partially sunken concrete tanks



FIG. 1. Aerial view of Coconut Island, showing the Marine Laboratory (lower center) and the tidal pool (middle left).

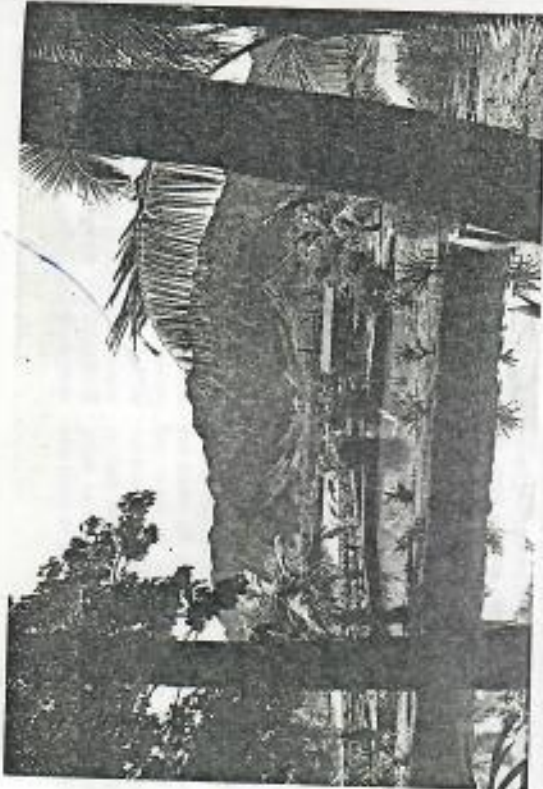


FIG. 2. View of some tidal ponds.

with an aggregate capacity of 20,000 gallons. The aquaria and tanks are provided with circulating sea water by a pumping plant separate from that which supplies the system in the laboratory building.

Laboratory and auxiliary building: The laboratory building (Figs. 3, 4) faces southeast and borders a large dredged lagoon. The dock is connected to the laboratory structure with a concrete lanai, thus facilitating the transfer of living specimens from the live *Seifia*, to the aquarium tables of the laboratory just 30 feet away. Collecting gear and supplies may also be transferred readily to and from the *Seifia*.

The building contains two large laboratories, one for general biological work and one for physiological research, and two smaller general-purpose laboratories (Fig. 5). Fluorescent overhead lights assure adequate illumination. Four to six investigators may be conveniently located in each of the larger

laboratories and two in each of the smaller laboratories. In addition to the laboratories there are a work shop, a darkroom, three storerooms, a collection room, and a long concrete lanai on which the aquarium tables are located, thus keeping the sea water out of the laboratories proper. The remainder of the laboratory building consists of living quarters with two large bedrooms, one large dormitory, a kitchen, a combination dining and living room, and bathrooms.

Additional living quarters are located in a second building. These consist of two large bedrooms, one smaller bedroom, bathroom, and living quarters for the caretaker. An electrically operated marine airway which can handle all the smaller craft, and a large storage house for pool screens and other large equipment, complete the present plant.

Laboratory equipment: Running sea water with a salinity of about 35 to 36 parts per thousand is distributed to both the large outdoor aquaria and to the smaller salt-water

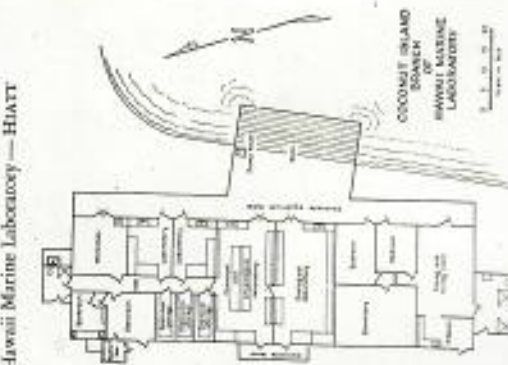


FIG. 3. Floor plan of the laboratory building and dock.

tables on the lanai outside the laboratories. Pumps and motors are arranged in duplicate for each system, with a timer switch which automatically alternates the units. There is no storage or recirculation of sea water, but rather a continuous pumping mechanism. The large pumps are made of cast iron while the lines and valves are of transitite, antimony-free lead, and hard rubber. The unit supplying sea water to the smaller laboratory aquaria consists of stainless steel pumps, lead pipes, and hard rubber cocks. The sea water delivered is thus free from contaminants and suitable for the most critical embryological studies. The six large tidal ponds provide unusual space for holding live material, either of small or large size.

Laboratories are supplied with hot and cold running fresh water, 110- to 115-volt alternating current, and bottled-gas outlets. Vacuum and pressure are achieved by portable pump

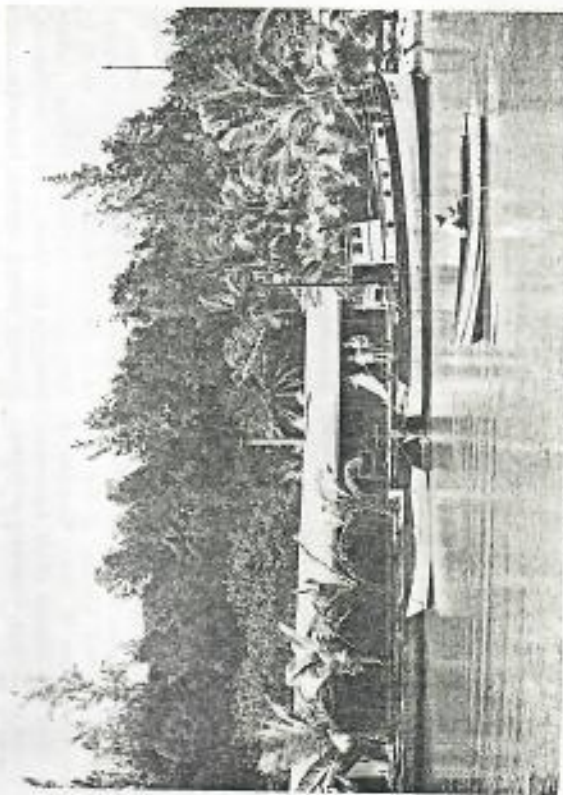


FIG. 4. View of the laboratory building.



FIG. 3. Interior of a biology laboratory.

units. Direct current may be supplied by batteries or by an a.c.-d.c. converter.

Refrigeration in the laboratory consists of a deep-freeze unit, a 150-cubic foot refrigerator, and electric household-type refrigerators.

Small stocks of routine glassware and reagents are maintained at the laboratory. Certain equipment such as pH meters, colorimeters, Warburg-Barcroft apparatus, Van Slyke apparatus, cathode ray oscilloscope, and other physiological equipment, microscopes, microtomes, balances, cameras, and virtually any other needed item will be supplied by the University from its main campus when the need for them arises. All investigators, however, are requested to submit a detailed list of their needs so that they may be advised of what the Laboratory is in a position to supply.

Field equipment: The opportunities for investigators to conduct research in the field and to observe marine species in their natural environment constitute one of the chief attractions of the Laboratory, and every effort is made to assist investigators on projects requiring this type of approach.

The field equipment includes the 46-foot research vessel, the *Solfer* (Fig. 6), which has a live well with circulating sea water and hoisting gear for dredging, hauling plankton nets, and hydrographic work. Gear such as dredges, seines, and nets of various sorts, traps, plankton nets from small to meter-size



FIG. 6. The *Solfer*.

openings, Clarke-Bumpus and high-speed quantitative plankton nets, current meters, Nansen bottles with reversing thermometers, bathythermographs, glass-bottom boxes, and diving equipment is available. As with laboratory supplies, investigators are advised to inquire in advance as to their particular requirements.

In cooperation with the Territorial Division of Fish and Game and the Pacific Oceanic Fishery Investigations, larger vessels for work at sea and for deeper dredging are often available to qualified investigators. Such cooperation must be arranged for well in advance.

Library facilities and publications: The proximity of the extensive libraries of the University of Hawaii, Bernice P. Bishop Museum, Hawaiian Sugar Planters' Association Experiment Station, Pineapple Research Institute, and the Pacific Oceanic Fishery Investigations make it unnecessary to maintain a separate library at the Laboratory. At these libraries investigators may secure reference material needed for use at Gāconuar Island. Microfilm readers are available at the University Library.

The Hawaii Marine Laboratory issues two series of publications. The "Contributions from the Hawaii Marine Laboratory" are technical papers published in suitable journals and are numbered serially. Papers in this series are available to individuals in the fields of their interest, and to institutions which may request individual or all papers of the series. Exchanges are desired. A second series of mimeographed leaflets, entitled "Hawaii

Marine Laboratory News Circular," is sent to interested persons or institutions.

Housing: Housing for four couples and about ten single investigators is available at the Cocunut Island residential area. Since all investigators automatically become temporary (although unpaid) members of the staff of the University, other apartments and houses are frequently available on the main campus. These would be more suitable for investigators with families. The rental fee is minimal, and arrangements should be made several weeks or months in advance. Community kitchen and dining room facilities are available at the Laboratory.

Staff: An advisory board deals with general policies and the distribution of working space if the demand exceeds that available. The Board members are Dr. Albert W. Bellamy, Professor of Zoology, University of California at Los Angeles; Mr. Vernon E. Bosch, Director, Territorial Division of Fish and Game; Dr. Robert W. Hiatt, Chairman of the Board and Director of the Laboratory, Professor of Zoology, University of Hawaii; Dr. Carl L. Hubbs, Professor of Zoology, Scripps Institution of Oceanography of the

University of California; Dr. George F. Patterson, Associate Professor of Botany, University of California; and Dr. Albert L. Tester, Professor of Zoology, University of Hawaii.

The resident research staff includes Dr. Albert H. Banner, Associate Professor of Zoology (biological oceanography); Mr. Vernon E. Bosch, Lecturer in Fishery Biology (ichthyology, fishery biology); Dr. George W. Chu, Associate Professor of Zoology (parasitology); Dr. Maxwell S. Darcy, Associate Professor of Botany (marine botany); Dr. William A. Gosline, Associate Professor of Zoology (ichthyology); Dr. Robert W. Hiatt, Professor of Zoology (marine invertebrates, ecology); Dr. Sidney C. Hsiao, Associate Professor of Zoology (experimental embryology, physiology); Dr. John L. Kirk, Lecturer in Fishery Biology (fishery biology); Dr. Donald C. Matthews, Associate Professor of Zoology (invertebrate zoology); Mr. O. E. Sette, Lecturer in Fishery Biology (fishery biology); Dr. Albert L. Tester, Professor of Zoology (fishery biology, biometrics); and Dr. Pieter van Weel, Professor of Zoology (comparative physiology).



Gene John FM
Please Return to GMB

University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O. Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346
Cable Address: UNIHAW

May 17, 1990

Mr. David E. Parsons
State Boating Manager
Harbors Division
Department of Transportation
79 S. Nimitz Highway
Honolulu, Hawaii 96813

RE: Boating Violations in Kaneohe Bay, May 12, 1990

Dear Dave:

The enclosed maps show where the commercial operators were on Saturday, May 12, 1990. Everyone excepting Schuster's Ona Mana and Bob Dall's Barefoot Bob are complying with the new zoning rules.

It is too bad that these two operators are flaunting the regulations. I told the Marine Patrol Boat, and they promised to warn them. I don't know if they did or not.

You'll recall that both Schuster and Dall agreed to comply at the meeting we had Monday evening, April 23, at the North Bay Boat Club.

The Marine Police still do not have adequate maps. They said something about you telling them not to enforce the regulations yet. That didn't make much sense to me. If we allow Dall and Schuster to do what they want, then the other operators will have no incentive to follow the regulations.

We feel very strongly about protecting the reefs in Zone H. If Dall and Schuster don't comply, then I'm afraid we at Coconut Island will have to join the chorus of voices who want the commercial boats out of Kaneohe Bay altogether.

Please, Dave, use your influence to move Dall and Schuster out of Zone H and to begin utilizing the reefs designated for their use in Zone E. Mahalo.

Sincerely,

Ernst S. Reese
Professor

ESR:ly



University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O. Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346

Cable Address: UNIHAW

May 17, 1990

Capt. Robert Dall
President
All Hawaii Cruises, Inc.
1860 Ala Moana Blvd., Ste. 414
Honolulu, Hawaii 96815

Dear Bob:

Thank you for your letter of April 27, 1990, pointing out the many good things you have done and are doing in Kaneohe Bay in the area of education and conservation. Your sensitivity and awareness should make it all the more apparent to you that certain areas must be protected as much as possible.

We feel that way about the reefs in the north end of Zone H. We are very concerned that these reefs and adjacent turtle feeding grounds receive as much protection and as little disturbance as possible.

Please explore the use of reef areas outside of Zone H as was agreed at the meeting held at the North Bay Boat Club on Monday evening, April 23. If you do not move, then I am sure Schuster won't either. Last Saturday, May 12, I noticed he was still on Reception Reef and his raft was up on the Sand bar near your boat in the turtle feeding area. I noticed all the other operators were nicely spaced out along the Sandbar in Zone C. It was not crowded.

We all have to cooperate. Just because you are a good citizen does not, and should not, give you special privileges. Please help us protect the reefs in Zone H. If we do not get the cooperation of the commercial operators, then we will have to join the growing chorus of citizen voices who do not want any commercial operations in Kaneohe Bay whatsoever.

I feel confident that you will cooperate in trying to preserve the multiple use concept of Kaneohe Bay. Mahalo.

Sincerely,

Ernst S. Reese
Professor

ESR:ly



University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O. Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346

Cable Address: UNIHAW

July 20, 1990

Mr. David E. Parsons
State Boating Manager
State of Hawaii
Department of Transportation
Harbors Division
79 South Nimitz Highway
Honolulu, HI 96813

Dear Dave:

Subject: Continuing Violation of Zone "H" in Kaneohe Bay
by Robert Dall's Barefoot Bob

This is a follow-up of my letter of May 17, 1990, to you. Currently, to the best of my knowledge, all the commercial operators are abiding by the ORMA Rules for Kaneohe Bay excepting for Robert Dall's Barefoot Bob. He is blatantly in violation of the rules. Apparently, he thinks his is a special case. He has not responded to my letter to him dated May 17, 1990. I have enclosed a copy.

Barefoot Bob anchors on the sand spit adjacent to Reception Reef in Zone "H." This is in the turtle feeding area. They set up a volleyball net, swim and cook lunch. On Friday, July 13, 1990, Barefoot Bob was anchored on the sand spit and no turtles were observed feeding nearby, while they could be seen feeding in an area to the southeast along the sand bar. The water was exceptionally clear that day, and one could see the turtles very easily. It appears that they had been displaced from the area where Barefoot Bob was anchored.

Barefoot Bob also anchors on a reef for snorkeling in Zone "H," again in blatant violation of the ORMA Rules. When Kualoa Ranch's Kahala Kai stops to snorkel, they use a reef, also in Zone "H," adjacent to the one used by Barefoot Bob. As I suspected, if one operator violates the rules and is allowed to get by with it, then others will follow.

Enclosed is a map showing the areas being used illegally in Zone "H" which notes the dates and times I have personally observed Barefoot Bob in the area. While you were away, I talked to Paul Dolan about these violations, and he has promised to alert the Marine Police to the matter. There are excellent reefs for commercial use in Zone "E" which are currently not being used.

Again, Dave, we at H.I.M.B. will greatly appreciate your continued enforcement of the ORMA Rules. We believe that we can all work together providing everyone plays by the rules. Clearly, Bob Dall needs to be persuaded.

Sincerely,

ERNST S. REESE
Professor

Enclosures

ESR:esm

cc: Mike McCartney
Philip Helfrich
Bob Dall

SIGHTINGS OF VIOLATIONS IN ZONE "H," KANEOHE BAY

June 8, 1990 (1340 hrs):

Barefoot Bob snorkeling on reef in Zone "H."

Kahala Kai snorkeling on adjacent reef in Zone "H."

June 17, 1990 (1145 hrs):

Barefoot Bob anchored on sand bar adjacent to Reception Reef in Zone "H."

June 20, 1990 (1145 hrs):

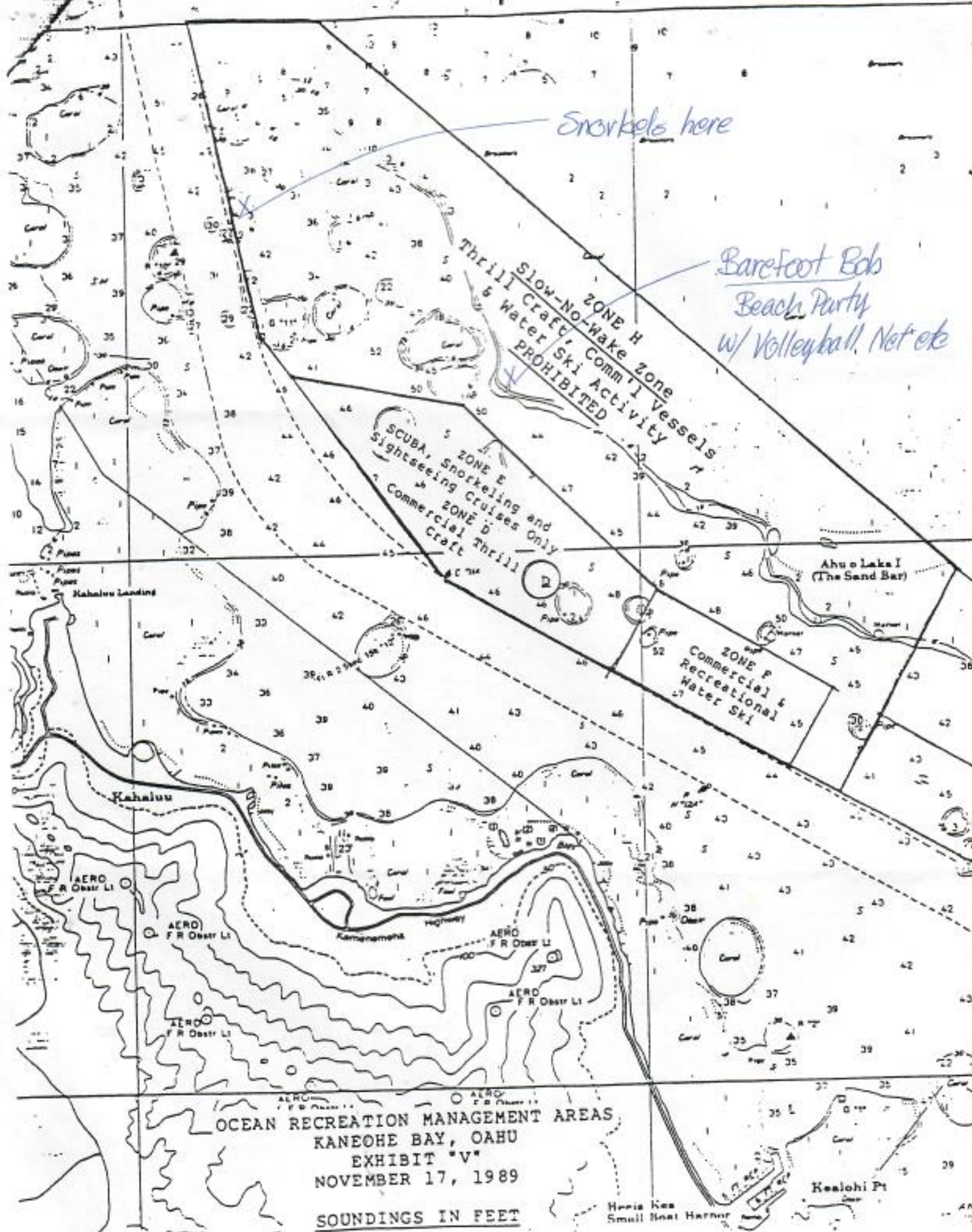
Same as June 17th.

June 23, 1990 (1215 hrs):

Barefoot Bob snorkeling in Zone "H."

July 13, 1990 (1130 hrs):

Barefoot Bob anchored on sand bar. Turtles not feeding in immediate area.



Snorkels here

*Barefoot Bob's
Beach Party
w/ Volleyball, Net etc*

Slow-No-Wake Zone
Thrill Craft & Water Ski Activity
PROHIBITED

ZONE E
SCUBA, Snorkeling and
Sightseeing Cruises Only

ZONE D
Commercial Thrill
Craft

ZONE F
Commercial &
Recreational
Water Ski

OCEAN RECREATION MANAGEMENT AREAS
KANEOHE BAY, OAHU
EXHIBIT "V"
NOVEMBER 17, 1989
SOUNDINGS IN FEET

Hania Kea
Small Boat Harbor

Kealahi Pt

SEA TURTLE TAG CENTER OF THE PACIFIC

June 1990

The Sea Turtle Tag Center of the Pacific is a cooperative program to make available tags, tag applicators, and technical assistance in the tagging of sea turtles for research purposes to government and other qualified organizations in the Pacific region. The program is jointly conducted by the Southwest Fisheries Center Honolulu Laboratory of the National Marine Fisheries Service, NOAA, and the University of Hawaii's Hawaii Institute of Marine Biology (HIMB). The program is designed in particular to aid those locations where small to moderate numbers of tags (i.e., 100-500) are needed and local authorities or organizations might not otherwise order them from the manufacturer.

The tags available for use are made of Inconel, a superior corrosion-resistant alloy composed of cadmium and nickel. The tags are self-piercing, self-locking, and simple to use when applied with a special plierlike applicator to the trailing edge of a turtle's front flippers. All tags are imprinted consecutively with a letter-number combination to permanently identify individual turtles. In addition, the following inscription appears on each tag:

Write HIMB
University
Hawaii 96744

Persons who report the resighting of a tagged turtle to this address are sent a T-shirt bearing a sea turtle logo. The resighting information that is received is relayed in a timely manner to the research organization responsible for tagging the turtle.

The distribution of tags in the Pacific region under this cooperative program has been under way for several years, but without the benefit of a formal name until now.

Organizations interested in receiving more information about the availability of tags from the Sea Turtle Tag Center of the Pacific should write to: G. H. Balazs, Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, 2570 Dole Street, Honolulu, Hawaii 96822-2396 (FAX 808-942-2062).

SIGHTING INFORMATION TURTLE AND SEAL

Animal sighted (circle): Turtle Seal
Number of animals: 9 Type, if known: Green sea turtle
Date: May 2nd 1972 Observer: Bill Fulton
Address & phone

Time: 9:00 A.M. (optional):
Location: along a line from chinaman's hat to Makepa pt.
Observed from (circle): shore, boat (name: Sea plane),
while skin or SCUBA diving (on surface or at _____ feet deep).
Estimated size (length): 2 to 3 feet

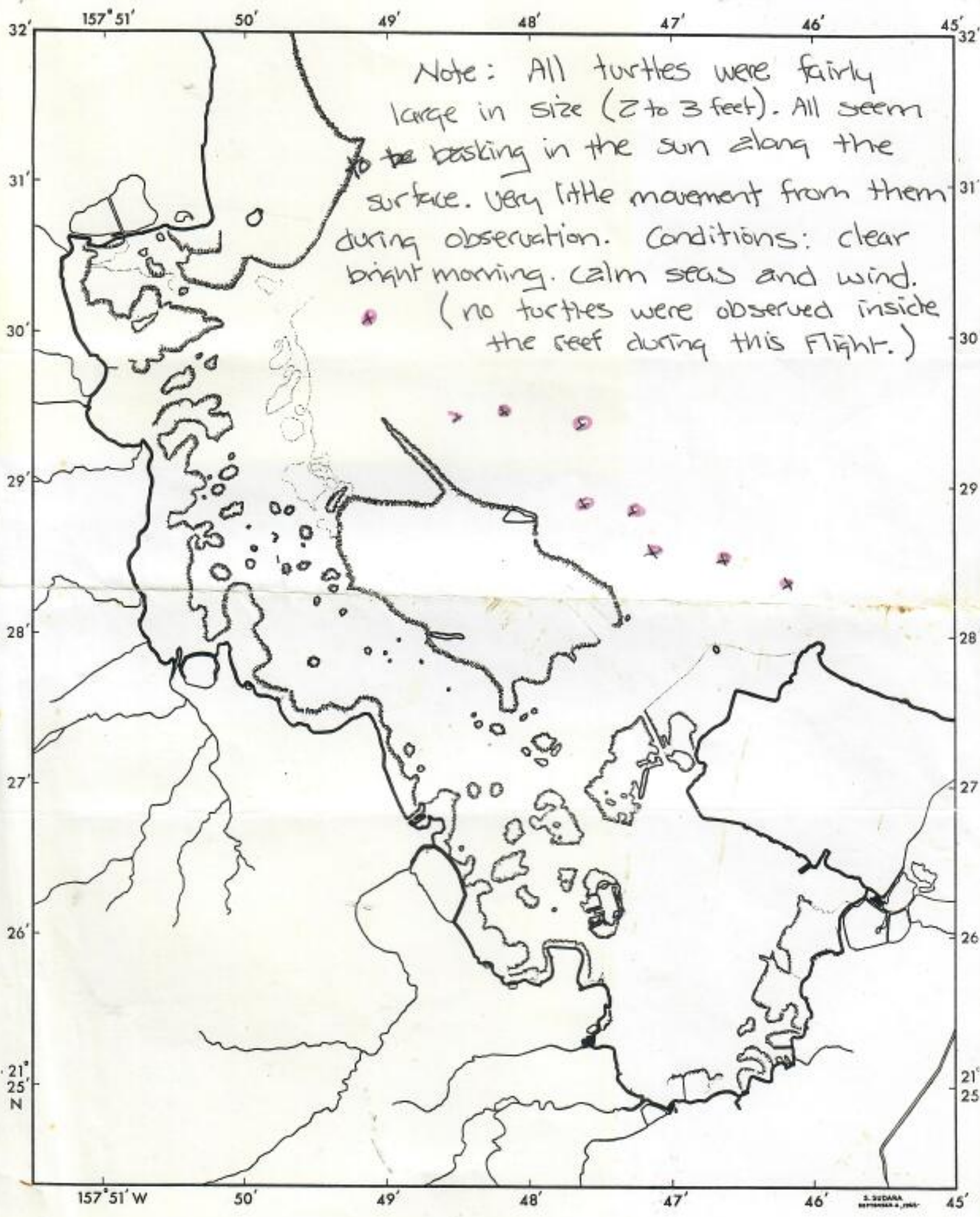
Comments: (such as color pattern; injuries; scar patterns; tumors;
whether flipper tags are present (Y/N); color and number of the tag(s);
bleach marks (number/letter); behavior; and weather)

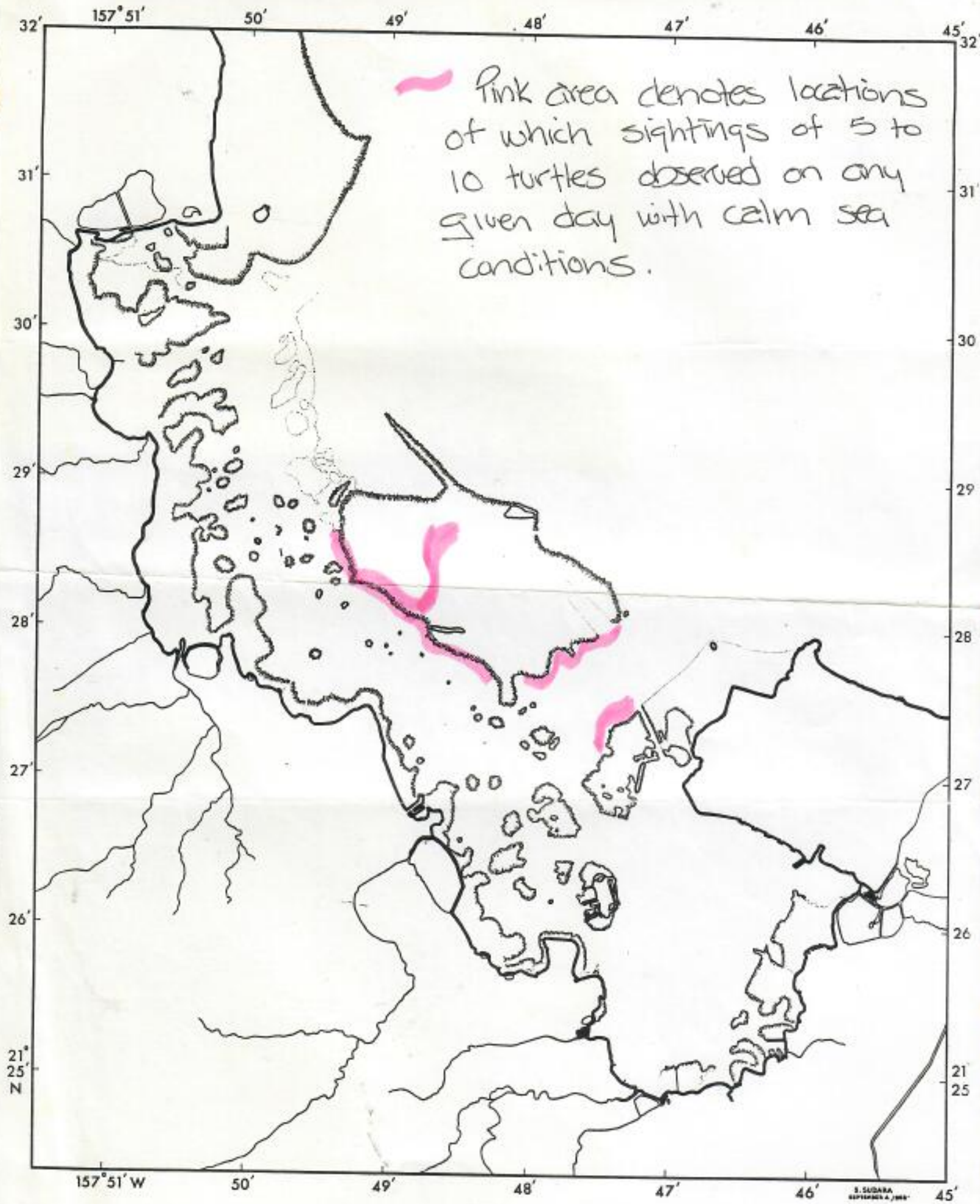
see attached map.


Extreme low tide at time of sightings.

Seals and sea turtles are protected under Federal and State law.

DO NOT DISTURB.





 Pink area denotes locations of which sightings of 5 to 10 turtles observed on any given day with calm sea conditions.

George Balazs
National Marine Fisheries Ser.
2570 Dole st.
Honolulu HI. 96822/2396

6/18/92

ALOHA GEORGE:

Received your letter the other day and regret that I haven't got back to you sooner. I think now that I perhaps misunderstood the sighting information that you are interested in. From our last phone conversation I surmised that you were mainly interested in sightings of groups of turtles, 3 or more sharing a common location. Although now I realize that you may also be interested in single sightings of more than 3 turtles through out the course of my daily observation. Somehow groups of 3 or more stuck in my head for the information that you are after. Please correct me if I am in error.

At any rate, I seem to observe an average of 5 to 10 turtles on each day that I fly. 90% of these sightings are along the outside of the Kapapa island sand bar shallow reef area as noted on the map. Most of these turtles are single and rather spread out amongst each other. And lately it has been rare to see more than one turtle share a common area.

May 2nd. was an interesting day. It was a bright, clear, calm wind day, accompanied by an extremely low tide. Because of these conditions I could pick out things floating on the surface for great distances around me. I noticed floating debris about 1/2 mile east of the reef line of Kapapa Island. Once arriving at this location, to my surprise, I found them to be turtles. They were all fairly large turtles, 2 to 3 feet in length. They remained motionless and appeared to be basking in the sun light. Perhaps the low tide brought them out side the reef for I did not observe any inside the reef line on that flight. There was 9 turtles total and appeared to be along a line from Chinamans hat to Makapu pt.

That is all that I have to report for now. No sightings of sharks or seals, although did spot ONE BIG eagle ray just east of coconut Island on June 6th.

Please call if I can help more in any way. I will keep the reports coming. I plan on doing a lot of flying this summer.

ALOHA



Wm D FULTON II

DREAMS: Were mostly just that

Continued from Page B-1

Floating ... everything — At one time or another, someone has proposed that just about every major development be of the floating variety: convention centers, stadiums, hotels and even an entire city.

"A floating city is unquestionably a part of our future in the next 25 years," undersea research expert Joseph MacInnis predicted boldly. That was in 1962 and with only 14 years left on his prediction, it doesn't look likely. But don't hold it against MacInnis. Others predicted there'd be a floating city off Waikiki by 1976. In 1972, the University of Hawaii actually built a 150-ton scale model of a floating city. The only drawback was that when it was tested, it sank.

There have been plans for floating hotels, complete with underwater restaurants, and for a floating convention center. And before the Halawa site was selected for the gradually disintegrating Aloha Stadium, one proposal called for it to be a floating stadium, which would have meant that at least it would have been rust-resistant.

Fill in the banks — As persistent as plans for floating buildings have been the plans to develop reefs. Plans for artificial surfing reefs have been plentiful yet none have taken place. The best chance came in 1976 but Waianae residents and Hawaiian Electric Co. couldn't get on the same wavelength.

Plans for reef highways, parks and industrial areas are as common as coral. The reef runway and development of Magic Island prove that the plans are more than dreams. For years, the half-mile-long reef off Ala Moana park was depicted on many island maps as a green extension of Magic Island.

The submerged reefs of Keehi Lagoon have whispered to local developers for years. A 1980 plan by Hadley-Pruyn Developers Inc. would have filled in 300 submerged acres and turned it into a combination industrial park and recreation area with more than 1,800 boat slips. The federal government pointed out that the area, which is federal land, could only be used for an airport and so the plan sank at high tide.

The transportation department proposed a freeway be built on the reef from Koko Head to Black Point, but it was swamped

by a storm of citizen outrage.

You can't get here from there — Transportation has been fertile ground for dreamers. Dirigibles, or blimps, were seriously considered both in 1972 as people movers on the Big Island and in the 1980s as cargo carriers between the islands. Neither idea flew.

The use of ferries has been tried but the image of them being an integral part of Hawaii mass transit still is a dream. The Sea Flight jet foils came closest to a sustained business, running between the islands in the 1970s. A commuter ferry between Barber's Point to Honolulu was tried but died last year.

Just about every futurist's drawing of Honolulu includes a monorail or some similar elevated rail system. Though the drawing pads have been many, such a mass transit system still is a glimmer in a designer's eye.

A potpourri of ideas — Not all of the dreams for Hawaii have been tied to trams, tourism and traffic. Some thought Hawaii could just have been a lot more fun. Here are some of those ideas:

■ Casinos, dog tracks, horse tracks, jai alai frontons and off-track betting parlors. Nearly every year some sort of gambling plan arises. Local legend has it that one hotel actually was designed so it could easily be turned into a casino if the anti-gambling climate changed.

■ You would be able to see Hawaii through King Kamehameha's eyes if developer Jack Mahakian had had his way in 1974. He's the one who proposed the 500-foot tall statue of the king on Tantalus. Fees from the elevator ride to the King's scenic eyeball overlooks alone would have paid for the project, Mahakian said. Most thought the project would merely be an eyesore.

■ If it wasn't for an \$800,000 difference of opinion, the Forbidden Isle of Niihau might today be a state park open to everyone. Gov. John Burns wanted the state to buy the island from the Robinson family in 1970 for its appraised value of \$300,000. The Robinsons wanted \$1.1 million. Burns blew it.

Guess where it is now??

8/3/83 → CHB 11/5/93

TODAY

Friday, September 11, 1992 ■ Star-Bulletin

- **TV:** Fox's 'Flying Blind' a hip
- **Diary:** Hiker leaves tale of de
- **Donnelly:** Lights, camera, Bro



Hanging out at the sand bar



By Cory Lum, Star-Bulletin

Hungry guys stand on the submerged sand bar in Kaneohe Bay while their boat holds the hibachi cooking their lunch. They are, from left, Lance (who would not give his last name), Jeff Akamine, Dean Ihara, Sheldon Murata and Harvey Sumida.

□ In the middle of Kaneohe Bay, a small spit lures boaters and bathers to 'paradise'

By Charles Memminger
Star-Bulletin

WE launched our kayaks from a small boat ramp in Kahaluu and made our way over the mud flats and shallow reefs.

The water, churned up by days of rain and trade winds, was a nasty-looking brown, like watered-down, day-old chocolate milk.

But about a mile into Kaneohe Bay, the reef gave way to a deep channel and the water turned a startling blue. We paddled into the teeth of the wind, toward the mythical beach in the middle of the bay.

Another half a mile, and we could make out the masts of a number of boats that seemed to be anchored in the middle of nowhere. As we got closer, we could smell barbecuing ribs and hear the faint sound of music and people laughing.

It was eerie. We could see people walking on water and chasing Frisbees, tossing footballs, playing tag.

But as we got closer, we could see the people weren't actually walking on water, but on a submerged sand bar right smack in the middle of Kaneohe Bay.

The sand bar is one of the best kept beach secrets on the island. A mile from Heeia Kea Pier, hundreds of yards of clean, white sand are exposed at low tide. At high tide, the sand bar lies under a foot or so of water. But that doesn't stop people from bellying up to the bar.

They come in every type of craft imaginable. On Labor Day, there were more than 40 different types of boats that had run up onto the sand or anchored in deeper water.

Yachts worth tens of thousands of dollars tie up next to wooden skiffs. Weekend fishermen make room for kids floating by on plastic inflated whales. Volleyball nets go up, even though the game is played in a foot of water. Dogs are pulled by on Boogie boards. People sit in lawn chairs up to their navels in water, sucking up beer and a view of the Koolaus.



When the sand is showing, more people come to the sand bar and things are rowdier. Otherwise, people are content to float in the shallow water or stroll along.

It is one of the most bizarre scenes in all of Hawaii beachdom — a massive party on an island of sand in the middle of a bay.

You can zip out to the bar on a motorboat. But the best way to experience the sand bar is on a kayak, paddling among the yachts and dinghies and platforms and rubber boats and apparently any other thing in the world that floats. Then you realize that it is not just one big party, but a number of separate parties taking place at the same time, a virtual party-rama hip-deep in salt water.

We slipped by a cabin cruiser called "Wedidit II" where an elderly couple sat on deck chairs.

"What'd you do?" we asked.

"We don't tell many people," the woman said conspiratorially. "But we did it twice."

"The first time it was smaller," the man says, laughing.

Not far away, a frequent sand bar visitor, James Fernandez, is attracting a lot of attention. His fishing pole is bent over like a question mark. His friend, Chris Barta, is sitting on a nearby boat yelling encouragement.

"Whatever it is, it's huge. Don't let it get away," he yells.

Fernandez struggles to reel in the monster.

"Maybe it's an eel or a blow fish," a spectator chimes in.

Gradually Fernandez pulls in the mysterious, heavy catch. Finally it surfaces. It's a giant . . . beach towel!

"Hey, guys, Uncle James caught a towel!" Barta yells to a group of kids playing near the boat.

Fernandez is not put off by the razzing. It's the first towel he's ever caught on the sand bar and, as far as he's concerned, "it's a nice one. A three-pounder."

Barta is one of those people who come to the sand bar every week. He's the food and beverage manager for Royal Hawaiian Cruises and could go boating on the leeward side any time he wants.

"That's Waikiki, this is paradise," he said.

In a weather-beaten wooden fishing boat not far away, Brian Kon and his girlfriend Debbie Quon are barbecuing chicken. Instead of a tarp, the boat is sporting a blue patio umbrella with "San Pellegrino" logos all over it.

"It's some kind of liquor, like wine," Kon explains. Whatever. It blocks the sun as well as the large sailing tarps that grace the yachts only a few yards away.

Kon eagerly shows the fish he caught trolling earlier in the day. He wishes he still were trolling.

"What it is, see, is she (Debbie) gets sick while I'm fishing and we have to come in to the sand bar to recuperate," Kon says.

Any boat that floats, no matter how small, has a name. Kon's boat is named "Debbie Jane". He says Jane is his mother, not another girlfriend.

We paddle on, not wanting to explore the matter further.

A squid's throw away, three boats are tied together. Allan Anduha is a Halawa prison guard who spends every weekend on the sand bar with his

See SPIT, Page B-6

SPIT: A sand bar in the middle of Kaneohe Bay attracts a crowd

Continued from Page B-1
family and friends. His wife, Gloria, is cooking teriyaki ribs on a hibachi that Anduha has rigged to hang off the side of the boat.
"Kumu,

"I bring people out from town who have lived here all of their lives and they didn't know this existed," Anduha said, sipping his light beer. "When the tide is out, it's like a big football field."

Anduha's friend, Carl Arume, sits on the deck of the next boat, holding a fishing pole.

He hasn't caught a thing today. Not even a beach towel.

"I just feel good about having my line in the water," he said, sort of summing up the overriding philosophy of the sand bar: Look busy, do nothing, drink beer, have fun.

Technically, drinking isn't allowed on the bar, which is a state beach park. But it's not illegal to drink on your boat as long as you don't drink too much, according to James Hardy, a marine patrol officer.

He crisscrosses the bay in a State Marine Patrol boat, a water-soaked version of an HPD "blue and white".

He keeps boats from speeding by the sand bar, which is nice for people trying to balance a plate of musubi and noodles in one hand while opening a beer and throwing a football with the other.

Despite complaints by bar regulars that their secret beach is too crowded, the volume is actually down, according to Hardy.

Last year as many as 75 boats parked at the sand bar on weekends, he said.

"It was boating hell," Hardy lamented.

Today, things are quieter.

Maybe it's because the tide is too high. When the sand is showing, more people come to the sand bar and things are rowdier. Today, people are content to float in the shallow water or stroll along the edge of the bar looking for shells or trying to catch small fish.

As we paddle back across the channel, the sounds gradually fade.

We look back and see people running and playing on the surface of the water. We know now it is an illusion. People can't really walk on water. But a day at the sand bar is pretty close.

B-6 □ Friday, September 11, 1992

Sean Ihara holds up a catch as Wade Murata and Reid Murata fool around while standing on the sand bar in Kaneohe Bay.



By Cary Lam, Star-Bulletin

Tagging and measurement data for 11 green turtles hand-captured in Kaneohe Bay, Oahu

Compiled by George H. Balazs and Barry K. Choy

Tag No.	Straight Carapace length	Carapace width	Curved Carapace length	Carapace width	Plastron	Comments ¹
<u>March 31, 1989</u>						
Y-161, Y-162	79.5	59.9	--	--	--	Three small tumors on left eye. DB-4, VB-2. Kipapa reef flat. A
<u>May 16, 1989</u>						
Y-170*, Y-171	48.1	37.3	52.0	45.0	40.4	Tag recovery from 4-27-89 same location. Twin Reef #1. Stomach sample obtained. No change in measurements.
2538**, 2539 (Y-304)	72.9 (72.8)	55.9	77.5	68.0	58.9	Tag recovery from 4-11-80, Bellows, Waimanalo Bay. 12.6 cm increase in SL over 9.08 years (1.34 cm/yr). Increase from 67 lbs to 117.5 lbs. Numerous tumors-some surgically removed. Twin Reef #2. Stomach sample obtained. Several leeches present but no leech eggs.
<u>May 17, 1989</u>						
Y-305*, Y-306 (40.4)	41.2	34.9	43.5	41.0	32.7	No skin or carapace/plastron barnacles. New recruit? A.O.L foraging.

<u>Tag No.</u> <u>May 17, 1989</u>	<u>Straight Carapace</u> <u>length</u> <u>width</u>	<u>Curved Carapace</u> <u>length</u> <u>width</u>	<u>Plastron</u>	<u>Comments</u> ¹
Y-307*, Y-308	44.8 (44.4)	47.5 42.0	36.6	DB-11, VB-10. A.O.L. foraging
Y-309*, Y-310	44.7 (44.6)	47.5 43.0	36.1	DB-11, VB-5. 0.5 x 2.5 cm grey tumor right jaw. Photo. A.O.L. foraging.
Y-311*, Y-312	38.3 (38.1)	40.5 35.5	31.2	DB-15, VB-1. Pink coralline alga. A.O.L. foraging.
Y-313*, Y-314	59.8 (59.4)	64.0 60.0	48.0	DB-7, VB-7. Numerous tumors. Coralline alga. A.O.L. foraging.
Y-315*, Y-316 Y-317	63.4 (62.8)	68.0 62.0	51.5	0.5 cm tumor right eye. DB- 12, VB-5. A.O.L. foraging north of kayak/windsurfing operation.
Y-318*, Y-319	45.5 (45.4)	48.5 43.5	36.9	DB-5, VB-5. Small tumor on left eye. coralline alga. A.O.L. foraging.
Y-320*, Y-321	47.3 (47.0)	50.0 45.0	37.2	DB-6, VB-6. Small tumor on right eye. A.O.L. foraging.

* = number engraved
 DB = Dorsal barnacles, Chelonibia. A.O.L. = Ahu-O-Laka
 VB = Ventral Barnacles, Chelonibia.

KANEHOE, WID

Tagging and measurement data for seven green turtles hand-captured in Kaneohe Bay on 6 June 1989
 (* - number engraved, DB = dorsal barnacles, Chelonibia; VB = ventral barnacles, Chelonibia;
 A.O.L. = Ahu-O-Laka)

Compiled by George H. Balazs and Barry K. Choy

Tag No.	Straight carapace		Curved carapace		Plastron	Comments
	length (cm)	width (cm)	length (cm)	width (cm)		
Y-324*	46.9	37.9	51.0	46.0	37.2	Twin Reef No. 2. DB19, VB-53.
Y-326*	73.5	57.2	78.0	72.0	59.5	Twin Reef No. 1. DB-5, VB-27. Numerous tumors including 6 x 10 cm on right jaw.
Y-329*	52.8 (52.5)	42.2	56.5	50.0	42.0	A.O.L. foraging. DB-32.
Y-331*	53.1 (52.7)	42.1	56.0	49.0	42.7	A.O.L. foraging. DB-11, VB-5.
Y-91*, Y-92, Y-93	44.8 (44.2)	--	--	--	--	A.O.L. foraging. Tag recovery from 2/22/89 A.O.L., SL-44.2 cm. 4 new DB 1.5, 1.2, 1.0, 0.8 cm removed.
Y-80*, Y-81	44.7 (43.9)	--	48.0	--	--	A.O.L. foraging. Tag recovery from 2/22/89 and 5/1/89. A.O.L. one new DB 1.2 cm removed. Tumor surgery completely healed.

Tagging and measurement data for seven green turtles hand-captured in Kaneohe Bay on 6 June 1989
 (* = number engraved, DB = dorsal barnacles, Chelonibia; VB = ventral barnacles, Chelonibia;
 A.O.L. = Ahu-O-Laka)

Compiled by George H. Balazs and Barry K. Choy

Tag No.	Straight carapace		Curved carapace		Plastron	Comments
	length (cm)	width (cm)	length (cm)	width (cm)		
Y-334*, Y-335	58.7 (58.4)	47.5	63.0	56.5	47.0	A.O.L. foraging. Numerous tumors including 4 x 10 cm on left head and jaw. Leeches and leech eggs, <u>Ozobranchius branchiatus</u> .
Y-322*	41.1	35.4	50.0	42.0	36.9	Green turtle found entangled in monofilament line at Makapuu, Oahu, 4/7/89 resuscitated by Sea Life Park and released at Twin Reef on 6/6/89 by G. Balazs and B. Choy.

Tagging and measurement data for four green turtles captured and tagged in Kaneohe Bay on 30 June 1989
 (* = number engraved, DB = dorsal barnacles, Chelonibia; VB = ventral barnacles, Chelonibia;
 A.O.L. = Ahu-O-Laka)

Compiled by George H. Balazs and Barry K. Choy

Tag No.	Carapace length (cm)		Plastron (cm)	Head (cm)	Tail (cm)	Comments
	Straight	Curved				
Y-344, * Y-345	50.0 (49.8)	53.0	40.4	8.3	7.0/11.0	DB-16, VB-15. Large tumors. Photos. AOL foraging.
Y-346*, Y-347 Y-348	57.6	62.0	46.1	9.2	11.0/13.0	DB-17, VB-14. AOL foraging.
Y-349, * Y-350	49.9	54.5	40.6	7.7	6.0/10.0	DB-1, VB-7, Four small tumors, one removed. AOL foraging.
Y-351, * Y-352 Y-353, Y-354	85.1	90.5	67.8	11.7	22.0/31.0	Numerous large tumors. Twin Reef No. 1. Male(?)

*Number engraved in carapace.

L. Choy. 2/11/89

Tagging and measurement data for six green turtles
captured in Kaneohe Bay on 29 December 1989
by

George H. Balazs and Barry K. Choy

HONOLULU LABORATORY
Southwest Fisheries Center
2570 Dole Street
Honolulu, HI 96822-2396

Tag No.	Carapace length (cm)		Comments
	Straight	Curved	
<u>Deep Reef #1</u>			
Y-265,66,67,68	73.2	77.5	Tumors on both eyes, neck, shoulder and groin.
Y-269,70	53.7	57.5	Tumors on both eyes and massive one on right jaw.
Y-271,72	49.7	53.0	Tumors on both eyes, front flippers and groin. Burrowing barnacles.
<u>Deep Reef #2</u>			
Y-273,74	50.9	54.5	Tumor on right eye and ruptured left eye. Emaciated.
Y-275,76,77	56.4	60.0	Tumors on neck, left eye, groin, and tail. Vigorous and strong.
Y-278,79,80,81	77.5	84.5	Tumors on both eyes, neck, and right shoulder. Vigorous and strong.

Tagging and measurement data for three green turtles hand-captured
in Kaneohe Bay on 2/15/89

<u>Tag No.</u>	<u>Straight Carapace length</u>	<u>Straight Carapace width</u>	<u>Curved Carapace length</u>	<u>Curved Carapace width</u>	<u>Plastron</u>	<u>Tail</u>	<u>Comments</u>
Y-51, Y-52 Y-53	64.5	53.0	69.0	67.0	52.3	10.0	Tumors on eyes.
Y-54, Y-55 Y-56	50.4	40.2	54.0	49.0	40.5	11.0	<u>Chelonibia</u> sampled for parasite study.
Y-57, Y-59 Y-60, Y-61	86.6	64.0	94.0	84.5	66.5	29.0	Large tumors on eyes and front flippers. <u>Ozobranchus</u> leeches.

Tagging and measurement data for 11 green turtles hand-captured
in Kaneohe Bay on February 22, 1989.

Tag No.	Straight Carapace length	Straight Carapace width	Curved Carapace length	Curved Carapace width	Plastron	Comments
Y-62, Y-63 Y-64, Y-65	70.5	55.0	76.0	71.0	56.5	Tumors on eyes, neck, and axillae. DB-8, VB-24. Twin Reef #2.
Y-66, Y-67 Y-68	50.3 (49.8)	40.4	-	-	39.5	1.3 x 0.8 cm tumor left shoulder. DB-7, VB-7. Twin Reef #1.
Y-69, Y-70 Y-71	48.9 (48.4)	37.5	51.5	45.0	38.8	Small tumors left shoulder and left eye. DB-5, VB-13. A.O.L. foraging.
Y-72, Y-73 Y-74	52.0 (51.8)	41.0	55.0	47.5	41.6	Small tumor right shoulder. Abnormal <u>scute</u> count. DB-23, VB-2. 1 leech and eggs. A.O.L. foraging.
Y-75, Y-76 Y-77	50.8 (50.6)	40.7	54.5	48.0	41.1	DB-11. A.O.L. foraging.
Y-78, Y-79	41.4 (41.1)	34.0	44.5	40.0	33.0	Clean--no biofouling. Possible scratches from shark bite. A.O.L. foraging.
Y-80, Y-81	44.2 (43.7)	35.5	47.0	42.0	36.3	LFL tag tear? DB-25. A.O.L. foraging.
Y-82, Y-83 Y-84	47.4	38.8	50.5	46.5	39.0	DB-9, VB-10, HB-4. A.O.L. foraging.
Y-85, Y-86 Y-87	50.5 (49.4)	40.7	54.0	50.0	41.1	6 leeches in left eye. DB-2, VB-8, FB-3. A.O.L. foraging.

Tag No.	Straight Carapace length	Straight Carapace width	Curved Carapace length	Curved Carapace width	Plastron	Comments ¹
Y-88, Y-89 Y-90	52.6 (52.0)	43.3	57.0	49.5	42.0	Small tumor left shoulder. LFL slit with tag. DB-19, VB-7. A.O.L. foraging.
Y-91, Y-92 Y-93	44.4 (43.8)	36.2	47.0	43.5	36.2	DB-69, VB-75 . A.O.L. foraging.

¹DB - dorsal barnacles, Chelonibia
 VB - ventral barnacles, "
 HB - head barnacles, "
 FB - flipper barnacles, "

A.O.L. - Ahu-O-Laka

Summary of Hawaiian green turtles captured, tagged, and biopsied during the cooperative fibropapilloma project with Elliott Jacobson, 26 April to 2 May 1989 (* = number etched in carapace, C = barnacles on carapace, P = barnacles on plastron, H = barnacles on head).

Compiled by George H. Balazs and Barry K. Choy
 Southwest Fisheries Center Honolulu Laboratory
 National Marine Fisheries Service, NOAA

Capture date	Tag No.	Straight carapace			Curved carapace			Head	RFF	Tail	E. J. tumor sample No.	Location and comments
		Length	Notch	Width	Length	Width	Plastron					
4/5/89	Y-212 Y-213	80.4	79.5	67.5	85.0	82.0	--	--	13.2	--	HGT-2	Kania. Held at Kewalo. Photos. Adult female. (Released Kaneohe 5/1/89).
4/26/89 (Wednesday)	Y-164* Y-165	73.1	72.5	56.3	78.5	72.0	--	11.0	--	--	HGT-1	Twin Reef. Photos. C-20, P-4.
4/27/89 (Thursday)	Y-170* Y-171	48.0	--	37.1	52.0	45.0	40.2	7.6	8.9	6.9	--	Twin Reef. 11th MS left missing.
4/27/89	Y-166* Y-167 Y-168 Y-169LH	86.5	--	--	91.0	--	68.2	12.1	14.7	35.4	--	Twin Reef. Adult male.
4/28/89 (Friday)	Y-172* Y-173	62.9	42.3	34.4	45.5	41.0	36.4	7.1	7.0	8.5	--	Ahu-o-laka. C-27, H-4, P-86.
4/28/89	Y-174* Y-175RH Y-207 Y-208	73.2	--	57.4	78.5	74.0	59.9	10.6	11.3	15.5	--	Twin Reef.
4-28-89	Y-209 Y-210 Y-211*	70.6	--	58.3	74.5	69.5	56.6	10.3	11.7	17.0	HGT-3	Twin Reef. Photos 5/1.

Tagging and measurement data for eight green turtles hand-captured in Kaneohe Bay, 17-18 May 1990. By G.H. Balazs and University of Hawaii MOP Students. (DB = Dorsal Barnacles, VB = Ventral Barnacles, RHL = Right Hind Flipper, LFF = Left Front Flipper)

Tag No.	Straight (cm)		Curved (cm)		Comments	
	Length	Notch Width	Length	Width		
	<u>17 May, Reef 42 and 43</u>					
Y830, Z40	50.2	50.0	40.1	53.3	47.5	Tumors on both eyes, neck, LFF and tail. DB = 20, VB = 25.
Y831, Z39	60.6	60.0	47.4	65.0	59.0	Tumors on both eyes. VB = 9.
Y832, Z38	63.3	63.1	52.0	67.0	61.0	Tumors on both eyes, neck all four flippers. DB = 37, VB = 29.
Y834, Z37	56.1	56.0	45.1	60.0	53.0	Large tumors RFL 6th scale and RHF.
	<u>18 May, Ahu-O-Laka</u>					
Y835, Z36	37.1	36.4	32.3	39.0	36.0	Likely new recruit to benthic habitat.
	<u>18 May, Reef 42</u>					
Y836, Z35	37.9	37.3	34.0	40.0	38.5	Likely new recruit.
Y837-38, Z34	51.9	51.4	43.1	55.6	49.5	--
	<u>18 May, "Mark Reef"</u>					
Y839, Z33	40.4	40.0	34.8	43.0	40.0	Evidence of sustained residency in benthic habitat.

Note: Y833 not applied.

Tagging and measurement data for nine green turtles hand-captured at "Mark Reef", Kaneohe Bay, Oahu, June 1, 1990.

by
 G. H. Balazs, R. Miya, C. Dold, and R. Douglas
 National Marine Fisheries Service Honolulu Laboratory
 2570 Dole Street
 Honolulu, HI 96822-2396

Tag no.	Straight (cm)		Curved (cm)		Comments
	Length	Notch	Length	Width	
Y848, Z50	38.4	37.8	40.5	39.0	Likely new recruit (SCA).
Y849, Z51	40.1	39.9	42.0	39.0	Two deep 1 cm punctures in 1st central. DB = 3, VB = 9.
Y850, Z52	41.6	41.2	44.0	40.5	Likely new recruit (SCA).
Y851, Z53	46.8	46.4	49.5	45.5	Tumor below right eye.
Y852, Z54	37.4	37.0	39.5	45.5	Likely new recruit (SCA).
Y853, Z55	36.6	36.4	38.5	35.5	Likely new recruit (SCA).
Y854, Z56	45.3	45.0	48.0	43.5	Tumors on jaw, shoulder, and hind flipper. VB = 3.
Y855, 56; Z57	56.2	55.8	60.0	53.0	Tumors on both eyes and front flippers. Dense skin barnacles. VB = 7.
Y857, 58; Z58	59.6	59.6	63.5	59.0	Tumors on both eyes, front flippers, cloaca, and neck. DB = 5, VB = 2.

NOTE: SCA = Speckled Coralline Algae on carapace.
 DB = Dorsal Barnacles (all removed).
 VB = Ventral Barnacles (all removed).

4 of 9 turtles captured (44%) had tumors. 23 other turtles sighted ^{during} 1.5 hours of search and capture efforts on 6/1/90. 16 turtles tagged to date at "Mark Reef".

Tagging and measurement data for 22 green turtles hand-captured at "Mark Reef," Kaneohe Bay, Oahu, June 15, 1990.

By G. H. Balazs, R. Miya, C. Dold, R. Douglas,
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Tag No.	Carapace length (cm)			Comments
	Straight	Notch	Curved	
Y873,Z61	39.1	38.3	41.5	DB - 7 (2mm); SCA
Y874,Z62	39.1	38.8	41.0	DB - 2, VB - 1
Y875,Z63	47.4	47.2	51.0	Tumors; DB - 27, VB - 20
(Note: Tags Y876 and Y877 were used off the Mauna Kea Beach Hotel.)				
Y878,Z64	43.9	43.5	46.5	Tumors; DB - 4
Y879,Z65	42.7	42.0	45.0	Tumors; DB - 41, VB - 12
Y880,Z66	46.3	45.7	49.5	Tumors
Y881,Z67	45.6	44.8	48.0	DB - 37, VB - 45
Y882,Z68	40.0	39.3	43.0	Possible start of tumor in left eye
Y883,Z69	46.9	46.4	50.0	Tumors; DB - 2
Y884,85;Z70	52.2	52.0	56.0	Tumors
Y886,87;Z71	55.1	54.8	59.0	Tumors, DB - 1, left hind flipper 50% gone, but healed.
6790,91	55.8 (37.8)	55.5 (37.3)	59.5 (40.1)	Recapture of turtle released 6 years, 3 months ago, off Waikiki Aquarium.
Y889,Z73	43.6	43.5	46.5	Tumors
Y890,Z74	49.5	49.3	53.0	
Y891,92;Z75	51.0	50.8	58.0	DB - 1
Y893,Z76	39.7	39.5	42.0	Tumors
Y894,95;Z77	62.6	62.0	67.5	Tumors
Y896,97;Z78 (Note: Tag Z79 was not used)	71.8	71.4	77.1	Tumors, DB - 1, VB - 7
Y898,99;Z80	60.9	60.4	65.6	Tumors, DB - 2; VB - 3

Tagging and measurement data for 22 green turtles hand-captured at "Mark Reef," Kaneohe Bay, Oahu, June 15, 1990.--Continued.

Tag No.	Carapace length (cm)			Comments
	Straight	Notch	Curved	
Y900,01	46.4	46.3	49.0	Tumors
Y902,03	49.3	49.0	52.5	Tumors
Y904,05	36.9	36.6	39.5	Likely new recruit

Note: DB = Dorsal barnacles (all removed).
VB = Ventral barnacles (all removed).
All turtles had speckled coralline algae on carapace except Y904,05.
14 (64%) of the 22 turtles captured had tumors.
Four other turtles (Z33,Z45,Z56, and Z57) were resighted that had been tagged at "Mark Reef" during the past 30 days.
38 turtles tagged to date at "Mark Reef."

Eight green turtles hand-captured and tagged
in Kaneohe Bay, Oahu on May 23, 1990

by

George H. Balazs, Bill Barnum, Dawn Beyer, and Mark Lammers
National Marine Fisheries Service Honolulu Laboratory
2570 Dole Street
Honolulu, HI 96822-2396

Tag no.	Curved carapace (cm) length	width	Comments
<u>Mark Reef resting habitat</u>			
Y840, Y841	76.0	66.0	DB = 19, VB = 4; tumors on both eyes, neck, both front flippers, and RHF.
Y842, Z43	42.0	40.0	Likely new recruit.
Y843, Z44	43.0	39.5	Likely new recruit.
Y844, Z45	43.0	40.0	
Y845, Z46	47.5	43.0	
Y846, Z47	49.5	43.5	
<u>AHU-O-LAKA foraging habitat</u>			
Y847, Z48	61.0	55.0	Tumors on both eyes, front flippers, neck, hind flippers; healed extensive shark bites(?) to posterior carapace and hind flippers.
Y172, Y173, (Z49)	47.0	42.5	Originally tagged 4/28/89 AHU-O-LAKA. CL = 45.5 cm, CW = 41.0 cm. DB = 6; VB = 12 (not removed). 4/28/89 - DB = 27, VB = 86, head = 4 (all removed).

Four green turtles hand-captured and tagged in Kaneohe Bay
at "Mark Reef" on 20 June 1990.

By George Balazs, Russ Miya, and Mark Lammers
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Tag No.	Straight (cm)			Curved (cm)		Comments
	Length	Notch	Width	Length	Width	
Y906,Z81	48.6	48.4	38.7	52.0	47.0	Patch tumors; SCA
Y907,Z82	51.2	--	40.7	55.0	48.5	Numerous tumors; SCA; 2SRFF missing. DB = 4, VB = 1
Y908,Z83	45.8	45.5	36.5	48.5	44.0	VB = 2; SCA; slightly sunken plastron
Y909,Z84	38.3	37.4	32.9	40.5	37.0	Likely new recruit within the past 4 months; SCA

NOTE: SCA = Speckled coralline algae on carapace.
DB = Dorsal barnacles (all removed).
VB = Ventral barnacles (all removed).
2SRFF = Second-scale right front flipper.

Two of the four turtles captured (50%) had tumors.
Turtles with tags Z57, Z62, Z63, Z64, and Z68 also
resighted.
Forty-two turtles tagged to date at Mark Reef since 18 May
1990.

Three green turtles hand-captured and tagged in
Kaneohe Bay on 20 July 1990

by
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Tag No.	Straight (cm)			Curved (cm)		Comments
	Length	Notch	Width	Length	Width	
<u>Mark Reef</u>						
Y223, Y225, (Z197)	43.0 (41.4)	43.8 (40.0)	34.5 (34.3)	47.5 (45.0)	42.0 (41.5)	Recapture from 5/1/89; Ahu-O-Laka, DB = 11, VB = 11 (removed)
<u>Ahu-O-Laka</u>						
N391, Z198	38.5	38.0	30.9	41.0	36.5	Likely new recruit
N392, N393, Z199	66.2	66.0	54.1	71.0	63.5	Numerous tumors; DB = 13, VB = 2

VB = Ventral barnacles
DB = Dorsal barnacles

Tagging and measurement data for 11 green turtles hand-captured
in Kaneohe Bay on 27 July 1990

by
G. H. Balazs, J. Naughton, R. Miya, and R. Douglas
Southwest Fisheries Center Honolulu Laboratory
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Tag No.	Carapace length (cm)			Comments
	Straight	Notch	Curved	
<u>Ahu-O-Laka foraging habitat</u>				
Y80, 81 (Z200)	49.6 (44.2)	49.3 (43.7)	53.5 (47.0)	Recapture-tagged at same site 5/1/89 and 2/22/89 (1.4 yr). 1DB (1.8 CM) 3VB (2.6, 1.8, 0.3 cm). Numerous tumors. Leeches. No tumors seen 2/22/89, or 5/1/89 HGT-7
Y886, 887 Z71	55.3 (55.1)	55.0 (54.8)	59.0 (59.0)	Recapture-Tagged 6/15/90 at Mark Reef. 2DB (2.3, 0.8 cm). Numerous tumors, Photos with J. Naughton.
Y318, 19	49.1 (45.5)	49.0	52.0 (48.5)	Recapture-tagged at same site 5/17/89 (1.2 yr). 8DB, 7VB. Tumors. Barnacles in tags.
N394, Z201	54.6	54.4	58.8	Small tumor in left eye. 3DB, 2VB. S.M. in front flippers.
<u>Mark Reef Resting Habitat</u>				
N395, Z202	48.5	48.0	51.5	Numerous tumors including blind in left eye. DB6, VB10. Dislocated left hind flipper.
N396, Z203	54.0	53.8	58.0	VB1, SCA. Released at CI.
N397, Z204	48.3	48.1	51.0	DB1, SCA
N398, Z205	48.8	48.4	51.1	DB1, SCA. Small tumor in left eye.
N399, Z206	41.4	41.2	44.5	DB10, 7VB, SCA.
N400, Z207	62.7	62.5	68.5	Tumors. DB5, VB1. SCA.
N476, Z208	52.8	52.6	55.5	Numerous Tumors. Photos with J. Naughton.

Notes: 8 of the 11 turtles (73%) captured had tumors, 4 of which were severe. Turtle Z80 resighted at Mark reef.

Tagging and measurement data for 11 green turtles hand-captured in Kaneohe Bay on 27 July 1990.--Continued.

DB = Dorsal barnacles.
VB = Ventral barnacles.
SCA = Speckled coralline algae on carapace.
CI = Coconut Island.

Seawater temperature = 25.5°C Ahu-O-Laka.
26°C Mark Reef.

50 turtles tagged to date at Mark Reef since 5/18/90.

Tags N401-N475 sent to Volcanoes National Park.

Eight green turtles hand-captured and tagged in Kaneohe Bay at "Mark Reef" on August 3 and 7, 1990.

By George Balazs and Russ Miya
 Southwest Fisheries Center Honolulu Laboratory
 National Marine Fisheries Service, NOAA
 2750 Dole Street
 Honolulu, HI 96822-2396

Tag No.	Straight (cm)		Curved (cm)		Comments	
	Length	Notch Width	Length	Width		
	<u>Mark Reef, 8/3/90</u>					
N490, Z209	43.2	42.8	33.5	46.5	40.5	Numerous tumors; 1DB, 1VB; stomach sample.
N491, N492, Z210	53.3	52.9	44.6	57.5	52.5	Numerous tumors; living graft mark photos; stomach sample. Released 8/7/90 same site.
	<u>Ahu-O-Laka, 8/3/90</u>					
493, Z211	41.8	41.6	34.9	44.5	41.0	10DB, 1VB.
N494, Z212	38.0	37.5	32.5	40.5	39.0	3VB; heavy SCA.
N495, N496 Z213	61.4	61.0	46.8	66.0	57.5	Tumors; right hind flipper missing but healed; 1DB, 1VB, 74.
N497, N498 Z214	61.5	60.8	49.2	65.0	59.0	Numerous tumors; 9DB, 9VB.
	<u>Mark Reef, 8/7/90</u>					
N499, Z215	--	--	--	41.0	36.5	DB37, VB44.
N500, Z216	--	--	--	53.5	44.0	Small tumors on both eyes; SCA.

Seawater temperature: Mark Reef, 8/3/90 = 78°F; 8/7/90 = 80°F
 Ahu-O-Laka, 8/3/90 = 82°F

Five of the eight turtles captured had tumors. Three of the five with tumors were severe (advanced growth stages).

Eight green turtles hand-captured and tagged in Kaneohe Bay at "Mark Reef" on August 3 and 7, 1990.

By George Balazs and Russ Miya
 Southwest Fisheries Center Honolulu Laboratory
 National Marine Fisheries Service, NOAA
 2750 Dole Street
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Tag No.	Straight (cm)		Curved (cm)		Comments	
	Length	Notch Width	Length	Width		
<u>Mark Reef, 8/3/90</u>						
N490, Z209	43.2	42.8	33.5	46.5	40.5	Numerous tumors; LDB, 1VB; stomach sample.
N491, N492, Z210	53.3	52.9	44.6	57.5	52.5	Numerous tumors; living graft mark photos; stomach sample. Released 8/7/90 same site.
<u>Ahu-O-Laka, 8/3/90</u>						
493, Z211	41.8	41.6	34.9	44.5	41.0	10DB, 1VB.
N494, Z212	38.0	37.5	32.5	40.5	39.0	3VB; heavy SCA.
N495, N496 Z213	61.4	61.0	46.8	66.0	57.5	Tumors; right hind flipper missing but healed; LDB, 1VB, 74.
N497, N498 Z214	61.5	60.8	49.2	65.0	59.0	Numerous tumors; 9DB, 9VB.
<u>Mark Reef, 8/7/90</u>						
N499, Z215	--	--	--	41.0	36.5	DB37, VB44.
N500, Z216	--	--	--	53.5	44.0	Small tumors on both eyes; SCA.

Seawater temperature: Mark Reef, 8/3/90 = 78°F; 8/7/90 = 80°F
 Ahu-O-Laka, 8/3/90 = 82°F

Five of the eight turtles captured had tumors. Three of the five with tumors were severe (advanced growth stages).

Five green turtles hand-captured and tagged
in Kaneohe Bay on 24 August 1990

by
G. H. Balazs, Karl Bromwell, and Russ Miya
Southwest Fisheries Science Center Honolulu Laboratory
National Marine Fisheries Service
2570 Dole Street
Honolulu, HI 96822-2396

Tag no.	Straight (cm)			Curved (cm)		Comments
	Length	Notch	Width	Length	Width	
<u>Mark Reef Resting Habitat</u>						
Y844, Z45 (N501)	40.5	40.0	34.4	42.5 (43.0)	40.0	Recapture - tagged here - 5/23/90 (3 months).
Y845, Z46 (N502)	44.7	44.4	46.8	47.0 (47.5)	43.5	Recapture - tagged here 5/23/90 (3 months) photo of growth on Z46.
N503, N504, E217	38.9	38.5	32.1	41.0	38.0	2 patches of CA; likely new recruit.
<u>Ahu-O-Laka Foraging Habitat</u>						
N505, N506 Z219	48.5	48.4	37.8	52.0	45.0	27DB, 35VB, CA; suspicious 0.5 cm bump on left dorsal shoulder.
N374, N375 Z218	40.7	40.1	32.0	43.0	37.5	1VB 0.5 cm. Likely new recruit.

NOTE: DB = Dorsal Barnacles
VB = Ventral Barnacles
CA = Coralline Algae

Two of five turtles were already tagged. None of the five turtles had tumors.



University of Hawaii at Manoa

Hawaii Institute of Marine Biology
P.O. Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346
Cable Address: UNIHAW

28 June, 1990

George Balazs
National Marine Fisheries Service
2570 Dole Street
Honolulu, HI 96822-2396

Dear George:

I have looked over your description of the "Sea Turtle Tag Center of the Pacific" and believe that the text, as well as the program it supports, are commendable. If you are still open to suggestions for a name for the program, I would like to submit "Tagged Sea Turtle Monitoring Center of the Pacific". We are happy to continue to provide logistical assistance in forwarding any and all recovered tags to you.

I also want to officially reiterate our offer of turtle holding ponds to you if and when they become necessary. As Cindy mentioned, the ponds are in the process of being renovated by student help this summer and should be in very good condition should you need to use one.

Thank you for keeping us abreast of the current status of turtles in Kaneohe Bay. We are extremely concerned about their protection and the menace of the fibropapillomas. If we can be of any further assistance in your research efforts here, please do not hesitate to contact me.

Yours sincerely,

PHILIP HELFRICH
Director



ghb
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

June 25, 1990

F/SWC2:GHB

Dr. Philip Helfrich
Director
Hawaii Institute of Marine Biology
P. O. Box 1346
Kaneohe, HI 96744

Dear Dr. Helfrich:

Many thanks for the generous offer you recently conveyed to me via Cindy Hunter regarding the availability of a holding pond at Coconut Island for sick sea turtles with tumors. If the need arises, which I expect it will, we certainly want to take advantage of this opportunity. At present turtles with tumors that are found stranded ashore and still alive are housed in the limited tank space we have at our Kewalo Research Facility.

My main reason for writing to you at present is to solidify an idea that I have harbored for some time. It has occurred to me that our informal cooperative turtle tag program using the HIMB address inscribed on the tags should be "formalized" to the extent of being given a name. As mentioned in my earlier letter, the request for turtle tags from responsible persons throughout the Pacific has increased during recent years. In most cases, the number of tags asked for is relatively small (a few hundred), and the respective projects, all based outside of Hawaii, would probably not go to the trouble of purchasing the tags from the manufacturer. Supplying the tags and keeping track of resightings, has, therefore, provided a valuable service to the study of sea turtles in the Pacific region.

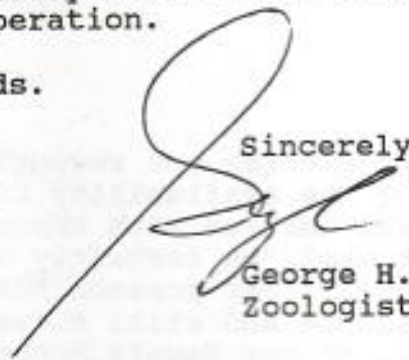
The name that I propose we use when referring to our cooperative effort is "Sea Turtle Tag Center of the Pacific." A brief description of this entity, as it has existed in an unnamed fashion for several years, has been enclosed for your consideration. I would appreciate your comments on this draft before I give it further circulation for approval at this end. Please keep in mind that there will be no need for you to make any commitment of funds or other resources. The only requirement, as in the past, is that your staff open a few letters reporting tag resightings (4-5 a year) and relay them to me at their earliest opportunity. We already have an adequate supply of tags and applicators on hand, so I foresee no problems in that regard. The small number of T-shirts needed to use as a reward for reporting a tag resighting has been made available at no cost to government.



In closing, I want to let you know that 42 turtles have thus far been hand-captured and tagged at the newly discovered site in Kaneohe Bay ("Mark Reef"). Unfortunately, 21 of these turtles were found to have fibropapillomas. We will continue to work at this location once every week or two throughout the summer using HIMB as a base of operation.

Best personal regards.

Sincerely,



George H. Balazs
Zoologist

Enclosure

DRAFT

SEA TURTLE TAG CENTER OF THE PACIFIC

June 1990

The Sea Turtle Tag Center of the Pacific is a cooperative program to make available tags, tag applicators, and technical assistance in the tagging of sea turtles for research purposes to government and other qualified organizations in the Pacific region. The program is jointly conducted by the Southwest Fisheries Center Honolulu Laboratory of the National Marine Fisheries Service, and the University of Hawaii's Hawaii Institute of Marine Biology (HIMB). The program is designed in particular to aid those locations where small to moderate numbers of tags (i.e., 100-500) are needed and local authorities or organizations might not otherwise go to the trouble of ordering them from the manufacturer.

The tags that are available for use are made of Inconel, a superior corrosion-resistant alloy composed of cadmium and nickel. The tags are self-piercing, self-locking, and simple to use when applied with a special plier-like applicator to the trailing edge of a turtle's front flippers. All tags are imprinted consecutively with a letter/number combination to permanently identify individual turtles. In addition, the following inscription appears on each tag:

Write HIMB
University
Hawaii 96744

Persons who report the resighting of a tagged turtle to this address are sent a T-shirt bearing a sea turtle logo. The resighting information that is received is relayed in a timely manner to the research organization responsible for tagging the turtle.

The distribution of tags in the Pacific region under this cooperative program has been underway for several years, but without the benefit of a formal name until the present time.

Organizations interested in receiving more information about the availability of tags from the Sea Turtle Tag Center of the Pacific should write to: G. H. Balazs, National Marine Fisheries Service, 2570 Dole Street, Honolulu, Hawaii 96822-2396 (FAX 808-942-2062).



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

June 25, 1990

F/SWC2;GHB

Dr. Tom Clarke
Hawaii Institute of Marine Biology
P.O. Box 1346
Kaneohe, HI 96744

Dear Tom,

The enclosed map of Kaneohe Bay shows the additional sites known to me where sea turtles aggregate to forage or rest. All of these sites involve green turtles, *Chelonia mydas*. However, I should point out that the hawksbill, *Eretmochelys imbricata*, is also known from Kaneohe Bay. The record I am aware of comes from a gillnet entanglement and mortality. A note that I wrote on this event in 1978 has been enclosed. The hawksbill is listed as an endangered species and there are, I believe, different provisions for its "take" under the Endangered Species Act and State of Hawaii revised statutes. You should contact Gene Nitta of our NMFS, Pacific Area Office (tel. 955-8831) for clarification.

If a turtle dies from entanglement during your research activities, there would be a definite value in our being able to necropsy the animal. However, I prefer that you first make direct contact with Gene Nitta's office, if at all possible, to ensure proper coordination within our agency. I should mention that "death" in a sea turtle is not always clear-cut, and that a "dead" turtle can often be revived if held out of the water and given special attention. I would be happy to get together with your people to brief them on what to do when attempting to resuscitate a sea turtle (see enclosed note from Herpetological Review).

Lively turtles that show no evidence of harm from forced gillnet submergence should of course be untangled and released on the spot. If a tag is present (usually on the front flipper) you should record the number and address inscription. Although I mentioned to you the possibility of supplying tags to tag any live turtles found entangled, I am going to hold off on that until I can determine what complications, if any, there may be under our State of Hawaii Scientific Collecting Permit to capture and tag sea turtles.

As of June 20, we have captured and tagged 42 green turtles at the "Mark Reef" location that I previously pinpointed for you. Unfortunately, 21 (50%) of these turtles had fibropapillomas.

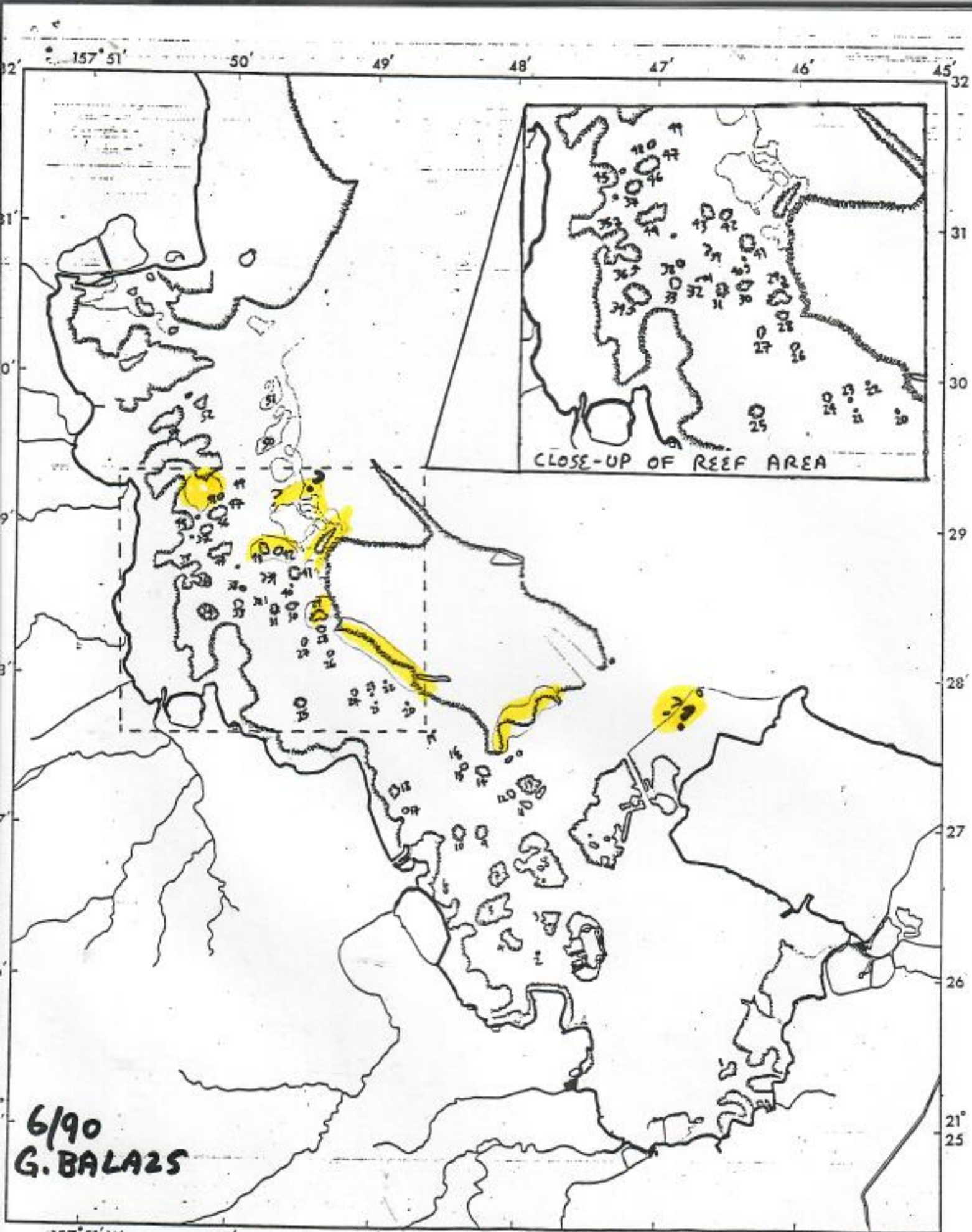


Unfortunately also is the fact that turtles with these tumors are more liable to entanglement in gillnets and fishing line, along with the physiological problems they experience from this disease.

Sincerely,

George H. Balazs
Zoologist

cc: Gene Nitta



6/90
G. BALAZS

SOME KNOWN RESTING AND FORAGING SITES IN KANEOHE BAY WHERE GREEN TURTLES AGGREGATE

L. SUDARA
SEPTEMBER 2, 1990



GHB

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

May 30, 1990 F/SWC2:GHB

Dr. E. Reese
Hawaii Institute of Marine Biology
P.O. Box 1346
Kaneohe, HI 96744

Dear Ernie,

On May 17th and 18th, and again on May 23rd, I carried out hand captures, tagging, and surveys of green sea turtles in Kaneohe Bay using HIMB as a base of operation. Activities on the first two dates were in conjunction with the student training "QUEST" project of the Marine Option Program. Since you have contacted me a number of times in past months regarding HIMB's important efforts to protect and manage the marine resources of Kaneohe Bay, I felt that you would be interested in the findings of my recent three days of work.

Reef #42 and #43 were the primary study sites on May 17 and 18. Six turtles were captured here, four of which were seriously diseased with fibropapillomas (tumors). On May 23rd efforts were focused at a location just recently pointed out to me by Mark Thomas, a boat operator for one of the commercial enterprises in Kaneohe Bay. The site, shown on the attached map, clearly harbors a dense concentration of "resting" turtles. We were able to capture and tag six turtles here on May 23rd (including one with tumors). In addition, we sighted at least 15 others (several with tumors). Many of the turtles were quite small, suggesting that the area may be especially attractive to young turtles when they first recruit to Kaneohe Bay from a pelagic existence. Whatever the circumstance of the aggregation, we will certainly be doing more work at this location during coming months.

I am also sharing this information with Tom Clarke, who recently contacted me for advice on areas to avoid in setting gill nets in Kaneohe Bay for research purposes.

Sincerely,

George H. Balazs
Zoologist

Attachment





University of Hawaii at Manoa

Marine Option Program

1000 Pope Road, Room 229 • Honolulu, Hawaii 96822

Telephone: (808) 948-8433

Telex: 7430725 SPRAD • Fax: (808) 955-6950 • Omnet: J.DAVIDSON

May 24, 1990

George Balazs
National Marine Fisheries Service
2570 Dole St.
Honolulu, HI
96822

Dear George,

Thank you for your contribution to a successful QUEST Workshop. Your presentation and field survey activity on sea turtles ranked very high in the students' evaluations of the workshop. Undoubtedly, you have inspired many of them to become turtle conservationists, and, perhaps, to assist you with future turtle tagging expeditions. *5 students already volunteered!*

Again, thanks for your efforts. It is always a pleasure to work with you.

Sincerely,

Steve Russell
Steve Russell

Dr. George Balazs
Southwest Fisheries Center
2570 Dole Street
Honolulu, HI 96822-2396

9 January 1980

Dear Dr. Balazs:

Thanks for sending me the report on sea turtles in Kaneohe Bay. The reefs you describe are 42 and 43, in fact the enclosures are ones I put out to look at the effects of butterflyfishes on reproduction and metabolism in corals.

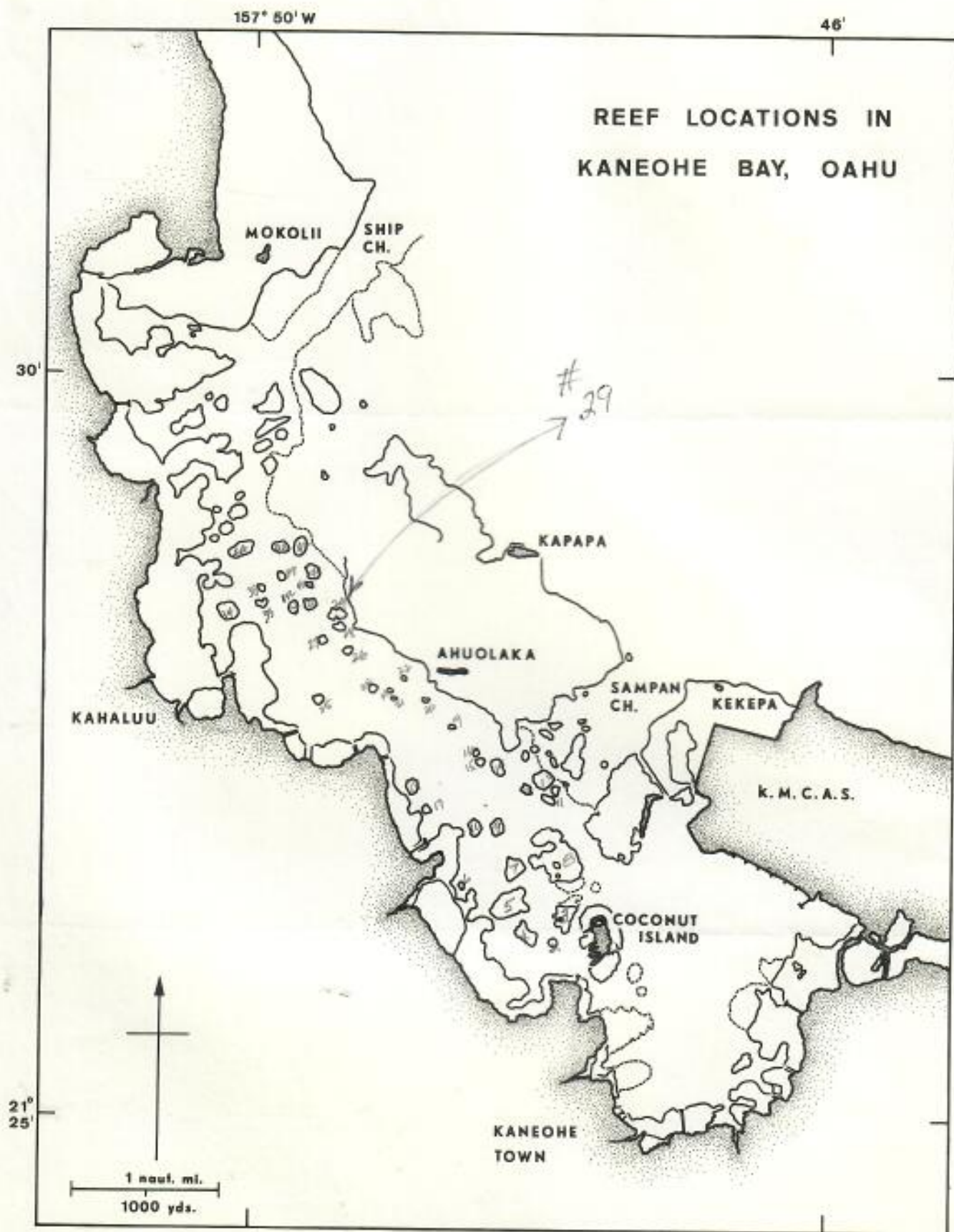
I have frequently seen turtles on Reef 42, many with tumors; but I usually see them out of the corner of my eye as I'm doing other things. They are also quite commonly encountered on the top of the reef, and they seem to have quite a few resting places smoothed out on the top of the reef. In fact one area I put out coral fragments to look at fragment survivorship became, after about two months, a turtle resting place.

I was also recently checking out reef (29) (see map), known by Ernie Reese as Reception Reef, and saw six turtles on the makai edge of the reef, again as I was doing something else, so I didn't note whether they had tags or lots of tumors. I was somewhat surprised to see so many - given that a tourist catamaran ties up on the mauka side of that reef every day. The tourist activities, however, seem to be confined to the small area when the boat anchors and the waters behind the boat where wind surfers and the like are available for use.

I'll be happy to keep a look out for the tagged turtles at reef 42.

Aloha,
Fenny Cox
H.I.M.B.

P.S. I have forgotten about sending you a slide of the C. multincinctus with tumors at Club Lanai - we've been a little slow getting slides copied.



MAP I. Reef Locations in Kaneohe Bay. K. M. C. A. S. is the Kaneohe Marine Corps Air Station; dotted line represents reef areas below 10 feet; solid reef lines represent reefs at or near surface. Adapted from U. S. C. & G. S. Chart 4134 and aerial photographs.

SEA TURTLE SIGHTING REPORT

(Please return to: George H. Balazs; Hawaii
Institute of Marine Biology; P. O. Box 1346;
Kaneohe, HI 96744; Tel. 247-6631)

Thank you for your cooperation

Observation made by R. SCOTT HENDERSON Date 3/11/81 Time 1300-1400hrs

Address & Tel. No. (optional) 254-3704 WK 261-3587 HOME Low tide
NW Vis. @ 30ft.

Location (indicate on chart) KANEOHE BAY - PATCH REEF SLOPE

Observation made from: shore;

boat; or while skin

SCUBA diving.

MOST INDIVIDUALS ABOUT 20 INCH CARAPACE LENGTH

Estimated size (shell length) ONE INDIVIDUAL ABOUT 28-30 INCH " "

Turtle seen on: surface; or at depth
of approx. Y ft. *See comments*

Distinguishing characteristics (species
I.D. if known, long tail, shell color,
tags, injuries, etc.):

*All appeared to be green sea turtles. All had
patches of large white acorn-sized barnacles
on the carapace. About 20 individuals of ~20"
size observed at 8 to 20 ft. depth on reef slope*

Other comments:

*while swimming around patch reef shown on map;
observed one larger (28-30") individual at patch reef site. "X" marks on map indicate
approx. locations of other 20" size individuals seen.*

SIGHTING INFORMATION TURTLE AND SEAL

Animal sighted (circle): Turtle Seal
Number of animals: 5 Type, if known: Green
Date: Mar. 12, 1980 Observer: E. S. Reese

Address & phone
Time: 10-12 am (optional): HMB 247-6631

Location: Reception Reef Kaneohe Bay

Observed from (circle): shore, boat (name: _____),

while skin or SCUBA diving (on surface or at 10 feet deep).

Estimated size (length): full grown

Comments: (such as color pattern; injuries; scar patterns; tumors;
whether flipper tags are present (Y/N); color and number of the tag(s);
bleach marks (number/letter); behavior; and weather)

*Fewer turtles we see seem to have the tumors than
previously. Large dead turtle on beach north
end of Bay, near Reese home at 49-035 Kaimoana Hwy*

Seals and sea turtles are protected under Federal and State law.

DO NOT DISTURB.

*George: Call me regarding above. You could send
a batch of these to us here at Coconut Island.*



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

April 16, 1990 F/SWC2:GHB

Dr. Philip Helfrich
Director
Hawaii Institute of Marine Biology
P.O. Box 1346
Kaneohe, HI 96744

Dear Dr. Helfrich:

It's that time of the year again to remind our colleagues at the University of Hawaii that the Inconel alloy sea turtle tags we use here at the National Marine Fisheries Service continue to be inscribed:

WRITE HIMB
UNIVERSITY
HAWAII 96744

As you know, there are both historical and practical reasons for using this simple return address. Over the years, dating back to 1977, it has repeatedly proven to be a successful "non-governmental" inscription that is easily understood, and apparently foolproof for postal delivery at the Kaneohe Post Office.

A recent tag order we have made for several thousand more tags, including ones made of blue and brown plastic, will eventually be distributed to workers in several Pacific island nations. In addition, observers on foreign driftnet vessels may soon be using these tags on sea turtles capture alive and released on the high seas. There is good potential for exciting new information on sea turtle life history to result from this work.

In closing, I want to take this opportunity to also thank you for allowing me the periodic use of HIMB's Boston Whalers for our work on turtles in Kaneohe Bay.

Best personal regards.


Sincerely,

George H. Balazs
Zoologist



Date: August 14, 1989

To: George Balazs
NMFS

From: **Philip Helfrich** 
Director
Hawaii Institute of Marine Biology

I am responding to your request of 14 August for limited use of our boats to observe turtles within Kaneohe Bay. We will be happy to support your program in this way. We will ask that you share information on the distribution and abundance of turtles with Paul Jokiel who is coordinating our Kaneohe Bay data base.

Please check with Bob Ferguson on the boat use, and follow the established procedures for check-out and operation. Call me if you have any questions.

cc: Bob Ferguson
Paul Jokiel
George Losey



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

August 14, 1989 F/SWC2:GHB

Dr. Philip Helfrich, Director
Hawaii Institute of Marine Biology
P.O. Box 1346
Kaneohe, HI 96744

Dear Dr. Helfrich:

I appreciated having the opportunity to talk with you last Friday to re-establish our professional and personal ties. It's hard to believe that over seven years have now passed since I left Coconut Island to work here at NOAA Fisheries. The research and administrative experiences I acquired working for you throughout the 1970's continue to form the solid foundation of my day-to-day professional life. I know I've said it before, but again - "thank you."

A recent meeting I had with Dr. Ernie Reese certainly confirms our mutual interest and concerns for green turtles and their essential habitats in Kaneohe Bay. My research efforts in the bay, which were initiated this past February, are aimed at mapping high-density foraging and resting areas, and determining present scope and magnitude of the tumor disease. In addition, I have been trying to regularly sample the small gastropod, Smaragdia bryanae, for analysis as an intermediate host in a contracted parasite study of green turtles we have undertaken. A parasite etiology has been suggested for the tumors, and we are following-up on that hypothesis as best possible. Smaragdia bryanae occurs in abundance on the Halophila which, in turn, is one of several preferred forage items for green turtles in Kaneohe Bay.

As I described during our phone conversation, our ability to efficiently collect these snails would be greatly enhanced if we could use one of HIMB's Boston Whalers for a couple hours, once every week or two. I appreciated hearing your initial positive response to this idea. I look forward to hearing confirmation from you. I will, of course, be able to supply the necessary gasoline and outboard motor oil needed for this boat use.

Again, it was good to talk to you and I hope we can do so more often.

Sincerely,

George H. Balazs
Zoologist

cc: G. W. Boehlert



Opinion

Proposed new ocean rules are step in right direction

It is good that the state is moving on revisions to the Kaneohe Bay provisions in the Ocean Recreation Management Plan, which was drafted originally under great pressure to do something to curtail thrill craft operations. It is also good to note that enforcement of the rules has begun, despite a lack of personnel and support equipment.

The revisions include moving jet ski and other commercial operators away from the sandbar and central reef area in the bay, the banning of all commercial jet ski operations on weekends and the banning of boats from dropping anchor on the reef.

Equally important, commercial operators would be allowed to operate in an area of roughly the same amount of space as is now used, but in a different location. Commercial diving and snorkeling would be allowed between the sandbar and Chinaman's Hat, but would be closely monitored.

One of the weak spots in the rule revision is the matter of patrolling the bay to monitor operations and enforce the new rules. While the state Legislature has appropriated funds to hire 17 marine patrol officers and to buy new vessels, it has been difficult to find qualified people to fill the jobs.

Most recreational users of the bay will welcome the weekend ban on thrill craft and the moving of jet ski and other commercial operators away from the sandbar, which so many people use for sunning and peaceful water pursuits.

The state is to be commended for working with all segments, including the commercial operators, to bring an equitable solution to the uses of Kaneohe Bay. The bay is a resource that should be protected, but also needs to be opened as wide as possible to recreational use. The state is moving in this direction.

New state rules would protect reef

By JANINE TULLY
Staff Writer

KANEHOHE
The state Department of Transportation is planning to move jet ski and other commercial operators away from the sandbar and central reef area of Kaneohe Bay and closer to Sampan Channel in a proposed revision of the Ocean Recreation Management Plan.

David Parsons, the state boating manager for the DOT, said the new version of the ocean plan also would ban commercial jet ski operations from Kaneohe Bay on weekends.

Parsons said the changes were prompted partly by suggestions from National Marine Fisheries Service and Hawaii Institute of Marine Biology scientists, who argued that the central reef area currently being used by the commercial operators

should be protected for research and observation of marine life.

The scientists also offered the DOT data showing that one area being used by the commercial water sports operators is a foraging ground for green sea turtles, which are protected under the federal Endangered Species Act, Parsons said.

The large operators, which frequently offer windsurfing, jet ski rides and other activities to the people who accompany them into the bay, would be given roughly the same amount of space as they now have to operate, Parsons said. But he added that the commercial zone will be shaped to keep operations out of well-traveled routes through the bay.

"We're just trying to make room for everybody," Parsons said.

The DOT's proposed revisions to the plan would still allow commer-

cial diving and snorkeling operations between the sandbar and Chinaman's Hat, but Parsons said those activities would be closely monitored to ensure the divers do not damage the reef.

The revised rules also would ban boats from dropping anchor on the reef, and prohibit divers from crawling on the reef.

Gene Nitta, a biologist for the National Marine Fisheries Service, said the new version of the plan answers the scientists' concerns about the turtle habitat. Ernest Reese, a zoologist with the University of Hawaii, also praised the revisions in the plan, although he said he and other scientists with the Hawaii Institute of Marine Biology at Coconut Island have recommended some additional changes.

"What they've done is really good," Reese said. "They've tried to pre-

serve the central reef by moving the commercial operations farther south."

The plan divides the central reef into a recreational area, which is to the northeast near the sandbar, and a coral reef research area. Commercial operations would be banned from the recreational area, although operators of snorkeling and diving operations would be allowed in the research area.

But Reese said the scientists recently pointed out that if commercial operators are in the area feeding the fish, that will undermine the research value of the area. As an alternative, the scientists proposed adjusting the boundaries of the recreational area to include some of the reefs in the north central part of the bay, but the DOT has not yet responded to the idea, he said.

See MARINE on A-8

Aug 3-9, 89 Windward Sun Press A-1

Aug 3-9, 89 Windward Sun Press

Lecture explains bay's intricacies

By **MARK DOYLE**
Staff Writer

KANEOHE

Dr. Richard Titgen stood poised with a small microphone around his neck and a thin wooden pointer in his hand while he introduced the subject of his lecture to some 40 or 50 Windward residents last week at He'eia State Park's Visitor's Center Hall.

"Everything that happens on land affects the bay," he said as his colleague flicked on the first slide showing an aerial shot of Kaneohe Bay.

Titgen, a researcher with the Hawaii Institute of Marine Biology, then proceeded with his lecture. It was the second of a series of free lectures called "Where the Land Meets the Sea," sponsored by The Friends of He'eia and Windward Community College.

After describing some of the bay's general characteristics with the aid of additional slides, Titgen explained the various occurrences that have had direct and indirect impacts on the bay over the last 30 years.

First he addressed natural impacts like low tides and influxes of fresh water.

"Mobile marine life, like fish, can usually just move out toward the sea with the tide," he said. "But stationary marine life, like coral and many other living organisms, can't do that.

"It's not so bad when it's night and it's cooler. But in the daylight, the heat can really take a toll."

Titgen then explained how fresh water from heavy rains and flooding can enter the bay water and pollute it with mud



Richard Titgen

and other foreign substances, disrupting the natural marine ecosystem and killing the coral. After a major "killoff," he said, a lot of algae usually starts growing, bringing additional changes and problems.

He described a few of the major impacts on the bay that have been man-made, such as the clearing of land between the Koolaus and the shoreline for agricultural needs.

Agricultural clearing dates as far back as the late 1800s and has increased the opportunity for sedimentation to flow down from the mountains and settle in the bay. The urbanization over the last 30 years around Kaneohe also has added to the problem, he said, explaining that the clearing of vegetation around the bay has removed a natural barrier that used to trap much of the sediment before it reached the water.

"A good rain will also carry all kinds of trash from the land to the bay," he added.

He went on to describe the impacts that dredging and the dumping of sewage have had on the bay.

"There's not much need right now for dredging. Most of it was done some time ago. The majority of the dredging in Kaneohe Bay took place between 1939 and 1945, when an estimated 15 million cubic yards of dredged material was removed."

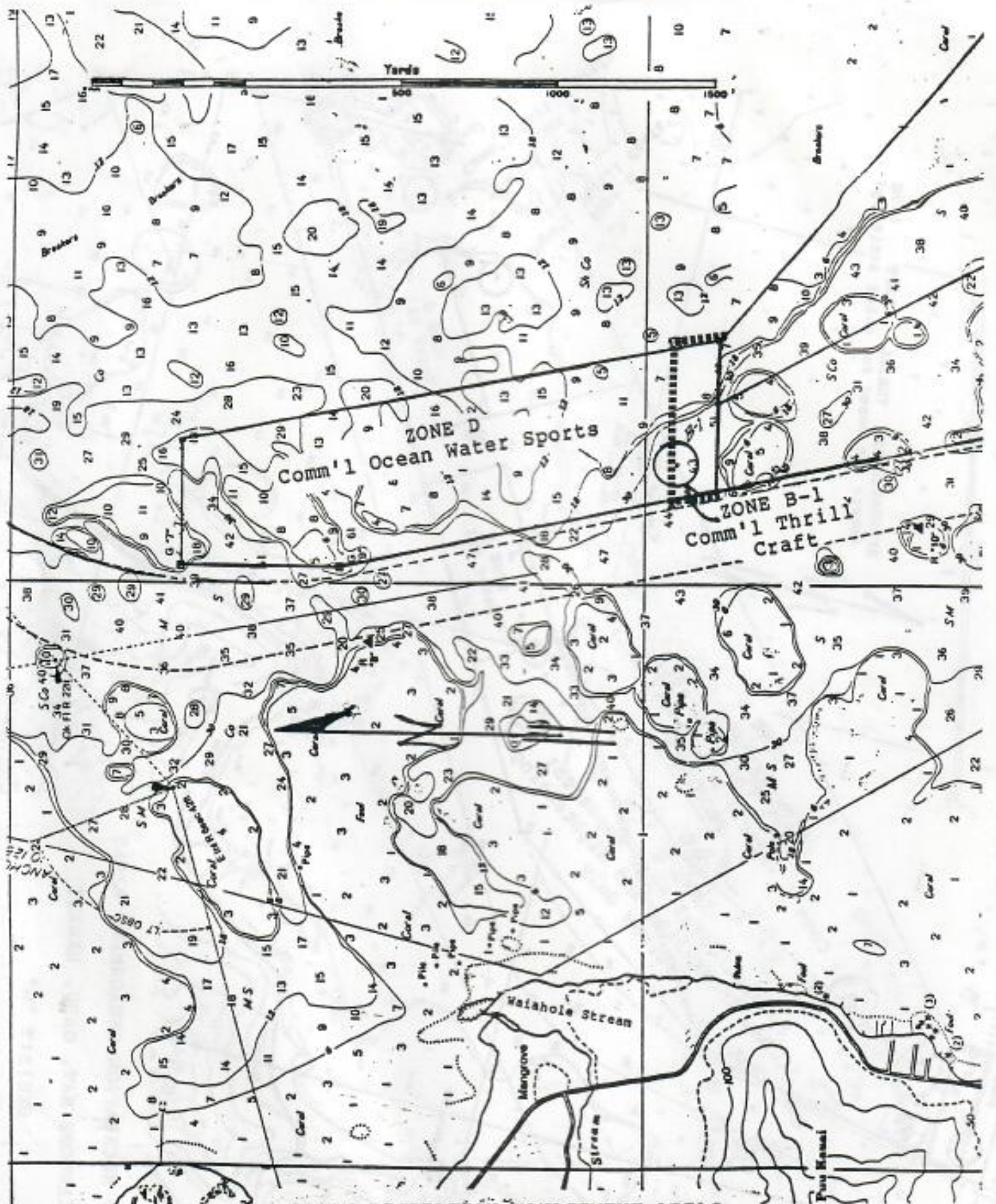
He said there has been speculation that instead of dumping the dredged material in open water, as directed, the responsible parties dumped the displaced material in the deeper parts of the bay, which some believe has contributed to making the bay 5.4 feet shallower than it was in 1927.

Titgen then addressed the impact of sewage. He said that up until 1978, unregulated raw sewage had been dumped regularly in the southern part of the bay, causing severe contamination that cut off vital nutrients from the coral and other plant life.

"As soon as the sewage was diverted to open ocean, the bay started clearing up — almost immediately," he said.

Explaining that the recovery of Kaneohe Bay is going "quite well," and that the bay is in

"pretty good shape," Titgen said the newest man-made threat to the area's marine life is the proliferation of commercial and recreational activities. "Commercial vessels, yachts, fishing boats, jet skis and private boats — there's a lot of activity in the bay right now," he said. "At the moment we don't have any real enforcement of regulations. We need to think about some kind of authority."



OCEAN RECREATION MANAGEMENT AREAS

KANEOHE BAY, OAHU, HAWAII

EXHIBIT "V"

JUNE 9, 1989

JOHN WAIHEE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION

79 90, NIMITZ HWY. • HONOLULU, HAWAII 96813

April 20, 1989

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI
JEANNE K. SCHULTZ

IN REPLY REFER TO:

HAR-BA 3771

Mr. Eugene Nitta
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Nitta:

Enclosed is a letter from Dr. Philip Helfrich regarding the areas defined in Kaneohe Bay for commercial and recreational uses and the objections to those uses.

If you have any other information about the areas discussed, it would be greatly appreciated if that information could be sent to us.

Very truly yours,

D. E. PARSONS
State Boating Manager

Enclosure



University of Hawaii at Manoa

Hawaii Institute of Marine Biology

P.O.Box 1346 • Coconut Island • Kaneohe, Hawaii 96744-1346

Cable Address: UNIHAW

23 March 1989

To Whom It May Concern:

Field researchers working at the Hawaii Institute of Marine Biology have been studying Kaneohe Bay for over 40 years, using many of the patch reefs as study sites. The attached map shows currently used study sites in Kaneohe Bay. There are 86 sites within the Bay plus 8 offshore. The areas designated as "Commercial Ocean Water Sports Zones" are also included. These areas include "Commercial Thrill Craft Zones" and "Water Ski Zones". There are numerous collecting sites throughout the Bay (not shown for clarity), many included within the commercial zones. Thirteen regularly used study sites are located within these zones, accounting for 15% of our Bay study sites.

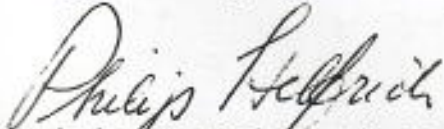
The designated "Recreational Thrill Craft Zone" encompasses virtually all of Kaneohe Bay between the ship channel on the north and west and Sampan Channel on the south. Recreational thrill craft are excluded only from the Sandbar area (Ahuolaka) and the commercial zones. Thirty-five (40%) of all HIMB study sites and 48% of coral reef study sites, are within these commercial and recreational zones.

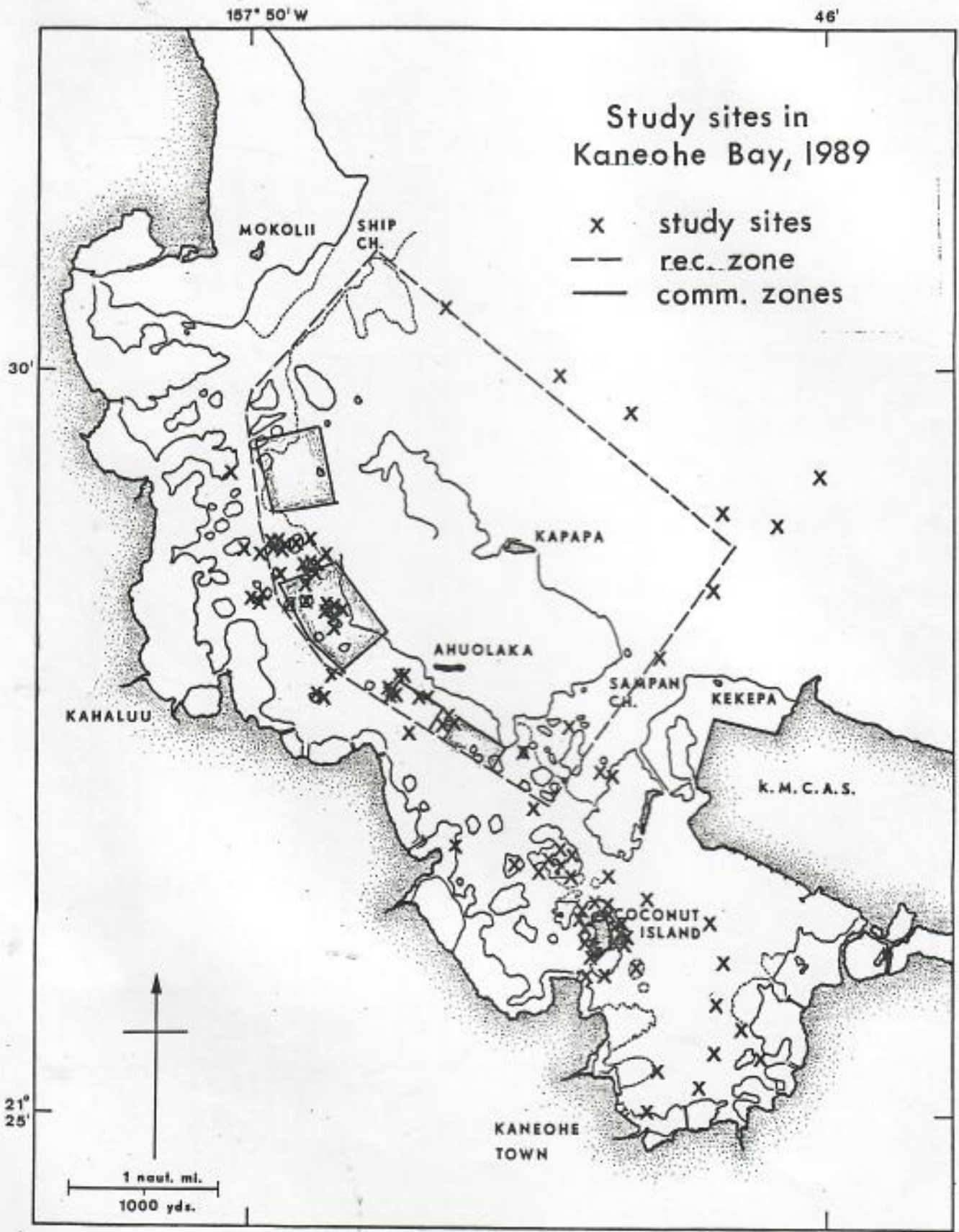
Furthermore, the zoned areas delineated above enclose the majority of thriving coral reefs in Kaneohe Bay. The abundance and diversity of corals, fishes and other reef associated plants and animals are the greatest in this area. Habitats such as the sub- and inter-tidal area around Kapapa Island and the sand flats between the sandbar and Kapapa Island are among the most unique and accessible areas within Kaneohe Bay. Researchers and students, as well as the general public, are attracted to this area because its natural beauty and richness. In zoning the large area for commercial and recreational use of thrill craft, the safety and enjoyment of all users have been jeopardized.

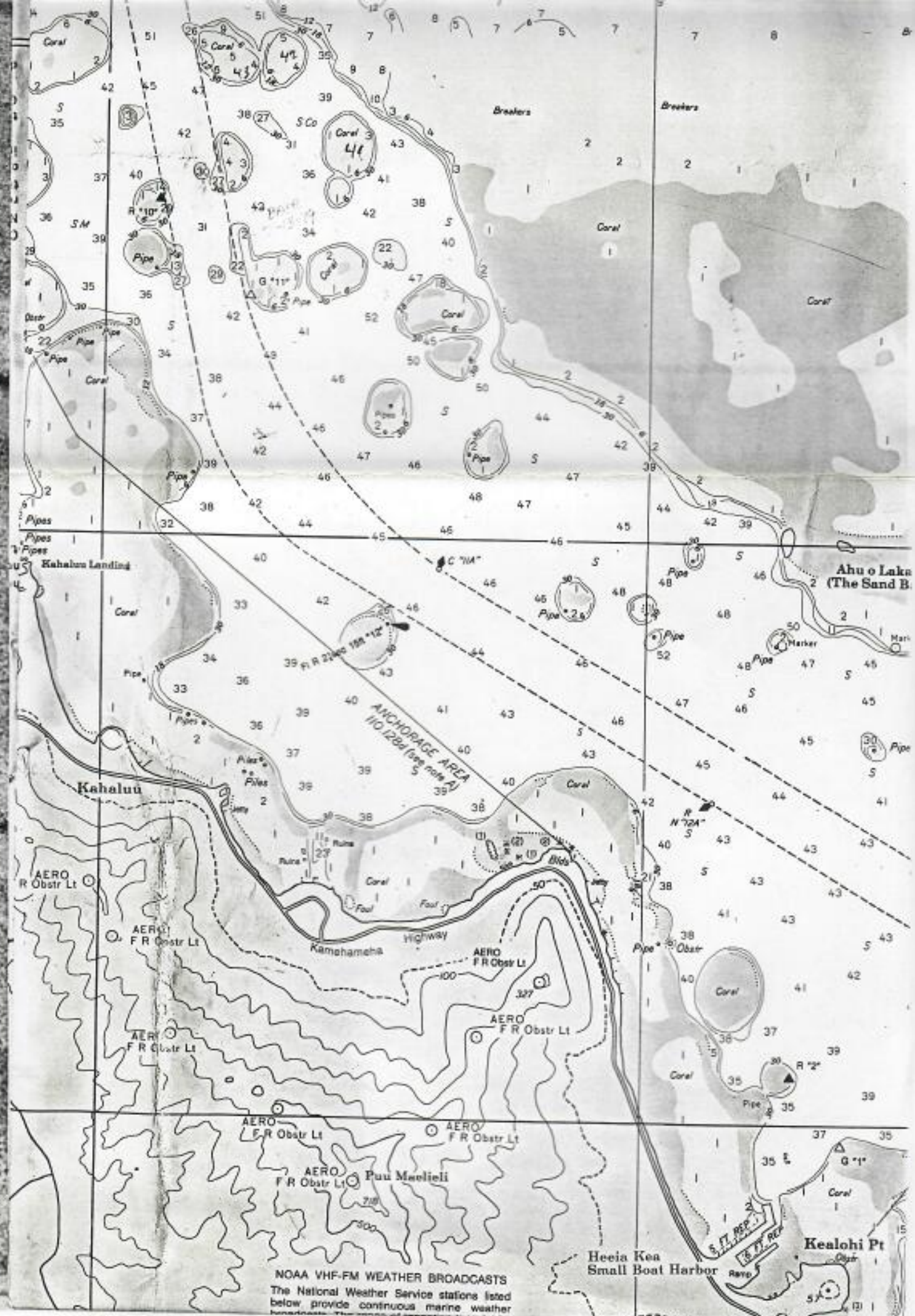
In addition, this entire area is a feeding ground for the green sea turtle. This animal rises to the surface to breath, and it is vulnerable to being hit by rapidly moving surface craft.

This statement is supplemental to the substantial body of information already submitted that points to a serious detrimental impact that recreational thrill craft have on safety and general welfare of university researchers and many of the marine organisms they are studying.

Respectfully submitted,


Philip Helfrich, Ph.D,
Director





NOAA VHF-FM WEATHER BROADCASTS
 The National Weather Service stations listed below provide continuous marine weather

Heeia Kea
 Small Boat Harbor

Kealahi Pt

Kahaluu

AERO
 R Obstr Lt

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 F R Obstr Lt

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Summary of Hawaiian green turtles captured, tagged, and biopsied during the cooperative fibropapilloma project with Elliott Jacobson, 26 April to 2 May 1989 (* = number etched in carapace, C = barnacles on carapace, P = barnacles on plastron, H = barnacles on head).

Compiled by George H. Balazs and Barry K. Choy
 Southwest Fisheries Center Honolulu Laboratory
 National Marine Fisheries Service, NOAA

Capture date	Tag No.	Straight carapace			Curved carapace			Plastron	Head	RFF	Tail sample No.	E. J. tumor	Location and comments
		Length	Notch	Width	Length	Width	Length						
24/5/89	Y-212 Y-213	80.4	79.5	67.5	85.0	82.0	--	--	13.2	--	HGT-2	Kunia. Held at Kewalo. Photos. Adult female. (Released Kaneohe 5/1/89).	
26/89 (Wednesday)	Y-164* Y-165	73.1	72.5	56.3	78.5	72.0	--	11.0	--	--	HGT-1	Twin Reef. Photos. C-20, P-4.	
27/89 (Thursday)	Y-170* Y-171	48.0	--	37.1	52.0	45.0	40.2	7.6	8.9	6.9	--	Twin Reef. 11th MS left missing.	
27/89	Y-166* Y-167 Y-168 Y-169LH	86.5	--	--	91.0	--	68.2	12.1	14.7	35.4	--	Twin Reef. Adult male.	
28/89 (Friday)	Y-172* Y-173	42.9	42.3	34.4	45.5	41.0	34.4	7.1	7.0	8.5	--	Ahu-o-laka. C-27, H-4, P-86.	
28/89	Y-174* Y-175RH Y-207 Y-208	73.2	--	57.4	78.5	74.0	59.9	10.6	11.3	15.5	--	Twin Reef.	
28-89	Y-209 Y-210 Y-211*	70.6	--	58.3	74.5	69.5	56.6	10.3	11.7	17.0	HGT-3	Twin Reef. Photos 5/1.	

Tagging and measurement data for nine green turtles hand-captured at "Mark Reef", Kaneohe Bay, Oahu, June 1, 1990.

by
G. H. Balazs, R. Miya, C. Dold, and R. Douglas
National Marine Fisheries Service Honolulu Laboratory
2570 Dole Street
Honolulu, HI 96822-2396

Tag no.	Straight (cm)		Curved (cm)		Comments
	Length	Notch	Length	Width	
Y848, Z50	38.4	37.8	40.5	39.0	Likely new recruit (SCA).
Y849, Z51	40.1	39.9	42.0	39.0	Two deep 1 cm punctures in 1st central. DB = 3, VB = 9.
Y850, Z52	41.6	41.2	44.0	40.5	Likely new recruit (SCA).
Y851, Z53	46.8	46.4	49.5	45.5	Tumor below right eye.
Y852, Z54	37.4	37.0	39.5	45.5	Likely new recruit (SCA).
Y853, Z55	36.6	36.4	38.5	35.5	Likely new recruit (SCA).
Y854, Z56	45.3	45.0	48.0	43.5	Tumors on jaw, shoulder, and hind flipper. VB = 3.
Y855, 56; Z57	56.2	55.8	60.0	53.0	Tumors on both eyes and front flippers. Dense skin barnacles. VB = 7.
Y857, 58; Z58	59.6	59.6	63.5	59.0	Tumors on both eyes, front flippers, cloaca, and neck. DB = 5, VB = 2.

NOTE: SCA = Speckled Coralline Algae on carapace.

DB = Dorsal Barnacles (all removed).

VB = Ventral Barnacles (all removed).

4 of 9 turtles captured (44%) had tumors. 23 other turtles sighted ^{during} 1.5 hours of search and capture efforts on 6/1/90. 16 turtles tagged to date at "Mark Reef".

Summary of green turtles tagged and resighted in
Kanehoe Bay, Island of Oahu

by

George H. Balazs

Southwest Fisheries Center Honolulu Laboratory

National Marine Fisheries Service, NOAA

2570 Dole Street

Honolulu, HI 96822-2396

Study dates	Study site	Total no. captured (no. w/tumors)	No. newly tagged	No. tag resightings	Total no. tagged in population to date
7/78 - 3/81	TR	5 (0)	5	0	5
2/15/89	TR	3 (2)	3	0	8
2/22/89	TR	2 (2)	2	0	10
2/22/89	AOL	9 (3)	9	0	19
3/31/89	KRF	1 (1)	1	0	20
4/26/89	TR	1 (1)	1	0	21
4/27-28/89	TR	5 (2)	5	0	26
4/28/89	AOL	1 (0)	1	0	27
4/30/89	TR	2 (2)	2	0	29
5/1/89	TR	2 (1)	1	1 (2/15/89)*	30
5/1/89	AOL	2 (1)	1	1 (2/22/89)*	31
5/16/89	TR	2 ^a (1)	1	1 (4/27/89)	32
5/17/89	AOL	8 (4)	8	0	40
6/6/89	TR	2 (1)	2	0	42
6/6/89	AOL	5 (2)	3	2 (2/22/89) (5/1/89)*	45
6/30/89	AOL	3 (2)	3	0	48
6/30/89	TR	1 (1)	1	0	49
8/28/89	AOL	1 (1)	1	0	50
12/29/89	DR	6 (6)	6	0	56
5/17-18/90	DR	5 (4)	5	0	61
5/18/90	AOL	1 (0)	1	0	62
5/18/90	MR	1 (0)	1	0	63
5/23/90	MR	6 (1)	6	0	69
5/23/90	AOL	2 (1)	1	1 (4/28/89)	70

Study dates	Study site	Total no. captured (no. w/tumors)	No. newly tagged	No. tag resightings	Total no. tagged in population to date
6/1/90	MR	9 (4)	9	0	79
6/15/90	MR	22 ^b (14)	22	0	101
6/20/90	MR	4 (2)	4	0	105
7/20/90	MR	1 (0)	0	1 (5/1/89 AOL)	105
7/20/90	AOL	2 (1)	1	0	106
7/27/90	MR	7 (4)	4	0	110
7/27/90	AOL	4 (4)	1	3 (2/22/89) ^f (6/15/90 MR) ^e (5/17/89) ^e	111
8/3/90	MR	2 (2)	2	0	113
8/3/90	AOL	4 ^c (2)	4	0	117
8/7/90	MR	2 (1)	2	0	119
8/18/90	-	1 ^d (1)	0	(12/29/89) ^e	119
8/24/90	MR	3 (0)	1	2 (5/23/90)	120
8/24/90	AOL	2 (0)	0		122
9/5/90	AOL	2 (2)	0	2 (5/17/89) ^e (7/27/90MR) ^e	122
9/5/90	MR	2 (0)	2	0	124

^aIncludes resighting of a turtle tagged in Waimanalo Bay, 4/11/80. No tumors when originally tagged.

^bIncludes resighting of a turtle tagged off Waikiki, 3/84. No tumors when originally tagged.

^cIncludes resighting of a graft-marked turtle with tumors.

^dRecovery of stranded and dead turtle Y269-70. No measurable growth since first tagged on 12/29/89 (8 months earlier). Numerous tumors when originally tagged and when stranded.

^eTumors already present when originally tagged.

^fTumors present on 7/27/90, but not when originally tagged 2/22/89. Also recaptured 5/1/89, at which time HGT-7 biopsy taken.

TR = Twin Reef (resting habitat)

AOL = Ahu-O-Laka (foraging habitat)

KRF = Kipapa Reef Flat

DR = Deef Reefs (resting habitat)

MR = Mark Reef (resting habitat)

68 of the 124 turtles (54.8%) tagged found to have tumors.

SUMTUR-6.GHB

From: George Balazs:Honolulu:NMFS

To:

Subj: [No Subject]

Four green turtles hand-captured and tagged in Kaneohe Bay on 9/5/90
by
G. H. Balazs, Karl Bromwell and Bob Cummins

Tag no.	Straight length	width	Curved length	width	Comments

AHU-D-LAKA FORAGING HABITAT Y313, Y314 (Z220)	60.9 (59.8)	48.9	64.0 (64.0)	60.5	Recapture-tagged here 5/17/89 (1yr, 4mo); Engraved number evident with regrowth. Numerous tumors still present. photos.
N400, Z207 (N507)	63.1 (62.7)	49.7	69.0 (68.5)	63.0	Recapture-tagged at Mark Reef 7/27/90. Tumors.
MARK REEF RESTING HABITAT					
Y882, Z68	40.6 (40.0)	31.4	43.0 (43.0)	37.5	Recapture-tagged here 6/15/90 (2.5mo ago.). SCA; no sign of tumors in eye.
N508, N509 (Z221)	51.8	43.1	56.0	51.5	SCA; 1DB, 3VB; released at Coconut Island.

Note: Three of the four turtles were already tagged. Two of the four turtles had tumors.

Summary of green turtles, *Chelonia mydas*, tagged
and resighted in the Kaneohe Bay (southern sector), Oahu, 1989-91.

compiled by
George H. Balazs
Honolulu Laboratory
Southwest Fisheries Science Center
2570 Dole Street
Honolulu, HI 96822-2396

study dates	Total no. captured	No. newly tagged	No. tag resightings	Total no. tagged to date	Peterson population index estimate*
2/22/89 (AOL)	9	9	0	9	-
4/28/89 (AOL)	1	1	0	10	-
5/1/89 (AOL)	2	1	1	11	20
5/17/89 (AOL)	8	8	0	19	-
6/6/89 (AOL)	5	3	2	22	48
6/30/89 (AOL)	3	3	0	25	-
8/28/89 (AOL)	1	1	0	26	-
5/18/90 (AOL)	1	1	0	27	-
5/18/90 (MR)	1	1	0	28	-
5/23/90 (MR)	6	6	0	34	-
5/23/90 (AOL)	2	1	1	35	68
6/1/90 (MR)	9	9	0	44	-
6/15/90 (MR)	22	22	0	66	-
6/20/90 (MR)	4	4	0	70	-
7/20/90 (MR)	1	0	1	70	70
7/20/90 (AOL)	2	1	1	71	140

study dates	Total no. captured	No. newly tagged	No. tag resightings	Total no. tagged to date	Peterson population index estimate*
7/27/90 (MR)	7	4	3	75	166
7/27/90 (AOL)	4	1	3	76	100
8/3/90 (MR)	2	2	0	78	-
8/3/90 (AOL)	4	4	0	82	-
8/7/90 (MR)	2	2	0	84	-
8/24/90 (MR)	3	1	2	85	126
8/24/90 (AOL)	2	2	0	87	-
9/5/90 (AOL)	2	0	2	87	87
9/5/90 (MR)	2	2	0	89	-
10/5/90 (MR)	3	1	2	90	134
10/5/90 (AOL)	2	2	0	92	-
12/7/90 (AOL)	2	2	0	94	-
12/7/90 (MR)	5	4	1	95	470
1/2/91 (MR)	23	17	6	112	364
1/31/91 (MR)	7	4	3	116	261
2/28/91 (MR)	6	4	2	120	348
4/1/91 (MR)	6	3	3	123	240
4/29/91 (MR)	3	3	0	126	-
4/29/91 (AOL)	5	5	0	131	-

*No. tagged turtles resighted / Total No. turtles tagged = Total No. turtles captured / Total No. turtles in resident population (X)

Summary of green turtles tagged and resighted in
Kanehoe Bay, Island of Oahu
by
George H. Balazs
Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
2570 Dole Street
Honolulu, HI 96822-2396

Study dates	Study site	Total no. captured (no. w/tumors)	No. newly tagged	No. tag resightings	Total no. tagged in population to date
7/78-3/81	TR	5 (0)	5	0	5
2/15/89	TR	3 (2)	3	0	8
2/22/89	TR	2 (2)	2	0	10
2/22/89	AOL	9 (3)	9	0	19
3/31/89	KRF	1 (1)	1	0	20
4/26/89	TR	1 (1)	1	0	21
4/27-28/89	TR	5 (2)	5	0	26
4/28/89	AOL	1 (0)	1	0	27
4/30/89	TR	2 (2)	2	0	29
5/1/89	TR	2 (1)	1	1 (2/15/89)*	30
5/1/89	AOL	2 (1)	1	1 (2/22/89)*	31
5/16/89	TR	2 ^a (1)	1	1 (4/27/89)	32
5/17/89	AOL	8 (4)	8	0	40
6/6/89	TR	2 (1)	2	0	42
6/6/89	AOL	5 (2)	3	2 (2/22/89) (5/1/89)*	45
6/30/89	AOL	3 (2)	3	0	48
6/30/89	TR	1 (1)	1	0	49
8/28/89	AOL	1 (1)	1	0	50

Continued.--Summary of green turtles tagged and resighted in Kaneohe Bay.

Study dates	Study site	Total no. captured (no. w/tumors)		No. newly tagged	No. tag resightings	Total no. tagged in population to date
12/29/89	DR	6	(6)	6	0	56
5/17-18/90	DR	5	(4)	5	0	61
5/18/90	AOL	1	(0)	1	0	62
5/18/90	MR	1	(0)	1	0	63
5/23/90	MR	6	(1)	6	0	69
5/23/90	AOL	2	(1)	1 (4/28/89)	1	70
6/1/90	MR	9	(4)	9	0	79
6/15/90	MR	22 ^b	(14)	22	0	101
6/20/90	MR	4	(2)	4	0	105
7/20/90	MR	1	(0)	0	1 (5/1/89 AOL)	105
7/20/90	AOL	2	(1)	1	1	106
7/27/90	MR	7	(4)	4	3	110
7/27/90	AOL	4	(4)	1	3 (2/22/89) ^f (6/15/90 MR) ^g (5/17/89) ^h	111
8/3/90	MR	2	(2)	2	0	113
8/3/90	AOL	4 ^c	(2)	4	0	117
8/7/90	MR	2	(1)	2	0	119
8/18/90	KBAY	1 ^d	(1)	0	1 (12/29/89 DR) ^e	119
8/24/90	MR	3	(0)	1	2 (5/23/90)	120
8/24/90	AOL	2	(0)	2	0	122

Continued.--Summary of green turtles tagged and resighted in Kaneohe Bay.

Study dates	Study site	Total no. captured (no. w/tumors)		No. newly tagged	No. tag resightings	Total no. tagged in population to date
9/5/90	AOL	2	(2)	0	2 (5/17/89)* (7/27/90 MR)*	122
9/5/90	MR	2	(0)	2	0	124
10/5/90	MR	3	(1)	1	2 (5/23/90) (6/15/90)	125
10/5/90	AOL	2	(1)	2	0	127
10/5/90	DR	2	(1)	2	0	129
12/3/90	KBAY	1 ^b	(1)	0	1 (10/5/90 DR)*	129
12/7/90	AOL	2	(1)	2	0	131
12/7/90	MR	5	(4)	4	1 (7/27/90 and 9/5/90)	135
12/18/90	KBAY	1 ^b	(1)	0	1 (5/17/89 AOL)*	135
1/2/91	MR	23	(11)	17	6 (6/15/90) (6/20/90) (6/15/90) ¹ (6/1/90) (6/20/90)* (6/15/90)	152
1/31/91	MR	7	(5)	4	3 5/23/90* 6/15/90* 6/15/90*	156

*Includes resighting of a turtle tagged in Waimanalo Bay, 4/11/80. No tumors when originally tagged.

^bIncludes resighting of a turtle tagged off Waikiki, 3/84. No tumors when originally tagged.

^cIncludes resighting of a 53.3 cm graft-marked turtle with tumors originally marked as a hatchling at French Frigate Shoals 8/82 (8 years earlier).

^aRecovery of stranded and dead turtle Y269-70. No measurable growth since first tagged on 12/29/89 (8 months earlier). Numerous tumors when originally tagged and when stranded.

^aTumors already present when originally tagged.

^bTumors present on 7/27/90, but not when originally tagged 2/22/89. Also recaptured 5/1/89, at which time HGT-7 biopsy taken.

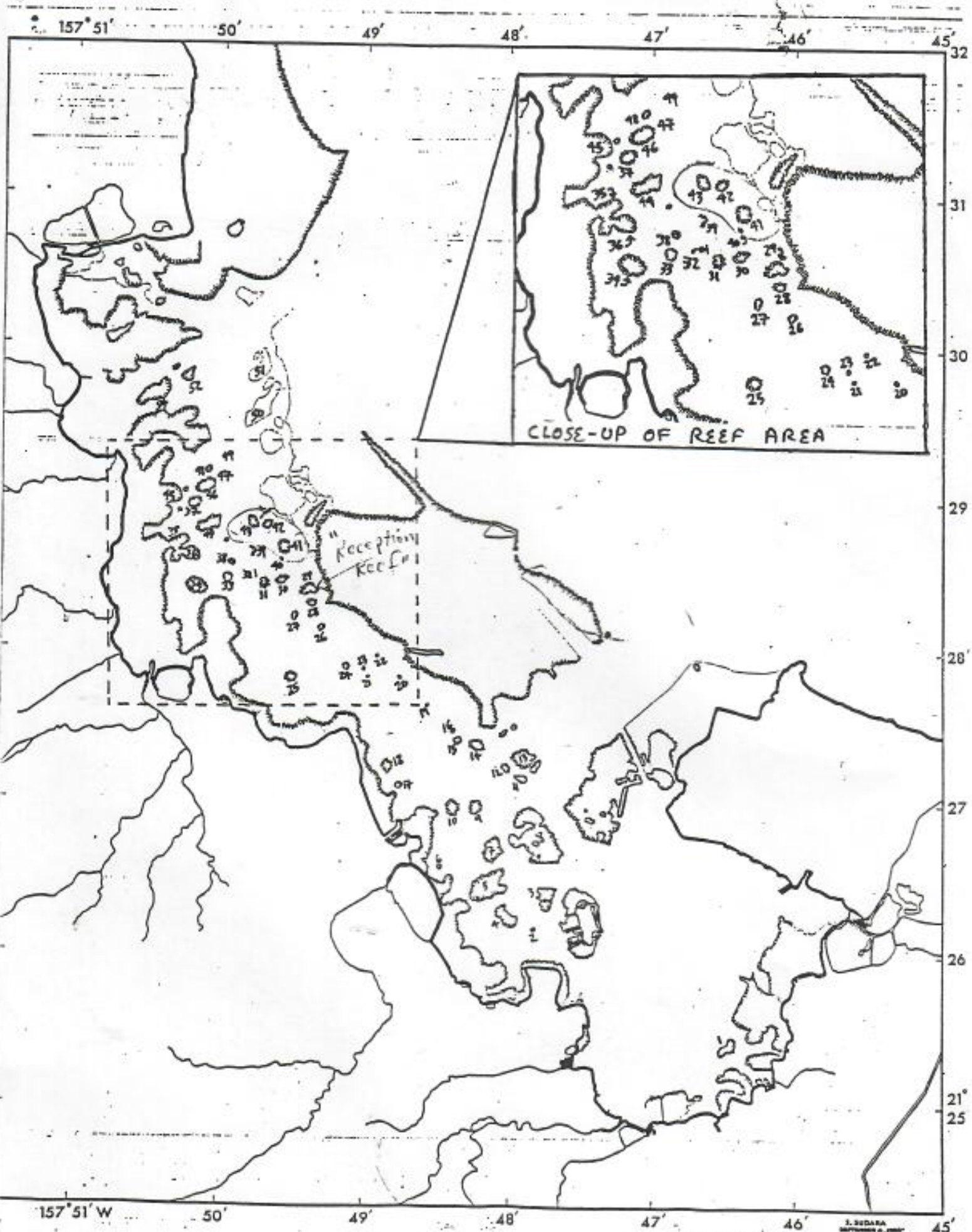
^aRecovery of stranded dead and decomposing turtle N515-16, Z224. Numerous tumors when originally tagged (2 months earlier) and when stranded.

^bRecovery of stranded and dead turtle Y313-14, Z220. Straight carapace length 59.8 cm when tagged on 5/17/89 at AOL; 60.9 cm when recaptured on 9/5/90; 61.2 cm when found dead 12/18/90.

^cTumors present on 1/2/91, but not when originally tagged 6/15/90.

TR - Twin Reef (resting habitat)
AOL - Ahu-O-Laka (foraging habitat)
KRF - Kipapa Reef Flat
DR - Deef Reefs (resting habitat)
MR - Mark Reef (resting habitat)
KBAY - Shoreline of Kaneohe Bay

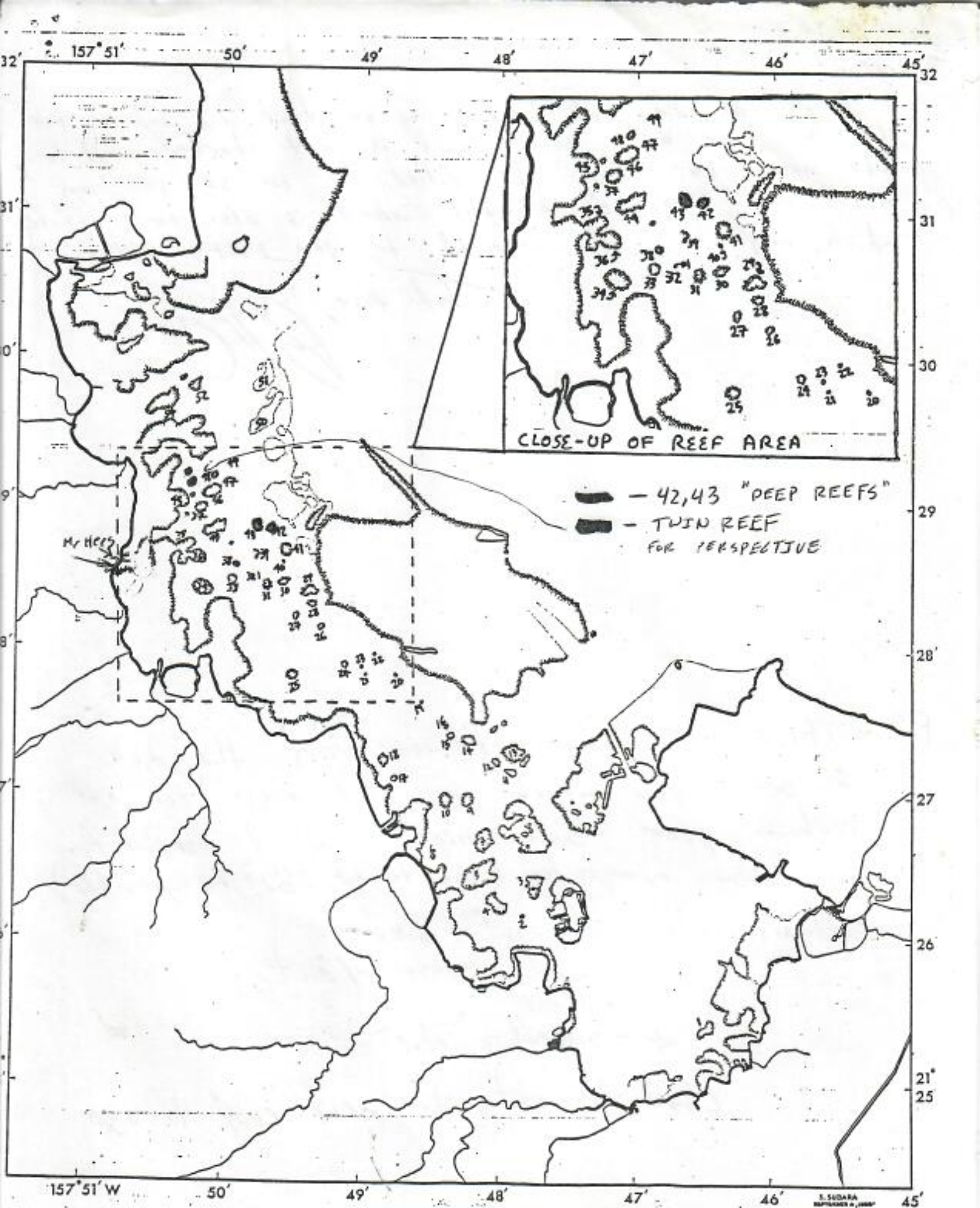
SUMTUR-6.GHB



SOURCE: BILL TYLER

J. BOGARD
SANTA MONICA, CALIF.





SOURCE: BILL TYLER

George,

42,43 are the reefs were diving on that day and as you can see our other secret spot is not charted, well being the nice guy I am I filled it in, so you can get your "bearings" straight. Enclosed is also some articles which may be of interest to you NMFS folks.

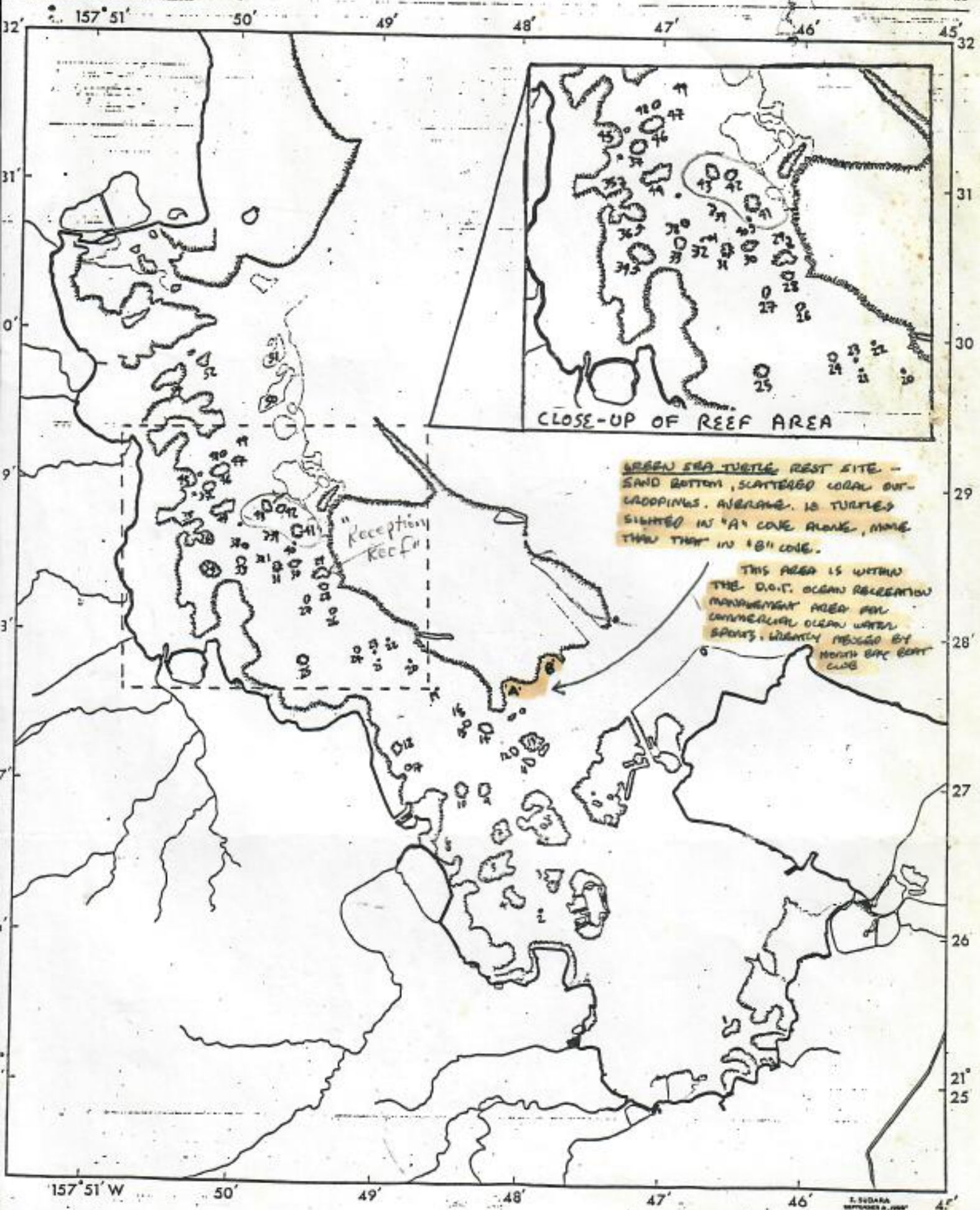
Take care,
BKC

P.S. - There is some software on the disk I sent you which is real easy to use perhaps your son might find it useful for his new computer (has to be IBM compatible)

Software called - Microsoft works
- word processor w/disk
- dBASE
+ - something else

check it out its real easy to use

MARK THOMAS, 45-906 S.W.1. ANDY RD., KANEONE, HI. 96744 (808) 235-8525
 (BOAT CAPTAIN IN KANEONE BAY, RAISED UPON IT.)



GREEN SEA TURTLE REST SITE -
 SAND BOTTOM, SCATTERED CORAL OUT-
 CROPPINGS. AVERAGE 10 TURTLES
 SIGHTED IN 'A' COVE ALONE, MORE
 THAN THAT IN 'B' COVE.

THIS AREA IS WITHIN
 THE D.O.T. OCEAN RECREATION
 MANAGEMENT AREA FOR
 COMMERCIAL OCEAN WATER
 SPORTS. HEAVILY REGULATED BY
 NORTH OCEAN BOAT
 CLUB

SOURCE: BILL TWEED

RESEARCH ACTIVITIES REPORT

MONITORING OF SEA TURTLES AND THEIR HABITATS IN KANEOHE BAY, OAHU

DECEMBER 29, 1989

by

George H. Balazs

Marine Turtle Research Task

Southwest Fisheries Center, Honolulu Laboratory

On December 29, 1989 George H. Balazs and visiting former staff member Ensign Barry K. Choy snorkeled from a small boat in Kaneohe Bay to hand-capture, tag, measure, and assess the health status of green turtles in their benthic "resting" habitats. Efforts were focused on two adjacent patch reefs in the northern portion of the bay. This location had not been previously studied, but was nevertheless recognized (by BKC) as a preferred site for green turtles to aggregate. The two patch reefs, informally designated by local fishermen as Deep Reef #1 and #2, have minimum estimated depths of four feet in their centers, dropping off abruptly to 25-30 feet along the perimeters. Reef #1 has several small wire enclosures, presumably placed there by researchers from the Hawaii Institute of Marine Biology located on Coconut Island.

A total of six turtles ranging from 49.7 to 77.5 cm in straight-line carapace length were captured during two hours of snorkeling (Table 1). All were found to be afflicted with fibropapillomas (tumors) ranging from a moderate to a severe extent. Approximately nine other turtles were sighted during this time, but not captured. At least four of these were noted to have tumors, although observations were difficult due to the brief

time available to inspect them as they quickly swam away. The four noted to have tumors should therefore be considered as a minimum count.

The finding of high incidence of turtles with tumors during this study is consistent with results of recent stranded turtle reports, and with work conducted elsewhere in Kaneohe Bay by GHB and BKC earlier in 1989.

An additional significant finding was made during this short assessment. At an 8-10 foot depth along the seaward perimeter of Reef #2, a large freshly dead green turtle (ca 75-85 cm) was found trapped under a fractured block of Porites coral. This large piece had separated and fallen from the patch reef at a time when the turtle was resting on the bottom directly under it. Mortality of this nature would likely be an uncommon event, except possibly during earthquakes or periods of high wave energy that impose undue stress to the reef structure. The collapse of this coral block onto the turtle is the first such case encountered during many years of diving by GHB and BKC in the Hawaiian Islands.

Tagging and measurement data for six green turtles
 captured in Kaneohe Bay on 29 December 1989
 by
 George H. Balazs and Barry K. Choy

Tag No.	<u>Carapace length (cm)</u>		Comments
	Straight	Curved	
<u>Deep Reef #1</u>			
Y-265,66,67,68	73.2	77.5	Tumors on both eyes, neck, shoulder and groin.
Y-269,70	53.7	57.5	Tumors on both eyes and massive one on right jaw.
Y-271,72	49.7	53.0	Tumors on both eyes, front flippers and groin. Burrowing barnacles.
<u>Deep Reef #2</u>			
Y-273,74	50.9	54.5	Tumor on right eye and ruptured left eye. Emaciated.
Y-275,76,77	56.4	60.0	Tumors on neck, left eye, groin, and tail. Vigorous and strong.
Y-278,79,80,81	77.5	84.5	Tumors on both eyes, neck, and right shoulder. Vigorous and strong.