

# GEORGE BALAZS DAILY LOG - JANUARY 1, 2014 TO MAY 2014

HONU WORLD IN HAWAII

PDF 60,000,609

LISTS 34  
DIFFERENT  
EASTERS PHOTOS  
SPECIAL

DATES CLOSED

DF - PDF 36 37



HONOLEA

TAIWAN photos

PDF 6,66

3 of 3

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COMPOSITION BOOK

808-395-6409 (MOKU

LINE TIME

WH6BLO

George H. Balazs

992-A Awaawaanoa Place

Honolulu, Hawaii 96825

"HIKIANA LIA"



L2



I need my sleep.

Please stay away 6 feet.

9-17-09

SEA LIFE PARK

Jeff Pawloski

TURTLE ALCOON

RECORDED (125)

BIOPSY SAMPLES FLIPPERS

\*DEPIMENTAL CARAPACE

FLIPPERS	VIAL NUMBER	TURTLE #	SEX	LENGTH	LT	RT	VIAL	
1	"A"	80.3 cm	♀	407	2C1749	RT-F7E	(6)	
2	"C"	83.7 cm	♂	TAG-METAL	LT-NW763	PIT-45261355PA	(7)	
3	"P"	83.6 cm	♀	45241	B3764	RT-41363959PC	(4)	
4	"KIANA"	84.6 cm	♀	TAG-METAL	LT-11532	RT-11531	(5)	
5	"MAUI"	88.5 cm	♀	NO TAGS FOUND			(3)	
6	"L"	76.9 cm	♀	TAG-METAL	LT-45273	D7C23-LT PIT	(2)	
7	"W"	77.3 cm	♂	RT-A423	LT-9905	LT-443A224B63	(1)	
8	"NUI"	94.6 cm	♀	NO TAGS FOUND			(10)	
9	"K"	82.2 cm	♀	RT-41353	45035	LT-41360	47B03	(8)
10	"P"	83.9 cm	♀	LT-45241	B3764	RT-41363959PC	(9)	
11	"N"	82.5 cm	♀	LT-6498	LT-NOT READ	RT-413616302C	(11)	
12	"E"	94.6 cm	♀	RT-41361	F4D14	RT- <del>754</del> NW751	(12)	
13	"U"	89.3 cm	♀	LT-407C	7P417A	RT-445467345E	(15)	
14	"H"	74.7 cm	♂	RT-44520	D250E	LT-5105	LT-424F2E1705	RT-NW762
15	"G"	83.4 cm	♀	RT-44544	B4C23	LT-44397A	0D7D	(13)

DEEP SCARS ON LT CARAPACE

SLIGHT PROLAPSE

G. BALAZS  
 Marine Turtle Research  
 NOAA NMFS PIFSC  
 2570 Dole Street  
 Honolulu, Hawaii 96822

# Sea turtles can tolerate casual



## KOKUA LINE

June Watanabe

**Question:** Since returning to the islands two years ago, I have been dismayed to find how often the turtles resting on the beaches are bothered by human contact. I have visited beaches on the North Shore and on the Big Island, and the situation is the same. The turtles are allowed little privacy and peace. They are constantly being closely surrounded to be photographed and touched. Even if there are signs to leave the turtles alone, they are ignored. Is there any beach patrol to keep an eye on these creatures? It seems as if this situation is tolerated to please the tourists. However, it is at the expense of the world's remaining turtles.

**Answer:** It obviously will surprise you to learn that, at least as far as Hawaiian green sea turtles are concerned, casual human contact, in most instances, is not considered bad.

This assessment comes from marine researcher George Balazs, a well-respected authority on the Hawaiian "honu."

Under state and federal acts,



STAR-BULLETIN / 2002

**Aviana Gutierrez feeds limu to a large turtle on Oahu's North Shore. A marine researcher says Hawaiian sea turtles have become accustomed to living among humans.**

all sea turtles are protected from harm and harassment. In some areas, such as Florida, sea turtles are listed as "endangered," or facing extinction; in Hawaii, the green turtles — the species most people see — are categorized as "threatened," a step below the endangered stage.

But what constitutes harm or harassment? State officials we contacted agree that harm or harassment usually would involve something egregious, more than people taking photos or even getting close to the turtles.

Still, enforcement officials are hesitant to have people invade a turtle's space.

"We encourage people to appreciate the wildlife and observe them from a distance," said Francis Oishi, acting administrator of the state Department of Land and Natural Resources Aquatics Division. "That's the best way to enjoy those animals."

But first, if you witness someone killing, harming or harassing sea turtles, you are advised to call any of the following law enforcement agencies:

>> State Division of Conservation & Resources Enforcement, 587-0077.

>> U.S. Fish and Wildlife Service, 861-8525.

>> The National Oceanic and Atmospheric Administration's fisheries law enforcement office, 541-2727 or 853-1964.

For illegal tour bus or vehicle parking, or other traffic violations that may be related to turtle-watching on the North Shore or elsewhere on Oahu, you are advised to call police at 911 and say it is a nonemergency.

If you find a sick, injured, or dead turtle, call 983-5730 to find out what to do regarding veterinary treatment or removal for scientific study.

This information was provided by Balazs, leader of the National Marine Fisheries Services Marine Turtle Research

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Project in Ha

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Project in Hawaii.

He's studied and tracked Hawaiian turtles for more than 30 years, during which time they have gone from near extinction to being "very numerous throughout the Hawaiian Islands. There is hardly a place where turtles can't be seen," he said.

Balazs said he has no doubt that you are sincere in your concern for the well-being of the turtles. But, in his estimation — and emphasizing that he was speaking personally as a professional researcher and not officially on behalf of any agency — the Hawaiian sea turtles have become accustomed to living among humans.

"The turtles are in no way bothered by casual human contact," he said.

Having spent a good part of his life in the field studying and observing them, Balazs said he can "comfortably estimate that 99 percent" of some people's perception of harm or harassment of the turtles have "no basis in scientific fact."

He said the turtles knowingly come to beaches and coastal waters already occupied by people — sometimes a great many people — and seem "very willing" to share space with them.

Over the three decades that he's observed them, the turtles' behaviors have changed from "outright mortal fear of humans hunting and killing them, to one of acceptance, curiosity (and) seeming 'friendship.'"



**SHERWOOD DAVIS  
MAYNARD**

Dr. Sherwood Davis Maynard, passed away on Thursday, December 5, 2013, after a long struggle with diabetes and related health issues. As Director of the Marine Option Program (MOP) from 1980 – 2007, he mentored thousands of students in ocean-related studies and was responsible for the development of the University of Hawaii's unique underwater field schools (QUEST and MAST), Blue-Water Marine Lab, the Graduate Ocean Policy Certificate, and the Maritime Archaeology Symposium. At the time of his retirement in 2008, he led the Biology and Marine Biology programs at the University of Hawaii-Manoa College of Natural Sciences. Sherwood was proud of the achievements of all his students and will be greatly missed by his students and colleagues.

Sherwood was born in Rochester, Minnesota on October 4, 1946, the son of Dr. Mason and Margaret Maynard. He grew up in Grand Rapids, Michigan and graduated from Ottawa Hills High School. He received degrees from the University of Washington and the University of Hawaii, completing a PhD in Oceanography at University of Hawaii. His strong work ethic ran through their family from their father who was a physician and their mom a nurse. His quiet determination began early leading to achievements as an Eagle

Scout, high school SCUBA certification, and, as the oldest of four children, set high standards for his siblings who came after him in school.

Sherwood is survived by his wife, Elizabeth; sisters, Susan Bowen and Sharon Crawford; and brother, Michael Maynard.

A memorial service will be held Saturday, January 25, 2014 with visitation at 10:00 a.m. (services at 11:00 a.m.) at Hawaiian Memorial Park Mortuary in Kaneohe.

The family requests that in lieu of flowers, a donation may be made in Sherwood's memory to the University of Hawaii Marine Option Program or to the Sherwood Maynard scholarship for the MOP QUEST Student Assistance Fund through the University of Hawaii Foundation.

Date: Sun, 8 Dec 2013 16:30:55 -1000  
From: Bill Puleloa <wpuleloa@hawaii.rr.com>  
To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>  
Subject: Re: from george- When you were in school- High school or elementary school

Keoki,  
I started elementary school in 1949 and we were forbidden to speak any other language other than English. Growing up in those years, pidgin English was the norm. My grandmother talked to me in Hawaiian every chance she got, but was so adamant in the correct usage that I shied away from learning. To this day it is one of my greatest regrets. By the 1950s Hawaii was a hodgepodge of different nationalities and for all practical purposes Pidgin became the lingua franca for most.

On Dec 8, 2013, at 2:01 PM, "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu> wrote:

> Bill, when you were in school could you speak Hawaiian in the class, in the school? Was it allowed? What year(s) would that have been? Best regards,  
george



Date: Fri,  
From: Geor  
To: Bill P  
Subject: R

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Date: Fri, 6 Dec 2013 14:58:05 -1000 (HST)  
From: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>  
To: Bill Puleloa <wpuleloa@hawaii.rr.com>  
Subject: Re: Question- Re: Marine Turtle Newsletter

God Bless you and Family. You have helped me to remember, once again. Sincerely I had not recalled for a while. You opened my eyes to the petals of a blooming flower again, via your message. Your wise words give me the vision I need to write a forward. I'll bounce it off you before I send off. Have a nice weekend (trite but sincerely), George

On Fri, 6 Dec 2013, Bill Puleloa wrote:

George, do you remember how it was when we were younger and more naive? I remember the first time I saw a rose and marveled at how wonderful it smelled, how soft the petals were, and how colorful it was. Now that I'm older and smarter, it seems whenever I encounter a rose my thoughts wonder off to things like photosynthesis, osmosis, stomata, stamens and pistils, color refraction, chlorophyll, transpiration, and other tangent notions. Knowledge seems to me a double-edged sword that way. Unlike before, I know a lot about roses (and turtles) these days but oftentimes I wonder where have the flowers gone? I don't know about you, but I miss those days when I could look at a rose and simply appreciate it for what it is, just a beautiful mysterious flower. This spiritual experience to me being the source of all true art and science.

On Dec 5, 2013, at 12:15 PM, George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu> wrote:

I understand and I admire and agree totally with your wishes. Thank you Bill.

I was gone 2 days. Now I will do more serious thinking about the few sentences I will write as a "Forward." And first and foremost for the Forward I ask you to suggest to me what You Might Like Me to Include? Please tell me, something anything that you would like to see said. Yes I have a few things to say with conviction, but would like your one or two too. Please. With Aloha, George

On Tue, 3 Dec 2013, Bill Puleloa wrote:

Wow! Promising news indeed. In keeping with the spirit of the story, I'm glad to see it being submitted anonymously. Sea turtles return in the dark of the night to escape being noticed. Ambiguity is their hallmark, and so should it be for those who are privileged with serendipitous rendezvous.  
Bill

On Dec 3, 2013, at 5:40 AM, "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu> wrote:

The editors have read it already, Like it Very Much, and don't feel any editing is needed whatsoever! Gee, I am SO Pleased to hear that! What they would like, however, is a short forward by me to give some context to the article. I've told them I would be happy to do that, but need to ponder to come up with the right words, and then of course get approval from the anonymous native Hawaiian author. I'll think about this over the next few days. With Pride and Joy (for my friend Bill!), George

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**THE XUNLIAO GUANGDONG PROVINCE EXPERIENCE: RELEASING SEA TURTLES FOR RESTOCKING AND CONSERVATION AWARENESS IN CHINA**

George Balazs<sup>1</sup>, Ka-yan Ng<sup>2</sup>, He-Xiang Gu<sup>3</sup>, and Feiyan Zhang<sup>3</sup>

<sup>1</sup> NOAA Pacific Islands Fisheries Science Center, Honolulu, Hawaii USA

<sup>2</sup> City University of Hong Kong, Hong Kong SAR P. R. China

<sup>3</sup> Huidong Gangkou Sea Turtle National Nature Reserve, P. R. China

There is widespread global and historic multi-cultural interest in releasing or returning sea turtles to the sea for restocking efforts, conservation awareness, government-sponsored activities, and even for religious purposes. Sources of these turtles have included hatchlings from artificial hatcheries, captive rearing projects, captive breeding, fishery by-catch, and turtle rehabilitation facilities. Often the turtles are released in considerable numbers with advance publicity attracting many adult and child spectators filled with excitement and interest. The mass release of sea turtles for restocking and conservation awareness in

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33<sup>rd</sup> ISTS Symposium on Sea Turtle Biology and Conservation, Baltimore, Maryland, USA

Mainland China occurs periodically but not predictably as to date and location. Very little information in English has been reported outside of China about internal turtle release events. These activities usually include the release of other marine life such as fish, shrimp, and crabs obtained from aquaculture facilities. On June 6, 2012 the authors were honored to participate in the release of 134 turtles and an array of other marine life at Xunliao, Oceania Point Resort, in Guangdong Province, People's Republic of China. The event marked the government's seasonal closure prohibiting the use of certain fishing gear in the South China Sea, including Guangdong Province. Thirty-four of the turtles released were from fishery by-catch turned in to the authorities by fishermen. These turtles ranged up to 99 cm carapace length and included 33 green turtles and one loggerhead all obtained from the coastal waters of Guangdong Province, such as Daya Bay. In addition, 100 others were captive-reared green turtles estimated to be 45cm carapace length. All turtles appeared to be healthy, active, and in excellent body condition. This presentation explores and photographically illustrates some of the unique aspects of China's spectacular sea turtle release phenomenon, as witnessed at Xunliao. Ideas are set forth for the possibility of enhanced conservation study involving both cultural and biological science perspectives. The People's Republic of China has vigorous and growing sea turtle conservation and research programs that deserve praise and partnership to improve the status of regional stocks.

Need PP on web site

see P. 29

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need 1999 ABSTRACT

# Researcher Spotlight: George Balazs

By Kristen Weiss

In a time when little was known about green turtle ecology and there was little protection for sea turtles, a young man stepped up to champion the cause of sea turtle conservation. It was 1972, and George Balazs bravely testified before the Hawaii Animal Species Advisory Commission that turtle fishing in the state of Hawaii was increasing dramatically and required immediate management.

Since those "early" days, he has overseen research on many aspects of sea turtle ecology and biology, and supports education programs that raise awareness for species protection. Today, George works at the U.S. National Oceanic and Atmospheric Association (NOAA), heading the Marine Turtle Research Program, and is recognized as one of

the world's foremost sea turtle experts. In particular, George has played a critical role in understanding fibropapillomatosis (FP) disease (see story opposite page).

Sea Turtle Foundation recently asked George a few questions about his career working with turtles.

*Q: Who or what inspired you to work with sea turtles originally?*

*A:* First and foremost the sea turtles themselves—green turtles (honu) here in the Hawaiian Islands. In the late 1960's/early 1970's they needed conservation help and more science information to ensure their survival and proper resource management. Their physical appearance—their appealing eyes—had a favorable impact on me. As did my wife Linda—her eyes shedding tears seeing live



Balazs tagging nesting green turtle at French Frigate Shoals in 1974. Photo courtesy of [www.mississaugawatch.ca](http://www.mississaugawatch.ca)

turtles being captured and taken off to market, which in those days were restaurants serving turtle steak to Hawaii's growing visitor industry. And third, I was inspired by a lady named Hilde Cherry, a Honolulu resident and acquaintance that lectured me on several occasions in forceful terms that "if I didn't do something" about the dismal state of Hawaiian turtles, no one else would and the population would disappear.

*Q: What is it about sea turtles that fascinates you most?*

*A:* I'm most definitely drawn to green turtles, and first and foremost to Hawaiian green turtles, a genetically discrete stock that I can distinguish (as individuals) visually from other green turtles of the world. I believe I feel this attraction because of the strong cultural link of the turtles to the Hawaiian people of the past and present. In addition, sea turtles have been the guiding and connecting factor in weaving an array of friendships and research partnerships I been fortunate to make with people from all walks of life, all over the world. The turtles did this for me—truly an amazing blessing as I look back over the past four decades.

*Q: What is your favourite turtle moment during your time with them?*

*A:* Swimming in their ocean-world underwater, for capturing research, at the very moment of being successful in grasping one by hand—knowing it's not going to escape, that I'm the "Victor of the Hunt", but that I'll let it go in a short time, after data has been collected, and the turtle will carry identification tags (double pit tags these days, flipper tags before that) for the rest of it's life. The two of us then will have a bond between us—that is, the tag.

*Q: What do you think is the greatest threat that turtles face today?*

*A:* Not Climate Change. Sea turtles in one form or another have survived for millions of years and I'm confident they will continue to do so in spite of climate change, maybe far more successfully than many vertebrate species, including humans. The greatest activity threat

to certain stocks of sea turtles is the directed take of hunting. The Hawaiian experience demonstrates that, if you effectively stop the hunting of turtles for 20-30 years, the population will nicely start to restore itself on a road to recovery. For this I am grateful to the People of Hawaii—that is, Hawaiian people, and people of all ancestries that make up our diverse Community of Aloha, for their accomplishment of allowing the honu time to replenish herself.



Balazs holding Hawaiian juvenile green with children before the turtle's release. Photo courtesy of [www.turtles.org](http://www.turtles.org)



UNOFFICIAL INFORMAL NON-SCIENTIFIC SURVEY

Should it be legal again in Hawaii to hunt/fish for green turtles (honu) for food and other non-commercial purposes? Yes; No

IF hunting/fishing for green turtles were made legal:

How many turtles do you think should be allowed taken each year state-wide? Turtles

What size of turtles should be allowed taken?

Small; Medium; Large; All

Should the method of hunting/fishing (nets, spears, hand-capture, harpoon, noose, firearms, etc.) have restrictions? Yes; No

Should hunting/fishing be limited to one or more of the following:

- Certain Island(s) in Hawaii; Area(s) of Certain Island(s) in Hawaii;
- Hawaii State Resident; USA Resident; Economic Status;
- Ethnicity; Age; Religious or Cultural Belief; Everyone;
- Everywhere; Tumored turtles; Non-tumored turtles

Would you approve of raising green turtles in captivity in Hawaiian fish ponds or tanks for use as food and other non-commercial purpose? Yes; No

George Balazs  
Kailua-Kona  
3-22-01

Handwritten notes on lined paper.

# NESTING

<p><b>1 EMERGING FROM SEA</b></p>	<p><b>2 DIGGING BODY PIT</b></p>	<p><b>3 DIGGING EGG CHAMBER</b></p>
<p>The female turtle moves very cautiously up the beach, pausing frequently to look for danger.</p> <p>(15-30 minutes)</p>	<p>The turtle throws sand backwards with great sweeps of her front flippers to form a shallow body pit. The turtle frequently stops to rest and this should not be mistaken for the onset of the next stage.</p> <p>(20-30 minutes)</p>	<p>Back flippers lift and throw sand forward alternately, but not as vigorously as in the previous stage. The back of the turtle's shell rises and falls and moves from side to side.</p> <p>(30-50 minutes)</p>



# DISTURBAN

<p><b>VERY HIGH</b></p>	<p><b>VERY HIGH</b></p>	<p><b>HIGH/MODERATE</b></p>
<p>The slightest light or movement will scare the turtle back to sea. Keep off of the beach crest because your moving silhouette is enough to scare the turtle away. If you see a turtle, immediately stop and crouch to watch. If she continues moving up the beach, wait until you can creep behind her out of sight. Keep low. It may take several minutes before she starts moving again.</p> <p><b>NO PHOTOGRAPHS</b></p>	<p>Any approach closer than 10 meters (30 ft.) or any flash of light will scare the turtle back to the sea. There is a danger of stumbling on a turtle at this stage as the animals are in a body pit at or below beach level. Move cautiously and watch for sprays of sand to pinpoint nesting turtles. Keep low and stay behind the turtle.</p> <p><b>NO PHOTOGRAPHS</b></p>	<p>You can approach the turtle quietly from behind. Stay about 3 meters (10 ft.) away. Do not touch the turtle or turn on lights. She will rest frequently. Be careful not to mistake the pauses for the onset of egg laying. Wait at least five minutes from when digging stops before approaching to see if laying has started. Keep low and stay behind the turtle.</p> <p><b>NO PHOTOGRAPHS</b></p>

# STAGE

<p><b>4 LAYING EGGS</b></p>	<p><b>5 COVERING EGGS</b></p>	<p><b>6 RETURN TO SEA</b></p>
<p>Lying quietly, with periodic sighs and a slight lifting and curling of the back flippers, the female slowly lays about 100 leathery eggs.</p> <p>(20-30 minutes)</p>	<p>Using her back flippers, the female covers the eggs with sand. She then energetically throws sand backwards with her front flippers to cover and disguise the nest area.</p> <p>This stage is difficult to differentiate from Stage 2.</p> <p>(10 minutes)</p>	<p>The turtle moves quickly down the beach to the sea.</p> <p>(10 minutes)</p>

# RISK FACTOR

<p><b>LOW</b></p>	<p><b>MODERATE/HIGH</b></p>	<p><b>HIGH</b></p>
<p>Once the turtle begins laying eggs, she is less sensitive to disturbance. Do not touch the turtle. Keep low and stay behind the turtle. A small flashlight may be used by your guide to help you see the eggs being laid. The guide will not shine the light on the turtle's head and light will not be used if another turtle is nearby that might be scared away. Use extreme care with flash photography. Always point flashes or lights inland and do not take a picture if there is another turtle within 60 meters (180 ft.).</p> <p><i>PHOTOGRAPHS WITH CAUTION. NO FLASHES TOWARD SEA</i></p>	<p>The turtle becomes increasingly sensitive to disturbance as she covers the nest. The same rules for flash photography apply as in the previous stage. The best time to take pictures is in the early morning using natural light.</p> <p><i>PHOTOGRAPHS WITH CAUTION. NO FLASHES TOWARD SEA</i></p>	<p>No photographs may be taken at night because of the danger of disturbing other turtles coming in from the sea. In the morning take pictures only if no other turtles are emerging from the sea or nesting on the beach.</p> <p><i>DAYLIGHT PHOTOGRAPHS ONLY</i></p>

# Historical versus Contemporary Climate Forcing on the Annual Nesting Variability of Loggerhead Sea Turtles in the Northwest Atlantic Ocean

Michael D. Arendt<sup>1,2\*</sup>, Jeffrey A. Schwenter<sup>1</sup>, Blair E. Witherington<sup>3</sup>, Anne B. Meylan<sup>4</sup>, Vincent S. Saba<sup>5</sup>

**1** Marine Resources Division, South Carolina Department of Natural Resources, Charleston, South Carolina, United States of America, **2** Department of Biological Sciences, University of South Carolina, Columbia, South Carolina, United States of America, **3** Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, Melbourne Beach, Florida, United States of America, **4** Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, St. Petersburg, Florida, United States of America, **5** National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Princeton, New Jersey, United States of America

## Abstract

A recent analysis suggested that historical climate forcing on the oceanic habitat of neonate sea turtles explained two-thirds of interannual variability in contemporary loggerhead (*Caretta caretta*) sea turtle nest counts in Florida, where nearly 90% of all nesting by this species in the Northwest Atlantic Ocean occurs. Here, we show that associations between annual nest counts and climate conditions decades prior to nest counts and those conditions one year prior to nest counts were not significantly different. Examination of annual nest count and climate data revealed that statistical artifacts influenced the reported 31-year lag association with nest counts. The projected importance of age 31 neophytes to annual nest counts between 2020 and 2043 was modeled using observed nest counts between 1989 and 2012. Assuming consistent survival rates among cohorts for a 5% population growth trajectory and that one third of the mature female population nests annually, the 41% decline in annual nest counts observed during 1998–2007 was not projected for 2029–2038. This finding suggests that annual nest count trends are more influenced by remigrants than neophytes. Projections under the 5% population growth scenario also suggest that the Peninsular Recovery Unit could attain the demographic recovery criteria of 106,100 annual nests by 2027 if nest counts in 2019 are at least comparable to 2012. Because the first year of life represents only 4% of the time elapsed through age 31, cumulative survival at sea across decades explains most cohort variability, and thus, remigrant population size. Pursuant to the U.S. Endangered Species Act, staggered implementation of protection measures for all loggerhead life stages has taken place since the 1970s. We suggest that the 1998–2007 nesting decline represented a lagged perturbation response to historical anthropogenic impacts, and that subsequent nest count increases since 2008 reflect a potential recovery response.

**Citation:** Arendt MD, Schwenter JA, Witherington BE, Meylan AB, Saba VS (2013) Historical versus Contemporary Climate Forcing on the Annual Nesting Variability of Loggerhead Sea Turtles in the Northwest Atlantic Ocean. PLOS ONE 8(12): e81097. doi:10.1371/journal.pone.0081097

**Editor:** Richard Reina, Monash University, Australia

**Received:** March 29, 2013; **Accepted:** October 16, 2013; **Published:** December 5, 2013

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**Funding:** These authors have no support or funding to report.

**Competing Interests:** The authors have declared that no competing interests exist.

\* E-mail: arendtmd@dnr.sc.gov

Date: Wed, 4 Dec 2013 00:44:31 -1000  
From: William Connor <wconnor@hawaii.edu>  
To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>  
Subject: Connor MS Thesis Defense, Thursday Dec 05 @ 12, Sherman Lab 103

Aloha George,  
I apologize for the radio silence for such a long period of time; graduate school has been hectic to say the least and many things seem to get pushed to the wayside. I am writing to let you know that I will be defending my thesis titled, "Evaluation of AVHRR-to-MODIS Cross-sensor Translation Using Landsat TM." Wordy and convoluted, I know. There's not a huge overlap between the work I did for MTRP and my current project. However, you played a large role in my decision to pursue a higher degree in the natural sciences and I would be remiss not to extend an invitation to come and watch me publicly humiliate myself in the name of scientific progress. Below is the transcript of my abstract. If you are unable to attend, I would like to thank you for providing me with the opportunity to grow as a researcher and mentoring me during my time under your employment.

Regards,  
Will

GEORGE H. BALAZS.

from December 1975 DEFENDERS- The Magazine of Defenders of Wildlife

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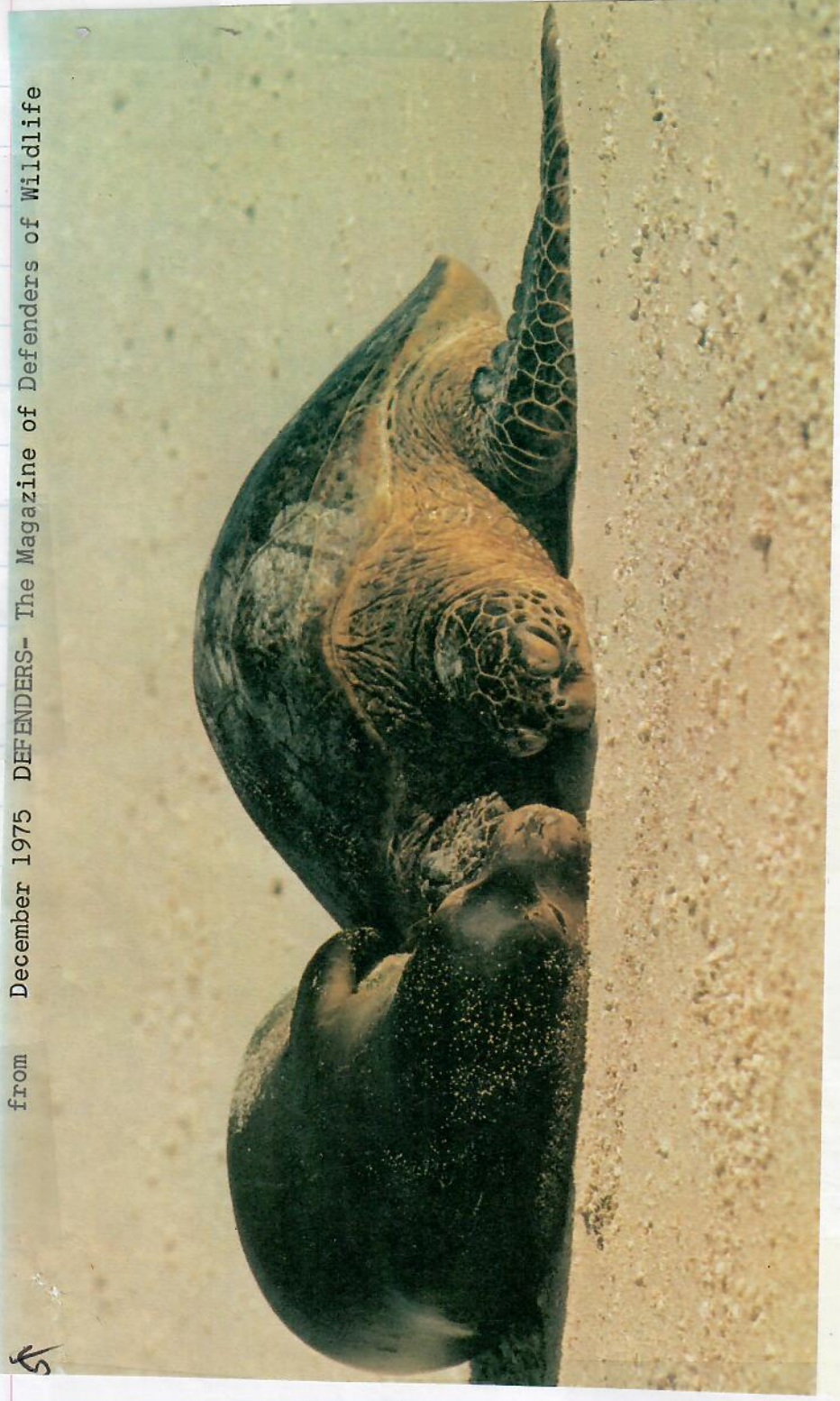


Photo by George H. Balazs

Two members of endangered species, a monk seal and a green turtle, nap together in the Leeward Islands.

by George H. Balazs

# Green Turtle's Uncertain Future

*Protection vital if remnant population is to survive*

**E**ARLY HAWAIIANS were well acquainted with the green turtle, which they called *honu*. A second kind of sea turtle, the hawksbill or *'ea*, was also familiar to them. This animal's range appears to have always been restricted to the southeast portion of the island chain, and presently so few exist that the population is nearly extinct. Both of these native turtles, which are referred to in mythology and illustrated in petroglyphs, were carefully utilized in the old Hawaiian culture to ensure a lasting supply.

For the past three years, I have worked toward gaining a better biological understanding of the Hawaiian green turtle. Information resulting from this research has been used to aid in the conservation of these magnificent animals. My continuing field studies are focused on French Frigate Shoals, a 15-mile crescent-shaped atoll that includes several small sand islands and a

volcanic pinnacle. Located 480 miles northwest of Honolulu, in the Hawaiian Islands National Wildlife Refuge, French Frigate Shoals is the site of Hawaii's last green-turtle breeding colony and the only one left in the United States. Most egg laying takes place at this location between June and August on the 11-acre island of East, or Turtle Island, as it was originally called. Thus far, I have spent a total of 162 days at this remote location tagging and censusing turtles and collecting information on hatching production. Results of this work, along with the findings from earlier taggings by U.S. Fish and Wildlife Service personnel, have made a start in piecing together the complex natural history of the population. Our work has shown that many members of the seasonal breeding colony come from feeding pastures around the major inhabited islands to the southeast. Additionally, some turtles have been found

Photo by Robert J. Shallenberger



A hatching green turtle reaches the surf. Eggs hatch 55 to 65 days after laying; the young turtles normally run to sea after dark. They are seldom seen again until they weigh about ten pounds.

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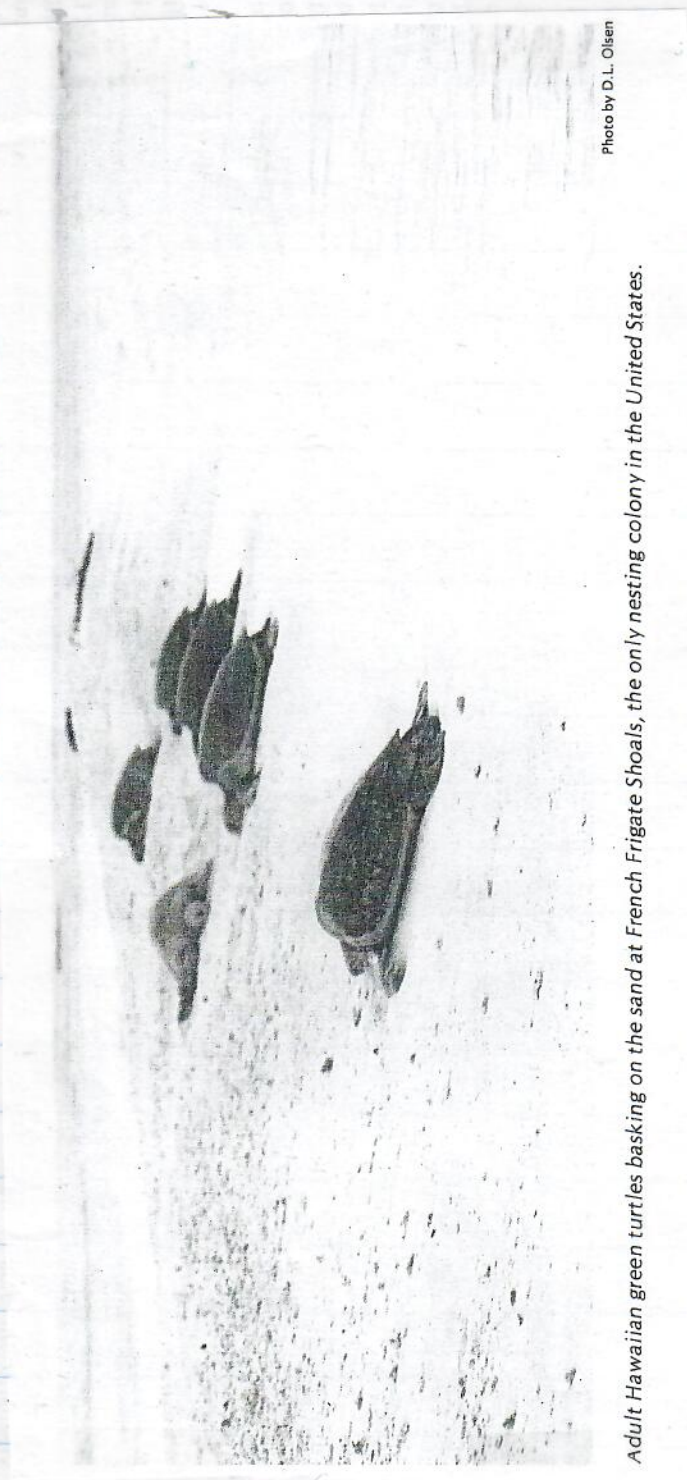


Photo by D.L. Olsen

Adult Hawaiian monk seals basking on the sand at French Frigate Shoals, the only nesting colony in the United States.



to travel to the breeding site from around the small islands northwest of French Frigate Shoals. Because no tagged animals have been recovered from anywhere outside the chain, it appears that Hawaii has one of the few *Chelonia* populations in which protection is not complicated by international migrations. This factor is a major problem in efforts to conserve green turtles in other parts of the world.

With both the feeding pastures and breeding grounds under the jurisdiction of a single country, one would hope to find a healthy population that has not undergone ecologic decline. Unfortunately, Hawaii's green turtles have nevertheless experienced serious losses and, in many ways, reflect the global problem. Although events contributing to the Hawaiian situation have taken place over a 150-year period, the last 40 years have been the most devastating.

At the time of Captain Cook's arrival in 1778, native Hawaiians were unaware of the small islands northwest of Nihoa. Following the discovery of these uninhabited areas by foreign explorers during the late 1700s and early 1800s, visits involving wildlife exploitation became common. Although information is scarce on the actual number of turtles taken, the log of one expedition in 1882 suggests that it was considerable.

After four months in these islands, the crew of the schooner *Ada* had killed more than 400 turtles, as well as many monk seals and seabirds. Ironically, at Laysan Island, a sign was found that appealed to voyagers not to take turtles. The sign was repainted before the *Ada* left, but 130 basking turtles were nevertheless removed from the beaches. Turtles were also regularly killed during this period to provide food for resident guano miners, Japanese feather hunters, and numerous shipwreck victims. One account states that several hundred were eaten by the crew of a single whaling vessel wrecked at French Frigate Shoals in 1888. When the barque *Wandering Minstrel* captured turtles at French Frigate Shoals during the 1891 breeding season, one island alone was described as having hundreds of turtles basking on the beaches and at least ten times that many in the water. To provide a modern comparison, during the 1975 season, I found no more than 35 basking turtles on any single island.

Primarily due to the massive destruction of nesting seabirds by feather hunters, all of the northwestern islands except Midway and Kaula were set aside as a federal wildlife refuge in 1909. This far-sighted conservation measure should have put a stop to the killing of turtles and prevented the dis-

turbance of critical habitat. But this was certainly not the case. During the 1923 nesting season, a scientific expedition visiting French Frigate Shoals found evidence of a recent turtle slaughter. In 1926, a commercial fishing station was established at Pearl and Hermes Reef, an important basking and feeding site for Hawaiian *Chelonia*. The station remained active until 1931, and during those years turtles were exploited both at that location and at Lisianski Island, 145 miles to the southeast. Between 1930 and 1940, U.S. military exercises were regularly conducted at French Frigate Shoals. East Island was the base for these operations, which included seaplane runways in adjacent waters and encampments of 150 tents or more. During the early 1940s, related war games involving artillery bombardments were carried out at both French Frigate Shoals and Pearl and Hermes Reef. Although large numbers of turtles may not have been directly killed by these activities, disturbances of such magnitude contributed to the decline, particularly at the breeding site. In 1942, a military air station was constructed at French Frigate Shoals. The area utilized for this facility was Tern Island, a small 11-acre site originally very similar in appearance to East Island. After massive dredging and landfill operations

were completed, the "new" Tern Island encompassed 57 acres of packed coral and sand held in place with iron pilings. I have estimated that this single project destroyed 19 percent of Hawaii's total acceptable green turtle nesting habitat.

Further degradation of the ancestral breeding grounds was yet to follow. In 1944, a radio-transmitting navigation station was established on East Island. Permanent buildings and roads were built, and an extensive antennae ground wire system was buried over much of the island. It is difficult to understand why this important 11-acre piece of green turtle real estate in the Hawaiian chain was selected for such an incompatible human use. Eight years later, in 1952, the station was completely abandoned, and transmitting facilities were constructed on Tern Island, six miles to the north. Rotting wood, rusting metal, and buried wire still interfere with turtle nesting at East Island.

In 1946, the killing of turtles at French Frigate Shoals for markets in the major islands was greatly simplified. In that year, Tern Island was opened to commercial fishing interests. It would appear that the area's wildlife refuge status was all but forgotten. Over a three-year period, fights were made between Tern Island and Honolulu to transport fish and turtles. At least 200 turtles were taken by one company involved, and turtle meat made up a large portion of the fishing crew's diet. Exploitation at the breeding site was reduced after 1949, partly due to economic reasons related to declining

**I**N THE MAJOR inhabited islands to the southeast, an important green turtle-breeding colony formerly nested on Lanai. This site last hosted animals in the 1920s and probably represented a more recent colonization than the geologically older area of French Frigate Shoals. Several select beaches on Molokai, Oahu, and Kauai were also used by *Chelonia* as recently as 40 years ago. Today, a single such nesting anywhere in the major islands would be a newsworthy event. Several factors are responsible for these losses of reproductive capability. Land development and advanced modes of transportation have made nearly all previously isolated beach areas accessible to exploitation and disturbance by man. Additionally, on Lanai in particular, native vegetation has been significantly altered by plant and animal introductions, and erosion has occurred. These factors have produced changes in the nesting habitat. Even if offspring of this breeding colony still remained alive, I seriously doubt that the characteristics of the present beach would be acceptable.

Over the years, hunting pressures have also steadily increased on all sizes of turtles in feeding pastures around the major islands. This was brought about by Hawaii's growing human population and by the dollar incentive of commercialization. No site could be considered safe from the fast boats launched from trailers, modern diving gear, high-powered spear and shark guns, synthetic turtle nets of great length, and even rifles. It is surprising to realize that before June of

George H. Balazs is a research biologist with the Hawaii Institute of Marine Biology. Supported by the Fish and Wildlife Service, he has studied the green turtle breeding colony at French Frigate Shoals.

fully known. Sport divers, conservation-minded fishermen, and longtime residents described the declines they had witnessed. I received one account from a pilot who had casually counted turtles in the water while flying over a comparatively remote coastal area for a ten-year period. His observations indicated that a 90 percent decrease had taken place.

In short, overwhelming evidence and support existed for the overdue protection. Among the few dissenters was a small group of efficient part-time turtle hunters who were supplying restaurants all over the state with tens of thousands of pounds of meat. In 1974, a state regulation was effected which prohibited the sale of Hawaiian green turtles, but still allowed capture for home consumption with restrictions on size and method of capture. The nearly extinct hawksbill (*Eretmochelys*) population was given full protection along with the rare open-ocean leatherback (*Dermochelys*) which occasionally wanders into local waters. However, proposals for a moratorium on all turtle killing and a systematic study of remaining animals were unsuccessful. At this late date in the turtle's dismal history, such a plan seems essential if via-

numbers of fish and turtles. Sporadic killing of turtles for commercial purposes did, however, continue at French Frigate Shoals throughout the 1950s, and it is likely that other northwestern refuge islands were also involved.

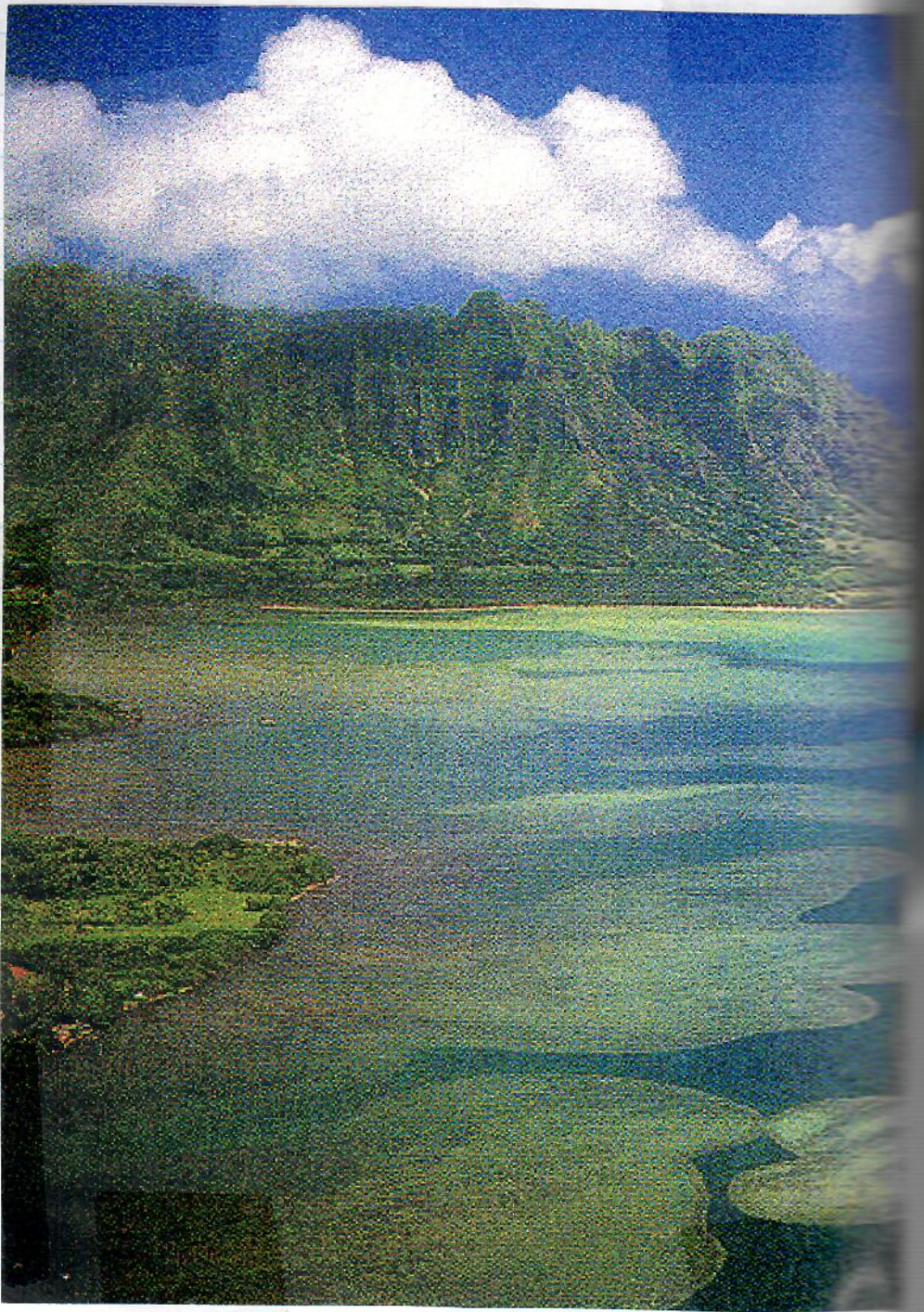
The last recorded instance of turtles being slaughtered at the breeding site took place in 1959, exactly half a century after the refuge was established. In that year, a commercial fishing company destroyed a minimum of 25 percent of the nesting females present for the season. One of the "harvesting" methods involved clubbing the turtles on the head while they were in the process of laying eggs. Many shipments were made to Honolulu before the operation stopped abruptly, possibly because of a plane crash. Whole dead animals awaiting removal were left to rot on the beaches alongside the remains of the previously butchered turtles. In 1964, personnel of the U.S. Fish and Wildlife Service were permanently assigned to Hawaii to administer all of the refuge islands. Since that time, turtles in the area have enjoyed relative freedom from destruction and harassment.

1974, the only law relating to the capture of turtles around the major islands was a ban on the use of firearms, poisons, and explosives. Commercial fishing had always been permitted, and essentially no conservation regulations ever existed to help protect these unique native animals. In the early 1960s, turtle killing accelerated in order to satisfy the expanding tourist industry's desire to offer visitors an exotic luxury food. Green turtle meat was sold as "tasting something like veal." This description was well suited to the appetites of most tourists who had visions of Hawaiian food consisting of fish heads and seaweed. Visitors were able to return home satisfied at having sampled the native cuisine, restaurants turned a high profit margin, and weekend fishermen prospered. Everyone seemed to find the business rewarding except the Hawaiian green turtle who was being openly sold down the road to extinction.

In 1972, efforts were started to inform the general public about what was taking place and, hopefully, to obtain some form of legal protection. Public hearings on the matter were held over a one-year period and the gravity of the situation became

bility is to be assured.

While waiting for turtles to finish nesting, I have had ample time during the long nights on East Island to think about what the future holds for these gentle creatures. Certainly the remaining numbers would not be able to tolerate any reoccurrence of the past abuses. Realizing full well the precarious survival status of all green turtles, I am nevertheless encouraged by recent events that have taken place. A policy statement issued in April, 1975, by the International Union for the Conservation of Nature and Natural Resources (IUCN) officially recognized *Chelonia* as being in danger of becoming extinct. Although carrying no legal power, this action will still serve as an important guideline in the formulation of laws in many nations. In addition to the decisive statement by IUCN, the U.S. Departments of the Interior and Commerce have recently proposed changes in the law that would give *Chelonia* full protection. While waiting for these necessary measures to be adapted, each of us can aid in the animal's survival by refusing to buy derived products and urging others to do the same.





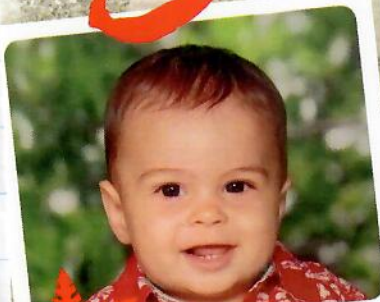
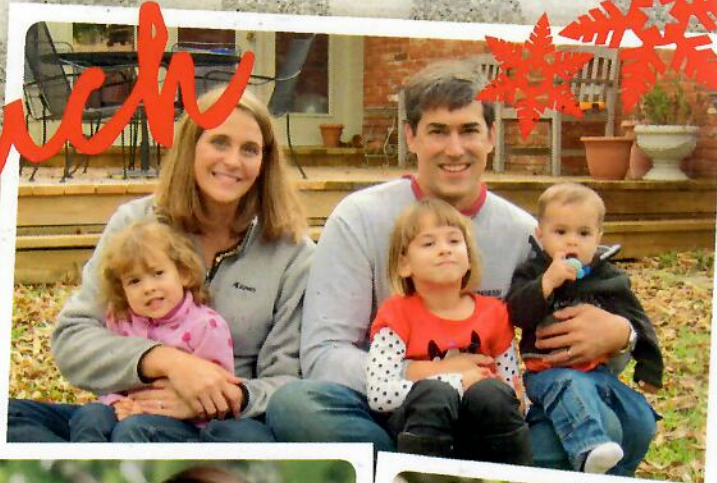
"Kawelo Spot"  
 MR Kawelo NANI  
 PAI

3 CROSSIES Reef  
 Turtles out Basking  
 extreme low tide  
 LATE April Thursday  
 photoed by Barry Chaff

STACY

Ms. Stacy A. Hargrove  
14040 SW 72nd Ave  
Palmetto Bay, FL 33158-1357

So Much Joy



THE HARGROVE FAMILY

John, Stacy, Lucille, Jolena, and Edison

DONNA BROWN

82 S. LAUTHOE PLACE  
LAHAINA, HI 96761

mother passed away  
sent 1/14

LIZ KUMABE

1/25/14 45-179 LILIPUNA CP.  
APT. P  
KANEHOHE, HI 96744

sent + \$100  
sherwood  
passed away  
1/14

The "Sea Turtle Research-University of Hawai'i" sign in front of the pavilion at Punalu'u County Beach Park attracts local residents and visitors alike, who have come by the busload to view the scenic cove. They all want to see the turtles, to "talk story," to ask turtle questions, and to get pictures of, with, and amid the creatures.

Researcher George Balazs and students from the Marine Option Program (MOP) at the University of Hawai'i-Hilo, on this weekend in February, are capturing and studying Hawaiian green turtles from the cove and nearby waters. Balazs, a wildlife biologist with the National Marine Fisheries Service in Honolulu, believes that gathering data about the green turtles is essential if they are to be properly managed for their benefit and ours. He explains that, while they are not an endangered species now, they are threatened, which means a dramatic change in their population might put them on the brink of extinction. As a threatened species, they are protected by federal and state laws.

Punalu'u is a sheltered cove with a black sand beach on the southeastern shore of the Big Island. The cove's name means "diving spring" and recalls a Hawaiian practice long ago of diving into the cove with gourds to obtain drinking water from an underwater spring.

MANULANI

Punalu'u and other areas along the Ka'u coast have probably been a favorite habitat of Hawaiian green and other turtles for centuries, judging from their mention in local mythology. A turtle named Kauila, according to legend, lived in the spring behind the beach and could assume human form out of water. She played with the children and watched after them as they fished in the spring.

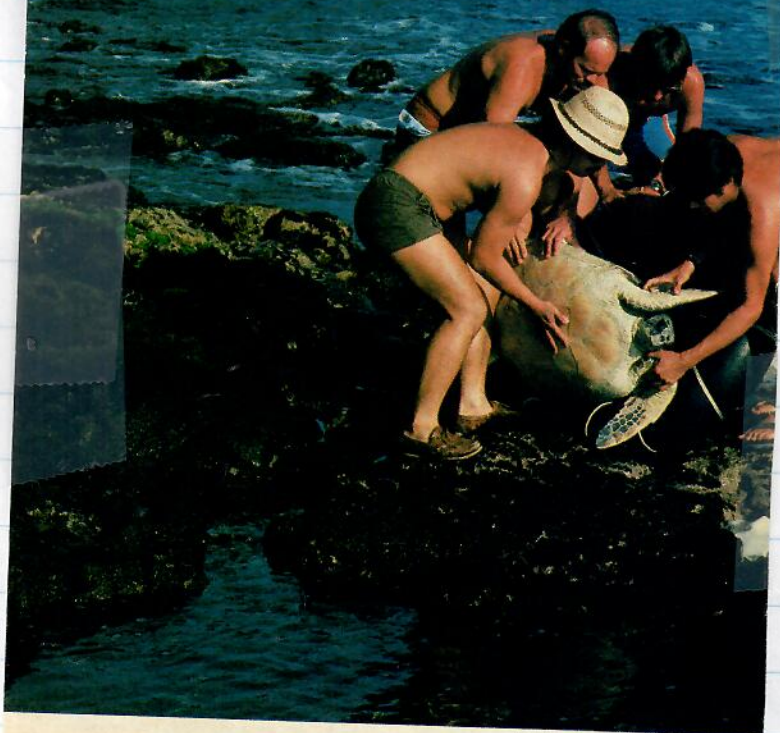
With funding from the University of Hawai'i Sea Grant College Program, Balazs has been capturing and releasing turtles at Punalu'u since late 1983 to learn more about their feeding habits and growth rates. Growth rates among green turtles along the Ka'u coast appear to be more rapid than among green turtles elsewhere in the main Hawaiian Islands. Because of the faster growth rates, Balazs thinks the Ka'u turtle population may make up a large proportion of the breeding colony at French Frigate Shoals in the Northwestern Hawaiian Islands. It is believed that all Hawaiian green turtles go there to breed.

He was attracted to Punalu'u in 1974 when a local couple discovered a clutch of turtle eggs in the sand near their beach concession stand. Possibly because of a red *limu* (algae or seaweed) with the scientific name of *Pterocladia capillacea* and other underwater features, this area along the Ka'u coast may be one of the best feeding grounds for green turtles in the

(cont. on page 8)

MANULANI

# Tagging May Save



By Rick Klemm,  
University of Hawai'i Sea Grant Extension Service

—Photo by George H. Balazs

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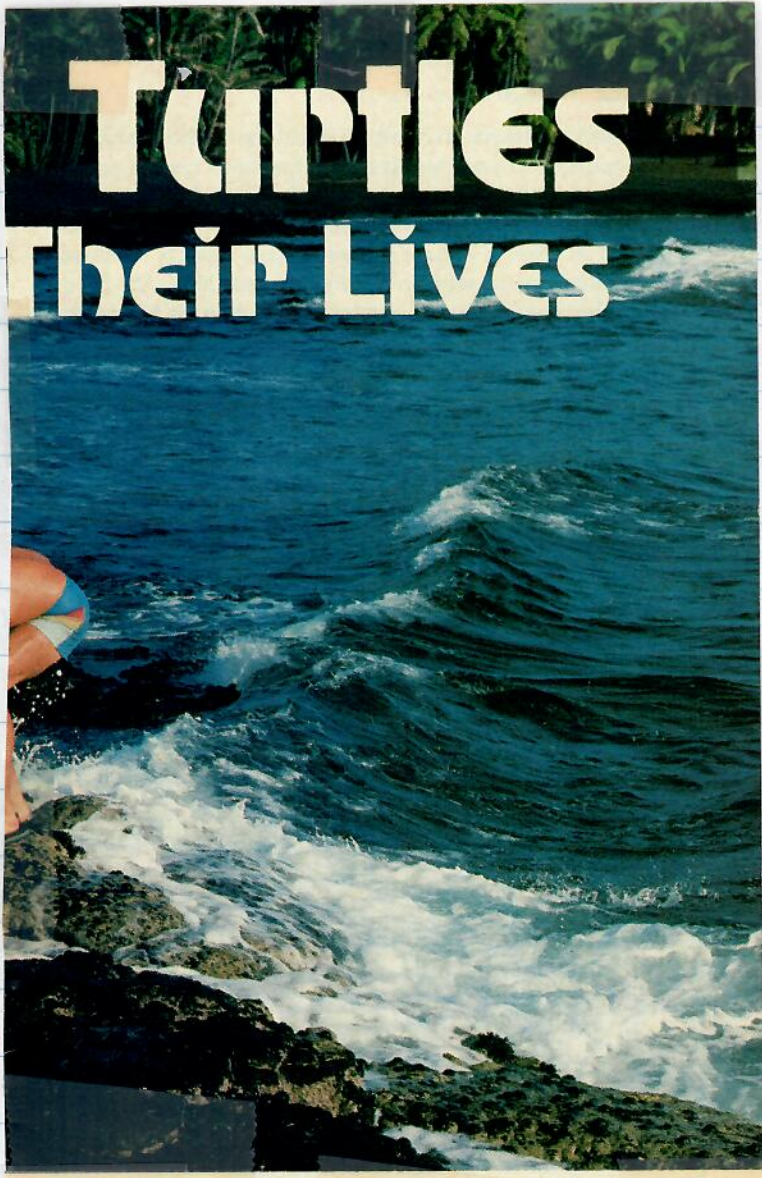
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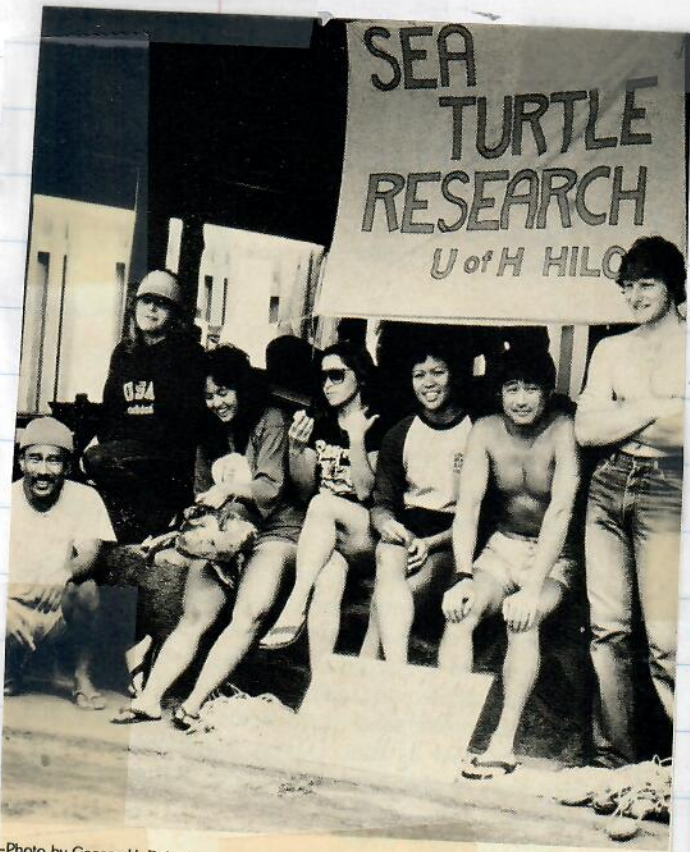
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VOL 4, NO 9





*The turtles are carried to and from the beach in innertubes. After tests and tagging are completed, they'll be released, none the worse for wear.*



-Photo by George H. Balazs

(cont. on page 33)

## HAWAII

**Nicknames:** The Big Island; The Orchid Island; The Volcano Island

**Land Area:** 4,037 square miles  
93 miles long; 76 miles wide  
Largest island in the Hawaiian chain

**Mayor:** Herbert T. Matayoshi

**Population:** 92,053 (Source: Dept. of Planning/Economic Development, Oct., 1982)

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JAPAN

2001年(平成13年)4月3日



海亀の標識調査について情報交換するG・パラスさんと宮形佳孝さん=米フィラデルフィアで



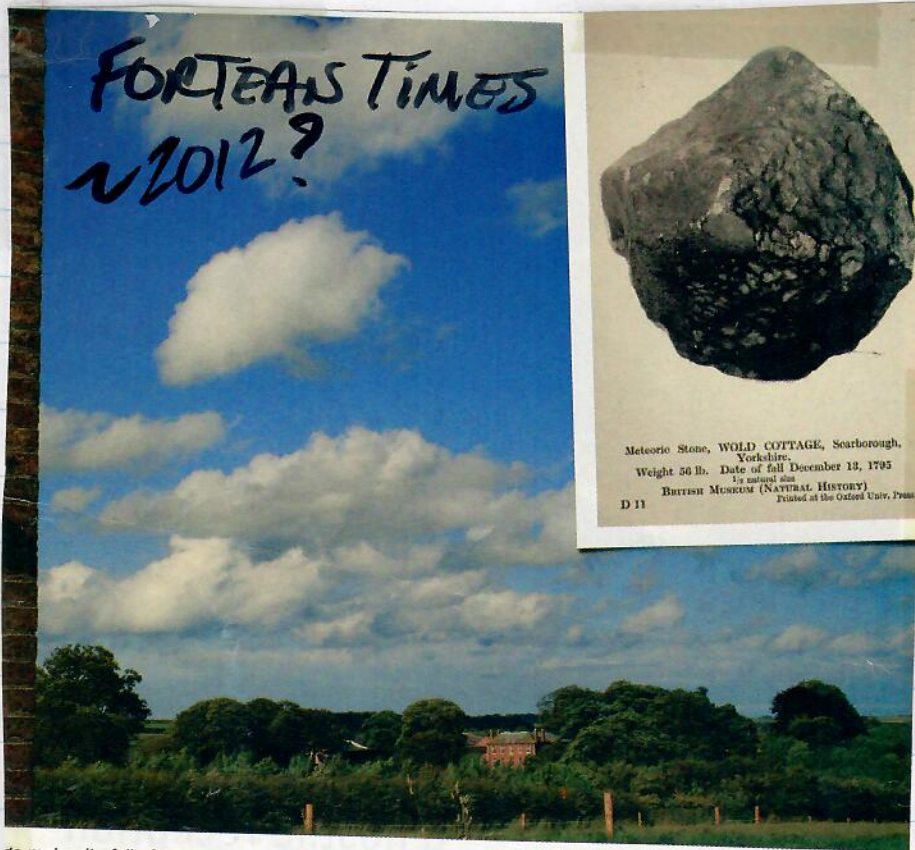
*Gently a tag is fixed to a flipper in a painless process that will help researchers document the turtle's life.* —Photo by Rick Klemm

**TURTLE TAGGING** (cont. from page 9)

weigh each turtle and measure its head and shell. Finally, Balazs takes a blood sample, in a harmless and painless procedure, from each turtle's neck. The blood will be sent to the Mainland and analyzed to determine the turtles' sexes. You can't tell by just looking at them.

When all the work on a turtle is finished, three or four MOP students carry it to the ocean's edge and release it. As a wave comes in the turtle rides it to slightly deeper water where it can "fly" away in a burst of speed, up to 25 miles per hour.

After the last turtle has been released and the visitors and residents have moved on, the research team prepares for a long afternoon's nap before another night and morning's work with the green turtles. Because of research like this by Balazs and his student team, the Hawaiian green turtle may be around for future generations to enjoy. It's all part of worldwide efforts to save the many finned, feathered and furred creatures we share this planet with. ☑



Meteorite Stone, WOLD COTTAGE, Scarborough,  
Yorkshire.  
Weight 56 lb. Date of fall December 13, 1795  
1/2 natural size  
BRITISH MUSEUM (NATURAL HISTORY)  
Printed at the Oxford Univ. Press  
D 11

ge meteorite fall of 1795, and the 56lb (25kg) stone recovered and put on display in a London coffee-house.

## Only in 1950 was the origin of meteors in the asteroid belt conclusively proven

high speed.

Chladni cited several reports of a sinister hissing sound accompanying falling meteors, and we still don't know exactly what this is. In recent years, the Ministry of Defence's

Project Condign report on *Unidentified Aerial Phenomena in the UK* (see FT211:4-6; 212:28; 220:29; 250:28) has revealed that government scientists take seriously the idea that super-heated meteors may somehow interact with atmospheric gases to create exotic plasmas that are mistaken for flying saucers. Over 200 years after Chladni unravelled the origins of meteors, some of their mysteries remain. **FT**

### AUTHOR BIOGRAPHY



**MATT SALISBURY** is news and features editor of English language industry teaching trade paper *English Language Gazette*, and an activist with the London freelance branch of the National Union of Journalists ([www.londonfreelance.org](http://www.londonfreelance.org)). He is a regular contributor to *Fortean Times*.

MARJOLIJN @gmail.com

# Habitat collapse due to overgrazing threatens turtle conservation in marine protected areas

DEPRA

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Marine protected areas (MPAs) are key tools for combatting the global over-exploitation of endangered species. The prevailing paradigm is that MPAs are beneficial in helping to restore ecosystems to more 'natural' conditions. However, MPAs may have unintended negative effects when increasing densities of protected species exert destructive effects on their habitat. Here, we report on severe seagrass degradation in a decade-old MPA where hyper-abundant green turtles adopted a previously undescribed below-ground foraging strategy. By digging for and consuming rhizomes and roots, turtles create abundant bare gaps, thereby enhancing erosion and reducing seagrass regrowth. A fully parametrized model reveals that the ecosystem is approaching a tipping point, where consumption overwhelms regrowth, which could potentially lead to complete collapse of the seagrass habitat. Seagrass recovery will not ensue unless turtle density is reduced to nearly zero, eliminating the MPA's value as a turtle reserve. Our results reveal an unrecognized, yet imminent threat to MPAs, as sea turtle densities are increasing at major nesting sites and the decline of seagrass habitat forces turtles to concentrate on the remaining meadows inside reserves. This emphasizes the need for policy and management approaches that consider the interactions of protected species with their habitat.

## **PIFSC Program review 2011**

### **Short version of Panel comments and recommendations**

#### **Observations of Center's turtle programs:**

- Research not well integrated across divisions
- Lack of overall strategy with common goals
- Goals from CIE review in prior years not considered
- Chiefs need to ensure collaboration regardless of differences in opinion among researchers
- Program fragmented across 5 programs
  - Poor communication
  - Poor data availability
  - Inefficiency
  - Population status & assessment should be a priority across divisions
- Increase collaborations with outside scientist at the SE and NW centers

#### **MTRP**

- JP research of lower priority and could be left to university researchers
- Need to document vital rates (reproduction, recruitment, growth, survival).
- Need abundance data
- Parameters including; growth, size distribution, nesting frequency, size of maturity, recruitment of adults)
- Age and growth studies (e.g. cross sections of humeri)

#### **MTAP**

- Priority needs to be Population Assessment and improvement of models for population dynamics.
- Need to seek outside expertise
- Fit models to long time series at MTRP
- Evaluate sub lethal impacts (growth, reproduction)
- Find ways to work with local scientists, fishermen, community leaders
- Ensure scientific rigor
  - Vet assumptions with experts
  - Consider all sources of data
  - Work with data holders throughout a project from hypothesis to pub.

#### **FRMD**

- Future emphasis could be on delayed health impact from bycatch (but likely hard to show).
- Collect data on bycatch/mortality rates to contribute to bycatch assessments Pacific-wide.

#### **EOD**

- Refining habitat models and evaluating turtle movements relative to ocean productivity.

#### **CRED**

- Collect information on turtle effects on algae and associated organisms.

**Prioritization of future funding – suggested criteria**

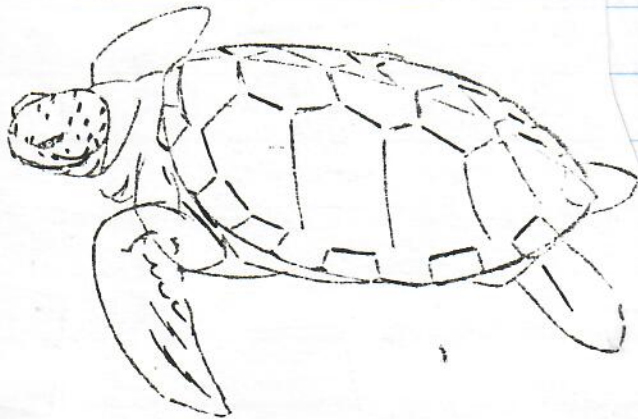
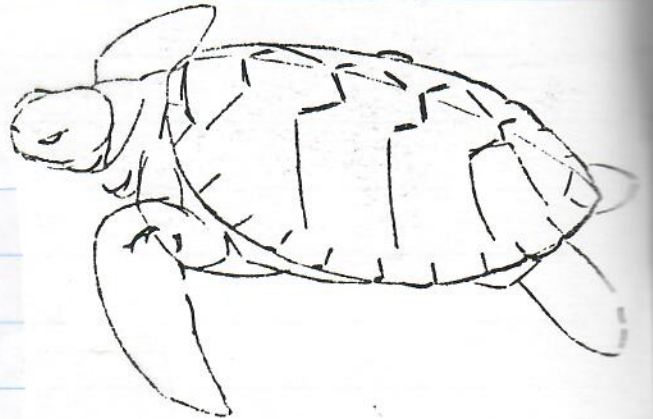
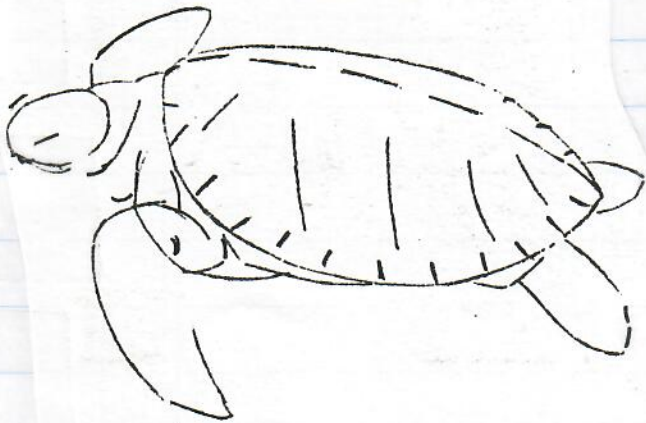
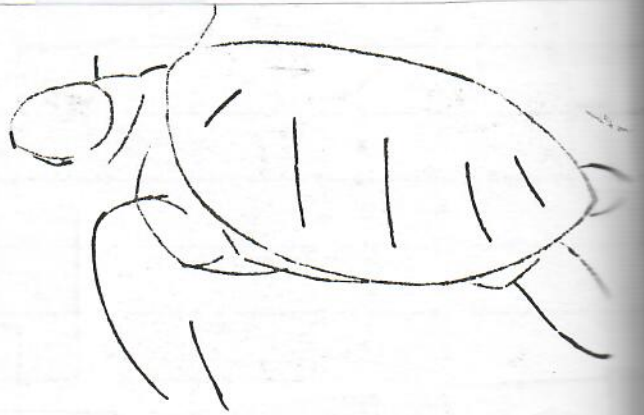
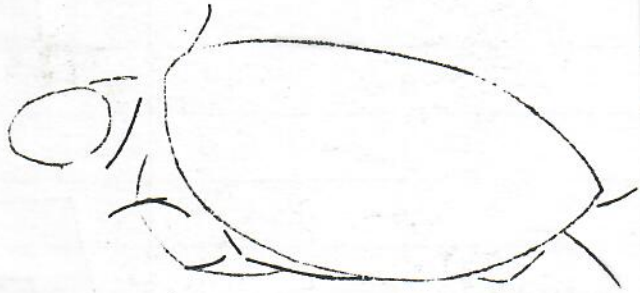
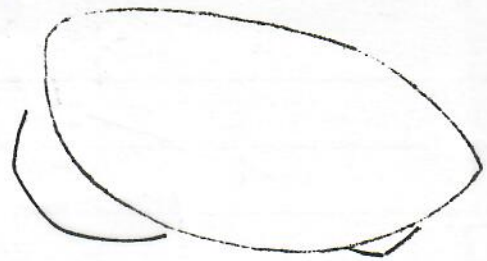
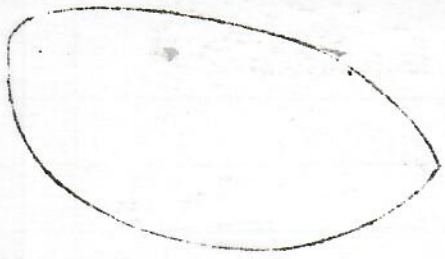
- Management need, for status determination
- Conservation and recovery
- Science quality
- Outreach
- Partnerships
- Division integration, cross cutting research
- Division chiefs will need to consider feasibility

**Stakeholder's comments:**

- Roles of tagging and genetics and other projects should be clarified and codified to avoid overlap in funding or research with SWFSC.
- Improve communication among PIRO and Westpac turtle activities
- There is only one permit holder for turtle research
- Stakeholders need to know how the center's priorities will be set, research domain, future collaborations.

**Recommendations**

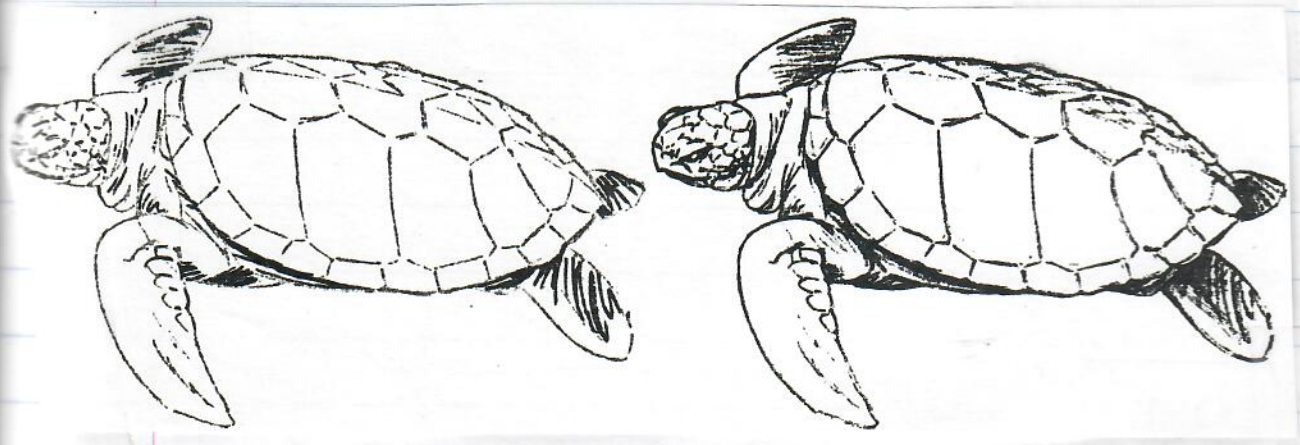
- 1 - Follow recommendations in the NRC report
  - improve data collection methods, data quality and availability
  - external review plan for data and models
  - data needed include in-water abundance, hatchling-cohort production, survival of immature turtles, nesting females, age at sexual maturity, breeding rates, clutch frequency,
- 2- Increase outreach to stakeholders (e.g. annual sea turtle summit)
- 3-Improve integration of turtle programs in PSD (combine MTRP & MTAP)
- 4-Evaluate cost and benefit of current projects
- 5-Determine how to maintain contact with non-noaa collaborators from Ford Island.
- 6-Publish existing data from past projects
- 7-Participate/host workshops with other centers/universities
- 8-Evaluate the permit process and ensure fair and transparent evaluation.





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[ Pictured (l-r): Corey Aves '88, George Watson, David Suter '88, and André Nogués '88 proudly display their catch of the day after a weekend fishing trip organized by Mr. Watson. ]



Office calendar days  
See old passport

#1 CHINA VISA-E1881836 JUN 2011  
#2 CHINA VISA-F9321129 JUN 2012  
#3 CHINA VISA-G894832 MAY 2013  
TRIPS / DATES TO HONG KONG-CHINA  
#3 CHINA VISA <sup>new pp</sup> MAY 2014

Reserve  
\* (8-15 AUGUST 2011 HK+CHINA Reserve  
8-15 OCTOBER 2011 HK  
\* (8-20 FEBRUARY 2012 HK+CHINA + HAINAN Reserve  
\* (4-11 JUNE 2012 HK+CHINA Reserve  
\* (28 MARCH - 8 APRIL 2013 HK-SOUTH CHINA Guangzhou  
ZHANJIANG

Support of sea turtle research - City University of Hong Kong  
Hong Kong / CHINA and National Reserve

✓ (6-14 OCTOBER 2012 BANGKOK THAILAND  
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Keoki Balazs

Honu Scientist



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WITH  
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# 48B408871 NEWS PP - ISSUE - 30 APRIL 2013  
 EXPIRE - 29 APRIL 2023

197

TREK GYM  
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 PASSPORT

AMAGATA - "Heaven Direction"

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ISSUED	EXPIRE	ISS	ASST	DEPART DATE	PLACE
22 JUL 2007	21 JUL 2017	23 AUGUST 1994	FIRST EVER TAIWAN		
2/19/08	→ TURTLE SACRIFICE	MY number 5	DAYS (6)	2/25/08	TAIPEI
4/4/08	→ MAZU WALK DAJIA		(6)	4/10/08	TAIPEI
9/30/09	→	MY NO. 6		10/6/09	TAIPEI
2/16/11	→ TURTLE SACRIFICE	NO. NO. 7	(5)	2/21/11	TAIPEI
4/6/11	→ MAZU WALK DAJIA		(9)	4/15/11	TAIPEI
9/29/11	→ HENG CHIU NUN MBA WORKSHOP	LIU QIU #1		10/8/11	TAIPEI
2/4/12	→ TURTLE SACRIFICE	MY NO. 7	(4)	2/8/12	TAIPEI
5/31/12	→ KAOSHUNG YARU wedding		(3)	6/3/12	TAIPEI
11/4/12	→ LIU QIU #2		(7)	11/11/12	TAIPEI
2/18/13	→ HENG CHIU NUN MBA	MY NO. 8	(8)	2/26/13	TAIPEI
#3 LIU QIU	→ Penghu	2/25/13		FULL MOON Sacrifice	TAIPEI
7/11/13	→ KAOSHUNG	LIU QIU #4	(9)	7/11/13	TAIPEI
9/5/13	→ TAIPEI KUANDU - DAJIA			9/9/13	TAIPEI
10/10/13	→ KAOSHUNG	LIU QIU #5		10/16	TAIPEI
2/12-2/17/14	→ Penghu turtle sacrifice	year of the Horse 9th		2/17	TAIPEI

BORN  
2/7/2011,  
"MARIE"

Hui-wen (May)  
+ Chung-ye

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LI

Yun-zhen

" 李允甄 "

LEE

李允甄

SUKAI  
SON

TKI PEI

總經理 陳呂華娟  
Felicia Lu Chen

 大東山珠寶  
since 1963 Lucoral & Lupearl®

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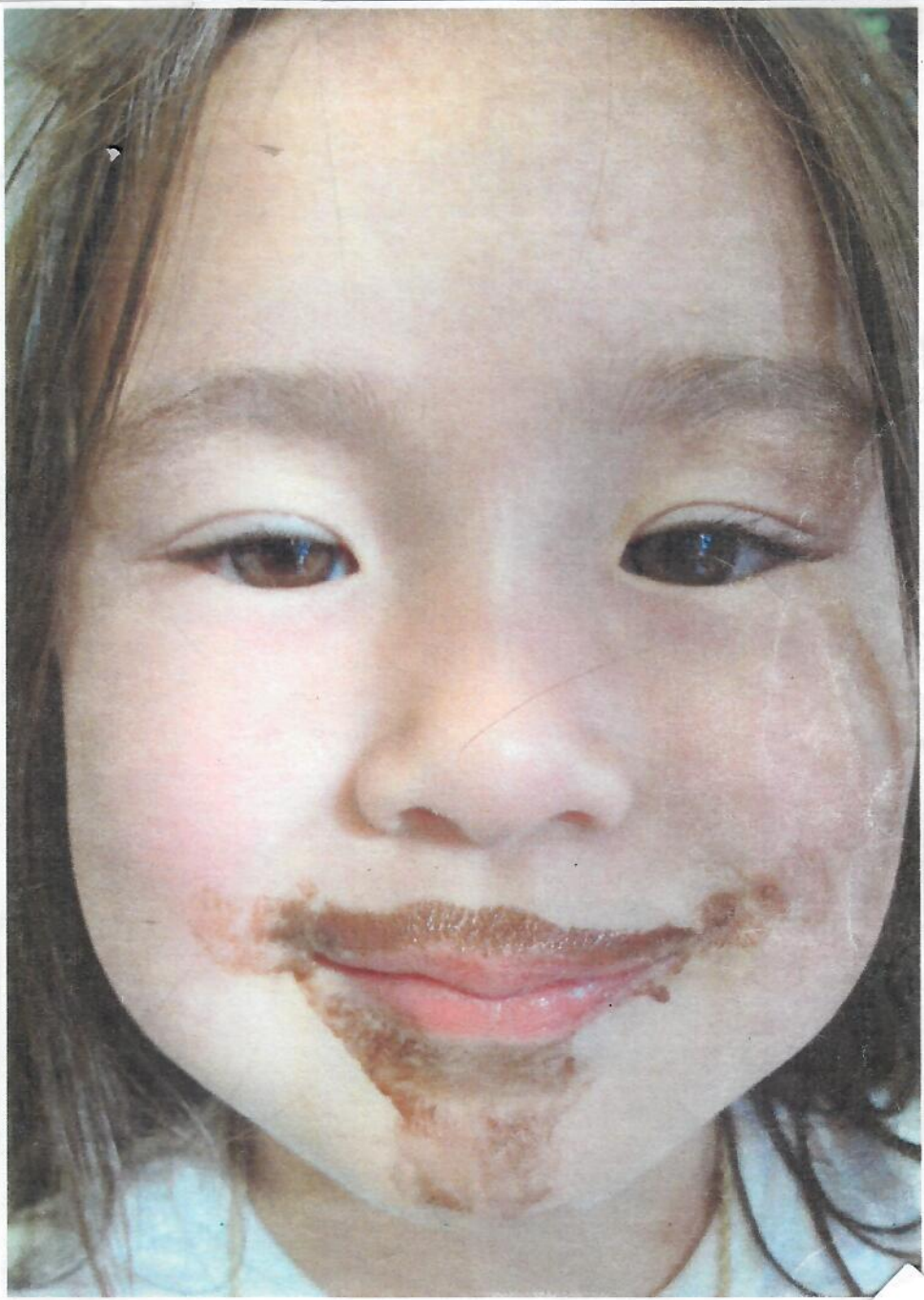
大東山希望天地股份有限公司  
Wish Paradise Corp. (80678165)

10487 台北市南京東路三段90號7樓  
10487 台北市南京東路三段89巷3弄14號  
TEL : 02-25031991 FAX : 02-25031661  
Mobile : 0915-110-261  
E-mail : luperla.tpe@gmail.com  
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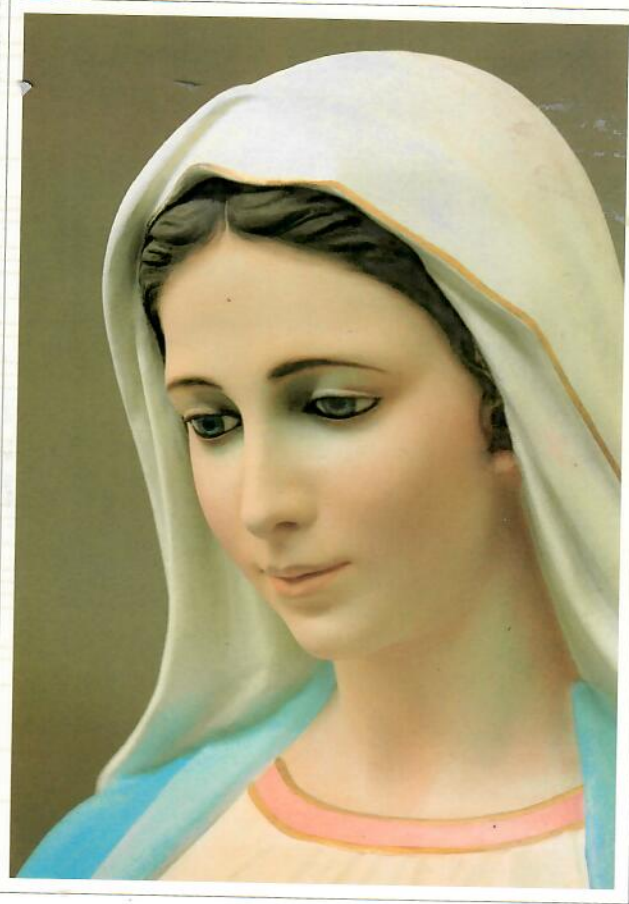












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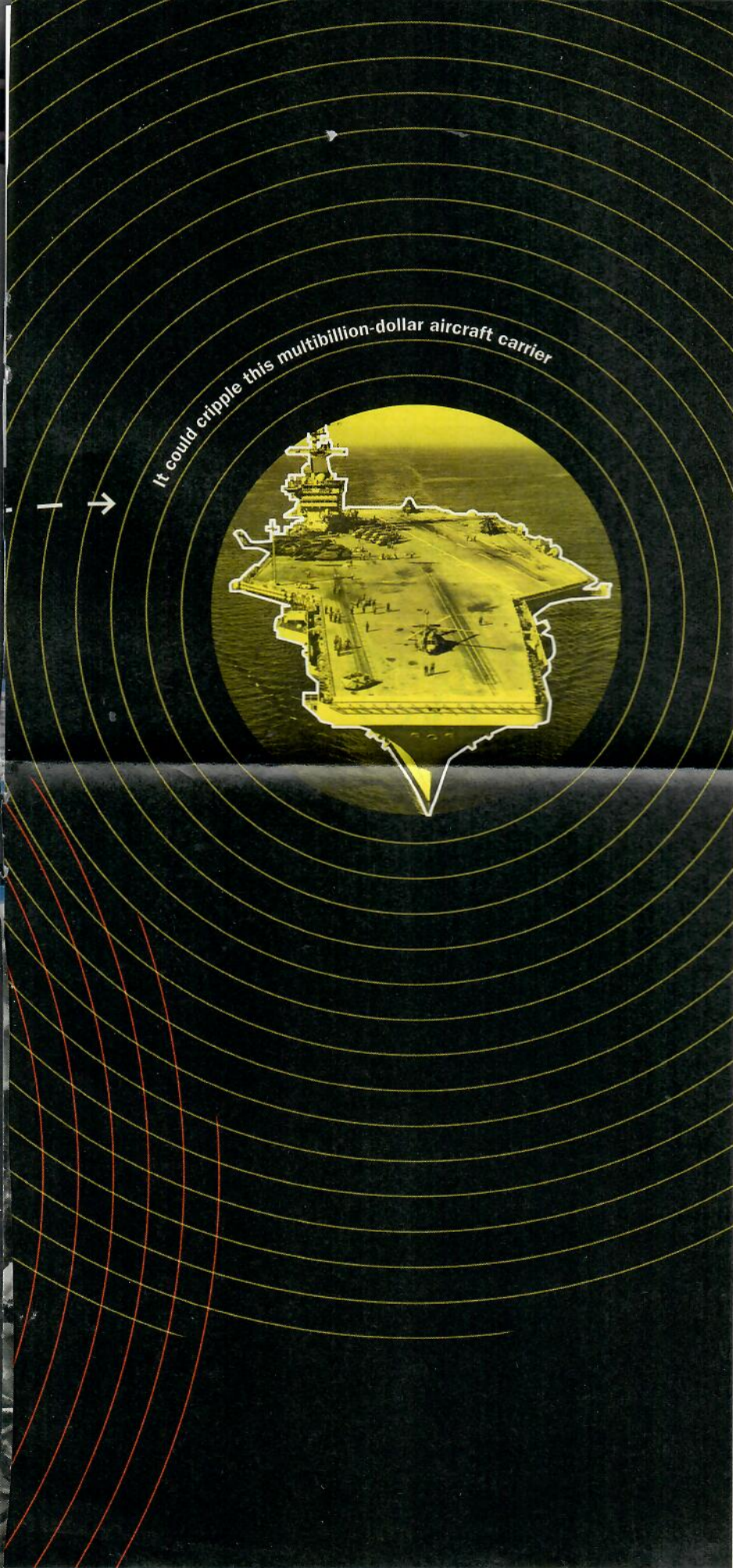
# In China's Sights

## A new missile threatens the U.S. Navy's biggest warships—and stability in the Pacific

BY MARK THOMPSON



This \$11 million Chinese missile is launched from a truck



It could cripple this multibillion-dollar aircraft carrier

THERE ARE FEW THINGS AS AWESOME AS A U.S. aircraft carrier—100,000 tons of nuclear-powered steel towering 20 stories above the waterline and crammed with nearly 70 warplanes ready to do its nation's bidding. A carrier reassures allies while giving pause to global troublemakers. For more than a half-century, these 1,000-ft. flattops and their 5,000-sailor crews have patrolled the seas with impunity. The Navy apparently believes they have a future too: it is building two new ones, at a cost of nearly \$15 billion each, with a third in the pipeline. Admirals like to call a carrier "4½ acres of sovereign American territory."

But these mighty fighting machines may be losing some of their invincibility, at least in a wide expanse of the Pacific Ocean off the coast of China. Since 2010, Beijing has deployed a new kind of land-based ballistic missile with the potential to change the balance of power in a volatile and vital part of the world. The Dong Feng-21D missile is what Andrew Erickson of the U.S. Naval War College calls a Frankenweapon, a marriage of several existing military technologies that together could transform war. Launched from a truck, it can fly almost 1,000 miles over the ocean, homing in on its target during the final moments of flight before diving into the ship from above.

If China's military commanders were to succeed in disabling or even sinking one of those targets, it would signal a marked loss in American hegemony on the high seas. If effective, such weapons would push U.S. carriers farther from China, cutting the range and utility of their warplanes and reducing the U.S.-provided security that has nurtured East Asia's economic growth and relative stability. The threat has coincided with an unpredictable dispute between China and Japan over a cluster of islands that both countries claim. In the pre-DF-21D era, the U.S. might have quickly sent a carrier or two to the region to bring an effective end to Chinese military maneuvers.

The U.S. debate over the Dong Feng—meaning East Wind in Chinese—is happening quietly but intensely behind closed doors in Washington. Public photographs of the missile don't exist. Dozens of U.S. and Chinese officials declined to discuss the weapon, saying it is too sensitive. Admiral Jonathan Greenert, chief of U.S. naval operations, tells *TIME* that the Navy

has spent years working “feverishly” on secret ways to defeat the DF-21D, which the Pentagon first acknowledged in 2009. “It’s a good weapon that they’ve developed,” the Navy’s top admiral says, “but there’s nothing that doesn’t have vulnerabilities.” The Navy will use “good risk logic” if tensions rise in the region. “We’re not going to sit ... where we would have ballistic missiles raining down,” Greenert says. That alone might signal a change in the U.S. posture in the Pacific. But to date, Navy officers say, carrier deployments haven’t changed.

THE U.S. MILITARY HAS TREATED THE western Pacific as its private pond since the end of World War II. U.S. warships regularly sailed within three miles of nations like China, which could do little about it—and in many cases didn’t know it was happening. But that has changed in recent decades as satellites, long-range radar and other forms of reconnaissance have made clear to Beijing that the U.S. Navy has been cruising not far off its coastline.

For China, the realization that the U.S. military was peering in its windows from the seas turned into humiliation in 1995 and ’96, when Washington dispatched a pair of carriers to Taiwan to suggest to Beijing that it curb its missile tests in the neighborhood. After a century of defeat at the hands of the West and Japan and being hemmed in by the U.S. since the creation of the Chinese communist state in 1949, China quietly decided to change the game. It is adding three submarines every year to its 50-strong fleet (the U.S. Navy has 72 submarines) and has built 80 surface ships since 2000. But those are large vessels the U.S. Navy believes it can elude. A barrage of incoming DF-21Ds from a fleet of trucks is a different kind of challenge.

Boasting the world’s second largest economy—one projected by some to eclipse the U.S.’s by 2017—China has been investing heavily in its military, now spending about \$200 billion a year. That’s only a third of the Pentagon’s annual bill. But while the U.S. has worldwide military obligations, China is focusing its military’s attention on the western Pacific.

China’s rise troubles its neighbors, some of which have bloody histories with the Middle Kingdom. In recent years, Beijing has vocally repeated long-standing claims to scores of islands, reefs and rocks spanning more than 1,000 miles

## China’s Expanding Reach

With an estimated range of more than 900 miles (1,500 km), China’s DF-21D missile is designed to attack ships that come close to China and its neighbors



(1,600 km) in the South China and East China seas, including those it’s tussling over with Japan. China has pushed its ships into parts of the South China Sea claimed by other nations. China has so far been reluctant to engage in multilateral negotiations to settle the claims. Responding to China’s rise, Malaysia and Vietnam have bolstered their own militaries. The Philippines doubled its defense budget in 2011 and in April signed a 10-year pact with the U.S. allowing more American troops on its territory. On July 1, the Japanese government said it wants to reinterpret its U.S.-imposed pacifist constitution to allow its military to come to the aid of an ally under attack.

Beijing has increased tension by asserting claims to often uninhabited areas—sometimes dispatching patrol boats to them—despite competing claims from Japan, the Philippines, South Korea, Taiwan and Vietnam. In November, China declared an air-defense identification zone over islands controlled by Japan but claimed by both nations. (The U.S. flew a pair of B-52s through it without notifying Beijing, declaring China’s air-defense zone invalid.)

“I am concerned by the aggressive

growth of the Chinese military, their lack of transparency and a pattern of increasingly assertive behavior in the region,” Admiral Harry Harris, commander of the U.S. Pacific Fleet, told an Australian audience in April. Harris’ job makes him a key guarantor of President Obama’s pivot to the Pacific, designed to highlight growing U.S. interest in the region. But a shrinking U.S. military makes Harris’ job harder, especially following China’s recent announcement that it is boosting defense spending by 12.2% this year.

### The Stakes

THE WATERS OFF CHINA’S EASTERN COAST have become one of the world’s key economic arteries: a third of all global commerce, including \$1.4 trillion annually in two-way trade with the U.S., is with Asia. Beijing’s goal is to keep foreign pressure off that coast to ensure the flow of the resources—especially oil—that it needs to keep its economy humming, its 1.3 billion citizens content and its communist rulers in power. “China sees itself as a global player,” James Clapper, the top U.S. intelligence officer, recently told Congress. “They’ve been quite aggressive about asserting what they believe is their manifest destiny, if

PREVIOUS PAGES: CARRIER; CANDICE VILLARREAL—U.S. NAVY/GETTY IMAGES

### Asymmetric Warfare

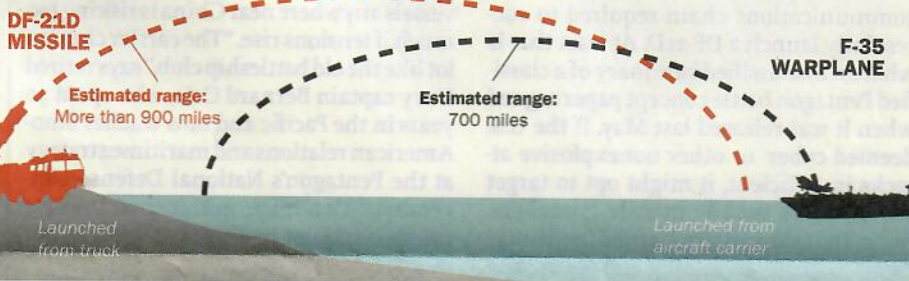
One Chinese source estimates the cost of a DF-21D and its launcher at \$5 million to \$10.5 million. Even at **\$11 million** apiece, China could produce 1,227 DF-21D systems for the cost of a single U.S. *Ford*-class aircraft carrier



The U.S.'s future carriers will be **\$13.5 billion** *Ford*-class vessels outfitted with \$160 million F-35 fighters. The F-35 is the costliest weapon system in history

### Costly Underreach

China's new missiles could make it impossible for warplanes on U.S. aircraft carriers to reach their targets without midair refueling or costly standoff weapons that can be fired a long way from targets



doesn't have to sink U.S. carriers to render them ineffective; it merely has to scare them away from the Chinese coastline. The DF-21D could keep carriers beyond the fleet's F-18 warplanes' unrefueled range as well as the yet-to-be-bought F-35 attack bombers'. The math of deterrence is on the Chinese side. Experts believe that for the price of one carrier, the Chinese can build more than 1,200 DF-21D missiles.

### The Missile

SO WHAT HAS TAKEN THE WORLD'S MILITARIZED nations so long to produce a potential ship killer like this? First, both the U.S. and Russia are barred from developing such weapons under the 1987 Intermediate Nuclear Forces arms treaty, which prohibits missiles with ranges of 300 to 3,400 miles (480 to 5,470 km). China has never signed such an agreement. But just as critical, developing a maneuverable warhead capable of hitting a vessel moving at 30 knots has proved extremely difficult from an engineering perspective.

The U.S. Navy says it believes China has harnessed "the space-based intelligence, surveillance and reconnaissance, command and control structure and ground-processing capabilities" needed to make the missile work. Since roughly 2010, Beijing has deployed DF-21Ds with its Second Artillery Corps, whose doctrine is to overwhelm an adversary with multiple warheads. DF-21D warheads could be filled with hundreds of minibombs, designed to disable a carrier by peppering its aircraft and radars, or bigger bombs designed to strike a mortal blow.

Pentagon officials say the DF-21D is operational after what one admiral calls "extensive testing." But it has yet to be launched, as far as is known, against an ocean target. (It was successfully tested last year against a stationary carrier silhouette painted on the Gobi Desert floor in western China.)

A lot could go wrong with a weapon whose battle-worthiness has yet to be tested. The DF-21D must detect, identify, locate and track a target as it moves; it must draw information from sensors and send that information to control systems and to the missile to make midcourse adjustments. But no one in the Pentagon is banking on the DF-21D's malfunctioning. Precedent suggests that China can surmount such challenges: in 2007 it used a DF-21

you will, in that part of the world. It does create potential flash points."

At times, U.S. and allied officials say, China behaves almost as if it wants to start a fight. In 2001 a Chinese J-8 fighter flew into a U.S. Navy EP-3 spy plane off the Chinese coast, killing the Chinese pilot and forcing the damaged EP-3 to land at a Chinese airfield, where the 24-member crew was held for 11 days. In 2011 the Chinese conducted a test flight of its long-secret J-20 stealth fighter while then defense chief Robert Gates was in Beijing seeking to improve relations. China announced that air-defense zone last year just before Vice President Joe Biden arrived on an official visit. The same day Biden was in Beijing, the cruiser U.S.S. *Cowpens* almost collided with a Chinese warship that cut across its bow in the South China Sea.

American officials and military planners say China's goals are to weaken the ties that bind the U.S. to its traditional Asian allies and to undermine the doctrines of free trade and democracy that the U.S. and its allies introduced to the region after WW II. "Our historic dominance that most of us during our careers have enjoyed is diminishing," Admiral Sam Locklear, the chief of U.S. Pacific

Command, told the annual gathering of the Surface Navy Association not far from the Pentagon earlier this year. He's not surprised. "If I was them and I had the visibility to the global technology and I had the cash and I had the people and I had the resources, I'd do the same thing."

One crucial tool in preventing that disruption has been the aircraft carrier. The vessel has been the heart of the U.S. fleet since World War II. Five of the Navy's 10 carriers call the Pacific home. None have been lost since the Japanese sank the *Hornet* in 1942. But they are in danger of becoming like the battleships they replaced—big, slow, costly and vulnerable. Some analysts suggest the new *Gerald R. Ford* class of carriers aren't really much of an upgrade. A new *Ford*-class carrier costs nearly twice as much as the *Nimitz*-class carrier it replaces but will be able to launch only 33% more planes a day, according to a 2013 analysis by then Navy Captain Henry Hendrix. He calculates that during a decade of war in Afghanistan and Iraq, each carrier aircraft launched an average of 16 weapons. Average cost per bomb dropped: \$7.5 million. That's nearly four times the price of a Tomahawk cruise missile.

The beauty of the Dong Feng is that it



variant to destroy an obsolete weather satellite that was orbiting the planet. The missile hit the satellite at 18,000 m.p.h. (29,000 km/h).

### The Showdown

TROUBLE WOULD MOST LIKELY COME—deliberately or through miscalculation—in the East China Sea over what Japan calls the Senkaku Islands. In China they're known as the Diaoyu. The stakes, in terms of geography, could hardly be smaller. The Senkaku consist of five uninhabited islets and three barren reefs, but they're surrounded by waters teeming with fish and believed to be rich in natural gas and oil.

The Chinese claim that Japan seized the islands from them in 1895, and they're basing that claim on ancient texts and maps suggesting that the islands were China's. Japan disputes that and says the islands were unclaimed by any nation when it took them over. Some U.S. Navy officers believe China is preparing "to conduct a short, sharp war to destroy Japanese forces in the East China Sea, following with what can only be expected a seizure of the Senkakus," Captain James Fanell, the Pacific Fleet's top intelligence officer, told a Navy gathering in San Diego in February. (His superiors play down his concerns.)

"We don't take a position on final sovereignty determinations with respect to Senkakus, but historically they have been administered by Japan, and we do not believe that they should be subject to change unilaterally," Obama said during an April visit to Tokyo, adding that the U.S. commitment to Japan's control of the islands is "absolute." China denounced Obama's position as a Cold War relic that Foreign Ministry spokesman Qin Gang said "should not be used to damage China's sovereignty and legitimate interest."

China knows it could never defeat the U.S. military in a prolonged conflict. But any move by Beijing to seize the Senkaku—perhaps targeting a U.S. carrier in the process—would raise the question of whether the U.S. would go to war with a nuclear-armed nation over 1,700 acres (690 hectares) of uninhabited rocks whose ownership is uncertain.

Logic on both sides is likely to maintain the uneasy status quo. But in the event of hostilities, the Navy is betting that it would be able to detect, track and destroy an incoming DF-21D during the

estimated 12 minutes the missile would take to reach a carrier 1,000 miles away. Or it could even thwart the missile's launch. The best way to do that is to attack the kill chain that guides the DF-21D to its target. "You want to break as many links as possible," Greenert told reporters in 2012. "You want to spoof them, preclude detection, jam them, shoot them down if possible, get them in termination, confuse it." But that may require the U.S. to attack Chinese targets—largely on Chinese soil—before the Second Artillery is ordered to fire the missiles.

Timed just right, a pre-emptive U.S. attack could break the command and communications chain required to successfully launch a DF-21D. At least that is what an unclassified summary of a classified Pentagon battle concept paper argued when it was released last May. If the U.S. deemed cyber- or other nonexplosive attacks insufficient, it might opt to target the DF-21D's mobile missile launchers. But as the U.S. military learned in the 1991 Persian Gulf War, finding and destroying such targets isn't easy (Scud-killing flights: 2,493, confirmed Scuds killed: 0).

China might be deterred from seizing the Senkaku by the impact an attack might have on global commerce and its own economy. China holds \$1.3 trillion of the U.S. government's \$17 trillion debt. "The Chinese would never be stupid enough to kill 5,000 Americans on their doorstep," says Thomas P.M. Barnett, a former Pentagon official and now chief analyst at the Washington-based consultancy Wikistrat. "That is such an uncontrollable dynamic." But over the past six decades, China has been three times as likely to go to war when it was clearly weaker than its foe than when it was stronger, according to an analysis by Taylor Fravel, a military

**'It's a good weapon that they've developed, but there's nothing that doesn't have vulnerabilities.'**

—ADMIRAL JONATHAN GREENERT, CHIEF OF U.S. NAVAL OPERATIONS

scholar at the Massachusetts Institute of Technology.

Secretary of State John Kerry told China's leaders during a visit to Beijing earlier this month that "there's no U.S. strategy to try to push back against or be in conflict with China." But Beijing spurned a U.S. request to restart a working group to iron out cyberspace challenges facing the world's two biggest economies.

### The Response

MEANWHILE, A GROWING CHORUS—including some in uniform—argues that the carriers are 20th century platforms and that dispatching such big and slow vessels anywhere near China is risking too much if tensions rise. "The carrier club is a lot like the old battleship club," says retired Navy captain Bernard Cole, who spent 30 years in the Pacific and now teaches Sino-American relations and maritime strategy at the Pentagon's National Defense University. "It's a huge, entrenched interest group—and not just inside the Navy but industry and Congress too."

Critics of current Navy plans say the service should have a larger fleet of smaller ships and accelerate the development of longer-range drones for those smaller, nimbler vessels—which would be "less concentrated and less conspicuous than today's easy targets for the Chinese kill chain," David Gompert, a former deputy director of national intelligence, says.

As the debate continues, the U.S. Navy is going to be mapping out the projected range of the DF-21D and deciding whether to send warships within range or to stay back and risk looking weak. "China appears to be intent on fielding a system that directly threatens U.S. carriers," Naval War College expert Erickson says. "The game and its governing rules are changing, whether Washington likes it or not."

It's a dangerous game when one major power sees another gaining and perhaps eclipsing it. Graham Allison, a national-security strategist at Harvard, recently noted that this led to war in 11 of 15 such instances over the past 500 years. He calls it the Thucydides Trap, in honor of the Greek historian. "What made war inevitable was the growth of Athenian power," Thucydides wrote in his history of the Peloponnesian War more than 2,000 years ago. "And the fear it caused in Sparta."

—WITH REPORTING BY HANNAH BEECH/BEIJING AND KIRK SPITZER/TOKYO ■

Date: Tue, 4 Mar 2003 15:07:33 -1000  
From: Rod Salm <rsalm@TNC.ORG>  
To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>  
Cc: Lizzie McLeod <emcleod@TNC.ORG>, Willie Atu <tncdpm@solomon.com.sb>  
Peter Thomas <pthomas@TNC.ORG>  
Subject: FW: Turtle Tag

Dear George

It is getting to be time for another curry lunch!! I hope all is well and that there is some relapse in the incidence of fibropapillomas in Hawaiian turtles. Here is an interesting discovery. Do you know who might have applied this tag? Perhaps it wasn't even attached in the SI?

rod

*See TNC file  
Boo*

-----Original Message-----

From: William Atu [mailto:tncdpm@solomon.com.sb]  
Sent: Monday, March 03, 2003 1:48 PM  
To: Rod Salm  
Cc: Laurel Chun; Paul Lokani; emoersch@tnc.org; pthomas@tnc.org  
Subject: Turtle Tag

Hi Rod,

I have just arrived back with Richard Hamilton of SCRFA who did some community enquiries on SPAGS on the northern part of Isabel. This is outside the Arnavon Area.

USNM Number	Other Numbers	Family number	Family	Genus	Species	Subspecies	Identification Comments	Type Status	Country	State
293677	4469	29120	Cheloniidae	Caretta	caretta				China 1	Fujian
293682	JGF 4478	29120	Cheloniidae	Caretta	caretta				China 2	Fujian
293664	JGF 4378	29120	Cheloniidae	Chelonia	mydas				China 3	Hainan Island
293665	JGF 4407	29120	Cheloniidae	Chelonia	mydas				China 4	Hainan Island
293666	JGF 4386	29120	Cheloniidae	Chelonia	mydas				China 5	Hainan Island
293667	JGF 4318	29120	Cheloniidae	Chelonia	mydas				China 6	Fujian
293668	JGF 4385	29120	Cheloniidae	Chelonia	mydas				China 7	Hainan Island
293669	No Field Number	29120	Cheloniidae	Chelonia	mydas				China 8	Hainan Island
293670	JGF 4301 or 4302	29120	Cheloniidae	Chelonia	mydas				China 9	Hainan Island
293671	JGF 4301 or 4302	29120	Cheloniidae	Chelonia	mydas				China 10	Hainan Island
293672	JGF 4303 and 4304 Base	29120	Cheloniidae	Chelonia	mydas				China 11	Guangdong
293673	JGF 4423	29120	Cheloniidae	Chelonia	mydas				China 12	Guangdong
293674	JGF 4424A	29120	Cheloniidae	Chelonia	mydas				China 13	Guangdong
293675	JGF 4424B	29120	Cheloniidae	Chelonia	mydas				China 14	Guangdong
293676	JGF 4424C	29120	Cheloniidae	Chelonia	mydas				China 15	Guangdong
293678	JGF 4467 July 1978	29120	Cheloniidae	Chelonia	mydas				China 16	Guangdong
293679	JGF 4466	29120	Cheloniidae	Lepidochelys	olivacea				China 17	Fujian
293680	JGF 4468	29120	Cheloniidae	Lepidochelys	olivacea				China 18	Fujian
293681	JGF 4477	29120	Cheloniidae	Lepidochelys	olivacea				China 19	Fujian

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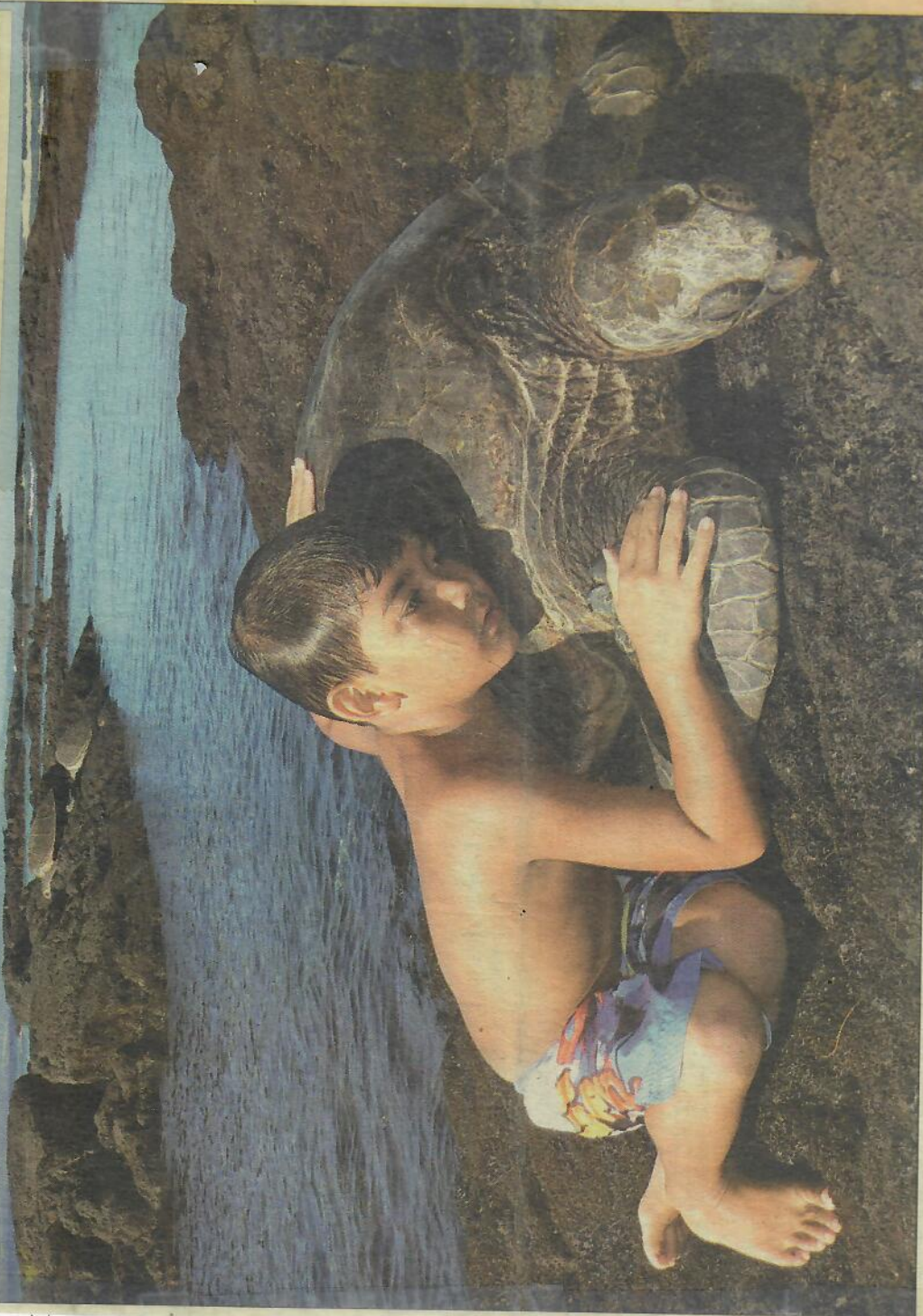
+ TAIWAN WHOLE ADULT FEMALE TAIWAN BASHI





# TURTLE LOVE

Friday, December 31, 2010



WILLIAM ING/Tribune-Herald  
 Six-year-old Kaleb Fuller sings softly to a honu he found basking on the rocks Thursday at Waiuli Beach Park in Hilo. Drawn to the beach by fine weather and tranquil sea conditions, he and his family were thrilled even more by the sight of leaping dolphins out in the bay and the presence of four green sea turtles resting on the surrounding rocks. For today's forecast, see Page A8.

199.

## WEIGHT

- 1 gram (g) = 100 cg
- 1 milligram (mg) = 0.001 g
- 1 centigram (cg) = 0.01 g
- 1 decigram (dg) = 0.1 g
- 1 decagram (dkg) = 10 g
- 1 hectogram (hg) = 100 g
- 1 kilogram (kg) = 1,000 g

<b>5</b>	5	10	15	20	25	30	35	40	45	50	55	60
<b>6</b>	6	12	18	24	30	36	42	48	54	60	66	72
<b>7</b>	7	14	21	28	35	42	49	56	63	70	77	84
<b>8</b>	8	16	24	32	40	48	56	64	72	80	88	96
<b>9</b>	9	18	27	36	45	54	63	72	81	90	99	108
<b>10</b>	10	20	30	40	50	60	70	80	90	100		120
<b>11</b>	11	22	33	44	55	66	77	88	99	110		132
<b>12</b>	12	24	36	48	60	72	84	96	108	120		144

# Keoki Balazs

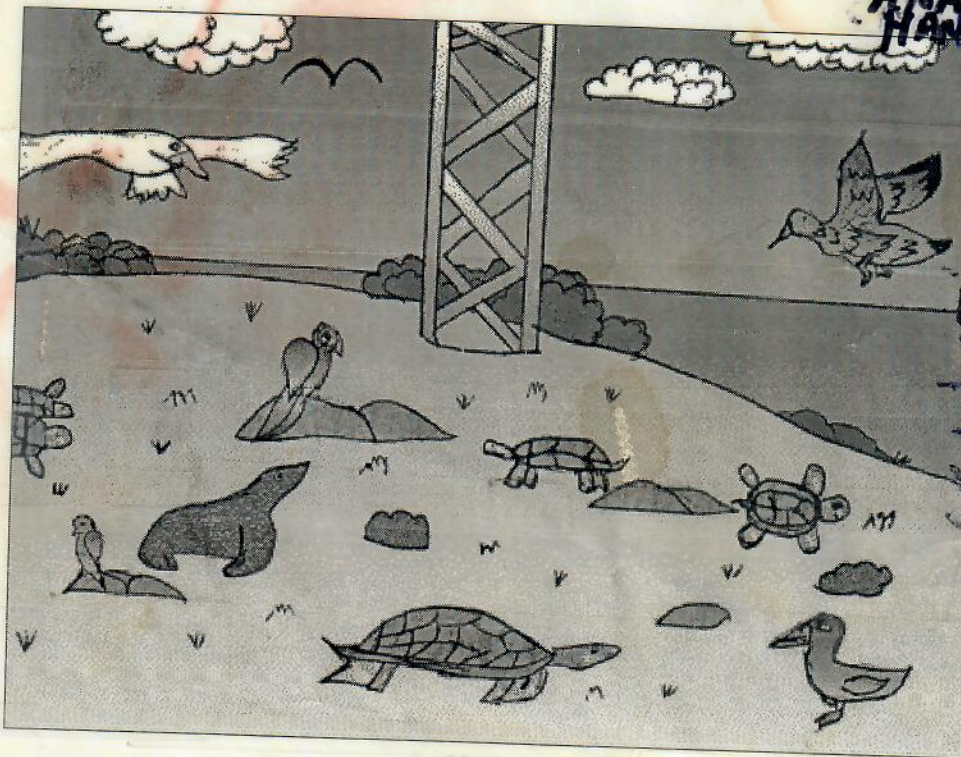
Honu Scientist



## French Frigate Shoals--25th Anniversary

Official 25th Anniversary Poem

by Derek M., Age 11



Drawing by Rubina P., Age 11

You built this Land of Trust  
Love isolated measured by time  
Wish I could help  
More work needs to be done  
Creatures and humans coexist  
Help us learn  
Waves upon the shore  
Turtle Guardians  
Serve and protect  
You do it willingly  
French Frigate Shoals

"APOCALYPTO"  
2007

HONU NATION  
CHB PHOTOS  
KISHIA SATTRACK  
HAINAN

FIRST LIFE  
BASK PHOTOS  
FFS SATTRACK  
ANA KULUP  
HANAUMA P  
ANA LUI  
KI HOLO P  
TAHITI P  
NECKER  
HONOLULU  
PNEA P