MAC MANAGEMENT STUDY 1970s-1980s
G.H. BACAZS FILE HIMB

PROPOSED RESEARCH STUDY OF MARINE TURTLE POPULATIONS

IN THE HAWAIIAN ISLANDS

BY: George H. Balazs
Hawaii Institute of Marine Biology

January, 1973

In conjunction with the proposed protective restrictions on the capture of marine turtles within the State, it is hereby requested that $45,000 in funds be provided for a 3-year research study dealing with the management of marine turtle populations in the Hawaiian Islands. Such an investigation of this Central Pacific colony is particularly critical due to the fact that overexploitation of marine turtle resources is widespread throughout the world. It is imperative that as much knowledge as possible be obtained on Hawaii's turtles in order to determine how best to ensure their continued viability and existence. Hawaii's population may very well comprise the largest remaining Green turtle nesting colony left in the United States.

The initial objectives of the proposed study are:

1. To investigate the movement of adult and sub-adult populations between the various feeding areas found around the major islands. This would involve the capture, tagging and subsequent recapture of individuals in the grazing habitats. Assistance from the Division of Fish and Game and the National Marine Fisheries Service will greatly expedite this phase of the project.

2. To determine the present size of the Green turtle population. Included will be the collection of much needed additional data on migration, nesting occurrence both within and between seasons, and length-weight frequencies of individuals. This will be accomplished by implementing an intensive tagging program at several selected nesting sites in the Hawaiian Islands National Wildlife Refuge. Such a project would be carried out in close cooperation with the Bureau of Sport Fisheries and Wildlife to ensure that adequate safeguards are taken against disturbing other delicate wildlife present in the area.

3. To determine which types of algae and in what proportions are utilized as food. This would be accomplished by the systematic examination of stomach contents from turtles caught in a lawful manner by local fishermen. In addition, recognized grazing habitats would be surveyed to determine their carrying capacity.

4. To devise and implement a computer program research study which will statistically analyze all records relating to turtle catch that are presently on file at the Division of Fish and Game.

5. To make recommendations, based on the study's findings, that will assist in formulating a long term management program for marine turtles in Hawaii.

PROPOSED RESEARCH STUDY OF MARINE TURTLE POPULATIONS

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BY: George H. Balazs
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In conjunction with the proposed protective limitations on the capture of marine turtles within the State, it is hereby requested that $45,000 in funds be provided for a 3 year research study dealing with the management of marine turtle populations in the Hawaiian Islands. Such an investigation of this Central Pacific colony is particularly critical at this time due to the fact that overexploitation of marine turtle resources is widespread throughout the world. This makes it imperative that as much knowledge as possible be obtained on Hawaii's turtles to determine whether or not additional protection is necessary to ensure their continued viability and existence. Hawaii's green turtle population may very well comprise the largest remaining nesting colony left in the United States.

The initial objectives of the proposed study are:

1. To determine the present size of the green turtle population. Included would be the collection of much needed additional data on migration, nesting occurrence both within and between seasons, and length-weight frequencies of individuals. This would be accomplished by implementing an intensive tagging program at several selected nesting sites in the Hawaiian Islands National Wildlife Refuge. Such a project would be carried out in close cooperation with the Bureau of Sport Fisheries and Wildlife to ensure that adequate safeguards are taken against disturbing other delicate wildlife present in the area.

2. To investigate the movement of adult and sub-adult populations between the various feeding areas found around the major islands. This would involve the capture, tagging and subsequent recapture of individuals in the grazing habitats. Assistance from the Division of Fish and Game and the National Marine Fisheries Service would greatly expedite this phase of the project.

3. To determine which types of algae and in what proportions are utilized as food. This would be accomplished by the systematic examination of stomach contents from turtles caught by commercial fishermen.

4. To devise and implement a computer program study which will statistically analyze all records relating to turtle catch that are presently on file at the Division of Fish and Game.

The expertise, personnel, facilities and equiptment to direct and carry out these objectives exists within the framework of the Hawaii Institute of Marine Biology. The project would thus represent a teamwork effort on the part of Hawaii's scientific community to study a valuable indigenous resource.

BREAKDOWN OF NON-SALARY EXPENDITURES IN PROPOSED MARINE TURTLE STUDY

by G. H. Balazs
Hawaii Institute of Marine Biology
P. O. Box 1346
Kaneohe, Hawaii 96744

YEAR 1

Objective 1.	Investigate adult and sub-adult grazing populations found around major islands.	
	Twenty (20) days of ship time (using 50' trawler which is available to HIMB for charter)	2,200
	Equipment and supplies (nets, charts, tags, food, etc.)	790
	Subtotal	2,990
Objective 2.	Determine the present size of the breeding population by an intensive tagging program at a selected nesting site (East Island) in the Hawaiian Islands National Wildlife Refuge.	
	Equipment and supplies (2-way radio, 2 outboard motors, 5-man inflatable boat, camping equipment, portable toilet, tags, food, etc.)	4,360
	6-round trips (Honolulu-Tern Island) for 3 persons. Transportation by U. S. Coast Guard	900
	Subtotal	5,260
Objective 3.	Determine the types of algae and other foodstuffs utilized by turtles in Hawaiian waters.	
	Finders Fee	500
	Shipping costs	200
	Laboratory analyses (physical and chemical)	500
	Subtotal	1,200

Objective 4.	Carry out a computer program research study using existing marine turtle records.		
	Computer time		425
	Supplies (cards, etc.)		75
		Subtotal	500
Objective 5.	Periodic reports based on project activities and findings.		
	Publication costs		200
		Subtotal	200
		TOTAL	$10,150

YEAR 2 and YEAR 3

A cost of $7,950 has been determined for each of the years 2 and 3. Several initial purchases made during year 1 (outboard motors, inflatable boat, camping equipment) will need to be made only once, thus accounting for the lower non-salary expenditures during these subsequent years.

University of Hawaii at Manoa

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PROJECT PROGRESS REPORT

March 31, 1980

Task Order No. 173

HAWAIIAN GREEN SEA TURTLE MANAGEMENT STUDY

PRINCIPAL INVESTIGATOR: George H. Balazs

OPERATING AGENCY: Hawaii Institute of Marine Biology

FUNDING: MAC 1978-80 - $29,237
UH Sea Grant College Program 1979-80 - $21,853
IUCN/WWF/NYZS/UH-ORA/NMFS (International Scientific Meetings) 1979-80 - $4,200

MAC FUND EXPENDED TO DATE: $23,560

I. OBJECTIVES

The overall objective of this study is to develop basic biological and ecological information relevant to the wise, long-term management and conservation of the unique Hawaiian green turtle population. Specific objectives include: 1) locating and censusing aggregations of turtles in their nearshore feeding pastures; 2) ascertaining productivity and population trends at the sole colonial breeding site of French Frigate Shoals; 3) determining the developmental migrations of immature turtles; 4) gaining information on natural growth rates and ages at sexual maturity; 5) determining the food sources used by each size category; and 6) determining the factors that limit the population. Life history information of this nature will be of direct use and benefit to the State of Hawaii in developing compatible programs of fisheries

resource utilization, particularly in waters of the Northwestern Hawaiian Islands. The 1978 designation of all U. S. populations of sea turtles as either "threatened" or "endangered" increases the need to gather this management-oriented information.

II. METHODS

Intensive land based and underwater field studies are periodically conducted at locations throughout both the major and Northwestern Hawaiian Islands. Research activities are focuses on population sampling through live capture and tagging as well as direct observations of feeding, basking and breeding activities. In addition, an extensive network of informants comprised of the general public and cooperating military agencies has been organized to gather information on the whereabouts and activities of turtles.

III. RESULTS

A. A series of lengthy and comprehensive field studies has provided basic life history data on turtle aggregations occurring at Necker, French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef, Midway, Kure, Oahu, Lanai and Hawaii.

B. The mean natural growth rates of immature turtles have been determined as follows: Necker - .14 cm per month; French Frigate Shoals - .08 cm per month; Lisianski - .13 cm per month; Midway - .09 cm per month; Kure - .08 cm per month; Oahu - .20 cm per month; Hawaii - .44 cm per month.

C. Comprehensive food studies involving samplings of stomach contents have identified the following major dietary components: Necker - *Caulerpa racemosa*; French Frigate Shoals - *Codium arabicum, Codium phasmaticum, Codium edule, Caulerpa racemosa, Ulva fasciata, Turbinaria ornata, Spyridia filamentosa*; Lisianski - *Caulerpa racemosa, Turbinaria ornata*; Midway - *Codium edule*; Oahu -

Codium arabicum, Codium phasmaticum, Ulva fasciata, Ulva reticulata, Pterocladia capillacea, Amansia glomerata, Ahnfeltia concinna; Lanai - *Amansia glomerata, Acanthophora spicifera; Sargassum polyphyllum*; Hawaii - *Pterocladia capillacea.*

D. The projected number of years to sexual maturity for 35 cm turtles newly recruited to resident pastures are as follows: Necker - 34 years; French Frigate Shoals - 59 years; Lisianski - 37 years; Midway - 53 years; Kure - 59 years; Oahu - 24 years; Hawaii - 11 years.

E. Monitoring of the breeding assemblage at French Frigate Shoals has indicated that approximately 180 adult females were present during the 1979 reproductive season.

IV. DISCUSSION

A. Significant Events and Accomplishments

1. Two papers resulting from this research program were presented at the World Conference on Sea Turtle Conservation held in Washington, D.C. during November 1979 ("Growth rates of immature green turtles in the Hawaiian Islands" and "Status of sea turtles in the Central Pacific Ocean"). Both of these papers will be published in the Conference Proceedings.

2. Two other papers resulting from this research program were presented at the joint SPC/NMFS workshop on sea turtles held in Noumea, New Caledonia during December 1979 ("Status of marine turtles in U. S. territories of the Central Pacific Ocean" and "Synopsis of biological data on green turtles in the Hawaiian Islands").

3. The Principal Investigator was appointed Deputy Chairman of the IUCN/SSC Marine Turtle Specialist Group.

4. A sea turtle research and management program for Hawaii and the Pacific region is being developed in collaboration with the Honolulu Laboratory of the National Marine Fisheries Service.

B. Setbacks or Problems Encountered

No setbacks or problems are being encountered at the present time.

C. Project Schedule

Research being conducted under Task Order No. 173 (1978-80) is on schedule, with significant contributions being made to our knowledge of the biology and ecology of the Hawaiian green turtle population (i.e. see attached correspondence from Dr. F. W. King).

V. SUMMARY/CONCLUSIONS

A. Conclusions Based on Research Performed

Research results and conclusions to date are contained in the numerous publications and reports that have been authored by the Principal Investigator and regularly forwarded to the Marine Affairs Coordinator.

B. Expected Completion of Project

The project is on schedule and the completion date remains June 1980.

C. Pertinent Comments

Support of this project by the MAC office has made it possible to develop within the State of Hawaii an authoritative source of information on sea turtles. This will benefit both Hawaiian sea turtles, and turtle populations throughout the Pacific region.

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PROJECT PROGRESS REPORT

February 28, 1978/9

Task Order No. 173

Hawaiian Green Sea Turtle Management Study

PRINCIPAL INVESTIGATOR: George H. Balazs

OPERATING AGENCY: Hawaii Institute of Marine Biology

FUNDING: MAC 1978-79 - $20,504
UH Sea Grant College Program 1978-79 - $13,815
National Geographic Society 1977-79 - $3,660
IUCN/New York Zoological Society (funding for travel to international meetings) - 1978-79 - $2,500

MAC FUNDS EXPENDED TO DATE: Task Order No. 173 - $10,476

I. OBJECTIVES

The overall objective of this study is to develop basic biological and ecological information relevant to the wise, long-term management and conservation of the unique Hawaiian green sea turtle population. Specific objectives include: 1) locating and censusing aggregations of turtles in their nearshore feeding pastures; 2) ascertaining productivity and population trends at the sole colonial breeding site of French Frigate Shoals; 3) determining the developmental migrations of immature turtles; 4) gaining information on natural growth ages and ages at sexual maturity; 5) determining the food sources used by each size category; and

6) determining the factors that limit the population. Life history information of this nature will be of direct use and benefit to the State of Hawaii in developing compatible programs of fisheries resource utilization, particularly in waters of the Northwestern Hawaiian Islands. The recent designation of all U. S. populations of green sea turtles as "threatened" increases the need to gather this management-oriented information.

II. METHODS

Intensive land based and underwater field studies are periodically conducted at various locations throughout both the major and Northwestern Hawaiian Islands. Research activities are focused on population sampling through capture and tagging, as well as direct observations of feeding, basking and breeding activities. In addition, an extensive network of informants comprised of the general public and cooperating military agencies has been assembled to gather information on the locations and activities of turtles.

III. RESULTS

A. A series of lengthy and comprehensive field studies has provided basic life history information on turtle aggregations occurring at Necker, French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef, Midway, Kure, Oahu, Lanai and the Big Island (Hawaii).

B. Natural growth rates of immature turtles in resident pastures at French Frigate Shoals and Midway/Kure have been determined for

periods of up to 37 months in the wild. Rates of growth, as measured by straight carapace length, have ranged from only .01 to .21 cm per month. At the Big Island off the Kau District, rates of growth have ranged from .38 to .52 cm per month.

C. Comprehensive food studies, involving samplings of stomach contents, have identified two genera of algae (*Codium* and *Caulerpa*) as major dietary components of turtles residing in the Northwestern Hawaiian Islands. In the major islands, *Pterocladia, Codium, Amansia* and *Ulva* have been found to be principal sources of food.

D. Monitoring of the breeding assemblage at French Frigate Shoals has indicated that approximately 250 adult females were present during the 1978 reproductive season.

IV. DISCUSSION

A. Significant Events and Accomplishments

1. An overview paper has been published in an internationally distributed newsletter covering the results of research to date on natural growth, food sources and migrations ("Growth, food sources and migrations of immature Hawaiian *Chelonia*" *IUCN/SSC Marine Turtle Newsletter*, Volume 10, 1-3).

2. A paper has been published on aspects of terrestrial critical habitat for sea turtles in the Hawaiian Islands and other areas under U. S. jurisdiction in the Pacific region ("Terrestrial critical habitat for sea turtles under United

States jurisdiction in the Pacific region" *'Elepaio*, Volume 39, 37-41.

3. A paper has been published on the results of preliminary algae collections made at select sites in the Leeward Islands ("Marine benthic algae collected from Kure Atoll, Maro Reef and Necker Bank, Northwestern Hawaiian Islands" *'Elepaio*, Volume 39, 110-111).

4. A paper has been published on the ecological aspects of a hawksbill turtle (*Eretmochelys imbricata*) recovered dead from a gill net in Kaneohe Bay ("A hawksbill turtle in Kaneohe Bay" *'Elepaio*, Volume 38, 128-129).

5. A note has been published describing efforts to tattoo young Hawaiian green turtles as a secondary system of individual identification ("Tattooing green turtles" *IUCN/SSC Marine Turtle Newsletter*, Volume 8, 3).

6. A report has been prepared dealing with sea turtles at Kahoolawe ("Sea turtles of Kahoolawe Island: A preliminary survey" November, 1978, 21 pp).

7. A paper dealing with stomach sampling techniques for green turtles has been submitted for publication ("Field methods for sampling the dietary components of green turtles *Chelonia mydas*" *Herpetological Review*).

8. A paper dealing with loggerhead turtle parts recovered from a tiger shark at Kure has been accepted for publication ("Loggerhead turtle recovered from a tiger shark at Kure Atoll" *'Elepaio*).

9. A comprehensive bibliography of the Hawaiian monk seal has been published as a technical report (No. 35) of the Hawaii Institute of Marine Biology. This has recently been updated and will be republished in the near future by the University of Hawaii Sea Grant College Program.

10. A comprehensive bibliography of sea turtles in the Hawaiian Islands is in draft form and will be submitted for publication in the near future.

11. A paper has been published on observations of parasites and ulcers found in a monk seal at French Frigate Shoals ("Parasitic ulceration of the stomach in a Hawaiian monk seal (*Monachus schauinslardi*)" Whittow and Balazs, *'Elepaio*, Volume 38, 83-84).

12. A paper has been published covering observations of a shark seen feeding on a monk seal at French Frigate Shoals ("First record of a tiger shark observed feeding on a Hawaiian monk seal" *'Elepaio*, Volume 39, 107-109).

13. An invitational ad hoc meeting of the IUCN Marine Turtle Specialists Group was attended in Toronto, Ontario to formulate international research strategies. All travel expenses were paid by IUCN/WWF of Switzerland.

14. An invitational meeting on sea turtles convened by NMFS was attended at the National Space Technologies Laboratory, Mississippi at the expense of the NMFS, Washington, D.C.

15. Lectures on the Northwestern Hawaiian Islands and the Hawaiian green sea turtle research project were presented to audiences throughout the state on seven different occasions. This was in conjunction with a marine lecture series sponsored by the University of Hawaii Sea Grant College Marine Advisory Program, the Waikiki Aquarium, the State Office of the Marine Affairs Coordinator, and the Hawaiian Academy of Sciences.

B. Setbacks or Problems Encountered

The conduction of suitable field studies continues to make it necessary for the Principal Investigator to spend longer than expected periods of time at geographical locations where the required activities are physically demanding and are frequently hazardous. The availability of travel to remote areas of the Leeward Islands has, however, been enhanced by the charter arrangements made by the MAC office with the Easy Rider Corporation.

C. Project Schedule

Research being conducted under Task Order No. 173 (1978-1979) is on schedule, with significant contributions being made to our knowledge of the biology and ecology of the Hawaiian green turtle population.

V. SUMMARY/CONCLUSIONS

A. Conclusions Based on Research Performed

Research results and conclusions to date are contained

within the numerous publications and reports authored by the Principal Investigator . Copies of this material have been, and will continue to be, forwarded to the MAC office and other agencies having interests in the wise management and conservation of Hawaii's marine biological resources.

B. Expected Completion of Project

In conjunction with the State, NMFS, FWS and Sea Grant fisheries investigations of the Leeward Islands, a reduced level of funding ($8,317) has been requested from the MAC office for use as matching funds for Sea Grant Year 12 (1979-1980). The increased research in the Leeward Islands during Year 12 by workers of other disciplines will significantly benefit the Principal Investigator's efforts to gather and interpret ecological information on the Hawaiian green turtle population.

C. Pertinent Comments

1. The project is being conducted solely by the Principal Investigator with the immediate help of one Biological Assistant. The Principal Investigator does not have a salary base at the University of Hawaii, therefore funds for this purpose must be derived from Sea Grant and MAC funds.

2. Support of this project by the MAC office has made it possible to develop within Hawaii an authoritative source of information on sea turtles that can be drawn upon internationally, but most importantly by island nations of the Pacific region (see memorandum to MAC office dated 19 January 1979).

GEORGE R. ARIYOSHI
GOVERNOR

JOHN P. CRAVEN, PH. D., J.D.
MARINE AFFAIRS COORDINATOR

STATE OF HAWAII
MARINE AFFAIRS COORDINATOR
OFFICE OF THE GOVERNOR
P. O. BOX 2840
HONOLULU, HAWAII 96803

December 2, 1980

MEMORANDUM

TO: MR. GILBERT OSHIMA
Comptroller, RCUH

FROM: HOWARD PENNINGTON
Principal Investigator: Project #4055

SUBJECT: TRANSFER OF COSTS TO PROJECT #4055 FROM PROJECT #4053

According to our telephone conversation of December 2, 1980, the final deficit balance on Project #4053 (MAC T.O. #173; Surv/Assess Sea Turtles) is $357.62.

This memorandum is your authorization to transfer that charge (negative balance) of $357.62 to RCUH Project #4055 (MAC T.O. #174; MAC Internship Program).

This should leave Project #4053 with a zero balance; the project should then be closed.

Thanks for your cooperation.

HP:t

cc: George Balazs, HIMB

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PROJECT PROGRESS REPORT

April 28, 1978

Task Order No. 151
Hawaiian Green Sea Turtle Management Study

PRINCIPAL INVESTIGATOR: George H. Balazs

OPERATING AGENCY: Hawaii Institute of Marine Biology

FUNDING: MAC 1977-78 $21,550

NOAA, Office of Sea Grant 1977-78 $20,000

National Geographic Society 1977-79 $3,660

MAC FUNDS EXPENDED TO DATE:
1977-78, Task Order No. 151 - $17,375 as of April 1978
1976-77, Task Order No. 118 - < $18,360

I. OBJECTIVES

The overall objective of this study is to develop basic biological and ecological information relevant to the wise, long-term management of the native Hawaiian green sea turtle population. Specific objectives include: 1) locating and censusing aggregations of turtles in their nearshore feeding pastures; 2) ascertaining productivity at the sole colonial breeding site of French Frigate Shoals; 3) determining the developmental migrations of immature turtles; 4) gaining information on natural growth rates and ages at sexual maturity; 5) determining food sources used by each size category; and 6) determining the factors which limit the population. Life history information of this nature will be of direct benefit to the State of Hawaii in developing compatable programs of fisheries resource utilization, particularly in waters of the Northwestern Hawaiian Islands.

II. METHODS

Intensive land based and underwater field studies are periodically conducted at various locations throughout both the major and Northwestern Hawaiian Islands. Research activities are focused on population sampling through capture and tagging, as well as direct observations of feeding and breeding activities. In addition, an extensive network of informants comprised of the general public and cooperating military agencies has been assembled to gather information on the locations and activities of turtles.

III. RESULTS

A. Assessments have been conducted of turtle aggregations at Kure, Midway, Laysan, French Frigate Shoals, Necker, Nihoa, Kauai, Oahu, Lanai and Hawaii.

B. Samplings of stomach contents have identified two genera of algae, *Codium* and *Caulerpa*, as major dietary components of turtles at Kure, Midway, French Frigate Shoals and Necker. *Codium*, *Pterocladia* and *Ulva* have been identified as major dietary components of turtles at Oahu and Hawaii. A small but potentially important quantity of animal material (jellyfish and tunicates) has also been identified in a significant number of samplings.

C. Recoveries of immature turtles tagged at Kure, Midway and French Frigate Shoals have thus far indicated natural growth rates of not more than 1/16" in carapace (upper shell) length per month. Recoveries at the Island of Hawaii have thus far indicated natural growth rates of not more than 1/8" in carapace length per month.

D. Fibroepithelial tumors from Hawaiian turtles have been analyzed by specialists at the Smithsonian Institution and determined to be not caused by foreign organic agents such as leeches, barnacles and plant material. Additional specimens are being evaluated by electron microscopy to determine if a viral etiology exists.

E. Pathology of relatively high incidence involving an unknown form of limb necrosis has been discovered in immature turtles at Kure.

F. An analysis of results obtained from the experimental release of captive-reared Hawaiian green sea turtles for stocking purposes has indicated that such procedures may not be an effective means of conservation.

IV. DISCUSSION

A. Significant Events and Accomplishments

1. A 27 page preliminary report on the ecological aspects of the Necker green turtle aggregation has been prepared and distributed.

2. A report covering the known aspects of terrestrial critical habitat for sea turtles under U.S. jurisdiction throughout the Pacific has been prepared and distributed.

3. A report dealing with the Hawaiian hawksbill sea turtle has been prepared and distributed.

4. The Principal Investigator has served as a guest lecturer on eight occasions for ocean-oriented and community service groups in order to maintain public awareness of the project and solicit cooperation.

5. The Principal Investigator has been appointed to serve a three year term on the six member advisory Marine Turtle Specialist Group of the International Union for Conservation of Nature (Switzerland). This has resulted in part from international recognition of the State's role in encouraging and supporting research of Hawaiian sea turtles.

6. The Principal Investigator has been awarded a rank promotion within the faculty (untenured) of the University of Hawaii. This advancement was based to a large extent on the scope and quality of research conducted under the MAC green sea turtle project.

7. The Principal Investigator has been requested by the Director of the Honolulu Laboratory of the National Marine Fisheries Service to attend an intra-agency meeting on national sea turtle management in Bay St. Louis, Mississippi between 8-12 May 1978. All expenses for this travel will be paid by the National Marine Fisheries Service.

8. A comprehensive 340 reference bibliography of the Hawaiian monk seal has been assembled and published in collaboration with Dr. G. C. Whittow of the Kewalo Marine Laboratory, Pacific Biomedical Research Center. Monk seals and Hawaiian green sea turtles utilize portions of the same habitat, therefore information developed for one species will to some extent be of direct benefit to the other.

B. Setbacks or Problems Encountered

The conduction of suitable field studies has often made it necessary for the Principal Investigator to spend longer than expected periods at locations where the required activities are physically demanding and at times hazardous. In addition, travel to some of the remote areas in the Northwestern Hawaiian Islands has not been available as originally projected.

C. Project Schedule

The third scheduled year (1978-79) for this project will be crucial in that the pool of tagged turtles established, both immatures in the feeding pastures and adults at the breeding grounds, will be particularly amenable to answering basic biological questions (growth, migrations, productivity, mortality) through tag recoveries. Due to the reasons stated above in B, and

the fact that Sea Grant counterpart support for the project did not start until September 1977, it is presently felt that additional time may be needed beyond year three in order to bring the project to a successful conclusion.

V. SUMMARY/CONCLUSIONS

A. Conclusions Based on Research Performed

A significant portion of the research undertaken in this project is unique in that the activities and techniques have not been previously carried out on other sea turtle populations. Much of the initial field work has therefore been of a developmental and experimental nature. However, it is now possible to conclude that the procedures being utilized are sound and thoroughly capable of providing the desired results.

B. Expected Completion of Project

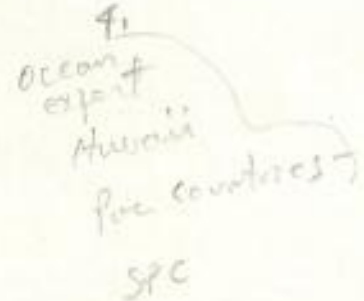
Year two of the project (1977-78, Task Order No. 151) will be completed as scheduled with a notable number of significant accomplishments. However, some additional time may be needed beyond year three in order to bring the project to a successful conclusion.

C. Pertinent Comments

1. The project is being conducted solely by the Principal Investigator and one Biological Assistant. The Principal Investigator does not have a salary base at the University of Hawaii, therefore funds for this purpose must be derived from the MAC and Sea Grant awards. This amounts to approximately $10,700 or 50% from each source, including the cost of State Fringe Benefits.

2. Of the $21,550 award from MAC for 1977-78, $1,078 represented overhead cost paid to RCUH.

3. The MAC award has been and will continue to be used as state matching funds to obtain financial support from the federal Office of Sea Grant. Of the $20,000 Sea Grant award for 1977-78, $4,677 represented overhead cost which was paid to the General Fund of the State of Hawaii.



NWHI/SURVEY AND ASSESSMENT OF THE GREEN SEA TURTLE RESOURCES
Task Order No. 173 (4053)

PROGRESS REPORT

MAC INVESTMENT: $20,504 (FY 1978-79)

MATCHING FUNDS (SEE OVERVIEW)

OPERATING AGENCY: HAWAII INSTITUTE OF MARINE BIOLOGY

PRINCIPAL INVESTIGATOR: GEORGE H. BALAZS

OBJECTIVES

The overall objective of this study is to develop basic biological and ecological information relevant to the wise, long-term management and conservation of the Hawaiian green sea turtle population. Specific objectives include:

1. locating and censusing aggregations of turtles in their nearshore feeding pastures;
2. ascertaining productivity and population trends at the sole colonial breeding site of French Frigate Shoals;
3. determining the developmental migrations of immature turtles;
4. gaining information on natural growth ages and ages of sexual maturity;
5. determining the food sources used by each size category; and
6. determining the factors that limit the population.

Life history information of this nature will be of direct use and benefit to the State of Hawaii in developing compatible programs of fisheries resource utilization, particularly in waters of the Northwestern Hawaiian Islands. The recent designation of all U.S. populations of green sea turtles as "threatened" increases the need to gather this management-oriented information.

METHODS

Intensive land-based and underwater field studies are periodically conducted at various locations throughout both the major and Northwestern Hawaiian Islands. Research activities are focused on population sampling through capture and tagging, as well as direct observations of feeding, basking and breeding activities. In addition, an extensive network of informants comprised of the general public and cooperating military agencies has been assembled to gather information on the locations and activities of turtles.

from- Fifth Annual Report from the Marine Affairs Coordinator to the Governor -30- and Legislature July 1978 to June 1979

RESULTS

A. A series of lengthy and comprehensive field studies has provided basic life history information on turtle aggregations occurring at Necker, French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef, Midway, Kure, Oahu, Lanai and the Big Island (Hawaii).

B. Natural growth rates of immature turtles in resident pastures at French Frigate Shoals and Midway/Kure have been determined for periods of up to 37 months in the wild. Rates of growth have ranged from only .01 to .21 cm. per month. At the Big Island off the Kau District, rates of growth have ranged from .38 to .52 cm. per month.

C. Comprehensive food studies, involving samplings of stomach contents, have identified two genera of algae *(Codium and Caulerpa)* as major dietary components of turtles residing in the Northwestern Hawaiian Islands. In the major islands, *Pterocladia, Codium, Amansia and Ulva* have been found to be principal sources of food.

D. Monitoring of the breeding assemblage at French Frigate Shoals has indicated that approximately 250 adult females were present during the 1978 reproductive season.

DISCUSSION

The availability of travel to remote areas of the Leeward Islands has been enhanced by the charter arrangements made by the MAC Office with the Easy Rider Corporation. Support of this project by the MAC Office has made it possible to develop within Hawaii an authoritative source of information on sea turtles that can be drawn upon internationally and, most importantly, by island nations of the Pacific region.

Research results and conclusions to date are contained within the numerous publications and reports authored by the Principal Investigator. Lectures on the Northwestern Hawaiian Islands and the Hawaiian green sea turtle research project were presented to audiences throughout the state on seven occasions. An invitational ad hoc meeting of the IUCN Marine Turtle Specialists Group was attended in Toronto, Ontario to formulate international research strategies. All travel expenses were paid by IUCN/WWF of Switzerland and an invitational meeting on sea turtles convened by NMFS was attended at the National Space Technologies Laboratory, Mississippi at the expense of the NMFS, Washington, D.C.

PROJECT CONTINUENCE

Research being conducted is on schedule, with significant contributions being made to our knowledge of the biology and ecology of the Hawaiian green turtle population.

University of Hawaii at Manoa

Hawaii Institute of Marine Biology

MEMORANDUM January 19, 1979

To: Office of the Marine Affairs Coordinator

From: George H. Balazs

Subject: Matching MAC funds for the green sea turtle Sea Grant proposal (1979-80) as a component of the Northwestern Hawaiian Islands Commercial Fisheries Investigation.

For the forseeable future, green sea turtles in the Northwestern Hawaiian Islands are likely to continue to be viewed as a nonconsumable wildlife resource associated closely with the protected areas of the National Wildlife Refuge. Along with the monk seals and numerous seabird species, the turtles within that portion of our island chain are not likely to provide direct and tangible economic benefits for man. Nevertheless, their existence and well being are of value and importance to a large segment of the citizenry of Hawaii and the nation. Although the form of this value certainly varies among individuals, it is usually described in terms of aesthetics, America's wildlife heritage, diversity of genetic resources, or biotic components necessary to maintain the healthy ecosystem upon which man is dependent. We are all in agreement that the orderly and rational development of any commercial fisheries by the State in the Northwestern Hawaiian Islands must take place with a minimum of adverse impact to these valued, but noneconomic, wildlife species. It is therefore within this context that the management-oriented life history study of the green turtle has been incorporated as a key component of the Sea Grant NHI Fisheries Investigation. I have attempted to make these points clear in my proposal narrative, along with other relevant and clarifying information.

There is another point concerning the research of Hawaiian sea turtles which I believe may be worthwhile to emphasize at this time. With financial support from the MAC office, it has been possible to develop within Hawaii an authoritative source of information on sea turtles that can be drawn upon internationally, but most importantly by island nations of the Pacific. This acknowledged expertise can be demonstrated in part by my honorary consultancy assignment with the South Pacific Commission (see Dr. Mahony's letter of 7-8-77 to Mr. Kono), and my appointment as a full member of the Marine Turtle Specialist Group of the International Union for the Conservation of Nature (IUCN - Switzerland). Hawaii is already recognized for providing expertise from a broad spectrum of marine

disciplines, and it is an additional credit that the biology and ecology of sea turtles can now be added to the list.

I appreciate having the opportunity to clarify and confirm some of these points relative to my work.

GHB:md

A project proposal for research
to be conducted within the Hawaiian
Islands National Wildlife Refuge

Submitted to

The United States Department of Interior
Bureau of Sport Fisheries and Wildlife
Fish and Wildlife Service

Title

An investigation of green turtle (Chelonia sp.) populations of French Frigate Shoals, Northwestern Hawaiian Islands.

Principal Investigator

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

Duration Continuing - April 1974 to April 1975. Anticipate requesting permission to conduct similar investigations through 1978.

Objectives

1. To continue an intensive tagging study of nesting turtles at East Island, French Frigate Shoals during the 1974 nesting season. Data from the 1973 study have indicated East Island to be the site of greatest nesting activity within the atoll. Comprehensive information collected at this location will further provide a basis for defining parameters of the entire colony. Included in this phase of the work will be the accumulation of data on length-width frequencies, renesting intervals and locations, fecundity and emergence, site selection and nesting behavior.

2. To obtain data on the number of green turtles utilizing other nesting locations (Tern, Trig, Whale-Skate, Gin and Little Gin Island) during the 1974 season. In addition, intensive sampling of those animals nesting on Whale-Skate, the second most utilized island within the atoll,

will be made at periodic intervals in order to determine if parameter differences exist between East and Whale-Skate Island turtles.

3. To conduct further investigations on the incidence of basking and its relationship to nesting on the islands under surveillance. In depth observations will be made on this unique behavioral trait in order to accurately define and describe emergence, quiescence, retreat and other thermoregulatory patterns associated with the basking habit.

4. To obtain information on green turtle mating habits and their relationship to subsequent basking and nesting location preferences. Observations will be made to either confirm or reject the theory postulated during 1973 that at the onset of the mating season males arrive within the atoll in advance of females. Information will also be obtained on the cyclic reproductive patterns of males in order to determine if breeding by this sex takes place each year.

5. To make determinations on the degree of predation by small sharks, ghost crabs and birds on newly hatched turtles.

6. To collect additional data on egg fertility and embryo and hatchling mortality within nests at several select locations. Substrate information will also be gathered to identify those characteristics conducive to high productivity.

7. To carry out periodic land and aerial surveys several times throughout the year in order to establish the presence and size of resident green turtle populations; to determine seasonal migration patterns both in and out of the atoll, and to examine for the presence of marine turtle species other than Chelonia that may be nesting at other times of the year.

Justification

Pressures from man continue to increase on marine turtle colonies throughout the world. In order to obtain knowledge on the Hawaiian Archipelago green turtle (Chelonia sp.) colony, a preliminary intensive investigation was conducted on nesting and basking populations occurring at French Frigate Shoals, Northwestern Hawaiian Islands during 1973. A summary report on the significant results of this work accompanies this proposal.

Because French Frigate Shoals is the last remaining congregated nesting site of the green turtle in the Hawaiian Archipelago, and because Hawaiian green turtles comprise the last intact colony in the United States and possibly the only one in the world that can be completely managed under one nation's jurisdiction, it is imperative that continued studies be carried out at this location in order to gather data that will aid in the formulation of a sound long range management program. This is particularly important in view of the fact that mature animals found at French Frigate Shoals migrate to coastal waters of the major inhabited Hawaiian Islands where they are unprotected from both commercial and private exploitation.

Results obtained from the 1973 investigation have been instrumental in demonstrating the need for marine turtle protection within waters under State jurisdiction. Proposed protective measures are presently under consideration by the Hawaii State Department of Land and Natural Resources, but it is unknown at this time whether or not these restrictions, if enacted, will provide the necessary protection to ensure future viability in the Hawaiian Archipelago colony.

Because cyclic reproductive patterns are exhibited by female green turtles, intensive studies need to be conducted at the nesting site over a number of years in order to examine the entire nesting colony. Although nesting occurs most frequently in other areas of the world at three year intervals, both two and four year cycles are not uncommon. The reproductive patterns of the French Frigate Shoals colony are unknown. Due to cyclic reproduction, additional studies at the nesting site will, in essence, be examining completely different populations. Census data, as well as length-width frequencies will need to be collected on these animals in order to accurately define parameters for the total colony. This data will, in part, allow for the confirmation or adjustment of determinations previously made on the total size of the nesting colony.

During the 1973 study only eight animals were identified that had been formerly tagged, however, several hundred individuals have been marked at this location over the past six years. Subsequent investigations may well encounter greater numbers of these tagged animals and permit full utilization to be made of data previously collected by U. S. Fish and Wildlife personnel.

Procedures

Research methods utilized during the 1973 study proved highly successful and, in general, the same basic procedures will be carried out during subsequent studies. The practical experience derived from being closely associated with the French Frigate Shoals ecosystem for extended periods of time allowed for the adjustment and refinement of data collection techniques. Procedures that will be followed in order to fulfill

each of the project's objectives are outlined as follows:

1. East Island tagging study -

A small campsite will be re-established on East Island and investigators will commute between this location and the Tern Island facility as necessary for supplies, rest and rotation of duty. Seventeen previously designated areas which comprise the vegetated portion of East Island and each extend for approximately 50 meters will again be located and marked with identifying stakes. Activity during the major portion of the nesting season (June - July or as indicated through preliminary observations) will be intensively monitored by conducting surveys at two hour intervals during each night. During each survey tracks from emerged animals will be recorded and followed inland to determine incidence of unsuccessful pits and/or stage of nesting. Temporary identification will be made by numbering each animal's carapace with spray paint. When the latter cover-up stages of nesting are observed, body measurements will be taken and permanent identifying tags attached. In order to eliminate disruptions to normal behavioral patterns, animals will not be turned over for tagging purposes unless absolutely essential to the collection of critical data. Egg counts will be made on those animals found to be at a nesting stage conducive to such observations and several such nests will be permanently marked for future location.

Physical and mental stress incurred to the researchers from the rigorous data collecting schedule (in excess of 80 hours per week) will be minimized by maintaining three individuals at any one time in the

area, two of which will carry out intensive nightly duties on East Island while the third person will act in a support capacity on Tern Island. Rotation of assignments will allow for adequate rest, and give each individual the capacity to remain within the atoll for two consecutive weeks before returning to Honolulu. Tours of research duty for longer than two weeks are not deemed feasible due to University commitments and financial responsibilities on the part of research assistants that will be helping the principal investigator on this project.

2. Utilization of other islands by nesters -

Daytime surveys of the islands Trig and Whale-Skate will be made every second day in order to record the incidence of nesting pits at these locations. Similar surveys will be conducted on Gin and Little Gin at six day intervals or as weather conditions permit. Pits on Tern will be monitored periodically by that person acting in a support capacity. New pits that are recorded during each survey will be marked for future recognition. At ten day intervals one individual will carry out a night survey of Whale-Skate using the same methods as previously described for East Island.

3. Incidence and observations of baskers -

In conjunction with the regular daytime nesting pit surveys, observations on the incidents of basking animals will also be recorded. A similar survey will also be conducted regularly on East Island. Baskers which possess permanent tags and no painted numbers will be approached for identification using non-disruptive techniques developed during the previous study.

In order to make careful observations on the basking behavior of individual animals, a small tent with observation ports will be situated adjacent to a heavily used basking area at the southeast end of East Island. This facility will also be useful during night surveys for shelter from the frequent rain showers which occur at the atoll.

4. Mating habits -

Surveys will be conducted over a six day period during the first week of May to collect data and make observations on copulation and sex ratios. Samples of basking animals on each island will be marked with spray paint in order to determine inter-island movements, mating frequencies, and subsequent nesting activity. Baskers bearing tags from previous years will be approached for identification.

5. Predation on hatchlings -

Commencing the second week of July, baited hooks suspended from floats will be set at two-day intervals at select locations off East and Whale-Skate Island in order to sample the stomach contents of small sharks which are abundant in those areas. As conditions permit, observations will be made on the emergence of hatchlings from select nests to record degree of predation by ghost crabs and birds.

6. Egg fertility, embryo and hatchling mortality -

During the first week of October surveys will be made on each island to locate nests in which hatching and emergence have taken place. Excavations will be made on each nest to assess the number of undeveloped eggs, dead hatchlings, and partially developed dead embryos. Live

hatchlings found to be entrapped underground will be retrieved and released into the ocean. Terrain descriptions will be made and soil samples taken at each location.

7. Land and aerial surveys -

At three month intervals, the principal investigator and one assistant will conduct land surveys of each island over a six day period. All information pertinent to the presence and activity of turtles within the atoll will be collected. In conjunction with the weekly USCG/FAA logistics flight, and as passenger space permits, an aerial survey of the islands will be carried out by the principal investigator once each month to further census turtle populations.

To ensure the well being of the research team while conducting studies in this remote and potentially hazardous area, all possible safety precautions will be implemented. Radio contact will be maintained at regular intervals with the Tern Island facility. The launch used for interisland travel will be equipped with flare guns, extensive mooring gear, first aid supplies, emergency food and water and reserve gasoline. In addition, an extra outboard motor and spare parts will be carried. The principal investigator will personally supervise and be responsible for all research activity within the atoll.

Close contact will be maintained at all times with U. S. Fish and Wildlife personnel in order to coordinate research activities and disseminate information relative to the progress of the project. At the completion of each major phase of the investigation, data will be compiled and a summary report prepared for the Bureau of Sport Fisheries and Wildlife.

Schedule of proposed research activities (April, 1974 to April, 1975)

Month	Week	Activity
April	1st and 3rd	1-day preliminary aerial survey
May	1st	6-day survey of mating activity
May	4th	Initiation of intensive tagging study and periodic island surveys
July	2nd	Initiation of shark sampling
August	1st	Completion of intensive tagging and survey studies
September	1st	1-day aerial survey
October	1st	6-day survey of egg fertility, hatchling and embryo mortality and overall turtle activity
November	1st	1-day aerial survey
December	1st	1-day aerial survey
January	1st	6-day survey of overall turtle activity
February	1st	1-day aerial survey
March	1st	1-day aerial survey
April	1st	6-day survey of overall turtle activity

Responsibilities and support

Direct financial assistance will be obtained from sources other than the Bureau of Sport Fisheries and Wildlife for all investigations scheduled to take place after April of 1975. Based on the results and accomplishments of the 1973 investigation, a proposal is in preparation for submission to granting agencies interested in supporting green turtle research of this nature. The following support is deemed necessary in order to successfully accomplish the immediate project objectives for the period April 1974 to April 1975.

Air transportation between Honolulu and Tern Island, French Frigate Shoals		Provision requested from the U. S. Coast Guard, and Bureau of Sport Fisheries and Wildlife at no direct cost to project
Use of marine laboratory's research facilities, equipment and supplies (extra outboard motors, parts, tools, mooring gear, safety equipment, spray paint, calipers, and photographic materials)		Provided by the Hawaii Institute of Marine Biology
Food costs at Tern Island (available through U. S. Coast Guard facilities at a rate of $4.05 per man per day)		
BSFW fiscal year 1973-74 (102 man days).	413.10	Provision requested from the Bureau of Sport Fisheries and Wildlife
BSFW fiscal year 1974-75 (129 man days ending April 1975). . . .	522.45	
Portable 2-way radios (3) . . . . . .$ 480		Provision requested from the Bureau of Sport Fisheries and Wildlife
Salary for project leader (principal investigator		Provided by the Hawaii Institute of Marine Biology

Compensation for research assistants (can be awarded for either fiscal year 1973-74 or 1974-75) . . . . . Requested as a grant sum for payment to research assistants at a rate of $75.00 for each week (20 man weeks total) of duty at French Frigate Shoals. Recruitment of University level assistants for this type of intensive research will be facilitated considerably by offering such a cash incentive.	$ 1,500	Provision requested from the Bureau of Sport Fisheries and Wildlife
Total direct cost to the Bureau of Sport Fisheries and Wildlife	$ 2,915.55	

GEORGE R. ARIYOSHI
GOVERNOR

JOHN P. CRAVEN, PH. D., J.D.
MARINE AFFAIRS COORDINATOR

STATE OF HAWAII
MARINE AFFAIRS COORDINATOR
OFFICE OF THE GOVERNOR
P. O. BOX 2840
HONOLULU, HAWAII 96803

February 28, 1980

MEMORANDUM

TO: George Balazs

FROM: John P. Craven
Marine Affairs Coordinator

SUBJECT: PROGRESS REPORT TO THE MAC ON TASK ORDER NO. 73: NWHI Green Sea Turtle Assessment

Act 149, SLH 1977 requires periodic project reports and a final report from the principal investigator(s) on all MAC-funded projects.

This is to inform you that the progress report on your project (RCUH No. 4053) is due on March 15, 1980. We would appreciate your cooperation in following the attached progress report format.

If your project is also funded by Sea Grant, a copy of all progress reports should be sent to the MAC Office, 1164 Bishop Street, Suite 1501, Honolulu, Hawaii, 96813. (Please do not sent reports to the University of Hawaii, Marine Programs Office.) The Sea Grant progress report will be accepted in lieu of MAC progress reports if all MAC information requirements are met.

Please feel free to call the MAC Office if you have any questions regarding the submittal of progress reports. The MAC staff will be happy to discuss your problems and concerns. You may reach us at any of the following numbers: 548-6262, 548-2358, or 548-2408.

The MAC will be authorizing RCUH to release or withhold MAC funds during the duration of the project contingent upon the submission and approval of the reports to the MAC.

Attachment

FORMAT

PROJECT PROGRESS REPORT

DATE:

PROJECT T.O. NO. and TITLE:

PRINCIPAL INVESTIGATOR(S):

OPERATING AGENCY:

FUNDING (Dollars and Source/s/):

MAC FUNDS EXPENDED TO DATE:

- - - - - - - - -

I. OBJECTIVES

Brief description of goals, objectives and potential benefits to State

II. METHODS

Methods used to achieve stated goals and objectives

III. RESULTS (thus far, if any)

IV. DISCUSSION

A. Significant events, accomplishments in relation to project goals and objectives

B. Setbacks or problems encountered during course of project thus far

C. Is the project on schedule as planned in the proposal? If not, why?

V. SUMMARY/CONCLUSIONS

A. Summary/conclusions based on research performed to date

B. Expected completion of project; justification if extension date is required

C. Other pertinent comments

University of Hawaii at Manoa

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

October 3, 1980

MEMORANDUM

TO: Mr. Howard Pennington
Office of the Marine Affairs Coordinator

FROM: George H. Balazs
Assistant Marine Biologist

SUBJECT: Budget Status of MAC/RCUH Project 4053 (NWHI Green Turtle Survey and Assessment)

The contract award to the University of Hawaii from the National Marine Fisheries Service for further studies of sea turtles has at long-last béen finalized. This contract is retroactive to August 1st, therefore the costs incurred to Project 4053 will be reimbursed as I had promised to you during our telephone conversations. However, Mr. Oshima has recently informed me that approximately $345 was utilized prior to August 1st, and therefore cannot be covered by the new contract. This deficit amountis attributed to hourly pay to my research techician- about eight days of work. I am, of course, very sorry that this situation has arisen.

I have no choice but to ask for your assistance in making up this amount to RCUH. If it would be agreeable and beneficial, I could arrange to have my technician (Alan Kam) work in your office for eight days (being paid under the new contract) as your compensation.

Thank you for your consideration and assistance in this matter.

cc Gilbert Oshima, RCUH

Balazs

University of Hawaii at Manoa

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

May 14, 1974

Dr. Raymond F. Dasmann
Senior Ecologist
Research and Planning
International Union for Conservation
of Nature and Natural Resources
1110 Morges
Switzerland

Dear Ray:

Greetings and best wishes! This is an inquiry and quest for assistance related to the correspondence you have had with Mr. George Balazs, valued junior associate of mine at this laboratory. You corresponded with him about a year ago concerning turtle research. For two years now we have been engaged in natural history and population ecology studies at the only remaining congregated nesting site left for green turtles in the U. S. (French Frigate Shoals). The 1974 nesting season studies are now in progress.

In connection with this we have also conducted nutrition research on the first two years of the green turtle's life history. This research has been supported in part through contribution of the U. S. Department of Interior Bureau of Sport Fisheries and Wildlife, which administers the French Frigate Shoals Hawaiian Islands National Wildlife Refuge area, but in the main it has been supported by NOAA Sea Grant funds. As you probably know NOAA and Sea Grant are under the U. S. Department of Commerce and are therefore highly practically and commercialization oriented. Given the present state of the art, we feel it would be dishonest and do turtle conservation potential substantial harm if we gave this funding agency to understand that we want and indeed should implement commercial farming at this time. I think to you no further comment on this is necessary. To do so would of course weaken the animals' already endangered status.

We have explored getting support from the State of Hawaii perhaps through the Dingell-Johnson Act, but unfortunately marine turtles are excluded from the definitions of fish and wildlife under such Federal assistance funds and the State of Hawaii itself, seems, has had "other fish to fry."

Thus, unless we receive support from other sources we will soon have to cease this promising and interesting research. I would therefore explore with you the possibility of a project proposal to IUCN World Wildlife Fund roughly to comprise the following.

1. Population ecology and breeding colony work at French Frigate Shoals. Here we are assured of continued in-kind assistance by the Department of Interior in the form of free transportation, use of the military establishment on French Frigate Shoals, boat, motor, a small lab, and living quarters without cost to us.

2. After each season field work at French Frigate Shoals several hundred hatchlings will be brought back to our facilities where we have already constructed holding pens and feed processing equipment for on-location experiments to last various lengths of time (one, two and six months), before releasing the animals at selected sites.

3. An important aspect of this release work will be tagging. We wish to use common external metal tags as well as a newly developed living internal antibody "tag" which relies on the innocuous injection of certain protein materials retained in the metabolic network of the animal to yield, hopefully even many years later, an immune reaction when the blood of a so-tagged turtle is tested. This tag has been developed by Dr. Al Benedict, a University of Hawaii immunologist, who has spent five years on the project with marine turtles. We feel that this type of carefully controlled experimental rearing and release work with this new type of tag is absolutely essential if hard data are to be obtained on the fate - entry into breeding population, etc. - of captive-reared animals after release into the wild.

Such questions as, is headstarting aiding or further destroying wild turtle populations, and how long do they take to sexual maturity, are some questions that can be so answered. Please note that the Hawaiian Archipelago is probably the best site in the world for this type of work because both <u>feeding</u> (main inhabited islands) and <u>breeding</u> (French Frigate Shoals) grounds are under one government jurisdiction. No international boundaries are crossed by the migrants.

Please, Ray, give me your reading on whether or not you feel it may be possible for you to help us get money for this work? I'm certain that it falls under IUCN/WWS auspices. What I don't know is what your funding situation is and therefore rather than proceed with an elaborate proposal at this point, I prefer to "feel you out" informally with this letter. A funding level of approximately US$6,000 per year over the next three years would be anticipated.

Please react as soon as you can because we would certainly hate to have to say "finis" now to what we have so nicely started. Please send a copy of your reply to me also to George Balazs.

Hope all goes well with you. Best wishes.

Cordially,

John E. Bardach
Director

mk

cc: G. Balazs

PROPOSED PROTECTION FOR MARINE TURTLES

PREPARED BY: George H. Balazs

1. Complete protection shall be provided for Leatherback (Dermochelys sp.) and Hawksbill (Eretmochelys sp.) turtles in all territorial waters of the State of Hawaii.

   Justification: Leatherbacks are of little economic value and are rarely seen in Hawaiian waters. Encroachment by man on the few known nesting sites in the world necessitates protection by all governments before excessive reduction in numbers occurs. Hawksbills are officially recognized by the federal government as an endangered species. No Hawksbill or products derived from the Hawksbill may be imported into the United States. Recognition of the fact that these animals are threatened with extinction should be given by the State of Hawaii in the form of complete protection.

2. Complete protection shall be provided for all green turtles (Chelonia sp.) within the territorial waters of the Hawaiian Islands Wildlife Refuge.

   Justification: Federal protection of this animal does not extend to the navigatable territorial waters surrounding the reefs and islands in this area. Breeding of marine turtles occurs offshore, sometimes as far out as 1/2 mile. During this time animals are very susceptible to predation by man. Because the Wildlife Refuge is the largest green turtle nesting area left in the United States, protection by the State should be afforded to these animals.

3. Protection shall be provided for green turtles (Chelonia sp.) under thirty-four (34) inches straight line carapace length within the territorial waters surrounding the main Hawaiian Islands.

   Justification: Green turtles are recognized as the world's most valuable reptile owing to the many useful products obtained from their carcass. For this reason overexploitation of the resource has occured in most areas of the world. Research has shown that this migratory animal is slow to recover from such abuses by man. The realization by governments that green turtle numbers are fast declining has led to passage of protective restrictions. Many areas have afforded total protection for green turtles. A size limitation on these animals at this time would assist juveniles in the Hawaiian population in reaching reproductive age. This would ensure a future breeding stock. In addition, the taking of small animals is unsportsmanlike and wasteful in terms of potential edible protein.

4. Restrictions on the holding and transport of live marine turtles. Special permit will be granted only for educational or scientific purposes.

Justification: Transporting live turtles for commercial purposes is often inhumane and a cause of undue suffering by a creature of the wild. Educational and scientific purposes are the only legitimate reasons for holding marine turtles in captivity since as many animals as possible should remain in the natural environment and be free to breed and reproduce.

PROPOSED PROTECTION FOR MARINE TURTLES

PREPARED BY: George H. Balazs

Recognizing the fact that title to all wildlife belongs to the State in its sovereign capacity, and that the State holds this title in trust for the people of Hawaii, and that the State has a right and an obligation to protect, perpetuate and control wildlife within its boundaries, the following bill for an act relating to the protection of marine turtles is hereby proposed:

1. It shall be unlawful for any person to take, sell, kill, possess, mutilate or in any way disturb any Leatherback (Dermochelys sp.) or Hawksbill (Eretmochelys sp.) in or from the territorial waters of the State of Hawaii.

2. It shall be unlawful for any person to take, sell, kill, possess, multilate or in any way disturb any green turtle (Chelonia sp.) in or from the territorial waters of the State of Hawaii which surround the Hawaiian Islands National Wildlife Refuge.

3. It shall be unlawful for any person to take, sell, kill, possess, multilate or in any way disturb any green turtle in or from the territorial waters of the State of Hawaii which surround the major islands (Hawaii, Maui, Kahoolawe, Lanai, Molokai, Oahu, Kauai and Niihau) excepting green turtles having a straight line carapace measurement of more than thirty-four (34) inches.

4. It shall be unlawful for any live marine turtle to be held in captivity or transported within or across the boundaries of the State except by special permit which will be granted by the Division of Fish and Game only for educational or scientific purposes. The number of animals held for such purposes by any one person or institution shall not exceed that as deemed reasonable, prudent and necessary by the Division of Fish and Game.

5. Any officer or agent authorized by the Division of Fish and Game shall have authority to execute any warrant to search for and seize any animal or animal product held in violation of sections 1, 2, 3 or 4 of this act. Such material shall be held pending proceedings in any court of proper jurisdiction. Upon the conviction of any person charged with a violation of section 1, 2, 3 or 4 of this act the animal or animal product seized shall be forfeited and either released, offered to a recognized institution for scientific or educational purposes, or destroyed.

6. Any person convicted of violating any section of this act shall be fined not more than $500 or imprisoned not more than 6 months or both.

PROPOSED PROTECTION FOR MARINE TURTLES

PREPARED BY: George H. Balazs

1. Complete protection shall be provided for Leatherback (Dermochelys sp.) and Hawksbill (Eretmochelys sp.) turtles in all territorial waters of the State of Hawaii.

more recent information indicates that leatherbacks are also on endangered species list.

Justification: Leatherbacks are of little economic value and are rarely seen in Hawaiian waters. Encroachment by man on the few known nesting sites in the world necessitates protection by all governments before excessive reduction in numbers occurs. Hawksbills are officially recognized by the federal government as an endangered species. No Hawksbill or products derived from the Hawksbill may be imported into the United States. Recognition of the fact that these animals are threatened with extinction should be given by the State of Hawaii in the form of complete protection.

2. Complete protection shall be provided for all green turtles (Chelonia sp.) within the territorial waters of the Hawaiian Islands Wildlife Refuge. 12 miles

Justification: Federal protection of this animal does not extend to the navigatable territorial waters surrounding the reefs and islands in this area. Breeding of marine turtles occurs offshore, sometimes as far out as 1/2 mile. During this time animals are very susceptible to predation by man. Because the Wildlife Refuge is the largest green turtle nesting area left in the United States, protection by the State should be afforded to these animals.

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4. Restrictions on the holding and transport of live marine turtles. Special permit will be granted only for educational or scientific purposes.

Justification: Transporting live turtles for commercial purposes is often inhumane and a cause of undue suffering by a creature of the wild. Educational and scientific purposes are the only legitimate reasons for holding marine turtles in captivity since as many animals as possible should remain in the natural environment and be free to breed and reproduce.

Enforcement of size restriction could be facilitated by requiring shell to remain attached to meat before selling. This would also aid in determining if illegal means were used to capture animal.

February, 1973

EXPENDITURES FOR PROPOSED MARINE TURTLE STUDY [1/]

by G. H. Balazs
Hawaii Institute of Marine Biology
P. O. Box 1346
Kaneohe, Hawaii 96744

Phase 1 - 3-year duration with funding level at $50,000.

YEAR 1		
Salaries:	1-Principal Investigator - 1/4 time	$3,500
	3-Technical Assistants - 1/4 time	3,000
Equipment, supplies and research costs		10,150
	Subtotal	16,650
YEAR 2		
Salaries:	1-Principal Investigator - 1/4 time	3,625
	5-Technical Assistants - 1/4 time	5,000
Equipment, supplies and research costs		7,950
	Subtotal	16,575
YEAR 3		
Same as Year 2		
	Subtotal	16,575
	TOTAL	$49,800

1/ Values were calculated assuming the author to be the principal investigator and the Hawaii Institute of Marine Biology to be the center of operations.

February, 1973

BREAKDOWN OF NON-SALARY EXPENDITURES IN PROPOSED MARINE TURTLE STUDY

by G. H. Balazs
Hawaii Institute of Marine Biology
P. O. Box 1346
Kaneohe, Hawaii 96744

YEAR 1

Objective 1.	Investigate adult and sub-adult grazing populations found around major islands.	
	Twenty (20) days of ship time (using 50' trawler which is available to HIMB for charter)	2,200
	Equipment and supplies (nets, charts, tags, food, etc.)	790
	Subtotal	2,990
Objective 2.	Determine the present size of the breeding population by an intensive tagging program at a selected nesting site (East Island) in the Hawaiian Islands National Wildlife Refuge.	
	Equipment and supplies (2-way radio, 2 outboard motors, 5-man inflatable boat, camping equipment, portable toilet, tags, food, etc.)	4,360
	6-round trips (Honolulu-Tern Island) for 3 persons. Transportation by U. S. Coast Guard	900
	Subtotal	5,260
Objective 3.	Determine the types of algae and other foodstuffs utilized by turtles in Hawaiian waters.	
	Finders Fee	500
	Shipping costs	200
	Laboratory analyses (physical and chemical)	500
	Subtotal	1,200

Objective 4.	Carry out a computer program research study using existing marine turtle records.		
	Computer time		425
	Supplies (cards, etc.)		75
		Subtotal	500
Objective 5.	Periodic reports based on project activities and findings.		
	Publication costs		200
		Subtotal	200
		TOTAL	$10,150

YEAR 2 and YEAR 3

A cost of $7,950 has been determined for each of the years 2 and 3. Several initial purchases made during year 1 (outboard motors, inflatable boat, camping equipment) will need to be made only once, thus accounting for the lower non-salary expenditures during these subsequent years.

August 5, 1976

To: Howard Pennington
Marine Affairs Coordinator
1136 Union Mall
Suite 501
Honolulu, Hawaii

From: George H. Balazs
Jr. Marine Biologist

Subject: Revised Year One Budget for Three-Year Hawaiian Green Turtle Management Study.

Salary and Wages

Principal Investigator (R2-8) (one-half time, including fringe benefits)	$ 9,425
Student Help, one-half time for five months ($3.25 per hour)	1,300
Subtotal	10,725

Equipment, Supplies and Services

Tags/applicators	825
Capturing equipment (net, rod, reel)	325
Calipers (2)/scales (2)	80
Telethermometer/glass thermometers	265
SCUBA tanks (4)/air	475
Shark gun	110
Underwater camera	340
Camping equipment	70
Binoculars (1)	40
Cordless drill (1)	35
Turtle food	30
Long distance telephone calls	50

Small boat charter	375
Small aircraft charter	100
Consultants' fees (turtle fishermen)	750
Subtotal	3,870

Inter Island Travel

Round trip air fare Kauai, Molokai/Lanai, Maui and Hawaii (1 each)	195
Per diem (25 days), five days on each island at $30 per day	750
Round trip air fare Kure Atoll (via Midway)	165
Subtotal	1,110
TOTAL	$15,705

GHB:md

July 20, 1976

To: Howard Pennington
Deputy Marine Affairs Coordinator

From: George H. Balazs
Jr. Marine Biologist

Subject: THE THREE YEAR HAWAIIAN GREEN TURTLE MANAGEMENT STUDY

A. BRIEF HISTORICAL STATEMENT OF THE PROJECT

Management oriented studies of Hawaii's native green sea turtle population were started at HIMB in 1973 but have thus far been limited to the adult migratory nesting colony which seasonally utilizes French Frigate Shoals. Partial financial support for this work, which takes place in the Hawaiian Islands National Wildlife Refuge, has been provided by the U. S. Fish and Wildlife Service. Separate laboratory investigations, under the auspices of the Sea Grant Aquaculture Program, have also been conducted on the feasibility of raising green turtles in captivity.

B. PROJECT OBJECTIVES AND PURPOSES

1. Overall Objectives. To conduct comprehensive life history studies which encompass all size categories of green turtles as they naturally occur throughout the Archipelago. Special emphasis will be placed on assessing the status of those animals inhabiting algal feeding pastures around the major islands. Determining the essential biological facts of the total population will provide a sound basis for the long-term wise management and perpetuation of this valuable resource.

2. Specific Objectives.

   a. To determine the proportion of the population represented by each age group along with their abundance.

   b. To define the migratory patterns and distribution of each age group.

   c. To obtain information on growth rate in the wild and the sex ratios present.

d. To ascertain the reproductive potential and mortality factors that limit the population.

e. To determine the effects of man on the various population parameters.

3. Ultimate Objective. To develop and make available to the Hawaii State Department of Land and Natural Resources, the U. S. Fish and Wildlife Service, and other interested parties information necessary for the establishment of an optimum green turtle management program.

C. KINDS AND LEVELS OF ACTIVITIES TO BE UNDERTAKEN

1. Locate and inventory concentrations of animals in algal feeding pastures around the major islands.

2. Conduct periodic intensive surveys, samplings and taggings at select habitat locations around the major islands.

3. Analyze and interpret existing and future turtle catch statistics and interview fishermen.

4. Conduct land and aerial reconnaissance surveys to locate any reproduction which may still occur in the major islands.

5. Continue seasonal intensive nesting studies at French Frigate Shoals.

6. Survey at periodic intervals other sites in the Northwestern Hawaiian Islands.

7. Conduct tag and recapture studies of juvenile animals at Midway and Kure Atolls in cooperation with resident personnel.

D. NEED FOR THE PROJECT AND THE BENEFITS DERIVED

Both the Department of Land and Natural Resources, U. S. Fish and Wildlife Service and the Hawaii State Legislature have long recognized and reiterated the need for an in-depth green turtle study, particularly in waters adjacent to the major islands. Unfortunately, the absence of financial support has, up until this time, prevented the establishment of such a project.

Most of the world's distinct green turtle populations are experiencing significant declines due mostly to a lack of knowledge on how to best manage the resource. In Hawaii, management does not appear to be complicated by international migratory travels. An excellent opportunity therefore exists to ensure the survival and perpetuation of this unique native resource.

E. PERSONNEL AND FINANCIAL REQUIREMENTS

Because of the nature of the project's activities, it will be necessary to expend the appropriated $50,000 over a three year period. Funds will basically be used for: 1 project leader (1/2 time); 1 student helper; periodic consultants (resident turtle fishermen); tagging capture equipment; small boat charter; and outer island travel. A detailed budget for project year one is included in a separate memorandum.

Assistance from the U. S. Fish and Wildlife Service in the form of logistics and equipment support in the Northwestern Hawaiian Islands is expected to continue. Additionally, where feasible, enthusiastic cooperation from the State Division of Fish and Game, the Honolulu laboratory of the National Marine Fisheries Service and the Marine Options Program is anticipated.

F. SUMMARY STATEMENT

Sufficient biological information must be available to both State and Federal agencies in order to ensure the wise utilization and perpetuation of the unique Hawaiian green turtle resource, the last remaining viable green turtle population in the United States. Although a start has been made in gaining knowledge on the migratory adult nesting colony utilizing French Frigate Shoals (Hawaiian Islands National Wildlife Refuge), information is almost totally lacking on those portions of the population occurring in feeding pastures in State waters around the major islands. Effective management throughout the Archipelago can only take place when an understanding of the dynamics of the total population is achieved.

mk

	FY 1976-77
ECONOMIC DEVELOPMENT	
To provide funds for the Young Farmers program (AGR 151)	50,000
To provide funds for a management study of the green sea turtle (GOV 109) *	50,000
To provide funds for research into the conversion of fresh Hawaiian avocado into processed food products (PED 102)	30,000
To provide funds to accelerate the ohia decline study (LNR 402)	50,000
To provide funds for a Leeward Archipelago fisheries resource study (GOV 109)	50,000
To provide funds for an American Revolution Bicentennial Commemoration Program (PED 102)	55,000
To provide funds for research into alternate uses for lava rock (PED 102)	100,000
To provide funds for the papaya marketing order (AGR 151)	20,000
To provide for a feasibility study on the establishment and operations of a farmer's market at Fort Armstrong, Oahu; provided, that a study be made on how a farmer's market could best fit into the area, the capital improvements that would be necessary, the estimated costs of operation, and possible methods of funding; provided, further, that the Hawaii Farm Bureau Federation shall be consulted during the course of the feasibility study (AGR 151)	5,000
To provide funds for a statewide facility for aquaculture (LNR 153)	78,000

HOUSE OF REPRESENTATIVES
THE EIGHTH LEGISLATURE

STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

April 21, 1976

Room 440
548-7805

Dr. George Balazs
Hawaii Institute for Marine Biology
P.O. Box 1346
Kaneohe, Hawaii 96744

Dear Dr. Balazs:

Enclosed is a copy of the portion of the supplemental budget which appropriates $50,000 for the green sea turtle study. You can count on my support for this program.

Aloha,

Neil Abercrombie

Neil Abercrombie
Representative, 13th District

NA/jlw

TRANSMITTAL MEMO

FROM

SENATOR ANSON CHONG

To George DATE 4/20

- [x] For your information
- [ ] Your comments, please
- [ ] Review and call me
- [ ] Review and file
- [ ] Review and return to me
- [ ] Please reply and copy me
- [ ] Review and reply to _____
- [ ] Review and forward to _____
- [ ] Attach previous correspondence and return to me

COMMENTS/REPLY

2 budget items of interest to you.

Chris

From the office of
SENATOR ANSON CHONG
STATE CAPITOL
Honolulu, Hawaii 96813
Ph. 548-4183

	FY 1976-77
ECONOMIC DEVELOPMENT	
To provide funds for the Young Farmers program (AGR 151)	50,000
To provide funds for a management study of the green sea turtle (GOV 109)	50,000
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To provide funds for research into alternate uses for lava rock (PED 102)	100,000
To provide funds for the papaya marketing order (AGR 151)	20,000
To provide for a feasibility study on the establishment and operations of a farmer's market at Fort Armstrong, Oahu; provided, that a study be made on how a farmer's market could best fit into the area, the capital improvements that would be necessary, the estimated costs of operation, and possible methods of funding; provided, further, that the Hawaii Farm Bureau Federation shall be consulted during the course of the feasibility study (AGR 151)	5,000
To provide funds for a statewide facility for aquaculture (LNR 153)	78,000

July 26, 1976

To: Howard Pennington
Deputy Marine Affairs Coordinator
1136 Union Mall
Honolulu, Hawaii 96813

From: Mrs. Phyllis Luminelli
Administrative Officer

Subject: Management Study of the Hawaiian Green Sea Turtle.

The purpose of this memorandum is to confirm, and in some instances, clarify our meeting of July 22 concerning the above noted study to be conducted by George H. Balazs, Jr. Marine Biologist at HIMB. As a result of this meeting, it is my understanding that the following support will be be provided by your office:(1) $10,000 initial financial release of the $50,000 legislative appropriation of this study; (2) $1,000 additional support from MAC facility funding; (3) $4,750 contribution from legislative appropriation from Leeward Archipelago Resource Study totalling $50,000. This amount represents the months of January through March salary reserved for Robert Johannes which we anticipate not needing until March.

The total amount of $15,750 is considerably less than the anticipated year one minimum expenditure budget submitted to your office dated July 20, 1976 totalling $18,135 (excluding RCUH overhead). At this meeting you indicated that the deficit during the second half of the fiscal year has a very high probability of being compensated through other funding sources not yet released. It is also my understanding that every effort will be made to release an additional $20,000 for FY76 and the remaining funds for FY77.

As indicated during the meeting, we hope that you will make year one funds available immediately and that RCUH be urged to levy a minimal overhead rate due to the stringency of this one-year budget.

I thank you for your time and effort in this matter and trust that this meeting serves to our mutual benefit.

PL:md

GEORGE R. ARIYOSHI
GOVERNOR

JOHN P. CRAVEN, PH. D., J.D.
MARINE AFFAIRS COORDINATOR

STATE OF HAWAII
MARINE AFFAIRS COORDINATOR
OFFICE OF THE GOVERNOR
P. O. BOX 2840
HONOLULU, HAWAII 96803

July 30, 1976

MEMORANDUM

TO: Mrs. Phyllis Luminelli
Administrative Officer
Hawaii Institute of Marine Biology

FROM: Howard Pennington
Acting Marine Affairs Coordinator

SUBJECT: YOUR MEMORANDUM OF JULY 26, 1976, RE GREEN SEA TURTLE MANAGEMENT STUDY

As indicated in your memorandum of July 26, 1976, the Office of the Marine Affairs Coordinator (MAC) will now fund the management study of the green sea turtle, during FY 1976-77, at a minimum level of $15,750, rather than at the level of $10,000 which was first budgeted by this Office.

However, it must be clearly noted that the sum of $4,750, which would otherwise have been used for January-March allocation to Dr. Robert Johannes and his Neighbor Island fishery resource studies, can be applied to the green sea turtle project only if there is a firm and full understanding between HIMB and Dr. Bardach on the one hand, and MAC on the other, that no more than $4,750 will be requested from MAC for any support of Dr. Johannes and his project during FY 1976-77. If additional funding is needed for the Johannes project, MAC cannot provide it before FY 1977-78. (And this assumes that MAC will have appropriated and allocated funds available for such purpose.)

Incidentally, it should also be noted that the $4,750 under discussion above is not from the special $50,000 Archipelago Fisheries Resource appropriation, but from the regular MAC appropriation.

The $1,000 for equipment will, however, come from that special $50,000 appropriation.

cc: Dr. George Balazs-HIMB
Dr. John Bardach -HIMB

PROPOSAL FOR A RESOURCE MANAGEMENT STUDY OF THE HAWAIIAN GREEN TURTLE

Funding Request - $50,000 for a 3-year period

Submitted by George H. Balazs

A. Brief Historical Statement of the Project

Management oriented studies of Hawaii's native green sea turtle population were started at HIMB in 1973 but have thus far been limited to the adult migratory nesting colony which seasonally utilizes French Frigate Shoals. Partial financial support for this work, which takes place in the Hawaiian Islands National Wildlife Refuge, has been provided by the U. S. Fish and Wildlife Service. Concurrent laboratory investigations under the auspices of the Sea Grant Aquaculture Program have also been conducted on the feasibility of raising green turtles in captivity.

B. Project Objectives and Purposes

1. Overall objectives. To conduct comprehensive life history studies which encompass all size categories of green turtles as they naturally occur throughout the Archipelago. Special emphasis will be placed on assessing the status and utilization potential of those animals inhabiting algal feeding pastures around the major islands. Determining the essential biological facts of the total population will provide a sound basis for the long-term wise management and perpetuation of this valuable food source.

2. Specific objectives.

a. To determine the proportion of the population represented by each age group along with their abundance.
b. To define the migratory patterns and distribution of each age group.
c. To obtain information on growth rate in the wild and the sex ratios present.
d. To ascertain the reproductive potential and mortality factors that limit the population.
e. To determine the effects of man on the various population parameters.

C. Levels of Project Effectiveness Being Sought

To develop and make available to the Hawaii State Department of Land and Natural Resources and the U. S. Fish and Wildlife Service information necessary for the establishment of an optimum green turtle management program.

D. Kinds and Levels of Activities to be Undertaken

1. Conduct periodic intensive surveys, samplings and taggings at feeding habitat locations around the major islands.
2. Conduct land and aerial reconnaissance surveys to locate any reproduction which may still occur in the major islands.
3. Analyze and interpret existing and future turtle catch statistics and interview fishermen.
4. Continue seasonal intensive nesting studies at French Frigate Shoals.
5. Survey at periodic intervals other sites in the Northwestern Hawaiian Islands.
6. Conduct tag and recapture studies at Midway, Kure and Johnston Atolls in cooperation with resident personnel.

E. Need for the Project and the Benefits Derived.

Both the Department of Land and Natural Resources and the U. S. Fish and Wildlife Service have long recognized and reiterated the need for an in-depth green turtle study, particularly in waters adjacent to the major islands. The absence of financial support has, to date, prevented the establishment of such a project. Funds are not presently available through any Hawaii State Department and the inflexibility of ongoing specific task projects that require matching funds prevent HIMB from directly supporting this work. In addition, Federal aid grants for fish and wildlife restoration projects (Dingle-Johnson and Pitman-Robertson Acts) cannot be expended on sea turtles as under the definitions used in the Acts such animals are not classified as being either "fish" or "wildlife." A supplemental appropriation made earlier this year by the State Legislature has not resulted in project funding due to reduced allocations to the University.

Most of the world's distinct green turtle populations are experiencing significant declines due mostly to a lack of knowledge on how to best manage the resource. In Hawaii, management does not appear to be complicated by international migratory travels. An excellent opportunity therefore exists to ensure the perpetuation of a supplemental food source, particularly for those people who have been traditionally dependent on the sea.

F. Personnel and Financial Requirements

Because of the nature of the project's activities, it will be necessary to expend the requested $50,000 over a three year period. Funds will be used for: 1 project leader (1/2 time); 2 student helpers; periodic consultants (resident turtle fishermen); and tagging equipment as well as outer island travel. A detailed budget is included with this proposal.

Assistance from the U. S. Fish and Wildlife Service in the form of logistics and equipment support in the Northwestern Hawaiian Islands is expected to continue. Additionally, where feasible, enthusiastic cooperation from the State Division of Fish and Game and the Honolulu laboratory of the National Marine Fisheries Service is anticipated.

G. Summary Statement

Sufficient biological information must be available to both the Department of Land and Natural Resources and the U. S. Fish and Wildlife Service in order to ensure the wise utilization and perpetuation of the unique Hawaiian green turtle resource, the last remaining viable green turtle population in the United States. Although a start has been made in gaining knowledge on the migratory adult nesting colony utilizing French Frigate Shoals (Hawaiian Islands National Wildlife Refuge), information is almost totally lacking on those portions of the population occurring in feeding pastures in State waters around the major islands. Effective management throughout the Archipelago can only take place when an understanding of the dynamics of the total population is achieved.

Budget for Proposed 3-Year

RESOURCE MANAGEMENT STUDY OF THE HAWAIIAN GREEN TURTLE

Item	Expenditures Yearly	3-Year Total
Salaries and Wages		
Project Leader (1/2 time)	$7,300	$21,900
Consultants (turtle fishermen)	1,900	5,700
Student Help -	4,300	12,900
Sub-total	13,500	40,500
Equipment and Supplies	1,575	4,725
Outer-Island Travel	500	1,500
Vessel Charter	750	2,250
Aircraft Charter	250	750
Publication Costs	75	225
Total	$16,650	$49,950

With the Hawaii Institute of Marine Biology as the center for project operations, various laboratory services and equipment will be available to the study at no direct cost. In addition, agencies such as the State Division of Fish and Game, U. S. Fish and Wildlife Service, National Marine Fisheries Service and Marine Options Program (Manoa and Hilo campuses) are anticipated to enthusiastically cooperate in the project, thereby providing additional indirect assistance.

University of Hawaii at Manoa

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

Request for the Release of Supplemental Appropriation for
HAWAIIAN GREEN TURTLE RESOURCE MANAGEMENT STUDY

A. Brief Historical Statement of the Project

Management oriented studies of Hawaii's native green turtle population were started at HIMB in 1973 but have thus far been limited to the adult migratory nesting colony which seasonally utilizes French Frigate Shoals. Partial financial support for this work which takes place in the Hawaiian Islands National Wildlife Refuge has been provided by the U.S. Fish and Wildlife Service. Concurrent laboratory investigations under the auspices of the Sea Grant Aquaculture Program have also been conducted on the feasibility of raising green turtles in captivity.

B. Project Objectives and Purposes

1. Overall objectives. To conduct comprehensive life history studies which encompass all size catagories of green turtles as they naturally occur throughout the Archipelago. Special emphasis will be placed on assessing the status and utilization potential of those animals inhabiting algal feeding pastures around the major islands. Determining the essential biological facts of the total population will provide a sound basis for the long-term wise management and perpetuation of this valuable food source.

2. Specific objectives.

   a. To determine the proportion of the population represented by each age group along with their abundance.
   b. To define the migratory patterns and distribution of each age group.
   c. To obtain information on growth rate in the wild and the sex ratios present.
   d. To ascertain the reproductive potential and mortality factors that limit the population.
   e. To determine the effects of man on the various population parameters.

C. Levels of Project Effectiveness Being Sought

To develop and make available to the Hawaii State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service information necessary for the establishment of an optimum green turtle management program.

D. Kinds and Levels of Activities to be Undertaken

1. Conduct periodic intensive surveys, samplings and taggings at feeding habitat locations around the major islands.

2. Conduct land and aerial reconnaisance surveys to locate any remaining mating and nesting activity in the major islands.
3. Analyze and interpret existing and future turtle catch statistics and interview fishermen.
4. Continue seasonal intensive nesting studies at French Frigate Shoals.
5. Survey at periodic intervals other sites in the Northwestern Hawaiian Islands.
6. Conduct tag and recapture studies at Midway, Kure and Johnston Atolls in cooperation with resident personnel.

E. Need for the Project and the Benefits Derived

Both the Department of Land and Natural Resources and the U.S. Fish and Wildlife Service have long recognized and reiterated the need for an in-depth green turtle study, particularly in waters adjacent to the major islands. The absence of financial support has to date prevented the establishment of such a project. Funds are not presently available through any Hawaii State Department and the inflexibility of ongoing specific task projects that require matching funds prevent HIMB from directly supporting this work. In addition, Federal aid grants for fish and wildlife restoration projects (Dingle-Johnson and Pitman-Robertson Acts) cannot be expended on sea turtles as under the definitions used in the Acts such animals are not classified as being either "fish" or "wildlife".

Most of the world's distinct green turtle populations are experiencing significant declines due mostly to a lack of knowledge on how to best manage the resource. In Hawaii, management does not appear to be complicated by international migratory travels. An excellent opportunity therefore exists to ensure the perpetuation of a supplemental food source, particularly for those people who have been traditionally dependent on the sea.

F. Personnel and Financial Requirements

Because of the nature of the project, it would be desirable to expend the requested$50,000 supplemental appropriation over a three year period.
1 Project Leader (1/2 time); 1 Research Assistant (1/2 time); 1 Student Helper; Periodic Consultants (resident turtle fishermen). Other needs include sampling and tagging equiptment and outer island travel.

Assistance from the U.S. Fish and Wildlife Service in the form of logistics and equiptment support in the Northwestern Hawaiian Islands is expected to continue. Additionally, where feasible, enthusiastic cooperation from the State Division of Fish and Game and the Honolulu laboratory of the National Marine Fisheries Service is anticipated.

G. Summary Statement

Sufficient biological information must be available to both the Department of Land and Natural Resources and the U.S. Fish and Wildlife Service in order to ensure the wise utilization and perpetuation of the unique Hawaiian green turtle resource, the last remaining viable green turtle population in the United States. Although a start has been made in gaining knowledge on the migratory adult nesting colony utilizing French Frigate Shoals (Hawaiian Islands National Wildlife Refuge), information is almost totally lacking on those portions of the population occurring in feeding pastures in State waters around the major islands. Effective management throughout the Archipelago can only take place when an understanding of the dynamics of the total population is achieved.

8972
8510

aircraft charter 32 hr. × 8 = 256.00

1 Fishermen consultants –
2 per island
12 days @ 50.00 day = $600.00

$118-11.10

TENTATIVE BUDGET FOR PROPOSED
Resource Management Study of the Hawaiian Green Turtle
3-THREE YEAR GREEN SEA TURTLE MANAGEMENT STUDY

Item		Expenditures Yearly	3-Year Total
Salaries and Wages			
Project Leader (1/2 time)		$6,400	$19,200
Research Assistant (1/2 time)		3,800	11,400
Consultants (turtle fishermen)		1,900	5,700
Student Help		1,200	3,600
	Sub-total	13,300	39,900
Equipment and Supplies		1,575	4,725
Outer-Island Travel		500	1,500
Vessel Charter		750	2,250
Aircraft Charter		250	750
Publication Costs		75	225
	Total	$16,450	$49,350

With the Hawaii Institute of Marine Biology (located on Coconut Island in Kaneohe Bay) as the center for project operations, various laboratory services and equipment will be available to the study at no direct cost. In addition, agencies such as the State Division of Fish and Game, U. S. Fish and Wildlife Service, National Marine Fisheries Service and Marine Options Program (Manoa and Hilo campuses) are anticipated to enthusiastically cooperate in the project, thereby providing additional indirect assistance.

Salary - #7,300 + 754.30 = #8054.30

Benefits -

retirement - 10.87% = 793.51
Social Sec - 5.85 = 427.05
health plan - #15. month = 180.00
life ins - 225 month = 27.00
workmen's comp - 1.11% = 81.03

1508.59 x .5 = #75430

student help - 2.76 x 20 hr = 55.20 week
month = 220.80
6 months 1324.80

Equpt - supplies
nets - 400.00 approx

Togo
1000 Income 149 - 331.00
1000 681 - 75.80
1000 size 1 43.10
449.90 + 10% = #494.90
4730
#542.20 = 942.20

681 pliers - 4 x 7.25 = 29.00
49 " 2 x 9.15 = 18.30
47.30

922 3611

outer Is Travel:

	air	per diem
HI -	56.76	4 x 30 = 120
MAUI -	42.76	3 x 30 = 90
KAUAI -	42.76	3 x 30 = 90
Molo -	34.76	2 x 30 = 60
LANAI -	36.76	2 x 30 = 60
	213.80	420

= #633.80

July 20, 1976

To: Howard Pennington
Deputy Marine Affairs Coordinator

From: George H. Balazs
Jr. Marine Biologist

Subject: YEAR ONE BUDGET FOR THREE YEAR HAWAIIAN GREEN TURTLE MANAGEMENT STUDY

SALARY AND WAGES

Principal Investigator (R2-8) one-half time (including fringe benefits)		$ 9,425
Student Help, one-half time for nine months ($3.25 per hour)		2,340
	Subtotal	11,765

EQUIPMENT, SUPPLIES AND SERVICES

Turtle net, rods and reels	640
Inconel tags/applicators	825
Calipers/scales	240
Telethermometer/glass thermometers	265
SCUBA tanks (4)/air refills	475
Shark gun	110
35 mm underwater camera/film	360
Gasoline/outboard motor oil (Oahu)	45
Tent/misc. camping equipment	125
Binoculars (2)	80
Cordless drills	75
Turtle Food	30
HIMB vehicle rental or mileage charge (Oahu)	40
Long distance telephone calls	50
Vessel/small boat charter	750
Small aircraft charter	150
Consultants' fees (turtle fishermen)	1,000
Subtotal	5,260

INTERISLAND TRAVEL

Round trip air fare Kauai, Molokai/Lanai, Maui and Hawaii (1 each)	195
Per diem (25 days), projected five days on each island at $30 per day	750
Round trip air fare Kure Atoll	165
Travel to French Frigate Shoals and other Northwestern Hawaiian Islands	no direct cost
Subtotal	1,110
TOTAL	$18,135

(excluding RCUH overhead)

mk

University of Hawaii at Manoa

MEMORANDUM

29 June 1976

George:

I talked to Howard Pennington this AM and he said they can release only $20,000 for the turtle project at this time but would request the rest later.

$4,000 is being given to the MOP turtle project on the Big Is.

Bob May

#2,700

AN EQUAL OPPORTUNITY EMPLOYER

year one- locate
get staff ground
select sites,
begin intensive
tag/recapture
feeding study

Principal Abcve - major Inv

University of Hawaii at Manoa

Hawaii Institute of Marine Biology
P.O.Box 1346 • Coconut Island • Kaneohe, Hawaii 96744
Cable Address: UNIHAW
June 24, 1976

TO: Howard Pennington
Deputy Marine Affairs Coordinator

FROM: George H. Balazs

BUDGET FOR HAWAIIAN GREEN SEA TURTLE STUDY

Salary and wages

Principal Investigator R2-8 (1/2 time for 3 years) including fringe benefits and forthcoming union negotiated raise-	28,275 (9,425)
Student help- 1½/year @ $3.25 20hr/wk 1 2 3 9 6 6 — 1 month = 260 — 9 months = 2340	5,400 5460
Subtotal-	$33,675

Equipment, supplies and services

Turtle nets, rods and reels- 400x3 — 1200 + 480 — 240+240	1,680
Inconel tags/applicators-	825
Calipers/scales- 6x20	240
Telethermometer/glass thermometers- 15	265
Scuba tanks (4)/air refills- 400 + 200	600
Underwater lights (2)- 35	70
Shark gun-	110
35mm underwater camera/film- 340 +20 +60	400
Gasoline/outboard motor oil (Oahu)- 45	130
Tent/misc. camping equipment- tent - 125	225
Binoculars (2)- 40+40	80
Cordless drills (2)- 37.50 + 37.50	75
Chemical analyses- 5 complete	125

Hawaii – 57 × 4 = 228
Maui – 43 × 4 = 172
Kauai – 43 × 4 = 172
Molokai/Lanai 52 × 4 = 208

780

– use MAC office to make requests for assistance

preliminary assessment survey
animals/pastures/interviews

locate and inventory –
select several suitable sites for intensive tag and recapture studies

Equipment, supplies and services (continued)

Food for captive turtles-	60
HIMB vehicle rental or mileage charge (Oahu)	80
Laboratory/office supplies/long distance telephone calls-	125
Publication costs/graphics-	250
Vessel/small boat charter-	2,200
Small aircraft charter-	450
Consultants' fees (turtle fishermen)-	1,500
Subtotal-	$9,490

Travel

Round trip air fare Kauai, Molokai/Lanai, Maui, Hawaii (4 each)-	780
Perdiem (100 days)- 5 days each Isle / initial projection	3,000
Round trip air fare Kure Atoll (2)-	330
Travel to French Frigate Shoals and other Northwestern Hawaiian Islands-	U.S. Fish & Wildlife Service carriers- no direct cost
Subtotal-	$4,110

TOTAL- $47,275

DRAFT PRESS RELEASE

The Marine Affairs Coordinator has provided funds for a management study of the Hawaiian green sea turtle. The study is planned to extend over a three year period, with the budget for the first year amounting to $15,750.

During the 1975 legislative session $50,000 was appropriated to the University for a three year green sea turtle study. However, due to fiscal restraints, the funds were never released. The 1976 legislature made a similar $50,000 appropriation to the Marine Affairs Coordinator, but the Office of Budget and Finance also found it necessary to withhold the allotment because of fiscal cutbacks. The need for a comprehensive management study of the green sea turtle throughout the Hawaiian chain has been long recognized and recommended by scientists as well as state and federal officials. The Marine Affairs Coordinator realizes this fact, therefore in spite of the absence of specific task funds, the project is nevertheless still being initiated by judiciously using the regular fiscal appropriation.

The green turtle management study will be conducted by George H. Balazs, Junior Marine Biologist with the University's Hawaii Institute of Marine Biology located on Coconut Island. For the past four summers Mr. Balazs has conducted a monitoring program of the breeding colony at French Frigate Shoals in cooperation with the U. S. Fish and Wildlife Service. He has also carried out investigations into the feasibility of raising green turtles in captivity as a food source. Because of numerous biological and conservation problems, such an aquaculture plan for commercial purposes was not deemed to be realistic or acceptable at the present time. Several scientific and popular articles have been published based on the results of Mr. Balazs' sea turtle research.

Some of the study's more important objectives are listed as follows:

1. To locate and inventory concentrations of turtles around the major inhabited islands as well as at areas in the more remote Leeward chain. Investigations in the Leewards will serve to complement a joint State-Federal resource assessment survey of the area that is scheduled to begin later this year.
2. To determine the distribution and abundance of algae that is used for food by Hawaiian green turtles.
3. To determine the rate of growth and age at sexual maturity under natural conditions. Factual information on these two aspects is virtually nonexistent for any green turtle population. Several sites in the Hawaiian chain provide exceptional opportunities for gaining this knowledge through tag and recapture studies.
4. To determine the reproductive potential as well as the mortality factors limiting the population.

Although headquarters for the study will be the Hawaii Institute of Marine Biology, work will be carried out in close cooperation with the State Division of Fish and Game, the National Marine Fisheries Service, and the U. S. Fish and Wildlife Service. In addition, members of the general public that have information about Hawaiian sea turtles will be encouraged to contact Mr. Balazs (tel. 247-6631).

Three species of sea turtles occur in Hawaiian waters, the green (Chelonia sp.), the hawksbill (Eretmochelys sp.), and the leatherback (Dermochelys sp.). Of these, the green, or "honu" as it is called in Hawaiian, is by far the most common. Although green turtles occur at a number of other locations around the world, the population native to Hawaii is unique. In addition to being the only population that carries out its entire life cycle in the United States, Hawaiian green turtles have the unusual behavioral trait of crawling out on remote beaches in the Leeward chain and sun basking for hours at a time.

Green turtles are famous for their long distance migrations which are made for breeding purposes. In Hawaii, they are known to periodically travel

distances of 500 miles or more to the small islets of French Frigate Shoals (in the Leeward chain) to mate and lay eggs. Many of these adults spend the greater portion of their lives feeding on algae (limu) that grows in shallow waters around the main inhabited Hawaiian Islands.

Most of the world's sea turtle populations are experiencing significant declines due to habitat destruction, disturbance, and overexploitation for meat, hides, shell and soup stock. In 1974 the Department of Land and Natural Resources adopted a regulation to help conserve the sea turtles found in Hawaii. Under this regulation hawksbills and leatherbacks are fully protected. These two species also receive full protection under the Federal Endangered Species Act of 1973. The taking of green turtles is still allowed in Hawaii but only by permit for home consumption and only if they are 36 inches or more in shell length. Prior to the 1974 State regulation, Hawaiian green turtles were commercially exploited for the restaurant trade at an alarming rate. Available evidence indicates that the population was reduced considerably. A thorough biological understanding of the population must therefore be achieved if we are to ensure the survival and perpetuation of this native resource for the benefit of future generations.

UNIVERSITY OF HAWAII

Sea Grant College Program

MEMORANDUM

June 21, 1976

TO: Dr. Robert May, Aquaculture Project Coordinator, HIMB
Mr. Samuel Chastain, Fiscal Officer, HIMB

FROM: Ronald Linsky, Director, Sea Grant College Program

RE: Memo of June 10, 1976 Requesting Deficit Spending in Sea Grant 08 Year Tropical Animal Aquaculture Project, R/A-01 Account No. F 76 238 F 582 B 256

As we discussed in my office on June 15, I cannot approve your request to deficit spending in your Sea Grant account during the months of July and August prior to release of State Marine Affairs Coordinator's funds of approximately $15,000 for Moi Aquaculture and $50,000 for Turtle Research.

My office has checked with the MAC Office on the possibility of the Research Corporation, University of Hawaii (RCUH), advancing the money to you prior to release of state funds to avoid any deficit spending. The MAC office will request the advance from Research Corporation and will keep you informed of the outcome.

cc: Howard Pennington, MAC

October 13, 1976

Mr. Howard Pennington
Acting Marine Affairs Coordinator
Marine Affairs Coordinator's Office
1131 Union Mall
Honolulu, Hawaii 96813

Dear Mr. Pennington:

My recent unsuccessful attempts to reach you plus my bout with the flu seem to have stalled our Sea Grant overrun efforts. Therefore, I have enclosed for your information, a copy of the Budget Status Report, dated 8/31/76, showing an obvious overrun. The $8,090. represents salaries, $6,070.00 of which is the amount of relief we are seeking for G. Balazs (refer to letter of September 27, 1976).

Please advise if you feel a meeting is in order.

Sincerely,

(Mrs.) Phyllis Luminelli
Administrative Officer

mk

Enclosure

cc: J. Bardach
R. May
S. Chastain

bcc: G. Balazs

256 INDIRECT COST TYPE SALARIES/WAGES TYPE OF PROJECT RESEARCH

BUDGET PERIOD 09/01/75 TO 08/31/76 BUDGET-AMOUNT 153,078.00

PROJECT PERIOD 09/01/75 TO 08/31/76 PROJECT AMOUNT 153,078.00

CH, J/HAY, R FISCAL OFFICER CHASTAIN, SAMUEL

ALLOCATIONS TO DATE	PRIOR YEARS EXPENDITURES	CURRENT MONTH	CURRENT FISCAL YEAR YTD EXPEND	CURRENT FISCAL YEAR ENCUMBERED	UNENCUMBERED BALANCE
85,493.00	70,856.74	5,296.25	11,754.82	9,845.12	6,963.68
	3,781.81	217.35	675.67		4,457.48-
	5,364.15	557.10	1,149.90		6,514.05-
85,493.00	80,002.70	6,070.70	13,580.39	9,845.12	17,935.21-
13,645.00	11,081.97	918.44	2,072.09	1,969.02	1,478.08-
7,200.00	6,839.26	109.29	114.50	64.87	181.67
	53.99				53.99-
3,000.00	2,585.23	54.00	134.00		280.77
	66.80	5.00	5.00		71.80-
3,450.00	2,755.12		74.00	614.05	6.83
800.00	800.00				.00
113,588.00	104,185.07	7,157.43	15,979.98	12,492.76	19,069.81-
39,490.00	36,961.25	2,804.66	6,274.14	4,548.45	8,293.84-
39,490.00	36,961.25	2,804.66	6,274.14	4,548.45	8,293.84-
153,078.00	141,146.32	9,962.09	22,254.12	17,041.21	27,363.65-

(11,001.06)

Sal. 8090.-
IC. 3737.-
11,827.-

REPORT 1905
FREQUENCY: MONTHLY

UNIVERSITY OF HAWAII
RESEARCH AND TRAINING BUDGET STATUS REPORT
AS OF AUG. 31, 1976

ACCOUNT NO. F-77-238-F-582-8-256 INDIRECT COST TYPE SALARIES/WAGES TYPE

SPONSORING AGENCY NOAA BUDGET PERIOD 09/01/75 TO 08/31/76 BUDGE

AWARD NO. 04-6-158-44026 PROJECT PERIOD 09/01/75 TO 08/31/76 PROJECT

PRINCIPAL INVESTIGATOR BARDACH, J/MAY, R FISCAL OFFICER CHA

BUDGET CATEGORY	ALLOCATIONS TO DATE	PRIOR YEARS EXPENDITURES	* * * * * * CURRENT FISCAL YEAR * * * CURRENT MONTH	YTD EXPEND	EN
PERSONAL SERVICES					
SALARIES/WAGES REGULAR	85,493.00	70,856.74	5,296.25	11,754.82	
CASUAL PAY		3,781.81	217.35	675.67	
STUDENT HELP - REGULAR		5,364.15	557.10	1,149.90	
SUB-TOTAL	85,493.00	80,002.70	6,070.70	13,580.39	
FRINGE BENEFITS	13,645.00	11,081.97	918.44	2,072.09	
MATERIALS & SUPPLIES	7,200.00	6,839.26	109.29	114.50	
COMMUNICATION		53.99			
TRAVEL - DOMESTIC	3,000.00	2,585.23	54.00	134.00	
OTHERS		66.80	5.00	5.00	
EQUIPMENT	3,450.00	2,755.12		74.00	
* COMPUTER SERVICES	800.00	800.00			
INVESTIGATOR TOTAL	113,588.00	104,185.07	7,157.43	15,979.98	1
INDIRECT COST 46.20	39,490.00	36,961.25	2,804.66	6,274.14	
IC SUB-TOTAL	39,490.00	36,961.25	2,804.66	6,274.14	
ADMINISTRATIVE TOTAL	153,078.00	141,146.32	9,962.09	22,254.12	1

fol. 809
IC. 37

11,8

Geo. Balazs

September 27, 1976

Mr. Howard Pennington
Acting Marine Affairs Coordinator
Marine Affairs Coordinator's Office
1131 Union Mall
Honolulu, Hawaii 96813

Dear Mr. Pennington:

Attached is a memb dated June 21 from Ron Linsky to Dr. Robert May and Samuel Chastain. This memo addresses itself to a request for deficit spending on Dr. May's Sea Grant account which is referenced in this memo.

My conversations with Dr. John Bardach, Samuel Chastain and Dr. Robert May indicate that the overrun is due to the fact that Dr. Bardach and Dr. May budgeted George Balazs 50% on Sea Grant for the period of September 1, 1975 to August 31, 1976. This was done due to legislative approval of the Turtle Research funds. As we are all now aware, the funds were not forthcoming until your office received and released them in July of 1976.

Prior to the preparation of HIMB's 1976-77 budget, Dr. Bardach telephoned Dr. Craven in May of 1976, informed him of our dilemma, and received word that MAC money would take care of the deficit. Dr. Bardach was also told that the turtle money would be released on or about July 1. With that in mind, Bardach passed the word to S. Chastain (HIMB fiscal officer) that Balazs' salary deficit would be made up by MAC funding and that Chastain could budget Balazs 50% for FY 76-77 as the MAC turtle funds would be forthcoming.

The total Sea Grant deficit due to the 50% budgeting for Balazs is $7,399., not including fringe. Crediting 1/2 of Balazs' salary for July and August, 1976 on the turtle program ($1,329.00) reduces this deficit to $6,070. It is this amount which we seek your assistance in obtaining. If it is possible for you to provide us with relief in this amount, we feel that the easiest way to deal with it would be to increase the turtle funding by the amount and have our fiscal officer debit the Turtle program and credit Sea Grant.

Your continued support and concern is greatly appreciated and whatever assistance you may be able to provide in this matter will certainly add to this appreciation

as we at HIMB fully realize that you can be held accountable for prior commitments only to the extent that your existing funding allows.

Awaiting your reply, I remain

Very truly yours,

PHYLLIS LUMINELLI
Administrative Officer

PL:ec
Encl.
cc: J. Bardach
R. May
S. Chastain

√bcc: G. Balazs

UNIVERSITY OF HAWAII

Sea Grant College Program

MEMORANDUM

June 21, 1976

TO: Dr. Robert May, Aquaculture Project Coordinator, HIMB
Mr. Samuel Chastain, Fiscal Officer, HIMB

FROM: Ronald Linsky, Director, Sea Grant College Program

RE: Memo of June 10, 1976 Requesting Deficit Spending in Sea Grant 08 Year Tropical Animal Aquaculture Project, R/A-01 Account No. F 76 238 F 582 B 256

As we discussed in my office on June 15, I cannot approve your request to deficit spending in your Sea Grant account during the months of July and August prior to release of State Marine Affairs Coordinator's funds of approximately $15,000 for Moi Aquaculture and $50,000 for Turtle Research.

My office has checked with the MAC Office on the possibility of the Research Corporation, University of Hawaii (RCUH), advancing the money to you prior to release of state funds to avoid any deficit spending. The MAC office will request the advance from Research Corporation and will keep you informed of the outcome.

cc: Howard Pennington, MAC

University of Hawaii at Manoa

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

PROPOSAL FOR A RESOURCE MANAGEMENT STUDY OF THE HAWAIIAN GREEN TURTLE

Funding Request - $50,000 for a 3-year period

Submitted by George H. Balazs

A. Brief Historical Statement of the Project

Management oriented studies of Hawaii's native green sea turtle population were started at HIMB in 1973 but have thus far been limited to the adult migratory nesting colony which seasonally utilizes French Frigate Shoals. Partial financial support for this work, which takes place in the Hawaiian Islands National Wildlife Refuge, has been provided by the U. S. Fish and Wildlife Service. Concurrent laboratory investigations under the auspices of the Sea Grant Aquaculture Program have also been conducted on the feasibility of raising green turtles in captivity.

B. Project Objectives and Purposes

1. Overall objectives. To conduct comprehensive life history studies which encompass all size categories of green turtles as they naturally occur throughout the Archipelago. Special emphasis will be placed on assessing the status and utilization potential of those animals inhabiting algal feeding pastures around the major islands. Determining the essential biological facts of the total population will provide a sound basis for the long-term wise management and perpetuation of this valuable food source.

2. Specific objectives.

   a. To determine the proportion of the population represented by each age group along with their abundance.
   b. To define the migratory patterns and distribution of each age group.
   c. To obtain information on growth rate in the wild and the sex ratios present.
   d. To ascertain the reproductive potential and mortality factors that limit the population.
   e. To determine the effects of man on the various population parameters.

C. Levels of Project Effectiveness Being Sought

To develop and make available to the Hawaii State Department of Land and Natural Resources and the U. S. Fish and Wildlife Service information necessary for the establishment of an optimum green turtle management program.

D. Kinds and Levels of Activities to be Undertaken

1. Conduct periodic intensive surveys, samplings and taggings at feeding habitat locations around the major islands.
2. Conduct land and aerial reconnaissance surveys to locate any reproduction which may still occur in the major islands.
3. Analyze and interpret existing and future turtle catch statistics and interview fishermen.
4. Continue seasonal intensive nesting studies at French Frigate Shoals.
5. Survey at periodic intervals other sites in the Northwestern Hawaiian Islands.
6. Conduct tag and recapture studies at Midway, Kure and Johnston Atolls in cooperation with resident personnel.

E. Need for the Project and the Benefits Derived

Both the Department of Land and Natural Resources and the U. S. Fish and Wildlife Service have long recognized and reiterated the need for an in-depth green turtle study, particularly in waters adjacent to the major islands. The absence of financial support has, to date, prevented the establishment of such a project. Funds are not presently available through any Hawaii State Department and the inflexibility of ongoing specific task projects that require matching funds prevent HIMB from directly supporting this work. In addition, Federal aid grants for fish and wildlife restoration projects (Dingle-Johnson and Pitman-Robertson Acts) cannot be expended on sea turtles as under the definitions used in the Acts such animals are not classified as being either "fish" or "wildlife." A supplemental appropriation made earlier this year by the State Legislature has not resulted in project funding due to reduced allocations to the University.

Most of the world's distinct green turtle populations are experiencing significant declines due mostly to a lack of knowledge on how to best manage the resource. In Hawaii, management does not appear to be complicated by international migratory travels. An excellent opportunity therefore exists to ensure the perpetuation of a supplemental food source, particularly for those people who have been traditionally dependent on the sea.

F. Personnel and Financial Requirements

Because of the nature of the project's activities, it will be necessary to expend the requested $50,000 over a three year period. Funds will be used for: 1 project leader (1/2 time); 2 student helpers; periodic consultants (resident turtle fishermen); and tagging equipment as well as outer island travel. A detailed budget is included with this proposal.

Assistance from the U. S. Fish and Wildlife Service in the form of logistics and equipment support in the Northwestern Hawaiian Islands is expected to continue. Additionally, where feasible, enthusiastic cooperation from the State Division of Fish and Game and the Honolulu laboratory of the National Marine Fisheries Service is anticipated.

G. Summary Statement

Sufficient biological information must be available to both the Department of Land and Natural Resources and the U. S. Fish and Wildlife Service in order to ensure the wise utilization and perpetuation of the unique Hawaiian green turtle resource, the last remaining viable green turtle population in the United States. Although a start has been made in gaining knowledge on the migratory adult nesting colony utilizing French Frigate Shoals (Hawaiian Islands National Wildlife Refuge), information is almost totally lacking on those portions of the population occurring in feeding pastures in State waters around the major islands. Effective management throughout the Archipelago can only take place when an understanding of the dynamics of the total population is achieved.

Budget for Proposed 3-Year

RESOURCE MANAGEMENT STUDY OF THE HAWAIIAN GREEN TURTLE

Item	Expenditures Yearly	3-Year Total
Salaries and Wages		
Project Leader (1/2 time)	$7,300	$21,900
Consultants (turtle fishermen)	1,900	5,700
Student Help	4,300	12,900
Sub-total	13,500	40,500
Equipment and Supplies	1,575	4,725
Outer-Island Travel	500	1,500
Vessel Charter	750	2,250
Aircraft Charter	250	750
Publication Costs	75	225
Total	$16,650	$49,950

With the Hawaii Institute of Marine Biology as the center for project operations, various laboratory services and equipment will be available to the study at no direct cost. In addition, agencies such as the State Division of Fish and Game, U. S. Fish and Wildlife Service, National Marine Fisheries Service and Marine Options Program (Manoa and Hilo campuses) are anticipated to enthusiastically cooperate in the project, thereby providing additional indirect assistance.

2 years full time = #37,700
2 years " " #56,550
3 years 3/4 = #42,408
3 years 1/2 = #28,272

as of 5/3/76 my fringe benefits #233.72 month or 2804.64 annual or 19.25%
#1214. " or #303. wk.
annual #14,568
total 17,373
50% = 7284. + 1402. = #8686. + 8.5% = 9,424.
75% = 10,926 + 2103 = 13,029 + 8.5% = 14,136

8.5% Raise
KCUH overhead @ 10%

actual with raise 15,806
w/fringe & raise 18,880

August 11, 1976

Mr. Ronald B. Linsky
Director
Sea Grant Programs
University of Hawaii
Spalding Hall, Room 255
2540 Maile Way
Honolulu, HI 96822

Dear Ron:

As you know, extended jurisdiction has been thrust upon us without any funds, whether State or federal aid, allocated for the pre-implementation stage. Availability of future funding is also a matter of conjecture. We, however, are very much concerned with the program and therefore have been working with NMFS to the extent possible within out limited manpower and financial capability.

The tremendous nature of the entire extended jurisdiction undertaking indicates to me that among the key to success is that a close working relationship be established among and between the Regional Councils and the Federal and State entities. In this light, I feel that it would be premature and somewhat presumptuous of us to list down separately what we may conceive of as research priority needs relative to extended jurisdiction. I think it would be best if we await the deliberations of the Western Pacific Regional Council, which will likely hold its first formal meeting in September or October, 1976.

There is one area, however, that I'd like to explore with you--that is funding for green sea turtle research in the Hawaiian Archipelago. If you are willing to consider this, I suggest that we sit down with George Balazs to discuss it.

Yours truly,

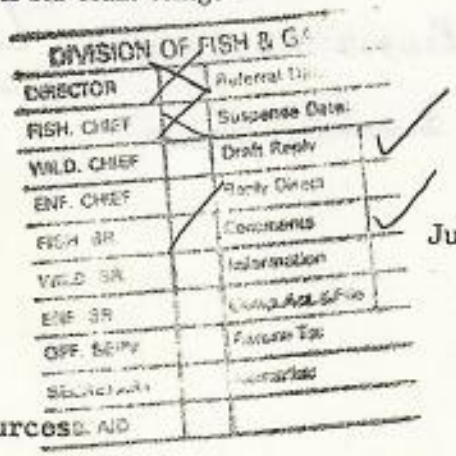
MICHIO TAKATA, Director
Division of Fish & Game

MT:KE:rfm

UNIVERSITY OF HAWAII

A Sea Grant College

Sea Grant Programs Office



July 27, 1976

Mr. Michio Takata
Director, Fish & Game Div.
Dept. of Land & Natural Resources
1151 Punchbowl St.
Honolulu, HI 96813

Dear Mr. Takata:

As a result of the meeting in San Francisco last month between Sea Grant Directors from the five western states and the Regional and Center Directors of the National Marine Fisheries Service regarding responsibility in extended jurisdiction, it was determined that, among other activities, Sea Grant universities should be actively involved in the research priorities of extended jurisdiction. At this time the University of Hawaii, Sea Grant College Program, is preparing its programmatic strategies for the next five years and will have, as a major effort, the matter of extended jurisdiction. Since the Sea Grant concept includes promulgating multi-agency programs, I would like to solicit, from your office by August 15, a list of research priority needs to ascertain how the University of Hawaii Sea Grant might assist your agency in the coming years.

Sincerely,

Ronald B. Linsky
Director

Spalding Hall · Room 255 · 2540 Maile Way · Telephone (808) 948-7031 · Honolulu, Hawaii 96822/Cable Address: UNIHAW

F6 meeting 9/22/76 WEDNESDAY

SEND MR. TAKATA outline of "needs" for inclusion in memo to Fish and Game agents on all Islands
Eg logistics
serve as guide using vehicle, boat, etc
→ list of name, titles, phone nos, addresses
→ Provide any existing biological information on HAWAII Turtles

APPOINTMENT WITH RONALD LINSKY

Make application for Scientific permit.

FINAL FISCAL REPORT

Project Task Order No. 173

MAC - NWHI Survey/Assessment Sea Turtle Account 4053

Contract Amount: $29,237.00
Contract Period: 7/1/78-8/31/80
Principal Investigator: George Balazs

Total Cash Received		$29,237.00
Less Cash Disbursements:		
Salaries	$17,141.13	
Fringe Benefits	2,503.13	
Supplies	636.12	
Travel	1,200.80	
Consultants	200.00	
Other	898.42	
RCUH Administrative Fee	1,492.00	
Transfer to a/c4029, MTO151	5,523.02	
Transfer to a/c4055, MTO174	(357.62)	29,237.00

-0-

UNIVERSITY OF HAWAII

Sea Grant College Program

MEMORANDUM

March 25, 1981

TO: George Balazs

FROM: Jane Ball Jane

SUBJ: Final Report

The final 90-2 should indicate under "Identified Benefits" all the benefits of your project. You may use the flip-side of the form, and please include a list of publications resulting from the Sea Grant study.

I certainly hope we aren't causing you to do double work, but I can't find a final 90-2 or final report for your project anywhere in our files. If you find them in your files will you please send us a copy so we can get them off to Washington?

Thanks a lot.

UNIVERSITY OF HAWAII
Sea Grant College Program

MEMORANDUM

June 4, 1981

TO: George Balazs

FROM: Jack R. Davidson

SUBJECT: Final Report for Year 12 (FY 1979-80)

A final report is required upon completion of any Sea Grant funded project. A narrative final report and the other forms listed below for your project entitled "Survey and Assessment of the Green Sea Turtle Resources of the Northwestern Hawaiian Islands" are due in my office by June 30, 1981.

1. The narrative final report should be in the form of an evaluation of the accomplishments of the project with some thought given to its impact on social issues or needs, as well as identified target groups. Also list any publications (including those still in process) or other products of your project at the end of your report. If you have not submitted copies of your publications to our office, please submit a copy as an attachment to your final narrative report.

2. A Completion NOAA 90-2 form is also required on which accomplishments for the full period of the project should be summarized, using the reverse side of the sheet if necessary. A copy of the NOAA 90-2 form submitted with your proposal is enclosed for reference. If you wish, you need only change the identified benefits section.

Attached are the following forms which should be submitted with your final report:

NOAA form 90-2 (Completion)
Student involvement form

COMPLETION

OMB APPROVAL NO. 41-R2600 EXPIRES 6-78

NOAA FORM 90-2
(4-77)

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: ☐ NEW ☐ CONTINUING PROJECT TITLE	DATE INITIATED, IF CONTINUING
GRANT NO. *(Office)*		DATE OF THIS FORM
INSTITUTION	OLD TITLE *(If different)*	ESTIMATED COMPLETION DATE

PRINCIPAL INVESTIGATOR AND COLLEGE OR DEPARTMENTAL AFFILIATION	% TIME	ASSOCIATE INVESTIGATOR	% TIME

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	

PART OF UNIVERSITY PROGRAM	OFFICE OF SEA GRANT CLASSIFICATION

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 %	%	MANPOWER DEVELOPMENT %	PUBLIC EDUCATION %	%

OBJECTIVES:

ANTICIPATED BENEFITS:

IDENTIFIED BENEFITS TO DATE:

KEYWORDS:

SUPERSEDES NOAA FORM 90-2 (6-73) WHICH IS OBSOLETE, AND EXISTING STOCK SHOULD BE DESTROYED UPON RECEIPT OF REVISION.

IV. NOAA FORM 90-2

COMPLETION

OMB APPROVAL NO. 41R2600 EXPIRES 6-78

NOAA FORM 90-2 (4-77)

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.: NI/R-5	PROJECT STATUS: ☐ NEW ☐ CONTINUING PROJECT TITLE: Survey and Assessment of the Green Sea Turtle Resource of the Northwestern Hawaiian Islands	DATE INITIATED, IF CONTINUING: 09-01-77
GRANT NO. (Office):		DATE OF THIS FORM: 03-31-81
INSTITUTION: UH	OLD TITLE (If different):	ESTIMATED COMPLETION DATE: 06-30-80

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	
63,964	45,875					NI/R-1 to NI/R-10

PART OF UNIVERSITY PROGRAM	OFFICE OF SEA GRANT CLASSIFICATION
Marine Resoruces Development	06. Commercial Fisheries-biology

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 determine the essential biological facts of the green turtle (Chelonia mydas) resource of the Northwestern Hawaiian Islands; and to effectively utilize this information in programs of management and conservation

Specific

1. To identify areas presently used for breeding, basking, feeding and resting purposes
2. To assess the size, productivity and ecological characteristics of breeding colonies and monitor annual fluctuations
3. To determine migratory patterns of the population
4. To identify food sources
5. To ascertain natural growth rates and ages at sexual maturity
6. To determine factors that limit the population
7. To develop a permanent Pacific sea turtle management program

ANTICIPATED BENEFITS:

The information obtained will be used by the Department of Land and Natural Resources (State of Hawaii), the National Marine Fisheries Service (US Department of Commerce), and the Fish and Wildlife Service (US Department of the Interior) as a data base for making intelligent, long-range management decisions relating to the utilization, protection, and perpetuation of the resources of the Northwestern Hawaiian Islands.

IDENTIFIED BENEFITS TO DATE:

A series of comprehensive field studies has provided basic life history data on key aspects of all of the specific biological objectives stated in the above. This information has been prepared into a number of papers and distributed to agencies and individuals having interest in the resources of the Northwestern Hawaiian Islands. A list of these publications and reports is attached to this form.

A Pacific sea turtle management and research program has been developed within the National Marine Fisheries Service, Southwest Region Honolulu Laboratory, with the direct assistance of the Principal Investigator.

KEYWORDS:

SUPERSEDES NOAA FORM 90-2 (6-73) WHICH IS OBSOLETE, AND EXISTING STOCK SHOULD BE DESTROYED UPON RECEIPT OF REVISION.

OMB APPROVAL NO. 41-R2600 EXPIRES 6-78

NOAA FORM 90-2
(4-77)

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: ☐ NEW ☒ CONTINUING	DATE INITIATED, IF CONTINUING
NI/R-5	PROJECT TITLE: Survey and Assessment of the Green Sea Turtle Resource of the Northwestern Hawaiian Islands	09-01-77
GRANT NO. (Office)		DATE OF THIS FORM: 11-27-78
INSTITUTION: UH	OLD TITLE (If different)	ESTIMATED COMPLETION DATE: 05-31-80

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	
37,179	37,558	17,179	17,558	26,785	8,317	NI/R-1 to NI/R-10

PART OF UNIVERSITY PROGRAM	OFFICE OF SEA GRANT CLASSIFICATION
Marine Resources Development	06. Commercial Fisheries-biology

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 %	%	MANPOWER DEVELOPMENT %	PUBLIC EDUCATION %	%
			100			

OBJECTIVES:

Overall

To determine the essential biological facts of the green sea turtle resource of the Northwestern Hawaiian Islands; and to effectively utilize this information in programs of management and conservation

Specific

1. To tag and recapture additional numbers of turtles on the nesting beaches and in the feeding pastures in order to gain further insight into growth rates and migratory patterns
2. To sample stomach contents from additional numbers of turtles in order to further delineate food utilization
3. To conduct additional analyses of turtle parts recovered from the stomachs of top-level carnivores by other investigators and commercial fishermen in the Northwestern Hawaiian Islands
4. To ascertain the productivity of the breeding colony at French Frigate Shoals during the 1979 season
5. To analyze and interpret all relevant information to determine marine critical habitat for turtles associated with the Hawaii Islands National Wildlife Refuge
6. To develop a permanent Pacific sea turtle management and research program within the National Marine Fisheries Service, Southwest Region

ANTICIPATED BENEFITS:

The information obtained will be used by the Department of Land and Natural Resources (State of Hawaii), the National Marine Fisheries Service (US Department of Commerce), and the Fish and Wildlife Service (US Department of the Interior) as a data base for making intelligent, long-range management decisions relating to the utilization, protection, and perpetuation of the resources of the Northwestern Hawaiian Islands.

IDENTIFIED BENEFITS TO DATE:

A series of comprehensive field studies has provided basic life history data on the aspects of growth rates, food sources, distribution and numbers, migrations, and predation. This information has been assembled into preliminary reports and publications for distribution to agencies and individuals having interest in the resources of the Northwestern Hawaiian Islands.

KEYWORDS: Green sea turtle resource, Northwestern Hawaiian Islands