FINAL REPORT TO

NOAA

THE NATIONAL MARINE FISHERIES SERVICE

IN-WATER POPULATION STUDIES OF MARINE TURTLES ON THE EAST-CENTRAL FLORIDA COAST; SEPTEMBER, 1999 THROUGH DECEMBER, 2000.

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INTRODUCTION

Beginning in the mid-1970's the UCF Marine Turtle Research Group (L. M. Ehrhart, P.I.) began to study the population ecology of immature green turtles and loggerheads in Mosquito Lagoon, the northern reach of the Indian River Lagoon system (IRLS), on the east central Florida coast. At that time the UCF group and another led by Larry Ogren of NMFS (working on the Gulf coast near Cedar Key), were the only researchers using large-mesh tangle nets for the live capture of marine turtles, in order to study the structure and relative density of wild populations. The UCF group experienced modest net capture rates but the overall understanding of population structures was enhanced by windfalls of data obtained during cold-stunning events in 1977 and 1981. Using the techniques developed and refined in Mosquito Lagoon between 1975 and 1981, the UCF group shifted its net-capture work to the central region of the system, near Sebastian Inlet, in 1982. That work has continued, at varying levels of effort, to the present day. The tangle net method was adapted for use in an entirely different developmental habitat, the worm-rock reefs in the near-shore Atlantic waters off northern Indian River County, Florida, in 1989.

Before June, 1995, none of the "in-water" research in the lagoon or on the reefs had been supported by external grants or contracts. Throughout the early to mid-1980's the levels of effort (and therefore sample sizes) were relatively high, especially in the summers, but from 1989 to 1995 the paucity of funding forced a marked decrease in the levels of effort dedicated to the study of these populations. The work continued at suboptimal levels in the summers, when student assistants volunteered their time and expenses (e.g., fuel) could be covered by funds internal to the university, but the capability to work during the cooler months was seriously diminished. This was true in spite of the fact that it was clear by that time that capture rates for green turtles were greatest during the late fall, winter and early spring. Then, in 1995, the

National Marine Fisheries Service provided funding to support the field work on the lagoon and reef for one year. As a result, the research effort flourished and produced significant, even extraordinary, results.

The long-term project underwent another funding hiatus from June, 1996 through August, 1997 but the field work continued at a moderate level of effort, again with resources internal to the university. There were noteworthy results during that time, including the observation of significantly reduced capture rates (and therefore, reduced relative population densities) for green turtles in the Indian River Lagoon in the summer of 1997. Also, for the first time in eight summers of work and with nearly 200 green turtles examined, a significant prevalence of fibropapillomatosis appeared in the population of reef-dwelling juvenile green turtles, although the level of affliction was mild in every case. The long-term study received another "shot-in-the-arm" when the National Marine Fisheries Service provided operating funds for the period from September, 1997 through August, 1998. CPUE rates observed during that time indicated that loggerhead population density in the central region of the IRLS had not changed over the 15 year span of the study. Green turtle CPUE, on the other hand, was significantly higher, indicating a greater relative density of green turtles in the lagoon. CPUE rates on the nearshore reef were consistently higher than in the lagoon but there was no statistically significant trend.

The work on the reef and lagoon populations underwent another funding gap between September, 1998 and August, 1999. Once again the research continued at a somewhat reduced level of effort. During that period the patterns in lagoon loggerhead and green turtle CPUE remained unchanged but capture rates on the reef rose to unprecedented levels. Funding to support continued field work from September, 1999 through December, 2000 was then acquired from NMFS and it is that work that is the subject of this report. What follows, then, is a compilation and

analysis of research results relative to the green turtle population of the near-shore reefs and to the green turtle and loggerhead populations of the central Indian River Lagoon, from September, 1999 through December, 2000. The report is organized with reference to the objectives stated in the proposal, as follows:

1. To continue to define long-term trends in relative population density of loggerheads and green turtles in the Indian River Lagoon system through seasonal live capture in tangle nets and analysis of CPUE.
2. To provide an index to long-term relative density of green turtles dwelling over near-shore worm-rock reefs in northern Indian River County, Florida, through live capture in the summer and analysis of CPUE.
3. To continue to quantify the size and age structures of lagoon loggerhead and green turtle populations and of the reef-dwelling green turtle assemblage and to relate those data to the long-term trend.
4. To further our understanding of the ecological geography of these loggerhead and green turtle assemblages.
5. To monitor the prevalence of fibropapillomatosis in two wild populations of green turtles on the east Florida coast.
6. To compare and contrast the biological attributes discussed above for lagoon and reef dwelling green turtles.
7. To attend and fully participate in an "in-water' studies workshop convened by NMFS in FY 2000.

METHODS AND STUDY AREAS

Turtle populations were studied in two foraging habitats. One is in the Indian River Lagoon System which extends 260 kilometers along the east coast of Florida from Ponce DeLeon Inlet to Jupiter Inlet (Figure 1). All of the netting effort in the IRLS

Figure 1. The Indian River Lagoon System including the locations of the primary lagoon and reef netting sites.

during this contract period has been expended in a large embayment 3 km south of Sebastian Inlet, unnamed on maps but known as South Bay by local commercial fishermen and residents. The standard netting site is within 1 km of the eastern shore at 27° 49' N, 80° 27' W. The central region of the IRLS averages 1.5 meters in depth and exceeds 3 meters only in dredged channels and basins. The study area is on the relatively undeveloped eastern side of the lagoon. The undisturbed areas of shoreline are lined with red mangroves (Rhizophora wrightii). Sea grass beds composed primarily of manatee grass (Syringodium filiforme) and shoal grass (Halodule wrightii) are found in areas less than one meter deep. The sea grass Halophila decepiens is also found in deeper waters next to the manatee and shoal grass beds and in areas of drift algae. Large areas of drift algae, including Gracilaria sp., Acanthoptera specifica, Bryothamnion seaforthii, Hypnea sp., and Solieria filiformis can be found in deeper waters adjacent to the grass beds.

The other study area is in the system of Sabellariid worm reefs that extend along the Atlantic Coast of Florida from Cape Canaveral southward to Biscayne Bay. The reefs are formed by a species of polychaete worm (Phragmatopoma lapidosa) in the Sabellariid family. These worms cement sand grains and fragments of shells into tubes; the aggregations of which form the reefs. These reefs extend from the intertidal zone to a depth of approximately 10 meters in a series of linear structures parallel to the shoreline. The reefs provide a substrate for the growth of at least 109 species of benthic marine algae; primarily red algae (Rhodophyta), but also green (Chlorophyta), brown (Phaeophyta), and blue-green (Cyanophyta) algae (Juett et al., 1976).

Turtles are captured through the use of large mesh tangle nets. The nets are approximately three meters deep with a 40 cm stretch (knot to knot) mesh size. They are hung from a braided polypropylene top line that is suspended at the surface by floats attached at intervals during deployment. The bottom line is braided

polypropylene with a continuous lead core. In the lagoon 192 to 455 meters of net is set, depending on weather conditions. Over the Sabellariid worm reefs 220 meters of net is set.

In the lagoon the nets were deployed during daylight hours for varying lengths of time and were tended assiduously. The net was checked constantly by pulling hand over hand along the top line from the bow of a 15', 17' or 19' Boston Whaler boat. The nets were soaked for a total of 15.18 hours (6.98 km hours of effort) in the fall of 1999, 23.35 hours (10.74 km hours) in the winter of 2000, 33.02 hours (15.19 km hours) in the spring of 2000, 23.60 hours (10.86 km hours) in the summer of 2000 and 18.98 hours (8.73 km hours) in the fall of 2000. The seemingly limited number of km hours in fall and winter are reflective of the combination of high capture rates (many turtles, each requiring extensive processing), relatively short day length (the need to finish measuring, weighing, tagging, PIT-tagging, blood sampling, photographing, fibropapilloma mapping, etc.) and the desirability of releasing captured animals before sunset. On many occasions the nets were retrieved earlier than anticipated so as not to overwhelm our capacity to process captured animals and to shift personnel to the tasks of handling, measuring, etc.

Ocean surface conditions only allow net deployment over the reefs during the summer months (as noted in our proposal), and even then there are many days when the surf conditions are too rough to work. Usually by early afternoon the rising sea breeze or thunderstorms force netting operations over the reefs to stop. When conditions do allow the net to be set, relays of swimmers equipped with mask, snorkel, and fins continuously patrol its length. Nets were deployed over the reefs for 3.92 hours (0.86 km hours) in the late spring and for 11.60 hours (2.55 km hours) in the early summer. Adverse ocean surface conditions and poor visibility prohibited work on the reef after the end of July, except for one day, August 18, when tropical storm-

related conditions relented enough to permit one last day of reef netting.

In the lagoon, when a turtle becomes entangled it is immediately brought aboard and freed from the net. Measurements are made of its standard carapace length (SCL), total carapace length, straight-line carapace width, head width, and body depth by use of forestry calipers. Curved carapace length, curved carapace width, plastron length, the distance from the posterior tip of the plastron to the vent and from the posterior tip of the plastron to tip of tail are measured by use of a cloth tape. A spring scale is used to obtain weight. Each animal was double tagged externally, one inconel tag on the trailing edge of each front flipper. The tags were purchased from the Archie Carr Center for Sea Turtle Research (UF, Gainesville). Each turtle was photographed and released near its capture location. Over the reef, captured turtles were disentangled at the surface and then transferred to a boat by means of a long-handled dip net. In most cases ocean surface conditions were too rough to allow for effective weighing, measuring, etc., so turtles captured over the reef were taken to land for processing.

Determining the abundance of marine turtles by a direct visual census is at best difficult, and in many of their habitats impossible. The latter is the case with both the Indian River Lagoon System (IRLS) and Sabellariid worm reef marine turtle populations. Instead, catch per unit effort (CPUE) data can be used as an index of relative abundance (Ricker, 1958). The unit of effort for this study was standardized as the net kilometer-hour, i.e. one kilometer of net in the water (net soak) for one hour. CPUE was calculated using the formula C/(L x T) where C = the number of captures, L = the length of net used, and T = the amount of net soak time.

Previously, the IRLS loggerhead and green turtle CPUE data were analyzed to determine if there was an increase or decrease in relative abundance of either species over the 16 year period through 1998, and if cyclic fluctuations in their relative

abundance occurred from season to season. To test the null hypothesis that there were no significant changes in the relative abundance of either species recently, the 1999-2000 CPUE data were compared statistically to those from the early years (1983-85), mid years (1988-90), later years (1993-95) and recent years (1996-1998). Because netting operations have been consistently conducted during the months of June and July each year from 1983 through 2000, while netting during other months was not conducted as consistently over the years due to time and budget constraints, only the data from June and July were used in these comparisons. This also minimized the possible influence of environmental variables such as water temperature, hours of daylight and food availability.

To quantify within-year cyclic fluctuations, CPUE data obtained for each species during the winter (December 22 to March 21), spring (March 22 to June 21), summer (June 22 to September 21), and fall (September 22 to December 21) were compiled and statistically compared to test the null hypothesis that there are no significant differences in relative abundance from one season to another.

Because netting over the Sabellariid reefs is generally only feasible during late May, June and July, it was not possible to look for within year cyclic fluctuations. The Sabellariid worm reef CPUE data obtained during this contract year were compared statistically with those from seven previous years to test the null hypothesis that there were no significant changes in the relative abundance of green turtles over the span of the study.

Due to the non-normal distribution of CPUE data, the Kruskal-Wallis nonparametric ANOVA test was used. When there were significant differences between samples, Dunn's multiple comparison test was used to determine which of the samples were significantly different from others in the data set. All statistical tests were performed using InStat for the Macintosh, published by GraphPad Software, Inc.

RESULTS AND DISCUSSION

Relative Population Size

Indian River Lagoon System

From 15 September, 1999 through 31 December, 2000 tangle nets were set in the Indian River Lagoon System 30 times for a total of 52.5 hours. During those netting sessions 44 loggerheads and 140 green turtles were captured.

Loggerheads

The mean loggerhead CPUE for the contract period was 0.97 (Table 1). The loggerhead CPUE was analyzed for seasonal differences and for departure from the long-term trend (1983-1998) in population density.

Seasonally, the average CPUE varied from a low of 0.44 in the fall of 1999 to a high of 1.62 in the winter of 2000 (Figure 2), but the difference was not statistically significant (K-W statistic = 4.75, P = 0.314). Table 2 contains the seasonal loggerhead CPUE data. As can be expected with a single year of data, the seasonal CPUE averages differed somewhat from the long-term seasonal averages reported by Ehrhart et al. in 1996 (Figure 2). The fall and spring averages were lower than the long-term while the winter and summer averages were higher.

To be consistent with methods utilized by Ehrhart et al. (1996) to examine the long-term population trend, the loggerhead CPUE data from the months of June and July were combined for the years 1983-85, 1988-90, 1993-95, and 1998/2000. These data were analyzed statistically to look for any trend in population density (Figure 3). The results of that analysis (K-W = 1.692, P= 0.639), and an examination of Figure 3 indicates that the loggerhead population density in the central region of the IRLS has not changed over the 17 year span of the study.

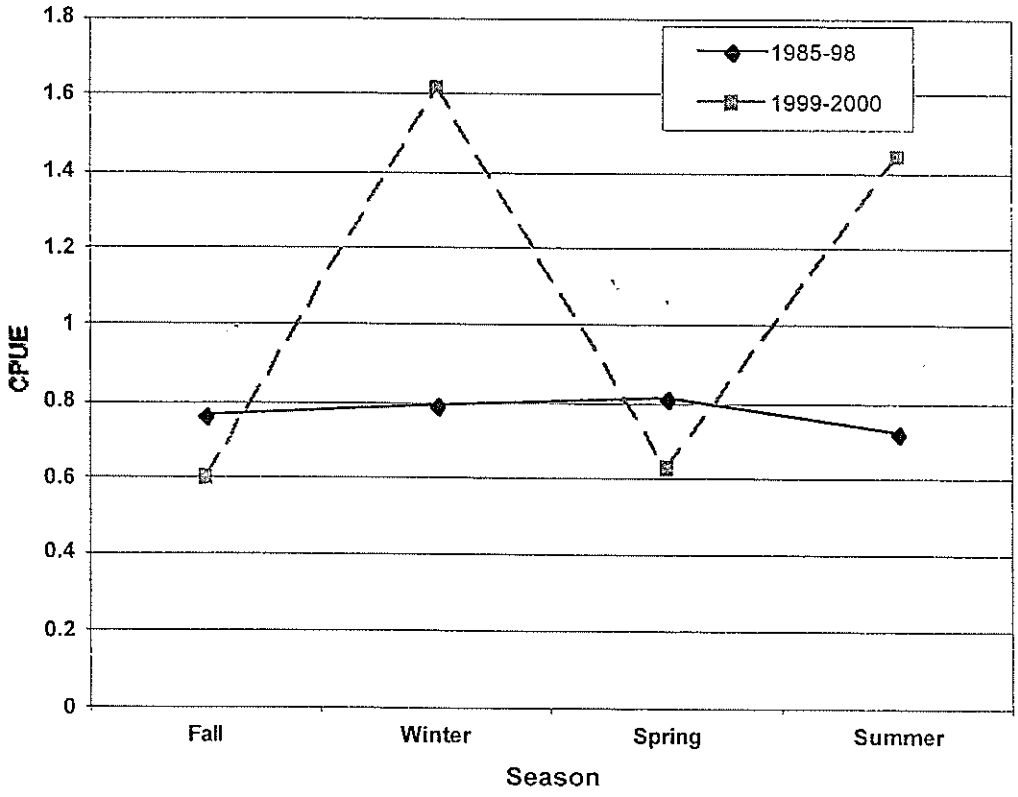

Figure 2. Seasonal variation in loggerhead CPUE, 1985-98 vs. 1999-2000.

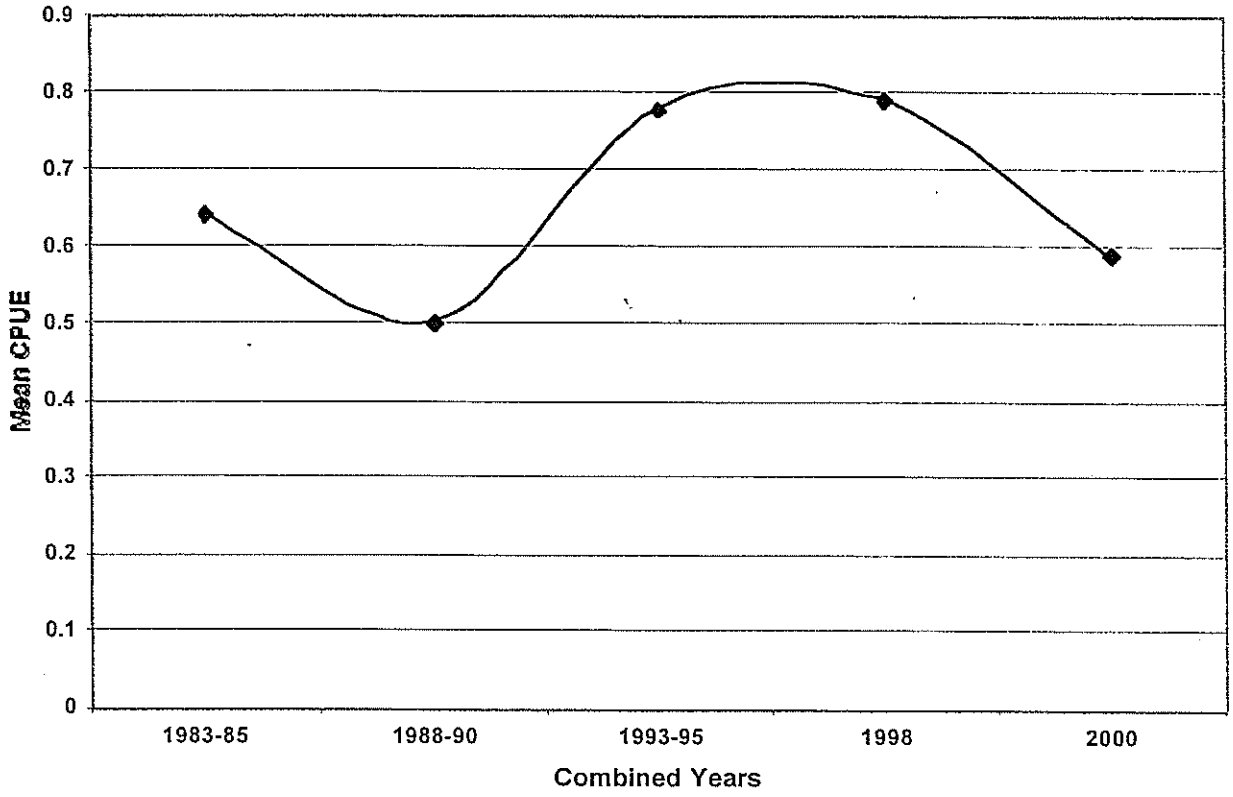

Figure 3. Long-term trend in loggerhead population density.

Green Turtles

The overall green turtle CPUE for the contract period was 2.89 (Table 1). As with the loggerheads, the green turtle CPUE data were analyzed for seasonal variation and for departure from the long-term population density trend.

Over the span of the contract period the seasonal CPUE (Table 2) varied from a mean of 0.65 in the spring to 5.34 in the winter (Figure 4). An analysis of the seasonal median CPUE showed a significant difference (K-W statistic = 12.32, P = 0.006). Dunn's post test showed the fall CPUE was significantly higher than that of the spring (P <0.01). The other seasons were not significantly different.

Although a statistical analysis of the data sets of the June and July CPUE for 1983-85, 1988-90, 1993-95, and 1998 and 2000 indicates there is a significant difference in CPUE between years (K-W = 35.85, P < 0.0001) an examination of Figure 5 does not reveal a trend.

Sabellariid Worm Reefs

During the 2000 reef netting season, 24 May through 18 August, nets were deployed 20 times for a total of 15.52 hours. Ninety-nine juvenile green turtles were captured during the season, yielding an overall CPUE of 38.86 (Table 3). No other marine turtle species were captured.

The average green turtle CPUEs from 1989 through 1995, 1998, and 2000 are shown in Figure 6. Although there is a statistical difference in the CPUE between years (K-W = 31.11, P < 0.0001), the fluctuations do not follow any discernible pattern. They may be the result of changes in surf conditions and water clarity from year to year, which affect netting success, rather than radical changes in green turtle population density over the reefs. It might also be the result of yearly fluctuations in the availability of the marine macroalgae species utilized by the green turtles as food.

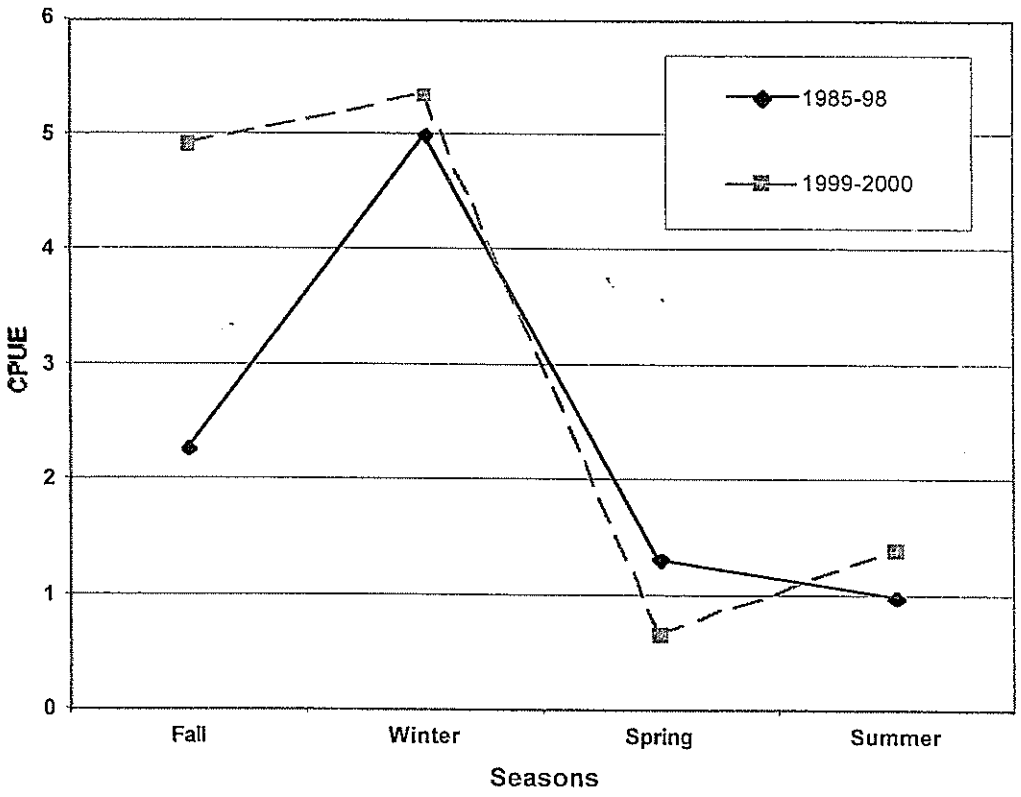

Figure 4. Seasonal variation in green turtle CPUE, 1985-98 vs. 1999-2000.

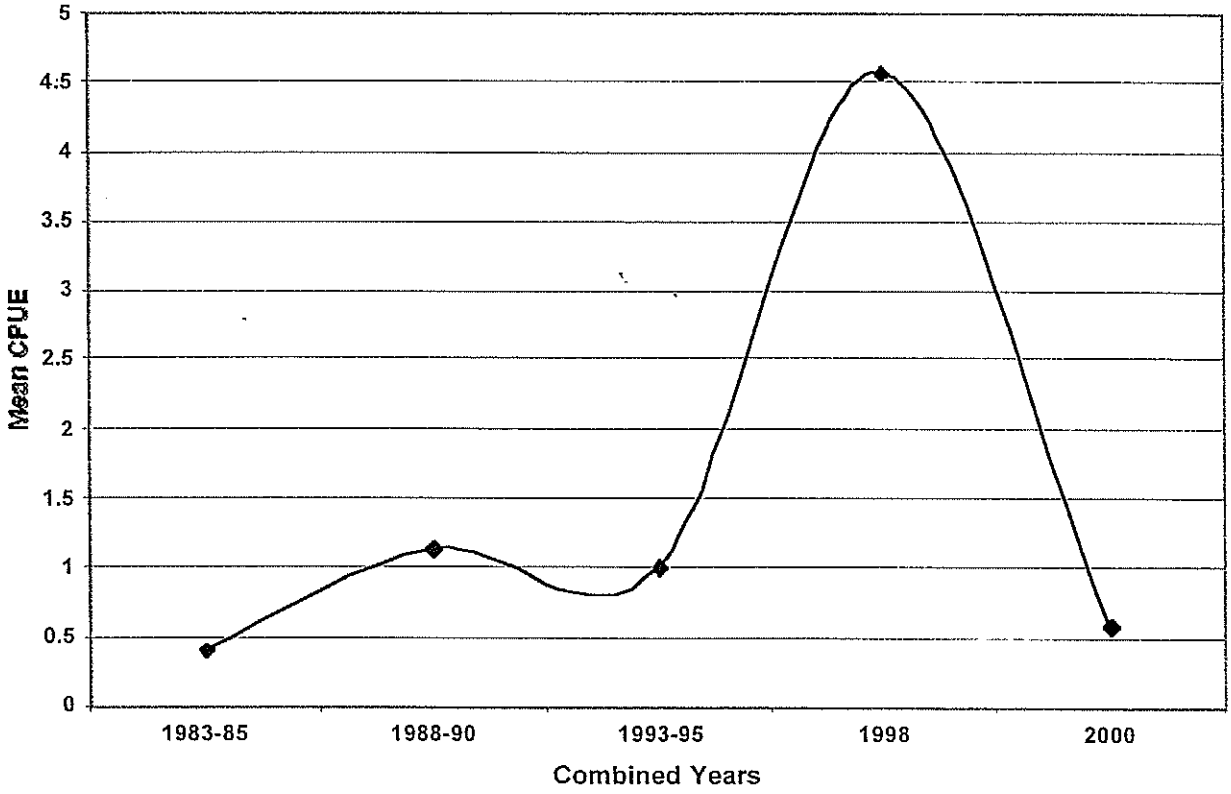

Figure 5. Long-term trend in green turtle population density.

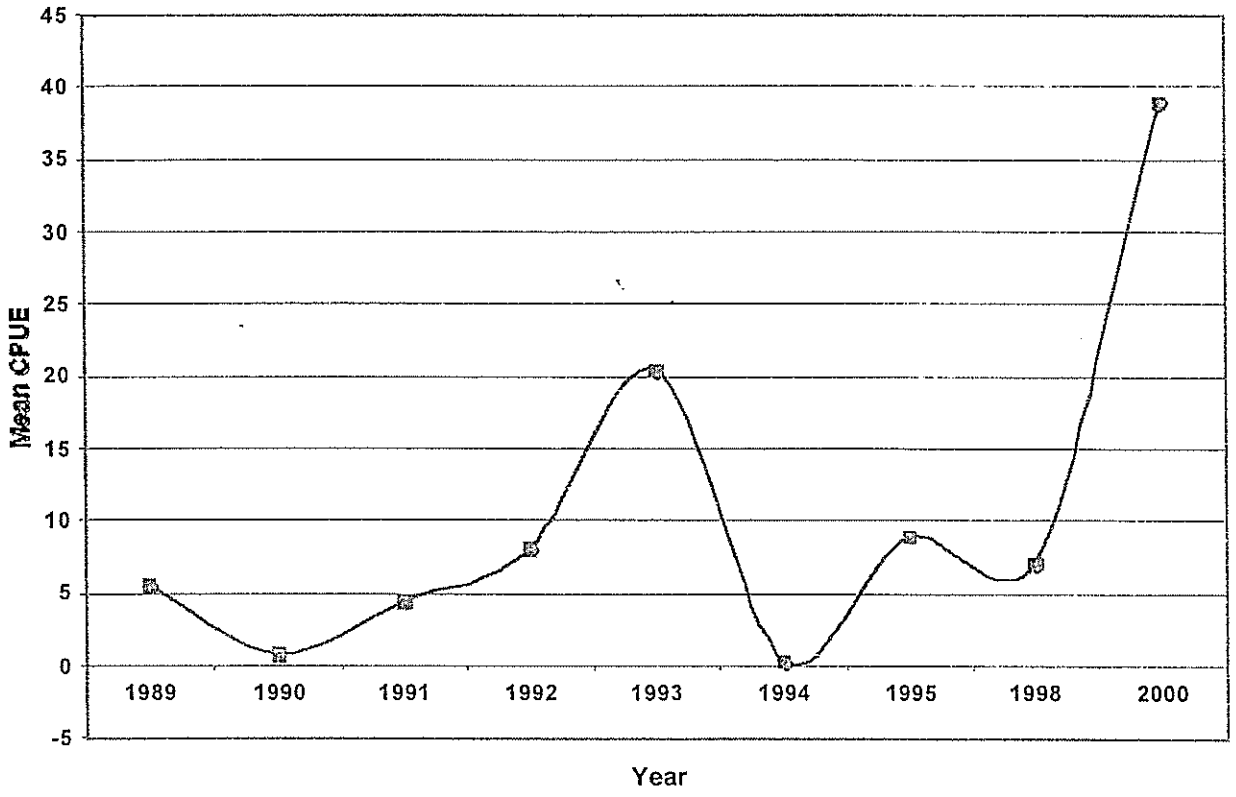

Figure 6. Long-term trend in the Sabellariid Worm Reef green turtle population density.

Population Structure

Lagoon Green Turtles

The SCL measurements for all initial capture juvenile green turtles ranged from 27.0 cm to 70.2 cm with a mean of 49.6 cm which is significantly larger ($t = 9.28$, $df = 1422$, $p < 0.0001$) than previously observed. One adult male was captured during this study (SCL = 99.5 cm) and an individual previously captured on the reef was captured in the IRLS. The range for data compiled between May, 1982 and August, 1999 was 24.3 cm to 78.6 cm with a mean SCL of 41.6 cm. Figure 7 shows the distribution of SCL measurements of initial capture green turtles during the period of 15 September, 1999 through 31 December, 2000. Figure 8 relates the SCL measurements of captures during this time period to the long-term trend from May, 1982 to August, 1999. During this study period there were fewer captures of individuals in the smaller size classes (25.0 cm to 39.9 cm) and in turn more captures of individuals in the larger size classes (40.0 cm to 64.9 cm) thus yielding a greater overall mean SCL. Table 4 contains the eight standard measurements and weight of each juvenile green turtle captured, excluding recaptures within the contract period. A summary including the median, mean, standard deviation and range of each measurement is at the end of the table. Morphometric data for the adult male is shown in Table 5.

The structure of the juvenile green turtle population in the central region of the IRLS is similar in both the mean and range of SCL measurements to that reported for some of the other developmental habitats along the Atlantic and Gulf coast of the U.S., yet dissimilar in mean and/or range to others. There doesn't seem to be a discernible geographic pattern. An extensive compilation and comparison of those other developmental habitats was provided in the 1996 Comprehensive Final Report and is not repeated here.

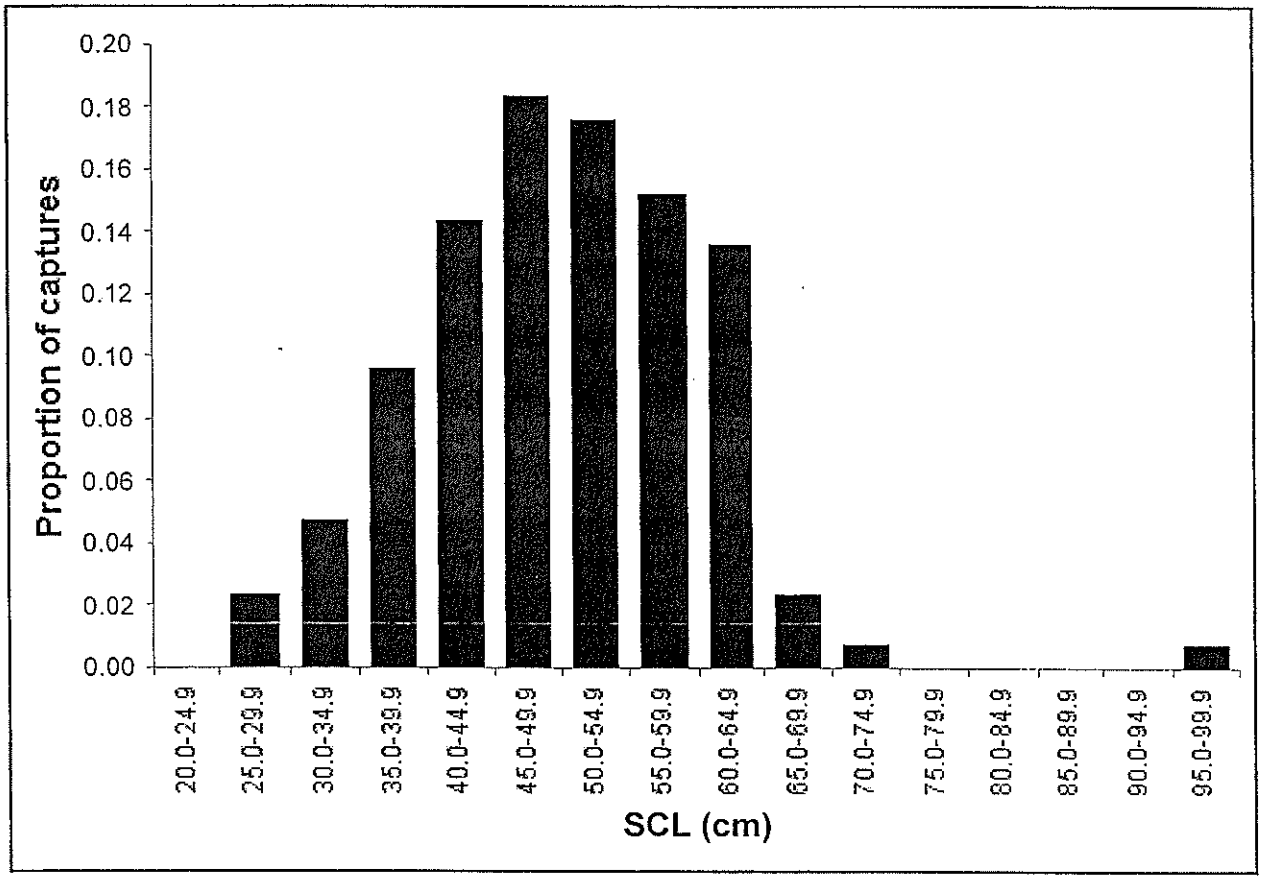

Figure 7. Distribution of the standard carapace length measurements of initial capture green turtles from the central region of the Indian River Lagoon system, Florida, from 15 September, 1999 through 31 December, 2000.

Lagoon Loggerheads

The range of SCL measurements for initial capture subadult loggerheads in the central region of the IRLS was 56.2 cm to 79.1 cm with a mean of 64.8 cm (Figure 9). Three adult females (SCL 87.5 cm, 90.9 cm, 93.9 cm) were captured during this study. The distribution of SCL measurements from 15 September, 1999 through 31 December, 2000 is given as a comparison to that from May 1982 through August 1999 in Figure 10.

Table 6 contains the eight standard measurements and weight of each subadult loggerhead captured, excluding recaptures within the contract period. A summary including the median, mean, standard deviation and range of each measurement is at the end of that table. Once again, a detailed compilation and comparison of this population of subadult loggerheads to other populations studied was reported in the 1996 Comprehensive Final Report and is not repeated here. Table 7 has the standard measurements and weights of the three adult female loggerheads captured incidentally during this time. Because of the difficulty in landing adult loggerheads in the small boats used to tend the nets and in handling them once they were aboard, weights and some measurements were not obtained for these animals.

Sabellariid Worm Reefs

The range of SCL measurements of initial capture juvenile green turtles captured over the Sabellariid worm reefs during this time period was 25.4 cm to 61.4 cm with a mean of 38.7 cm (Figure 11). This distribution is shown in comparison to the overall 1992-1999 distribution in Figure 12 where the range was 24.7 cm to 72.3 cm and the mean was 42.6 cm. Table 8 contains the eight standard measurements and weight of each green turtle captured, excluding recaptures within the contract period. A summary including the median, mean, standard deviation and range of each

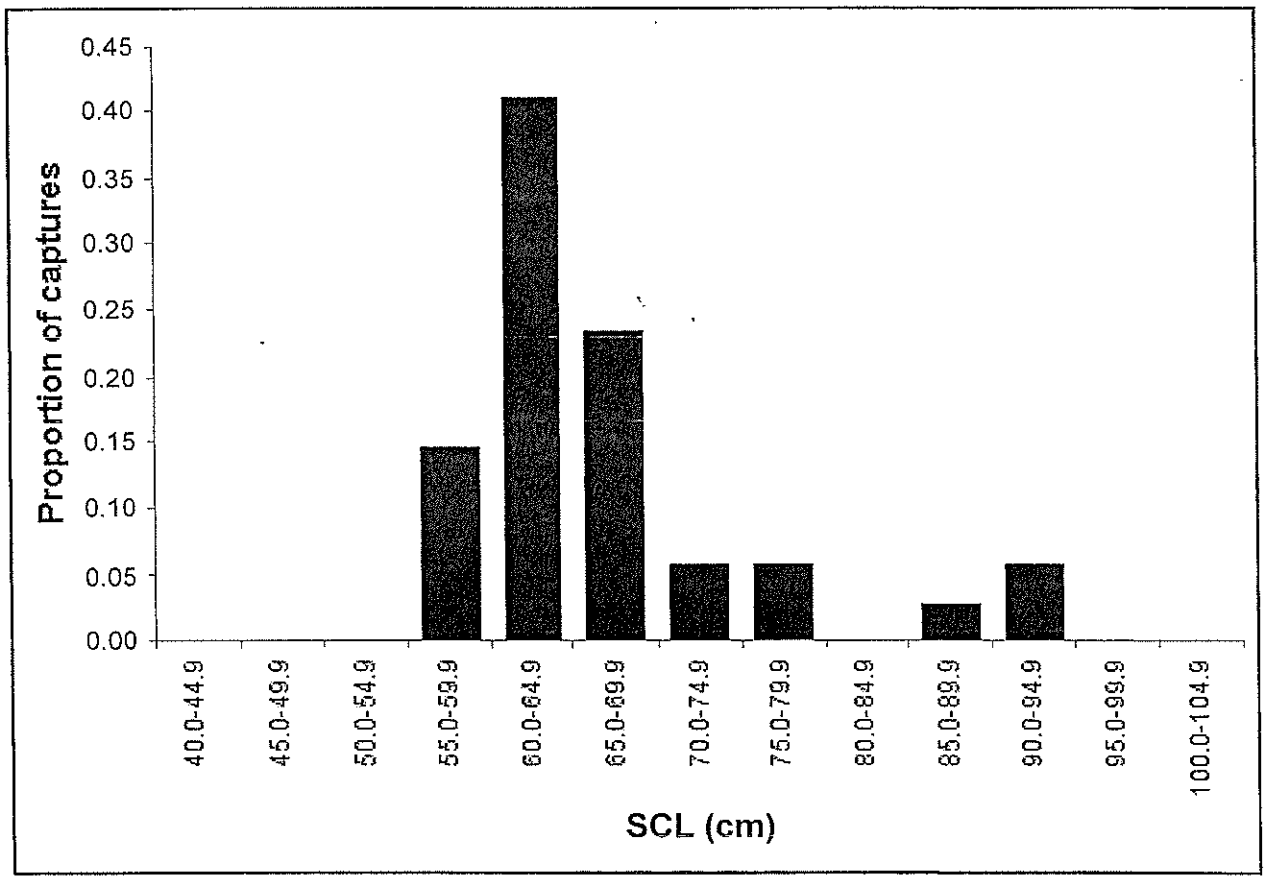

Figure 9. Distribution of SCL measurements for initial capture loggerheads from the central region of the Indian River Lagoon system, Florida, from 15 September, 1999 through 31 December, 2000.

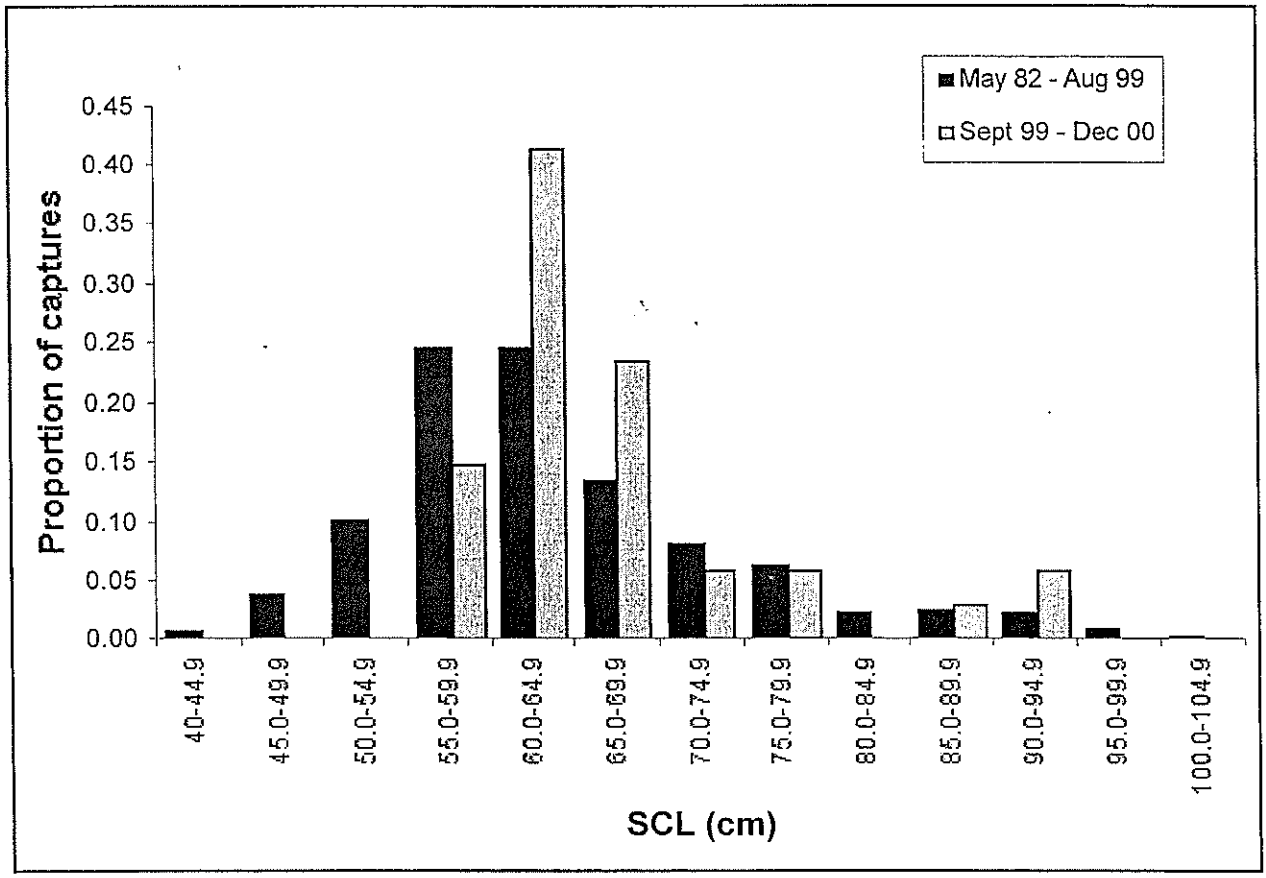

Figure 10. Distribution of the standard carapace length measurements of initial capture loggerheads from the central region of the Indian River Lagoon system, Florida.

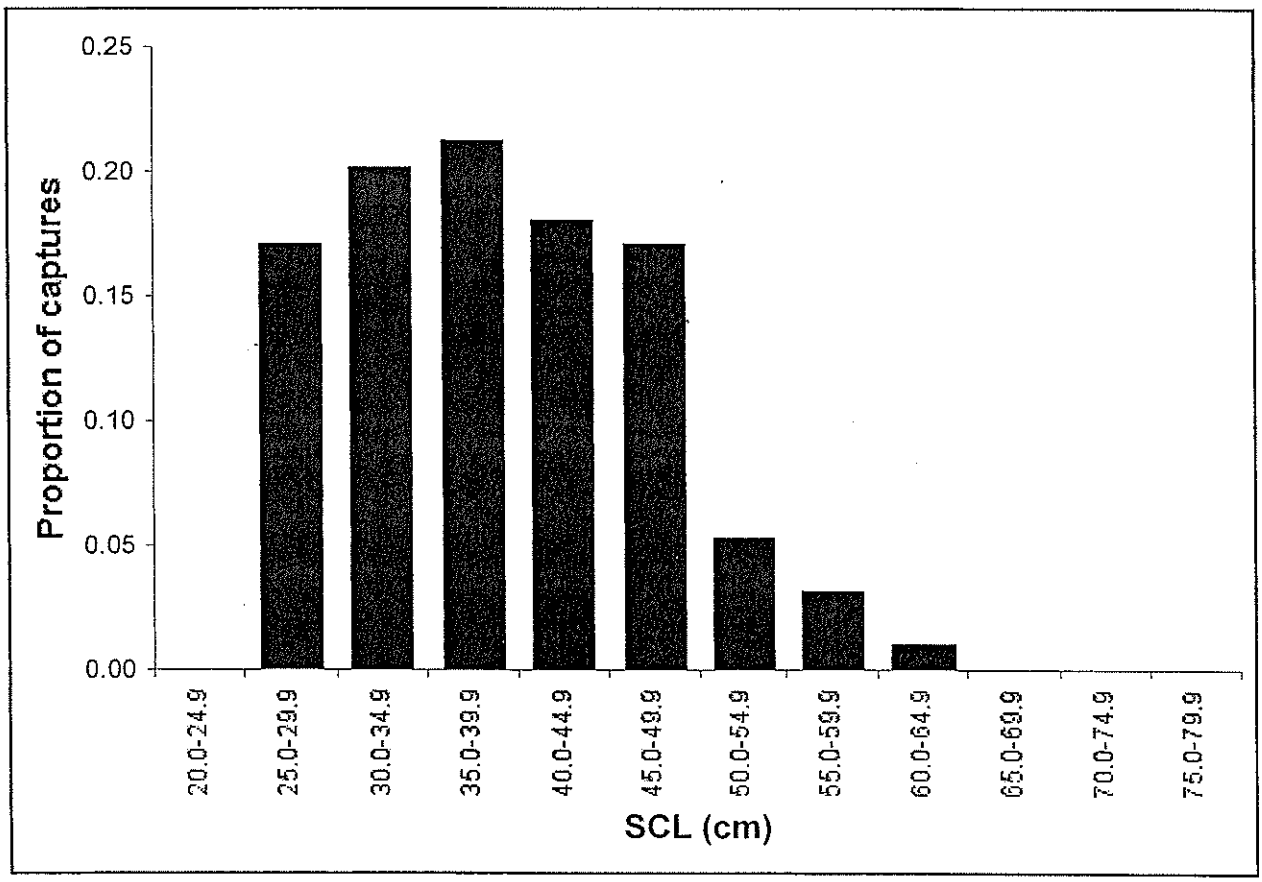

Figure 11. Distribution of the standard carapace length measurements of initial capture green turtles from the Sabellariid worm reefs, Indian River County, Florida from 15 September, 1999 through 31 December, 2000.

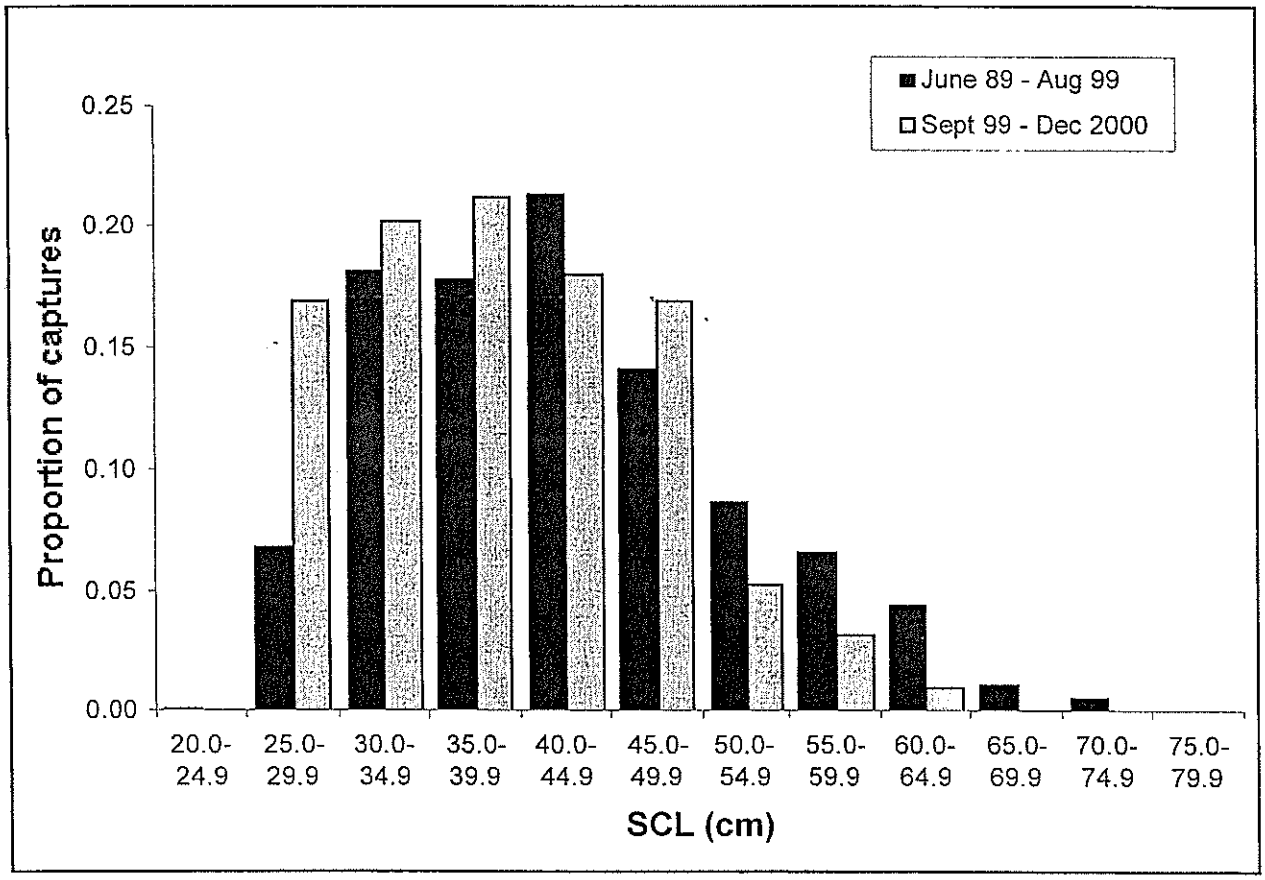

Figure 12. Distribution of standard carapace length measurements of initial capture green turtles from the Sabellariid worm reefs, Indian River County, Florida.

measurement is at the end of that table. In previous years, the structure of the reef population was essentially the same as that of the lagoon juvenile green turtle population. For the current contract period the structure of the reef population is significantly different ($t = 26.99$, $df = 93$, $P < 0.0001$) from that of the lagoon population. The mean SCL of the reef population was 38.7 cm whereas the mean SCL in the lagoon has increased markedly to 49.6 cm.

No loggerheads were captured on the reef during this time period.

Ecological Geography

Remote Recoveries

Remote tag returns are rare and although we have received quite a few, they are received occasionally and usually over long periods of time. During the time frame of this report we received only one long distance recovery of a Mosquito Lagoon cold-stunned turtle from 1989. This turtle was tagged on 27 December, 1989 and captured off Broston Bar on the northeast coast of Nicaragua in January, 2000. Cynthia Lagueux purchased the tags from a fisherman (Table 9) and notified us of the information.

Domestic Recoveries

We explained in the 1996 report that domestic recoveries of our tagged turtles have usually been within approximately a three county area (with only one exception) and that most recoveries have been in the local area, near the U.C.F. netting sites. This is what we find during this time period as well.

Loggerheads

There were no recoveries of lagoon loggerheads during the period of 15 September, 1999 through 31 December, 2000.

Green turtles

Table 10 shows that there have been four lagoon recoveries of green turtles during this time period. All four were found dead. One of these turtles was found floating in an eddy approximately three miles east of Sebastian Inlet. Two other green turtles were found washed up on the east shore of the Indian River Lagoon; both with fibropapillomatosis. One of these animals had monofilament entangled around the tumors, with both ends of the line going into the mouth. One other juvenile green was found dead in the lagoon, injured by a boat propeller and beached on one of the islands. During this same time there was also one recovery of a reef turtle (Table 11). It was found dead, in the Indian River Lagoon in Jensen Beach, Florida.

There is, however, one very special recovery from Mosquito Lagoon during this contract period. We found an adult green turtle nesting within the Archie Carr National Wildlife Refuge during the summer of 2000 that had originally been tagged by us as a juvenile in the cold stun event of 1989 at Mosquito Lagoon. To the best of our knowledge, this is the first recovery of a tagged juvenile turtle found later nesting as an adult. She is truly a Florida green turtle (Table 12).

Strange Recaptures

Occasionally during the course of our routine research work we happen to capture a turtle that was tagged by another researcher or in another habitat. While these opportunities occur infrequently, many of our "strange recaptures" are turtles tagged and released by the St. Lucie Power Plant on Hutchinson Island. During the timeframe of this report we encountered one turtle in the lagoon that had been tagged and released by our colleagues at the St. Lucie Power Plant, and one turtle that had originally been tagged by us over Atlantic nearshore reefs, seen in Table 13.

Fibropapillomatosis

Indian River Lagoon

The presence or absence of fibropapillomatous tumors on individual green turtles from the IRLS is indicated in Table 4. The data in the statistical summary at the end of that table show that 46% of the green turtles encountered in the lagoon during the period of this contract were afflicted by the disease (referred to hence as "GTFP"). The data represented in Figure 13 are similar (providing a prevalence of 47%) but compiled for the entire calendar year of 2000, so as to allow for comparisons of disease prevalence over the past three years (71% in 1998, 53% in 1999 and 47.4% in 2000). The prevalences seen in 1997 and 1998 suggested that the epizootic was enlarging and that an even greater proportion of the IRLS green turtle population was afflicted by this debilitating disease. The data from the 1999-2000 period, however, show the opposite trend in disease prevalence from the period of the last contract. The minimum and maximum of annual prevalence were 28% and 72% from 1982 to 2000 (Figure 13). The mean and standard deviation of prevalence over the past 19 years is 49.42 ± 11.37%. Prevalence was increasing from 1993 (25%) to 1998 (72%). In 1999 and 2000, however, it fell to 53 and 47%. This variation in annual prevalences of fibropapillomatosis over 19 years suggests that the degree of affliction is remaining relatively stable in the Indian River Lagoon population.

Sabellariid Worm Reefs

The presence or absence of fibropapillomatous tumors on individual green turtles from the reef habitat is indicated in Table 7. The data in the statistical summary at the end of that table shows that 12% of the green turtles encountered over the reef during the period of this contract were afflicted by the disease. The data are graphed for the 2000 calendar year in Figure 14 and correspond identically to those in Table 7

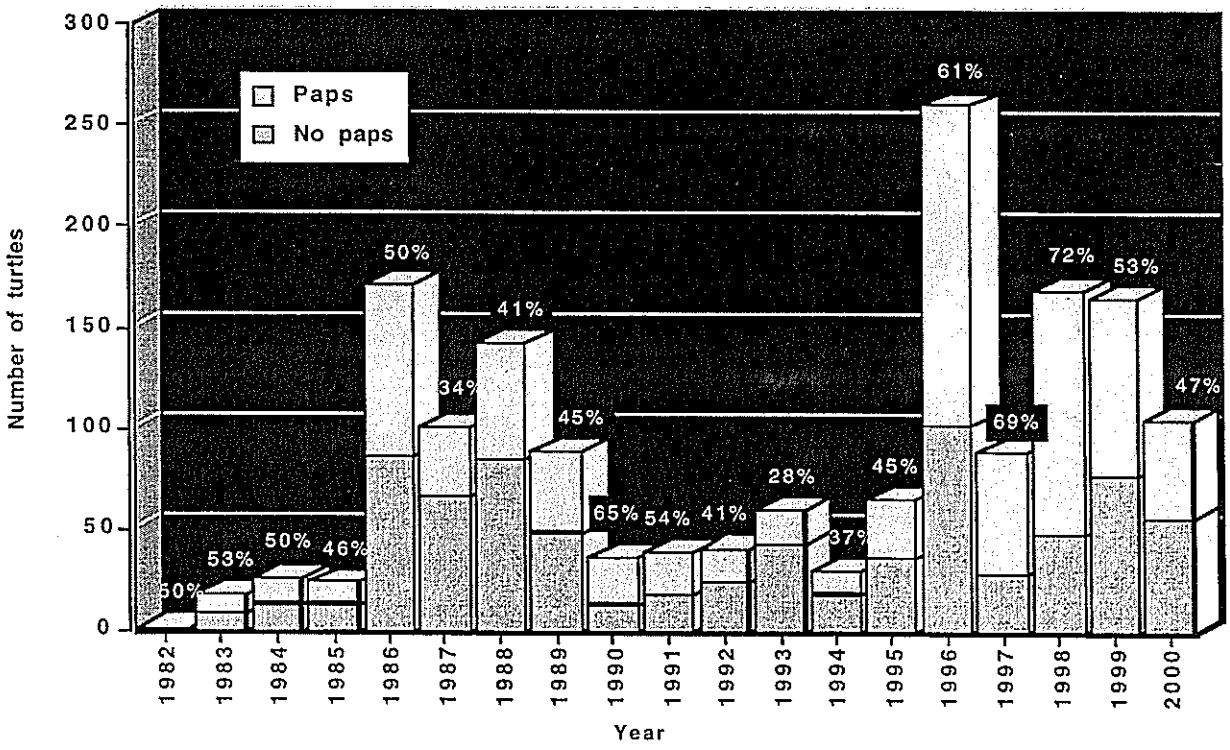

Figure 13. Long-term fibropapillomatosis prevalence in juvenile green turtles captured in the Indian River Lagoon, Indian River County, Florida, 1982-2000.

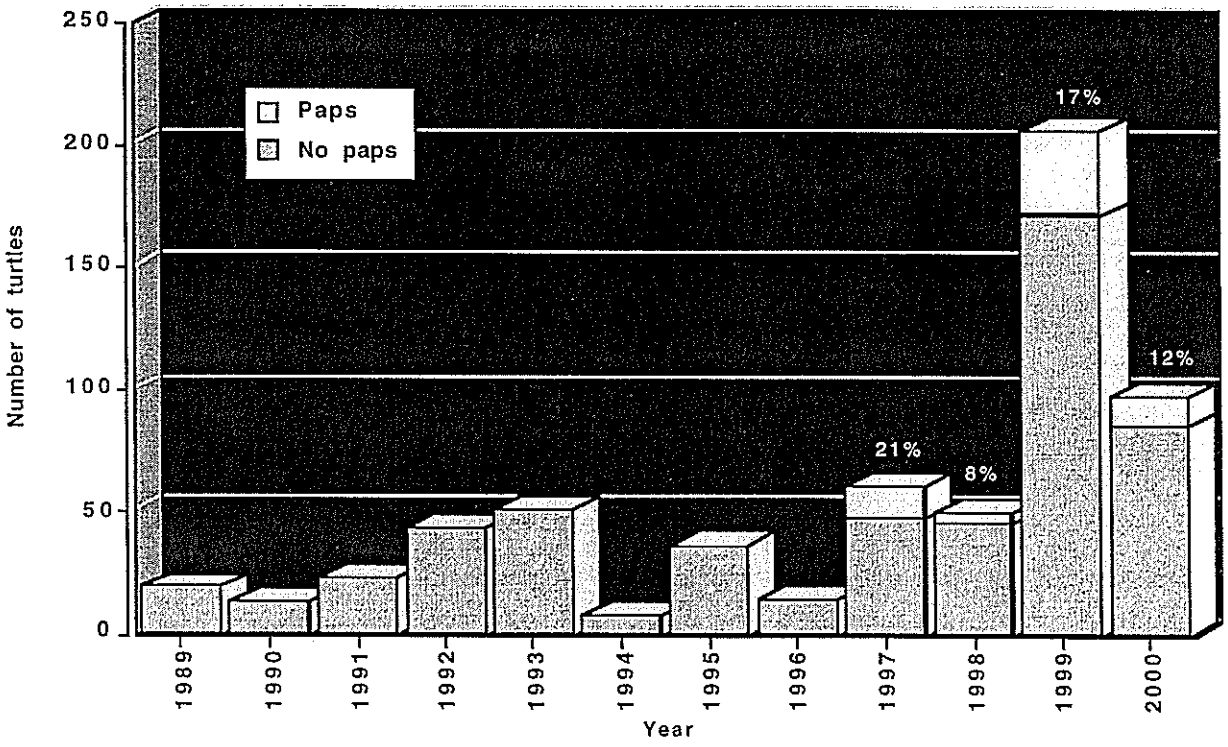

Figure 14. Long-term prevalence of fibropapillomatosis found in juvenile green turtles captured over Sabellariid worm rock reefs, Indian River County, Florida, 1989-2000.

because all of the work on the reef was done in the summer of 2000. It should be recalled that in the eight years of the reef green turtle population prior to 1997 no evidence of the disease was seen. In the summer of 1997, however, 13 of 61 greens (21%) were afflicted. Since then, turtles with tumors were captured over the past four years with rates of 21% in 1997, 8% in 1998, 17% in 1999 and 12% in 2000 (Figure 14). Even though there have been a few instances in which a green turtle tagged in one habitat is recaptured in the other, the rate of interactions between reef and lagoon individuals remains unclear.

Loggerheads

Fibropapillomatosis has been observed in IRLS loggerheads since 1984 but in very low prevalence and not at all in some years (Figure 15). The data collected during the period of this contract, given for individual loggerheads in Table 5, provide no exception to that statement, although, at 12% (4 of 34 were afflicted), the prevalence is higher than in most years. The degree of affliction was very mild in all cases. One of four afflicted turtles, bearing tag numbers W0306/W0307, had 6 tumors on its soft skin; all of the tumors were less than 1 cm in length (0.8, 0.7, 0.5, 0.4, 0.4, 0.3 cm). There was one tumor (2.7 X 1.6 cm) in the axillary region of the turtle bearing tag numbers W0309/W0308. The two other diseased turtles, X8273/X8274 and X8390/X8391 had three (1.0, 0.8 and 0.6 cm) and two (1.0 and 1.8 cm) tumors respectively. Considering that "full blown" cases of fibropapillomatosis have been showing up in other parts of Florida in recent years, it will be worthwhile to monitor the status of the disease in loggerheads of the east Florida seaboard over the short- and long-term future.

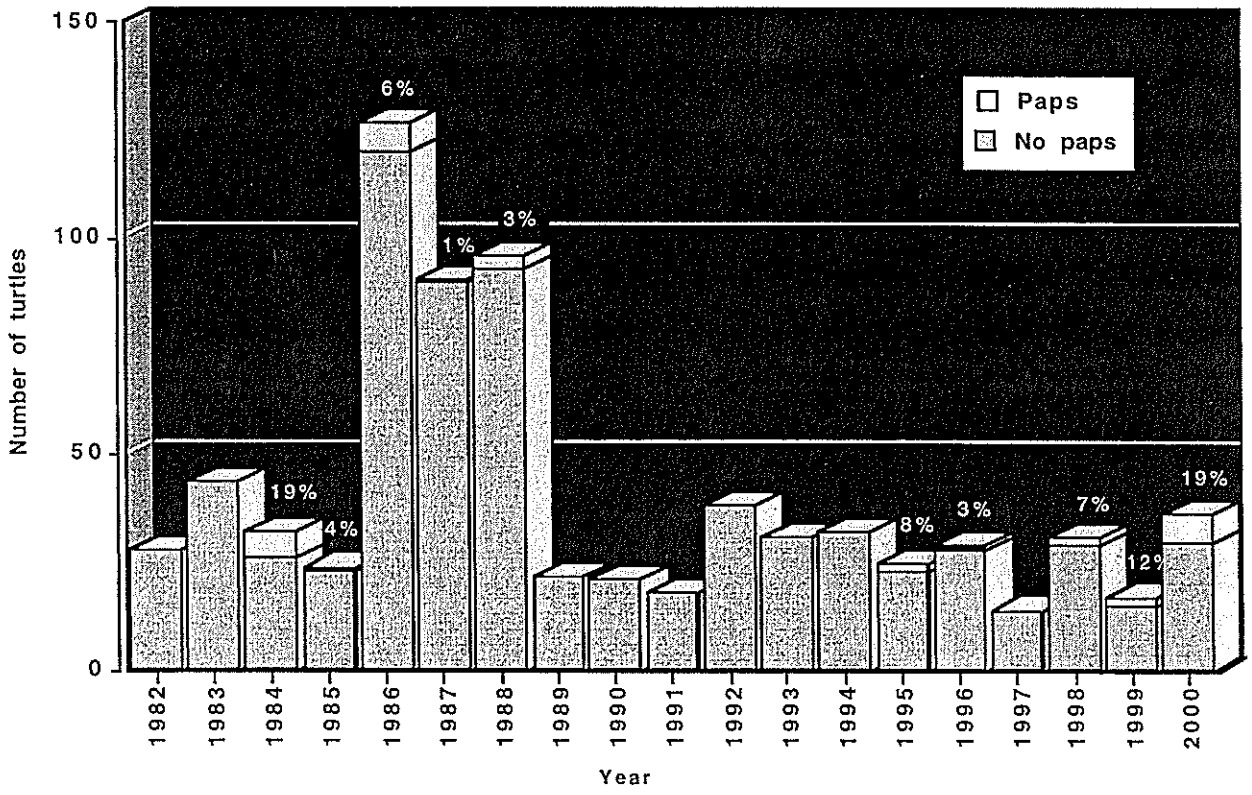

Figure 15. Long-term prevalence of fibropapillomatosis in loggerheads captured in the Indian River Lagoon, Indian River County, Florida, 1982-2000.

Similarities, Differences, and Connections

The matter of the association of the two groups of green turtles on the Indian River coast continues to be intriguing and perplexing. On the one hand and as a result of the current work, we now have two tag recovery records of juvenile greens moving from lagoon to reef and two moving from reef to lagoon. One of those that we captured on the reef and then later in the lagoon was first captured at the St. Lucie power plant (ocean nearshore), 80 km to the south. This is far too few recoveries upon which to decipher a pattern but would seem to provide the basis for a working hypothesis that these green turtles move and mix freely along the coast and between lagoon and reef. On the other hand, however, there are factors that seem to argue against that conclusion. One of them involves the prevalence of GTFP. In the past five years the annual prevalence of fibropapillomatosis in the lagoon aggregation has varied from 47% to 72% (mean = 50%). On the reef the range was from 0% to 21% (mean = 15%). If the reef and lagoon turtles mix and mingle freely by way of inlets (especially Sebastian Inlet) it seems that the prevalence of GTFP in the two habitats should be much more similar than it is.

Another factor involves basic morphometrics. During the current contract period we saw mean SCL of the lagoon greens (49.6 cm) exceed that of reef greens (38.7 cm) by about 28% (significantly different at $P < 0.0001$). This has generally not been true in previous years but if there were much interchange between the two habitats it seems that this should not be so.

There is another factor that we have studied recently, although it was not addressed directly in the current project. Analysis of DNA haplotype frequency has shown that about 77% of lagoon green turtles exhibit haplotype CM 1, characteristic of Florida and Mexico nesting beaches. Only about 59% of reef greens are of the CM 1 type and they are, generally speaking, considerably more heterogeneous genetically

(15 haplotypes demonstrated!) than are their lagoon counterparts.

We offer a hypothesis about the movements of these Atlantic coast green turtles that is, by any measure, highly speculative, but does reconcile the apparently disparate factors discussed above. We have long thought that inlets like the one at Sebastian may serve as "fyke traps" for turtles. That is, turtles that enter the lagoon through a very narrow opening and disperse widely in the lagoon system may not be able to find that narrow opening again in order to exit. There are only two "inlets" from the ocean north of Sebastian and both are difficult to reach from the Indian River proper. Ponce Inlet, far to the north, would be reachable only by exiting the Indian River via man-made Haulover Canal, moving northward through a complex system of islands in the north end of Mosquito Lagoon, and finally exiting through a labyrinthine system of channels. Exiting through Port Canaveral would be just as difficult because a turtle would have to find the extremely narrow entrance to the Banana River or the man-made Barge Canal, and then negotiate the locks at the port. It is more likely that there is a net movement southward, driven by the animal's innate migratory tendency, by the positive temperature gradient that occurs each fall, or simply by the lack of exit routes to the north. We suggest that most green turtles eventually depart the Indian River at its south end after being exposed to the causative agents of GTFP during their stay in the lagoon. Tag recoveries have shown that turtles move northward and southward over the nearshore reef system (e.g., recoveries of turtles tagged at the St. Lucie power plant at our reef study site in northern Indian River County). It is possible that our two reef recoveries of lagoon-tagged turtles were animals that left the lagoon further south and then made their way northward along the reefs. As noted above, this scenario is highly speculative but it does establish, as a smaller, special cohort, those green turtles which happen to enter the lagoon, become somewhat isolated, are exposed to the disease, and are less genetically diverse. The UCF group will be

attaching satellite transmitters to a small number of these reef and lagoon juveniles in the near future. We understand that satellite telemetry will not provide answers to all of the questions posed here, but there is a chance that it will contribute incrementally to our understanding of green turtle movements and migration on the Indian River coast.

The NMFS In-Water Workshop

A "Workshop on Assessing Abundance and Trends for In-Water Sea Turtle Populations" was held at the Archie Carr Center for Sea Turtle Research, University of Florida, Gainesville, from 23 to 26 March, 2000. L. M. Ehrhart (P.I.) and W. E. Redfoot (Research Associate) of the UCF Marine Turtle Research Group, participated in all aspects of the meeting, as specified in the proposal for this study. As the editors of the Proceedings of the workshop pointed out, the results of trials involving Minimum Detectable Annual Rate of Change and Minimum Duration Required to Detect Annual Change of 25% "should be considered preliminary--calculations, particularly of CVs, were, of necessity, done rapidly during the workshop." As a result, our contribution to the proceedings was admittedly quite small, but can be cited as follows:

Ehrhart, Llew and Bill Redfoot. 2000. Indian River Lagoon and Near-shore Worm Reefs. **in** Bjorndal, K. A. and A. B. Bolten, editors. Proceedings of a Workshop on Assessing Abundance and Trends for In-water Sea Turtle Populations. U.S. Dep. Commer. NOAA Tech. Mem. NMFS-SEFSC-445, 83 p.

Table 1. Catch per unit effort in km-hrs for net-captured juvenile green turtles and subadult loggerheads in the Indian River Lagoon, Indian River County, Florida, from 15 Sept, 1999 through 31 Dec, 2000.

Date	Hours	Net Length in kilometers	Loggerhead captures	Green Turtle captures	Loggerhead LogCPUE	Green Turtle GrnCPUE	Total TotCPUE
21-Sep-99	2.70	0.46	0	3	0.00	2.42	2.42
26-Oct-99	3.28	0.46	1	13	0.66	8.61	9.27
23-Nov-99	6.33	0.46	1	10	0.34	3.43	3.78
15-Dec-99	2.87	0.46	1	8	0.76	6.07	6.83
17-Jan-00	4.62	0.46	4	10	1.88	4.71	6.59
2-Feb-00	1.58	0.46	4	12	5.49	16.48	21.97
4-Mar-00	6.25	0.46	1	5	0.35	1.74	2.09
13-Mar-00	6.00	0.46	1	8	0.36	2.90	3.26
14-Mar-00	4.90	0.46	0	2	0.00	0.89	0.89
28-Apr-00	4.45	0.46	2	1	0.98	0.49	1.47
4-May-00	3.18	0.46	0	3	0.00	2.05	2.05
9-May-00	2.85	0.46	0	0	0.00	0.00	0.00
17-May-00	4.45	0.46	2	4	0.98	1.95	2.93
19-May-00	4.40	0.46	1	0	0.49	0.00	0.49
1-Jun-00	3.33	0.46	2	0	1.30	0.00	1.30
12-Jun-00	3.30	0.46	1	2	0.66	1.32	1.98
14-Jun-00	3.50	0.46	2	0	1.24	0.00	1.24
19-Jun-00	3.55	0.46	0	0	0.00	0.00	0.00
22-Jun-00	3.48	0.46	1	0	0.62	0.00	0.62
10-Jul-00	3.67	0.46	4	2	2.37	1.19	3.56
21-Jul-00	2.23	0.46	0	1	0.00	0.97	0.97
25-Jul-00	2.78	0.46	3	3	2.34	2.34	4.69
3-Aug-00	3.50	0.46	2	3	1.24	1.86	3.11
7-Aug-00	3.40	0.46	4	3	2.56	1.92	4.48
17-Aug-00	4.53	0.46	2	3	0.96	1.44	2.40
6-Oct-00	2.98	0.46	5	2	3.64	1.46	5.10
15-Nov-00	1.95	0.46	0	10	0.00	11.15	11.15
15-Nov-00	1.70	0.46	0	0	0.00	0.00	0.00
12-Dec-00	6.38	0.46	0	20	0.00	6.81	6.81
13-Dec-00	5.97	0.46	0	12	0.00	4.37	4.37

Total Net hours	Total Km-hrs	Caretta Captures	Chelonia Captures	Caretta CPUE	Chelonia CPUE	Total CPUE
114.13	52.50	44	140	0.97	2.89	3.86

Table 3. Catch per unit effort in km-hrs for net-captured marine turtles over Atlantic Sabellariid worm rock reefs in Indian River County, Florida, in 2000.

Date	Hours	Net Length in kilometers	Loggerhead Captures	Green Turtle Captures	Loggerhead LogCPUE	Green Turtle GrnCPUE	Total TotCPUE
24-May-00	0.08	0.22	0	1	0.00	54.55	54.55
24-May-00	0.45	0.22	0	0	0.00	0.00	0.00
24-May-00	0.98	0.22	0	5	0.00	23.11	23.11
26-May-00	0.37	0.22	0	0	0.00	0.00	0.00
26-May-00	0.85	0.22	0	15	0.00	80.21	80.21
6-Jun-00	0.42	0.22	0	0	0.00	0.00	0.00
6-Jun-00	0.77	0.22	0	0	0.00	0.00	0.00
30-Jun-00	0.93	0.22	0	0	0.00	0.00	0.00
13-Jul-00	1.28	0.22	0	10	0.00	35.42	35.42
13-Jul-00	1.27	0.22	0	8	0.00	28.71	28.71
14-Jul-00	1.37	0.22	0	1	0.00	3.33	3.33
14-Jul-00	0.68	0.22	0	12	0.00	79.82	79.82
17-Jul-00	1.17	0.22	0	7	0.00	27.27	27.27
17-Jul-00	1.30	0.22	0	8	0.00	27.97	27.97
18-Jul-00	0.75	0.22	0	0	0.00	0.00	0.00
18-Jul-00	1.17	0.22	0	15	0.00	58.44	58.44
19-Jul-00	1.13	0.22	0	3	0.00	12.03	12.03
18-Aug-00	0.18	0.22	0	7	0.00	173.55	173.55
18-Aug-00	0.20	0.22	0	4	0.00	90.91	90.91
18-Aug-00	0.17	0.22	0	3	0.00	81.82	81.82

* 1 hand capture on 26 May, 2000. Not included in effort.

Total Net Hours	Total Km-hrs	Caretta Captures	Chelonia Captures	Caretta CPUE	Chelonia CPUE	Total CPUE
15.52	3.41	0	99	0	38.86	38.86

Table 4. Juvenile green turtles net-captured in the Indian River Lagoon system, Indian River County, Florida, 15 September, 1999 through 31 December, 2000. Excludes multiple within-season recaptures.

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	WT (kg)
BP7357 X6565 X8132	9/21/99	1	54.1	47.0	51.8	51.4	40.5	43.1	19.8	8.1	17.3
X8130 X8131	9/21/99	no	51.1	43.3	48.2	47.9	38.7	39.8	17.3	7.2	13.1
X8134 X8135	9/21/99	1	48.8	40.6	46.1	46.4	35.1	39.5	16.8	7.2	11.6
BP8129 X8007 X8009	10/26/99	1	51.0	43.2	49.0	48.5	35.8	41.4	19.0	6.9	24.4
X8001 X8002	10/26/99	no	58.5	49.8	54.9	54.5	42.7	48.6	22.5	8.2	28.1
X8003 X8004	10/26/99	1	37.9	32.2	35.9	35.6	28.5	29.7	13.6	5.9	6.3
X8005 X8006	10/26/99	1	45.1	38.7	44.2	44.0	34.6	38.3	14.7	6.7	11.2
X8010 X8011	10/26/99	1	42.3	36.8	39.9	39.7	32.2	34.0	14.8	6.3	8.1
X8012 X8013	10/26/99	no	65.4	54.8	62.2	61.8	48.6	50.6	24.1	9.2	40.8
X8136 X8137	10/26/99	no	58.3	50.6	55.2	54.8	42.5	46.9	20.9	8.0	27.6
X8138 X8140	10/26/99	no	52.6	48.9	24.0	49.4	41.9	46.0	21.0	8.3	28.1
X8139 X8141	10/26/99	1	47.6	41.1	45.7	45.3	37.3	39.0	16.0	7.0	12.0
X8142 X8143	10/26/99	1	38.7	34.0	36.5	36.5	29.4	30.7	13.4	5.6	6.0
X8144 X8145	10/26/99	no	57.9	47.8	55.9	55.1	42.0	47.8	20.1	8.0	26.2
X8146 X8147	10/26/99	no	47.8	39.7	44.6	44.8	34.1	38.0	16.4	6.7	11.8
X8148 X8149	10/26/99	1	46.8	40.7	44.4	44.2	35.1	38.2	17.0	7.1	12.2
BP5622 X6797 X8049	11/23/99	1	47.6	40.8	45.8	45.7	34.8	38.6	17.8	6.4	18.1
BP8114 X8047 X8048	11/23/99	1	56.6	52.7	54.0	53.5	45.9	48.1	20.4	8.3	29.9
X8035 X8036	11/23/99	no	50.3	42.3	47.3	47.3	37.7	40.2	17.7	7.0	20.9
X8037 X8038	11/23/99	no	70.2	60.5	66.3	65.4	53.3	55.6	24.9	9.5	48.9
X8039 X8040	11/23/99	no	49.0	43.5	46.0	45.8	38.9	39.3	16.4	7.0	20.4
X8041 X8042	11/23/99	1	35.9	30.5	33.8	33.8	27.0	27.6	12.5	5.4	5.1
X8043 X8044	11/23/99	no	47.9	43.6	45.2	45.2	37.5	37.7	16.7	7.1	18.6
X8045 X8046	11/23/99	1	38.9	31.8	36.9	36.7	29.0	33.4	13.1	6.0	6.8
X8050 X8051	11/23/99	no	60.7	52.2	57.6	57.3	44.1	48.8	23.3	8.5	34.4
X8054 X8055	11/23/99	1	44.2	37.8	42.1	41.8	33.0	35.3	16.0	6.8	9.4
BP8281 X8062	12/15/99	no	43.4	37.1	41.6	41.1	32.9	34.2	16.1	6.8	9.7
X4739 X8069	12/15/99	no	58.5	49.6	54.9	54.5	44.4	46.6	20.9	8.1	28.0
X8056 X8057	12/15/99	1	47.6	42.7	45.6	45.6	37.9	39.5	16.9	7.3	12.2
X8060 X8061	12/15/99	1	62.0	53.4	57.5	57.3	45.8	47.2	21.8	8.6	30.8
X8063 X8064	12/15/99	no	60.9	50.9	57.0	56.7	44.1	49.5	21.4	8.6	32.6
X8065 X8066	12/15/99	no	64.0	56.9	60.0	60.0	47.8	48.3	22.5	9.4	37.1
X8067 X8068	12/15/99	no	63.9	55.8	61.9	61.3	47.3	51.7	22.0	9.5	35.3
X8070 X8071	12/15/99	no	57.9	48.2	54.0	53.9	41.1	45.0	19.8	8.2	26.2
SSM581 X8161	1/17/00	1	52.5	45.1	49.1	49.2	38.9	40.0	18.1	7.5	15.1
X8089 X8090	1/17/00	no	65.8	53.7	61.8	61.5	45.6	54.9	23.2	8.9	31.7
X8091 X8092	1/17/00	1	45.0	39.0	41.7	41.7	33.3	36.2	16.4	7.1	10.6
X8093 X8094	1/17/00	no	65.6	57.2	61.7	61.8	48.8	52.5	24.0	10.0	32.6
X8097 X8099	1/17/00	1	50.0	40.5	47.5	47.5	34.7	40.7	18.2	7.1	13.7
X8151 X8152	1/17/00	no	68.8	58.2	64.0	63.9	48.5	54.3	26.0	9.4	36.2
X8153 X8154	1/17/00	1	46.5	39.5	44.2	44.0	34.7	36.9	16.6	6.8	11.0
X8159 X8160	1/17/00	1	43.5	37.0	41.3	41.0	32.9	34.5	15.7	6.4	8.8
X8162 X8163	1/17/00	1	57.8	50.3	54.9	54.5	43.3	48.5	21.0	8.5	20.8

Table 4. continued

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	WT (kg)
X8164 X8165	1/17/00	1	36.7	31.5	34.5	34.6	28.3	28.6	12.4	5.7	5.2
BP7050 X8191 X8192	2/19/00	no	61.8	52.2	57.9	57.7	43.2	49.9	22.1	9.0	25.4
BP8243 X6812	2/19/00	no	46.0	39.2	43.7	43.5	34.9	37.5	15.0	7.1	10.7
X8166 X8167	2/19/00	1	61.5	54.4	58.0	57.8	46.2	49.0	22.4	9.0	29.0
X8168 X8169	2/19/00	1	56.9	49.2	53.6	53.5	42.2	46.6	20.3	8.1	20.8
X8170 X8171	2/19/00	1	42.6	37.0	41.1	40.9	33.9	33.7	14.2	6.8	8.3
X8172 X8173	2/19/00	no	58.7	48.7	55.7	55.0	42.9	46.5	21.0	8.4	20.8
X8174 X8175	2/19/00	no	46.7	39.4	43.4	43.3	32.9	37.1	16.0	7.9	10.7
X8181 X8182	2/19/00	1	40.9	35.2	39.3	39.2	39.0	33.5	15.3	6.7	8.2
X8185 X8186	2/19/00	no	49.4	43.6	47.0	46.7	37.7	37.9	17.8	7.6	13.6
X8187 X8188	2/19/00	1	36.0	30.7	33.9	33.8	26.1	27.7	13.1	5.7	4.9
X8189 X8190	2/19/00	no	51.8	41.7	48.2	48.2	35.9	41.3	18.1	7.4	15.4
X8193 X8194	2/19/00	1	64.3	53.4	61.3	60.9	46.5	50.7	22.3	8.9	28.1
BP4501 X8201 X8202	3/4/00	no	59.5	53.2	55.3	55.2	43.2	47.3	22.0	8.3	29.6
X8197 X8198	3/4/00	1	50.2	43.5	47.3	47.2	36.7	39.9	17.3	7.4	13.8
X8199 X8200	3/4/00	no	28.6	24.7	27.3	27.0	21.8	22.1	10.1	4.7	2.6
X8203 X8204	3/4/00	1	65.3	54.8	61.4	61.0	47.9	51.7	22.1	9.0	33.6
X8207 X8208	3/4/00	no	51.6	45.5	48.8	48.8	39.1	43.7	17.8	7.4	16.8
X8209 X8210	3/13/00	1	49.1	42.4	46.1	46.0	36.8	38.5	18.5	6.9	14.0
X8211 X8212	3/13/00	no	66.4	59.3	63.8	63.5	49.7	53.4	24.8	9.6	40.8
X8213 X8214	3/13/00	1	52.2	44.2	49.3	49.2	38.2	41.1	17.8	6.9	14.2
X8215 X8216	3/13/00	no	40.1	33.5	37.7	37.6	29.5	30.6	13.6	6.1	6.5
X8219 X8220	3/13/00	1	38.6	33.1	36.2	36.1	28.6	30.9	14.1	6.3	6.7
X8221 X8222	3/13/00	no	59.8	50.5	56.4	56.0	43.2	46.2	21.5	8.4	24.5
X8223 X8224	3/13/00	1	48.3	39.5	43.0	42.7	33.5	35.6	16.7	6.8	10.7
X8225	3/13/00	1	46.8	39.3	44.4	44.2	34.3	37.0	16.4	7.0	9.9
X8226 X8227	3/14/00	no	67.3	55.7	63.5	63.2	48.4	52.3	24.2	9.0	34.4
X8228 X8229	3/14/00	1	45.0	37.7	42.4	42.2	32.9	35.9	16.6	6.8	9.8
X8240 X8241	4/28/00	no	66.3	55.8	61.8	61.5	46.6	52.5	24.1	9.1	-
X8244 X8245	5/4/00	no	66.8	59.0	61.9	61.8	49.1	51.4	24.2	9.4	34.4
X8246 X8247	5/4/00	no	58.6	48.1	55.1	54.9	40.2	46.9	22.7	24.4	8.0
X8249 X8250	5/4/00	no	61.6	55.5	58.2	57.9	46.2	49.1	22.8	9.0	27.1
X8275 X8276	5/17/00	1	55.1	46.2	52.1	51.7	41.1	43.7	18.3	8.1	19.0
X8277 X8278	5/17/00	no	63.7	55.5	59.8	59.7	46.8	49.9	22.1	8.6	28.0
X8283 X8284	5/17/00	no	56.9	45.8	53.4	53.0	39.6	45.3	19.9	8.1	21.7
X8351 X8352	6/12/00	no	37.3	31.2	35.3	35.0	26.0	28.6	13.8	5.7	5.3
X8386 X8387	6/12/00	1	65.0	53.8	61.2	61.0	47.0	51.2	21.8	9.1	28.9
X8392 X8477	7/10/00	no	53.6	46.8	50.6	50.5	39.0	43.2	17.1	7.5	17.2
X8399 X8400	7/10/00	1	58.4	48.6	54.5	54.3	42.6	45.5	21.6	9.8	22.7
X7914 X7915	7/21/00	no	61.2	54.5	53.6	53.4	44.9	46.4	25.1	8.5	28.1
BP8245 X6815 X9059	7/25/00	1	48.4	44.1	46.6	46.2	37.8	39.8	17.4	7.1	13.6
X9061 X9062	7/25/00	no	55.0	47.2	50.5	50.5	39.0	42.2	20.2	8.0	18.1
X9063	7/25/00	1	48.0	43.1	45.6	45.4	36.1	39.5	16.1	7.3	13.6
X9066 X9067	8/3/00	no	62.7	53.3	58.5	58.0	44.6	48.2	23.0	8.7	27.2
X9068 X9069	8/3/00	1	39.2	32.7	37.6	37.1	29.0	31.1	14.3	6.3	6.7

Table 4. continued

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	WT (kg)
X9072 X9073	8/3/00	no	31.9	27.5	30.3	30.2	24.4	25.6	11.3	5.1	3.7
X9078 X9079	8/7/00	1	-	-	56.9	56.2	46.2	48.9	20.9	8.6	24.5
X9082 X9083	8/7/00	1	58.1	49.8	55.0	55.0	43.6	47.5	21.4	8.7	24.4
X9084 X9085	8/7/00	no	59.0	51.7	56.9	56.7	45.2	47.9	21.1	8.9	25.8
X9089 X9090	8/17/00	no	64.7	55.8	61.4	60.9	46.6	51.7	24.2	9.3	31.7
X9093 X9094	8/17/00	1	63.9	53.0	59.9	59.7	45.7	49.4	21.7	8.7	27.2
X9095 X9096	8/17/00	1	65.3	47.0	51.3	51.3	38.4	42.5	21.8	7.7	19.0
W0302 W0303	10/6/00	no	58.9	51.9	54.8	54.7	43.4	48.0	22.9	9.1	27.2
W0310 W0311	10/6/00	no	55.7	48.3	52.8	52.5	42.8	44.6	20.9	8.3	18.8
W0324 W0325	11/15/00	1	51.2	44.9	48.1	48.0	38.0	41.2	19.2	7.7	17.2
W0326 W0327	11/15/00	no	60.1	53.9	57.2	56.9	45.8	50.6	22.4	8.9	28.1
W0328 W0329	11/15/00	1	36.1	32.3	34.5	34.2	28.1	29.2	13.2	5.6	4.8
W0330 W0331	11/15/00	no	74.5	60.5	70.7	70.2	51.6	60.6	27.0	10.3	46.2
W0332 W0333	11/15/00	1	44.5	37.9	41.8	41.7	32.1	34.9	16.6	6.9	9.5
W0334 W0335	11/15/00	no	48.1	42.6	45.5	45.4	36.6	39.8	19.0	7.5	13.8
W0336 W0337	11/15/00	no	43.7	37.6	42.1	41.9	42.5	36.5	15.7	6.8	9.1
W0338 W0339	11/15/00	no	44.1	36.5	41.2	41.2	30.2	35.7	15.2	6.4	9.0
W0340 W0341	11/15/00	no	60.5	54.1	57.7	57.6	44.7	49.8	21.5	8.7	29.0
W0342 W0344	11/15/00	1	51.6	46.8	48.6	48.4	39.5	42.7	21.0	7.6	17.2
W0345 W0346	12/12/00	no	54.2	47.6	52.1	51.7	41.2	43.5	17.6	8.1	17.2
W0347 W0348	12/12/00	no	54.9	49.1	50.8	50.9	41.5	42.6	20.5	7.7	19.0
W0349 W0350	12/12/00	1	56.3	47.5	53.7	53.6	41.5	43.2	19.1	8.3	20.4
W0351 W0352	12/12/00	no	33.1	27.7	32.1	31.8	25.7	27.1	12.5	5.3	4.4
W0353 W0354	12/12/00	no	70.2	61.8	65.8	65.7	51.7	54.3	25.5	9.1	38.1
W0355 W0356	12/12/00	1	62.7	52.6	59.2	59.2	45.8	49.6	21.8	8.6	27.2
W0357 W0358	12/12/00	no	57.3	49.9	52.8	52.6	43.2	43.3	21.3	8.5	21.7
W0359 W0360	12/12/00	1	41.4	35.1	39.6	39.4	31.2	33.5	15.3	6.4	8.6
W0361 W0362	12/12/00	1	29.2	25.3	27.7	27.5	22.4	24.5	11.1	4.8	3.1
W0363 W0364	12/12/00	1	37.5	32.8	35.3	35.4	28.4	29.2	14.2	6.9	5.9
W0365 W0366	12/12/00	no	55.5	47.8	52.2	51.9	41.1	42.2	21.3	8.3	19.9
W0367 W0368	12/12/00	1	46.8	39.1	44.0	44.1	33.9	37.3	17.1	7.2	11.6
W0369 W0370	12/12/00	1	68.8	56.4	65.0	64.6	47.2	51.0	22.9	9.3	34.0
W0376 W0377	12/12/00	1	56.1	47.8	52.5	52.5	41.0	46.0	18.8	7.6	18.1
W0378 W0379	12/12/00	no	49.4	41.5	46.1	46.0	35.9	40.8	18.5	7.2	14.5
W0380 W0381	12/12/00	1	39.5	33.6	37.8	37.6	29.8	32.3	13.9	7.0	7.0
W0382 W0383	12/12/00	1	64.5	53.5	60.8	60.5	46.6	52.7	23.0	8.9	30.8
W0384 W0385	12/12/00	1	60.9	53.4	58.4	58.1	45.8	48.1	22.5	9.2	26.3
W0386 W0387	12/12/00	no	44.7	38.0	42.2	42.1	33.3	35.1	15.9	6.7	10.5
W0388 W0389	12/12/00	no	56.0	49.4	53.6	53.4	43.4	45.1	20.6	8.3	22.7
W0226 W0400	12/13/00	no	44.3	38.1	41.4	41.5	33.8	35.6	16.7	6.8	10.8
W0227 W0228	12/13/00	no	66.8	57.2	62.2	62.2	46.5	51.6	24.9	8.8	34.4
W0229 W0230	12/13/00	no	46.9	42.0	43.5	43.5	34.8	35.4	17.8	7.1	12.3
W0231 W0232	12/13/00	no	62.9	54.4	59.4	59.1	47.2	51.6	23.1	8.7	30.8
W0233	12/13/00	1	51.8	44.8	49.8	49.5	39.2	43.4	18.2	7.9	13.6
W0234 W0235	12/13/00	no	53.1	42.5	50.0	49.6	37.2	42.6	20.0	7.6	16.7

Table 4. continued

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	WT (kg)
W0390 W0391	12/13/00	1	62.0	54.5	58.4	58.1	40.2	47.7	20.1	8.7	-
W0392 W0395	12/13/00	no	58.1	52.7	54.9	54.7	44.9	46.0	22.9	8.2	22.7
W0393 W0394	12/13/00	no	29.8	25.2	28.3	28.1	22.9	23.8	10.6	4.7	3.1
W0396 W0397	12/13/00	1	48.3	42.7	46.1	45.7	36.1	38.8	18.3	7.1	13.3
W0398 W0399	12/13/00	no	71.1	62.5	67.2	67.1	52.2	58.0	27.2	9.3	46.2
	pap-afflicted	65	47.1%								
Number of individuals	138										
n			137	137	138	138	138	138	138	138	136
Mean			52.9	45.3	49.7	49.7	39.1	42.2	19.0	7.8	19.3
Median			53.1	46.2	50.3	50.1	39.4	42.7	19.1	7.7	18.1
Standard deviation			10.06	8.67	9.58	9.27	6.97	7.91	3.76	1.86	10.56
Range			28.6 to 74.5	24.7 to 62.5	24.0 to 70.7	27.0 to 70.2	21.8 to 53.3	22.1 to 60.6	10.1 to 27.2	4.7 to 24.4	2.6 to 48.9

Table 5. Adult green turtles net-captured in the Indian River Lagoon system, Indian River County, Florida, 15 September 1999 through 31 December 2000. Excludes multiple within-season recaptures.

Tag Numbers	Date	sex	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	Wt (kg)
X8279 X8280	5/17/00	male	107.0	95.8	101.0	99.5	76.3	82.0	39.6	14.5	-

Table 6. Subadult loggerheads net-captured in the Indian River Lagoon system, Indian River County, Florida, 15 September, 1999 through 31 December, 2000. Excludes multiple within-season recaptures.

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	Wt (kg)
BP7195 X8014	10/26/99	no	73.4	66.9	69.7	69.0	52.8	53.9	28.0	15.0	51.6
X8052 X8053	11/23/99	no	79.6	58.0	74.9	73.9	71.5	57.3	33.5	17.8	67.9
X8058 X8059	12/15/99	no	72.4	63.3	67.2	66.4	54.2	50.5	25.3	13.3	47.1
X8052 X8053	1/17/00	1	79.6	72.4	74.9	73.9	56.9	57.3	32.1	17.8	58.9
X8155 X8156	1/17/00	no	61.1	54.0	57.5	56.5	44.3	41.5	22.3	12.8	26.7
X8157 X8158	1/17/00	no	72.2	67.7	68.3	67.2	51.0	51.3	26.8	12.7	45.3
X8177 X8178	2/19/00	no	73.8	66.4	67.4	66.3	53.4	50.1	24.8	13.4	38.1
X8179 X8180	2/19/00	no	62.1	55.6	57.4	56.2	44.8	43.7	21.6	12.2	24.5
X8183 X8184	2/19/00	no	69.8	67.2	66.5	65.6	52.8	50.2	24.7	13.9	37.2
X8195 X8196	2/19/00	no	69.1	63.3	64.7	64.0	49.6	50.4	25.4	13.7	34.3
X8205 X8206	3/4/00	no	68.3	61.5	64.0	63.1	49.6	46.5	25.2	13.7	37.5
X8217 X8218	3/13/00	no	70.6	67.3	64.8	64.0	52.3	48.0	26.9	13.1	38.1
BP7259 X8242	4/28/00	no	69.9	66.3	64.1	63.6	52.3	47.3	25.4	14.1	-
X4899 X8243	4/28/00	no	82.1	72.1	75.8	75.3	57.6	57.8	28.9	15.6	-
X8273 X8274	5/17/00	1	75.8	69.3	72.2	70.8	58.1	56.9	28.4	15.7	57.0
X8281 X8282	5/17/00	no	65.0	61.5	60.5	59.6	49.9	46.2	26.4	13.0	31.7
X8285 X8286	5/19/00	no	68.6	64.2	65.6	64.7	51.5	51.6	26.2	13.3	42.5
X8381 X8382	6/1/00	no	84.9	81.6	80.6	78.8	64.6	63.1	-	17.3	80.6
X8384 x8385	6/1/00	no	59.7	55.9	56.8	56.4	45.5	43.5	24.0	11.6	27.1
X8388 X8389	6/12/00	no	64.0	59.7	59.5	59.2	49.8	45.6	23.9	12.8	29.9
BP8106 X6612	6/14/00	no	63.1	59.0	57.4	57.1	47.5	44.2	23.6	12.7	29.0
X8390 X8391	6/14/00	1	65.4	62.9	61.7	60.7	50.0	44.3	26.2	13.4	34.4
X8393 X8394	7/10/00	no	65.8	65.7	64.0	62.5	52.7	46.1	24.3	13.6	37.2
X8397 X8398	7/10/00	no	67.2	63.9	63.4	62.4	52.1	45.4	24.8	12.6	39.0
X8478 X8479	7/10/00	no	69.1	66.6	64.3	63.9	52.3	48.0	-	13.2	-
BP8108 X6615 X9057 X9058	7/25/00	no	72.3	67.8	68.8	68.2	54.5	51.2	27.7	15.1	48.0
BP8113 X6622 X9055 X9056	7/25/00	no	67.6	59.0	60.7	60.1	46.8	44.6	24.0	12.2	35.3
X9064 X9065	7/25/00	no	66.9	63.3	63.0	61.7	49.0	45.7	23.7	13.2	32.6
X9070 X9071	8/3/00	no	76.0	87.0	70.7	69.6	54.7	54.4	26.2	13.5	48.1
X6828 X9086	8/7/00	1	79.4	74.3	74.4	73.3	60.0	54.9	29.2	15.3	58.0
X9076 X9077	8/7/00	no	66.2	63.0	63.7	62.4	50.2	48.1	25.2	13.8	37.2
X9080 X9081	8/7/00	no	70.7	64.7	65.2	64.4	51.0	50.1	26.2	13.8	39.0
X9087 X9088	8/7/00	no	66.4	62.0	63.1	62.5	50.3	48.3	24.4	13.2	34.0
X9091 X9092	8/17/00	no	69.7	65.8	66.4	65.4	52.0	51.5	28.0	15.0	42.6
X9097 X9098	8/17/00	no	84.3	78.2	80.6	79.1	59.5	58.7	30.0	19.4	63.4
W0150 W0301	10/6/00	no	74.2	65.5	69.4	68.3	52.6	49.5	28.5	15.4	48.0
W0304 W0305	10/6/00	no	68.8	64.2	64.0	62.9	50.9	48.9	25.3	14.1	38.5
W0306 W0307	10/6/00	1	65.1	62.1	62.5	61.5	47.9	47.7	25.0	13.6	36.2
W0308 W0309	10/6/00	1	75.7	68.8	71.2	69.8	55.8	52.8	27.2	16.1	47.1

Table 6. continued

Tag Numbers	Date	Paps	CC length (cm)	CC width (cm)	Great length (cm)	SL length (cm)	SL width (cm)	Plastn (cm)	Body depth (cm)	Head width (cm)	Wt (kg)
	pap-afflicted	7	17.9%								
Number of individuals	39										
n			39	39	39	39	39	39	37	39	36
Mean			70.7	65.6	66.3	65.4	52.6	49.9	26.2	14.2	42.3
Median			69.7	64.7	64.8	64.0	52.1	49.5	25.4	13.6	38.3
Standard deviation			12.72	6.66	5.99	5.84	5.22	4.91	2.49	1.71	12.34
Range			59.7 to 84.9	54.0 to 87.0	56.8 to 80.6	56.2 to 79.1	44.3 to 71.5	41.5 to 63.1	21.6 to 33.5	11.6 to 19.4	24.5 to 80.6

Table 8. Tagging and morphometric data for juvenile green turtles captured over Sabellariid worm reefs, Indian River County, Florida from 15 September, 1999 through 31 December, 2000. Excludes multiple within year recaptures.

Tag Numbers			Paps	Carapace Length OC (cm)	Carapace Width OC (cm)	Greatest Length SL (cm)	Carapace Length SL (cm)	Carapace Width SL (cm)	Plastron Length (cm)	Body Depth (cm)	Head Width (cm)	Wt. (kg)
X8289	X8290	5/24/00	1	38.1	34.3	35.5	35.5	28.5	30.9	15.0	6.3	6.9
X8297	X8298	5/24/00	no	47.4	40.3	44.4	44.4	34.7	36.1	16.7	7.2	11.9
X8291	X8292	5/24/00	no	42.2	36.1	39.0	39.0	32.0	32.0	15.5	6.8	9.2
X8293	X8294	5/24/00	1	47.6	40.6	44.0	44.0	33.5	37.6	17.6	7.0	12.0
X8287	X8288	5/24/00	1	39.9	35.3	37.0	37.0	30.6	31.2	15.1	6.4	8.1
X8295	X8296	5/24/00	no	56.4	48.9	52.4	52.4	41.6	43.3	20.1	8.1	20.8
X8367	X8368	5/26/00	no	35.7	29.8	33.3	33.3	26.0	28.4	12.7	5.8	5.0
X8365	X8366	5/26/00	no	39.6	33.1	37.3	37.3	29.5	30.8	13.6	6.0	6.4
X8363	X8364	5/26/00	no	28.8	24.0	27.5	27.4	21.1	23.5	11.2	5.2	2.8
X8361	X8362	5/26/00	no	29.9	25.3	28.2	28.1	22.6	23.5	11.0	5.2	2.9
X8373	X8374	5/26/00	no	34.7	29.7	32.6	32.5	26.0	27.5	12.6	5.4	4.8
X8371	X8372	5/26/00	no	50.3	39.9	47.1	47.2	34.8	40.3	16.8	7.6	12.6
X8379	X8380	5/26/00	no	50.0	42.9	46.8	46.8	37.8	40.7	19.3	7.7	15.2
X8375	X8376	5/26/00	no	51.5	44.9	47.5	47.4	38.2	40.6	19.2	8.1	14.6
X8299	X8300	5/26/00	1	47.2	38.6	44.6	44.0	32.0	38.2	17.3	7.3	11.5
X8355	X8356	5/26/00	no	34.4	31.6	32.9	32.3	27.0	27.4	12.3	5.8	5.0
X8353	X8354	5/26/00	no	39.1	33.7	36.7	36.5	28.8	29.9	13.6	6.1	6.6
X8357	X8358	5/26/00	no	46.5	40.0	43.5	43.5	34.3	36.8	17.3	7.2	11.6
X8369	X8370	5/26/00	no	37.2	31.1	34.7	34.8	26.4	27.9	12.6	5.9	5.4
X8359	X8360	5/26/00	no	35.9	30.9	33.6	33.6	27.0	28.0	12.9	6.0	5.1
X8377	X8378	5/26/00	no	46.7	40.0	43.4	43.4	34.5	36.6	17.6	7.1	11.5
X8351	X8352	5/26/00	no	37.0	31.0	34.8	34.6	26.0	28.4	13.0	5.8	5.2
X8488	X8489	7/13/00	no	27.6	24.0	26.2	26.2	21.6	22.1	10.0	4.7	2.6
X8502	X8503	7/13/00	no	53.1	44.3	49.1	49.1	37.3	41.6	18.7	7.7	17.2
X8482	X8483	7/13/00	no	44.2	38.1	41.7	41.6	33.5	35.1	16.9	6.4	10.0
X8512	X8513	7/13/00	no	62.1	54.3	58.4	58.4	46.8	46.8	20.9	9.3	27.2
X8506	X8507	7/13/00	no	35.0	31.2	33.6	33.4	28.7	28.6	12.8	6.1	5.6
X8500	X8501	7/13/00	no	29.0	26.1	27.5	27.4	23.4	24.0	10.3	4.8	2.8
X8498	X8499	7/13/00	no	34.1	28.4	31.8	31.7	24.7	26.9	12.9	5.5	4.5
X8484	X8485	7/13/00	no	36.7	30.5	34.0	34.0	25.6	28.6	12.7	5.5	5.1
X8480	X8481	7/13/00	no	55.9	48.3	52.6	52.5	40.8	44.1	20.1	7.8	19.9
X8514	X8515	7/13/00	no	33.9	27.9	32.0	32.0	24.6	26.3	11.1	5.6	4.1
X8490	X8491	7/13/00	no	53.6	46.8	50.6	50.5	39.5	42.2	18.6	7.6	18.1
X8486	X8487	7/13/00	no	28.6	23.0	27.2	27.1	21.0	22.6	9.1	4.1	2.3
X8508	X8509	7/13/00	no	44.2	39.5	42.8	41.6	33.3	35.0	17.6	6.8	10.0
X8510	X8511	7/13/00	no	42.5	36.7	40.1	39.9	30.9	33.0	15.0	6.8	8.8
X8504	X8505	7/13/00	no	48.2	39.8	45.2	45.1	34.8	38.3	16.7	7.1	12.7
X8494	X8495	7/13/00	no	33.2	26.7	31.2	31.1	24.5	25.7	11.1	5.2	3.5
X8496	X8497	7/13/00	no	38.1	32.6	35.8	35.6	28.0	30.6	14.0	6.1	6.1

Table 8. continued

Tag Numbers			Paps	Carapace Length OC (cm)	Carapace Width OC (cm)	Greatest Length SL (cm)	Carapace Length SL (cm)	Carapace Width SL (cm)	Plastron Length (cm)	Body Depth (cm)	Head Width (cm)	Wt. (kg)
X8492	X8493	7/13/00	no	45.7	38.1	42.5	42.5	33.1	36.4	15.8	6.2	10.0
X8986	X8987	7/14/00	no	42.7	34.2	39.3	39.3	29.7	32.0	14.5	6.4	7.5
X8524	X8525	7/14/00	no	27.1	23.5	25.6	25.4	20.6	22.9	9.8	4.9	2.4
X8990	X8991	7/14/00	no	37.7	32.3	35.3	35.3	27.1	30.1	14.8	6.0	6.5
X8982	X8983	7/14/00	no	37.7	31.2	35.6	35.4	27.2	29.6	13.7	5.6	5.9
X8988	X8989	7/14/00	no	36.0	30.7	33.8	33.8	25.9	29.3	14.1	6.3	5.9
X8516	X8517	7/14/00	no	39.8	32.9	37.5	37.4	28.3	31.2	14.4	6.1	7.2
X8520	X8521	7/14/00	no	41.1	33.6	38.3	38.1	29.4	32.7	15.0	6.4	7.1
X8518	X8519	7/14/00	no	35.5	29.1	33.7	33.6	24.0	27.8	12.2	5.6	4.7
X8976	X8977	7/14/00	no	42.3	37.4	39.6	39.4	32.2	32.0	15.3	6.6	8.8
X8984	X8985	7/14/00	no	30.0	25.8	28.6	28.4	22.9	23.5	9.7	5.2	2.8
X8522	X8523	7/14/00	no	53.9	45.0	50.7	50.4	37.8	41.5	19.3	7.8	19.0
X8980	X8981	7/14/00	no	49.1	42.7	46.6	46.3	35.8	40.1	18.3	7.5	13.8
X8978	X8979	7/14/00	no	31.0	26.5	29.3	29.3	23.6	25.0	10.8	5.2	3.2
X9017	X9018	7/17/00	no	40.3	35.5	38.4	38.2	29.2	33.0	15.2	6.1	8.0
X9006	X9008	7/17/00	no	33.9	28.6	32.0	32.0	25.6	27.2	12.3	5.1	4.5
X9004	X9005	7/17/00	no	49.5	46.4	46.4	46.3	38.3	38.2	18.7	7.8	14.6
X9009	X9010	7/17/00	1	33.0	26.5	30.9	30.9	24.0	27.1	12.1	5.6	4.3
X9015	X9016	7/17/00	no	42.8	36.7	40.3	40.3	30.9	34.0	15.4	6.4	8.7
X9000	X9001	7/17/00	no	40.6	33.8	37.8	37.8	29.3	32.0	14.5	6.2	7.1
X9002	X9003	7/17/00	no	38.4	32.4	35.9	35.9	28.2	30.4	13.0	6.1	6.2
X9013	X9014	7/17/00	no	41.4	35.5	38.7	38.6	30.7	32.6	13.9	6.5	7.3
X8996	X8997	7/17/00	1	44.5	38.3	41.5	41.5	31.8	34.9	16.6	7.1	10.0
P6891	X9019	7/17/00	no	50.9	43.9	47.3	47.3	35.4	39.3	18.7	7.2	15.4
X8998	X8999	7/17/00	1	37.2	30.7	35.1	35.1	26.5	28.8	13.7	6.0	6.4
X8994	X8995	7/17/00	1	36.9	31.6	35.0	35.0	26.4	29.0	13.8	6.1	6.5
X9011	X9012	7/17/00	no	26.8	22.0	26.0	26.0	20.4	21.5	8.7	4.4	2.2
X8992	X8993	7/17/00	1	43.8	35.7	40.6	40.6	31.2	33.6	14.9	6.6	8.9
BP8267	P5106	7/18/00	1	39.0	34.3	37.3	37.2	29.7	31.9	15.3	6.1	7.0
X9042	X9043	7/18/00	no	44.1	37.9	40.6	40.6	31.5	35.5	16.4	6.6	9.8
X9046	X9047	7/18/00	1	46.6	41.1	43.7	43.7	34.9	36.7	17.0	7.1	10.4
X9036	X9037	7/18/00	no	42.5	36.0	40.7	40.7	31.3	34.1	14.9	6.7	8.6
X9030	X9031	7/18/00	no	65.2	60.7	61.4	61.4	49.7	50.1	25.0	9.9	32.6
X9026	X9027	7/18/00	no	30.4	26.0	29.4	29.2	23.5	24.5	11.5	5.0	3.5
X9038	X9039	7/18/00	no	31.3	26.8	29.8	29.7	24.4	25.5	11.3	5.2	3.6
X9032	X9033	7/18/00	no	56.5	51.2	53.6	53.5	41.3	45.1	22.3	8.3	23.1
X9034	X9035	7/18/00	no	62.7	54.4	57.3	57.1	45.0	46.4	23.9	9.1	29.0
X9020	X9021	7/18/00	no	29.9	25.7	28.6	28.4	23.3	24.9	11.5	4.8	3.4
X9022	X9023	7/18/00	no	47.4	40.9	45.0	45.0	36.2	37.7	15.6	6.9	11.3
X9028	X9029	7/18/00	no	29.8	26.1	28.0	28.0	22.6	24.4	10.6	4.9	3.2
X9040	X9041	7/18/00	no	31.0	25.8	29.5	29.4	23.8	25.6	11.1	5.2	3.5
X9044	X9045	7/18/00	no	31.6	25.9	30.0	29.8	23.9	24.9	10.1	5.2	3.5

Table 8. continued

Tag Numbers		Paps	Carapace Length OC (cm)	Carapace Width OC (cm)	Greatest Length SL (cm)	Carapace Length SL (cm)	Carapace Width SL (cm)	Plastron Length (cm)	Body Depth (cm)	Head Width (cm)	Wt. (kg)
X9024 X9025	7/18/00	no	52.9	44.7	49.7	49.7	38.4	39.5	18.3	7.6	15.4
X9052 X9053	7/19/00	no	60.9	56.1	56.4	56.4	43.2	47.2	23.3	9.0	26.3
X9048 X9049	7/19/00	no	50.2	43.0	46.7	46.7	36.4	37.8	17.6	7.1	13.1
X9050 X9051	7/19/00	no	39.0	31.8	36.1	36.1	27.2	30.3	15.0	6.1	7.1
W0136 W0137	8/18/00	no	29.2	26.6	28.5	28.3	23.7	23.6	11.2	4.9	3.1
W0144 W0145	8/18/00	no	50.9	43.1	48.2	48.2	36.3	39.0	19.4	7.4	13.9
W0138 W0139	8/18/00	no	43.6	36.5	41.9	41.7	32.2	33.7	15.5	6.5	8.8
W0134 W0135	8/18/00	no	37.8	32.1	36.4	36.4	28.2	28.8	12.9	5.8	5.9
W0128 W0129	8/18/00	no	31.3	27.6	30.5	30.5	24.7	25.6	11.7	5.2	4.1
X9099 X9100	8/18/00	no	32.6	26.7	31.2	31.2	24.0	25.1	10.7	5.1	2.8
W0132 W0133	8/18/00	no	49.4	43.9	47.7	47.4	35.3	37.9	19.2	7.2	14.6
W0142 W0143	8/18/00	no	46.9	38.5	44.9	44.9	32.7	36.9	16.9	6.8	11.3
W0146 W0147	8/18/00	no	46.0	38.9	43.9	43.7	33.6	35.6	16.7	7.0	10.8
W0126 W0127	8/18/00	no	35.0	29.6	33.4	33.4	26.4	27.3	12.5	5.7	4.8
W0140 W0141	8/18/00	no	49.7	45.7	46.9	46.9	37.2	38.7	18.8	7.5	14.6
W0148 W0149	8/18/00	1	33.2	27.5	31.8	31.8	24.4	25.4	11.8	5.8	4.2
W0130 W0131	8/18/00	no	33.0	25.8	32.0	31.7	24.3	26.7	11.6	5.8	3.9
	pap-afflicted	12	12.2%								
Number of individuals		98	(includes one hand-captured reef turtle)								
n											
Mean			41.2	35.2	38.8	38.7	30.3	32.4	14.9	6.4	9.0
Median			39.9	34.0	37.4	37.4	29.4	31.6	14.9	6.2	7.1
Standard deviation			8.88	8.15	8.16	8.16	6.25	6.61	3.45	1.12	6.23
Range			26.8	26.8	22.0	25.6	25.4	20.4	21.5	8.7	4.1
			to	to	to	to	to	to	to	to	to
			65.2	65.2	60.7	61.4	61.4	49.7	50.1	25.0	9.9

Table 9. Remote recovery of a cold-stunned juvenile green turtle tagged and released by U.C.F. in Mosquito Lagoon, Brevard County, Florida, received from 15 September, 1999 through 31 December, 2000.

Tag Numbers	Original Tag Date	Recovery Date	Recovery Location	Condition
BBA638/QQB242	27-Dec-89	29-Jan-00	Captured off Broston Bar, NE Nicaragua.	assumed dead

Table 10. Domestic recoveries of juvenile green turtles tagged and released by U.C.F. in the Indian River Lagoon, Indian River County, Florida, received from 15 September, 1999 through 31 December, 2000.

Tag Numbers	Original Tag Date	Recovery Date	Recovery Location	Condition
BP5626	15-Jan-96	June 1999	Found 3 miles E of Sebastian Inlet in eddy	dead
X6851	6-Jul-99	20-Jan-00	IRL, near McLarty Museum, tangled in monofilament	dead
BP8189 X6713	16-Feb-99	28-Mar-00	IRL, near McLarty Museum, washed up on shore	dead
X8137	26-Oct-99	3-Apr-00	IRL, Pelican Beach, 3rd island, NW side; boat hit	dead

Table 11. Domestic recoveries of juvenile green turtles tagged and released by U.C.F. over nearshore Sabellariid worm reefs, Indian River County, Florida, received from 15 September, 1999 through 31 December, 2000.

Tag Numbers	Original Tag Date	Recovery Date	Recovery Location	Condition
BP5504	13-Jun-95	Apr-00	Indian River Lagoon, Jensen Beach	dead

Table 12. Domestic recovery of a cold-stunned juvenile green turtle tagged and released by U.C.F. in Mosquito Lagoon, Brevard County, Florida, received from 15 September, 1999 through 31 December, 2000.

Tag Numbers	Original Tag Date	Recovery Date	Recovery Location	Condition
PPN897	27-Dec-89	3-Aug-00	Found nesting at ACNWR	good

Table 13. Tagging and morphometric data for marine turtles tagged by other researchers and net-captured by U.C.F. in the Indian River Lagoon and nearshore reefs, Indian River County, Florida between 15 September, 1999 and 31 December, 2000.

Tag Numbers	Species	Original Tag Date	Original Tag Location	U.C.F. Recovery Date	Recovery Location	Carapace Length SL (cm)	Wt (kg)
SSM581 X8161	Cm	4/3/95	St. Lucie Power Plant, FL	1/17/00	IR lagoon	52.5	49.2
X8351 X8352	Cm	5/26/00	Indian River Co. nearshore reefs	6/12/00	IR lagoon	35.0	5.3