F84-238-F-582-B-323

PUNALUU

SEA GRANT

GEORGE H. BALAZS

1 of 3

F84-238-F-582-B-323

UHH MOP
TURTLE TAGGING
EXPEDITION

Background Information

For almost a decade, UHH MOP has assisted George Balazs of the National Marine Fisheries Service (NMFS) in his efforts to learn more about the diet and movements of green sea turtles (*Chelonia midas*) in Hawaiian waters. The NMFS investigation requires that green sea turtles be captured, tagged, and released unharmed. In the past, two methods have been used to catch turtles: netting them, and catching them by hand.

Netting is done at night with a large-mesh fence net. The turtles come in to feed and get entangled. The net float-line is constantly monitored by MOP students during the night. When the line submerges, a turtle may be in the net and in danger of drowning unless it is quickly brought to the surface. The students on watch at the time swim out to the net, free the turtle, place it upside-down on a float, and swim it to shore where it will spend the night. In the morning the turtles are measured, weighed, tagged, and released.

Catching of turtles by hand is done during daylight hours. Two-persons teams assigned to try to catch them by hand (assigned by Mr. Balazs after consultation with MOP faculty and staff) swim slowly up to the turtle and try to grab it by its front flippers. Once grabbed, the turtles are quickly rolled onto a float (again, in an upside-down position) and brought into shore. On shore they will be measured, etc..

One or both methods may be used on an expedition, depending upon conditions and the turtles (they don't always cooperate with being people-handled). George Balazs will decide on the appropriate methodology to use.

Basic Turtle Tagging Rules

1. Catching of turtles is done only under the supervision of George Balazs of the National Marine Fisheries Service. Do nothing until told to what to do by George Balazs or his assistant, Drs. Hallacher or Dudley, or John Coney. Under no circumstances should anyone attempt to catch or restrain a turtle on their own volition or while away from organized group activities. Seriously! To do so is both irresponsible and a federal crime. Also, if people not associated with MOP or NMFS offer to help, politely say no. The Federal Permit which has been issued to Mr. Balazs does not allow members of the general public to capture or handle turtles.

2. When you're on net watch during the night, take your job seriously. Stay alert and check the net at regular intervals. Conversation/visitors are OK as long as they don't detract you from your duties. If you are distracted or miss seeing a netted turtle, that animal will ***die***. To lose an endangered animal through negligence would be inexcusable.

3. When handling or catching turtles, be aware that they can ***hurt you***. Watch for flippers which can hit you with amazing force. Turtles can and do bite on occasion. Keep your fingers away from their mouths or you could lose them. They can bite just about any other part of your anatomy as well, so stay away from their mouths!

4. Help out where you can. Remember that team work is the ticket, so let's all pull together.

Safety Rules

1. ***Never, repeat never***, enter the water alone! We have a mandatory buddy system. You must swim with a buddy and have your buddy in sight at all times. If your buddy leaves the water, so do you. This doesn't mean that you are going to be chained to someone for the entire time we're there, rather whenever you enter the water do so with a buddy.

2. Make sure that someone on shore knows that you and your buddy are in the water and is on "lifeguard duty" (keeps an eye on you).

3. If you drift away from your buddy but have them in sight, raise both arms in the air, make fists, and tap them together. This is the scuba signal for "let's get together". If you lose sight of your buddy and cannot locate them in a minute or two, give the same signal to the "lifeguard" on shore and they will either direct you to your buddy or see that assistance is rendered in finding them.

4. If you or your buddy are in trouble, give the international distress signal - "right-left waving of the open hand above head." The "lifeguard" on shore will see that assistance is rendered immediately.

4. No alcohol or drugs at any time!

5. No disappearing acts. If we can't find you, we're going to assume you're in trouble and come looking for you! To avoid the embarrassment of being unnecessarily "rescued" let Drs. Hallacher or Dudley or John Coney know if you will be out of sight of the group for any period of time.

If these rules are flagrantly broken and you have endangered someone's life, or maybe even your own, grave consequences will result! Remember you can be safe and still have fun.

Basic Turtle Capture Scenarios

A. Daytime turtle capturing.

1. Two to three turtle capture teams will enter the water to locate and capture turtles.

2. Two buoy teams will wait on shore until a turtle capture team has a turtle in hand.

3. When a turtle has been caught, a member of the capture team will give the "turtle caught signal", an up-down motion of a clinched-fist hand.

4. Upon seeing the "turtle caught signal", a buoy team will swim to the turtle with a buoy and assist the capture team in placing the turtle in the buoy.

5. The buoy and capture teams will then swim the turtle to shore.

6. Turtle capturing is exhausting, so watch yourself and stop when you are too tired to safely stay in the water. No shame!

B. Night-time turtle capturing.

1. Fence nets, set during the daytime, will be watched at all times during the night. The florescent floats on the top of the nets should be scanned every five minutes. If floats are underwater or a turtle is seen entangled in the floats, immediately send for Mr. Balazs or Drs. Dudley or Hallacher, whomever is on duty.

2. Under the supervision of Mr. Balazs or Drs. Hallacher or Dudley, a team of two students will swim out to the net and after determining that it is indeed a turtle, remove the turtle from the net, place it in the buoy and swim it to shore.

UNIVERSITY OF HAWAII

Sea Grant College Program

MEMORANDUM

October 25, 1982

TO: Dr. George Balazs, Assistant Marine Biologist, HIMB

FROM: Rose Pfund, Acting Associate Director, Sea Grant College Program

SUBJECT: Your Proposal on "Recruitment, Growth, and Developmental Habitat Requirements of Green Turtles in their Nearshore Foraging Pastures"

Attached please find the comments which we received from the reviewers of your project. There was some interest voiced on your project at the meeting of the Sea Grant Advisory Council which was held last week. The concern was that your proposal should focus on the stock assessment of the green turtles rather than such areas as the habitat requirements which is the present focus. In any event, we will not be able to provide but minimal funding for the project. Other agencies will have to pick up most of your projected costs. When Dr. Jack Davidson returns from his mainland trip after the first week in November you may call him on additional readout on your project.

As you may know, we are anticipating a reduction in our grant because of the proposed Congressional appropriation for Sea Grant and therefore we are not able to include all the projects which have been submitted to us for funding in our institutional program package.

Attachments

cc: J.R. Davidson

DI BALAZ

Dear Dr. Davidson:

I have recently read a research proposal submitted to the Sea Grant program by Mr. George Balazs. The proposed study entitled, "Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures," would be conducted in the Kau District of the Island of Hawaii. Faculty in the Natural Sciences Division at the University of Hawaii at Hilo, and faculty and students in the UHH Marine Option Program strongly support Mr. Balazs' proposal. Mr. Balazs' research record is impressive in itself, but he also very effectively communicates the importance of his work to the general public. This produces community support for scientific research and university programs in general.

The scientific merit of his proposal is excellent, but, in addition, his research would be a big boost to our undergraduate research activities through the Marine Option Program. Mr. Balazs proposes using our students as assistants in his work on the Big Island. There are obvious benefits to both parties. We have a group of MOP students who have been trained in algae, invertebrate and fish identification, transecting techniques, and who have passed the rigorous requirements of the University of Hawaii diving certification program. The use of local undergraduate students on state and federally sponsored research projects tends to build public support and eliminate any potential anxiety on the part of the local community. It would be good to see an outer island campus actively involved in a significant, major research project such as this, especially when the results of the project are of interest and can be understood by the local community.

We heartily support Mr. Balazs' proposed research. Please contact us should you have any questions.

Dr. Pfund:

PI BALAZ

I am in receipt of your request of September 22 to review and comment on the proposal submitted for Sea Grant support by George Balazs, Hawaii Institute of Marine Biology, entitled "Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures." Following are my comments:

1. George Balazs has demonstrated both his ability and desire to conduct research of this nature, and is regarded by his professional peers as the foremost authority on sea turtle biology and management in the mid-Pacific region. He is the logical candidate for research of this nature.

2. Research objectives (goals) consist of nine distinct items. I have some concern that a study period of one year may not be of sufficient duration to provide a data base for indepth analysis to fully accomplish objectives 4, 7, and 8. However, since I am not personally aware of the field situation involved, I could be wrong. Sample sizes will be predicated on size of area to be covered, size and age of composition of the turtle population involved, number of field workers directly involved, and their ability to gather appropriate data of sufficient magnitude and value to permit objective analysis and comparisons.

   I do think that the project can gather enough information on these specific objectives (4, 7, and 8) to provide at least a partial objective analysis and can refine the problem for further study to complete the picture.

   I believe that objectives 1, 2, 3, and 5 can be obtained. Objective 6 will depend on the extent of the geographic area to be sampled, ocean and atmospheric conditions, number of turtles in-

volved, and the field workers' abilities. Again, intensive work could probably accomplish this objective, but, based on the information contained in the proposal and the modest budget for field workers' salary and time, I am not sure how definitive the resultant data would be. It will certainly be more than is currently available.

Objective 9, dealing with effectiveness of the living tag, will depend on how many, if any, of those animals marked as hatchlings are obtained in the study area. Data will be limited, but, again, even one wild green turtle, so marked, will be more than is available to the world today. To date, I am aware of only one return of a wild turtle (Kemp's ridley), so marked, and this was in the Gulf of Mexico. As a note of interest, my office is supporting additional research on this marking technique, under field conditions in the U.S. and Latin America, beginning this current fiscal year (1983).

3. Methodology appears appropriate. My one concern is that the project proposal does not provide for enough field worker assistance. If I read the budget breakdown correctly, the proposal calls for approximately 63 days (8 hours per day) total field assistance, other than the project leader. This seems extremely limited, considering round trips from the main island to the big island, time to get people and equipment organized at each site, etc. Again, not being directly familiar with the field situation, I could easily be wrong. I can't believe that a rather modest increase in the budget request for additional field assistance would not be significantly conducive to a much higher level of overall project accomplishment for the objectives outlined.

4. The need for this research and resultant applicability to future understanding and management of sea turtle populations, both in Hawaiian waters and elsewhere, is certainly appropriate. So little is known about sea turtle ecology and management, that it is embarrassing to those of us attempting to work with this resource. Completion, or even partial completion, of the objectives set forth in this proposal will provide new information related to aspects of sea turtle ecology that we know very little about. The proposal at hand will address life history and ecological questions outside of the immediate area of nesting and of a mix of age classes (hopefully) which has only been touched on in past work. The role of the nearshore marine habitat and carrying capacity of this respective habitat, along with analyses of certain nutrient levels, daily levels of food consumption and preferences, and the determination of the mix of age classes within the population which utilize the study area, will all be extremely useful data to future research and management of sea turtle stocks in various parts of the world and certainly in Hawaii, where I would suspect conflicts between turtles and humans will rapidly increase. Base-line information such as this will help provide information necessary to lessen or avoid future conflicts through a better understanding of the turtle life history and ecology -- information not currently available to decision makers in Hawaii or elsewhere.

5. Mr. Balazs has reviewed the pertinent literature, which is limited, dealing with sea turtle ecology and the marine environment they may utilize. I am not familiar enough with literature dealing with the marine environment, per se, to judge whether the applicant has or has not covered this aspect as it may relate to the proposal at hand. However, based on my knowledge of the applicant's previous work, I would bet he has done a more-than-satisfactory job of literature review applicable to this research effort.

I appreciate the opportunity to review and comment on this proposal and recommend that serious consideration be given to granting approval. If I have a concern, it is that the applicant has not requested sufficient support to allow for the level of field worker assistance that may be necessary for certain segments of the work.

PI BALAZ

Dear Ms. Pfund:

In response to your letter of 22 September 1982, I enclose some comments on the Balazs proposal "Recruitment, growth and development habitat requirements of green turtles in their foraging pastures". I am not familiar with proposals submitted to the Sea Grant Program. I am familiar with NSF proposals and my comments herein pertain to why I think the proposal is weak and would probably not be funded by NSF.

The goals of the proposal are commendable and information on the behavior in the foraging pastures is certainly needed. Mr. Balazs probably has the experience to carry out most of the projects listed. However, the proposal is weak in methodology. For examples: How many adult and subadult turtles does the P.I. expect to tag in the pastures (and is the project really cost effective)? How are the nutrients going to be sampled (and does the P.I. have expertise in this procedure)? How are the resident turtles going to be sampled (i.e., the specific sampling methodology)? How is the P.I. going to investigate the carrying capacity of the habitat? How is the daily level of consumption going to be determined? How will the algae and invertebrate food sources be sampled? There is also a wealth of material on the productivity of algae pastures which perhaps should be reviewed in the proposal.

Again, I have no experience reviewing Sea Grant projects, so please ignore my negative comments if they are inappropriate for this type of proposal.

PI Balazs

Thank you for allowing me to review the very interesting research proposed by your organization. Any study of sea turtles involving their at-sea habits and population dynamics is important to our understanding of the entire biology for Chelonia. As you are probably aware, most research has concentrated on the reproductive biology of adult females and their migratory habits in the past. After carefully reading George Balazs' proposal to investigate the foraging ecology of the green turtles in Hawaii, I have no serious problems with the methodology or expected outcomes. The validity of the research question is certainly well substantiated. The review of the literature also indicates a thorough knowledge on Mr. Balazs' part of pertinent green turtle publications relating to this subject.

From my personal experience I am sure you'll find that Mr. Balazs is a very thorough researcher who probably knows more about Hawaiian sea turtles than any other person you could select for the task at hand.

Thank you again for soliciting my comments on a very intriguing proposal for studying some little known but very important aspects of sea turtle life history. We need more studies of this type elsewhere within the range of Chelonia.

Pf BALAZ

Dear Ms. Pfund:

Thank you for sending me the grant request from George Balazs to review. I have made comments on the enclosed sheet whose numbers correspond to those on the request. In general, I believe that proposal should be given careful consideration for funding. While I have no knowledge of your priorities, the results obtained from such a study as Balazs proposes will greatly assist in developing management proposals for protecting this threatened species. Certainly the requestor is well qualified to complete this work and since the study will require 100% of the investigator's time, the costs are not excessive. I would support funding as requested.

Should you have additional questions or if I can be of assistance in the future, please let me know.

Reviewers comments: green turtle studies in Hawaii.

I would like to point out that I have had no research experience with Hawaiian green turtles nor have I any familiarity with the research area in question; I have read all of Balazs previous work and believe that he is well qualified to conduct the proposed research.

The numbers below correspond to the numbers in the margins of the grant request.

1. I think the author is being somewhat premature in stating that these turtles grow faster than other sea turtle populations. They may indeed grow faster than other Hawaiian greens, and indeed other populations of green turtles in the world. However, so few studies have been adequately reported and followed for a substantial time period that it is difficult to make all encompassing statements about growth. I would prefer a more conservative approach when discussing the subject. And it is quite possible that ridleys and loggerheads achieve greater growth rates inasmuch as they rely on animal food with a higher nutrient content.

2. This section confuses me. I do not follow that higher levels of reproduction automatically follow from increased growth rates. The levels of reproduction I would think would not be much different from other green turtle populations, i.e. laying 100-120 eggs per nest several times a season on a 2-3-4 year cycle. What might be expected is that the total output of eggs during an individual's life might be greater since sexual maturity is reached quicker, that is, it has a greater reproductive potential in its life span. To me, the author implies here that the turtle might have greater fecundity by stating"higher levels of reproduction."And I don't understand at all why the interval between breeding migrations would be affected by growth rates. Unless of course he implies that turtles spend x amount of time and must grow z length during its time in the feeding pastures. My gut feelings from other studies is that turtles may be more stochastic in their movements than presently acknowledged.

3. The author should also consult:

   Bjorndal, K.A. 1980. Nutrition and grazing behavior of the green turtle, Chelonia mydas. Marine Biol. 56:147-154.

   Mortimer, J.A. 1981. The feeding ecology of the West Caribbean green turtle (Chelonia mydas) in Nicaragua. Biotropica 13(1): 49-58.

4. Given present budgets and economic conditions, it is unlikely that the U.S. Fish and Wildlife Service will be of much assistance in financial matters.

5. This would be exciting work and to my knowledge has not been attempted for an entire feeding ground. I caution that the work may be more heuristic than of immediate value and could be misinterpreted in a number of ways. Other factors, such as poorly understood social/behavioral interactions could influence the numbers of green turtles in an area, or even the number of sleeping stations or resting areas, in addition to the amount of forage habitat. It has not necessarily been demonstrated that recruitment is a limiting factor affecting numbers of turtles in this area.

6. Unless you can completely determine the fact that there are resident adult and juvenile turtles here, you will not be able to measure population recruitment (or mortality) using a simple mark-recapture paradigm. You must determine levels of immigration and emmigration as well as whether there are transients. You have not even been able to determine whether the turtles in this area are a "population" in the strict sense (sea turtle biologists use the word far too loosely). What I am saying is that you should take the data as stated, but that you will not necessarily be measuring recruitment to a "population." You will need a multi year study to begin to get a handle on these questions.

7. This is very important and indeed could provide the most important results to biologists studying sea turtles throughout the world.

8. I would suggest thataerial surveys be conducted to save time and perhaps provide more accurate delimitations of feeding areas. These could then be checked by "swim" truth.

9. I question whether this is desirable too near the study area as it might attract sharks to the area which in turn could result in increased predation. Could physiographically similar areas elsewhere be sampled? Admittedly, techniques might be available to reduce the predation probabilities but the shark fishing methods are not explained here.

TITLE

Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures

PRINCIPAL INVESTIGATOR

George H. Balazs
Hawaii Institute of Marine Biology
Office Phone: (808) 247-6631 and 946-2181
Home Phone: (808) 395-6409

DURATION

Sea Grant Year 16

MOTIVATION

Previous research carried out by this investigator has yielded considerable information on the life history and ecology of green turtles (*Chelonia mydas*) at their breeding and basking areas in the remote Northwestern Hawaiian Islands (Balazs, 1976; Balazs, 1980a; Balazs, 1980b; Dizon and Balazs, 1982; Whittow and Balazs, in press). As part of the Northwestern Hawaiian Islands Fisheries Investigations undertaken during Sea Grant Years 10 through 12, this work fulfilled the program's basic need for management oriented data on green turtles in the northwestern segment of the archipelago.

A significant and somewhat unexpected finding of these past studies was the identification of key coastal sites along the Kau District of the island of Hawaii that constitute highly productive foraging habitat for both immature and adult green turtles (Figure 1). These rich algal pastures at the extreme southeastern end of the archipelago have been shown to produce the most rapid growth rates thus far recorded in Hawaiian green turtles, or any other sea turtle population examined elsewhere to date (Balazs, 1979; Balazs, in press). It is therefore likely that turtles living along the Kau coastline are making major contributions to the seasonal migratory breeding colony that occurs at French Frigate Shoals

in the Northwestern Hawaiian Islands. More recruits to the breeding colony could be expected to result from these superior foraging areas. In addition, higher levels of reproduction could be expected once the turtles reach sexual maturity, since the interval needed between breeding migrations (2 years or more) would be shorter than for turtles residing at less productive coastal sites. The reasons for the higher rates of growth in the foraging pastures of the Kau District are not presently known. The principal food source used by the turtles is believed to be *Pterocladia capillacea*, a red alga that thrives along certain lava rock coastlines where fresh water percolates into the ocean. This submarine discharge of groundwater may very well supply elevated levels of nutrients that promote algal growth (see Johannes, 1980).

Comparatively little work has been focused on green turtles, or any other sea turtle species, while they are in foraging pastures where they spend the vast majority of their life. In addition to the author's own work here in Hawaii (Balazs, 1979; Balazs, in press), accounts of foraging pasture studies are limited to Schmidt (1916) for the Virgin Islands, Carr and Caldwell (1956) for west Florida, Burnett-Herkes (1974) for Bermuda, Limpus and Walter (1980) for Australia, and Mendonca (1981) and Mendonca and Ehrhart (1982) for Mosquito Lagoon in east Florida. Much of this work has been of a preliminary nature.

It is clearly far more difficult and time consuming to undertake research of sea turtles in their marine habitat, as opposed to nesting sites where the adult females converge on land and can be easily observed and tagged. The voluminous body of literature dealing with the tagging of nesting turtles reflects this important point. Nevertheless, there is now widespread agreement among sea turtle researchers and resource managers that studies must be directed toward immature and adult turtles in foraging pastures if further essential

The National Marine Fisheries Service, the Fish and Wildlife Service, and the Hawaii State Department of Land and Natural Resources each have interests and responsibilities in the management of Hawaiian green turtles. Partial funding of this proposal may be possible from one or more of these agencies. The NOAA Office of Coastal Zone Management would also be interested in the results of this study, and therefore is another likely source of partial funding.

GOALS

Overall

The overall project goal is to acquire comprehensive and in-depth baseline data on the ecology and population dynamics of green turtles living in rich foraging pastures along the Kau District of the island of Hawaii. This information will have direct application to the future management of Hawaiian, as well as other, populations of green turtles.

Specific

1. To locate, map and characterize the specific habitat currently being used by green turtles for foraging and sleeping purposes.

2. To sample and determine the levels of nutrients contained in the submarine groundwater discharge occurring along the coastline.

3. To census the resident turtle stocks by size category (juvenile, subadult and adult) at each of the key habitat sites located.

4. To estimate the carrying capacity of the available habitat for green turtles in order to predict how much the local aggregations could expand if recruitment was not a limiting factor.

5. To substantially strengthen and refine the existing body of growth data by recapturing and remeasuring immature turtles that were tagged along this coastline at an earlier date.

6. To determine the rates of recruitment of juveniles from the pelagic to the nearshore habitat that occurs during the course of the 12-month study.

7. To identify the specific food sources being utilized by the turtles, as well as the approximate daily levels of consumption by each size category.

8. To identify and, to the extent possible, quantify the factors responsible for natural mortality of the turtles.

9. To ascertain the effectiveness of the "living tag" marking procedure on those hatchlings that arrive as new juvenile recruits along the coastline.

METHODS

The basic methodology used to accomplish the project's goals will involve six study visits to the Kau District for a duration of 15-20 days each. A small field camp will be established during each trip in proximity to the area being intensively investigated. Much of the research will revolve around the capture of turtles, either by hand using scuba or by setting large-mesh tangle nets at strategic pathways between feeding and sleeping areas. Tangle nets will be carefully monitored to prevent injury to the turtles. A large proportion of this work will have to be conducted at night when the turtles are more susceptible to capture. Standard body measurements and weights will be recorded on all turtles. The dietary components will be determined by sampling the stomach contents through a plastic tube inserted down the esophagus (Balazs, 1980c). All turtles will be double tagged, or retagged, using numbered Inconel alloy tags bearing a return mailing address.

Key feeding sites will be located by hiking the coastline and making direct observations of the shallow (<5 meters) nearshore waters where algal growth is most abundant. Lava rock cliffs along the area will provide excellent lookouts

for using binoculars to spot turtles while they are foraging. Green turtles frequently swim to the surface to breathe while they are actively feeding.

Underwater surveys with scuba, and by towing a diver from an inflatable boat, will be carried out to compile detailed habitat maps of foraging and sleeping areas. The algae and invertebrate growth available to turtles as forage at each benthic community will be sampled and identified. Larger samples will also be collected to estimate standing crop densities of *Pterocladia capillacea* and other algae found to be heavily used by turtles as food.

Permanent transects will be designated and mapped to aid in censusing aggregations of turtles. The number of turtles of each size category will be counted during surveys with scuba (or while being towed) for a given time over a set distance. The generally excellent clarity of the ocean water along the Kau coastline will enhance this portion of the study.

Information on natural mortality that results from predation, or possibly disease, will be tabulated through observations of lesions, scars and any pathological signs present on the turtles captured or sighted. At select sites, several large baited hooks will be set to sample sharks and examine their stomachs for the presence of turtle remains.

Samples of the groundwater discharge occurring in the nearshore waters will be sampled and analyzed for nitrates, phosphorus and other nutrients. Sites of discharge in the Kau District are easily located along the lower intertidal zone. Nutrient levels of the seawater will also be sampled nearby, as well as at coastal sites in Kau where there are no foraging pastures or resident turtles.

TRAVEL JUSTIFICATION

Travel between Honolulu and the Kau District is essential in order to accomplish the proposed research. Six study visits distributed evenly throughout

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures — Principal Investigator(s) G. Balazs

Project Area — Associate Investigator(s)

Project Number — Fiscal Officer's Signature — Date

BUDGET CATEGORIES	TIME/EFFORT BY MAN-MONTHS: Sea Grant Funded Cal (11 mo)	Sea Grant Funded Acad (9 mo)	Sea Grant Funded Sum/OL	UH Funded Cal (11 mo)	UH Funded Acad (9 mo)	UH Funded Sum/OL	Others Funded Cal (12 mo)	Sea Grant NOAA	Matching UH	Matching Others*	TOTAL
SALARIES & WAGES											
1a. Principal Investigator(s) Balazs, G., R-3	27,386							27,386			27,386
b. Associate Investigator(s)											
2a. Professionals (Staff)											
b. Research Associates RCUH 6 mo=504 hrs @5.00								2,520			2,520
c. Graduate Students											
e. Pre-Baccalaureate Students											
f. Secretarial-Clerical											
g. Technical-Shop											
h. Other-Specify											
SUB-TOTAL - Salaries & Wages (S/T A.)								29,906			29,906
FRINGE BENEFITS (S/T B.)								8,035			8,035
								37,941			37,94

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures

DATE 9/14

Project Number

Principal Investigator(s) G. Balazs

BUDGET CATEGORIES	Sea Grant NOAA	Matching U H	Matching Others*	TOTAL
PERMANENT EQUIPMENT				
(S/T C.)				
EXPENDABLE SUPPLIES & EQUIPMENT				
Turtle nets	800.			800.
(S/T D.)	800.			800.
TRAVEL				
Domestic				
Island of Hawaii, 6 trips (15 days) @$725	4,350.			4,350.
International				
(S/T E.)	4,350.			4,350.
PUBLICATION COSTS	200			200

PROPOSED SEA GRANT BUDGET YEAR

DATE 9/14/82

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures

Principal Investigator(s) G. Balazs

Project Area

Associate Investigator(s)

Project Number

BUDGET CATEGORIES	Sea Grant NOAA	Matching: U H	Matching: Others*	TOTA
OTHER DIRECT COSTS				
1. HIMB lab fees, 05.00% of $29,906 salaries	1,459.			1,459
2. Consultant fee for algae & invertebrate identification	300.			300
3.				
4.				
5.				
(S/T G.)	1,759.			1,759
TOTAL D/C (A-G)	45,050.			45,05
INDIRECT COSTS MODIFIED 45,050				
ON Campus - Research: 41.00% of DIRECT COSTS : of	18,471.			18,47
Training: % of : of				
OFF Campus - Research: % of : of				
Training: % of : of				
Research Vessel: % of of				
(S/T Ind Cos)	18,471.			18,47
TOTAL D/C + Ind Cos	63,521.			63,52

TAL DIRECT COSTS (A THRU G)

TAL COSTS

*Note: may qualify as "Off Campus" research

* Please insert in this column, Matching Funds from sources other than UH State Funds. Also, indicate Fund's source in parentheses under the figure, giving Institution's or Firm's name. Non-monetary contributions such as supplies, service, etc. should be supportable by evidence and subject to audit. For both monetary & non-monetary contributions, please detail in category column.

WORKSHEET FOR FRINGE BENEFIT CALCULATIONS - SEA GRANT YEAR 16 Page ox

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures Date 9/14/82

(UH MATCHING FRINGE CALCULATED AT % OF SALARIES & WAGES)

SOURCE OF FUNDS: NOAA

	Name	Balazs	RCUH				
	Rank-Step	R3					
	Amount	27,386.	2,520.				
	No. of Months	12	6				
gular Employees							
A. 26.29% of Wages*		7,200.					
B. 57/mo. or 684/12 mos.**		684.					
C. APT Accum. Vac. 2.5% of Wages							
D. Overload (OL)*** 2.09% of Wages							
E. UH Match only % of Wages							
duate Students							
A. 2.09% of Wages*** RCUH 06.00%			151.				
B. /mo. or /12 mos.**							
ergraduates & Less an 1/2 time employees							
A, 2.09% of Wages***							
als		7,884.	151.				

SUB-TOTAL Sea Grant Funded	8,035.
SUB-TOTAL UH Funded	
SUB-TOTAL Others Funded	
OVERALL TOTAL	8,035.

* Retirement, Social Security, Workmen's Compensation, Unemployment Compensation Insurance
** Health, Dental, Life Insurance
*** Workmen's Compensation, Unemployment Compensation Insurance

University of Hawaii at Manoa

Hawaii Institute of Marine Biology
Coconut Island, Kaneohe, Hawaii

MEMORANDUM

September 20, 1982

TO: Jack R. Davidson
Director, UH Sea Grant College Program

FROM: George H. Balazs
Assistant Marine Biologist

SUBJECT: Proposal for Sea Grant Year 16 (1983-84)

My research proposal entitled "Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures" is being respectfully submitted to your office for funding consideration during Sea Grant Year 16. Please note that the budget sheets do not presently show matching funds due to the fact that financial commitments have as yet not been received from the potential cooperators referenced in the text. It is hoped that such support will be forthcoming after the agencies have had the opportunity to scrutinize the full proposal, and come to recognize the need and significance of this work. I should also mention to you that there is some uncertainty whether the proposed project falls under "on campus" or "off campus" research. Consequently, for the time being, the overhead cost has been computed at the higher rate of "on-campus."

Did Dr. Davidson contact them?

I have decided not to submit a full proposal at this time covering the assessment of sea turtle stocks and native usage in American Samoa. You will recall that earlier this year I sent a preproposal to your office on this subject. I am still quite interested in eventually undertaking this work in Samoa, but my proposed foraging pasture study here in Hawaii is simply more important at the moment. If a foraging pasture study is going to be launched in the Kau District, it should be done in a consecutive year following my past and present tagging work in Hawaii. The one-year (or more) gap caused by undertaking a project in Samoa during Sea Grant Year 16 would weaken my ability to achieve optimum results working in the pastures at a later date.

I would appreciate your continuing advice and guidance on these matters.

GHB:ec
Encls.

Fulfill a need

- Names of people on advisory council?
- minutes of meeting?
- written reviews or correspondence from these people or others (not now in my file)?
- letters or membership of people I wrote to?
- in bound dossier shown as - not funded?

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

SEA GRANT PROJECT SUMMARY

(See NOAA Form 90-2A for instructions before completing form. Limit all information to this page.)

PROJECT NO.	PROJECT STATUS: [X] NEW [ ] CONTINUING PROJECT TITLE Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in their Nearshore Foraging Pastures	DATE INITIATED, IF CONTINUING
GRANT NO. (Office)		DATE OF THIS FORM 9/20/82
INSTITUTION UH	OLD TITLE (If different)	ESTIMATED COMPLETION DATE 5/31/84

PRINCIPAL INVESTIGATOR AND COLLEGE OR DEPARTMENTAL AFFILIATION	% TIME	ASSOCIATE INVESTIGATOR	% TIME
George H. Balazs, Hawaii Institute of Marine Biology	100		

FUNDING TO DATE		LAST YEAR'S FUNDING		PROPOSED FUNDING		RELATED PROJECTS (By numbers)
FED.-SEA GRANT	MATCHING	FED.-SEA GRANT	MATCHING	FED.-SEA GRANT	MATCHING	
				63,521		

PART OF UNIVERSITY PROGRAM	OFFICE OF SEA GRANT CLASSIFICATION
	Marine Resources Development

PERCENT OF PROPOSED FUNDING FOR ANTICIPATED BENEFIT AREAS *(Consider Prog. Mgt. & Support, if applicable)*

RESOURCE UTILIZATION			RESOURCE MANAGEMENT	EDUCATION		PROGRAM MANAGEMENT AND SUPPORT
ESTABLISHED INDUSTRY %	EMERGING INDUSTRY %	PUBLIC USE %	100 %	MANPOWER DEVELOPMENT %	PUBLIC EDUCATION %	%

OBJECTIVES:

Overall:

To acquire in-depth baseline data on the ecology and population dynamics of green turtles living in the rich foraging pastures along the Kau coast of the island of Hawaii.

Specific:

1. To locate, map and characterize specific habitat used by green turtles in the nearshore environment.
2. To determine nutrient levels in the submarine groundwater discharge.
3. To census resident turtle stocks.
4. To estimate the carrying capacity of the habitat used by turtles.
5. To compile further data on growth rates of immature turtles.
6. To determine recruitment rates of juvenile turtles.
7. To identify food sources.
8. To identify natural mortality factors.
9. To ascertain the effectiveness of a scute grafting technique for permanently marking hatchlings.

ANTICIPATED BENEFITS:

The information obtained will be used by the National Marine Fisheries Service, the Hawaii State Department of Land and Natural Resources, the Coastal Zone Management Program, and the Fish and Wildlife Service to make sound long-range management decisions relating to green turtles and their marine habitat in the main Hawaiian Islands. The information will also be beneficial to the management of green turtles occurring elsewhere in the world.

IDENTIFIED BENEFITS TO DATE:

KEYWORDS:

TITLE

Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures

PRINCIPAL INVESTIGATOR

George H. Balazs
Hawaii Institute of Marine Biology
Office Phone: (808) 247-6631 and 946-2181
Home Phone: (808) 395-6409

DURATION

Sea Grant Year 16

MOTIVATION

Previous research carried out by this investigator has yielded considerable information on the life history and ecology of green turtles (*Chelonia mydas*) at their breeding and basking areas in the remote Northwestern Hawaiian Islands (Balazs, 1976; Balazs, 1980a; Balazs, 1980b; Dizon and Balazs, 1982; Whittow and Balazs, in press). As part of the Northwestern Hawaiian Islands Fisheries Investigations undertaken during Sea Grant Years 10 through 12, this work fulfilled the program's basic need for management oriented data on green turtles in the northwestern segment of the archipelago.

A significant and somewhat unexpected finding of these past studies was the identification of key coastal sites along the Kau District of the island of Hawaii that constitute highly productive foraging habitat for both immature and adult green turtles (Figure 1). These rich algal pastures at the extreme southeastern end of the archipelago have been shown to produce the most rapid growth rates thus far recorded in Hawaiian green turtles, or any other sea turtle population examined elsewhere to date (Balazs, 1979; Balazs, in press). It is therefore likely that turtles living along the Kau coastline are making major contributions to the seasonal migratory breeding colony that occurs at French Frigate Shoals

in the Northwestern Hawaiian Islands. More recruits to the breeding colony could be expected to result from these superior foraging areas. In addition, higher levels of reproduction could be expected once the turtles reach sexual maturity, since the interval needed between breeding migrations (2 years or more) would be shorter than for turtles residing at less productive coastal sites. The reasons for the higher rates of growth in the foraging pastures of the Kau District are not presently known. The principal food source used by the turtles is believed to be *Pterocladia capillacea*, a red alga that thrives along certain lava rock coastlines where fresh water percolates into the ocean. This submarine discharge of groundwater may very well supply elevated levels of nutrients that promote algal growth (see Johannes, 1980).

Comparatively little work has been focused on green turtles, or any other sea turtle species, while they are in foraging pastures where they spend the vast majority of their life. In addition to the author's own work here in Hawaii (Balazs, 1979; Balazs, in press), accounts of foraging pasture studies are limited to Schmidt (1916) for the Virgin Islands, Carr and Caldwell (1956) for west Florida, Burnett-Herkes (1974) for Bermuda, Limpus and Walter (1980) for Australia, and Mendonca (1981) and Mendonca and Ehrhart (1982) for Mosquito Lagoon in east Florida. Much of this work has been of a preliminary nature.

It is clearly far more difficult and time consuming to undertake research of sea turtles in their marine habitat, as opposed to nesting sites where the adult females converge on land and can be easily observed and tagged. The voluminous body of literature dealing with the tagging of nesting turtles reflects this important point. Nevertheless, there is now widespread agreement among sea turtle researchers and resource managers that studies must be directed toward immature and adult turtles in foraging pastures if further essential

knowledge of the species is to be acquired (Hirth, 1971; Carr *et al.*, 1978; Hopkins and Richardson, 1981; Bjorndal, in press).

Nearly all sea turtles are currently listed under the U.S. Endangered Species Act. Although population declines have occurred as the result of several adverse factors, there is nevertheless good reason to believe that green turtles, especially in the Hawaiian Islands, can be restored and properly managed for the benefit of both man and turtles. Recent work by Thayer *et al.* (1982) indicates that green turtles are likely to play a significant role in the cycling of nutrients by reducing the decomposition time of the marine vegetation used as forage. This "short-circuiting" of the detritus cycle represents a beneficial link between the abundance of turtles in nearshore habitat and the enrichment of the ecological system as a whole.

The overall motivating factor of this proposal is the desire to fulfill a recognized and important need for specific information on green turtles in their nearshore foraging pastures. Given the known need for this work, the question then is "where" can it best be conducted, and with what research talents. The advantages of having this investigator use foraging pastures along the Kau District as the focus of an in-depth, year-long, investigation are summarized as follows. Each of these persuasive factors are viewed as a component part of the investigator's overall motivation to do the research.

1. The comparatively rapid growth rates exhibited by turtles living in the Kau pastures, and the potentially major contribution they make to the breeding colony at French Frigate Shoals;

2. The presence of sufficient numbers of both adults and immature turtles aggregated at specific sites along the Kau coastline so as to make the research cost effective;

3. The substantial amount of previous tagging conducted at French Frigate Shoals, the site where adults living in Kau pastures migrate to breed;

4. The presence of a pool of over 100 immature turtles that were captured, tagged, measured and released during earlier exploratory work in the Kau pastures by this investigator and by students of the Marine Option Program at the University of Hawaii - Hilo campus;

5. The accessible nature of these pastures, and their relative safety as an area to undertake research (i.e. few sharks and good weather);

6. The investigator's proven ability to study, capture and tag turtles in the marine environment;

7. The investigator's use of a superior corrosion-proof turtle tag made from Inconel alloy (see Balazs, 1982). These tags are the only ones ever produced to date. They are the result of an experimental batch that the investigator arranged to have manufactured in 1976 by the National Band and Tag Company of Newport, Kentucky;

8. The relatively undeveloped and undisturbed nature of the ecological system that comprises the Kau foraging pastures;

9. The demonstrated assistance and goodwill to sea turtle researchers that is exhibited by the local residents of the Kau District;

10. The availability of a portable scuba compressor, tanks, an inflatable boat, outboard motors, an underwater camera and other basic equipment from the Northwestern Hawaiian Islands Fisheries Investigation suitable for use in a foraging pasture study;

11. The marking that was conducted in 1982 on 1300 hatchlings at French Frigate Shoals using a promising scute grafting, or "living tag", procedure developed by Hendrickson and Hendrickson (1981). The recruitment of some of these known-age turtles from the pelagic environment is expected to occur in the Kau pastures during the 12-month period covered by this proposal.

The National Marine Fisheries Service, the Fish and Wildlife Service, and the Hawaii State Department of Land and Natural Resources each have interests and responsibilities in the management of Hawaiian green turtles. Partial funding of this proposal may be possible from one or more of these agencies. The NOAA Office of Coastal Zone Management would also be interested in the results of this study, and therefore is another likely source of partial funding.

GOALS

Overall

The overall project goal is to acquire comprehensive and in-depth baseline data on the ecology and population dynamics of green turtles living in rich foraging pastures along the Kau District of the island of Hawaii. This information will have direct application to the future management of Hawaiian, as well as other, populations of green turtles.

Specific

1. To locate, map and characterize the specific habitat currently being used by green turtles for foraging and sleeping purposes.

2. To sample and determine the levels of nutrients contained in the submarine groundwater discharge occurring along the coastline.

3. To census the resident turtle stocks by size category (juvenile, subadult and adult) at each of the key habitat sites located.

4. To estimate the carrying capacity of the available habitat for green turtles in order to predict how much the local aggregations could expand if recruitment was not a limiting factor.

5. To substantially strengthen and refine the existing body of growth data by recapturing and remeasuring immature turtles that were tagged along this coastline at an earlier date.

6. To determine the rates of recruitment of juveniles from the pelagic to the nearshore habitat that occurs during the course of the 12-month study.

7. To identify the specific food sources being utilized by the turtles, as well as the approximate daily levels of consumption by each size category.

8. To identify and, to the extent possible, quantify the factors responsible for natural mortality of the turtles.

9. To ascertain the effectiveness of the "living tag" marking procedure on those hatchlings that arrive as new juvenile recruits along the coastline.

METHODS

The basic methodology used to accomplish the project's goals will involve six study visits to the Kau District for a duration of 15-20 days each. A small field camp will be established during each trip in proximity to the area being intensively investigated. Much of the research will revolve around the capture of turtles, either by hand using scuba or by setting large-mesh tangle nets at strategic pathways between feeding and sleeping areas. Tangle nets will be carefully monitored to prevent injury to the turtles. A large proportion of this work will have to be conducted at night when the turtles are more susceptible to capture. Standard body measurements and weights will be recorded on all turtles. The dietary components will be determined by sampling the stomach contents through a plastic tube inserted down the esophagus (Balazs, 1980c). All turtles will be double tagged, or retagged, using numbered Inconel alloy tags bearing a return mailing address.

Key feeding sites will be located by hiking the coastline and making direct observations of the shallow (<5 meters) nearshore waters where algal growth is most abundant. Lava rock cliffs along the area will provide excellent lookouts

for using binoculars to spot turtles while they are foraging. Green turtles frequently swim to the surface to breathe while they are actively feeding.

Underwater surveys with scuba, and by towing a diver from an inflatable boat, will be carried out to compile detailed habitat maps of foraging and sleeping areas. The algae and invertebrate growth available to turtles as forage at each benthic community will be sampled and identified. Larger samples will also be collected to estimate standing crop densities of *Pterocladia capillacea* and other algae found to be heavily used by turtles as food.

Permanent transects will be designated and mapped to aid in censusing aggregations of turtles. The number of turtles of each size category will be counted during surveys with scuba (or while being towed) for a given time over a set distance. The generally excellent clarity of the ocean water along the Kau coastline will enhance this portion of the study.

Information on natural mortality that results from predation, or possibly disease, will be tabulated through observations of lesions, scars and any pathological signs present on the turtles captured or sighted. At select sites, several large baited hooks will be set to sample sharks and examine their stomachs for the presence of turtle remains.

Samples of the groundwater discharge occurring in the nearshore waters will be sampled and analyzed for nitrates, phosphorus and other nutrients. Sites of discharge in the Kau District are easily located along the lower intertidal zone. Nutrient levels of the seawater will also be sampled nearby, as well as at coastal sites in Kau where there are no foraging pastures or resident turtles.

TRAVEL JUSTIFICATION

Travel between Honolulu and the Kau District is essential in order to accomplish the proposed research. Six study visits distributed evenly throughout

the 12-month period will allow for comprehensive coverage, and constitute an intensive workload. The relatively low cost of travel shown in the budget is due to the fact that most lodging and meals will take place in a campsite setting.

COOPERATIVE ORGANIZATIONS

Cooperative assistance in the form of in-kind services and partial funding may be forthcoming from the National Marine Fisheries Service, the Fish and Wildlife Service, the Hawaii State Department of Land and Natural Resources, and the Coastal Zone Management Program. The National Park Service may also provide some assistance since a portion of the Volcanoes National Park is located along the Kau coastline.

Students at the University of Hawaii - Hilo Campus will be invited to participate in certain aspects of the research as credit toward their certification in the Marine Option Program.

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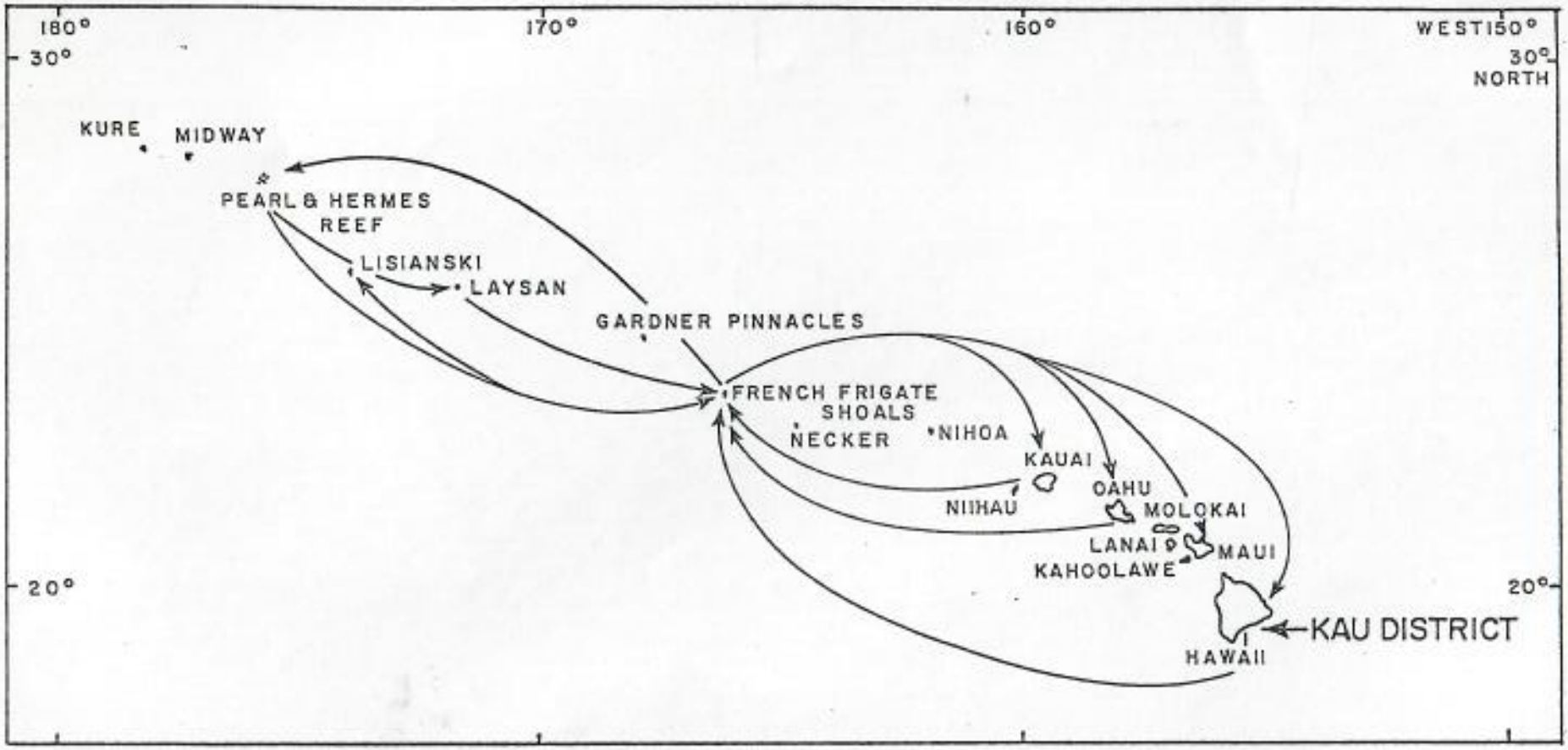

Figure 1. Map of the Hawaiian Archipelago showing the location of the Kau District on the island of Hawaii at the southeastern end of the chain. The various arrows show the breeding migrations of adult green turtles to and from French Frigate Shoals as documented by tagging studies.

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures — Principal Investigator(s) G. Balazs

Project Area — Associate Investigator(s)

Project Number — Fiscal Officer's Signature — Date

BUDGET CATEGORIES	TIME/EFFORT BY MAN-MONTHS: Sea Grant Funded Cal (11 mo)	Acad (9 mo)	Sum/OL	UH Funded Cal (11 mo)	Acad (9 mo)	Sum/OL	Others Funded Cal (12 mo)	Sea Grant NOAA	Matching UH	Matching Others*	TOTAL
SALARIES & WAGES											
. Principal Investigator(s) Balazs, G., R-3	27,386							27,386			27,386
. Associate Investigator(s)											
. Professionals (Staff)											
. Research Associates RCUH 6 mo=504 hrs @5.00								2,520			2,520
Graduate Students											
Pre-Baccalaureate Students											
Secretarial-Clerical											
Technical-Shop											
Other-Specify											
SUB-TOTAL - Salaries & Wages (S/T A.)								29,906			29,906
FRINGE BENEFITS (S/T B.)								8,035			8,035
								37,941			37,94

DATE_____

ROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures

roject Number_____ Principal Investigator(s) G. Balazs

DGET CATEGORIES	Sea Grant NOAA	Matching UH	Matching Others*	TOTAL
ERMANENT EQUIPMENT				
(S/T C.)				
XPENDABLE SUPPLIES & EQUIPMENT Turtle nets	800.			800.
(S/T D.)	800.			800.
RAVEL omestic Island of Hawaii, 6 trips (15 days) @$725	4,350.			4,350.
ternational				
(S/T E.)	4,350.			4,350.

PROPOSED SEA GRANT BUDGET YEAR

DATE 9/

PROJECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures

Principal Investigator(s) G. Balazs

Project Area

Associate Investigator(s)

Project Number

BUDGET CATEGORIES	Sea Grant NOAA	Matching UH	Matching Others*	TOTA
OTHER DIRECT COSTS				
HIMB lab fees, 05.00% of $29,906 salaries	1,459.			1,459
Consultant fee for algae & invertebrate identification	300.			300
(S/T G.)	1,759.			1,759
TAL DIRECT COSTS (A THRU G) TOTAL D/C (A-G)	45,050.			45,05
INDIRECT COSTS MODIFIED 45,050				
ON Campus - Research: 41.00% of DIRECT COSTS : of	18,471.			18,47
Training: % of : of				
OFF Campus - Research: % of : of				
Training: % of : of				
Research Vessel: % of of				
(S/T Ind Cos)	18,471.			18,47
TAL COSTS TOTAL D/C + Ind Cos	63,521.			63,52

*Note: may qualify as "Off Campus" research

* Please insert in this column, Matching Funds from sources other than UH State Funds. Also, indicate Fund's source in parentheses under the figure, giving institution's or Firm's name. Non-monetary contributions such as supplies, service, etc. should be supportable by evidence and subject to audit. For both monetary & non-monetary contributions, please detail in category column.

WORKSHEET FOR FRINGE BENEFIT CALCULATIONS - SEA GRANT YEAR 16 Page of

JECT Recruitment, growth & developmental habitat requirements of green turtles in their nearshore foraging pastures Date 9/14/82

(UH MATCHING FRINGE CALCULATED AT % OF SALARIES & WAGES)

SOURCE OF FUNDS: NOAA

	Name	Balazs	RCUH				
	Rank-Step	R3					
	Amount	27,386.	2,520.				
	No. of Months	12	6				
gular Employees							
A. 26.29% of Wages*		7,200.					
B. .57/mo. or 684/12 mos.**		684.					
C. APT Accum. Vac. 2.5% of Wages							
D. Overload (OL)*** 2.09% of Wages							
E. UH Match only % of Wages							
iduate Students							
A. 2.09% of Wages*** RCUH 06.00%			151.				
B. /mo. or /12 mos.**							
ergraduates & Less an 1/2 time employees							
A, 2.09% of Wages***							
als		7,884.	151.				

SUB-TOTAL Sea Grant Funded	8,035.
SUB-TOTAL UH Funded	
SUB-TOTAL Others Funded	
OVERALL TOTAL	8,035.

* Retirement, Social Security, Workmen's Compensation, Unemployment Compensation Insurance
** Health, Dental, Life Insurance
*** Workmen's Compensation, Unemployment Compensation Insurance

Intent to submit a research proposal to the Sea Grant College Program

May 1982

Title - Recruitment, growth and developmental habitat requirements of green sea turtles in their coastal foraging pastures at the island of Hawaii

Principal Investigator - George H. Balazs
Assistant Marine Biologist
Hawaii Institute of Marine Biology
(vitae attached)

Duration - Sea Grant Years 16 and 17 (1983-85)

Motivation - Previous studies that have been undertaken with Sea Grant support by this investigator have yielded substantial information on the life history and ecology of green turtles (Chelonia mydas) at their breeding and basking areas in the Northwestern Hawaiian Islands. The publications and reports providing detailed results of this research are listed in the attached vitae. As part of the Northwestern Hawaiian Islands Resource Investigation coordinated by Dr. Richard Grigg, this work fulfilled the need for management-oriented data on green turtles as envisioned in the Tripartite Cooperative Agreement.

A significant and somewhat unexpected finding of this past research was the identification of certain coastal sites in the Kau District of the island of Hawaii that constitute highly productive foraging habitat for both immature and adult green turtles. These rich algal pastures at the extreme southeastern end of the archipelago yield the most rapid growth rates thus far recorded for green turtles of the Hawaiian population. It is therefore likely that the turtles living in these areas are making major contributions to the seasonal (and nearly sole) migratory breeding colony that assembles at French Frigate Shoals in the Northwestern Hawaiian Islands.

Proportionally more recruits to the breeding colony could be expected to result from these rich areas. In addition, higher levels of reproduction could be expected once maturity is reached, since the interval needed between breeding migrations (2 years or more) would be shorter than for turtles living at less productive coastal sites. The reasons for the higher productivity of the Kau District foraging pastures are not known at present. The principal food source used by the turtles is believed to be Pterocladia capillacea, a red alga that thrives along certain lava rock coastlines where fresh water percolates into the ocean. This groundwater discharge may very well be a rich source of nutrients for the algal growth.

Comparatively little work has been focused on green turtles (or any of the other marine turtle species) while they are in the foraging pastures where the vast majority of their life is spent. It is clearly much more difficult and time consuming to undertake a study in this marine habitat, as opposed to nesting areas where the turtles crawl ashore and can be conveniently observed and tagged. Nevertheless, there is now widespread agreement among marine turtle biologists and resource managers that the emphasis of study should, and must, be shifted to foraging areas if further knowledge of practical use is to be acquired. The question then is not "if" the work is urgently needed, but rather "where" it can be best conducted, and with what talents and financial support. The intended proposal described herein would stress the many advantages of having this investigator use foraging pastures in the Kau District as the focus of an in-depth investigation. Some of these important advantages are briefly stated as follows:

1. The comparatively rapid growth rates exhibited by turtles living in

these pastures, and their potentially major contribution of recruits to the breeding colony.

2. The presence of sufficient numbers of both adults and immature turtles aggregated at specific coastal areas.

3. The substantial amount of previous tagging and other research conducted at French Frigate Shoals, the site where adults living in these pastures migrate to breed.

4. The presence of a pool of over 100 immature turtles that were captured, tagged, measured and released during earlier exploratory work at these pastures.

5. The accessible nature of these pastures to research activities, and this investigator's proven ability to study and tag turtles in their marine habitat.

6. The relative saftey of undertaking research in these pastures (i.e. low numbers of sharks and a high percentage of suitable weather conditions).

7. The relatively undeveloped and undisturbed nature of the ecosystem associated with these pastures.

8. The demonstrated assistance and enthusiasm that can be obtained from people living along this coastline.

9. The interest of other potential Sea Grant investigators in undertaking marine studies along this coastline that will complement the work being proposed herein.

It is anticipated that the National Marine Fisheries Service and the Division of Aquatic Resources of the State of Hawaii will vigorously endorse this intended proposal and cooperate to whatever extent possible. Both of these agencies have interests and responsibilities in the management of

green turtles occurring in foraging pastures of the Kau District and elsewhere in the Hawaiian Islands. However, the limitations of funds and personnel are likely to prevent this work from being undertaken within the foreseeable future. Sea Grant appears to be an appropriate and logical avenue for accomplishing this task.

Goals - The overall project goal is to acquire comprehensive and in-depth base-line data on the ecology and population dynamics of green turtles living in foraging pastures along the Kau coastline. This information will have direct application to the furure management of Hawaiian as well as certain other populations of green turtles.

Methods - The primary study methods employed will consist of 1) systematic tag and recapture efforts using tangle nets and scuba; 2) underwater censuses and observations of feeding and other behavior; 3) Underwater mapping of foraging and sleeping habitat; and 4) collection and analysis of food and other samples.

Major budget items would include travel to the study area, supplies, salary for part-time assistants, and the Principal Investigator's salary at the R-3 level. The use of an inflatable boat, outboard motor, and portable scuba compressor should be possible from existing equipment now on hand from the Northwestern Hawaiian Islands Resource Investigation.

University of Hawaii at Manoa

Hawaii Institute of Marine Biology
Coconut Island, Kaneohe, Hawaii

MEMORANDUM

September 20, 1982

TO: Jack R. Davidson
Director, UH Sea Grant College Program

FROM: George H. Balazs
Assistant Marine Biologist

SUBJECT: Proposal for Sea Grant Year 16 (1983-84)

My research proposal entitled "Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures" is being respectfully submitted to your office for funding consideration during Sea Grant Year 16. Please note that the budget sheets do not presently show matching funds due to the fact that financial commitments have as yet not been received from the potential cooperators referenced in the text. It is hoped that such support will be forthcoming after the agencies have had the opportunity to scrutinize the full proposal, and come to recognize the need and significance of this work. I should also mention to you that there is some uncertainty whether the proposed project falls under "on campus" or "off campus" research. Consequently, for the time being, the overhead cost has been computed at the higher rate of "on-campus."

I have decided not to submit a full proposal at this time covering the assessment of sea turtle stocks and native usage in American Samoa. You will recall that earlier this year I sent a preproposal to your office on this subject. I am still quite interested in eventually undertaking this work in Samoa, but my proposed foraging pasture study here in Hawaii is simply more important at the moment. If a foraging pasture study is going to be launched in the Kau District, it should be done in a consecutive year following my past and present tagging work in Hawaii. The one-year (or more) gap caused by undertaking a project in Samoa during Sea Grant Year 16 would weaken my ability to achieve optimum results working in the pastures at a later date.

I would appreciate your continuing advice and guidance on these matters.

GHB:ec
Encls.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu Laboratory
P. O. Box 3830
Honolulu, Hawaii 96812

December 2, 1982 F/SWC2:GHB

TO: William G. Gilmartin

FROM: George H. Balazs

SUBJECT: My Sea Grant proposal entitled "Recruitment, growth, and developmental habitat requirements of green turtles in their nearshore foraging pastures"

I met with Dr. Jack Davidson on November 10 to discuss the above topic. While Dr. Davidson said that he would not be able to fund my salary request, he did propose to support the project at a level of $15,000 to cover student technicians, supplies, and travel. My base salary would have to be obtained from another source in order for the project to be ultimately funded. Under the revised plan that we discussed, the work on my part would not require a full-time effort since the Marine Option Program at UH-Hilo would be substantially involved under my direction.

Letters of inquiry relating to my proposal that I sent in September to Doyle Gates and Ernest Kosaka were never answered. Mr. Brian Harry of the National Park Service did respond, and a copy of his helpful letter is attached for your information.

Enclosure

United States Department of the Interior
NATIONAL PARK SERVICE
HAWAII VOLCANOES NATIONAL PARK
HAWAII 96718

IN REPLY REFER TO:

N2219(HAVO)

November 13, 1982

Mr. George H. Balazs
Assistant Marine Biologist
Hawaii Institute of Marine Biology
University of Hawaii
P.O. Box 1346, Coconut Island
Kaneohe, Hawaii 96744

Dear Mr. Balazs:

Thank you for your informative Sea Grant proposal and letter of September 22nd. We would like to be kept informed of progress with your proposal and of dates and locations of your trips to the Ka'u Coast.

Personnel and facilities of the Research Center at Hawaii Volcanoes National Park may be of some help to you during your study. Please contact Dr. Charles Stone, Research Scientist, Hawaii Volcanoes National Park, Hawaii 96718 (telephone: 967-7367) if you need assistance. He can give you details about dormitory space, laboratory facilities, storage space, and logistical help.

We wish you success in getting your proposal funded. We anticipate a productive study and look forward to your recommendations for proper resources management to enhance the survival of green turtles.

Sincerely,

G. Bryan Harry
Pacific Area Director

UNIVERSITY OF HAWAII
Sea Grant College Program

MEMORANDUM

July 13, 1982

TO: George Balazs

FROM: Jack R. Davidson

SUBJECT: Your preproposals titled "Marine Turtle Stocks and their Native Usage in American Samoa" and "Recruitment, Growth and Development...of Green Sea Turtles"

The Sea Grant Advisory Council met recently to establish priorities for the 1983-85 Sea Grant program and to discuss the intents for proposals we have received.

The council's reaction to your proposals were mixed. The first received medium to low priority ratings, with the second receiving ratings ranging from high to low. One of the reviewers most qualified to comment on this type of program gave the following assessments:

> "I agree there is a need for a biological assessment of the turtle resource in the Samoas (American and Western Samoa Islands). Equally important is a study to determine the importance and role of marine turtles in the culture of the Samoan people. Instead of confining the research effort to American Samoa, my suggestion would be to expand the study to include Western Samoa. George Balazs should be able to provide considerable input in the study of the hawksbill nesting population in Western Samoa. more important, an assessment of the imporance of turtles in the culture of the Samoan people can be better obtained by interviewing people in Western Samoa.
>
> "Whereas research on the turtle resources in the Hawaiian Archipelago is badly needed, I believe the other turtle project deserves higher priority and consideration for funding at this time. Possibly, a revised version of this proposal could be submitted for support in the second of the 2-year period."

The next steps in our proposal process are peer review and National Sea Grant office review. At this point it would be difficult to predict the success and probability of eventual funding. I am not sure where National Sea Grant stands with respect to threatened species research.

If you decide to resubmit either or both of these, I will need a complete proposal in our format by September 20. Also I would suggest we send copies to Dallas Miner,of OCZM, and see if he would signify their priority to his agency by offering to share costs. If you wish to discuss this further please call or make an appointment.

University of Hawaii at Manoa

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

May 19, 1982

To: Jack R. Davidson, Director
Sea Grant College Program

From: George H. Balazs
Assistant Marine Biologist
(IPA contract with NMFS through May of 1983)

Subject: Intent to submit research proposals to the Sea Grant College Program

The two enclosed preliminary drafts for possible proposals are being submitted for consideration in accordance with your memorandum of April 22, 1982.

My intended proposal dealing with the population dynamics of green turtles at the Big Island would logically fall within the program tentatively envisioned by Rick Grigg. I would welcome the opportunity to once again be a part of this sort of team effort under Rick's coordination.

I am not asking to have both proposals funded during the same year, but rather seeking your views as to which project might receive the highest endorsement from your office. Thank you in advance for your guidance in this important matter.

GHB:md

Enclosures

1. Locate, map & characterize habitat
2. Sample and determine nutrient levels in SGD
3. Census resident aggregations
4. Estimate habitats carry capacity of green turtles
5. Strengthen & refine growth data through recaptures
6. Determine recruitment of juveniles from pelagic to nearshore habitats
7. Identify food sources
8. Identify & quantify natural mortality
9. Ascertain effectiveness of "living tag".

[Have all Fed & State permits

SEA GRANT COLLEGE PROGRAM ADVISORY COUNCIL

Dr. Richard S. Miller
Dean, Law School
1400 Lower Campus Road
Honolulu, HI 96822
Ph: 948-7986

Dr. John Bardach
Resource Systems Institute
East-West Center
1777 East-West Road
Honolulu, HI 96848
Ph: 944-7510

Dr. Donnis H. Thompson
Superintendent of Education
Department of Education
Queen Liliuokalani Bldg.
1390 Miller Street
Honolulu, HI 96813
Ph: 548-6405

Mr. Jack Suwa
Chairman
Department of Agriculture
1428 South King Street
Honolulu, HI 96814
Ph: 548-7101

Mr. ~~Svein Fougner~~ Kitty Symonds
Executive Director Acting
Western Pacific Regional Fisheries
Management Council
1164 Bishop Street, Room 1608
Honolulu, HI 96813
Ph: 523-1368

Mr. Doyle E. Gates
Administrator
Western Pacific Program Office
National Marine Fisheries Service
2570 Dole Street
Honolulu. HI 96822
Ph: 955-8831

Mr. Richard Gibson
Manager, Hawaii Aquaculture
c/o Kekaha Sugar Plantation
P.O. Box 596
Kekaha, HI 96752
Ph: 337-1421

Mr. Frank Goto
Manager
United Fishing Agency, Ltd.
117 Ahui Street
Honolulu, HI 96813
Ph: 536-2148

Dr. Lawrence Hallanger
c/o Seaco
146 Hekili Street
Kailua, HI 96734
Ph: 261-7955

Mr. Jack Harmon
146 Hekili Street
Kailua, HI 96734
Ph: 261-7955

Dr. Philip Helfrich
Hawaii Institute of Marine Biology
Coconut Island
P.O. Box 1346
Kaneohe, HI 96744
Ph: 247-6631

Dr. Charles E. Helsley
Director
Hawaii Institute of Geophysics
2525 Correa Road, HIG 131
Honolulu, HI 96822
Ph: 948-8760

Mr. Andrew In
Dean, College of Education
1776 University Avenue, WA2-128
Honolulu, HI 96822
Ph: 948-7703

Mr. Ray Jenkins
375 Dune Circle
Kailua, HI 96734
Ph: 262-5401

Mr. Karl Keller
U.S. Army Engineer
District, Honolulu
Bldg. 230, Ft. Shafter
APO San Francisco 96558
Ph: 438-1635

Mr. Hideto Kono
Director
Department of Planning & Economic Development
250 South King Street
Honolulu, HI 96813
Ph: 548-3033

Mr. Chew Lun Lau
Environmental Officer
Department of Public Works
Honolulu Municipal Building
Honolulu, HI 96813
Ph: 523-4150

Dr. James Maragos
Environmental Resources Sec.
Planning Branch
U.S. Army Corps of Engineers, POD
Building 230
Ft. Shafter, HI 96858
Ph: 438-2263

Mr. George M. Nakasato
Assistant Director
Cooperative Extension Service
3050 Maile Way, Gilmore 203
Honolulu, HI 96822
Ph: 948-8139

Mr. Susumu Ono
Director
Dept. of Land & Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813
Ph: 548-6550

Mr. Richard Shomura
Director, Honolulu Laboratory
National Marine Fisheries Service
P.O. Box 3830
Honolulu, HI 96812
Ph: 946-2181

Mr. George Wilkins
Senior Scientist
Naval Ocean Systems Center
P.O. Box 997
Kailua, HI 96734
Ph: 254-4433

Dr. Klaus Wyrtki
Professor of Oceanography
Department of Oceanography
University of Hawaii
Honolulu, HI 96822
Ph: 948-7037

Mr. Louis Agard
55 S. Kukui Street, #404
Honolulu, Hawaii 96813

Mr. Charles Clark
Director
Department of Health
Kinau Hale
1250 Punchbowl Street
Honolulu, HI 96813

George,

7/23/82

For a variety of reasons I have decided against launching a big island research program. I really appreciate your interest and willingness to participate but at this juncture I've decided to take several new directions. One is a Makalii project on the buoys (FAOS), another is seamount ecology, a third is Research coordinator (overall) for Sea Grant (¼ time) and a fourth is a sabbatical next year. I'm also, of course, trying to wind up the NWHI project. So it'll be pretty busy. I would resubmit both proposals and hope for the best. Good luck.

Rick

University of Hawaii at Manoa

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

September 21, 1982

Mr. Howard Takata
Sea Grant Advisory Service
Richardson Ocean Center
2349 Kalanianaole
Hilo, Hawaii 96720

Dear Howard:

I thought that you should have a copy of the full proposal focusing on the Kau District that I recently submitted to Sea Grant. Any helpful comments, or assistance, that you can give me at this stage will be greatly appreciated.

I have not forgotten to send you the turtle tags and applicators that I promised several weeks ago. My supply of applicators ran low, so I have been waiting for several to be returned from a recently dismantled field camp at Lisianski Island. The vessel is off-loading in Honolulu today so you will be getting a package from me soon.

Arlo Fast mentioned to me that the two of you had visited a well-cared-for mullet pond along Kalanianaole that had a few turtles. My only interest in this matter is to ask if the pond operator had a specific purpose for putting the turtles into the pond. Are they there for "looks" or pets, or do they serve some real purpose? Would you please ask him this question when you see him again. The turtles were probably put in the pond before September of 1978, consequently they are perfectly legal.

Best regards.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec
Enclosure

University of Hawaii at Manoa

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

September 21, 1982

Dr. Walter C. Dudley
Marine Option Program
Chemistry and Geology Discipline
University of Hawaii
1400 Kapiolani St.
Hilo, Hawaii 96720

Dear Walt:

Enclosed is a copy of the proposal that I recently submitted to the UH Sea Grant College Program. In the text, I have mentioned my interest and intent to partly use MOP Hilo Campus students in the project, should it be funded. At this time, I simply wanted to make you aware of this fact, and ask for any feedback you may wish to offer - either good or bad. If you can see this sort of project giving a big boost to your MOP activities, it would, of course, be helpful to have you communicate this directly to Dr. Davidson. However, perhaps this sort of action would be premature until we have the opportunity to talk more about the proposed work, either in person or by telephone.

Best regards to everyone.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

Enclosure

September 22, 1982

Mr. Henry Sesepasara, Director
Office of Marine Resources
Government of American Samoa
Pago Pago, American Samoa 96799

Dear Henry:

I want to thank you very much for your letter of August 11th expressing strong support for my preproposal to Sea Grant on turtle stocks and their native usage in American Samoa. I was indeed pleased to learn of your interest in having this work conducted. The short study visits I have been making to Rose Atoll will help establish a firm foundation for a comprehensive turtle assessment throughout Samoa at a later date.

Because of various professional and personal commitments, and the tenuous nature of Sea Grant funding at present, I have decided not to submit a full proposal on Samoa to Sea Grant for 1983-84. However, I want to assure you that I do indeed have a keen interest in eventually undertaking this work, possibly during 1984-85.

I should explain to you that for the past 11 years now I have been employed on a year-to-year basis by various grants and contracts administered through the University of Hawaii. The problems of obtaining funds by this method have increased during recent years as the result of government cutbacks and inflation. Consequently, I have been looking into the possibilities of being employed as a sea turtle researcher on a more secure basis by some other agency.

The chances of having Sea Grant eventually fund my project idea for Samoa would be strengthened considerably if "matching" funds are available from one or more other agencies. I would appreciate hearing any suggestions you may have for sources of these matching funds. Can any money be committed directly from your office? I arrive in Pago Pago on September 30th, and we are scheduled to leave for Rose Atoll on October 3rd. Possibly we can talk more about this funding subject sometime during my visit.

Best regards.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

Northwest Administrative Service Office
1700 Westlake Avenue North
Seattle, Washington 98109

June 1, 1981

TO: MB/PER Ralph Reeder

FROM: MB/NW2 Carroll McCutcheon

SUBJECT: IPA - George H. Balazs

The attached agreement to extend Mr. Balazs' IPA for one month from June 1, 1981 to June 30, 1981 has been verbally cleared and approved by Jack Falls, NMFS.

The 1-month extension is approved pending determination as to whether further extension for an additional 1-year period will be allowed.

Attachment

Distribution:

NMFS - Fx3
DOC-Office of Personnel
OPM-Office of Intergovernmental Personnel Progs.
University of Hawaii
NMFS - Honolulu
NOAA-MB/FIN
Seattle Field Finance Office - MB/NW1
Mr. George Balazs

69 Rev. 9/79
Office of Personnel Management
FPM Chapter 334

ASSIGNMENT AGREEMENT

Title IV of the

Intergovernmental Personnel Act of 1970 #03-0-FT2-2 Amendment 1

(5 U.S.C. 3371 - 3376)

INSTRUCTIONS

This agreement constitutes the written record of the obligations and responsibilities of the parties to a temporary assignment arranged under the provisions of the Intergovernmental Personnel Act of 1970.

The term "State or local government," when appearing on this form, also refers to an institution of higher education, an Indian tribal government, and any other eligible organization.

Copies of the completed and signed agreement should be retained by each signatory.

Within 15 days of the effective date of the assignment, two copies of this form must be sent to:

Faculty Fellows and Personnel Mobility Division
Office of Intergovernmental Personnel Programs
Office of Personnel Management
P.O. Box 14184
Washington, DC 20044

Procedural questions on completing the assignment agreement form or on other aspects relating to the mobility program should be addressed to either mobility program coordinators in each Federal agency or to the staff in the Intergovernmental Personnel Programs Division in Office of Personnel Management's regional office.

PART 1—NATURE OF THE ASSIGNMENT AGREEMENT

1.

[ ] New Agreement [ ] Modification [X] Extension

PART 2—INFORMATION ON PARTICIPATING EMPLOYEE

2. Name *(Last, First, Middle)*
BALAZS, George Harvey

3. Social Security Number
564-54-0156

4. Home Address *(Street, City, State, ZIP Code)*
992-A Awaawaanoa Place
Honolulu, Hawaii 96825

5. - A. Have you ever been on a mobility assignment?
[X] YES [ ] NO

5. - B. If "YES", date of each assignment *(Month and Year)*
FROM: June 1, 1980 TO: May 31, 1981

PART 3—PARTIES TO THE AGREEMENT

6. Federal Agency *(List office, bureau or organizational unit which is party to the agreement)*
Commerce, NOAA, National Marine Fisheries Service, SWFC, Honolulu Laboratory

7. State or Local Government *(Identify the governmental agency)*
University of Hawaii at Manoa
Honolulu, Hawaii 96822

8. Is assignment being made through a faculty fellows program? If yes, give name of program.
[ ] YES [X] NO

PART 4—POSITION DATA

A—Position Currently Held

9. Employment Office Name and Address *(Building, Street, City, State and ZIP code)*
University of Hawaii at Manoa
Bachman Hall
Honolulu, Hawaii 96822

10. Employee's Position Title
Assistant Marine Biologist

11. Office Phone No. *(Area Code)*
(808) 247-6631

12. Immediate Supervisor *(Name and Title)*
Dr. Philip Helfrich, Director
Institute of Marine Biology

B—Type of Current Appointment

13. Federal Employees *(Check appropriate box.)*
[ ] Career Competitive
[ ] Other *(Specify)*

Indicate GS Level

14. State and Local Employees

State or Local Annual Salary
$23,695

Original Date Employed by the State or Local Government
October 1971

C—Position To Which Assignment Will Be Made

15. Employment Office Name and Address *(Building, Street, City, State and ZIP code)*
National Marine Fisheries Service
Honolulu Laboratory
P. O. Box 3830, Honolulu, HI 96812

16. Assignee's Position Title
Fishery Biologist

17. Office Phone No. *(Area Code)*
(808) 946-2181

18. Immediate Supervisor *(Name and Title)*
William G. Gilmartin
Wildlife Biologist

PART 5–TYPE OF ASSIGNMENT

19. Check Appropriate Box

- [ ] On detail from a Federal agency
- [ ] On leave without pay from a Federal agency
- [X] On detail to a Federal agency
- [ ] On appointment in a Federal agency

20. Period of Assignment *(Month, Day, Year)*
FROM: June 1, 1981 TO: June 30, 1981

PART 6–REASON FOR MOBILITY ASSIGNMENT

21. Indicate the reasons for this mobility assignment and discuss how the work will benefit the participating governments. In addition, indicate how the employee will be utilized at the completion of this assignment.

The National Marine Fisheries Service has been assigned the responsibility for sea turtles in the central and western Pacific Ocean. In response to this mandate the NMFS Honolulu Laboratory has agreed with the University of Hawaii for the detail of turtle expert George H. Balazs to the Laboratory staff. The ensuing programs are expected to result in a valuable advance in understanding of the Pacific populations of marine turtles. Results of this work will be documented in appropriate reports and publications.

PART 7–POSITION DESCRIPTION

22. List the major duties and responsibilities to be performed while on the mobility assignment. Attach an accurate current description of the position being filled through the IPA assignment.

Major duties and responsibilities of this assignment consist of developing and carrying out research programs dealing with Hawaiian and other Pacific populations of marine turtles (Cheloniidae and Dermochelidae). These programs will encompass tagging, stock assessment, migratory patterns, growth rates, reproductive ecology, food habits, natural mortality, terrestrial basking, and habitat usage involving radio tracking. The results of this work will be presented in appropriate reports and publications.

PART 8–EMPLOYEE BENEFITS

23. Rate of Basic Pay

$23,695

24. Special Pay Conditions *(Indicate any conditions that could increase the assigned employee's compensation during the assignment period)*

See attachment detailing fringe benefits.

25. Leave Provisions *(Indicate the annual and sick leave benefits for which the assigned employee is eligible. Specify the procedures for reporting, requesting and recording such leave)*

Employee will be eligible for his existing annual and sick leave benefits and will continue established procedures for requesting, reporting, and recording leave.

PART 9—FISCAL OBLIGATIONS

Identify, where appropriate, the office to which invoices and time and attendance records should be sent.

26. Federal Agency Obligations *(If paying more than 50 percent of a Federal employee's salary beyond a 6-month period, specify rationale for cost-sharing decision.)*

Federal Agency will reimburse the State Agency for the salary and fringe benefits of G. Balazs, and will provide office space, typing services, and supplies as normally provided a visiting researcher.

27. State or Local Government Agency Obligations

State Agency is responsible for continuing to pay all wages and benefits to G. Balazs, who will report time and attendance to the University of Hawaii for normal record keeping, according to established procedures.

PART 10—CONFLICTS OF INTEREST AND EMPLOYEE CONDUCT

[ ] 28. Applicable Federal, State or local conflict-of-interest laws have been reviewed with the employee to assure that conflict-of-interest situations do not inadvertently arise during this assignment.

[X] 29. The employee has been notified of laws, rules and regulations, and policies on employee conduct which apply to him/her while on this assignment.

PART 11—OPTIONS

30. Indicate coverage or "N.A." if not applicable

A. Federal Employees Group Life Insurance

[ ] Covered [X] N.A.

B. Federal Civil Service Retirement

[ ] Covered [X] N.A.

C. Federal Employee Health Benefits

[ ] Covered [X] N.A.

31. State or Local Agency Benefits *(Indicate all State employee benefits that will be retained by the State or local agency employee being assigned to a Federal agency. Also include a statement certifying coverage in all State and local employee benefit programs that are elected by the Federal employee on leave without pay from the Federal agency to a State or local agency.)* State employee benefits to be retained by G. Balazs being assigned to a Federal agency are, in addition to base pay, his retirement plan, Social Security (FICA), health plan, group life insurance plan, workmen's compensation and unemployment compensation insurance.

32. Other Benefits *(Indicate any other employee benefits to be made part of this agreement)*

Any travel that may be necessary to the effective performance of his duties while assigned to the Federal agency will be at Federal government expense.

PART 12—TRAVEL AND TRANSPORTATION EXPENSES AND ALLOWANCES

33. Indicate: (1) Whether the Federal agency or State or local agency will pay travel and transportation expenses to, from, and during the assignment as specified in Chapter 334, of the Federal Personnel Manual, and (2) which travel and relocation expenses will be included.

Not applicable

PART 13--APPLICABILITY OF RULES, REGULATIONS AND POLICIES

34. Check Appropriate Boxes

[X] YES
[ ] Yes, with exceptions attached

A. The rules and policies governing the internal operation and management of the agency to which my assignment is made under this agreement will be observed by me.

[X] B. I have been informed that my assignment may be terminated at any time at the option of the Federal agency or the State or local government.

[*] C. I have been informed that any travel and transportation expenses covered from Federal agency appropriations may be recoverable as a debt due the United States, if I do not serve until the completion of my assignment (unless terminated earlier by either employer) or one year, whichever is shorter. * not applicable

[ ] D. I have been informed of applicable provisions should my position with my permanent employer become subject to a reduction-in-force procedure.

[ ] E. I agree to serve in the Civil Service upon the completion of my assignment for a period equal to that of my assignment. Should I fail to serve the required time, I have been informed that I will be liable to the United States for all expenses (except salary) of my assignment. *(For Federal employees only)*

PART 14--CERTIFICATION OF ASSIGNED EMPLOYEE

In signing this agreement, I certify that I understand the terms of this agreement and agree to the rules, regulations and policies as indicated in Part 13 above.

35. Location of Assignment *(Name of Organization)*	36. Date *(Month, Day, Year)* From:	To:
National Marine Fisheries Service, SWFC Honolulu Laboratory	6/1/81	6/30/81
37. Signature of Assigned Employee: George H. Balazs	38. Date of Signature *(Month, Day, Year)*: 2/27/81	

PART 15--CERTIFICATION OF APPROVING OFFICIALS

In signing this agreement, we certify that:

- the description of duties and responsibilities is current and fully and accurately describes those of the assigned employee;
- this assignment is being entered into to serve a sound, mutual public purpose and not solely for the employee's benefit;
- at the completion of the assignment, the participating employee will be returned to the position he or she occupied at the time this agreement was entered into or a position of like seniority, status and pay.

State or Local Government Agency	Federal Agency
39. Signature of Authorizing Officer: Durward Long	40. Signature of Authorizing Officer: Carroll McCutcheon
41. Date of Signature *(Month, Day, Year)*: MAY 21 1981	42. Date of Signature *(Month, Day, Year)*: June 1, 1981
43. Typed Name and Title: Durward Long, Chancellor, University of Hawaii at Manoa	44. Typed Name and Title: Carroll McCutcheon, Personnel Officer, NASO, Seattle, WA

PRIVACY ACT STATEMENT

Sections 3373 and 3374, Assignment of Employees To or From State or Local Governments, of Title 5, U.S. Code, authorizes collection of this information. The data will be used primarily to formally document and record your temporary assignment to or from a State or local government, institution of higher education, Indian tribal government, or other eligible organization. This information may also be used as the legal basis for personnel and financial transactions, to identify you when requesting information about you, e.g., from prior employers, educational institutions, or law enforcement agencies, or by State, local, or Federal income taxing agencies.

Solicitation of your Social Security Number (SSN) is authorized by Executive Order 9397, which permitted use of the SSN as an identifier of individual records maintained by Federal agencies. Furnishing your SSN or any other data requested is voluntary. However, failure to provide any of the requested information may result in your being ineligible for participation in the Intergovernmental Assignment Program.

January 26, 1983

Dear Doyle: I never did get a response to this letter of inquiry (and proposal) that I submitted to you in late September of last year. Also, Dr. Davidson mentioned that he did not directly receive comments from your office.

The proposal has moved ahead within the Sea Grant program with a greatly reduced funding request. Though it may not be possible for WPPO to make a financial contribution, I would nevertheless certainly appreciate any endorsement of the project that you are able to make. Would you please let me know if this will be possible.

Sincerely,

George Balazs

September 23, 1982

Mr. Doyle Gates
Western Pacific Programs Office
Southwest Region
National Marine Fisheries Service
P. O. Box 3830
Honolulu, Hawaii 96812

Dear Doyle:

As you may know, for the past 11 years my salary has been funded through various research grants and contracts administered by the University of Hawaii. My current contract, an Interagency Personnel Act (IPA) agreement with the Honolulu Laboratory, will be completed at the end of May of next year. It is unlikely that this contract will be renewed, since the University usually does not allow an IPA to exceed three years.

Because there are still some key facts that we need to know about Hawaiian green turtles, I have decided to delay seeking funds for a project in American Samoa, and instead try to focus a one year (1983-84) study effort on turtles in their foraging pastures along the Kau District. The enclosed proposal that I recently submitted to Sea Grant provides the details of this planned research. In order for this project to have a reasonable chance of being funded, it will clearly have to receive vigorous endorsements from agencies that have responsibilities in the recovery and management of sea turtles. There will also have to be a partial commitment of funds from these same agencies for use as "matching" money.

After you have had the opportunity to study the proposal, I ask that you give serious consideration to having WPPO commit $10,000 or more toward the funding of this work. Similar requests are being made to several of the other potential cooperators mentioned in the text. If there are any questions that you need answered about the proposal, I will, of course, be pleased to meet with you and your staff for discussions. In any event, I look forward to hearing from you at your earliest convenience. Please send your written response, comments and/or suggestions to my University address (shown on this letterhead) so a copy can be forwarded directly to Dr. Davidson's office.

Thank you for your consideration of this matter.

Sincerely,

GHB:ec
Encl.

GEORGE H. BALAZS
Assistant Marine Biologist

University of Hawaii at Hilo
COLLEGE OF ARTS AND SCIENCES
NATURAL SCIENCES DIVISION

October 1, 1982

Mr. George Balazs
Hawaii Institute of Marine Biology
P. O. Box 1346
Coconut Island
Kaneohe, HI 96744

Dear George:

Thank you for sending me the proposal and the recent articles. I read over and passed the "Detritus Short-circuit" article on to Leon Hallacher (our marine biologist). He felt it was a quite plausible mechanism for increasing cycling rates. Please continue to send any interesting literature that passes your way. It is appreciated by faculty and students.

I've read the proposal and must say that I am quite interested. I will send a letter of support to Dr. Davidson immediately. I think that both you and our students would benefit by working together on this. We have and could make available to you: an inflatable boat and motor, walkie-talkie radios, marine sighting compass, salinity, temperature and oxygen meters. Plus we have a group of students currently being trained in their use in a study of Hilo Bay. We also have MOP students trained in algae, invertebrate and fish identification, and with UH diving certification.

There are many aspects of your project about which I would like to talk with you. Maybe we could get together this winter for a planning meeting. We could always fly you down here to give a "turtle talk."

I'm off to New Orleans to give a talk in mid-October and then off from the beginning of December to mid-January on a Deep Sea Drilling cruise, so give me a call in the next couple of months.

Best regards to all.

Sincerely,

Walt

Walter C. Dudley
Assistant Professor of Marine Geology & Oceanography
1400 Kapiolani Street
HILO, HAWAII 96720 TEL: (808) 961-9383

WCDyh

Balazs

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

October 5, 1982

Dr. Rose T. Pfund
Acting Associate Director
University of Hawaii
1000 Pope Head Road, Room 220
Honolulu, Hawaii 96822

Dear Dr. Pfund:

I am in receipt of your request of September 22 to review and comment on the proposal submitted for Sea Grant support by George Balazs, Hawaii Institute of Marine Biology, entitled "Recruitment, Growth and Developmental Habitat Requirements of Green Turtles in Their Nearshore Foraging Pastures." Following are my comments:

1. George Balazs has demonstrated both his ability and desire to conduct research of this nature, and is regarded by his professional peers as the foremost authority on sea turtle biology and management in the mid-Pacific region. He is the logical candidate for research of this nature.

2. Research objectives (goals) consist of nine distinct items. I have some concern that a study period of one year may not be of sufficient duration to provide a data base for indepth analysis to fully accomplish objectives 4, 7, and 8. However, since I am not personally aware of the field situation involved, I could be wrong. Sample sizes will be predicated on size of area to be covered, size and age of composition of the turtle population involved, number of field workers directly involved, and their ability to gather appropriate data of sufficient magnitude and value to permit objective analysis and comparisons.

   I do think that the project can gather enough information on these specific objectives (4, 7, and 8) to provide at least a partial objective analysis and can refine the problem for further study to complete the picture.

   I believe that objectives 1, 2, 3, and 5 can be obtained. Objective 6 will depend on the extent of the geographic area to be sampled, ocean and atmospheric conditions, number of turtles in-

volved, and the field workers' abilities. Again, intensive work could probably accomplish this objective, but, based on the information contained in the proposal and the modest budget for field workers' salary and time, I am not sure how definitive the resultant data would be. It will certainly be more than is currently available.

Objective 9, dealing with effectiveness of the living tag, will depend on how many, if any, of those animals marked as hatchlings are obtained in the study area. Data will be limited, but, again, even one wild green turtle, so marked, will be more than is available to the world today. To date, I am aware of only one return of a wild turtle (Kemp's ridley), so marked, and this was in the Gulf of Mexico. As a note of interest, my office is supporting additional research on this marking technique, under field conditions in the U.S. and Latin America, beginning this current fiscal year (1983).

3. Methodology appears appropriate. My one concern is that the project proposal does not provide for enough field worker assistance. If I read the budget breakdown correctly, the proposal calls for approximately 63 days (8 hours per day) total field assistance, other than the project leader. This seems extremely limited, considering round trips from the main island to the big island, time to get people and equipment organized at each site, etc. Again, not being directly familiar with the field situation, I could easily be wrong. I can't believe that a rather modest increase in the budget request for additional field assistance would not be significantly conducive to a much higher level of overall project accomplishment for the objectives outlined.

4. The need for this research and resultant applicability to future understanding and management of sea turtle populations, both in Hawaiian waters and elsewhere, is certainly appropriate. So little is known about sea turtle ecology and management, that it is embarrassing to those of us attempting to work with this resource. Completion, or even partial completion, of the objectives set forth in this proposal will provide new information related to aspects of sea turtle ecology that we know very little about. The proposal at hand will address life history and ecological questions outside of the immediate area of nesting and of a mix of age classes (hopefully) which has only been touched on in past work. The role of the nearshore marine habitat and carrying capacity of this respective habitat, along with analyses of certain nutrient levels, daily levels of food consumption and preferences, and the determination of the mix of age classes within the population which utilize the study area, will all be extremely useful data to future research and management of sea turtle stocks in various parts of the world and certainly in Hawaii, where I would suspect conflicts between turtles and humans will rapidly increase. Base-line information such as this will help provide information necessary to lessen or avoid future conflicts through a better understanding of the turtle life history and ecology -- information not currently available to decision makers in Hawaii or elsewhere.

5. Mr. Balazs has reviewed the pertinent literature, which is limited, dealing with sea turtle ecology and the marine environment they may utilize. I am not familiar enough with literature dealing with the marine environment, per se, to judge whether the applicant has or has not covered this aspect as it may relate to the proposal at hand. However, based on my knowledge of the applicant's previous work, I would bet he has done a more-than-satisfactory job of literature review applicable to this research effort.

I appreciate the opportunity to review and comment on this proposal and recommend that serious consideration be given to granting approval. If I have a concern, it is that the applicant has not requested sufficient support to allow for the level of field worker assistance that may be necessary for certain segments of the work.

Sincerely yours,

Jack B. Woody

Jack B. Woody
Acting Assistant Regional Director
Federal Assistance, Fishery
Resources, and Engineering

MEMORANDUM

September 23, 1982

TO: Bill Gilmartin
Richard Shomura

FROM: George Balazs

SUBJECT: My proposal to Sea Grant for 1983-84.

I am providing each of you with a copy of the full proposal that I recently submitted to the U.H. Sea Grant Office in order to meet their September 20th deadline. Copies are also being sent to the other interested agencies listed in the text in an effort to solicit cooperative assistance and financial help for "matching" funds. At present I have no matching funds, and it is highly unlikely that Sea Grant will support the work unless they are forthcoming.

My professional goal is to remain active in marine turtle research, in order to fully utilize the knowledge and expertise I have acquired over the past 11 years. There are, I believe, several possibilities for the funding of my salary at the end of our IPA contract in May of next year. One of these would be the proposal to Sea Grant, while another that I have already briefly discussed with Bill would be a temporary appointment directly with the Honolulu Lab. In the not-too-distant future I need your thoughts and ideas on this subject in order to accurately plan for the future.

Since the Southwest Fisheries Center is the lead agency responsible for research of sea turtles while they are in the water, I imagine that Sea Grant would expect a matching-funds commitment from this agency of not less than $25,000, or about 40% of the total. This is simply a rough estimation on my part, and would, of course, depend upon what matching funds might also be received from other agencies.

I would appreciate your help and guidance with this important matter.

GB:ec

Encl.

September 27, 1982

Mr. Kelvin Char
Marine Sanctuaries Program
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Kelvin:

By now you should have received a copy of the full proposal that I submitted to Sea Grant dealing with green turtles in foraging pastures on the Big Island. You will undoubtedly recall that Dr. Davidson left a copy of my preproposal for this project at your office when he visited Washington in August.

It seems to me that this proposed work has direct application to the delineation and eventual designation of several sea turtle sanctuaries by your office. A firm data base would obviously be needed for such a designation, and this is exactly what I can provide in one year if the project is funded. However, in order to have a chance of being funded by Sea Grant, I am certain that vigorous endorsement and some matching funds will be needed from other agencies that have interests in sea turtles. Can your office see fit to give this endorsement and$10,000 or more in matching funds? I am making similar requests to the other agencies listed in the proposal so the project can truly be shaped into a cooperative effort.

Thank you for your consideration of this important request. I look forward to hearing from you at your earliest convenience.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

University of Hawaii at Manoa

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

September 21, 1982

Mr. Ernest Kosaka
Endangered Species Coordinator
U.S. Fish and Wildlife Service
P. O. Box 50167
Honolulu, Hawaii 96850

Dear Ernie:

I am writing to ask you to please consider providing $10,000 or more of financial support from your office for the enclosed research proposal that I recently submitted to the University of Hawaii Sea Grant College Program. As indicated in the text, I am in need of "matching funds" from cooperative agencies that have a direct interest in this line of research. Your office within the Fish and Wildlife Service is one of several such agencies.

I look forward to hearing from you at your earliest convenience. Thank you for your consideration.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist
(1982-83 IPA Contract with NMFS)

GHB:ec

Enclosure

September 24, 1982

Mr. Henry Sakuda, Director
Division of Aquatic Resources
1151 Punchbowl Street
Honolulu, HI 96813

Dear Henry:

Enclosed is a copy of the full proposal that I recently submitted to Sea Grant in order to meet their September 20th deadline. The work being proposed represents one of the avenues I am pursuing in order to remain active in the research of Hawaiian sea turtles. As you may know, my IPA contract with NMFS is completed in May of next year.

After you have had the opportunity to read through the proposal, I would appreciate receiving your comments, and hopefully your support.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

Enclosure

September 22, 1982

Mr. Brian Harry
National Park Service
300 Ala Moana Blvd.
P. O. Box 50165
Honolulu, Hawaii 96850

Dear Mr. Harry:

I am sending you a copy of the enclosed Sea Grant proposal for 1983-84 in view of the fact that the Hawaii Volcanoes National Park is listed as a potential cooperator in the research. I would appreciate hearing your thoughts on this subject after you have had the opportunity to study the proposal.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

Enclosure

December 28, 1982

Mr. Calvin Char
Marine Sanctuaries Program
3300 Whitehaven, N.W.
Washington, D.C. 20235

Dear Calvin:

I never did hear from your office concerning my inquiry of September 27th (copy enclosed) asking about possible partial funding for my Sea Grant proposal (revised copy also enclosed). If you can see your way clear, at this date I would still appreciate receiving at least an endorsement for the project from the Marine Sanctuaries Program.

Best regards for the New Year.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

Enclosures

September 21, 1982

Mr. Howard Takata
Sea Grant Advisory Service
Richardson Ocean Center
2349 Kalanianaole
Hilo, Hawaii 96720

Dear Howard:

I thought that you should have a copy of the full proposal focusing on the Kau District that I recently submitted to Sea Grant. Any helpful comments, or assistance, that you can give me at this stage will be greatly appreciated.

I have not forgotten to send you the turtle tags and applicators that I promised several weeks ago. My supply of applicators ran low, so I have been waiting for several to be returned from a recently dismantled field camp at Lisianski Island. The vessel is off-loading in Honolulu today so you will be getting a package from me soon.

Arlo Fast mentioned to me that the two of you had visited a well-cared-for mullet pond along Kalanianaole that had a few turtles. My only interest in this matter is to ask if the pond operator had a specific purpose for putting the turtles into the pond. Are they there for "looks" or pets, or do they serve some real purpose? Would you please ask him this question when you see him again. The turtles were probably put in the pond before September of 1978, consequently they are perfectly legal.

Best regards.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec
Enclosure

September 21, 1982

Mr. Pete Hendricks
Sea Grant Advisory Service
P. O. Box 1327
Kailua-Kona, Hawaii 96740

Dear Pete:

I thought that you would like to have a copy of the full proposal that I recently submitted to Sea Grant. Any helpful comments, or assistance, that you can offer at this stage will be greatly appreciated.

A copy of the proposal has also been sent to Howard.

Sincerely,

GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

Enclosure

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu Laboratory
P. O. Box 3830
Honolulu, Hawaii 96812

Mr. Mike Yamamoto
Division of Aquatic Resources 22 August 1983

Dear Mr. Yamamoto:

As I understand it, my request for Scientific Collecting Permit No. SCP-83-15 is being held in abeyance until you hear from me. I have now received clarification on this matter. The application should now be processed, but with my name listed as "Primary Permittee". The "Applicant" should be Mr. Richard S. Shomura, Director, Honolulu Laboratory. The "designated assistants" should be Walter Dudley, David Clements, Nancy Bernard, Alan K. H. Kam, and Ronald McAmber. All other information in the application remains the same.

I should also mention that all non-NMFS persons listed as designated

(over)

assistants will be covered under federal law by a permit issued to the Hawaii Institute of Marine Biology (copy enclosed). NMFS employees, such as myself, do not need a federal permit to undertake research activities of "Threatened"-listed species, like the green sea turtle.

If there are any questions, please call me at 946-2181. Thank you for your help.

Sincerely,

George H Balazs

WILDLIFE Biologist

August 24, 1983 F/SWC2

Mr. Alika Cooper
163 Kaiulani Street
Hilo, HI 96720

Dear Mr. Cooper:

During the coming months a small research project will be undertaken on the Big Island to tag and study green turtles in their marine habitat. This work will be a cooperative effort involving mainly the Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, the University of Hawaii at Hilo Marine Option Program, and the Sea Grant College Program. In view of your recognized experience with Hawaiian sea turtles I would like to ask for your cooperation with any information you may be able to provide on the following points.

1. At which specific coastal sites on the Big Island should we direct our efforts in order to catch the greatest number of turtles?

2. At which specific coastal sites would we be most likely to catch large turtles, 200 pounds and greater?

3. What capture techniques would you recommend for the above locations?

4. Which beach sites on the Big Island were previously used (or are now used) by turtles to nest and lay eggs?

Any help that you can offer on these important subjects will be greatly appreciated. We will be requesting similar assistance from other individuals on the Big Island.

Sincerely,

Richard S. Shomura
Director, Honolulu Laboratory

Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street, Room 330
Honolulu, Hawaii 96813

SCIENTIFIC COLLECTING PERMIT APPLICATION

Applicants are advised that each application will be subjected to critical evaluation to determine the beneficial, educational and/or scientific aspects of the proposed activity or project. Attachment of research project proposals, description of proposed activity or any other information to justify this request is encouraged. Applicants should complete this application as thoroughly as possible to permit full evaluation of the request and expeditious issuance of the permit if warranted.

[ ] New Permit

[X] Renewal, previous permit No. SCP82-25, SC81-25

TYPE OF APPLICANTS:

[ ] School Teacher (Primary to High School)
[ ] University Professor and/or Other Researcher
[ ] Aquarium, Zoo or Other Public Live Display Facility
[X] Others (specify) National Marine Fisheries Service

PURPOSE: To (take, [illegible]) for maintenance in an enclosure at Green Island, Kure Atoll weaned female Hawaiian monk seal pups from the time of weaning until late September to increase the potential for their survival; to use fine mesh nets and traps to cat food fish and invertebrates for the captive seals; to bleach mark all seals to develop informa tion on the size and age/sex structure of the Kure monk seal population; and to census the ato at 2-day intervals, counting seals and collecting scats and spewings.

ORGANISMS AND NUMBER REQUIRED: [List common and scientific name(s) and specify number of specimen(s) to be collected.]

Hawaiian monk seal, Monachus schauinslandi, six weaned female pups, various reef fishes and invertebrates, quantities as required.

METHOD(S) TO BE USED: [An Environmental Assessment and/or Environmental Impact Statement must be submitted with complete research proposal for any project involving taking of aquatic organisms with any chemical substance. Activities concerned with "threatened," "endangered" or other protected species may require an Environmental Assessment and/or Environmental Impact Statement.]

A Marine Mammal Protection Act/Endangered Species Act Permit for this project has been obtained to collect the first three pups (MMPA/ESA Permit No. 366). An application has been submitted to collect more pups as necessary in 1983. The seals will be collected with a hoop net after weaning and placed into a small cage which will be carried by hand or boat to the maintenance enclosure on Green Island. The pups will be kept there up to 6 months for release about 30 September 1982. They will be fed fish locally caught as much as possible, supplemente as necessary with frozen fish.

LOCATION(S) WHERE ACTIVITIES ARE TO BE CONDUCTED:

Kure Atoll: Collection of pups: Green and Sand Islands.
Maintenance of pups: Green Island.
Behavioral observations and monk seal scat/spewing collections: Green Island and Sand Islands.

(8/15/81)
3271

(over)

DURATION OF PROPOSED ACTIVITY: (Specific dates, if available.)

9 March 1983:	Begin observations:
5-7 April 1983:	Enclosure construction.
7 April to 30 September 1983:	Capture and maintenance of monk seals in enclosure.
About 30 September 1983:	Release seals, remove fencing from enclosure.
1 October to 31 December 1983:	Pup observations.

NAME(S) OF ALL PERSONS TO ENGAGE IN ACTIVITIES UNDER THIS PERMIT:

Primary Permittee: William G. Gilmartin

Title: Leader, Marine Mammal and Endangered Species Investigation

Affiliation: National Marine Fisheries Service

Address: 2570 Dole Street, Honolulu, HI 96822

Mailing Address: P. O. Box 3830, Honolulu, HI 96812

Designated Assistants: (List names of all assistants, any subsequent changes should be reported to the Division of Aquatic Resources immediately.)

C. Edward Bowlby
John R. Henderson
Karl W. Kenyon
Alan K. H. Kam
Nicholas E. Palumbo, DVM
Gail A. Peiterson
Rodney T. Watson

The applicant is aware that the permit requested may be denied if proposed project or activity is deemed to be unjustified by the Department of Land and Natural Resources or for any infraction of previous permit(s).

Date

Signature of Applicant, Richard S. Shomura, Director
Honolulu Laboratory, Southwest Fisheries Service
Phone: (B) (808) 946-2181 (R) (808) 988-3430

(8/15/81)
3273

340 MoHouli St.
Hilo 96720

Oct 5, 83

Dear George,

I want to thank you for the nice book & hope I can fill it real fast. I also wanted to ask you more about what kind of information you want me to gather. I have those "sea turtle sighting report" sheets w/ all the questions and map, but are there more specific things you want me to know. I have a few more people who are asking questions around but don't want to fill in sheets or anything, they're local and young and surfy and well, paper is out of the question. Anyway maybe when you get a free moment you might drop a short note.

Mahalo
Lisa Hall

P.S. Send to:
340 Mohouli St
Hilo, Hi 96720

PROPOSED SEA GRANT BUDGET - YEAR 16 X Y 17 PERIOD 06/01/83-05/31/84 DATE 12/16

PROJECT RECRUITMENT, GROWTH AND DEVELOPMENTAL HABITAT REQUIREMENTS OF GREEN TURTLES IN THEIR NEARSHORE FORAGING PASTURES. Principal Investigator G. BALAZS

Project Area ISLAND OF HAWAII Associate Investigator(s)

Project Number MR/R-26 Fiscal Officer's Signature Date

BUDGET CATEGORIES	TIME/EFFORT BY MAN-MONTHS Sea Grant Funded Cal (11 mo)	Acad (9 mo)	Sum/OL	UH Funded Cal (11 mo)	Acad (9 mo)	Sum/OL	Others Funded Cal (12 mo)	Sea Grant NOAA	Matching UH	Matching Other	TOTALS
A. S A L A R I E S & W A G E S											
1a. Principal Investigator											
b. Associates											
2a. Professionals											
b. Research Associates											
c. Graduate Students											
d. Pre-Baccalaureate Students											
e. Secretarial-Clerical											
STUDENT HELP (1,210 HOURS @ $5)								6,050			6,050
f. Technical-Shop											
g. Other-Specify											
CASUAL (ALGAE AND INVERTEBRATE IDENTIFICATION)								300			300
SUB-TOTAL - Salaries & Wages (S/T A.)								6,350			6,350
B. F R I N G E B E N E F I T S (S/T B.)								92			92
TOTAL = SALARIES & WAGES + FRINGE BENEFITS (S/T A + B)								6,442			6,442

PROPOSED SEA GRANT BUDGET - YEAR 16 X YEAR 17 PERIOD 6/1/83-5/31/84 DATE 12/16/8

PROJECT RECRUITMENT, GROWTH AND DEVELOPMENTAL HABITAT REQUIREMENTS OF GREEN TURTLES IN THEIR NEARSHORE FORAGING PASTURES. Principal Investigator G. BALAZS

Project Number MR/R-26

BUDGET CATEGORIES		Sea Grant NOAA	Matching UH	Matching Others*	TOTALS
C. PERMANENT EQUIPMENT					
	(S/T C.)				
D. EXPENDABLE SUPPLIES AND EQUIPMENT					
NETS, FLOATS, ANCHORS, SAFETY DEVICES, AND FUEL		1,200			1,200
	(S/T D.)	1,200			1,200
E. TRAVEL					
1. Domestic					
6 TRIPS TO KAU (15 DAYS EACH) AT $725 PER TRIP		4,350			4,350
2. International					
	(S/T E.)	4,350			4,350
F. (PUBLICATION COSTS)	(S/T F.)				

PROPOSED SEA GRANT BUDGET YEAR 16 06/01/83 - 05/31/84

RECRUITMENT, GROWTH AND DEVELOPMENTAL HABITAT REQUIREMENTS

PROJECT OF GREEN TURTLES IN THEIR NEARSHORE FORAGING PASTURES

DATE 12/1[illegible]82

Principal Investigator(s) G. BALAZS

Project Area

Associate Investigator(s)

Project Number MR/R-26

BUDGET CATEGORIES	Sea Grant NOAA	Matching UH	Matching Others*	TOTALS
OTHER DIRECT COSTS				
1. LAB FEES	135			135
2.				
3.				
4.				
5.				
(S/T G.)	135			135
TOTAL DIRECT COSTS (A THRU G) — TOTAL D/C (A-G)	12,127			12,127
INDIRECT COSTS				
Research: On-campus - 41.00% of MTDC				
Off-campus - 23.00% of MTDC 12,127	2,789			2,789
Training: On-campus - 25.00% of MTDC				
Off-campus - 16.00% of MTDC				
(S/T Ind Cos)	2,789			2,789
TOTAL COSTS — TOTAL D/C + Ind Cos	14,916			14,916

* Please insert in this column, Matching Funds from sources other than UH State Funds. Also, indicate Fund's source in parentheses under the figure, giving Institution's or Firm's name. Non-monetary contributions such as supplies, service, etc., should be supportable by evidence and subject to audit. For both monetary and non-monetary contributions, please detail in category column.

RECRUITMENT, GROWTH AND DEVELOPMENTAL HABITAT REQUIREMENTS
PROJECT OF GREEN TURTLES IN THEIR NEARSHORE FORAGING PASTURES Date 12/16/82

(UH MATCHING FRINGE CALCULATED AT 18% OF SALARIES & WAGES)

SOURCE OF FUNDS: NOAA NOAA

Name	STUDENT HELP	CASUAL				
Rank-Step						
Amount	6,050	300				
No. of Months						
Regular Employees						
A. 26.29% of Wages*						
B. $57/month or $684/12 mos.**						
C. Accum. Vac.% Wages APT; 1.75% Civil Serv: 2.5% Faculty: 2.5%						
D. Overload: 1.45%						
E. UH match only 26% of wages						
Graduate Students						
A. 1.45% of wages***						
B. $57/mo. or $684/12mos.**						
Undergraduates & Less than ½ time employees						
1.45% of wages	88	4				
RCUH Employees 25% of wages						
TOTALS	88	4				

SUB-TOTAL Sea Grant Funded	92
SUB-TOTAL UH Funded	
SUB-TOTAL Others Funded	
OVERALL TOTAL	92

* Retirement, Social Security, Workmen's Compensation, Unemployment Compensation Insurance
** Health, Dental, Life Insurance
*** Workmen's Compensation, Unemployment Compensation Insurance

NOAA FORM 36-27A (2-80)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

[X] GRANT
[ ] COOPERATIVE AGREEMENT

AMENDMENT TO FINANCIAL ASSISTANCE AWARD

NUMBER: NA81AA-D-00070

ACCOUNTING CODE: *See Below

RECIPIENT'S NAME: University of Hawaii

AMENDMENT NUMBER: 5

STREET ADDRESS: 1000 Pope Road, Rm. 220

EFFECTIVE DATE: June 1, 1983

CITY: Honolulu

STATE: Hawaii

ZIP CODE: 96822

PURPOSE OF AMENDMENT (Check appropriate box(es))

[X] EXTEND WORK COMPLETION TIME TO: May 31, 1984

[X] REVISE ESTIMATED AWARD COST AS FOLLOWS:	TOTAL COST PRIOR TO THIS AMENDMENT	ADD	DEDUCT	REVISED TOTAL COST ESTIMATE
UNITED STATES' SHARE OF COST	$ 3,415,000	$ 1,743,300	$ -0-	$ 5,158,300
RECIPIENT'S SHARE OF COST	$ 2,686,752	$ 1,373,713	$ -0-	$ 4,060,465
TOTAL ESTIMATED COST	$ 6,101,752	$ 3,117,013	$ -0-	$ 9,218,765

REASON FOR AMENDMENT

To provide additional funds to support the research described in the Recipient's proposal entitled "Sea Grant Institutional Program Year 16" dated February 4, 1983 as revised April 22, 1983 which is incorporated by reference.

*ND1000/8K1A01/4112	$93,300
MD1000/8K4A05/4112	$936,369
MD1000/8K4B05/4112	$713,631

[ ] Continued on attached sheets.

SPECIAL AWARD CONDITIONS (THE RECIPIENT AGREES TO EXECUTE THE WORK IN ACCORDANCE WITH THE NON-DISCRIMINATION REQUIREMENTS SET FORTH ON THE REVERSE OF THIS DOCUMENT.)

1. The Sea Grant Budget and Activity Budget covering this additional effort are attached.

2. The Disputes Clause, Item 17 of the General Provisions, is hereby deleted from this grant.

3. This grant award does not imply future awards from NOAA. Subsequent grant awards are dependent upon funds being appropriated by Congress and review and approval by the Department of Commerce of specific projects. Project activities should be completed within the allotted budget, since this program is being proposed for termination or substantial reductions, making future funding doubtful.

[ ] Continued on attached sheets.

SIGNATURE (Approved for the Secretary of Commerce.)	TITLE GRANTS OFFICER	DATE JUN 15 1983
SIGNATURE for	TITLE Director, National Sea Grant College Program	DATE JUN 15 1983

RECIPIENT IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO: U.S. Department of Commerce, NOAA GRANTS OFFICER 6010 Executive Boulevard, Rockville, Maryland 20852 ATTN: AT/GSM13

SIGNATURE (Authorized recipient official)	TITLE President	DATE JUN 27 1983

UNIVERSITY OF HAWAII

Sea Grant College Program

MEMORANDUM

July 5, 1983

TO: Principal Investigators and Fiscal Officers

FROM: Jack R. Davidson, Sea Grant College Program

SUBJECT: Official Notification of Sea Grant Funding for Year 16 Projects, Grant #NA81AA-D-00070

Your Year 16 project has been funded per the attached three-page budget. The formal contract has been signed by the University; permanent accounts may now be opened. The official document with legal requirements is attached for fiscal officers.

Reporting Requirements

As a Sea Grant principal investigator, you will be responsible for carrying out the objectives of the project or program and for the timely submision of the following reports:

1. a final fiscal report, due on or before June 15, 1984;

2. an interim progress report, due on or before September 30, 1983;

3. an annual progress report, if your project extends past May 31, 1984, or a project completion report if your project ends on May 31, 1984. These reports will be used as a basis for writing our annual report (required by the National Sea Grant Collge Program). Pictures will be welcomed.

4. completion of NOAA Forms 90-2 as required by the National Sea Grant College Program.

Budget Changes

In pursuing the objectives of this project, you are authorized to expend the monies per your approved budget. Please remember that changes in categories need my approval.

If changes are necessary, please direct a memorandum to me, sent via your fiscal officer to insure accurate fiscal information, and allow enough time for processing. I must have National Sea Grant College Program approval or NOAA Grants Office approval on large changes in equipment, travel, and consulting categories. Sometimes this takes several weeks.

Please keep me informed on your progress and feel free to consult with me on problems you may encounter.

Attachments

DURATION OF PROPOSED ACTIVITY: (Specific dates, if available.)

9 March 1983:	Begin observations:
5-7 April 1983:	Enclosure construction.
7 April to 30 September 1983:	Capture and maintenance of monk seals in enclosure.
About 30 September 1983:	Release seals, remove fencing from enclosure.
1 October to 31 December 1983:	Pup observations.

NAME(S) OF ALL PERSONS TO ENGAGE IN ACTIVITIES UNDER THIS PERMIT:

Primary Permittee: William G. Gilmartin

Title: Leader, Marine Mammal and Endangered Species Investigation

Affiliation: National Marine Fisheries Service

Address: 2570 Dole Street, Honolulu, HI 96822

Mailing Address: P. O. Box 3830, Honolulu, HI 96812

Designated Assistants: (List names of all assistants, any subsequent changes should be reported to the Division of Aquatic Resources immediately.)

C. Edward Bowlby
John R. Henderson
Karl W. Kenyon
Alan K. H. Kam
Nicholas E. Palumbo, DVM
Gail A. Peiterson
Rodney T. Watson

The applicant is aware that the permit requested may be denied if proposed project or activity is deemed to be unjustified by the Department of Land and Natural Resources or for any infraction of previous permit(s).

Date

Signature of Applicant, Richard S. Shomura, Director
Honolulu Laboratory, Southwest Fisheries Service
Phone: (B) (808) 946-2181 (R) (808) 988-3430

(8/15/81)
3273

Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street, Room 330
Honolulu, Hawaii 96813

SCIENTIFIC COLLECTING PERMIT APPLICATION

Applicants are advised that each application will be subjected to critical evaluation to determine the beneficial, educational and/or scientific aspects of the proposed activity or project. Attachment of research project proposals, description of proposed activity or any other information to justify this request is encouraged. Applicants should complete this application as thoroughly as possible to permit full evaluation of the request and expeditious issuance of the permit if warranted.

[ ] New Permit [X] Renewal, previous permit No. SCP82-25, SC81-25

TYPE OF APPLICANTS:
[ ] School Teacher (Primary to High School)
[ ] University Professor and/or Other Researcher
[ ] Aquarium, Zoo or Other Public Live Display Facility
[X] Others (specify) National Marine Fisheries Service

PURPOSE: To (take, [redacted]) for maintenance in an enclosure at Green Island, Kure Atoll weaned female Hawaiian monk seal pups from the time of weaning until late September to increase the potential for their survival; to use fine mesh nets and traps to cat food fish and invertebrates for the captive seals; to bleach mark all seals to develop information on the size and age/sex structure of the Kure monk seal population; and to census the atol at 2-day intervals, counting seals and collecting scats and spewings.

ORGANISMS AND NUMBER REQUIRED: [List common and scientific name(s) and specify number of specimen(s) to be collected.]

Hawaiian monk seal, Monachus schauinslandi, six weaned female pups, various reef fishes and invertebrates, quantities as required.

METHOD(S) TO BE USED: [An Environmental Assessment and/or Environmental Impact Statement must be submitted with complete research proposal for any project involving taking of aquatic organisms with any chemical substance. Activities concerned with "threatened," "endangered" or other protected species may require an Environmental Assessment and/or Environmental Impact Statement.]

A Marine Mammal Protection Act/Endangered Species Act Permit for this project has been obtained to collect the first three pups (MMPA/ESA Permit No. 366). An application has been submitted to collect more pups as necessary in 1983. The seals will be collected with a hoop net after weaning and placed into a small cage which will be carried by hand or boat to the maintenance enclosure on Green Island. The pups will be kept there up to 6 months for release about 30 September 1982. They will be fed fish locally caught as much as possible, supplemente as necessary with frozen fish.

LOCATION(S) WHERE ACTIVITIES ARE TO BE CONDUCTED:

Kure Atoll: Collection of pups: Green and Sand Islands.
Maintenance of pups: Green Island.
Behavioral observations and monk seal scat/spewing collections: Green Island and Sand Islands.

(8/15/81)
3271

(over)

July 8, 1983 F/SWC2:GHB

State of Hawaii
Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street, Room 330
Honolulu, HI 96813

Dear Sirs:

I am writing to request renewal of Scientific Collecting Permit No. SCP 83-15 which authorizes the capture and tagging of green turtles for research purposes. The enclosed report, which will be published shortly as a NOAA Technical Memorandum, incorporates the results of work carried out under the previous permit (7/23/82 - 6/30/83).

Thank you for your assistance.

Sincerely,

George H. Balazs
Wildlife Biologist

Enclosure

GHB:vi

bc: Balazs
HL

Balazs

UNIVERSITY OF HAWAII
Sea Grant College Program

MEMORANDUM

June 2, 1983

TO: George Balazs

FROM: Jack Davidson

SUBJECT: Your requests of June 1, 1983

We would be happy to provide a two-month late start for your Sea Grant Year 16 project. However, we cannot guarantee an extension of the project at this time. We usually have no trouble extending our grant and will extend your project if we are able to extend the Year 16 grant.

Adding Dr. Dudley should be no problem. We will have to send a request to Washington, D.C., though, and that request must include a copy of his biodata.

Your third request is a little more complicated. You will have to request a category change from "salaries" to "other" category, specifically stating that the funds will be used for stipends. Because this involves a downward adjustment in indirect costs a strong case must be made for the training the students will acquire in order to secure the okay of the Contracts and Grants Administration Office.

We'll wait to hear from you before we take any action on this.

June 1, 1983

TO: Jack R. Davidson, Director
Sea Grant College Program

FROM: George H. Balazs
HIMB

SUBJECT: May 23rd memorandum concerning opening of a temporary account for Sea Grant Year 16 MR/R-26.

It is respectfully requested that a 2-month "late-start," and 2-month no-cost extension, be granted for this project. Existing commitments make it necessary for both Dr. Walter Dudley and me to be out of the State for most of the next 2 months (June and July). In addition, Walt tells me that seme of his key students planned for involvement in this project will be away until early August.

In addition to the above request, it is also asked that 1) Dr. Dudley be formally listed as an associate investigator on this project, and 2) that permission be given to convert a major portion of the budget's salary to student stipends for direct use in the project.

Thank you for your consideration of these requests.

GHB:ec

cc: Walter Dudley
Sherwood Maynard
Samuel Chastain
David Owens

FORM CD-29 (REV 2-77) PRES. BY DAO 204-1

U.S. DEPARTMENT OF COMMERCE

TRAVEL ORDER

1. OPERATING UNIT OR OFFICE	2. ORDER NUMBER
NOAA - NMFS 14	4-FSR-02046

3. NAME AND TITLE OF TRAVELER(S)	4. ORGANIZATIONAL UNIT (Division, etc.)	5. PRESENT OFFICIAL STATION
[redacted] George H. Balazs Wildlife Biologist	SWFC Honolulu Laboratory	Honolulu, HI WASC: Seattle, WA

6. SPECIFIC PURPOSE OF TRAVEL (Include, when applicable, travel to seek residence quarters and travel time allowed therefor)

Purpose Code - 1

Field tagging and data collection of green turtles according to the NMFS/Sea Grant cooperative project.

7. ITINERARY (Point of origin and places to be visited)

Honolulu, HI to Hilo, HI to Punaluu, HI and return to Honolulu.

8. PERIOD OF TRAVEL	a. BEGIN ON OR ABOUT	b. END ON OR ABOUT	9. ESTIMATED COST (See 11, 12, 13 below)
	Mar 22, 1984	Mar 30, 1984	*NO COST

10. APPROPRIATIONS/ALLOTMENT CHARGEABLE → *

11. MODE OF TRANSPORTATION (Check applicable blocks)

- a. ☐ Common carrier
  - ☐ Bus ☐ Rail Coach ☐ Rail Pullman
  - ☐ Other than Air First Class
  - ☐ Air First Class (Justify in Item 14)
- b. ☐ Privately-owned vehicle
  - ☐ Auto ☐ Plane ☐ Rate per mile_____cents (See Sec. 10 DAO 204-1)
  - (1) ☐ Determined more advantageous to the Government (Justify in Item 14)
  - (2) ☐ For convenience of traveler (See Sec. 9, DAO 204-1)
- c. ☐ Rented motor vehicle (See DAO 209-9)
- d. ☐ Other means (Specify)

Travel	$	*
Per Diem	$	*
Special Expenses	$	*
H/H Eff'ts	$	XXXXXXXX
TOTAL	$	*

12. PER DIEM RATE(S)

*

Note: Travelers authorized to operate a Government - owned or leased vehicle must possess SF-46, "U.S. Government Motor Vehicle Operator's Identification Card," in accordance with DAO 209-2, unless covered by special exception therein.

13. SPECIAL EXPENSES AUTHORIZED (Check applicable blocks)

- a. ☐ Meeting registration fees
- b. ☐ Hire of taxis between lodging and/or place(s) of business
- c. ☐ Excess baggage, not to exceed_____pounds
- d. ☐ Other (Specify)

14. SPECIAL PROVISIONS/REMARKS (No. of Transportation Requests needed, justification of Air First Class, exception to Requirement for SF-46, etc.)

Travel voucher must be submitted within 15 days after completion of travel, and travel advances must be refunded at that time unless you have a standing travel advance.

15. CHECK APPLICABLE BLOCK → ☐ CHANGE OF OFFICIAL STATION ☐ REPORT TO FIRST PERMANENT DUTY STATION

It is hereby certified that this action is not primarily for the convenience or benefit of the employee, or at his request. Items b, c, d, and e, when completed, are authorized in accordance with Office of Management and Budget Circular, A-56.

a. TO (Traveler's new/first permanent station)	b. TRANSPORTATION OF IMMEDIATE FAMILY →	NUMBER

c. SHIP HOUSEHOLD EFFECTS FROM (Location)	d. TO (Location)	e. EST. WEIGHT (Pounds)

16. SIGNATURE OF REQUESTING/APPROVING OFFICER: Mary Lynne Rodgers

TITLE: Administrative Officer

17. Certificate of Authorization By Designated Authorizing Officer — You are hereby authorized to travel at Government expense under the conditions noted on this Order, and in accordance with the Standardized Government Travel Regulations. The number and approval date of this Order must appear on each voucher claiming reimbursement for expenses incurred consequent to this Order.

a. SIGNATURE OF AUTHORIZING OFFICER: Richard A. Rowntree

b. TITLE (Please type): Director Honolulu Laboratory

c. DATE ORDER APPROVED: 3/7/84

(SEE PRIVACY ACT STATEMENT ON BACK OF LAST PAGE)

FORM 4 (DISB)
(Revised) 8/80
BMI 2021

UNIVERSITY OF HAWAII

☒ INTER-ISLAND ☐ OUT-OF-STATE

TRAVEL COMPLETION REPORT

(See reverse for instructions)
Exhibit E
2021

DOCUMENT NO. (1-6): T38829

SOC. SEC. NO. (35-43)	BARGAINING UNIT	LAST NAME, FIRST NAME, MIDDLE INITIAL (44-46)
564-54-0156		Balazs, George H.

TRAVELER'S HOME ADDRESS, ZIP CODE
992A Awaawaanoa Pl.
Honolulu, Hi. 96825

DEPARTMENT, PROGRAM, ETC.: HIMB

TRAVELER'S TITLE: Asst. Marine Biologist

MONTH, DAY, YEAR (7-12): 2/24/84

INSTRUCTIONS TO TREASURY OFFICE:
☑ FORWARD CHECK TO ☐ CALL HIMB

TELEPHONE NO.: 247-6631

ESTIMATED OUT-OF-STATE TRAVEL COST

PER DIEM RATE _____ X NO. OF DAYS _____ $ _____
AIR FARE-P.O. _____
MILEAGE/TAXI, ETC. _____
CONFERENCE FEE _____
OTHER _____
TOTAL $ _____

TRAVEL ADVANCE (13-34) / AMOUNT (70-79)

	ACCOUNT CODE			RECEIVED	EXPENDITURE
22		62	4501		

SOURCE OF FUNDS (CONTRACT/GRANT NO. ACCOUNT NO.(S) AND AMOUNTS)
Sea Grant Green Turtle , F-84-238-F-582-B-323

CASH ADV. ISSUED: ☐ Above A/C
Check/SMV No. _____

AMT. REFUNDED: $ _____
U.H. REC'T NO. _____

PROP. DEP. DATE	PROP. RET. DATE	PROPOSED ITENERARY
2/17/84	2/19/84	Honolulu-Hilo- Punaluu(Big Isl)- return

PER DIEM SCHEDULE

If Time of Departure/Return	Allow on Day of Departure/Return
12:01 a.m.-6:00a.m.	1 Day 1/4 Day
6:01 a.m.-Noon	3/4 Day 1/2 Day
12:01 p.m.-6:00p.m.	1/2 Day 3/4 Day
6:01 p.m.-Midnight	1/4 Day 1 Day

PER DIEM
DATE & TIME OF DEP. 2/17/84 10:30 A.M.
DATE & TIME OF RET. 2/19/84 7:00 P.M.

DEPART DAY	FULL DAYS	RETURN DAY	TOTAL DAYS	RATE	AMOUNT	LESS MEALS/ LODGING REC'D
___	+ ___	+ ___	= ___	x ___	=$ ___	(___) $ ___

SUBSISTENCE SCHEDULE

Claim for	If travel Begins/Ends	Amount
Breakfast	Bef. 8:00a.m./--	$2.25
Lunch	Bef.Noon/Aft.12:30pm	$3.75
Dinner	--/Aft.7:00p.m.	$6.00

SUBSISTENCE FOR INTER-ISLAND TRAVEL
SUBSISTENCE CLAIMED: ☐ BREAKFAST ☐ LUNCH ☐ DINNER
OTHER COST:
TRANSPORTATION TO/FROM AIRPORT/MILEAGE ALLOWANCE (as per attached) ~~14.40~~
CONFERENCE FEE
OTHER COSTS AS PER P.O. 440651 & 440650
TOTAL

COMMENTS (ADDENDUM TO AUTHORIZED TRAVEL OR PURPOSE OF INTER-ISLAND TRAVEL)

AMOUNT CLAIMED (13-34) / (70-79)

22	ACCOUNT CODE	30	OBJ. SYM.	AMOUNT
22	F-84-238-F-582-B-323	30	4111	14.40

SUBMITTED BY: ✓ George H Balazs — Traveler — 3-9-84 Date

APPROVED BY: ✓ Philip Helfrich — Supervisor — Date

CERTIFIED AS TO AVAILABILITY OF FUNDS.
Francine N. Barclay 3/13/84

TRAVEL ADDENDUM APPROVED:

_____ — CHANCELLOR/DIRECTOR OF FINANCE — Date

DISB Form 33
(Rev. 10/80)

DOCUMENT NUMBER A 38829 (1-6)

DATE 3/6/84 (7-12)
MO DAY YR

UNIVERSITY OF HAWAII
PERSONAL AUTOMOBILE MILEAGE VOUCHER

YEAR & MAKE 1977 Buick MODEL & TYPE Skylark NO. OF CYL. 6 U. OF H. CAMPUS Manoa

EMPLOYEE'S POSITION TITLE _____ BARGAINING UNIT CODE _____

TRANS (13-14)	ACCOUNT CODE (15-28)	APP (29-30)	OBJ (31-34)	SOCIAL SECURITY NO. (35-43)	NAME (LAST, FIRST, M.I.) (44-46)	AMOUNT (70-79)
22	F-84-228-F-582-B-203	30	4111	[redacted]	Balazs, George H.	14.40
22		30	7200			

MO/DAY	TRIP NUMBER	FROM	TO	PURPOSE	MILES TRAVELED
2/17	1	Home	Hon Airport	Return	24 mi
2/19	2	"	"	"	24 mi

I HEREBY CERTIFY THAT THE ABOVE IS A TRUE AND CORRECT RECORD OF MILEAGE ON MY PERSONAL AUTOMOBILE USED IN THE PERFORMANCE OF MY OFFICIAL DUTIES IN ACCORDANCE WITH THE COMPTROLLER'S RULES AND REGULATIONS GOVERNING OFFICIAL TRAVEL AND TRANSPORTATION EXPENSES.

I FURTHER CERTIFY THAT I CARRY THE MINIMUM LIABILITY INSURANCE AS REQUIRED BY THE "HAWAII NO-FAULT LAW" WITH:

International Service Ins. Co.
(INSURANCE COMPANY)

POLICY NO AP 3144382

EXPIRATION DATE 3/31/84

TRAVELLER'S SIGNATURE ✓ [signature]

FUND CERTIFICATION: I CERTIFY THAT FUNDS ARE AVAILABLE FOR THIS PAYMENT.

Genevieve M. Sanchez 3/6/84
FISCAL OFFICER'S SIGNATURE DATE

TOTAL MILES . . . . . 48 mi

RATE: 30 ¢ per mile for the first 600 miles per month $ 14.40

_____ ¢ for each additional mile in excess of 600 miles per month $ _____

TOTAL MILEAGE CLAIM (4111 for Employees, 4112 for consultants and 4100 for others) $ 14.40

PARKING FEES . . . . . 7200 . . . $ _____

TOTAL CLAIM FOR REIMBURSEMENT . . . . . $ 14.40

REIMBURSEMENT APPROVAL: I CERTIFY THAT THE ABOVE CLAIMS AND SUPPORTS ARE IN ACCORDANCE WITH APPLICABLE LAWS AND UNIVERSITY POLICY.

✓ [signature] PI
PROGRAM HEAD'S SIGNATURE TITLE

CHILDREN'S TELEVISION WORKSHOP
ONE LINCOLN PLAZA • NEW YORK, NEW YORK 10023 • (212) 595 3456

April 20, 1984

Mr. William G. Gilmartin
National Marine Fisheries Service
P.O. Box 3830
Honolulu, HI 96812

Dear Bill,

Many thanks for all of your help in getting us set up to film the segment for 3-2-1 CONTACT about George Balazs's sea turtle study.

I understand from our field producer, Larry Engel, an his crew that George and his assistants were a pleasure to work with and were truly dedicated to the effort under what turned out to be unusually trying circumstances.

We are all looking forward to seeing the footage -- Larry feels he got a great story. Again, thank you for your advice, cooperation and patience with my many questions!

Sincerely,

Anne MacLeod

Anne MacLeod
Associate Producer
3-2-1 CONTACT

cc: George Balazs

George —
let me add my thanks to Larry's — he hasn't stopped singing your praises! — and you couldn't have been more helpful to me in the early stages.
Anne

CABLE: SESAMEST NEW YORK/RCA TELEX 236168

CHILDREN'S TELEVISION WORKSHOP
ONE LINCOLN PLAZA • NEW YORK, NEW YORK 10023 • (212) 595 3456

April 20, 1984

Dr. Izadore Barrett
Center Director
Southwest Fisheries Center
National Marine Fisheries Service
P.O. Box 271
La Jolla, California 92037

Dear Dr. Barrett:

I just wanted to let you know that the filming of the segment about George Balazs's sea turtle project went quite well and to thank you for permitting us to film for 3-2-1 CONTACT.

The field producer, Larry Engel, and his crew came back with rave reviews for George and his assistants, who were extremely cooperative throughout the shoot. Larry brought back marvelous footage, and it looks like we will end up with a story that is not only informative but intriguing to kids. We'll advise you of the fall air date.

Again, thank you for your cooperation in making this segment of 3-2-1 CONTACT possible.

Sincerely,

Anne MacLeod

Anne MacLeod
Associate Producer
3-2-1 CONTACT

cc: William Gilmartin
George Balazs

REPORT 1905 UNIVERSI
FREQUENCY: MONTHLY RESEARCH AND TRAINI
AS OF SE

ACCOUNT NO. F-86-238-F-582-B-323 INDIRECT COST

SPONSORING AGENCY NOAA BUDGET PERIOD

AWARD NO. MRR-26 PROJECT PERIOD

PRINCIPAL INVESTIGATOR BALAZS, GEORGE

<PLEASE INPUT MISSING I

BUDGET CATEGORY	ALLOCATIONS TO DATE	PRIOR YEARS EXPENDITURES
PERSONAL SERVICES		
SALARIES/WAGES REGULAR	2,350.00	
SUB-TOTAL	2,350.00	
FRINGE BENEFITS	92.00	
SERVICES - FEE BASIS	135.00	410.06
MATERIALS & SUPPLIES	1,200.00	4,321.32
COMMUNICATION		65.15
TRAVEL - DOMESTIC	4,350.00	3,050.88
FREIGHT & DELIVERY		135.21
OTHER RENTALS		1,341.16
REPAIRS		111.49
OTHERS	920.00	224.23
1 STIPENDS (6510-6510)	4,000.00	3,875.00
INVESTIGATOR TOTAL	13,047.00	13,534.54
INDIRECT COST 23.00	1,869.00	2,221.70
IC SUB-TOTAL	1,869.00	2,221.70
ADMINISTRATIVE TOTAL	14,916.00	15,756.24

REMARKS: PROJECT ACCOUNT IS IN DEFICIT. PLEASE CLEAR DEFICIT I
SUBMISSION OF EXPENDITURE REPORTS TO SPONSOR BY CGMD.
UPDATING INCREASED PROJECT BUDGET ALLOCATION DUE TO RE
SUBMIT RTBSR INPUT FORM TO CGMD IMMEDIATELY TO REFLECT
SMALL BE SUBJECT TO AUTOMATIC INACTIVATION.

REMARK: PROJECT ACCOUNT HAS TERMINATED OR IS SCHEDULED TO TERM
NECESSARY ADJUSTMENTS, AND LIQUIDATE OR CANCEL ALL OUT
OR RENEWED BEYOND CURRENT TERMINATION DATE. PLEASE SUB
NEW PROJECT PERIOD AND ANY INCREASES TO BUDGET ALLOCAT
TO AUTOMATIC INACTIVATION (CODE 1) AT TERMINATION OF P
LIQUIDATE EXISTING ENCUMBRANCES WILL BE ALLOWED TO BE
REJECTED AS INVALID TRANSACTIONS.

TY OF HAWAII
NG BUDGET STATUS REPORT
PT 30, 1985

TYPE MTDC TYPE OF PROJECT RESEARCH

10/01/83 TO 08/31/84	BUDGET-AMOUNT	14,916.00
10/01/83 TO 08/31/84	PROJECT AMOUNT	14,916.00

FISCAL OFFICER (038) CHASTAIN, SAMUEL
NFORMATION INDICATED BY *>

* * * * * * CURRENT FISCAL YEAR * * * * * * * CURRENT MONTH	YTD EXPEND	ENCUMBERED	UNENCUMBERED BALANCE
			2,350.00
			2,350.00
			92.00
			275.08-
			3,121.32-
			65.15-
			1,299.12
			135.21-
			1,341.18-
			111.49-
			695.77
			125.00
			487.54-
			352.70-
			352.70-
			840.24-

MMEDIATELY TO ENABLE PROPER CLOSE OUT AND FINAL
IF DEFICIT IS THE RESULT OF NOT PROPERLY
NEWAL OR ADDITIONAL FUNDING FROM SPONSOR, PLEASE
NEW BUDGET ALLOCATIONS. OTHERWISE, PROJECT ACCOUNT

INATE WITHIN 60 DAYS. PLEASE RECORD ALL EXPENDITURES.
STANDING ENCUMBRANCES. IF PROJECT HAS BEEN EXTENDED
MIT RTBSR INPUT FORM TO CGMO IMMEDIATELY TO REFLECT
IION. OTHERWISE, PROJECT ACCOUNT SHALL BE SUBJECT
RJECT PERIOD BY CGMO AND ONLY TRANSACTIONS TO
PROCESSED. ALL OTHER FISCAL EXPENDITURES WILL BE

Listen carefully and you will hear...

Seawords

News of the Marine Option Program — University of Hawaii

Seawords August 22, 1984 Issue 11

How I Spent My Summer Vacation...

ON THE R/V "KILA"

I'd never been at sea for longer than a few hours before; I could get sea-sick in a particularly storm-tossed bath tub; and my idea of the ideal research cruise is to study alcohol tolerance on an Aikane catamaran booze cruise. So it only makes sense that I'd find four days of plankton netting to be the perfect way of wasting the closing hours of my summer vacation.

It all started out innocently enough. I'd made it widely known that I wanted to do some serious, on-the-spot reporting for Seawords-- to go out into the field in the greatest Hunter Thompson tradition and cover the story, deal with it on it's own terms. When Annie Orcutt offered me a chance to sail with the R/V Kila I figured I could either accept or look like a complete idiot... with a grin painted on my face I said sure, what the hell. Can't be any worse than sitting behind a desk in the MOP lounge, pushing little pieces of paper around a big piece of paper trying to make something that looks vaguely like a layout.

I showed up at the dock the night before she was to sail, Tuesday night... dark and cold down at Snug Harbor, and I was already considering a panicked retreat. After introducing me as a warm body, my father disappeared into the night, cutting off my last practical opportunity for escape. I got the 'this is the pointy end, and that's water' tour of the place and stowed my gear (good ghod, four days at sea and I'm spouting that nonsense...gear, indeed...).

The R/V Kila is 104 feet of rust and motion sickness, twice converted before she washed up at Snug Harbor as a research vessel. She started out as a crabber, and through some no doubt gruesome chain of events wound up running drugs... by the time she was impounded, she was carrying such an ungodly load of high tech electronics that the Navy recovered the hundred grand they paid the Coast Guard for her by just stripping the avionics bare. Even so, I've heard that some sort of bug detector slipped through their search and wound up somewhere at UH.

She's actually fairly new and clean for a research ship, with nice roomy corridors just right for rattling around in. I got shoved into the fore peak with Carl, the ship's cook, and went to see how I could help get the ship ready for the high seas.

It became immediately clear that my main function on this cruise was to be fourth leg on the tripod... I was the only one on board who knew nothing at all about ships and just enough about oceanography to figure out which end of a shark to avoid. Plankton nets were repaired (side thought: what damaged them in the first place? Sharks, killer whales, giant carnivorous squids? Bad thoughts, push them away...) and everything was lashed down.

I woke up the next morning at 0500 when they started testing the diesels... a deep, throaty growl, like your average Mack truck turned big and mean, that appeared from nowhere and then cut off dead, then repeated several times until they were certain that nothing would blow up. There had been a lot of uncomfortable talk the night before about seasickness, and as we slowly pulled away from the dock I kept hearing vicious rumors of 4 to 8 foot seas... I could see the headlines: Journalist lost Overboard in Shark Infested waters... no, no sense searching for him, no hope at all... Indeed, she started pitching and rolling as soon as we left the Harbor.

After a small breakfast (there was plenty of food but I kept reminding myself light, damn it, or it'll repeat on

Continued Page 2

Continued from Page 1

you) I got up onto the deck and settled down by the side. We were moving along at a pretty good clip, and by 0730- when I'm usually telling my dad to go to hell because I don't want to wake up- I was seeing flying fish. Glistening torpedo shapes that erupted from the waves to skim the surface, each flick of the tail as they clip wave tops keeping them aloft for a few more precious seconds of sunlight. Whole schools (wings? squadrons?) would appear out of nowhere, frantically trying to get out of the way of this thundering, 104' behemoth that had wandered into their ocean... and then smack, back into the water, hitting the waves with all the grace and beauty of a poorly skipped stone.

And the seabirds-- wheeling, circling, then swooping to inches above the wave tops and disappearing for a time, behind a stray wave crest, into the trough and then, just when you're certain it's vanished for good, cut it too close this time and done a crash & burn... just then breaking into the sunlight and soaring, effortlessly, towards the sky.

Yes, all in all a rather pleasant spectacle as Honolulu faded behind us, lost itself into the haze of distance. We cruised westward, past the reef runway and Pearl Harbor, towards the barren Waianae coast. There was already something interesting happening Ewa... just a cane fire, I told myself, sending a column of smoke straight upwards and then out, spreading into a vast pall to the west. It seemed that where a cloud's shadow hit it, it was nearly invisible, showing the cloudbanks behind it.

The scientific instruments were already coming into use. First in the water was the bathythermograph, a clunky looking torpedo shaped device that would make a temperature-depth record as it was lowered on its long line behind the ship. It was supposed to scratch this trace on a thin film of gold deposited on a glass slide, but it didn't quite work that way... the critter was old and getting a bit cantankerous, and the traces it made while going down and coming back up didn't even come near to matching up. Finally, a suitable balance was struck.

Eventually we reached the Waianae coast, a truly alien landscape to me-- I've never been there, and I'd certainly never seen it from that perspective. Dry and scrubby, it has a certain beauty of it's own with it's rugged fingers of ridges and eery erosion forms.

As the Kila began cruising back and forth, the first series of tows was begun with the Bongo nets. These were being run for Jeannette Yen, who's doing research into the Copepod Euchaeta, and the double nets would be sent down to a specified depth, opened, closed and brought back to the surface with the sample container filled with a sort or red planktonic sludge. After the bongos, the 1-metre diameter nets were run. A much simpler affair, the metre net is just a large hoop with a long stocking of a fine plankton net trailing behind it. It

yielded a similar sort of plankton mess, and these samples were quickly carried into the lab for sorting.

The day dragged on into a sort of hot, yellow haze. I wasn't on watch until later that night, and the journalist was feeling distinctly like excess baggage. I began to realize that sunglasses would have been a good thing to bring along... I kept pestering them to see if there was some way I could help with something that I knew nothing about and could probably screw up real well until they grew sufficiently pestered with me to tell me to get below decks and stop frying my brains.

Dinner was great, and since there were no signs of motion sickness yet I decided to indulge myself. Night fell slowly as Jeannette took light readings and more nettings for her work, and the sun sank to a dully burning ember-eye in the west. The sea calmed, low glassy swells that slowly went from deep blue to gunmetal to slate, and finally black touched, where the moon caught it, with silver. Eventually, my watch began and I was introduced to the bongos in person.

The bongo nets are set to either side of the cable so the wire and bridle won't scare all the poor little plankton out of the way. As they descend on the line, the nets stream out behind but the front of the frame is covered by heavy cloth lids. When it hits the right depth, a 'messenger'- a weight- is sent down the line, to release the covers which are then pulled out of the way by bungee cords. A few minutes later, when it's been towed in a little way, a second messenger is sent to release the nets which pop off the frame, close tight and trail behind. Then the whole affair is towed in where, in a few wet, frantic minutes the nets are removed, emptied, re-attached and the unlikely, spring-loaded contraption is armed and lowered back into the sea.

After a few hours of this, when it was finally time for me to hit the rack, I was too tired to be sea-sick...

I actually over-slept; I got a full 4 1/2 hours. This time, I dug into breakfast with gusto. Greasy sausages? Pancakes with, oh yes lots of syrup? Kim Chee? Bring 'em on, no trouble for iron gut here.

The sea was still low and glassy, easy, slow swells rolling towards the horizon. The last series of nets was dropped in and I decided it was time to hit the sun screen... the first leg of the cruise was drawing to an end, and by 9:15 we were underway for Snug Harbor.

We finally hit the Harbor by early that afternoon, to spend the night at dock. Samples were off loaded (along with Jeannette) and a number of us headed for dry land-- some because they had business there, myself just to get my feet on terra more-or-less firma for a few hours. Yes, the first leg had gone rather well... aside from a lingering feeling of uselessness and a shortage of beer, no major problems.

Continued Page 5

OF INTEREST

Want to be a docent? Know what docent means? Think 'docent' is a kind of neat word, y'know, sort of like 'decent', even if you don't know what it means? If you can answer 'yes' to any of these questions, you may quality as a Sea Life Park volunteer docent. The program, which begins September 7th, has been approved for high school and college credit. Call 259-7933.

Annie wants to see Wei Lin Chua, Liysa Ehlen, Swan Heng Boon and Kent Takahashi to give them their NAUI Research Diver Cards from the Maui Transecting Workshop.

The Waikiki Aquarium will be offering a slide show and lecture on "Origins and Biology of Hawaiian Stream Life" on August 22, with biologists John Ford and (UHM MOP graduate) Dr. Robert Kinzie. Call 923-9741 for the full scoop.

The blue-Water Marine Lab is now signing up cruises for the fall Semester. The trips are mainly meant for high school groups, but any interested body may sign up. They'll be leaving Snug Harbor, once in the morning and once in the afternoon, Monday through Friday, from September 24 to November 21. One week's trips will leave from the Waianae Small boat Harbor. Price is $200 for a class of 30 plus a teacher. Call 948-8444 for more info.

The Marine Option Program is sponsoring a basic NAUI certified SCUBA class from September 5 to October 10. Classes will be Monday and Wednesday, 6:30 to 10:00pm including both pool work (at the UH pool) and lectures. Four days of ocean dives are also planned on Sundays. Tuition is $55.00 for MOPers and the first five ASUH members, and $70.00 for the rest. Students must supply transportation as well as mask, fins, snorkel and gloves. Call 946-8433.

Dave Krupp is the new WCC MOP coordinator; also, Dr. Jim Szyper, formerly of UI and HIMB, is the new HBAP coordinator and instructor of ANUA 106 at WCC.

A nice note was recieved by MOP announcing the birth of Emily Sonia Dudley to Kamila and Walter Dudley on July 31st. Congratulations!

The University of Washington Fisheries Research Institute is recruiting applicants for fishery biologists serving as observers aboard foreign vessels. Requirements are US citizenship, good health, and a Bachelor's degree in a biological science. The temporary position will pay $1251 per month during the training period and $1564 per month during the 2-1/2 to 3 months to be spent at sea. It will provide experience in biological work, exposure to a foreign culture and a unique employment opportunity for young people.Forms are available at the MOP offices, 2nd floor Marine Science building.

Just a reminder: December 24 is the deadline for acceptance of proposals for the Liberal Studies Program degrees for the Spring term.

TOWING WITH MOP

by Annie Orcutt

One of the tasks assigned to CL's Mark Mitsuyasu and Keith Sakuma was to locate a site between Kewalo Basin and Magic Island for the BML Otter Trawl exercises conducted during each cruise. Sherwood Maynard, BML Director, described the site selection criteria as an area that is between 12 to 18 fathoms deep with good coral rubble and no large metal objects or similiar protrusions. This year BML wasn't going to be hung-up on the bottom!!

The best way to accomplish this was to use towing. Now you may ask "What's towing??". Any MOP student who participated in the Maui Transecting Workshop this past March can tell you it's a routine, systematic survey of the bottom while being towed through the water hanging onto a tow board attached to a 30 foot line and harness while being pulled behind a power boat. The snorkeler makes a series of repetitive, porpoise dives beneath the surface to 15 or 25 feet and surveys the bottom substrate looking for particular

Continued Page 4

MOPER MEETING

The MOP coordinator's meeting will be held on the 31st of this month at UH-Manoa, Marine Science Building, Room 224/225. Students are welcome.

Friday, 31 August

0900	Opening Remarks
0930	Campus Reports
1130-1300	Lunch
1300	Maui Transecting Workshop '85
1330	Skill Project Symposium
1345-1445	Improved Writing and the Skill Project
1445-1500	Break
1500	UHM MOP Degree
1515	NOSC Student Help Contract
1530	Expanding Skill Project Opportunities

Saturday, 1 September

at Windward Community College

0900	Sea Grant '85-'87 Proposal
0930	Other Funding
0945	The Role of the Student Coordinator
1030	Implementing the Five Year Plan
1100	Round Table Discussion, Evaluations
1200	Tour HBAP Facility

Continued from Page 3

organisms or anomalies. In our case, we were looking for coral rubble and no protruding metal objects.

Three people are needed to safely complete a towing exercise: a tower, a spotter, and a pilot. The tower, of course, is the person being towed behind the boat completing the visual survey. The spotter is the the boat watching the tower and his hand signals which communicate slow-down, speed-up, stop, and okay. The pilot is driving the boat. Although Keith and I had towed before, we briefed Mark on all these points.

Our journey commenced at Snug Harbor where all great UHM oceanographic expeditions take place. We quickly loaded the Whaler with snorkeling gear, compasses, and towing gear and departed at 0905. The seas were calm and the sun felt good, all portentous of an adventurous morning.

Adjacent to Kewalo Basin, we commenced towing. I think Keith and Mark had heard too many shark stories because when I asked them if they wanted to tow first, their eyes beamed: " I'm not going to be shark bait first!!". So.... I jumped into the water and snorkeled back to the tow board. The water was crystal blue-- so clean; the sun's rays brilliantly penetrated the deep; I couldn't see the bottom; and thankfully no sharks yet!!! I gave the signal to start towing... (Imagine the theme from "JAWS"). A viewer from another boat would probably think we were trolling for ahi looking at our huge wake. Time to dive.

By applying pressure to the top of the tow board, I would descend to about 20 feet and survey the area beneath me. In the area closest to Kewalo Basin it was all blue indicating deeper water (greater than 20 fathoms). Since visibility was only about 60 feet deep from the surface, when I dove to 20 feet, the maximum depth I could see was about 100 feet. Towing by the Magic Island end of Ala Moana was more fruitful. The depth was about 15 fathoms and filled with lots of coral rubble ideal for an otter trawl.

By now, after several passes across the length of Ala Moana, my arms felt like they were coming out of their sockets. Quickly, Keith came to my rescue, offering to tow now that all his fears of being "shark bait" has disappeared! Keith and Mark both towed and concluded that the area closest to Magic Island would be best for BML's purposes. Unfortunately, it was time to return to Snug. Another successful day of towing had come to an end.

MOPERS' MOVEMENTS

Randy Harr was back from Midway. He reports that the goony birds make three point landings: two legs and a beak. He also says he saw a monk seal very close to the dive shop there, and watched a tiger shark eat a goony bird; apparently, they don't like wings. He was on the Big Island for a while, doing his reserve work; two weeks at Pohakuloa, and then back to Midway.

Mark You is starting his UHM skill project-- a book about the life cycle of the awa'awa. He'll be doing transecting in Kaneohe Bay, and he's looking for underwater paints so he can do the illos in situ.

Sally Wickramaratne and Craig Rowland helped Dr. Richard Radtke and his wife Janice Bell test out MOP's hooka regulator, a surface compressor with a 50' hose with the regulator attached to the end of it. Tests were run at Sharks Cove, and went great-- a diver using it can stay under for three hours on one tank of gas, and the hose floats so it won't tangle.

Victoria Guarriello, who is transfering from Maui to Manoa MOP, called earlier from Rhode Island, making the deadline for this column. She's been working at Shoals Marine Lab on an intense schedule, taking classes in marine mammals.

I am sad to announce that Capt. William Harkness died of cancer on Monday, August 13. Bill served the last several years as the University Marine Superintendent, in charge of the UH Marine Center at Snug Harbor. He befriended both MOP and BML in many ways, and we will miss his kind, competent help. For MOP he provided the boat and base of operations for the Mokauea Fishpond Project as well as ship surveys and support for Data Acquisition Projects from Molokini to Niihau. He also surveyed ships for BML and, in some years, operated UH research vessels for us

Aloha.

.....Sherwood Maynard

SEAWORDS

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Sherwood Maynard — Director — 948-8433
David Stroup — Editor — 262-6485

1000 Pope Road, Room 233,
Honolulu, Hawaii 96822

Continued from Pg: 2

As it was, I got back to the dock at about 8:00... new members of the scientific crew were arriving, and I spent the evening helping Bob Harmon string the 4-metre square net...

A word about this before going on. The 4-metre net is a huge, ugly monster made out of rusty iron pipes and festooned with brackets, stray pieces of cable and rotting lengths of line. We had gotten it on board the previous day, before we set out, and it had taken four of us to wrestle the damn thing onto the deck. Now we just stood it on end and I helped where I could while Bob lashed the net itself to the frame with metre after metre of heavy yellow line. The net is maybe six metres of stinking, patched and re-patched mosquito netting worth, oh $3000... this assembly we pieced together in the hour before midnight while trying not to be crushed by it.

By shortly after dawn we were again heading west with murder in our eyes and four metres of death lashed to our deck, ready to put the fear of god into any and all plankton between Honolulu and Kauai. The seas rose steadily as we headed outward, and after a few preliminary tows with the metre nets we managed to get the 4-metre monster into the water (after several false starts involving the pulley and the rather unwieldy bridle) and, while I manned the level wind on the winch, started cookin' with gas...

Ah, yes... the winch. The winch was an object of fear and loathing for everyone onboard, a huge hydraulic creature that broke down several times and seemed destined on making our lives miserable even when it was working right. As it was a converted towing winch, there was no way of telling how much cable had paid out other than watching a series of cryptic marks spray painted on the cable itself. Naturally, these marks managed to wear off during the course of the cruise.

Worst of all, the beast had no automatic level wind; when the cable was reeled in it would snag, cross over itself and generally pile up in a messy snarl all over the spool. What this means is that, at all times, someone had to stand by the winch with a big, rusty metal pipe making sure that the cable winds up even. And this entailed working about six inches away from the cable itself, with all that incredible tension on it... Bob told me that if the cable even twitched I should clear out, dive over the side and swim for safety, and he wasn't kidding. I was fully aware that, at any time, that wire could snap releasing all that terrible tension and winding up as a large snarl wrapped around a pile of hamburger that used to be the poor, dumb slob running level wind.

And it was particularly hairy with that evil, bastard 4-metre net out... tension came and went, and despite my best efforts the cable wandered all the hell over the spool... I looked up.

While I'd been working, we'd wandered into some seriously hairy seas. The 4-metre net was wandering all over the place, and the cable was snapping and rattling like a vast, flat guitar string out of hell. The net was pulled in, and we discovered what we'd feared: the net had nearly pulled free of the frame, snapping line and even cable, nearly losing both the net and the flowmeter. We wrestled it back on board and headed for calmer waters.

That fourth night on board was spent anchored off Pokai bay. The seas were peaceful, the skies clear and the lights of land just out of reach. I wasn't on watch until 0400 the next morning, and everyone relaxed and just sort of wandered around the deck. A few of us got a little night fishing in, and we re-tied the monster net.

The next morning we set out again and fought the net back into the water. I don't think any of that would have been possible without a truly nifty feature of the Kila: at the stern is a huge A-frame that mounts the pulley, and it's mounted with hydraulic rams. The whole assembly can be rocked back over the after deck or out over open water. In calmer seas, the tows went well... load after load of seemingly identical plankton slime was brought in. Plankton, you know, smells uncannily like hundreds of thousands of teeny-tiny rotting fish...

Finally, the last of the tows was completed... the last net cleaned out... the last equipment stored away. A large part of this cruise was just to see how well the Kila does this sort of work. Despite whatever I, as a landlubber lost at sea, might say about her, she did just fine and the crew headed back to Snug Harbor with high spirits and, on my part at least, a sincere urge to find a bathroom that didn't move...

The Calendar

AUGUST

(Remember, all MOP and BML events are Underlined)
20, 22 Chemistry placement and exemption examinations, 9:00 am, Bilger 152
20, 22, 23 Registration at UHM
21 State Holiday- Statehood Day
25 Historic Hawaii Foundation will give picnic tour visiting Falls of Clyde and Hawaii Maritime Center. Call 537-9564.
27 First day of classes at UHM
27- Sept. 7 Late registration at UHM.
28 MOP Advisory Council meeting for funding and PR
31- Sept. 1 MOP State Wide Coordinators Meeting.

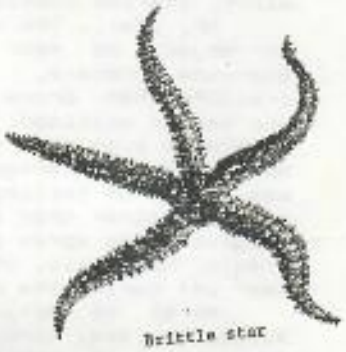
SEPTEMBER

1- 3 Labor Day Weekend-- Hawaii Surfing Meet and Rough Water Swim.
5 DOE Classes start
5 MOP sponsored NAUI scuba classes start at UHM; see article this issue. Call 948-8444 for details
7 Last day at UHM for late registration.
7- Oct. 19 Fall Docent Training & Instructional Workshop at Sea Life Park. Call 259-7933.
6 MOP Fishing Rally
8 BML Graduation
13 Deadline to register for Oct 13 GRE.
14 Last day at UHM for dropping classes.
15 BML-UI Workshop
24 BML Cruise Series One starts from Snug Harbor.
26 MOP A/L
29 State Fish Candidates march in Aloha Day Parade
30 MTS Annual Picnic and Milk Carton Race.

Hermit crab

OCTOBER

8 Holiday-- Discoverer's Day
19 State Fish Nomination Convention and Rally, Waikiki Aquarium, 6:00pm.



Brittle star

NOVEMBER

6 The General Election.
30 Last day to vote for State Fish-- 5:00pm deadline.

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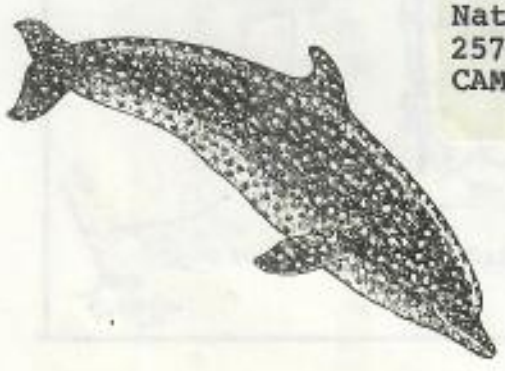

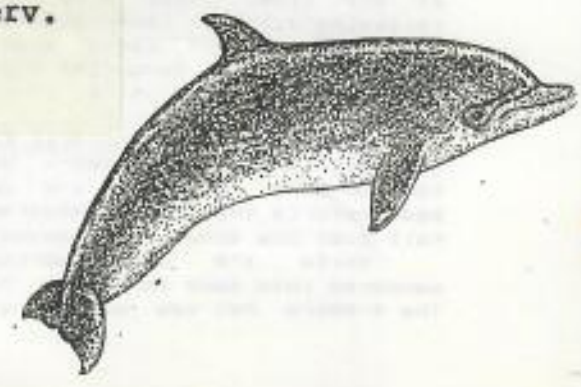

UH HILO MARINE OPTION PROGRAM NEWSLETTER

October 1985

MAUI TRANSECTING WORKSHOP WILL BE ON THE BIG ISLAND

Yes, it's true, the MTW will be held at Puako this year. Lucky us, at least this year we can't get homesick.

PREREQUISITES TO PARTICIPATING IN WORKSHOP

Candidates for the workshop must be SCUBA certified and pass coral, algae, fish and invertebrate ID classes with a score of 80% or above. Classes in First Aid and CPR are also required. MOP will offer all the classes. The CPR class costs $10.00 and the First Aid class, 3 year certification, costs $15.00. Classes will be scheduled and then posted on bulletin boards. Keep informed.

BENEFITS OF THE WORKSHOP

A working knowledge of Hawaiian island reefs,and the ability to use the three most common underwater survey techniques. Participants will also receive a NAUI Research Diver's card. An average day during the 7 day workshop includes 3 meals, 2 dives, and an evening lecture. It's intensive and exciting. Dr. Sherwood Maynard will explain more about the Workshop during his November 20th visit at 4.00pm. Be there.

MEET THE DIRECTOR

Dr. Sherwood Maynard, the Director of the Marine Option Program, will be visiting Hilo on Nov. 20th and 21st. We will have an informal get together, Wed. at 4.00 pm, and Dr. Maynard will talk about the MTW that will be held at Puako this year. All our MOP students are invited, and of course, refreshments will be served.

SCUBA.....ARE YOU CERTIFIED?

Your big chance. Geoff Saint, the Manoa MOP Student Coordinator will offer a Naui Basic Diver course in Hilo, sometime during Christmas break. It will be an intensive 4 dive class, possibly compressed into 3-4 days. The cost will be $55.00 / MOP student, and we will furnish equipment. Geoff is a very good instructor and this is a very good, inexpensive opportunity to get certified. Come into the office and sign up, a deposit or full payment is needed by Dec. 6th.

GET WET, ENJOY THE SIGHTS

Join us, Saturday, Nov. 9th, for a snorkel and picnic at Kapoho Tide Pools. The tide pools are well known for their diverse aquatic life. It is a very safe place to snorkel. You'll just need to bring gear and a lunch. If you don't have a mask, snorkel and fins, let us know early and we'll supply them. Students interested in attending the MTW on the Big Island this year, are encouraged to come to the tide pools and begin practicing ID. Car pool leaves UHH, by MOP bldg at 10.00am. Eat lunch, float around, learn some I.D.. See you there.

OUR AQUARIUMS NEED FISH

One of our new MOP students, Mashuri Waite, is going to establish and maintain the 150 gallon salt water tank in the Campus Center, and the 50 gallon tank in the MOP office, as his skill project. Some MOP students have been helping Mashuri establish the water quality but we could use some help collecting fish for the tank. Until the Campus Center tank is ready, collected fish can be temporarily given to Richardson's Ocean Center. Please let us know when you leave some fish there. For further information call us at 961-9544 or come by and pick up collecting gear.

WATER

The Washington Post reported the following item on May 19, 1985:

A water molecule that evaporates stays in the air an average of 10 days before it falls back to Earth as rain, according to John Woods of West Germany's University of Kiel.

If the molecule lands in a large lake, it could stay there about 100 years.

If it lands in the ocean, it may not escape for 3,000 years.

Should that molecule happen to drift over the poles and become part of a rare snowflake in those regions, it could get trapped in a glacier for tens of thousands of years.

WOW!!!!

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Mr. George Balazs
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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
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March 30, 1987 F/SWC2:GHB

Dr. Walter Dudley
Coordinator
Marine Option Program
Division of Natural Science
University of Hawaii at Hilo
Hilo, HI 96720-4091

Dear Walt,

Just a brief note to tell you how tremendously pleased I am with the outcome of our recent cooperative MOP/NMFS turtle netting expedition to Punaluu Bay. Some excellent data were collected on growth rates extending over a 3-year period (see attached). In addition, it was my impression that all of the students and faculty benefited substantially from this field-work experience. Furthermore, they appeared to have a very enjoyable (although exhausting!) time in the process.

Please pass on my gratitude, compliments, and best regards to everyone who contributed to make the project such a great and safe success.

Sincerely,

George H. Balazs
Zoologist

Attachment

cc: Sherwood Maynard
Director, MOP

Green turtles captured and tagged at Punaluu Bay, Kau, Hawaii on 23-25 March 1987.

	Date	Time	Tag No.	Sex	Straight-line carapace (cm) Length	Width
1.	3/23/87	2050	9826-29	F	80.8	62.1
2.	3/23/87	2230	9830-31	--	59.7	--
3.	3/23/87	2400	7734-36	F	85.7	62.7
	(Originally tagged at Punaluu on 6/28/84, 2 years, 9 months ago, at which time it measured 85.1 cm S-LC. Growth rate was 0.22 cm per year.)					
4.	3/24/87	2230	9832-33	--	60.9	47.8
5.	3/25/87	0530	9834-37	F?	75.1	57.6
6.	3/25/87	0530	7630-33; 9838	M	89.7	68.6
	(Originally tagged at Punaluu on 2/18/84, 3 years, 1 month ago, at which time it measured 88.8 cm S-LC. Growth rate was 0.29 cm per year.)					
7.	3/25/87	0530	9839-40	--	46.3	36.0

Law Enforcement at Sea

by David Stroup

Gene Witham wishes that his job wasn't needed, but he knows that that will never be so. He says that if he could achieve his goals simply through warnings and education, he would; it doesn't work that way. And with over a million square miles of territory to patrol, there's no end to his task in sight.

Gene Witham is an agent of the National Marine Fisheries Service Law Enforcement Division, the organization responsible for the control of fisheries resources and the protection of endangered marine species. His jurisdiction includes all waters within 200 miles of any American possession or commonwealth in the Pacific; when you add to Hawaii, Guam, the Marianas, Johnston, Wake and others, that's over 1,511,000 square miles in all.

The National Marine Fisheries Service (NMFS) was created in 1970, under the Nixon administration. It operates under NOAA, which operates under the Department of Commerce. In '72 NMFS was given responsibility for marine mammals, and in '73 the Endangered Species Act extended that responsibility to cover other species. In 1976, the 200 mile economic zone was created, and the NMFS and Coast Guard were assigned to monitor it. Since then a dozen smaller acts have added other species-- sockeye salmon, halibut, and so on. However, it's primarily those three laws-- the Marine Mammals Act, the Endangered Species Act, and the 200 mile fisheries zone-- which have made up 90% of the NMFS Law Enforcement Division's work.

Much of the scope of the NMFS's duties is based on the Magnusson Fisheries Conservation Management Act. The Magnuson FCMA establishes Fisheries Management Councils, responsible for regulating both foreign and domestic commercial use of American fisheries. The Councils determine Optimum Sustainable Yield and Maximum Sustainable Yield for the fishery, and are responsible for the establishment of management plans. The Law Enforcement Division assures compliance.

There are two types of plans which can be established by the councils. Preliminary Management Plans can, after a study, be enacted on request, in response to changing needs and threats to resources. The more permanent Fisheries Management Plans take years to design and put in place. Both have the force of law.

In fact, in 1983 NMFS Law Enforcement officers were given full police powers. The plans and acts are rigidly enforced, and violators should realize that the officers take their work very seriously.

Originally, most of the Law Enforcement Division's work in the Pacific was in response to violations of the 200 mile zone; foreign ships that didn't have the right to fish in American waters were arrested and given fines of up to US $80,000. Those that didn't pay could be prevented from fishing in American waters until they complied. Witham said that the methods have been "very successful," and that recently there has been "good compliance" with the rules. According to him, there are "hundreds of boats out there... only a small percentage violate the laws."

Now, much of the work involves the protection of endangered animals-- catching turtle poachers and people who get too close to whales.

The Law Enforcement Division and the Coast Guard work together, with the Coast Guard providing the platforms-- ships and helicopters-- and NMFS providing the expertise in this field, in the form of patrol advisors.

According to Witham, there's only one problem with the system, and it's a small one. The Coast Guard, specialists in Search & Rescue, drug enforcement, and many other fields, can't be experts in everything; they have to learn many of the ins and outs of the NMFS's operation while working with the patrol advisor. And since their officers are rotated every two years, once one becomes accustomed to the NMFS's work he's been moved on.

Gene Witham sees his task as one of the refereeing and allocating of resources. This usually puts him in the middle-- caught between the desires of commercial and sports fishermen, conservationists and recreational divers and boaters. No matter what he does somebody's going to be angry.

Witham, who worked for years as a conservation officer in Washington State before "going federal" and moving to Hawaii, recognizes this and is familiar with the problems it creates. He says that if they are going to make mistakes, he would rather err on the side of the resources. We can live with having one too many sea turtles-- one too few could be fatal to the species.

According to Witham, the NMFS worst problems come from the attitudes of some of the public. He related a personal anecdote; while walking in Waikiki he encountered a man, 6'9", with a goatee and earrings, drinking wine from a bottle. As he finished it, he tossed the bottle in the bushes; when Witham accused him of littering, he said that it was his "privilege."

Some people take the same attitude towards the limited resources of the sea. He feels that it's everybody's duty to become educated about the laws, and the realities of marine resources, before they use those resources.

Sea turtles are a favorite example of his. They've been protected for the past eight years, but there's been no increase in the nesting populations. Since it takes 35 years for a sea turtle to reach maturity, Witham hopes that it's just a lag-time effect.

But in those 35 years a lot can happen to a sea turtle-- the cards are stacked against them. And despite protective legislation, the number of illegal turtle 'takes' has actually gone up. Though this may be due to the NMFS catching a larger percentage of the poachers, there are still some areas which no reports at all come from.

Part of the problem here is that the NMFS is dependent on help from the public to catch the poachers, and many people think that it's against the "Hawaiian way" to "squeal" on your friends. Witham considers these values to be corrupt-- he says that "if nobody 'squealed, we wouldn't have any resources left.

He says that people claim that they're seeing more turtles, so it must be okay to take them. If this is true then it means that the protection is working-- but people must be made aware of the fact that the turtles are endangered, and it's everyone's duty to comply with the law.

Witham said that some people may be scared away from reporting by stories of $10,000 or $20,00 fines, and he wants to emphasize that those penalties are only for repeat and commercial violators. The fines are measured, and intended only to act as a deterrent, not to break the people who are caught. According to him, "they're not designed to inflict cruel and unusual financial penalties on carelessness.".

In addition, he wants to be sure people understand that all information given to the NMFS by informants will be held in confidence.

He also said he "question(s) the need... for any 'subsistence level' taking of any protected species." This is an excuse he heard while working in Washington state, and he didn't believe it then-- especially from people who left most of the carcass to rot. He found that they took the meat,

Cont'd page 8

and used the money they saved to buy alcohol and cigarettes. He's seen the same thing in Hawaii-- the vessels of poachers are often cluttered with what he called "frivolous purchases."

His main concern is changing people's attitudes-- convincing them to share the resources with everyone, and convincing poachers that there's always someone looking over their shoulder.

In the future, Witham sees many changes in store for resource enforcement in the Pacific. For one thing, Kiribati and other small South Pacific nations are making bilateral agreements with larger countries. Many of these small states have extensive ocean resources, but no way to patrol for themselves-- he's afraid that by the time they have the ability, their primary resources may be depleted.

In addition, changes are coming in the tuna industry. At present, America doesn't recognize the right of any other nation to regulate American activities in their tuna fisheries. This is partially due to the fact that the fish themselves are migratory, and may move from one fishery to another-- it's a tricky situation, with the whole Pacific interlocked. Witham says that this is changing, and that eventually the NMFS will have some sort of control over virtually all resources in the the U.S FCZ in the Pacific.

At present, Witham says that the Law Enforcement Division is winning some and losing some, but over all the situation is going down hill. He sees many more species being added to the endangered and protected lists-- and turtle violations have gone up from 10-12 a year to over 100 a year since 1981. You can often hear despair in his voice as he talks about the basic selfishness and greed of some of the people he deals with, and of the attitudes that allow people to break the law and push species into extinction as their "privilege."

But in the end he finds his work challenging-- he wants to gain compliance through education, but until that day comes he'll continue to be unrelenting in his enforcement of the laws. He has no tolerance for the violations, and accepts no excuses. He says that the wildlife have no spokesman; "we have to be that person". Because-- and this is his greatest problem, and his greatest regret-- if you leave it to the individual it'll never get done.

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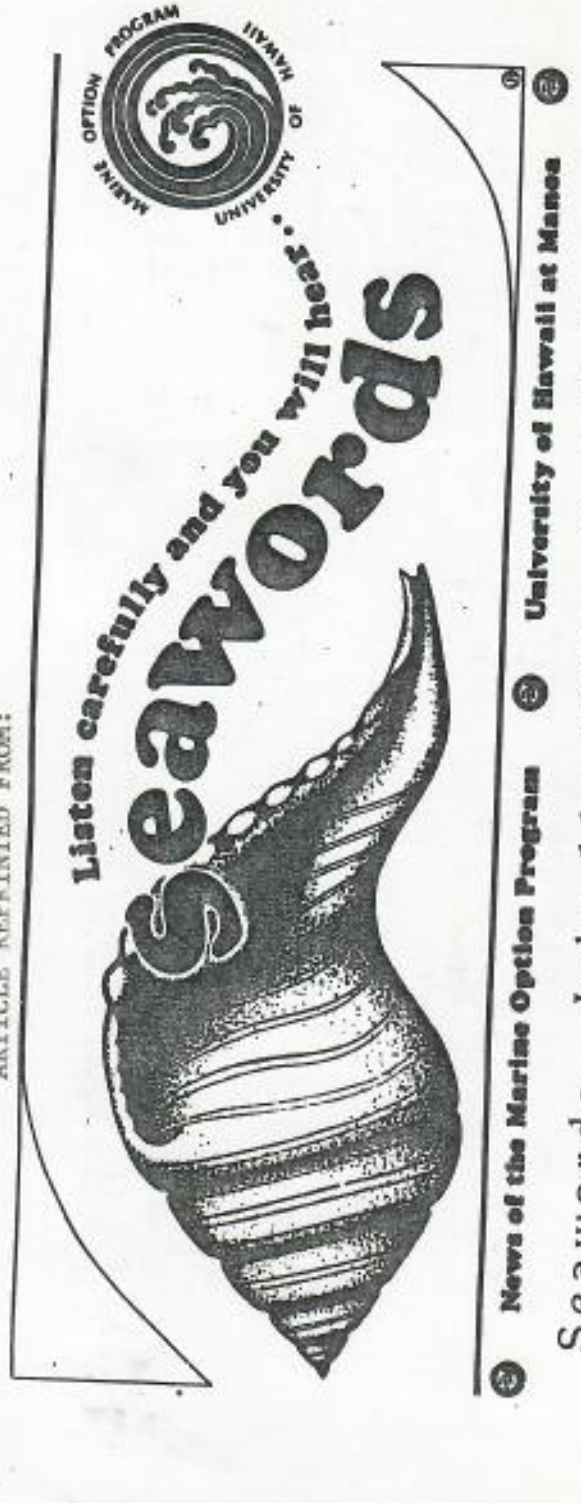

Seawords July 11, 1986 Vol II No. 3

Kimber - Looks FINE, except for some modifications needed. Please me early in the week and well discuss it. Give me a copy to read from. Geoff

STUDENT PROJECT PROPOSAL TO THE
UNIVERSITY OF HAWAI'I MARINE OPTION PROGRAM

→ Ecology (or Biology)

better do think

A Study of the ~~Life Cycle~~ of the Hawaiian Green Sea Turtle, Chelonia mydas, at Punalu'u, Hawai'i, Using Tag and Recapture Methods.

DURATION

January 18, 1988 - March 23, 1988

PROJECT LEADER

Kimber Alspach

PROJECT MEMBERS

Brion Duffy
Mark A. Alspach

NEED EVERYONE THAT PARTICIPATES HERE? ← LISTED

PROJECT ADVISORS

George H. Balazs, NMFS
Dr. Walter Dudley, UHH
Shelly Ebersole, MOP

PROPOSAL DATE

January 21, 1988

FINAL REPORT DEADLINE

May 31, 1988

DOESN'T GIVE YOU MUCH TIME, DOES IT? BUT MAYBE THAT'S ALL YOU NEED.

The endangered Hawaiian Green Sea Turtle, Chelonia mydas, has been the object of study by Mr. George Balazs of the National Marine Fisheries Service for fifteen years. In 1973, he initiated a comprehensive, long-term tag and recapture study. Although he was not the first to attempt such an endeavor, his has been the most widespread and productive attempt to document the ~~natural~~ ecology of these turtles (Balazs 1982a, 1983). Still, many questions remain unanswered: "The longevity and duration of reproductive life for Green Turtles in the wild are presently unknown. Long-term tag recoveries can, however, help to answer these important questions" (Balazs 1983). These questions are important ones indeed, as they are central to the conservation and propagation of this species whose numbers have seriously declined in ~~recent~~ modern times (Balazs 1982a).

Punalu'u Bay, on the coast of the Ka'u Desert of Hawai'i County (see figure 1), has been the site of several tagging expeditions under the direction of Mr. Balazs and carried out by the Marine Option Program of the University of Hawai'i - Hilo. This location is one of "seven representative study areas...selected for repetitive and long-term sampling" (Balazs 1982b). From March 21 to 23, we will conduct an expedition to Punalu'u Bay to capture, tag, and release Green Sea Turtles in order to collect additional data on their life-cycle.

Preparation for this project will include recruitment of volunteers and development of informative classes for them. All participants will be required to have certification in both First Aid and Cardiopulmonary Resuscitation. Efforts will be made to arrange certification classes specifically for those volunteers who may need them. Upon consultation with Mr. Balazs, we will prepare an itinerary of priority events and organize other necessary activities around them to produce a comprehensive working agenda. In addition, we will participate in a similar tag and recapture project (also under the direction of Mr. Balasz) in North Kona (Hawai'i County) sponsored by the Hawai'i Preparatory Academy.

METHODS AND MATERIALS

Green Turtles may be caught using one of two methods:

1) Skin divers may catch turtles by hand if they are found resting and/or are unaware of the diver's approach.

2) A large-mesh tangle net set vertically in the water column and perpendicular to shore is an effective method for catching

turtles(Balazs 1982b, 1987). Every 20 or 30 minutes, the net floats must be checked for any activity which might indicate a turtle has been caught. This is required so that entangled turtles do not drown. Depending on the number of participants, 4 to 6 teams of 4 or more will rotate on a four-hour watch when the net is in the water.

When caught, the turtle will be examined immediately for tags from a previous capture and the numbers noted in case of premature escape (Balazs; personal communication). Turtles will then be taken to shore in a raft made from a large inner tube with a piece of plywood strapped to one side. If overturned, this raft doubles as a platform for the turtle when measurements and samples are being taken. In addition, the raft provides a secure place to leave turtles unattended for short periods.

Between one and four tags, depending on the size of the turtle, will be attached to the trailing edge of the front flippers (hind flippers also for large turtles), and the tag numbers noted. The tags used are self-locking upon application (see Figure 2), are made of Inconel 625 alloy, and their dimensions are 25x8x9mm (Balazs 1983, 1987).

The straight-line measurements of the carapace are used for most comparisons of size and growth (Balazs 1987). Calipers are used to take this measurement and several others (except for the curved-line measurements of the carapace which require a tape measure) in order to monitor growth rates upon recapture:

1) Carapace length; a) straight-line
   b) curved-line
2) Carapace width at 6th marginal; a) straight-line
   b) curved-line
3) Plastron length
4) Plastron width
5) Head width
6) Tail length
7) Tail width at base

Samples of tissues, fluids and parasites will be taken for later analysis:

1) Blood samples may be taken from the bilateral sinus using a syringe. These samples will be examined for parasite eggs.
2) Stomach samples will be obtained by siphoning sea water into the crop through the esophagus with a flexible plastic tube (Balazs 1982b, 1987; Legler 1977). These samples will be stored in 10% formalin in seawater and examined later to determine the preferred food sources and if any correlation exists between food type and growth rates.
3) Fecal samples will be obtained using a plastic probe approximately ten inches long with a small loop at one end which is inserted into the anus (Balazs; personal communication).
4) Parasitic barnacles which burrow into the shell and softer tissues will be noted and removed for analysis.

In addition to the information stated above, the following data will also be noted:

1) Date, time, location, and method of capture.
2) Wind, water, and other pertinent weather conditions.
3) Water and air temperature.
4) Body temperature of turtle (Balazs 1987, Whittow and Balazs 1982).
5) Any abnormalities including excess or lack of algal growth, the presence of wounds, scars, eye infections, tumors, or other lesions.

SUMMARY

This project is of great value to the study of Green Sea Turtles in Hawai'i: 1) In light of the data obtained from tagging expeditions to Punalu'u in the past, the potential for significant results is high. It has been shown that Green Turtles do not change their resident foraging area (Balazs 1982b, 1987). This should increase the liklihood of capturing previously tagged turtles, thereby enhancing the value of the data obtained. 2) Hands on experience for students is an effective educational tool and, most importantly, 3) helps to increase public awareness and concern about this endangered species.

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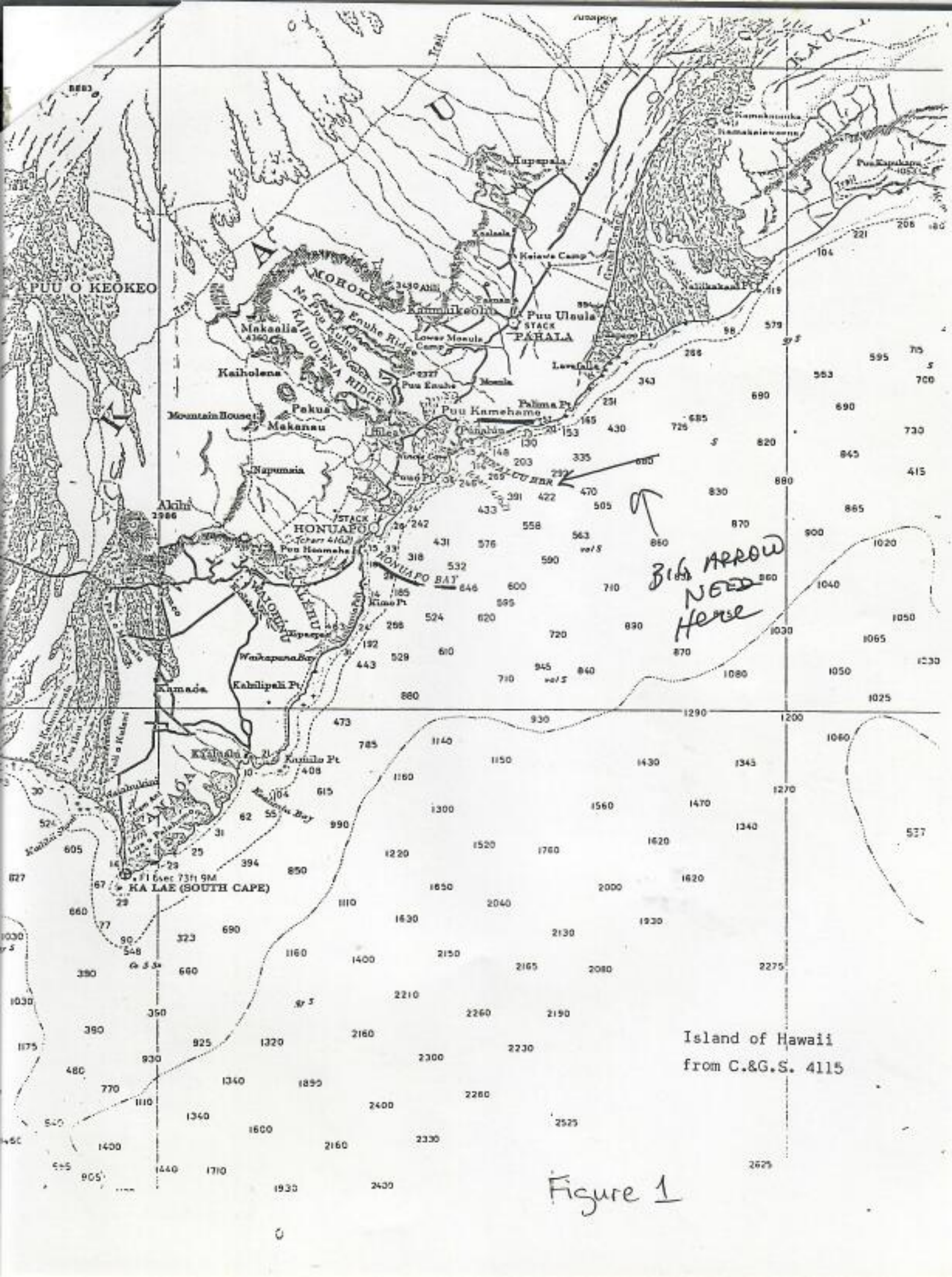
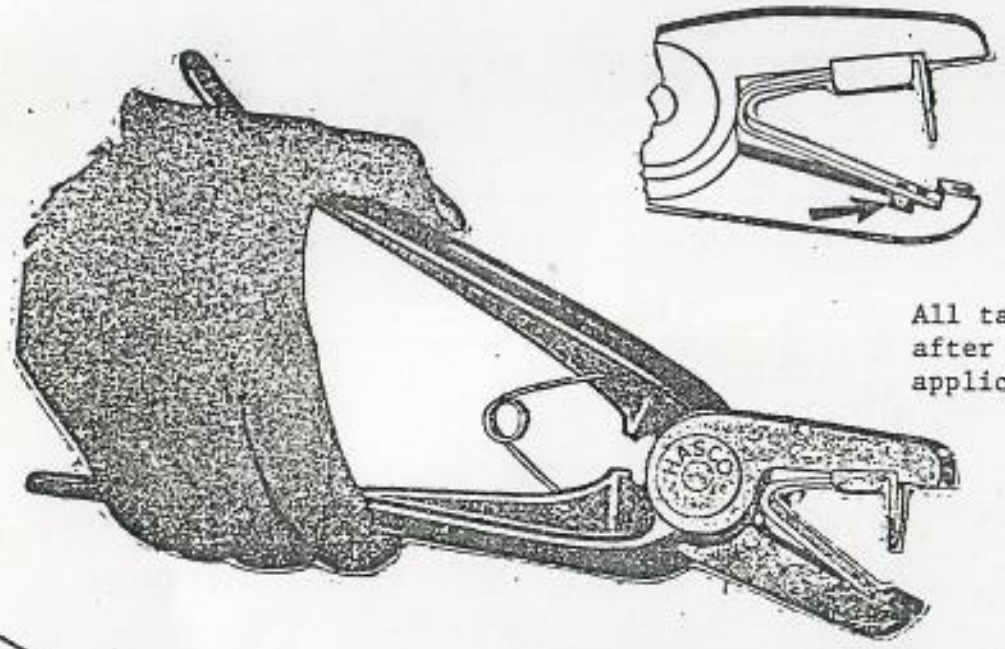

PUU O KEOKEO
Makanalia
Kaiholena
Pakua
Mountain House
Makanau
Napumaia
Akihi
2986
HONUAPO
Puu Heamoha
HONUAPO BAY
Kiimo Pt
Kamaoa
Kahilipali Pt
Kiilaula
Kaulula Pt
KA LAE (SOUTH CAPE)
Puu Kamehame
Palima Pt
Puu Enuhe
Lower Moauia Camp
Puu Ulaula
STACK
PAHALA
Kaalaala
Keiawa Camp
Kapuapala
Kamakaiwaona
Pua Kapukapu
Lavalava
Kaalaiki Pt
Hilea
Pauo Pt
Waikapuna Bay
Kaulula Bay
Big ARROW NEED Here
Island of Hawaii
from C.&G.S. 4115

Figure 1

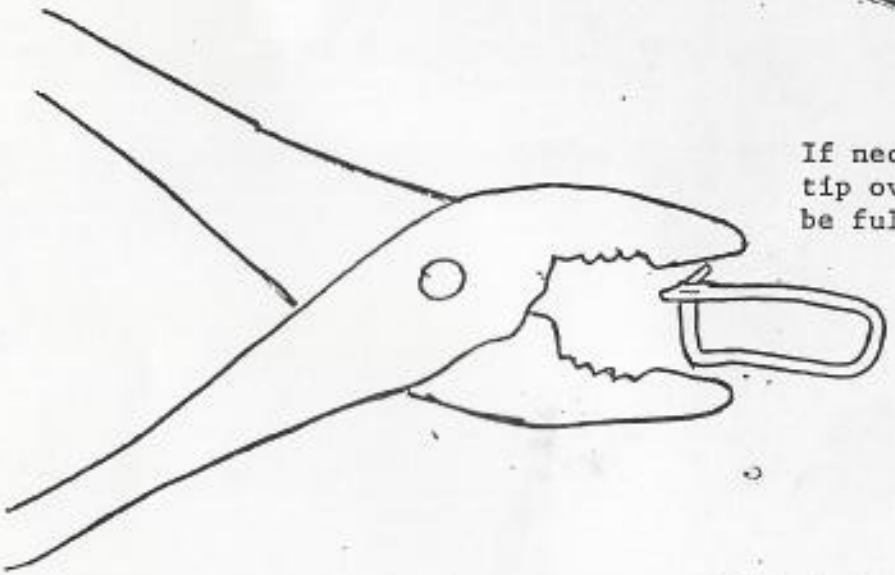
TURTLE TAGGING INSTRUCTIONS



All tags should be carefully inspected after being attached with the special applicators.

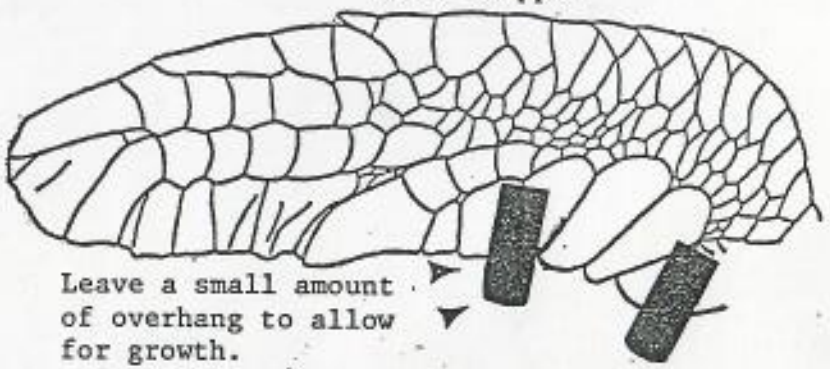
Probably can delete this

If necessary, gently bend the piercing tip over with pliers so the tag will be fully locked.



Fully locked tag

Front flipper



Leave a small amount of overhang to allow for growth.

Appropriate tagging sites- use two or more tags on each turtle.

Figure 2

Prepared by George H. Balazs, May 1982

Round to the nearest dollar

BUDGET SUMMARY

Stipend for project leader	$400.00
Stipend for the assistant researcher	$200.00
Stipend for the logistics coordinator	$50.00
Van rental	$296.97
Gasoline	$~~1~~50.00
Film	$52.39
Batteries	$46.41
Water hose	$7.28
Tarps (2)	$20.82
Ice chest	$88.35
Ice	$15.63
Gas cartridges	$10.40
Propane	$5.00
Paper products	$79.86
Food and drinks	$500.00
TOTAL COSTS	2,223.11 ~~$1923.11~~

seems high! How many vans?

?!

?

?

This seems high to me

Monday
Dinner

TUES
Breakfast
LUNCH
DINNER

WED
Breakfast
LUNCH

+ 2 NIGHTS of NIGHTTIME SNACKS

I marked "Budget Summary" before reading this.

BUDGET JUSTIFICATION

Stipends:

Project leader; $400.00. Based on 4 months (Feb. 1 to May 31) at $100.00 per month.

Research assistant; $200.00. Based on 4 months (Feb. 1 to May 31) at $50.00 per month.

Logistics coordinator; $50.00. Based on 1 month (Feb. 25 to March 25) at $50.00 per month.

Transportation:

We will be transporting approximately 25 people and all the necessary gear to Punalu'u and back. We will use one UHH vehicle and two rentals for a total of three days. One rental van with seats @ $60/day, and one with out seats @ $35/day comes to $296.97 including sales tax.

A gasoline allowanc of $50.00 per vehicle per day comes to $450.00. ? ?

If people car-pool and drive their own cars as in the past, you won't need this.

Equipment and supplies:

Black and white pictures will be in demand for future publications in the MOP newsletter as well as the UHH course catalog. Color pictures will be used in future demonstrations of turtle tagging procedures and as illustrations of the opportunities that MOP has to offer. Pictures will be taken of all activies concerning this project including the preparetory classes for volunteers, the tagging trip to North Kona, and all events leading up to and during the actual expedition to Punalu'u. Based on the present plan of activities, 6 rolls of 36 exposure, 125 ASA black and white film (@ $3.49 each) and 6 rolls of 36 exposure, 400 ASA color film (@ $4.89 each) will be used during this project. This comes to $52.39 including tax.

Batteries are required to run the cameras and underwater flashlights. We will need back-ups for the present batteries since their age and amount of use is unknown. One camera uses a miniature 6V battery (@ $7.99) and the other takes two 1.55V silver oxide batteries (@ $2.99 each). The underwater lights each take regular 6V batteries (@ $10.19 each). This comes to $46.41 including tax.

A water hose is needed to wash off all tagging gear, snorkeling gear and wet suits, the underwater camera, sandy bodies, large cooking pots, and other various uses. A 25'x5/8" hose costs $6.99 plus tax ($7.28).

Tarps will be needed to cover the turtles, if left unattended, and, in case of rain, to shelter the researchers while away from camp watching the net.

At least one ice chest will be needed in addition to the one belonging to MDP, and 3 others belonging to researchers. One 76 quart cooler costs $84.79 plus tax ($88.35).

Ice is necessary to keep the food from spoiling. Assuming that 100 lbs will be used each day (@ $1.25 for 25 lbs.) for three days, this comes to $15.63, including tax.

There is [illegible] electricity at pavilion -

Gas cartridges will be needed to run the Coleman lanterns. A 16 oz cartridge costs $4.99. This comes to $10.40 for two, including tax.

Propane gas is needed to fire the two Coleman stoves. At $2.50 to fill each stove, $5.00 is required for propane gas.

Paper products includes all of the plates, cups, napkins, and eating utensils. These are necessary to serve food and beverages to the hard-working volunteers who will make this project a success.

TAGGING EQUIPMENT AND SUPPLIES	NOAA	MOP	UHH	PERSONAL
Nets, weights, rope, etc.	X			
Calipers and tape measure	X			
Tags and applicator	X			
Food sampling equipment	X			
Blood sampling equipment	X			
Innertube rafts (2)		X		
Underwater flashlights (4)		X		
Spotlight	X			
12 V Battery with carrier		X		
Battery charger		X		
Camera (2: one U/W)		X		
Film (12 rolls: 6 B&W; 6 color)		X		
Flashlight batteries (3; 6V)		X		
Camera batteries (6V and 3V)		X		
Telethermometer	X		X	
Specimen jars		X		
Data sheets and pencils		X		
Nylon rope (100')		X		
Water hose (25')		X		
Extension cords (2; 25')		X		
Wet suits		X		
Folding chairs (4)		X		
Formalin in seawater (1 pt; 10%)		X		
Tarp (3)		X(2)		KA(1)
Binoculars (2)		X(1)		KA(1)
TRANSPORTATION				
UHH passenger van		X		
Rental passenger van		X		
Rental cargo van		X		
CAMPING EQUIPMENT AND SUPPLIES				
Ice Chests (5)		X(1)	X(1)	KA(1),SE
Ice (300 lbs.)		X		
Trash bags (30)		X		
Gas lanterns (3)		X(1)	X(2)	
Gas stove (2)		X(1)	X(1)	SE(1)
Gas cartridges (2)		X		
Propane gas		X		
Hot water pot		X		
Cooking utensils (assorted)		X		SE,KA
Plastic eating utensils (200 sets)		X		
Paper plates (200)		X		
Paper cups (400)		X		
Paper napkins (600)		X		
Paper towels (6 rolls)		X		
Hot plate				SE
Skillets (4)		X(3)		SE(1)
Sauce pans (2)		X		

Cooking pots (2)		SE
Colander (2)		SE
Pancake griddle		SE
Automatic coffee pots (2)		SE
Storage Bags (15; 1 gal.)	X	
Food storage containers (assorted)		KA
Knives (3)		KA