

FLORIDA G.H. BALAZS

21-27 June 2001 FL KEYS
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The
TURTLE
HUNTERS

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need MADDEN'S GPS
ETREX - GARMIN = Plug Argos turtle position INTO
it as waypoint, Then go TO
it.
25689 where in 1996?

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Bloodhound on the rent

12 November 1993

Dear George:

I have just finished reading the administrative report you sent me by Murray Dailey and Bob Morris on the relationship of trematodes to fibropapillomas. I was excited to find the references to "black dots" and "small white nodules" in the intestinal mucosa of many (all?) of the green turtles they looked at. I have been finding the same thing in many of the stranded greens I have necropsied to date, turtles with and without tumors. The nodules have been most prevalent and I always refer to them in my necropsy reports as "cream colored nodules" on the surface of the intestines, stomach, and associated mesentery. The number of these nodules ranges from just a few to an enormous number. I enclose a copy of a necropsy report as a sample. I have a good photograph of these which I will make a copy of and send out to you next time. Maybe you can at least tell me if this is visually the same thing you are seeing.

I wanted to let you know that we are finding the same thing here, and ask you for any suggestions you have on what I can do to provide material to any of your people, or collect any additional information. It seems that you are the one really directing the course of research in this area and I would value any suggestions you have. I have brought these nodules to the attention of the Gainesville folks in the past, but haven't gotten any solid information back.

I look forward to hearing from you.

Best regards always,

Barbara

P.S. I was thrilled to see that an adult female Florida green (or two) may be satellite tagged next summer. I have always felt that putting a few satellite tags on nesting Florida loggerheads was not the best use of limited resources and have long advocated putting them on greens, which we know absolutely nothing about outside the nesting season. If anything, I'm bummed not to be actively collaborating on this research. If there is any room for an additional investigator (I mean more than just watching) I'd lend any assistance I could, GIS mapping perhaps? Let me know what you think...my feelings won't be hurt so don't worry about that. I'll inquire the same of Doc.

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THE HURTLES "HURTLES"
TITLE "IN Search of the Giant Floridian Sea Turtle"
Underwater Hidden Homeland

OBJECTIVE: TO VIEW and VIDEO
(Underwater) Adult Green Turtles and their habitats in the Florida keys
underwater (giant sea turtles)
TO VIEW and VIDEO Adult green turtles
in their underwater hidden habitats (homelands)
of the Florida keys

Needs- gifts wash T-shirts; Kongs tunings; Coffee; M&A.

- GPS units; C-cards, maps, epirb/strobe

Date: Mon, 18 Jun 2001 17:52:28 EDT
From: TURTLEHOSP@aol.com
To: gbalazs@honlab.nmfs.hawaii.edu
Subject: Re: visit

Dear George:

Any problems when you come in just give me a call here at the hospital 305-743-6509 but I am sure all will go well. We did meet at one of the Orlando conferences, and I believe the Texas conference. It was more of just introductions so I don't expect you to remember me. It will be nice to speak to you in person after so many emails!!!

Sue

IUCN/SSC MTS9

Movements of Green Turtles Nesting at the Archie Carr National Wildlife Refuge, Florida, USA

The green turtle nests on beaches in east-central Florida with the greatest concentration from Melbourne Beach to south of Sebastian Inlet, especially in the Archie Carr National Wildlife Refuge (ACNWR) and at Hutchinson Island. Whereas nesting habitat is reasonably well-known within the United States, the spatial use of marine habitats by female green turtles is poorly known. To better understand turtle movements, manage sea turtles at the ACNWR, and plan for marine habitat protection--including the possible designation of Marine Sanctuaries--precise data are required. The best method for obtaining data on long-term movements and activity patterns is the use of satellite telemetry. The goal of the proposed research is to obtain data on female green turtle movements and behavior away from nesting beaches. The movements of six female green turtles will be followed for a period of at least one year. Data will be collected on location, internal transmitter temperature, duration of the turtles' last dive before transmission, mean duration and number of dives over the previous 12-hour period.

Contact Persons: C. Kenneth Dodd, Jr. and Richard Byles

Marine Turtles
Action Plan for
Their Conservation
Part 1
1993-98
DRAFT

Edited by
BOLTEN and Bjornnd

The Turtle Kraals Museum will provide some history of the Key West Green Sea Turtle industry. (thanks to the KWMHS). Green turtles have been part of Key West history for over 150 years. Even before the island was settled, Bahamian wreckers prowled the Keys, searching for ships aground on the reef...and turtling in their spare time.

Of the five marine turtles found in Keys waters, the green turtle was the most numerous and flavorful. As a food, the green turtle had much to recommend it: it was a good source of meat (it did not taste fishy, but had a flavor and consistency much like veal): it was easily caught (it could be harpooned, netted or turned on the beaches): and it had great keeping abilities (it could be kept alive in water-filled pens or, being an air-breathing animal, on its back for great lengths of time, which meant fresh meat readily available in days of no refrigeration). The eggs, which were very rich, could be gathered on beaches or taken from the butchered female. Both eggs and meat were welcome additions to a sea-farer's diet, and valued commodities in the Cuban and Bahamian markets.

(to be continued next month)

The Turtle Kraals Museum is open every day and is FREE to the public!

Considerations/needs

- Dawn/Dusk movements -- Active periods?
 - Night resting / NIGHT FEEDINGS
 - Modification of Corals / habitat from resting
 - Mangrove areas - back in shallows?
 - "PORTUGA BANK" (North of Marquesas)?
 - Going pelagic?
 - Going into the mangroves?
 - Moving on, after fooling us into thinking they are ^{our} staying put?
 - Interview pilots of US CG patrols, solicit sightings
 - Interview charter boat captains / solicit sightings
 - Transmitters to Greg Carter w/ some
 - Go on AIR TOUR over / along Marathon
 - Solicitation from locals via article in MARATHON ^{they} _{west papers}
 - Green stranded in key - need summary for adults -
Ocean vs FZ Bay side
- need TIME (night or day) of LC position endpoints



Satellite-Tracking of Sea Turtle Migrations

6 Turtles Are Being Tracked Right Now!

The tracking of Snapper, Amelia, Carmen, and Sam has finished, but our satellite-tracking education program continues.

Please select from the following sections on this page:

- [Welcome Page](#)
- [Background Information on Satellite Tracking](#)
- [1997 Green Turtle Tracking Project](#) (link to 5 current maps)
- [Lampa Bay Sea Turtle Tracking Project](#) (link to 1 current map)
- [Downloadable Blank Map](#)
- [Discussion Bulletin Board/Scientist Comments](#)
- [Results from 1996 Migration Tracking](#)
- [Results from 1994 & 1995 Migration Tracking](#)
- [Results of Tracking of nesting green turtles in the Caribbean](#)
- [You can Adopt a Satellite-Tagged Turtle](#)

Attention Teachers and Educators! [Click here](#) to receive an Educator's Guide!

Introduction

Research into the behavior and life cycle of marine turtles, most of which has been conducted in just the past few decades, has taught that these creatures do not generally nest and feed in the same area. We now know, for instance, that sea turtles are highly migratory, often traveling hundreds or even thousands of miles between the beaches where they lay their eggs and the foraging (feeding) grounds where they spend much of their time at sea.

This behavior creates a number of challenges for those of us working to fully understand and protect the world's sea turtles. In particular, to adequately protect sea turtles in all their habitats, we must know where

these habitats are located, how the turtles use these different habitats, and routes the turtles are taking to migrate back and forth.

Most research conducted on marine turtles has been carried out on nesting beaches -- and for very logical reasons. These areas are most accessible to researchers, and what occurs on the nesting beach (production of new generations of sea turtles) is extremely important to the species' survival.

However, of all the places where sea turtles travel throughout their life cycle, the least amount of time is spent on the nesting beach. The newborn turtle hatches out of a nest on its natal beach, and some decades later the surviving females begin making brief visits back to the beach to lay new eggs. That's it; except for a few sea turtles known to occasionally bask on land, that is all the time a sea turtle spends out of the sea. Well over 90% of a sea turtle's life is spent in the water -- feeding, mating, migrating and doing whatever else a sea turtle does when no one is watching.

Consequently, the threats faced by sea turtles in these ocean habitats present the greatest challenges to conservationists. We are already addressing some of these threats. Efforts are underway worldwide use Turtle Excluder Devices, which decrease the number of turtles killed at sea in shrimping nets. Conservation programs are also focussed on decreasing the amount of discarded plastic and other debris, which kill and injure turtles in their ocean habitats. But this is just a beginning. To fully protect turtles throughout their range, we simply must know more about their migratory patterns and their behavior at sea.

Tagging research like that conducted by Caribbean Conservation Corporation on the important green turtle nesting beach at Tortuguero, Costa Rica has helped researchers discover some of the critical feeding grounds of Caribbean turtles. As turtles tagged at Tortuguero are found throughout the Caribbean, we are slowly coming to understand where the population is dispersed. But the process is very slow, and it yields little information about migratory routes.

Before his death, Archie Carr urged young researchers to dedicate more time to studying how and where sea turtles migrate and what mechanisms they use to return from thousands of miles away to the same tiny stretch of beach. In particular, Archie lamented that the use of satellite telemetry to track turtles in the open ocean had not yet reached the required level of sophistication.

Well, Archie would be pleased to see what is being done with satellite technology today to study and protect sea turtles. [Return to top index](#)

State of the Art Research

The technology of satellite telemetry has advanced to the stage of allowing

researchers to track turtles in the open ocean after attaching Sony Walkman-sized transmitters to the backs of adult or immature sea turtles. The transmitters send signals full of information to an orbiting satellite each time the turtle surfaces for air. The satellite re-transmits the data to a receiving station on earth, which researchers can access through their computer and modem. After 8-10 months, the transmitters quit working and fall safely off the turtle.

The data received from the turtle comes in the form of digital codes, which must be deciphered. The codes allow researchers to determine, with varying degrees of reliability, the latitude and longitude location of the turtle, the number of dives taken during the last 24 hours, the duration of the most recent dive, and the water temperature.



Using computer mapping programs, or by hand plotting the location data, researchers can then visually see where the turtles are, the route they have travelled, and how fast they are generally swimming. Depending on the detail of the map one is using, a researcher can also determine the habitat characteristics at the turtle's location.

It should be noted that, as with any new technology, the bugs are still being worked out of satellite telemetry as a method for tracking marine turtles. For instance, the batteries in these transmitters can last for 6-10 months, but signals often stop prematurely. Ideas about why this is occurring range from problems with salt water getting into the device to turtles knocking the devices off as they wedge themselves under rocks. When signals do come in, there are also reliability problems with the location data. Each signal that comes from a turtle carries a code that ranks the reliability of that particular signal. When reliability is high, the latitude and longitude data is usually right on the mark. However, the locational data can sometimes be a little "off."

While viewing the migration maps shown on this web page, viewers should be aware that the plotted turtle movements represent the best data available; however, any given plot mark may not be 100% accurate. This limitation really doesn't detract from the overall value of the research. While a particular location point may actually be miles off a given turtle's actual location, the accumulation of data still tells us where the turtles are generally moving and where their primary foraging areas are located. Using this information, we can begin to focus conservation efforts where they are most needed. [Return to top index](#)

Results of 1995 Migration-Tracking Research in the Caribbean

rtls core/cont1.htm

10/10/97

The new technology of satellite telemetry has made it possible for researchers to study effectively for the first time the migratory habits of male green turtles in the Caribbean.

Because males do not leave the water (except occasionally -- to chase a fleeing female through the surfline!), they don't readily lend themselves to observation, and they are rarely tagged. Consequently, next to nothing is known about their movements and biology.

Tagging studies at Tortuguero conducted by CCC have produced a large and valuable body of data about the reproductive biology and migrations of the female green turtle. However, rough and turbid sea conditions throughout most of the nesting season have discouraged investigations in the waters off the nesting beach. Until recently, most of the information on Tortuguero males has been gleaned by Costa Rican scientists during visits to the turtle slaughterhouse in Limon.

Since 1990, CCC associates Peter and Anne Meylan have been studying the green turtles that pass seasonally through the waters of Bocas del Toro Province, Panama, approximately 150 miles southeast of Tortuguero. Locals in Bocas have traditionally fished for green turtles for centuries. The timing of the appearance of turtles in Bocas, the recovery of Tortuguero tags in Bocas and of Bocas tags in Tortuguero, and genetic data, all suggest that the green turtles the Meylans catch each year are members of the Tortuguero population.

The migrants are caught in large-mesh tangle nets, measured, tagged and released. Although there have been more than a dozen long-distance recoveries of turtles tagged in Bocas, the actual routes and schedules of migrations of the turtles tagged there have remained unknown.

In July 1995, two breeding males captured in Bocas were outfitted with satellite transmitters. The ST6 units, made by Telonics, were fiberglassed directly onto the back of the carapace, behind the head, where the unit's small flexible antenna can break the surface and transmit when the turtle comes up to breathe. The transmitters send information to passing satellites about the position of the turtle, the number of dives during the last 12 hours, the length of the last dive, and the temperature. The satellite re-transmits the data to France, where it is relayed to the United States and can be accessed by computer. The coordinates can then be plotted on maps, and the position and travel route of the turtle can be determined.

Analysis of the satellite data suggests that these two males did not behave as researchers expected. Current life history models predicted that they would proceed to Tortuguero with the females, and remain there for mating purposes in the near shore waters. They would eventually head back to their resident feeding grounds, which in the case of migrants captured in Panama, would be in the direction of South America. Neither

turtle followed the model. The Meylans are now evaluating other hypotheses to explain the movements. The plotted movements of both turtles can be seen on the attached map.

One of the turtle's transmitters continued to send signals until around the end of September, when data began showing no more dives below the water's surface. Eventually, it was determined that the signals were coming from a remote section of the Panama coast, where extensive net fishing for turtles is known to occur. After a very interesting search, the transmitter was recovered from the fisherman who had caught the turtle, and it was confirmed that the turtle had been butchered.

The other turtle was tracked until the end of November. After moving a short distance offshore, the turtle moved north and seemed to circle off the Costa Rican coast near Tortuguero --probably searching for females. Eventually, the turtle travelled still further north to the well-known green turtle feeding grounds at the Miskito Cays off Nicaragua.

The project was funded last year by the Wildlife Conservation Society; technical support was provided by the U.S. Fish and Wildlife Service. With the help of CCC, the Meylans are working to plan and fund additional research to be conducted later this year on turtles around Bermuda. As the project proceeds, the migration data will be posted and regularly updated on a map at this web site. We invite you to check back regularly to watch the movements of these and other turtles being tracked by satellite. Return to top index

Results of 1994 and 1995 Migration-Tracking of Florida Green Turtles

During the 1994 sea turtle nesting season, researchers Barbara Schroeder with the Florida Department of Environmental Protection's Marine Research Institute, Dr. Llewellyn Ehrhart with the University of Central Florida and George Balazs with the National Marine Fisheries Service attached satellite transmitters to three green turtles that nested in the Archie Carr National Wildlife Refuge. The three turtles -- named Honu, Fairly and Keya -- became part of a unique research project designed to help discover the unknown migratory patterns of green turtles nesting in Florida.

After attaching the transmitters, researchers studied locational data sent back through the Argos satellite system. At the 1995 Sea Turtle Symposium in Hilton Head, South Carolina, the preliminary findings were presented by Schroeder in a paper coauthored by Ehrhart and Balazs. The following short summaries of each turtles' movements are based on data presented at the symposium:

Fairly-Tag #22127

Tagged on July 23, 1994, Fairly's transmitter sent signals until October

15. On August 13, she was seen nesting again in the Archie Carr Refuge (green turtles are known to nest 3 or 4 times a season). After having nested again, signals located her off the coast of Ft. Lauderdale. After another 13 days, she had made it to an area off the lower Florida Keys known as Coffins Patch Reef, where she stayed approximately 50 days until signals were no longer received. The habitat in this area is characterized as patch reef with fragmented seagrass meadow.

Keya-Tag #22128

Tagged on July 22, signals were received from Keya until late October. From July 22 through Sept. 5, all of Keya's signals were sent from the vicinity of the Archie Carr Refuge. On Sept. 8, her signal began to illustrate a southward migration, and by Sept. 16 she had reached the coastline near Key Largo, Florida. Her final signal, received Oct. 21, showed her stationary off the Marquesas Keys located at the southern tip of the Florida Keys. The habitat here is also characterized as patch reef and seagrass meadow.

Honu-Tag #22129

Tagged on July 21, Honu's transmitter did not function long enough to document any movement away from her nesting beach. Signals ceased after 30 days, during which time she stayed in the immediate vicinity. The last signal was received Sept. 9.

After the study, the research team made a preliminary hypothesis that Florida green turtles utilize reefs and seagrass meadows around the Florida Keys as their primary feeding grounds. However, because of the short duration in which signals were received, more study was needed.

A similar experiment was conducted during the 1995 nesting season. This time, the turtles' movements were tracked for longer periods of time, and the results provided new insight into the migration of Florida green turtles. Some of the turtles tracked during 1995 followed a similar course toward the Florida Keys. However, at least one green turtle migrated to the Bahamas and travelled throughout the islands until her transmitter stopped working.

CCC was very interested in seeing this research continue and tracked four green sea turtles in 1996 with the assistance of Snapper, Inc., the Educational Foundation of America, the Geraldine R. Dodge Foundation, the Blue Planet Foundation, University of Central Florida, and the Florida Department of Environmental Protection. See the results of the 1996 tracking.

This is the fourth year green sea turtles have been tracked from the Archie Carr National Wildlife Refuge and CCC would like to thank Barbara Schroeder at the National Marine Fisheries Service, Andrea Mosier at the Florida Department of Environmental Protection's Marine Research

Institute and Dr. Llewellyn Ehrhart and his students at the University of Central Florida for funding, tagging the sea turtles and providing the location maps for 1997.

You also can support this research and CCC's efforts to protect marine turtles by "Adopting" a satellite-tagged turtle. Return to top index

You Can Adopt A Satellite-Tagged Turtle

To generate awareness about sea turtle migrations and the importance of the Archie Carr National Wildlife Refuge, CCC's Sea Turtle Survival League has developing an educational program based on the migration tracking. Teachers, students and others interested are invited to "adopt" one of the satellite-tagged turtles, and an Educators' Guide is available to those wanting to use the program in the classroom.

*The Educators' Packet is free to teachers, and adoptions will be just \$25 (Great for class participation). Adoptees will receive an adoption certificate, a sea turtle fact sheet, colorful decal and one-year subscription to CCC's membership publication, the *Velador*, with a special section for children called *Turtle Tides*.*

Funds raised from this new program will help pay for future satellite-tracking research and other conservation efforts of CCC's Sea Turtle Survival League. Return to top index

Click here for Membership Information

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1997 Migration-Tracking of Green Turtles

During mid-August 1997, researcher Barbara Schroeder (National Marine Fisheries Service), with the assistance of Dr. Llew Ehrhart and his students (University of Central Florida) attached satellite transmitters to the backs of five endangered green turtles that nested in the Archie Carr National Wildlife Refuge near Melbourne, Florida. The research was aimed at continuing to increase our knowledge of the principle foraging grounds and migratory routes used by Florida's nesting population of green turtles.

Similar tracking experiments conducted in 1994, 1995 and 1996 yielded exciting new information about where green turtles go after nesting on Florida's east coast. See the section titled "Results of 1994 & 1995 Migration-Tracking of Florida Green Turtles" and "Results from 1996 Migration Tracking" for more details. The research being conducted will help advance our understanding of the green turtle's migratory habits.

Thanks to Dean Bagley of the UCF Marine Turtle Research Group for providing the tagging history on all of the turtles tagged in 1997.

Click on a turtle's name to see its migration map!

"FLO-10"

The first turtle tagged with a satellite transmitter in 1997 was encountered nesting at Melbourne Beach on August 21. However, this turtle, named Flo-Jo, is not new to us. We encountered her nesting in 1995, and, at that time, we put her first satellite transmitter on her. When she returned this year, her transmitter was no longer present (they are designed to fall off harmlessly), however, we were able to recognize her because she had a small tag in her flipper (the most common way of tagging sea turtles). To our knowledge, this is the first time that a sea turtle has been re-tagged, with a satellite transmitter, during different nesting seasons. It is exciting because we will hope to learn whether or not she returns to the same location that she migrated to in 1995.

"ENDORA"

The second turtle selected for this year's study, named Endora, laid a clutch of 88 eggs on August 22, 1997. Her satellite tag was applied at that time. She had not been observed nesting at Melbourne Beach prior to this date, however, not all of the green turtles that nest in this area are encountered each year. It is possible that she was a re-migrant (a turtle returning in a subsequent year to nest) but it is also possible that this was her first nesting season. Endora is the smallest of the five green turtles selected for our research, she measures 95.3cm in carapace (shell) length.

"MARJORIE"

Marjorie is an old friend. She was first observed by the UCF Marine Turtle Research Group in 1991, then again in 1993, and, in 1997, she was observed nesting three times. Her satellite tag was applied on August 23, after she laid a clutch of 140 eggs. Marjorie measures 102.6cm in carapace (shell) length.

"JACQUES-LINE"

Jacques-line was first observed nesting at Melbourne Beach in 1992, she was seen twice that summer. She re-migrated in 1994 when she was observed four times. She was first observed in 1997 on August 13 and was discovered again on August 24, at which time we attached the satellite transmitter. She laid a clutch of 92 eggs. Jacques-line measures 96.3cm in carapace (shell) length.

"RHONDA"

Rhonda is the turtle with the longest known history of this year's satellite tagged turtles. She was first observed by the UCF Marine Turtle Research Group in 1987. However, at that time, she already carried a flipper tag from another group of researchers working in south Brevard County, and was likely tagged sometime in the early 1980's. She was seen again by the UCF group in 1989, 1991, but not observed again until this year. We believe that she did return to the Archie Carr National Wildlife Refuge to

urtle Survival League - Turtle Satel...

nest in the intervening years, but was not observed. Rhonda measures 110cm in carapace (shell) length.

Funding for the 1997 Florida Green Turtle Satellite Tracking research was provided by the National Marine Fisheries Service. Maps were created by Andrea Mosier (Florida Department of Environmental Protection) and Barbara Schroeder (National Marine Fisheries Service).

Return to Satellite Tracking Page

Click here for Adopt-A-Turtle and Membership information

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Satellite Telemetry of Green Sea Turtles (*Chelonia mydas*) nesting in Lechuguillas, Veracruz-Mexico

Symposium
2/01

Abstract

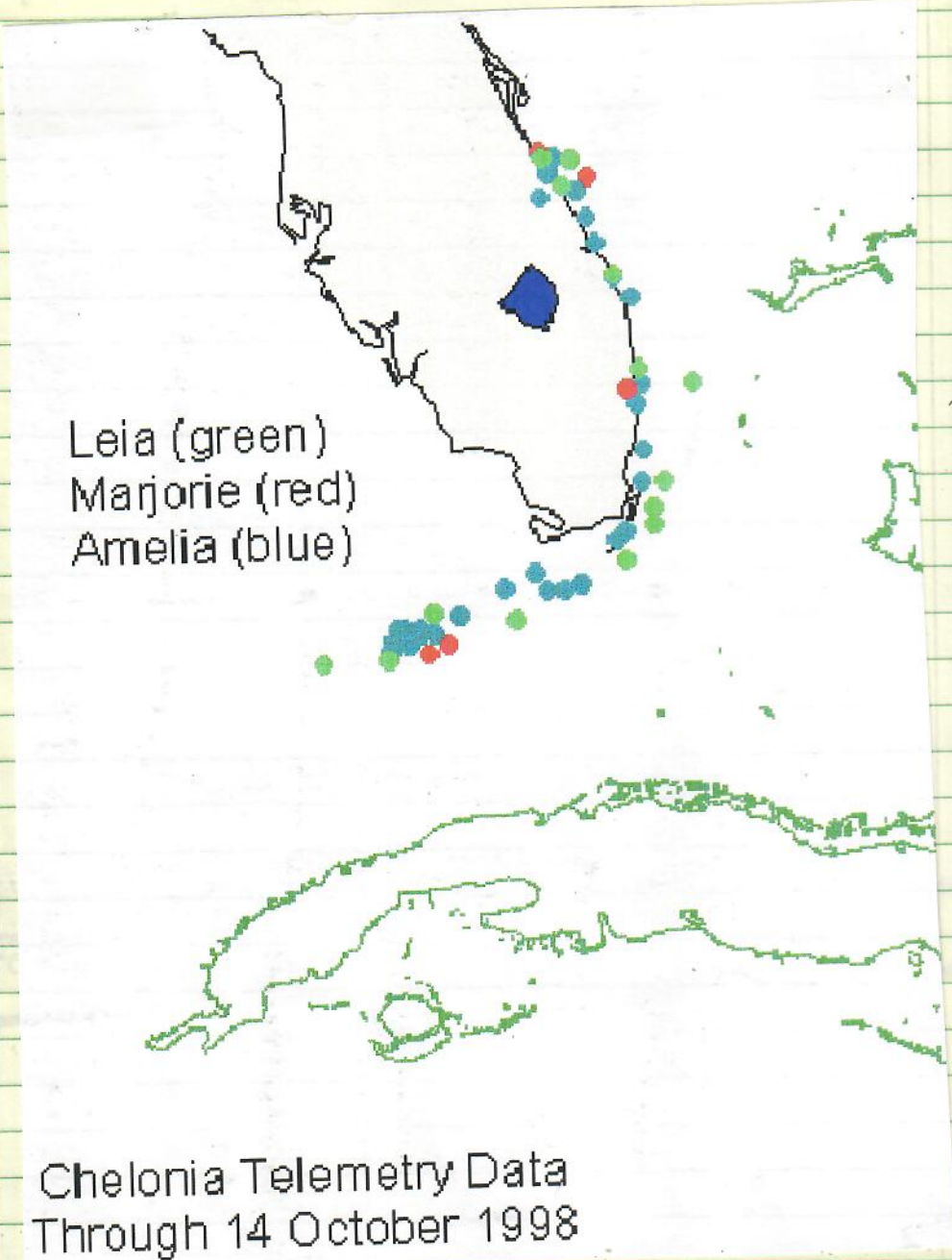
Satellite transmitters were attached to green turtles, *Chelonia mydas*, at Campamento Tortugero in Lechuguillas, Veracruz, Mexico. Tagging was done between August 20 and September 20, 2000. Two adult female turtles were captured following the deposition of their egg clutch and transported to the base camp to be fitted with the transmitting device. Telonics model ST-18 transmitters, programmed with a duty cycle of 6 hour transmission period followed by an 18 hour passive cycle were attached to the second central scutes of two sexually mature female turtles. The turtles' movements have been monitored by collecting longitude and latitude readings using The Service ARGOS Satellite System. All data points have been interpreted and plotted using ArcView 3.2 GIS mapping software. Both turtles traveled from their nesting ground in Mexico to feeding grounds off the coast of Florida, to an area called Tortugas Bank. Zyanaya traveled approximately 984 km in a southeastern curve, at an average speed of 0.631 km/hr. Roberta traveled at a pace of 0.362 km/hr for a total estimated distance of 1430 km. The tracking will be continued for a period of up to one year, dependent on equipment performance and battery life. The GIS plots will be analyzed to determine migration routes, swim speeds and habitat utilization of the two tagged turtles.

Authors-

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Fracc. Moderno, Veracruz, Ver., Mexico. (2) 935-07-79. pecesver@infosel.net.mx.

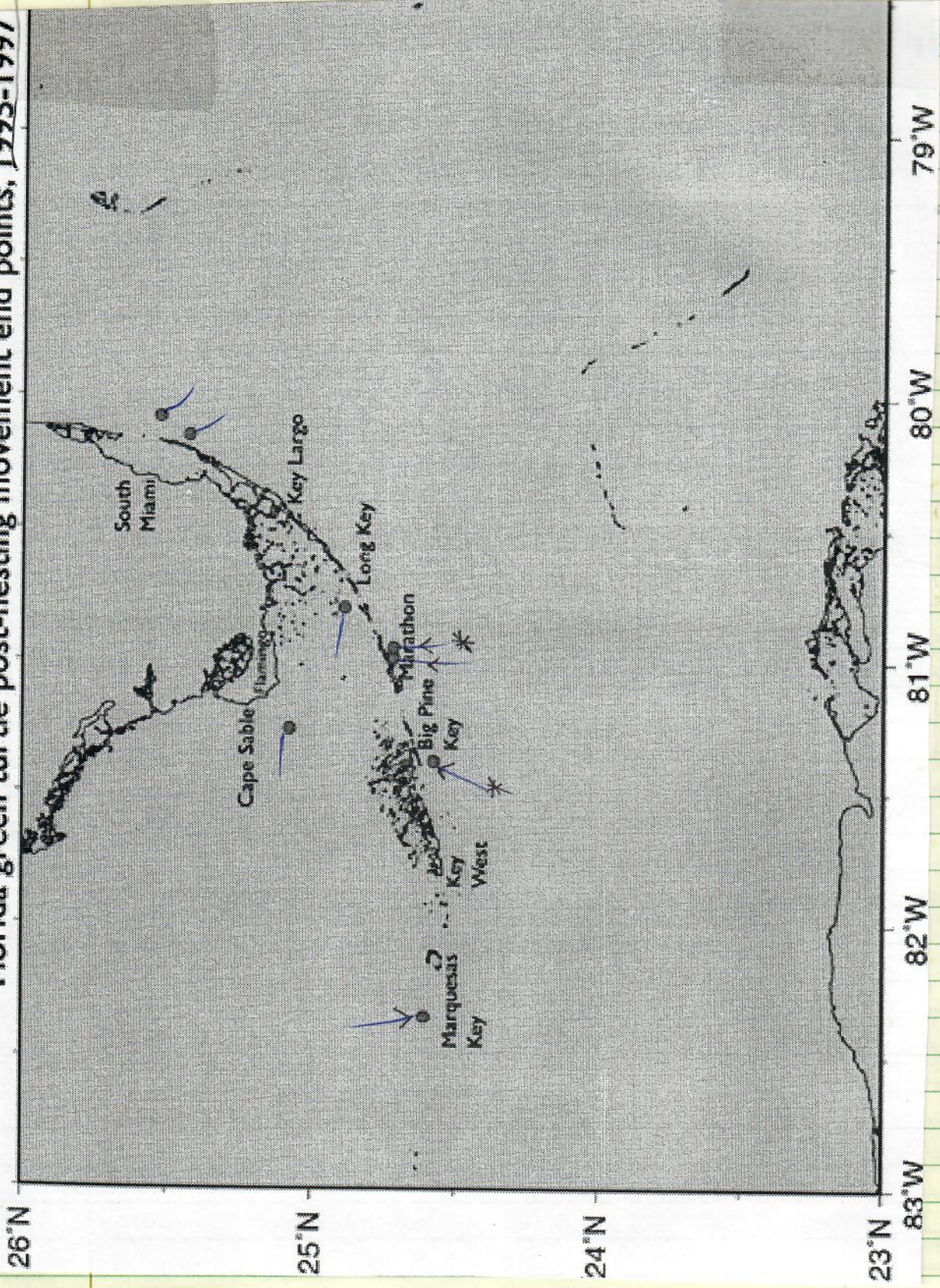


A map showing the telemetry data for three Chelonia turtles: Leia (green), Marjorie (red), and Amelia (blue). The map covers the eastern coast of Florida and the Gulf of Mexico. The turtles' locations are marked with colored dots. Leia (green) has the most locations, scattered along the coast from near Miami down to the Florida Keys. Marjorie (red) has two locations: one near the northern coast and one in the Florida Keys. Amelia (blue) has several locations, primarily in the Florida Keys and along the southern coast. A large blue area is marked in the Gulf of Mexico, and a large green area is marked in the Florida Keys.

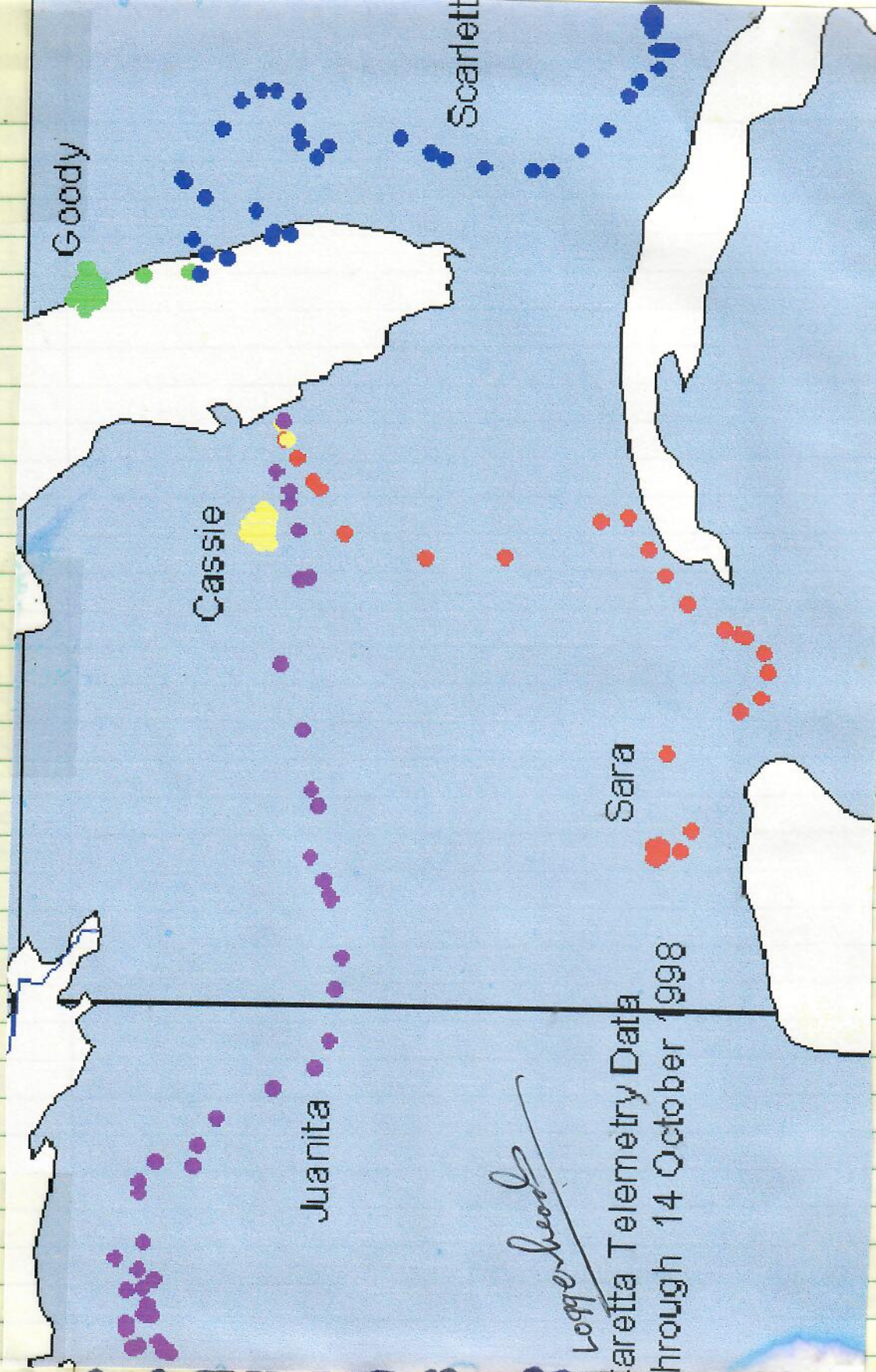
Leia (green)
Marjorie (red)
Amelia (blue)

Chelonia Telemetry Data
Through 14 October 1998

Florida green turtle post-nesting movement end points, 1995-1997







Goody

Scarlett

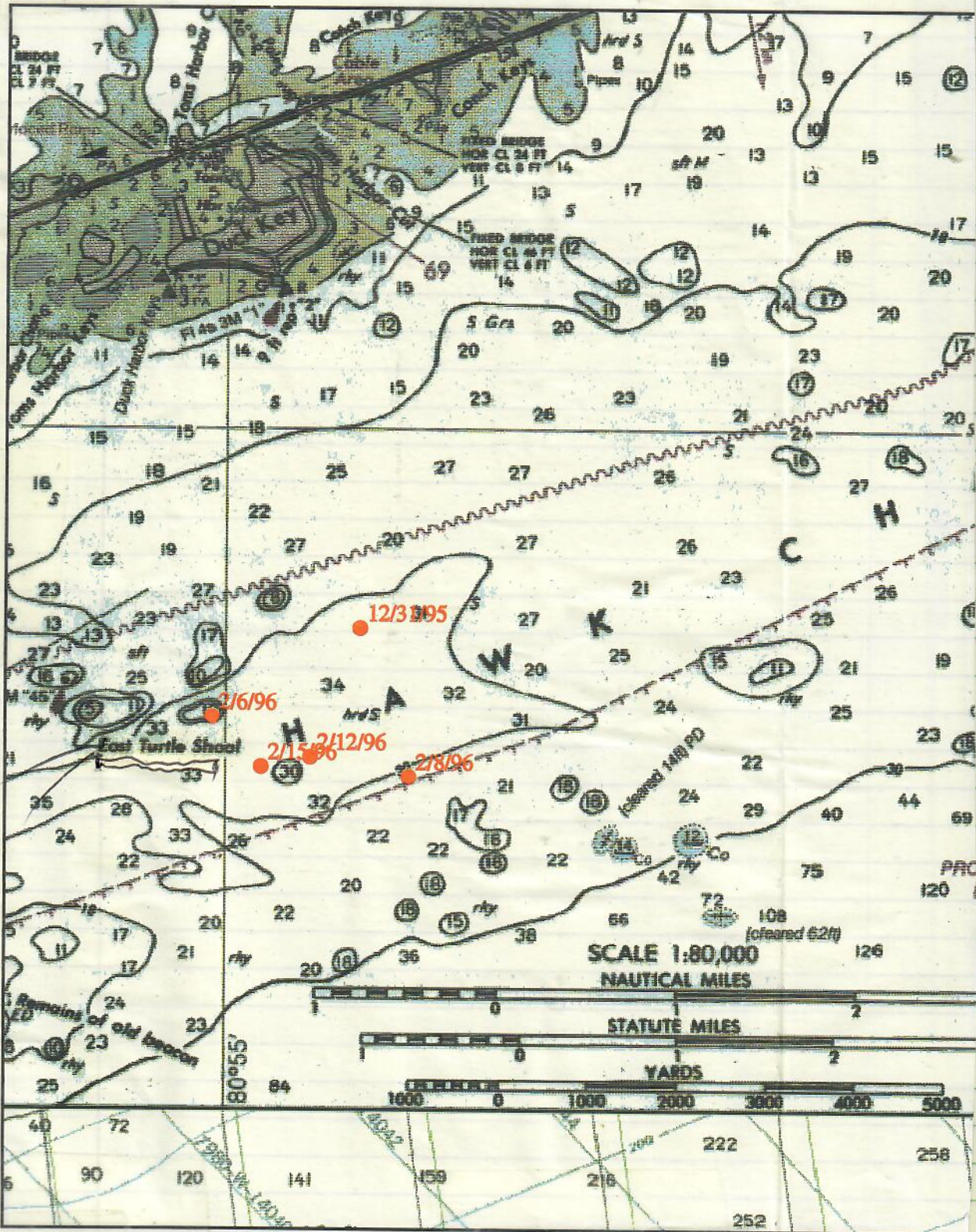
Cassie

Juanita

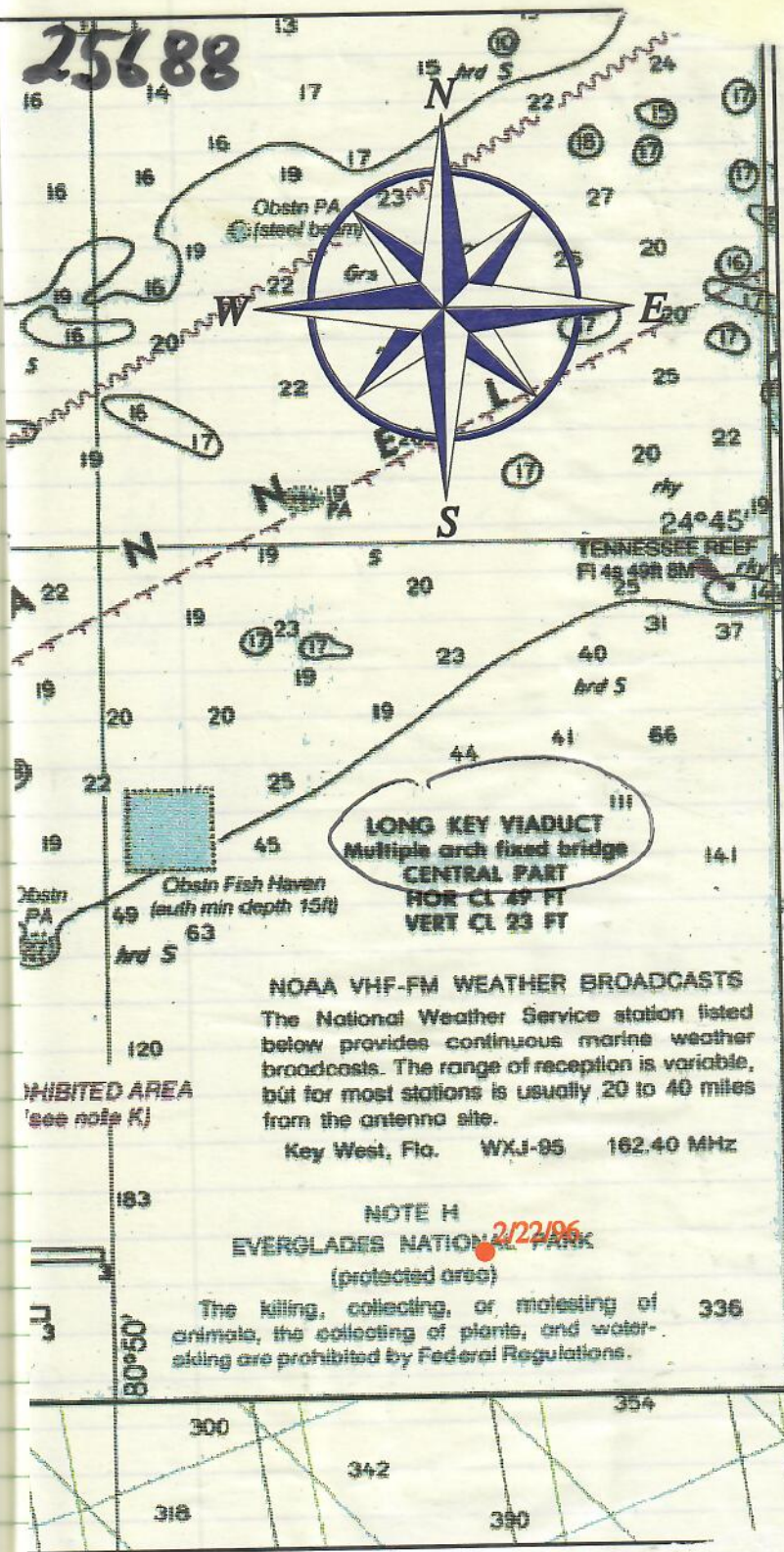
Sara

Logghehead
 Loretta Telemetry Data
 through 14 October 1998

From my office wall



25688



NOAA VHF-FM WEATHER BROADCASTS
 The National Weather Service station listed below provides continuous marine weather broadcasts. The range of reception is variable, but for most stations is usually 20 to 40 miles from the antenna site.

Key West, Fla. WXJ-95 162.40 MHz

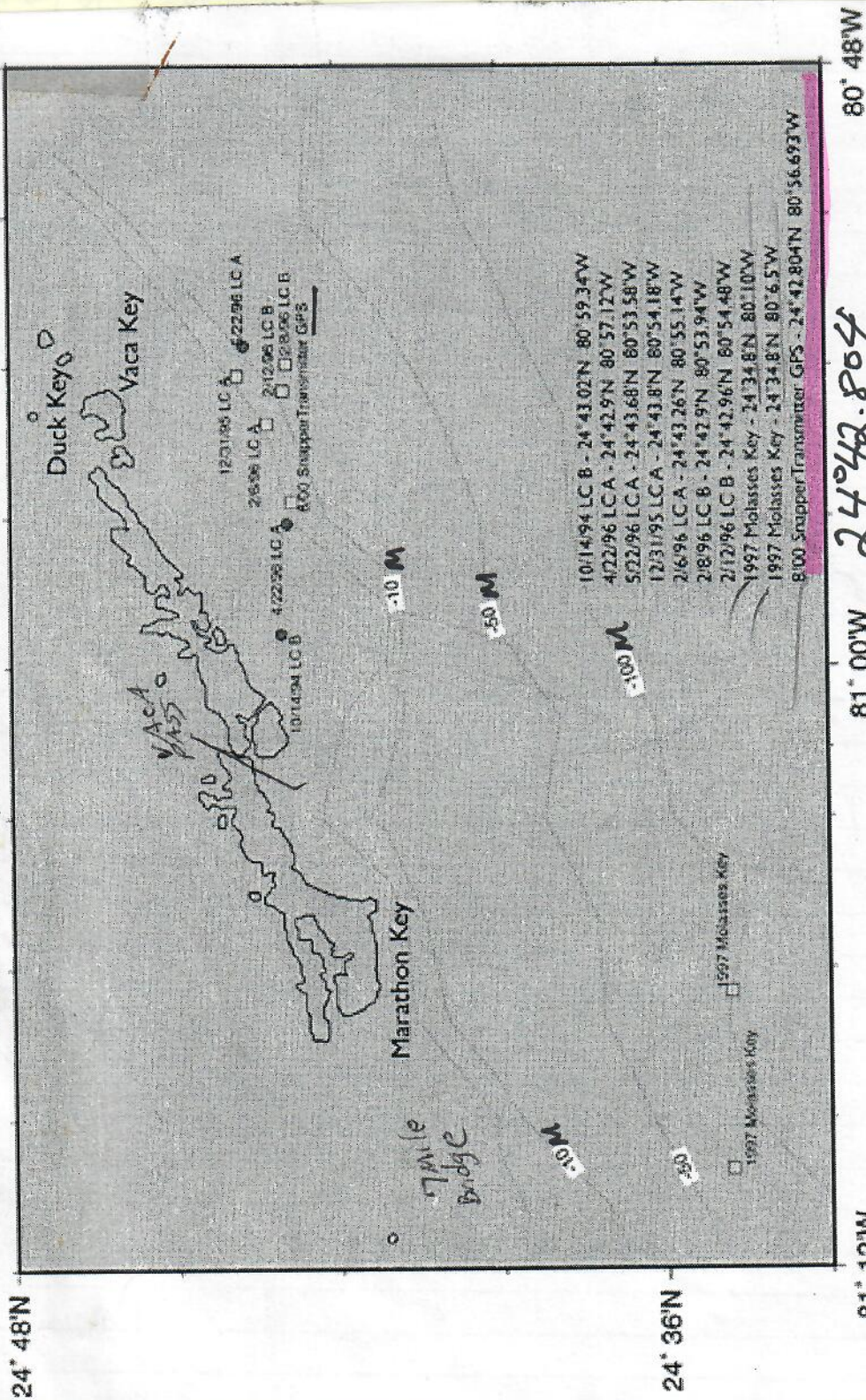
NOTE H
EVERGLADES NATIONAL PARK
 (protected area)

The killing, collecting, or molesting of animals, the collecting of plants, and water-skiing are prohibited by Federal Regulations.

PROHIBITED AREA
 (see note K)

MARATHON end Duck Keys

Green Turtle Endpoints Marathon and Duck Keys, FL Depth given in meters



- 10/14/94 LC B - 24°43.02'N 80°59.34'W
- 4/22/96 LCA - 24°42.9'N 80°57.12'W
- 5/22/96 LCA - 24°43.68'N 80°53.58'W
- 12/31/95 LCA - 24°43.8'N 80°54.18'W
- 2/6/96 LCA - 24°43.26'N 80°55.14'W
- 2/8/96 LC B - 24°42.9'N 80°53.94'W
- 2/12/96 LC B - 24°42.96'N 80°54.48'W
- 1997 Molasses Key - 24°34.8'N 80°10'W
- 1997 Molasses Key - 24°34.8'N 80°6.5'W
- 8:00 Snapper Transmitter GPS - 24°42.804'N 80°36.693'W

24° 48'N 81° 00'W 24° 42.804 80° 48'W
 24° 36'N 81° 12'W 80° 56.693

CHNT Map created by Denise Pyfar-05/2001
 National Marine Fisheries Service

Green Turtle endpoints near Long Key, FL

Depth contour indicated is the 5 m contour

25 00'N

9/16/97 LC B - 24°53.46'N 80°48.3'W

9/16/97 LC B

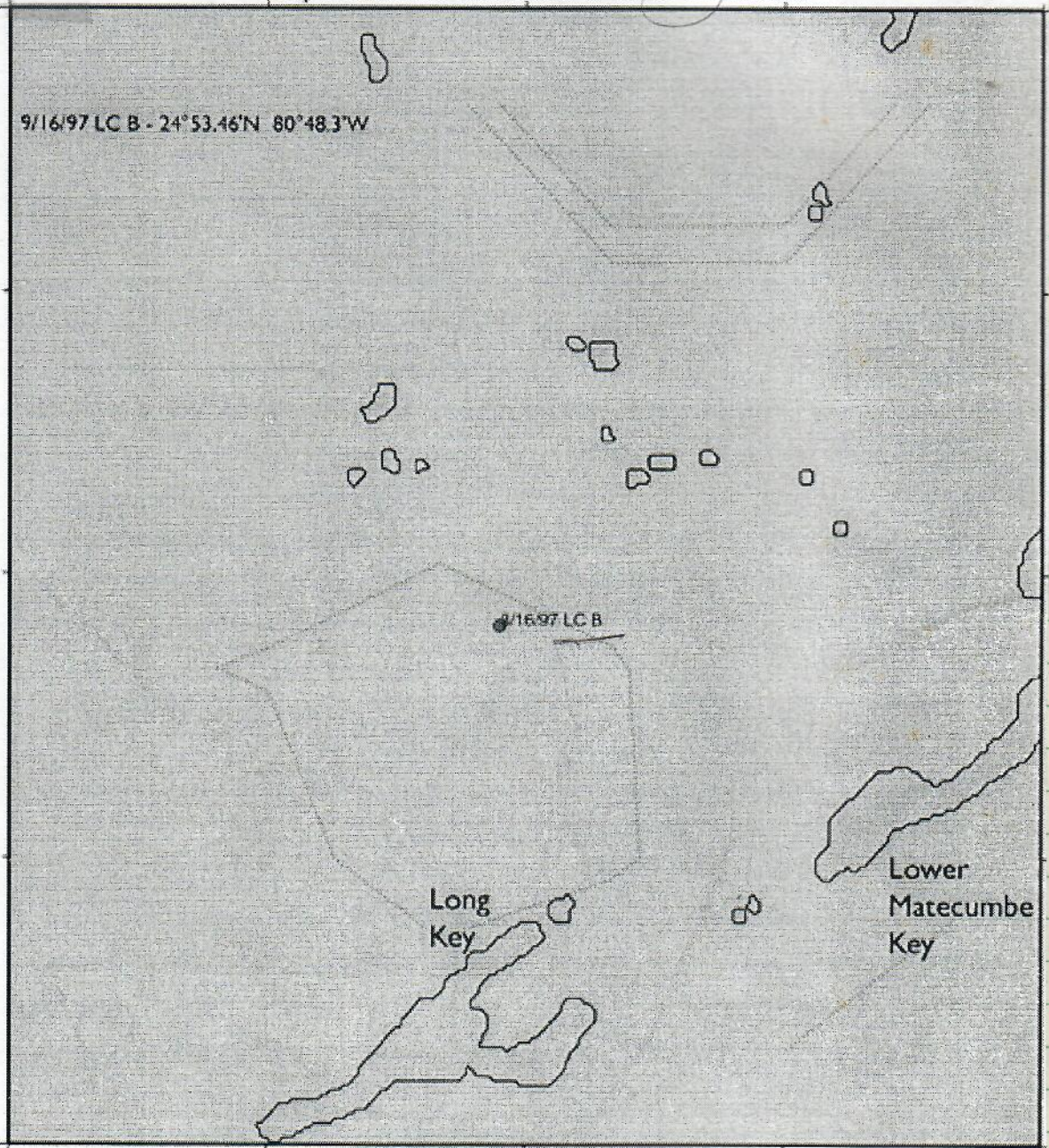
Long Key

Lower Matecumbe Key

24 48'N

80 48'W

GMT Map created by Denise Parker 05/23
National Marine Fisheries Service

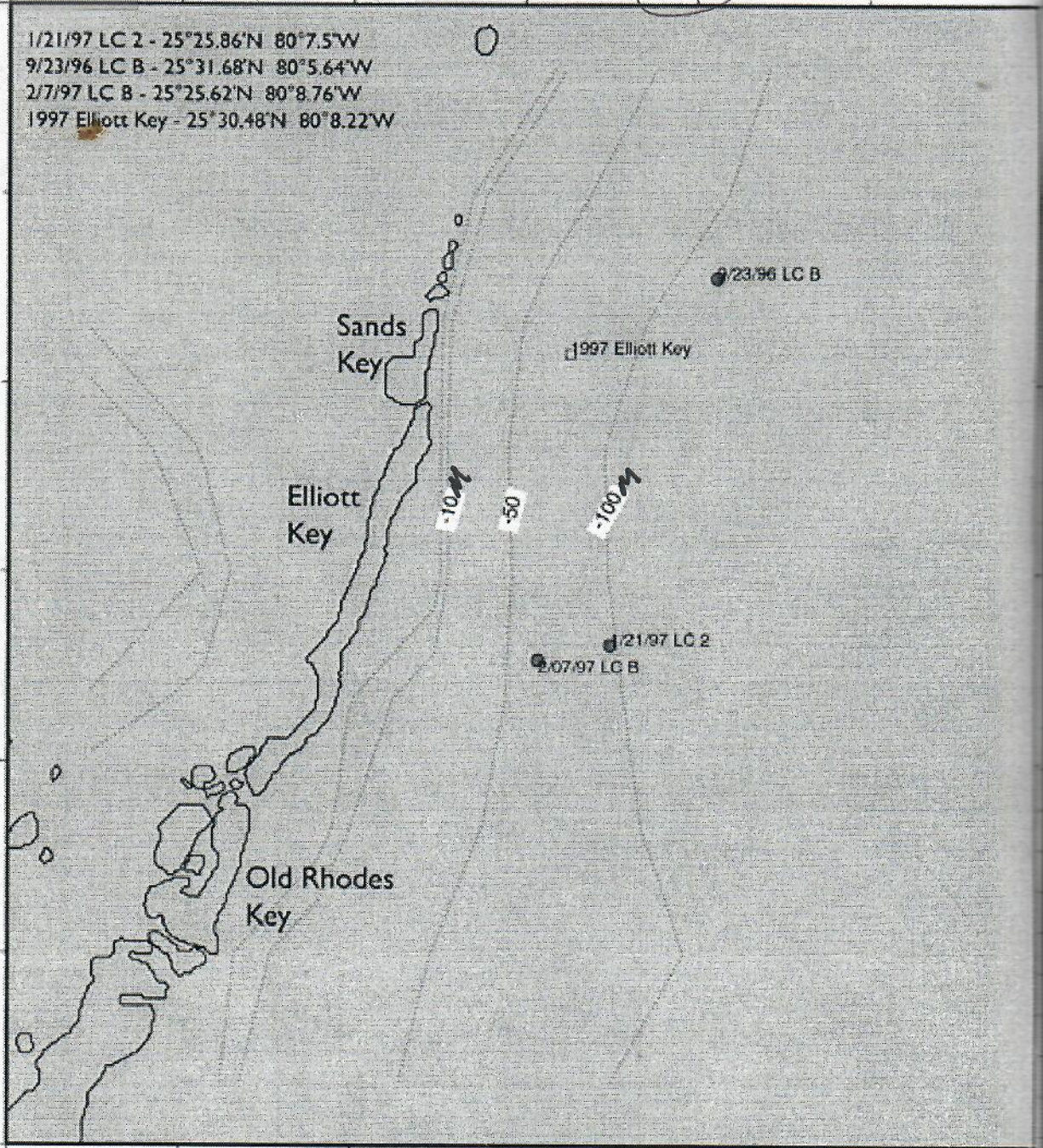


Green turtle end points around South Miami

Depth contours given in meters

25°
36'N

- 1/21/97 LC 2 - 25°25.86'N 80°7.5'W
- 9/23/96 LC B - 25°31.68'N 80°5.64'W
- 2/7/97 LC B - 25°25.62'N 80°8.76'W
- 1997 Elliott Key - 25°30.48'N 80°8.22'W



25°
24'N

80° 12'W

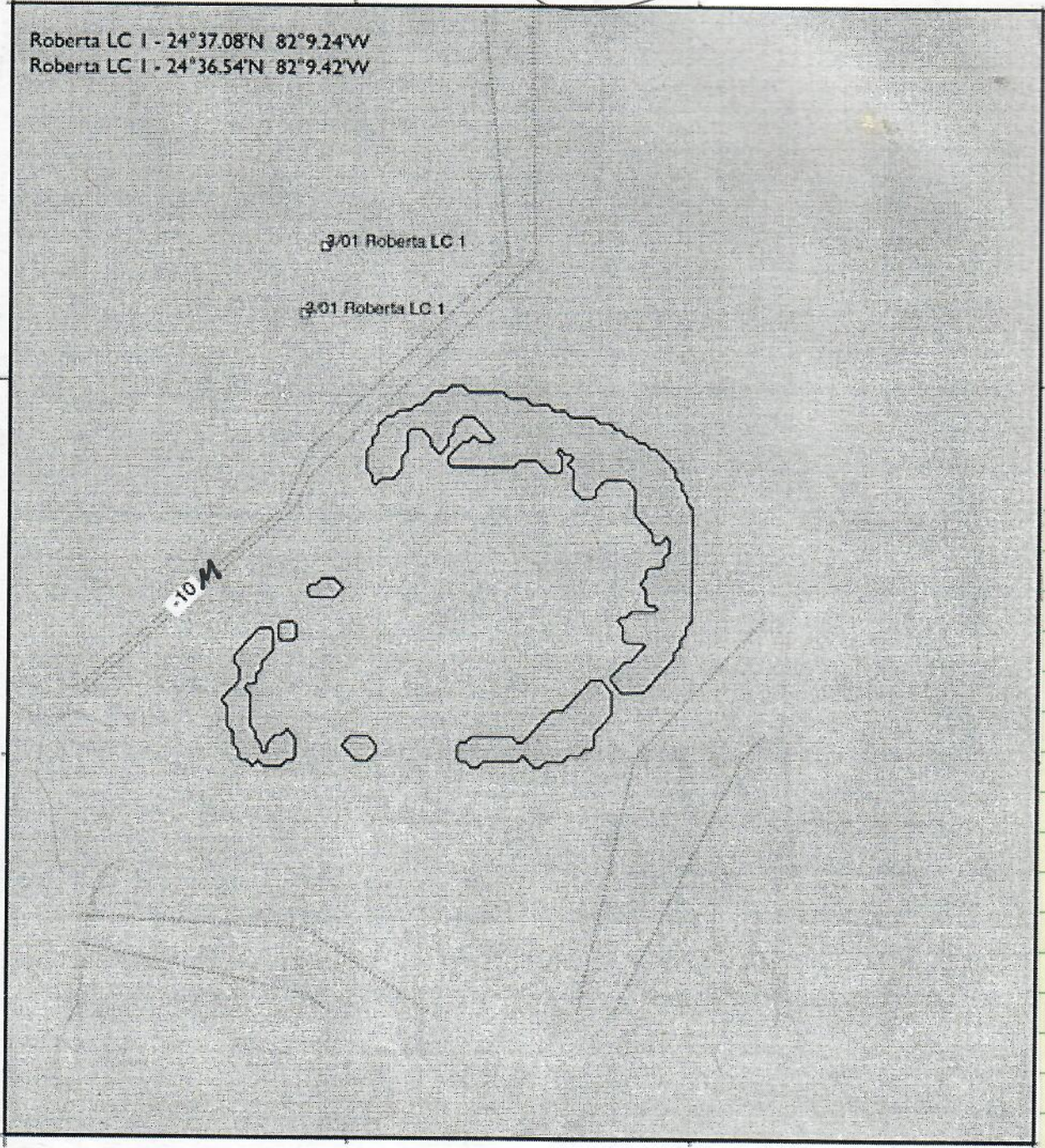
80° 0'

Green Turtle endpoints around Marquesas Key Close up

Depth given in meters

Roberta LC 1 - 24°37.08'N 82°9.24'W
Roberta LC 1 - 24°36.54'N 82°9.42'W

24°
36'N



82° 12'W

82° 09'W

82° 06'W

Green Turtle endpoints around Marquesas Key

Depth given in meters

25°
00'N

- 10/2/94 LC B - 24°36.54'N 82°21.36'W
- Michele Kinzel - 24°53.1'N 82°16.92'W
- Boca Grande - 24°26.9'N 82°2.2'W
- Boca Grande - 24°28.2'N 82°0.1'W
- Roberta LC I - 24°37.08'N 82°9.24'W
- Roberta LC I - 24°36.54'N 82°9.42'W
- Zyanya LC B - 24°37.14'N 82°17.16'W
- Zyanya LCA - 24°37.62'N 82°18.3'W

Nicholas Kinzel endpt

24°
48'N

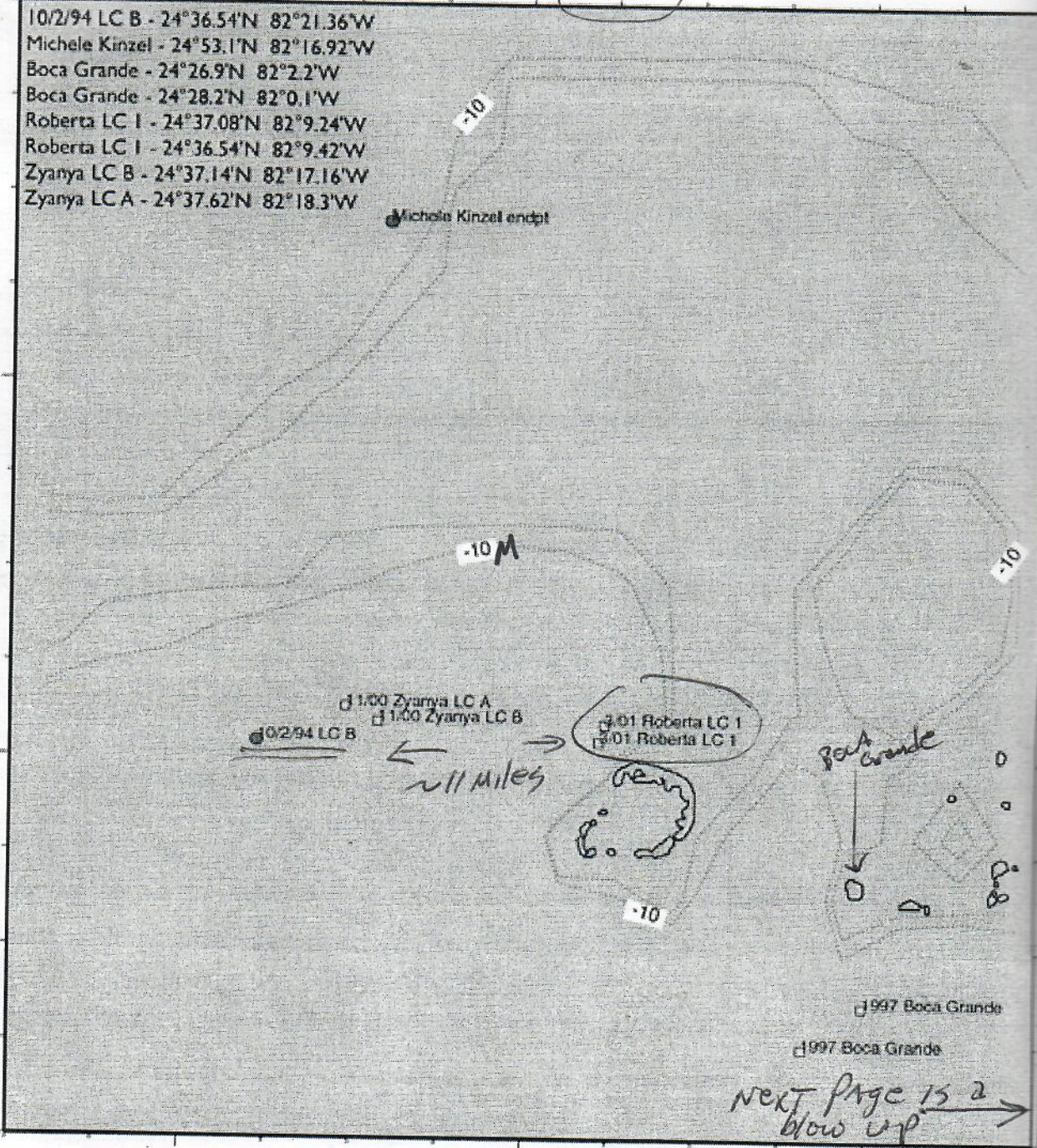
24°
36'N

24°
24'N

82° 24'W

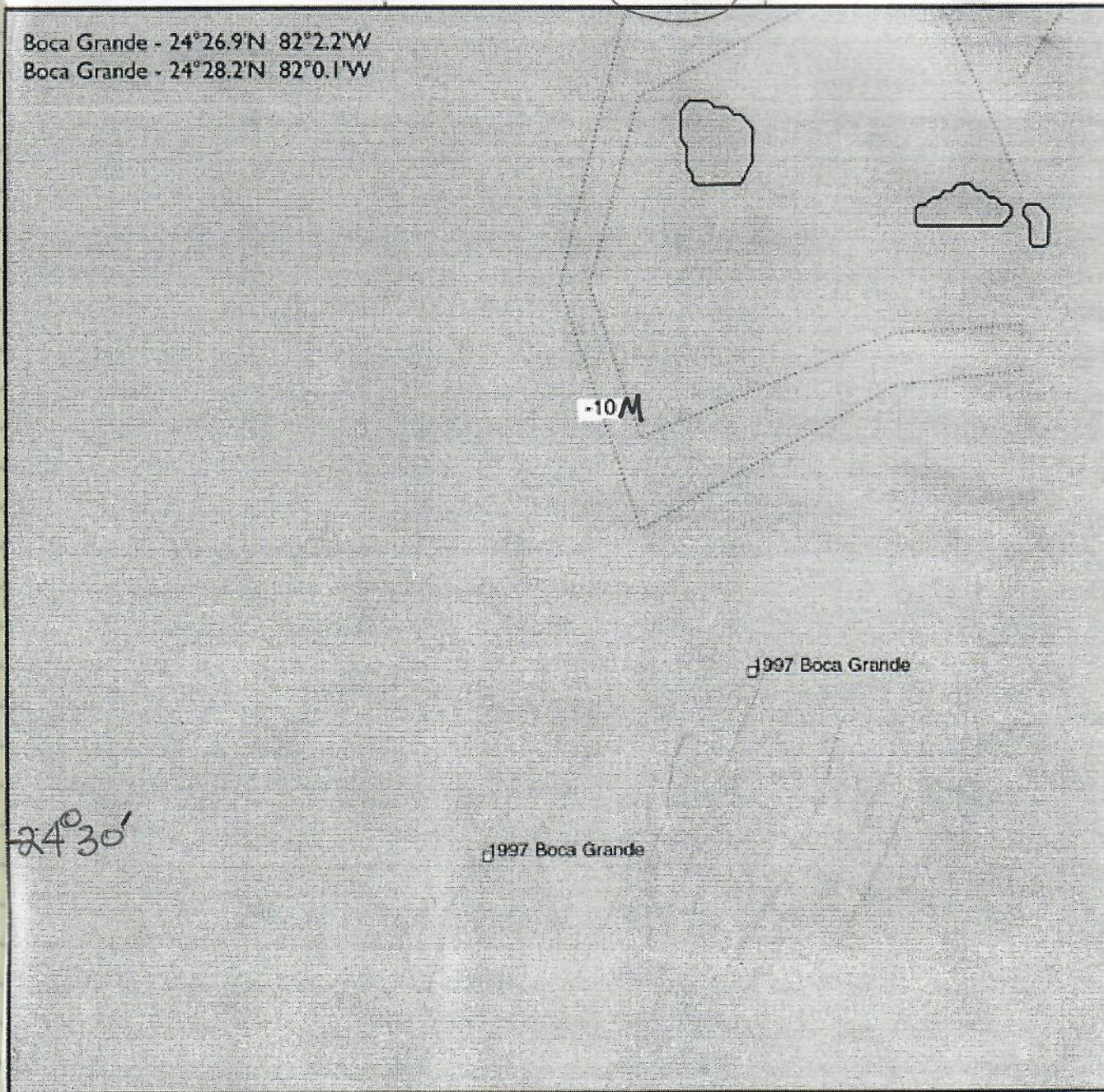
82° 12'W

82° 00'W



Green Turtle endpoints around Boca Grande Key Close up
Depth given in meters

Boca Grande - 24°26.9'N 82°2.2'W
Boca Grande - 24°28.2'N 82°0.1'W



82° 00'W










Date: Wed, 16 May 2001 10:56:05 -0700
 From: Denise Parker <Denise.Parker@noaa.gov>
 To: ghb <gbalazs@hnlab.nmfs.hawaii.edu>
 Subject: Florida end points w/ LC 1 or higher

I only found Two total.
 One from Barbara's earlier work (in the S. Miami area) -
 25.431N 80.125W (decimal degrees - an LC 2)
 and one from Mauricio's tracking of the Yucatan female (off area near the
 city of Flamingo - Cape Sable)
 25.029N 81.149W (decimal degrees - an LC 3)
 working on getting you depths and blow up of the areas you requested and
 I'm going to add the Cape Sable one also.

Date: Sat, 23 Jun 2001 20:01:50 -0400
 From: Barbara Schroeder <Barbara.Schroeder@noaa.gov>
 To: George H. Balazs <gbalazs@hnlab.nmfs.hawaii.edu>
 Subject: Re: phone and motel name

We are at Lime Tree Bay Resort, on Long Key. The number is 305-664-4740. Here are the most accurate, resident foraging ground locations among the Florida greens, of all the ones I've done. These are LC 1,2,3 points, which I don't have many of, and on most of the greens never had a 1,2, or 3. I planned to get these to you earlier in the week but didn't get to with everything else going on here.

6675:	24.458	82.391	82° 23.46' W	BoCA
25670:	24.632	81.150	81° 09' W	Grandes region
25689:	25.431	80.125	80° 07.5' W	WREATH
6674:	25.525	80.126	80° 31.5' W	Elliot

- Roberta2.shp
- Benthic Habitats (Group)
 -  Patch Reefs
 -  Platform Margin Reefs
 -  Continuous Seagrass
 -  Patchy Seagrass
 -  Hardbottom
 -  Bare Substrate
 -  Inland Water
 -  Unknown Bottom
 -  Land

Other
are
29507

ST185

6/22 note
cant be
correct -
This bank is
east of
Tortugas

TORTUGA BANK

LC1 ID 29508

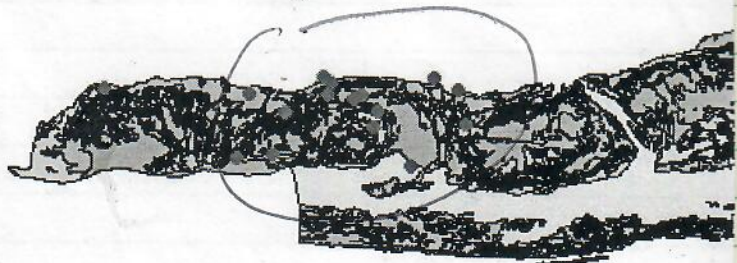
NOV 20, 00 24.611 N
82.163 W.

= 24° 36.66' N
82° 09.78' W

LC1
ID 29508

24.609 N / 82.157 W
MARCH 18, 2001

= 24° 36.54' N
82° 09.42 W



On Mon, 21 May 2001, Carter, Greg wrote:

> Hi George,

>

> Both turtles are/were in a pretty tight circle right at the Totrugas Bank.

I

> have a map data CD from NOAA on the habitats of the Florida Keys that
> identifies sea grass beds, sand bottom, coral patches, etc. I overlaid
some

> of the last points and lo and behold, right over sea grass beds they
swim...

> I'll send you the complete ARGOS data files if you like and the mentioned
> map, or just a few of their last positions. Found a website on the
Tortugas

> 2000 issue and there are some interesting socioeconomic maps of the Keys.

> Based on usage, I'm surprised there's anything alive down there. Looks
like

> that is an area of recreational diving. I had thought of a trip like yours
> would be interesting. If you see any turtles with radios, grab 'em. The

> batteries died about 2 weeks ago....

Date: Tue, 22 May 2001 06:48:30 -0700

From: "Carter, Greg" <carter.g@portseattle.org>

To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>

Subject: Argos data & map

Hi George,

Attached are two text files with our complete DIAG Argos data. The end of
the file will give you the most recent points near Tortugas Bank. I have
also attached a habitat map from the Keys CD with one turtle's points
overlayed. This map has no lat-long but is the west end of the Keys. I'll
copy the habitat CD tonight and get it off to you Wed.

- Flcmend.txt
- Geographic Names

Bathymetry

- 2.1 to 3.0 meters
- 3.1 to 4.0 meters
- 4.1 to 5.0 meters
- 5.1 to 6.0 meters
- 6.1 to 7.0 meters
- 7.1 to 8.0 meters
- 8.1 to 9.0 meters
- 9.1 to 10.0 meters
- 10.1 to 25.0 meters
- 25.1 to 50.0 meters
- 50.1 to 100.0 meters
- 100.1 to 500 meters
- Deeper than 500 meters
- Unknown Depth(s)

Benthic Habitats (Group)

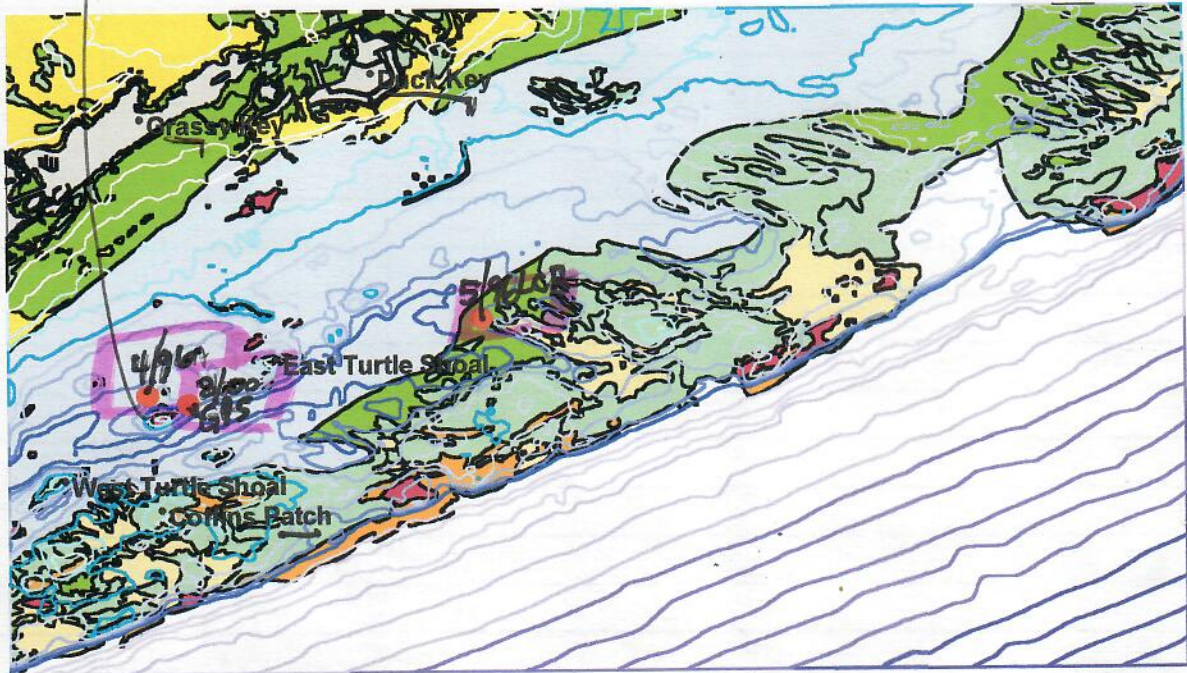
- Patch Reefs
- Platform Margin Reefs
- Continuous Seagrass
- Patchy Seagrass
- Hardbottom
- Bare Substrate
- Inland Water
- Unknown Bottom
- Land



Tile 12

Marathon and Duck Keys
Turtle
14 →

"TINA
TURTLE
SHOAL"



0

5

10 Miles

● Ficmend.txt

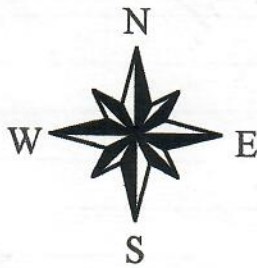
● Geographic Names

Bathymetry

- 2.1 to 3.0 meters
- 3.1 to 4.0 meters
- 4.1 to 5.0 meters
- 5.1 to 6.0 meters
- 6.1 to 7.0 meters
- 7.1 to 8.0 meters
- 8.1 to 9.0 meters
- 9.1 to 10.0 meters
- 10.1 to 25.0 meters
- 25.1 to 50.0 meters
- 50.1 to 100.0 meters
- 100.1 to 500 meters
- Deeper than 500 meters
- Unknown Depth(s)

Benthic Habitats (Description)

- Patch Reefs - Individual
- Patch Reefs - Aggregated
- Patch Reefs - Halo
- Patch Reefs - Aggregated with Halo
- Patch Reefs - Coral or Rock Patches with Bare Sand
- Platform Margin Reefs - Shallow Spur and Groove
- Platform Margin Reefs - Drowned Spur and Groove
- Platform Margin Reefs - Remnant - Low Profile
- Platform Margin Reefs - Back Reef
- Platform Margin Reefs - Reef Rubble
- Continuous Seagrass - Moderate to Dense
- Continuous Seagrass - Sparse
- Continuous Seagrass - Dense Patches in a Matrix of Sparse Seagrass (<60%)
- Patchy Seagrass - Moderate to Dense with Blowouts
- Patchy Seagrass - Dense Patches in a Matrix of Hardbottom
- Patchy Seagrass - Predominantly Sand and/or Mud with Small, Scattered Seagrass Patches (<60%)
- Patchy Seagrass - Predominantly Macroalgae Cover with Scattered Seagrass Patches
- Hardbottom - Soft Corals, Sponges, Algae
- Hardbottom - Perceptible Seagrass (<60%)
- Bare Substrate - Carbonate Sand
- Bare Substrate - Carbonate Mud
- Bare Substrate - Organic Mud
- Inland Water
- Unknown Bottom
- Land



Tile 14



Bamboo Key Bambookey
 Crawl Key
 Fat Deer Key Fat Deerkey
 Key Deer Key Key Deerkey

Marathon

→ To Tile 12

← To Tile 12



● Flcmend.txt

□ Map Tiles

Bathymetry

2.1 to 3.0 meters

□ 4.1 to 5.0 meters

□ 9.1 to 10.0 meters

□ 10.1 to 25.0 meters

□ 25.1 to 50.0 meters

□ 50.1 to 100.0 meters

□ 100.1 to 500 meters

□ Deeper than 500 meters

□ Unknown Depth(s)

Benthic Habitats (Group)

■ Patch Reefs

■ Platform Margin Reefs

■ Continuous Seagrass

■ Patchy Seagrass

■ Hardbottom

■ Bare Substrate

■ Inland Water

■ Unknown Bottom

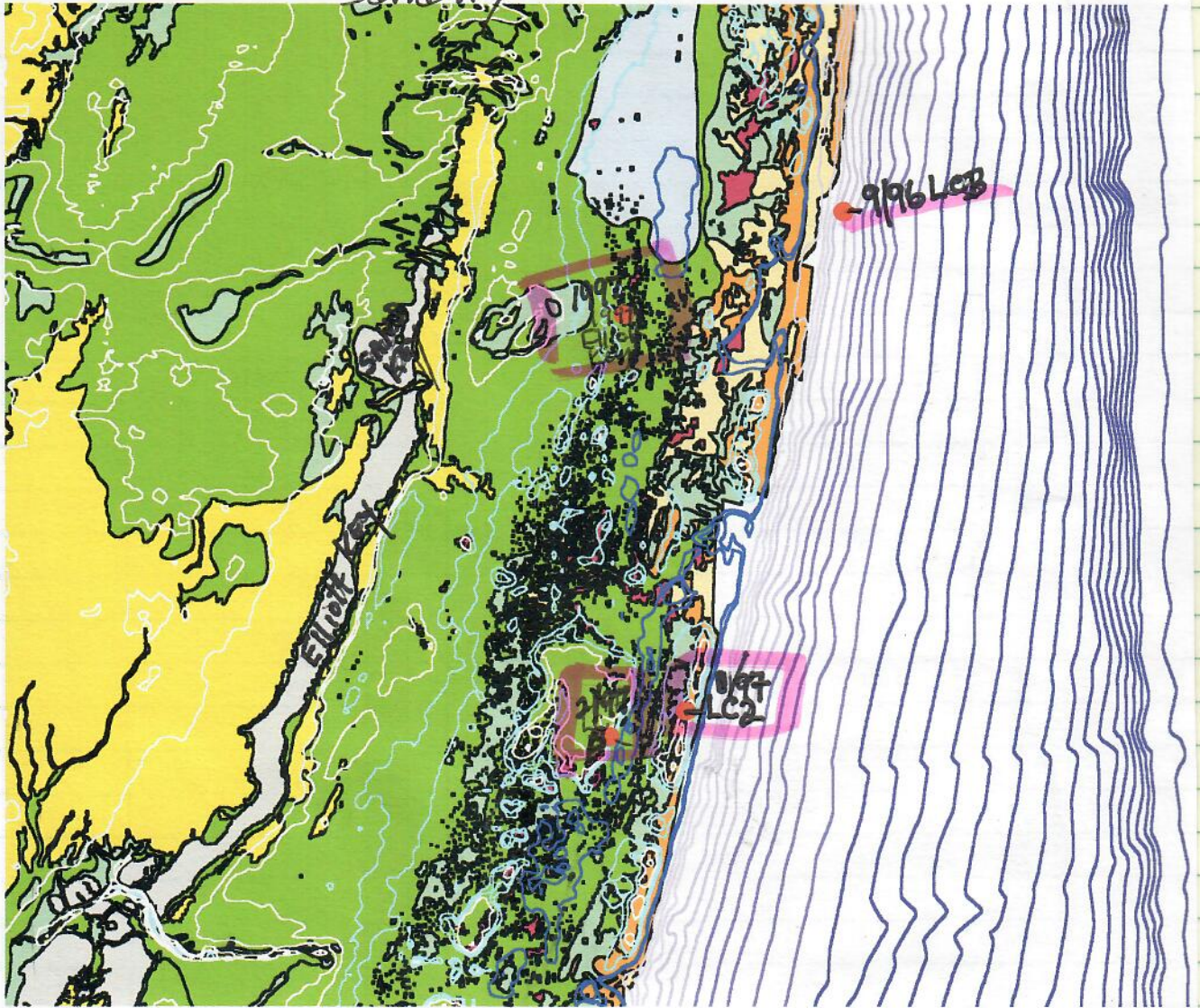
■ Land

Black = ?



Elliott Key, S. Miami
Sand Key

Region



- Flcmend.txt
- Geographic Names

Bathymetry

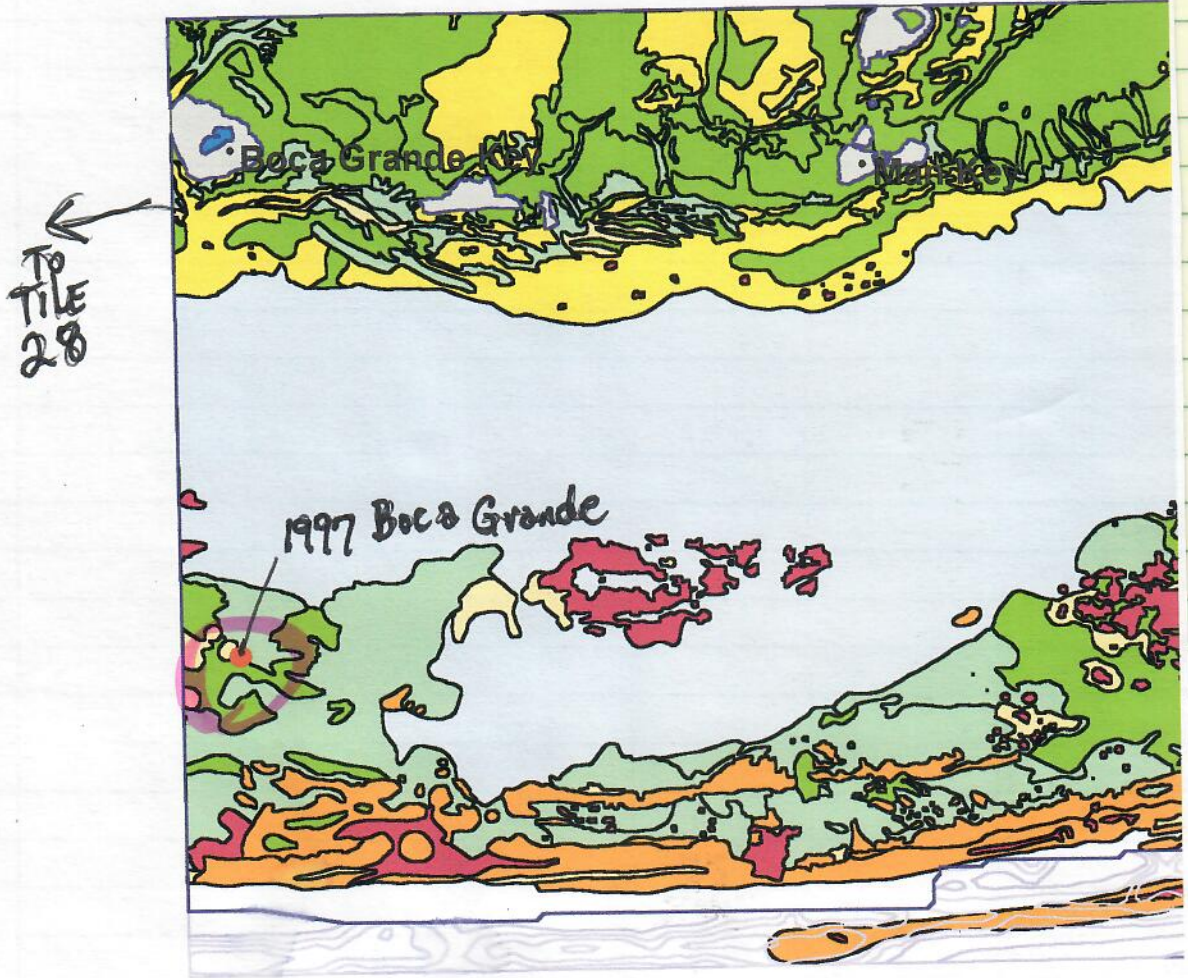
- 2.1 to 3.0 meters
- 3.1 to 4.0 meters
- 4.1 to 5.0 meters
- 5.1 to 6.0 meters
- 6.1 to 7.0 meters
- 7.1 to 8.0 meters
- 8.1 to 9.0 meters
- 9.1 to 10.0 meters
- 10.1 to 25.0 meters
- 25.1 to 50.0 meters
- 50.1 to 100.0 meters
- 100.1 to 500 meters
- Deeper than 500 meters
- Unknown Depth(s)

Benthic Habitats (Group)

- Patch Reefs
- Platform Margin Reefs
- Continuous Seagrass
- Patchy Seagrass
- Hardbottom
- Bare Substrate
- Inland Water
- Unknown Bottom
- Land



Tile 26



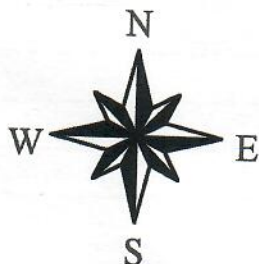
- Filcmend.txt
- Geographic Names

Bathymetry

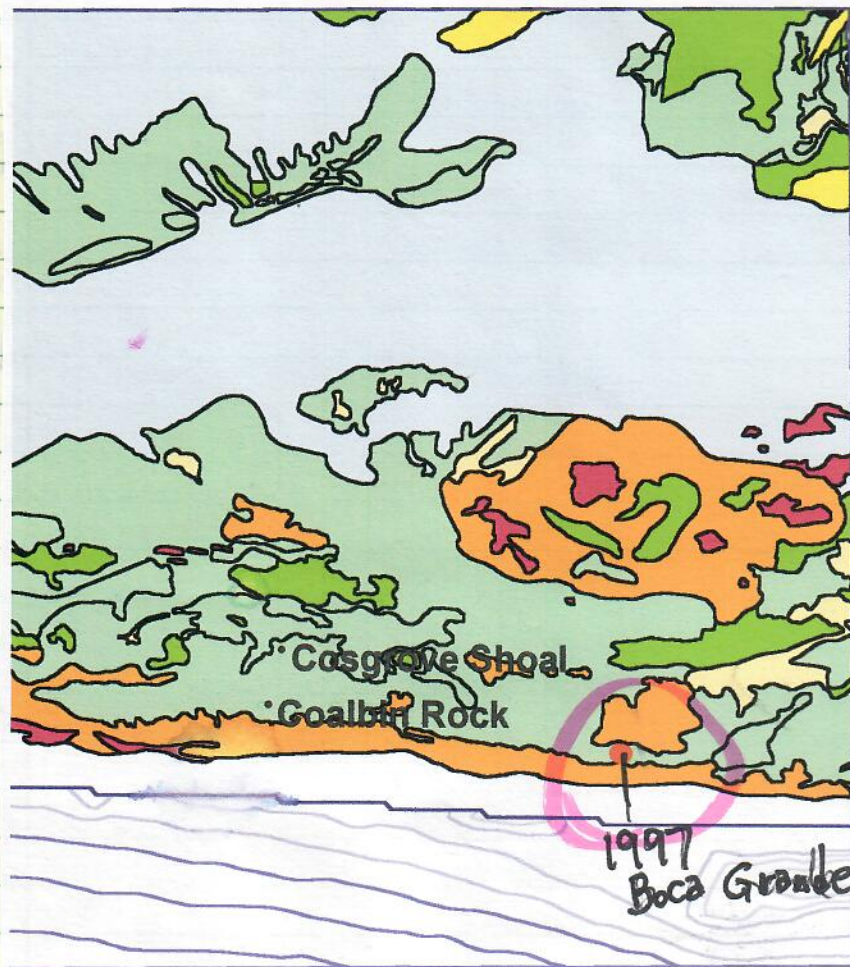
- 2.1 to 3.0 meters
- 3.1 to 4.0 meters
- 4.1 to 5.0 meters
- 5.1 to 6.0 meters
- 6.1 to 7.0 meters
- 7.1 to 8.0 meters
- 8.1 to 9.0 meters
- 9.1 to 10.0 meters
- 10.1 to 25.0 meters
- 25.1 to 50.0 meters
- 50.1 to 100.0 meters
- 100.1 to 500 meters
- Deeper than 500 meters
- Unknown Depth(s)

Benthic Habitats (Group)

- Patch Reefs
- Platform Margin Reefs
- Continuous Seagrass
- Patchy Seagrass
- Hardbottom
- Bare Substrate
- Inland Water
- Unknown Bottom
- Land



Tile 28



→ to file 26















• 1997

1997 Boca Grande



- **Flcmend.txt**
- **Geographic Names**

Bathymetry

-  2.1 to 3.0 meters
-  3.1 to 4.0 meters
-  4.1 to 5.0 meters
-  5.1 to 6.0 meters
-  6.1 to 7.0 meters
-  7.1 to 8.0 meters
-  8.1 to 9.0 meters
-  9.1 to 10.0 meters
-  10.1 to 25.0 meters
-  25.1 to 50.0 meters
-  50.1 to 100.0 meters
-  100.1 to 500 meters
-  Deeper than 500 meters
-  Unknown Depth(s)

Benthic Habitats (Group)

-  **Patch Reefs**
-  **Platform Margin Reefs**
-  **Continuous Seagrass**
-  **Patchy Seagrass**
-  **Hardbottom**
-  **Bare Substrate**
-  **Inland Water**
-  **Unknown Bottom**
-  **Land**



The Florida Keys National Marine Sanctuary

To protect this spectacular marine ecosystem, the Florida Keys National Marine Sanctuary was created in 1990. It is 2,800 square nautical miles, extends on both sides of the Florida Keys, and is the second largest marine sanctuary in the United States.

A final comprehensive management plan and water quality protection program have been created for the Sanctuary in cooperation with the public, a citizen's advisory council, and several federal, state, and local government agencies for implementation in 1997.

For more information, contact the Florida Keys National Marine Sanctuary, PO Box 500368, Marathon, FL, 33050. (305) 743-2437. For more information on Refuges, contact the Refuge Manager at (305) 872-2239.

Associates,
Express.

*When in Key West, visit the REEF RELIEF...
Environmental Center & Store
201 William St., Key West, FL 33040
(305) 294-3100 • Fax: 293-9515*

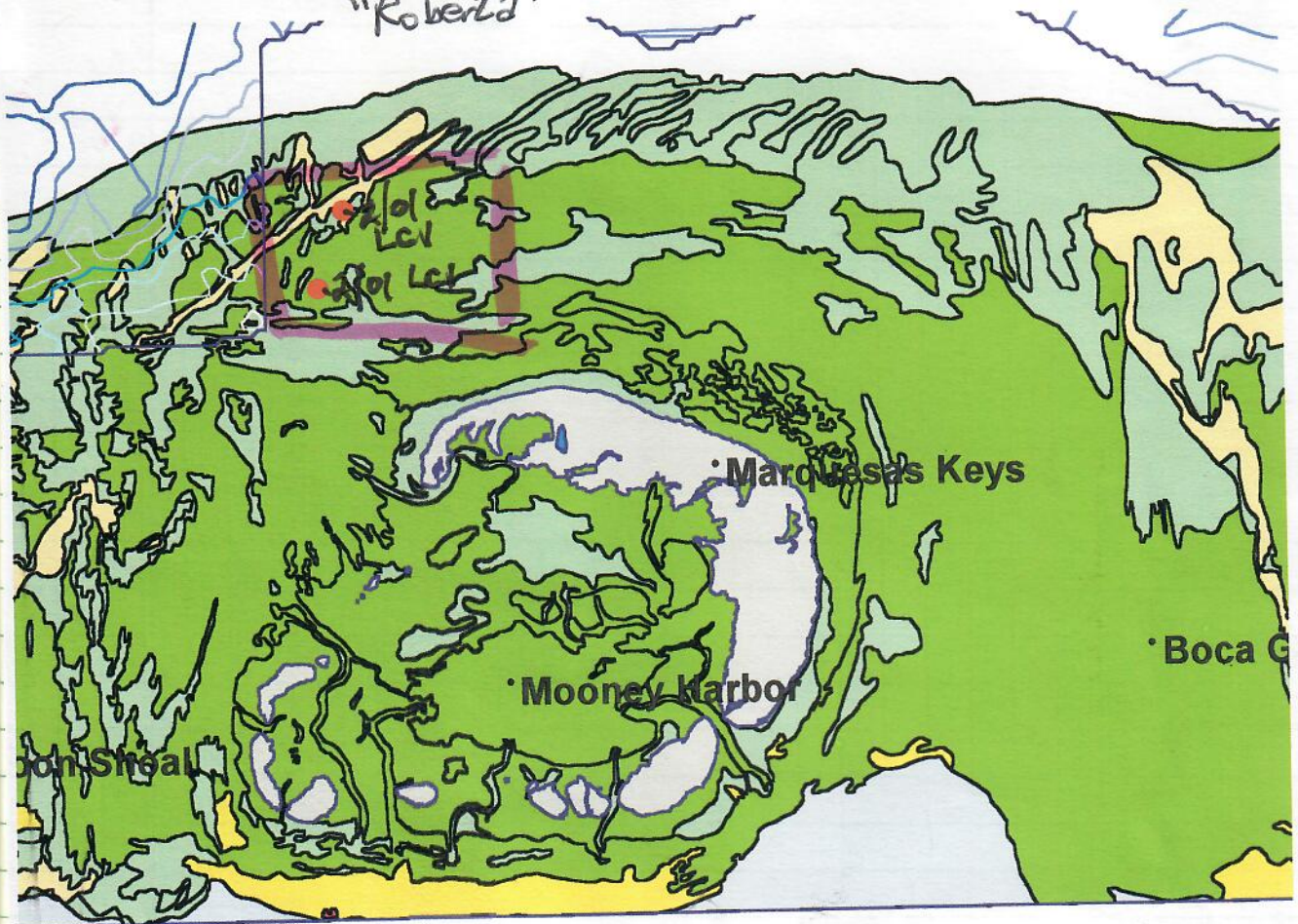
E-mail: reefrelief@bellsouth.com Website: www.reefrelief.org

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"FORTUGA BANK" ?















MARQUEZAS KEYS
"Roberta"

File 27



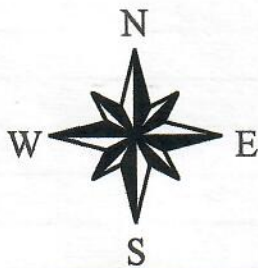
- Ficmend.txt
- Geographic Names

Bathymetry

-  2.1 to 3.0 meters
-  3.1 to 4.0 meters
-  4.1 to 5.0 meters
-  5.1 to 6.0 meters
-  6.1 to 7.0 meters
-  7.1 to 8.0 meters
-  8.1 to 9.0 meters
-  9.1 to 10.0 meters
-  10.1 to 25.0 meters
-  25.1 to 50.0 meters
-  50.1 to 100.0 meters
-  100.1 to 500 meters
-  Deeper than 500 meters
-  Unknown Depth(s)

Benthic Habitats (Group)

-  Patch Reefs
-  Platform Margin Reefs
-  Continuous Seagrass
-  Patchy Seagrass
-  Hardbottom
-  Bare Substrate
-  Inland Water
-  Unknown Bottom



Miles

West of Marquesas Tile 29



Marquesas Key
 Roberta's updated
 position
 from

11/2000

Date: Mon, 18 Jun 2001 12:40:37 -0700
 From: Denise Parker <Denise.Parker@noaa.gov>
 To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>
 Subject: Re: Denise- Two more...

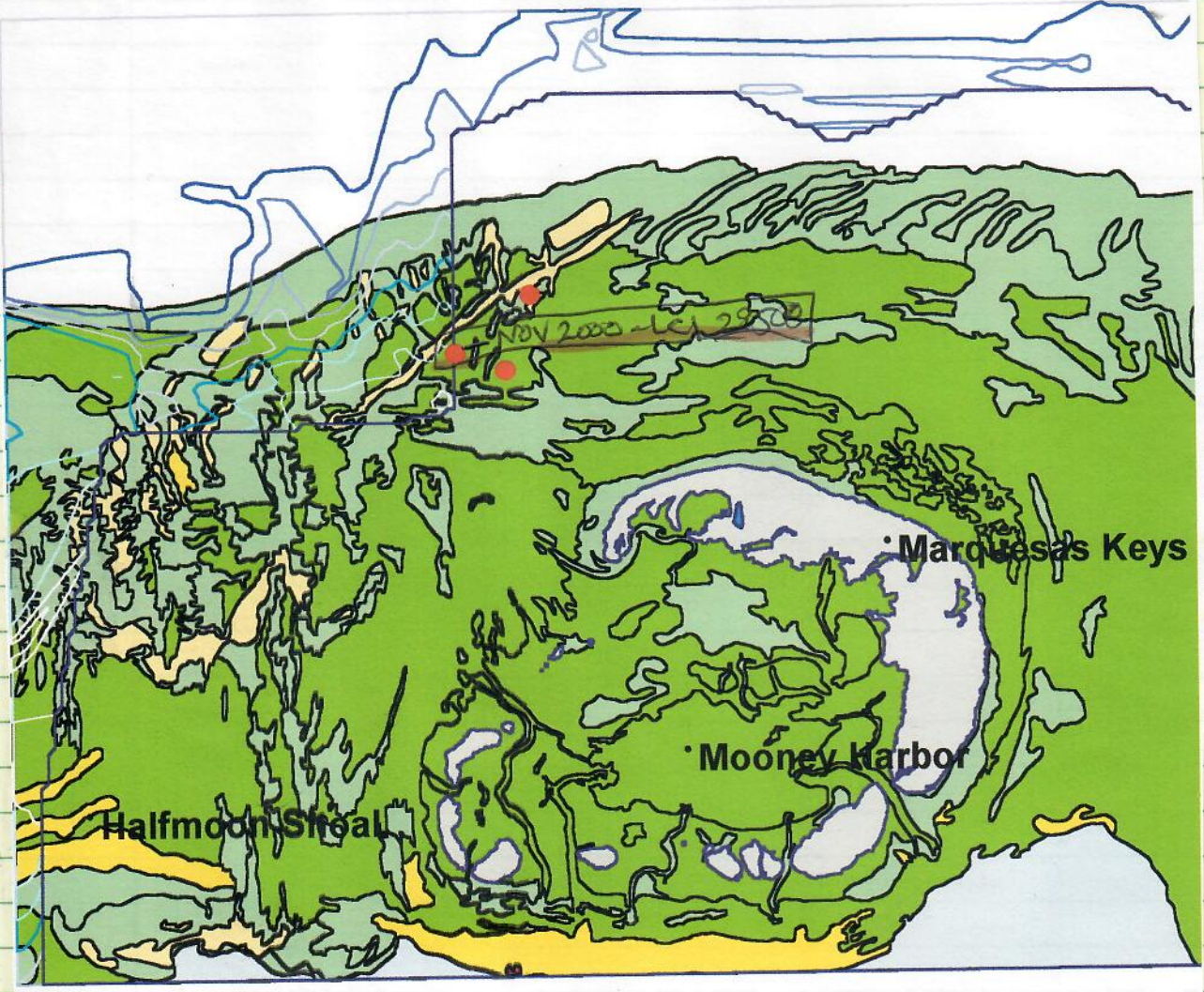
Last position (the March 18th, 2001) is Roberta. The other position was from the year previous but clustered basicly in the same area. (I'm working on getting that out to you fedex today so hopefully will get to you by Tues.). I will highlight new position on that map so you can see it's relation to Roberta's positions this year.

I guess the Tortuga Bank is North and West of Marquesas Key.
 Not sure where he got the name either.

"George H. Balazs" wrote:

>
 > ..positions, Gregg Carter provided them, I don't believe you have- end
 > points for a place in the Keys he's calling "Tortuga Bank." I can't even
 > find it on my nautical charts, so don't know where he got the name. Must
 > be somewhere out by Marquesas if it the Roberta and other one.
 >
 > ID 29508 LC1 Nov. 20,00 = 24.611N, 82.163W
 >
 > ID 29508 LC1 March 18, 01 = 24.609, 82.157W
 >
 > Can you plot on Habitat color like the ones recently done and fedex to
 > me going out no later than Tuesday? If not possible, I will understand
 > 100%. Let me know. Mahalo< george

Tile 27



**"SATELLITE TELEMETRY OF GREEN TURTLES (*Chelonia mydas*)
NESTING IN LECHUGUILLAS, VERACRUZ-MEXICO"**

Graciela¹ Tiburcio Pintos, Rafael Bravo Gamboa², Michelle Rene Kinzel³

¹ Oceanic Resource Foundation, Altamirano # 465, Cp. 91910, Veracruz, Ver., México.
gtiburcio@hotmail.com

² SEMARNAP, INP. CRIP-VER. (Centro Regional de Investigaciones Pesqueras-Veracruz),
La Fragua # 1301, C.P. 91918, Veracruz, Ver. México. pecesver@infosel.net.mx

^{1,3} Moss Landing Marine Labs, 1095 Calle Mesita, Bonita, CA. USA 91902. gypsea33@msn.com

Satellite transmitters were attached to green turtles (*Chelonia mydas*), at Campamento Tortuguero in Lechuguillas, Veracruz-Mexico. Tagging was done between August 20 and September 20, 2000. Two adult female turtles were captured following the deposition of their egg clutches and transported to the base camp to be fitted with the radio transmitter. Telonics model ST-18 transmitters, programmed with a duty cycle of 6 hour transmission period followed by an 18 hour passive cycle were attached to the second central scutes of two sexually mature female turtles. The turtles' movements have been monitored by collecting longitude and latitude data using The Service ARGOS Satellite System. All data points have been interpreted and plotted using ArcView 3.2 GIS mapping software. Both turtles traveled from their nesting ground in Mexico to feeding grounds off the coast of Florida, in an area called Tortugas Bank. Zyanya traveled approximately 984 km in a southeastern curve, at an average speed of 0.631 km/hr. Roberta traveled at a pace of 0.362 km/hr for a total estimated distance of 1430 km. The tracking will be continued for a period of up to one year, dependent on equipment performance and battery life. The GIS plots will be analyzed to determine migration routes, swim speeds and habitat utilization by the two tagged turtles.

METHODS

Both turtles were fitted with Telonics ST-18 transmitters using the method described by Balazs, et. al., 1996. The tracking is being conducted using The Argos Satellite System and the data is being analyzed and plotted with ArcView 3.2 mapping software. Swim speeds were calculated using the Greater Circle Equation.

RESULTS

Both turtles were released on their nesting beach in Lechuguillas, Mexico at approximately 97°18'11" W and 19°51'89" N. The first turtle tagged, Zyanya, remained within 10 km of the nesting beach for 21 days after she was released. Roberta, the second turtle, remained near the release site for 10 days (Figure 1). Both turtles migrated to approximately the same location off of Florida, to a location known as Tortugas Bank, along an underwater rise called the Florida Keys Ridge at approximately 82°16'65" W and 24°53'08" N (Figure 2). Both turtles have remained in this approximate location since November 11, 2000. The detailed open ocean movements of the two turtles were plotted and analyzed for 94 days for Zyanya and 88 days for Roberta. During that period, ARGOS satellites reported 33 transmissions for Zyanya and 75 transmissions for Roberta. Satellites were within range for an average of 270.02 seconds for both turtles, with a maximum

time of satellite overpass reported as 768 seconds. The majority of signals were registered as location class B for both turtles, 51.52 % for Zyanya and 62.16% for Roberta. Of these positions, the frequency of occurrence of acceptable location classes, or $LC \geq 0$ ($LC = 0, 1, 2$ and 3) were 21.21 % for Zyanya and 18.92 % for Roberta. Using the transmitted data, total distance traveled was calculated with the Great Circle Equation, and it is estimated that Zyanya traveled a total of 985 km while Roberta traveled an estimated 1,430 km. Using only the total distance traveled and the total number of days, Zyanya swam an average of 27.65 km/day and Roberta swam approximately 108.47 km/day. Zyanya's mean swim speed was 0.631 km/hr, and Roberta's mean swim speed was 0.362 km/hr.

DISCUSSION-SWIM SPEED

Green turtle swim speeds have been measured at 1.4 to 3.6 km/hr by Prange (1976) and over 1.0 km/hr over longer periods of time, weeks to months, by Nichols (1999). The results of this study are slightly lower at .631 km/hr for Zyanya and .362 km/hr for Roberta. The transmitter attached to the shell could have increased the drag on the turtle, but these effects are probably minimal due to the size ratio of the turtle to the transmitter, and the low profile of the transmitter on the turtles' carapace. The swim speeds calculated in this study seem to show a higher reading for satellite points close together in date. This may indicate a large error when the transmissions are received in close proximity to each other. Zyanya's average swim speed, 0.631 km/hr was almost twice that of Roberta's, calculated at 0.362 km/hr. Comparing these swim speeds with the plotted map points (Figure 1) shows that the turtle that swam the shorter distance, Zyanya, approximately 984 km, as compared to Roberta's estimated 1,430 km, also had the faster average swim speed. Calculated swimming speeds are subject to errors from satellite location and assistance or hindrance due to currents. For simplicity, the results presented here have neglected the influence of currents. The frequency of occurrence of acceptable location classes, $LC \geq 0$, was low, 21.21% for Zyanya and 18.92 % for Roberta. This could provide an inaccurate basis for calculating swim speeds. Additionally, there is error inherent in the low number of points used to calculate the swim speeds. The majority of ARGOS location classes received from these two turtles were Class B and only Class 0, 1, 2 or 3 are accurate enough for reliable data analysis. To obtain an accurate reading, the transmitter must be above the surface and the satellite must receive multiple transmissions during the time of the satellite overpass. The average time of the satellite overpass for this study was measured as 270.02 seconds. Future plans for tagging studies will consider the results obtained with this data, and use a different duty cycle for the transmitters. By setting the transmitters to a 24 hour on and 48 hour off duty cycle, we will attempt to maximize transmission time with battery life duration.

DISCUSSION-MIGRATION ROUTE

The turtles headed away from the nesting beach and followed known currents in the Gulf of Mexico to their current location, approximately $82^{\circ}16'65''$ W and $24^{\circ}53'08''$ N. The turtles showed a degree of affiliation with shallow water, remaining in waters approximately 30 m deep for the majority of their migratory route (TOPEX/Poseidon Satellite Altimeter and NOAA/NEDIS World Ocean Atlas, 1998). This study revealed that sea turtles nesting at Lechuguillas, Mexico, originate from an area of the Gulf of Mexico along the Florida Keys Ridge. It is likely the turtles are occupying an area of pelagic convergence zones, feeding on sea grass and algae in the shallow waters along the oceanic rise. The two turtles followed different migration routes to navigate across

the Gulf of Mexico to the same oceanic location. Navigation in sea turtles has been hypothesized to occur with chemosensory cues (Grassman and Owens, 1987), celestial cues (Ehrenfeld and Koch, 1967), experience based behavior (Able, 1996) and magnetic "map sense" or the ability for the turtle to maintain headings toward homing locations despite current drift or displacement (Papi, et al., 1997). Experience based behavior is possible, as the satellite tagged turtles were of average size for a nesting female on the beach of Lechuguillas and had probably laid egg clutches in previous years. Given that the two turtles followed different routes in the Gulf of Mexico to the same feeding grounds, some sort of map sense or detection of magnetic fields could also be occurring. For these sexually mature green sea turtles, a combination of "map sense" and experience based behavior probably guided them to the feeding grounds along the Florida Keys Ridge.

CONSERVATION IMPLICATION

The migratory routes followed by these turtles overlap with several commercial fisheries in the Gulf of Mexico, the predominant one being the shrimp fishery. Shrimp fishery related mortality is an important conservation issue and recent developments in mitigating this problem include the development of a turtle excluder device (TED) for shrimp nets and the closure of the shrimp industry during certain times of the year. This study emphasizes the need for further research on the migratory routes of the green sea turtles, *Chelonia mydas*, through the Gulf of Mexico. Satellite telemetry will prove to be an invaluable tool in marine conservation biology and fishery management decisions.

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TOPEX/Poseidon Satellite Altimeter and NOAA/NESDIS World Ocean Atlas, 1998 data.

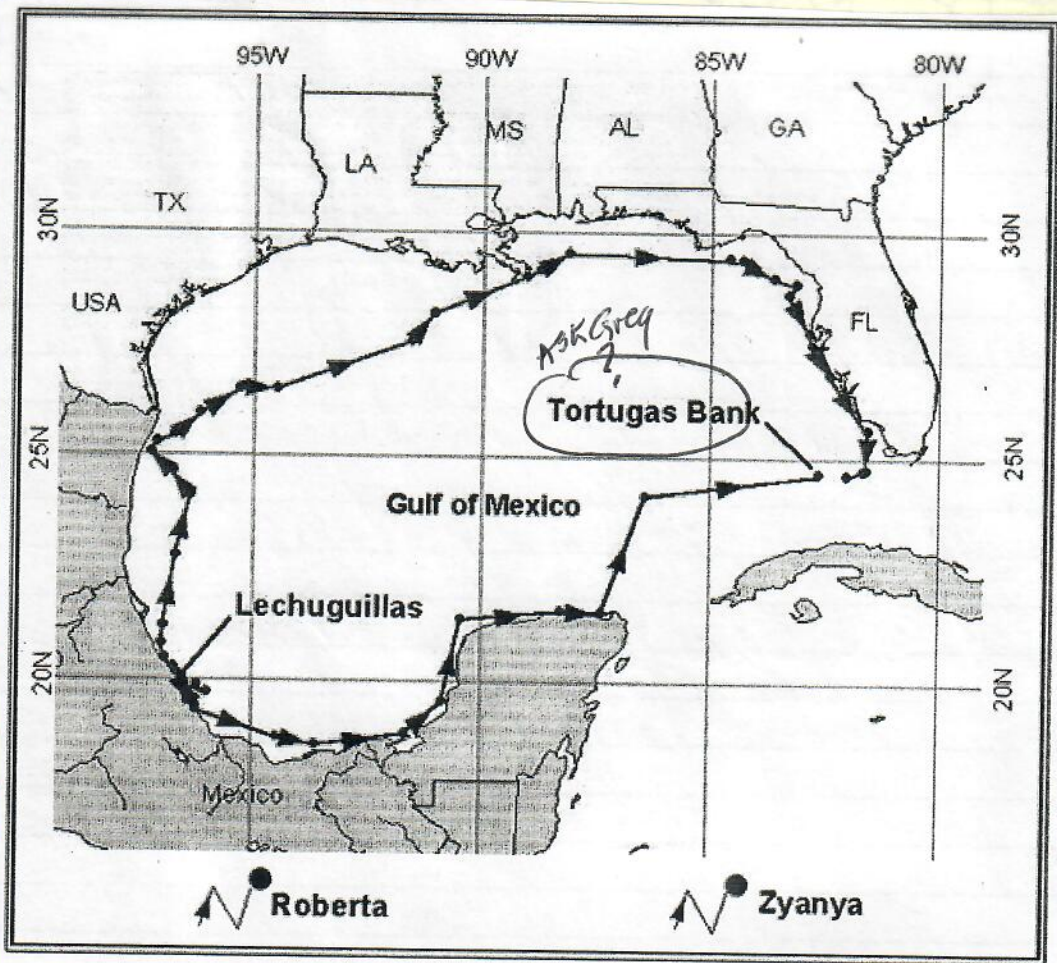


Figure 1. Map of tagging site and migration routes.

Janette - STANDING - Marathan area
handles

"Coach Republic" 55

21 JUNE 01 Depart Honolulu United FI 56 955 PM
Thursday for LA → FI 282 to Miami 810 AM

22 JUNE / Friday arrive ~ 445 PM. Rented National Car #170 wk total. Drove through traffic & toll to toll expressway South to Homestead, to Hwy 1 to Fla Keys. ~ 3 1/2 hr. drive to Marathan - Hobden Harbor Hotel - \$80 Night, Room 17

23 JUNE / Sat, up. ~ 730 AM - breakfast at Sat. McDonalds, stopped at Dive Shops Fantasea & Halls. Rented tanks 15 lbs each 2 wt belts. At William TINA came ~ 24ft. fiberglass boat. with 70 7 mile bridge to Atlantic side - Marc's GPS ~ 11.5 miles from Hobden Harbor to Snapper GPS site. Small shoals between East Turtle Shoal and West Turtle Shoals.

Dive 1 55 minutes Dive here - Marc videoed Soft corals, sponges depths ~ 10 to 30' & seagrass & few warts. Dive 2 31 min Seward of Coffin Patch = Thalassia 95% Halodule (wide blades) Tubular

Michelle - writer went on TRIP. FAXed her article 15th Symposium - 9st. tracking Melbourne

Returned about 3 PM Saturday. Saw 50 feed Finney at Cracked Conch restaurant print photos. Marathan.

However, there were places where old dead "branches" of hard coral seemed to have been "shoveled" out from under cuts.

56 June
24 Sunday 01 -

8am up - MacDally -
Visited Dwe shops - Retrieved
Bottles & wt. belts to Halls shop -

1230 pm TO PARADISE Divers -
Kellie - student here for 4 wks
Asst. INSTRUCTOR Training # will
to yH in August. 50 tank + weight
Motored to Coof NOAA Nat. Marine Sanct

"I hope the sea is better than the last"
"Verizon recommends traps"

The sea is better than the
last one, but, not as good
as Hawaii!

Dive 3

Looe Key - 5/ boats there upon arrival.
MARC video of juvenile green spawning trying to remove
Remora. Dive master says he caught it later and
took it off.



We saw lots of fish - Nurse sharks, groupers -
7 ft. Bull shark w/ small fish following
Smaller bull shark aggressive to Dive Master.
As on all Dives I spent most of time looking deep
under undercut ledges for turtles or signs

b/24/01
Sunday

(Dive 4) Turtles being present. None seen.
Moved a short distance of Looe Key.

Dinner w/ Richie
photo w/ Cowette

Geo Head

William Coe Photo at Restau
w/ Richie -
9000 Leverton Lane
Raleigh, NC
27615

At "The Island" Restaurant.
Coffee at his nearby new Apartment.



FOR WEBSITE printout
- GPS w/ Roberta
- Backup GPS
2-Epirbs
VHS west ch 6
Stobe

25 June 01
Monday

Tom Wilmer FWS 872-0101
home

- Donut 24° 26.983, 81° 55.666 31/52
- West Dry Rock 24° 26.715, 81° 55.700 31/49

6/24/01 Sunday late p.m. Small hawkebird stuff
brought by boat to Richies. Strife - Blood from Mouth, Say Terry Redlock
he was at stranding meeting at Hospital building.
Photo w/ JACK MUSICK wife
on way to dinner
me to assist with criteria for deployment
on Nurse Sharks at Dry Tortugas.

6/25/01 Drove TO USFWS Key Deer Refuge -
Monday met Tom Wilmer - Tom Richie had
phoned him - asked to take us to MARQUESS,
Arranged to trip 6/26 Tuesday,
TO Key West - 2 PM departure w/ SubTropic
Answers. TO Sand Key - main ship channel to Key West
area -

Dive 5 The Donut, Ledge w/ numerous undercuts - Sand bottom
Center. We thought it would be circular -
ended up being linear.

Dive 6 Western Dry Rocks - A few ft. deep to ~25 ft,
rented 2 tables/belts at SubTropic for more vests,
Dinner at TURTLE KRABBS Restaurant, Drove
back to Marathon.

26 JUNE 01 up ~ 5 AM. Coffee from Tom Thumbs.
TUESDAY met Tom Wilmer by his home on
Walton Rd. followed him w/ boat to Key West
Navy facility - launched his flat bottom boat
w/ 2 HP dual prop YAMAHA.
(CONTINUED)
PAGE 60

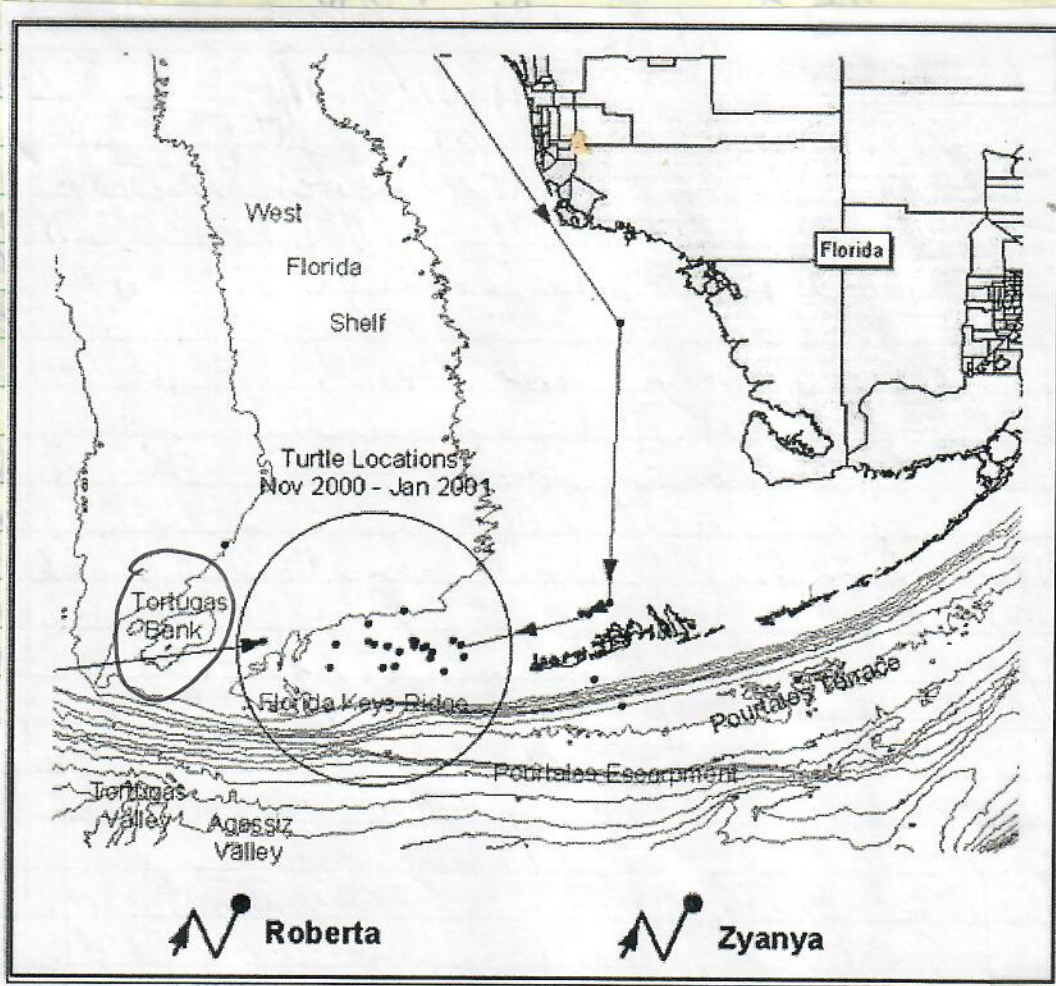


Figure 2. Map of turtle's current location.



www. FLKEYSDIVING.com

near STRANDING of adult Male Green

GPS: Coccolum Beach = 24 43.795, 81 0.082
Haleakale on beach

Turtle Hospital = 24° 42.670 81° 6.073
4,762 miles TO MARC's office

LOOE Key = 24° 32.70' 81° 24.50'

Sombrero Reef = 24° 37.50' 81° 6.50'

(The DONUT key west 24° 26.983' 81° 55.660'
Sand Key

W. Dry Rocks - 24 26.715' 81° 55.700'

"Robert's"

Robt = first place motored to year 2000
Robt = second place MARCH 2001

Robt * MARC description = 6/26 FACE MASK looking over TOM'S BOAT =
depth = 10-18 ft hard bottom - NO stone coral
seen - soft coral, + sponges some large
motored patches (but no fan corals (Gorgonian). Seagrass nearby -

more toward 6/15 rock light green = 25-30' barren sand flat

Vaca > 24° 43.815' 81° 1.764'
Bridge

ITOCTHA Wreck =
"Golden Turtles"

60 From p. 57 Need - La heads reported
Need Larry Ogren history
26 June 01 Motored to MarQueas - photo of
Tuesday 2 types of Mangroves growing in water
shipwreck near Boca Grande.

found it
photo
taken

Motored toward Ellis Rock using GPS of
LCI Roberta 1 & 2 positions from Yucatan
green turtle (Greg Carter year 2000) track
Didn't proceed further toward Ellis due
to boat having taken on some water -
plug wasn't in properly. Back to
MarQueas shallows - interior of "atc"
juvenile loggerhead seen surfacing several
times along edge of or in channel. I
saw a
7
large Barocuda seen

saw a
7

From the Turtle Kraal Museum:

Of the various Caymanian turtle boats that put into Key West, none was more beloved than the A.M. Adams. Captained by Allie Ebanks and crewed by men whose fathers and grandfathers had ben turtlers, the schooner Adams brought back cargo after cargo of green turtles from the Miskito Cays, Nicaragua.

In 1960, local historian and photo-journalist Wright Langley accompanied the Adams on one of its voyages. His photographs are featured in the Turtle Kraals Museum and tell the story of a by-gone era, for the Adams made its last trip in 1971.

From the Turtle Kraal Museum:

During the 19th century live shipment of turtles, while possible, was limited to major seaports, so other methods were explored to expand the market for green turtle meat. As early as 1849, a turtle soup and meat-canning factory was opened in Key West. Operated by a Mr. Gunn of Dublin, it closed after two years. In 1857, a Mr. J.J Harrison opened another short-lived cannery. It was not until Armand Granday opened his cannery in the late 1800s that Key West became known for its canned turtle soup.

Described as a "celebrated French chef" by historian Jefferson Browne, Granday opened a factory on Elizabeth Street where the V.F.W Hall is today. Made with his secret recipe, Granday's soup soon established a worldwide reputation and earned him a small fortune. In 1940, he retired, selling the cannery and recipe to his nephew, Louis Mouton.

Norbert Thompson bought the business from Mouton's estate in 1910, and Thompson Enterprises continued to can turtle soup using the Granday recipe until 1957. In addition to using the turtle in their own products, Thompson Enterprises shipped canned meat and dried parts to other companies for use in making their soups.

Turtles were caught by Key Westers as long as there was abundance in local waters. By the early 1900s, however, the green turtles population had declined considerably, and turtlers from Grand Cayman were supplying the Key West market with turtles from the coast of Nicaragua.

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Reservations: 1-800-362-3495



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Maui's HIDDEN SECRETS

1. Discover the motherlode of treasure from the *Nuestra Senora de Atocha*, the royal galleon that went down in 1622 at the height of Spain's power. Collector-quality gold doubloons, pieces of eight, emeralds and treasure from the *Atocha* are for sale at the Maui Ocean Center gift store (Map A:Inset). The Spanish galleon was discovered by world-famous treasure hunter Mel Fisher and marine archaeologist and conservator James Sinclair, who helped direct the archaeological excavation. Maui Ocean Center is open 9 a.m.-5 p.m. daily, 270-7061.



58

62

(24° 42.804' N
80° 56.693' W

Between east & west
turtle reef / 24° 43.02
80° 59.34

Maui's HIDDEN SECRETS

1. Discover the motherlode of treasure from the *Nuestra Senora de Atocha*, the royal galleon that went down in 1622 at the height of Spain's



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69
Ashley
9/30/02

72 hours

83153128309

er details

**Florida Keys 2002
Sea Turtle Workshop**

George Balazs
Marine Turtle Research
NMFS Honolulu Lab

Date: Thu, 26 Jul 2001 06:52:35 -1000
 From: Marc Rice <mrice@hpa.edu>
 To: gbalazs@honlab.nmfs.hawaii.edu
 Subject: coordinates of Atocha

FL reduce

[Part 1, Text/PLAIN 27 lines.]
 [Unable to print this part.]

I don't know what the 'feet' means... I also haven't plotted this yet so I don't know but it seems like it is 10-20 miles west of the Marquesas.

TREASURE SALVORS, INC., a corporation, and Armada Research Corp., a corporation, Plaintiffs, v. The Unidentified Wrecked and ABANDONED SAILING VESSEL, Her Tackle, Armament, Apparel and Cargo Located within 2500 Yards of a Point at Coordinates

24 degrees 31.5 feet North Latitude and 82 degrees 20 feet West Longitude,

Said Sailing Vessel is BELIEVED TO BE THE NUESTRA SENORA DE ATOCHA, Defendant, No. 75-1416-Civ-WM. UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF FLORIDA (408 F. Supp. 907; 1976 U.S. Dist. LEXIS 16852), February 3, 1976.

This is the first legal action by Mel Fisher to secure ownership of the Atocha and her treasure. At this time, Mel brought suit against the ship herself.

--
 Marc R. Rice
 Assistant Headmaster
 Director, Sea Turtle Research Project
 Hawaii Preparatory Academy
 Phone: 808 881 4004
 Cell: 987 6903
 Fax: 808 881 4004

SECRETS

1. Discover the whereabouts of treasure from the Nuestra Señora de Atocha that went down in 1622 at the height of Spain's power. Collector-quality gold doubloons, pieces of eight, Spanish coins and more.

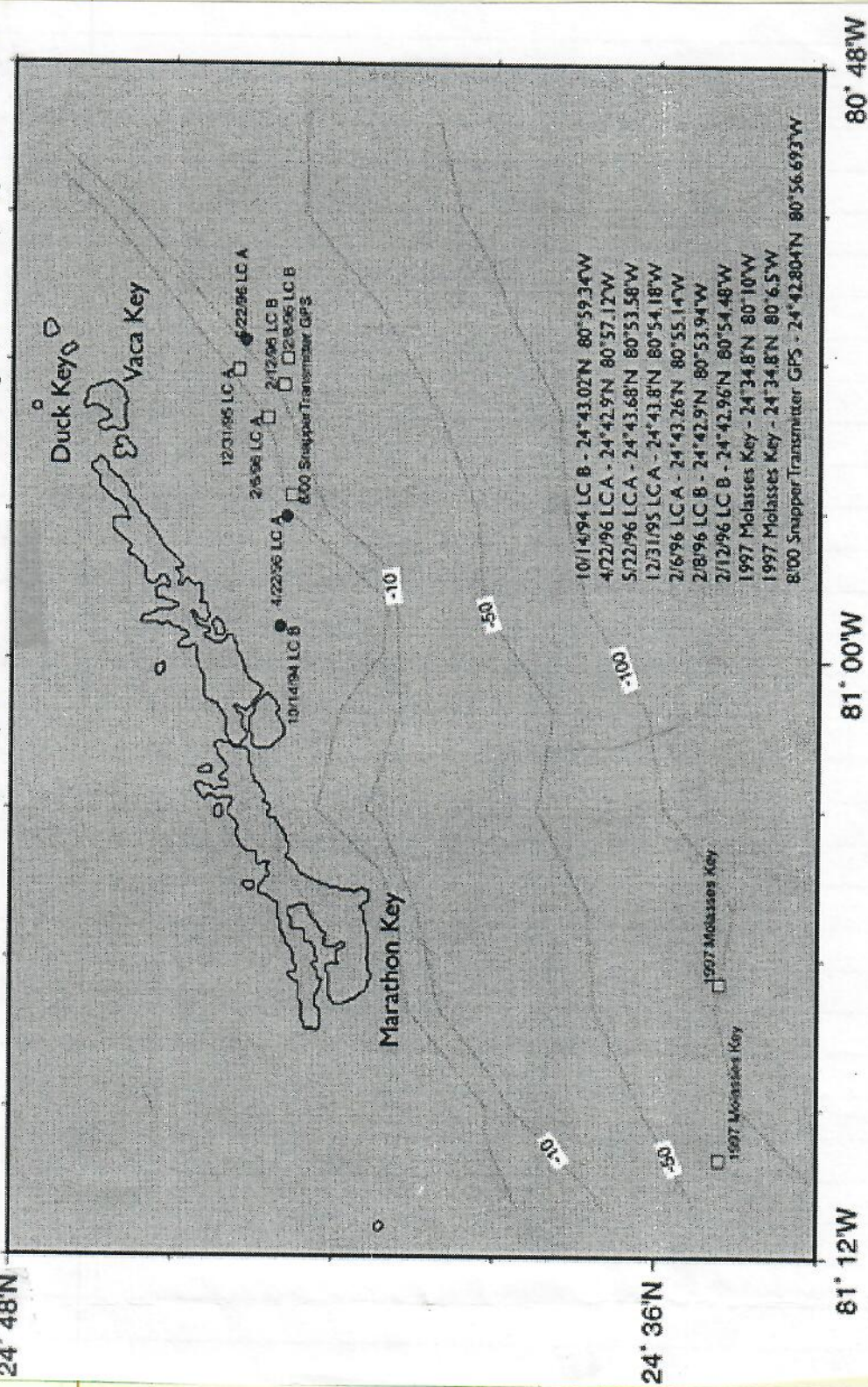
Ocean Center gift store (Map A inset). The Spanish galleon was discovered by world-famous treasure hunter Mel Fisher and his crew. Archaeologist and collector Marc Rice will talk about the archaeological excavations.

Center is open 9 a.m. - 5 p.m. daily 2/26-2/28.



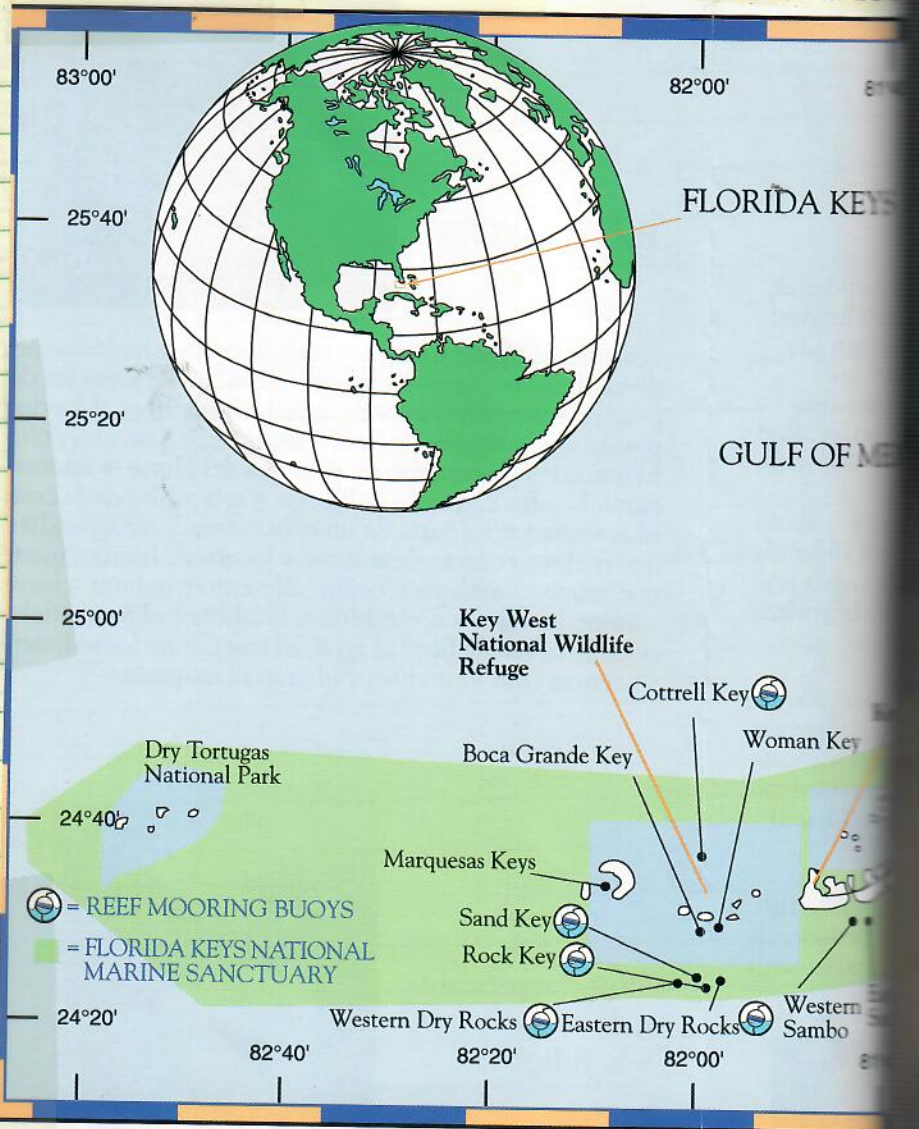


Green Turtle Endpoints Marathon and Duck Keys, FL Depth given in meters



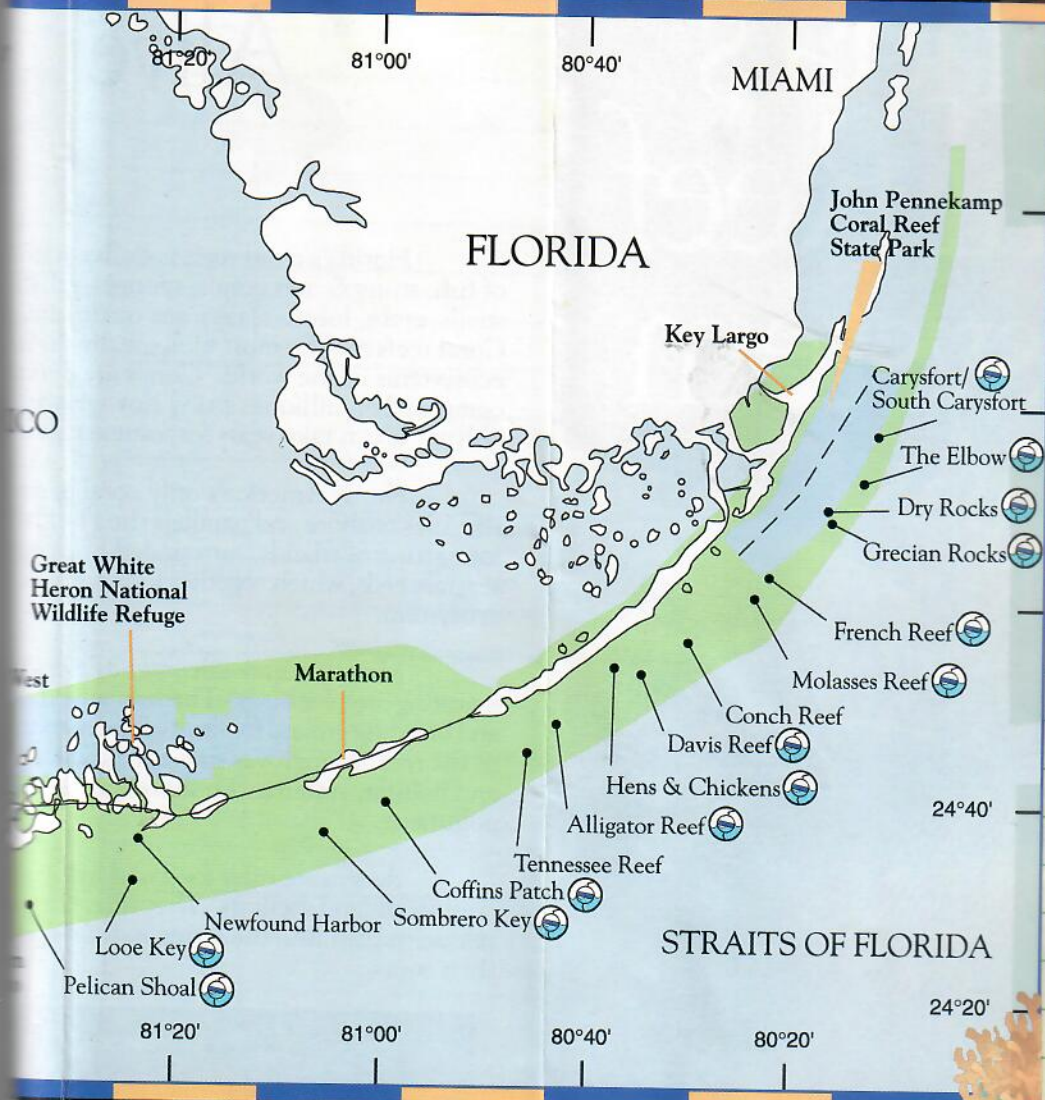
GMT Map created by Denise Parker 05/2001
National Marine Fisheries Service

Location of Reef Mooring



Reef mooring buoys off Key Largo, Islamorada, Marathon, and Looe Key are maintained by the Florida Keys National Marine Sanctuary, those off Key West by REEF RELIEF, those off Little Torch Key by Little Palm Island and the

ing Buoys in the Florida Keys



Florida Keys National Marine Sanctuary;
Dry Tortugas by the National Park.

© Center for Marine Conservation,
revised with permission.

What Are Seagrasses?

Seagrasses are flowering plants that live underwater. Like land plants, seagrasses produce oxygen. The depth at which seagrasses are found is limited by water clarity because they require light. Although seagrasses occur throughout the coastal areas of the state, they are most abundant from Tarpon Springs northward to Apalachee Bay. Seagrasses occur in protected bays and lagoons and also in places along the continental shelf in the Gulf of Mexico.

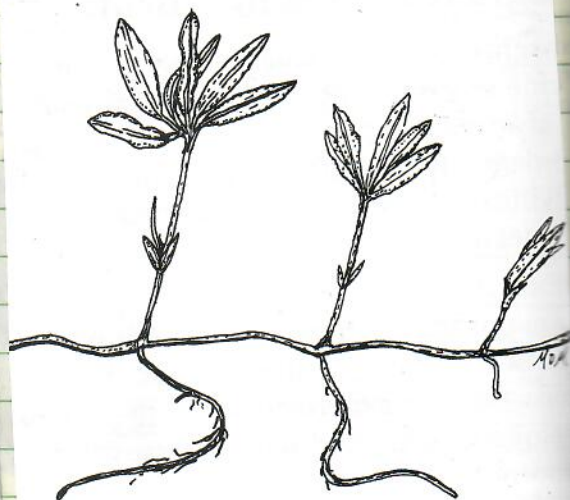
Florida's estimated 502,000 acres of seagrasses are important natural resources that perform many significant functions: 1) they help maintain water clarity by trapping fine sediments and particles with their leaves; 2) they can stabilize the bottom with their roots and rhizomes in much the same way that land grasses retard soil erosion; 3) they provide habitat for many fishes, crustaceans, and shellfish; 4) seagrasses and the organisms that grow on them are food for many marine animals; and, most importantly, 5) they are nursery areas for much of Florida's recreationally and commercially important marine life.

Seagrass leaves provide excellent protection for young marine animals from larger open-water predators. Some animals, such as manatees, eat seagrass blades. Other animals derive nutrition from eating algae and small animals that colonize seagrass leaves. These colonizing organisms provide an additional link in the marine food chain.

Mangroves are tropical trees that have adapted to the saltwater environment. They provide habitat and a nursery and feeding ground for hundreds of species of fish and other sealife. Mangroves stabilize the shoreline by trapping debris and silt, and filter land-based source of pollution.



Turtle-grass
(*Thalassia testudinum*)



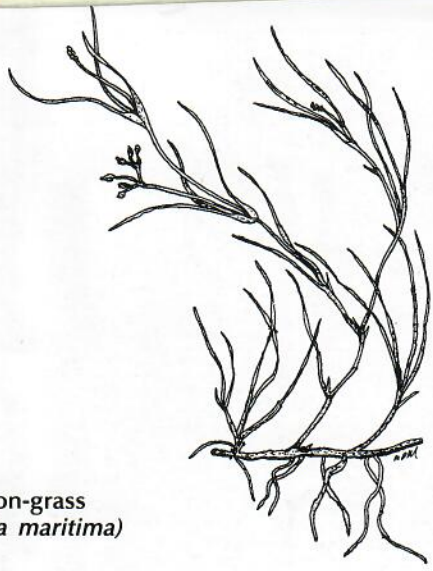
Star-grass (*Halophila engelmanni*)



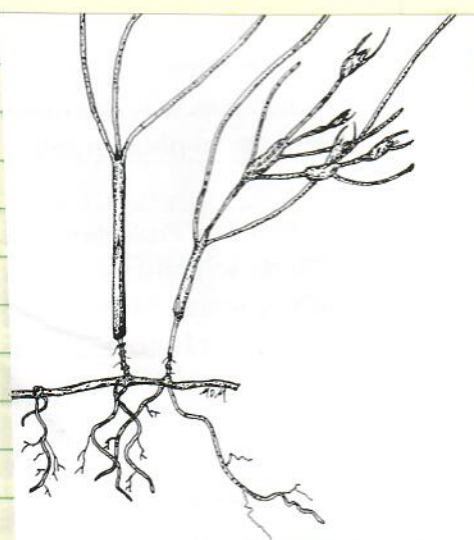
Johnson's Sea-grass
(*Halophila johnsonii*)



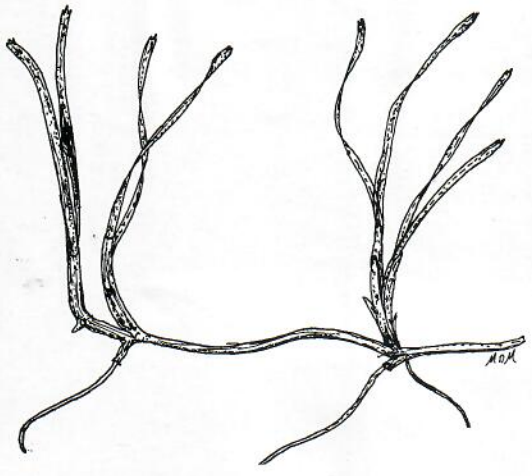
Paddle-grass
(*Halophila decipiens*)



Widgeon-grass
(*Ruppia maritima*)



Manatee-grass (*Syringodium filiforme*)



Shoal-grass (*Halodule wrightii*)