POPULATION ASSESSMENT OF MARINE TURTLES IN LAKE WORTH LAGOON, FLORIDA.
Sampling Event 6, June 2006

Submitted to : Palm Beach County Department Of
Environmental Resources Management
3323 Belvedere Rd. Building 502
West Palm Beach, FL 33406-1548

Submitted by : Inwater Research Group
4160 NE Hyline Drive
Jensen Beach, FL 34957

INTRODUCTION

Lake Worth Lagoon (LWL) is a 20 mile long body of water located just west of the Atlantic ocean along the coast of Palm Beach County, Florida. The lagoon was historically a freshwater lake, but has been severely altered by human activities since the late 1800's. Today, LWL is a moderately polluted estuarine waterway that receives ocean water from two man-made inlets. Due to heightened awareness of it's degraded state, Palm Beach County's Department of Environmental Resources Management (PBCDERM) drafted a management plan for LWL in the mid 1990's. The final draft of the Lake Worth Lagoon Management Plan was approved by a steering committee in 1998. One of the goals under the habitat restoration and enhancement program is "to attain and maintain the biological integrity of the ecosystem which supports the diversity of fisheries and wildlife, including endangered and threatened species." This directive specifically includes "research that should be conducted to understand the extent of utilization of the Lake Worth Lagoon habitat by sea turtles".

In March 2005, PBCDERM contracted Inwater Research Group, Inc. (IRG) to conduct a preliminary survey of marine turtles in LWL. Possible study sites in LWL were originally identified by analyzing stranding records and sighting data provided by PBCDERM. An introductory trip with PBCDERM representatives in fall 2004 provided an on-site look at potential study sites within LWL and was followed by a sampling trip on March 7-10, 2005. This initial assessment used a two pronged approach to evaluate the abundance and species composition of marine turtles utilizing LWL. First, visual transects were used to identify potential areas where marine turtles aggregate and second, netting operations were conducted in areas that were identified as potential turtle "hotspots". Results from this sampling trip were detailed in a report titled "Preliminary Population Assessment of Marine Turtles in Lake Worth Lagoon, Florida" submitted to PBCDERM in March 2005.

Based on results obtained during IRG's preliminary study, PBCDERM obtained funding through the Sea Turtle Grants Program for the continuation of this project. This report details sampling event number six conducted by IRG personnel on June 26 - 28, 2006. This report provides a summation of data collected during all sampling events. Field operations conducted in June represent the first sampling event of four, three day marine turtle sampling trips outlined in the new contractr between Inwater Research Group and Palm Beach County.

The primary objectives of this study are to:

1) Obtain baseline data on species abundance, size frequencies and sex ratios. These baseline data consist of quantitative measurements that can be used to determine stage-specific abundance, and in the future, determine recoveries or declines in these populations.
2) Determine Catch per Unit Effort (CPUE) at specific sites in Lake Worth Lagoon. This measurement will allow direct comparisons over time within

Lake Worth Lagoon and with other ongoing research projects throughout the state.

3) Document the prevalence of fibropapillomatosis (FP), a potentially deadly disease that occurs at a high frequency among sea turtles in Indian River Lagoon and Florida Bay.

4) Obtain blood samples for genetic, sex ratio and disease analysis.

5) Determine spatial distribution of sea turtles within Lake Worth Lagoon by collecting GPS waypoints for sighting and captures.

METHODS

Quantitative data on the abundance of turtles over wide areas of LWL were collected by a vessel based, visual transect system developed by IRG. The "H.U.N.T." (haphazard, unmarked, nonlinear transect) method consisted of stationing two individuals in an elevated tower of the boat to sight turtles while moving at slow speeds. Start and end points of each transect were recorded by GPS and all turtles sighted were assigned a waypoint relative to their distance from the transect line. This method allows for analysis of marine turtles sighted per kilometer of transect performed.

Turtles were captured using a large mesh tangle net, 150 meters long by five meters deep with 40 cm stretch (knot to knot) multi-filament mesh. The mesh is suspended from a foam core braided polyethylene top line with fixed buoys spaced 3.5 meters apart. The bottom line consists of a small diameter lead core line. Anchors attached to both ends of the net keep it in position and prevent it from drifting. GPS waypoints were recorded at each end of the net and when possible, habitat type was identified and recorded. Every effort was made to avoid damaging sea grass beds and netting was not conducted in areas of identified critical habitat for listed sea grass species. The net was deployed by boat and carefully monitored by pulling the net hand over hand every 30 minutes. When turtles encountered the net and became entangled, they were quickly removed and placed on the deck of the boat for work up.

Morphometric data were collected for each turtle captured using forestry calipers and a flexible tape. Measurements included straight standard carapace length (SCL), straight minimum carapace length, straight maximum carapace width, straight midline plastron length, curved standard carapace length, curved maximum carapace width and head width. Inconel # 681 tags were applied to the trailing edge of each front flipper and a passive integrated transponder (PIT) tag was applied subcutaneously to the right front flipper. Only one inconel tag was applied to green turtles smaller than 40 cm SCL or turtles with flipper anomalies. Before insertion of any tags all flippers were scanned for the presence of any pre-existing PIT tags. All turtles were inspected carefully and when present, tumors associated with fibropapillomatosis (FP) were measured and recorded on a standardized tumor score sheet. The total tumor score was used to assign turtles a severity category as described by Work and Balazs

(1999). Turtles were weighed and photographed before being released near the capture area.

To determine the relative abundance of marine turtles within LWL, catch per unit effort (CPUE) was calculated. In the formula described in Ehrhart et al. (1996) effort is expressed in net kilometer (km) hours (one kilometer of net fished for one hour). CPUE is then calculated using the formula C/(L*T). Where C = the number of turtles captured, L = the length of net fished, and T = the amount of time the net was fished. The CPUE data collected at sites within LWL will be used to determine seasonal and annual fluctuations in marine turtle abundance.

Blood samples were taken from most turtles captured for genetic analysis, sex ratios and disease verification. Blood was drawn from the cervical sinus using a sterile vacutainer with no additive (Owens and Ruiz, 1980). The area was thoroughly sterilized with betadine before needle insertion. A 22 gauge 1" needle was used on small juveniles, while a 1.5" was used on larger subadults. Approximately 4 ml of blood was collected from each turtle and a few drops were added to a lysis buffer (100 mM Tris-HCL, pH 8; 100 mM EDTA, pH 8, 10 mM NaCl; 1.0% SDS) in a 1:10 ratio, the mixture was gently shaken and stored in a cool dark place. This blood will be used for later mtDNA haplotype analysis to determine the turtles origins (Encalada et al. 1996). The remaining blood was placed in a sterile vacutainer with lithium heparin and spun for ten minutes in an Adams Physician centrifuge. Plasma was then pipetted into a 1.8 ml vial and held for future testosterone radioimmunoassays to determine sex.

Dietary samples were carefully extracted from captured green turtles using a technique called " lavage". The lavage process flushes food items from the esophagus and mouth areas. During this procedure turtles were held on their back with their posterior slightly elevated. A soft plastic veterinarian's stomach tube was lubricated with vegetable oil and cautiously inserted into the mouth and throat area. Seawater was then pumped through the tube using a veterinarian's double action pump. The tube was gently moved back and forth along the length of the esophagus and prey items were collected in a bucket positioned under the turtle's head.

The extracted diet sample was then strained through a fine mesh net (mesh ~1mm) and placed into a collection jar. A 4% formalin-seawater solution was used to preserve the sample for future analysis. Date, location and tag numbers of the turtles were recorded on the collection jar.

RESULTS AND DISCUSSION

On June 26 - 28, 2006, Inwater Research Group conducted sea turtle sampling efforts in LWL. During this sampling event six visual transects were conducted covering 19.89 kilometers of potential sea turtle habitat in LWL. A total of 26 green turtles (*Chelonia mydas*) were sighted during transect effort, generating a sighting rate of 1.31 green turtles per kilometer of transect (Table 1). Cummulatively, visual transects conducted over the course of this project

have yielded 78 green turtle sightings over 196.85 kilometers of transects. Total green turtle sightings were calculated at 0.40 turtles sighted per kilometer of transect. Green turtles have been the only species sighted during transect effort. Locations of all turtles sighted on transect are presented in Table 2. In addition to sea turtles sighted on transect in June seven green turtles were sighted off transect. These turtles were generally sighted during netting efforts and locations were recorded by GPS (Table 3). Overall, 76 green turtles and one loggerhead have been sighted off transect during sampling efforts in LWL. Green turtles sighted on and off transect were considered to be in their juvenile life stage (< 60.0 cm SCL)

In June, tangle nets were set in LWL five times for a total of 1.80 km net hours. Netting activity was conducted in the vicinity of Little Munyon Island (LMI) north of Lake Worth Inlet and Bird Island just north of South Lake Worth Inlet. All net beginning and end point locations were recorded by GPS (Table 4). During June, netting effort in LWL produced two green turtle captures for a CPUE of 1.11 turtles per km/net hour. Daily CPUE in June ranged from 0.00 to 3.12 turtles per kilometer net hour and overall CPUE for LWL, including past sampling events, was calculated at 2.61 turtles per km/net hour.

Straight carapace lengths of the two green turtles captured in June were 41.0 and 49.6 cm. Cumulatively, green turtles captured in LWL have ranged in size from 29.8 – 54.9 cm SCL with a mean of 42.0 cm (n=27, Table 5). Fibropapillomas were visually identified on both green turtles (100.0%) captured in LWL in June. Albeit a small sample size, this marks the highest rate of FP found among green turtles captured during any previous sampling trip conducted in LWL. Overall, the FP rate among green turtles captured in LWL is 57.1%.

In addition to collecting morphometric data on all turtles captured in June, two DNA samples were collected for future analysis. These samples will be stored by IRG until funding becomes available for processing. Two lavage samples were also collected in June for diet analysis.

During this sampling period an effort was made to investigate areas in the southern region of LWL in order to determine the extent of sea turtle usage. One day of the three day sampling period was devoted to surveying and netting at sites just north of South Lake Worth Inlet. No turtles were sighted or captured in this region of the lagoon during sampling efforts in June. To date we have not found any evidence to suggest that significant numbers of sea turtles use this area. However, this may be a function of limited effort in this region and at least a portion of upcoming sampling trips will include additional surveys.

In contrast to the southern region of the lagoon, the northern region sustains a significant number of green turtles with the highest concentrations centered around the Little Munyon Island site. In two days of sampling at this site 31 green turtles were sighted and two were captured. We have found that CPUE for green turtles at the LMI site is similar to the CPUE found in the Indian River Lagoon; which is considered an important developmental habitat for green turtles. This is an important finding and adds support to our contention that the LWL, specifically the LMI site, is an important developmental habitat for juvenile green turtles. This area contains some of the most robust seagrass beds in the

lagoon and we now know it supports the foraging requirements of a significant number of juvenile green turtles.

High rates of FP among green turtles in LWL have been documented by our group in previous sampling trips and in June this trend continued. Both of the green turtles captured in June had light to moderate tumor loads and were similar to turtles we have captured at this site over the previous five sampling trips. This was not an unexpected result considering that FP is at epizootic levels among green turtles in similar degraded, eutrophic, low flow environments like the Indian River Lagoon and Florida Bay. The rate of FP in the LWL is approaching the rate seen at sites in the Indian River Lagoon, where FP has been found to affect up to 70% of the green turtles captured. It is disturbing to find yet another site in Florida where green turtles are contracting this disease at an alarming rate.

Netting effort in June was again stymied by the presence of manatees (*Trichechus manatus*). When manatees are sighted in the study area nets are not deployed or are immediately retrieved to alleviate any possible manatee interactions. Typically, when manatees were seen in the netting area, nets were pulled and visual transects were performed in other regions of the lagoon. Effort was also decreased during the June sampling trip due to widespread severe thunderstorms that persisted in the early afternoons. These storms precluded any netting or transect activity and effort was suspended until the storms passed.

Bycatch in June included spotted eagle rays (*Aetobatus narinari*), cownose rays (*Rhinoptera bonasus*) and Atlantic stingrays (*Dasyatis sabina*). All rays were removed from the net and safely released back to the lagoon away from the netting area.

The number of green turtle sightings in the northern region of the LWL consistently exceeds sighting records for all other regions of the lagoon. We believe that the relatively robust habitat found at the LMI site and its proximity to the Lake Worth Inlet are what makes this an important developmental habitat for juvenile green turtles. Again, in June, no loggerheads were captured or sighted. At this point, our hypothesis that there could be a seasonal component to loggerhead usage of the lagoon has not been supported by CPUE data. As more data are collected we may find that the habitat in the lagoon does not support significant numbers of loggerheads.

As this project evolves and a greater area of the LWL is surveyed we will develop a better understanding of the demographic composition of sea turtles utilizing habitat in the lagoon. During the June sampling trip we attempted to expand our effort in the southern region of the lagoon as a way to identify potential netting sites. Despite the lack of turtles sighted or captured in this area we will still spend a portion of our effort searching for productive netting sites in the southern region of LWL. This will allow for a more comprehensive evaluation of sea turtle usage in LWL.

AKNOWLEDGEMENTS

We would like to thank personnel from PBCDERM for their help and support with this project, specifically Carly De Maye and Paul Davis. Also we would like to thank Karrie Singel from Florida Fish and Wildlife Conservation Commission, and one of our volunteers Carrie Crady for their field support.

This project was funded in part by a grant awarded from the Sea Turtle Grants Program. The Sea Turtle Grants Program is funded from proceeds for the sale of Florida Sea Turtle License Plates. Learn more at : www.helpingseaturtles.org.

LITERATURE CITED

Ehrhart, L.M., W.E. Redfoot and D.A. Bagley. 1996. A study of the population ecology of inwater marine turtle populations on the east-central coast of Florida. Comprehensive final report to NOAA, National Marine Fisheries Service. 164 pp.

Enclada, S.E., P.N. Lahanas, K.A. Bjorndal, A.B. Bolten, M.M. Miyamoto and B.W. Bowen. 1996. Phylogeography and population structure of the Atlantic and Mediterranean green turtle (*Chelonia mydas*): a mitochondrial DNA control region sequence assessment. Molecular Ecololgy 1996(5):473-483.

Inwater Research Group Inc. 2005. Final Report on Sea Turtle Sampling in the Key West National Wildlife Refuge, Florida. Technical report submitted to Florida Fish and Wildlife Research Institute.

Inwater Research Group Inc. 2004. Assessment of marine turtles in the southern Indian River Lagoon System, Florida. Annual report to NMFS, National Sea Turtle Coordinator.

Owens, D.W. and G.W. Ruiz. 1980. New methods of obtaining blood and cerebrospinal fluid from turtles. Herpetologica 36(1):17-20.

Work, T.M. and G.H. Balazs. 1999. Relating Tumor Score to Hematology in Green Turtles with Fibropapillomatosis in Hawaii. Journal of Wildlife Diseases, 35(4) pp 804-807.

.

TABLES

Table 1 . Visual transect results from haphazard unmarked non-linear transects, Lake Worth Lagoon, Palm Beach County, 2005/2006. Cm = Chelonia mydas, Cc = Caretta caretta.

DATE	TRANSECT NUMBER	AREA COVERED	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)	TRANSECT LENGTH (km)	*Cm* sighted	*Cc* sighted	*Cm* per km/transect	*Cc* per km/transect
3/7/2005	1	North end of lagoon to north of Blue Heron Bridge.	N26.83840 W80.05656	N26.79415 W80.04418	13.10	0	0	0.00	0.00
3/7/2005	2	North of Peanut Island to north of Flagler Bridge.	N26.77839 W80.04360	N26.71975 W80.04711	11.61	1	0	0.09	0.00
3/7/2005	3	Boynton Inlet area and north.	N26.54797 W80.04767	N26.54709 W80.04770	10.10	0	0	0.00	0.00
3/7/005	4	North of Flagler bridge to Sailfish Marina.	N26.72535 W80.04577	N26.77689 W80.04130	11.80	0	0	0.00	0.00
3/10/2005	5	Lake Worth Inlet to south of Rybovich Marine	N26.77241 W80.03999	N26.74685 W80.04556	4.31	0	0	0.00	0.00
3/10/2005	6	SE Little Munyon Island to north of Munyon Island	N26.80429 W80.04321	N26.82423 W80.04785	5.60	0	0	0.00	0.00
3/10/2005	7	East of Little Munyon Island to south of Little Munyon Island	N26.80626 W80.04241	N26.80021 W80.04344	2.54	0	0	0.00	0.00
6/13/2005	8	SE Little Munyon Island	N26.80101 W80.04001	N26.80335 W80.03676	1.14	1	0	0.88	0.00
6/13/2005	9	South of Little Munyon to north of Peanut Island	N26.79931 W80.04217	N26.77949 W80.04447	5.35	0	0	0.00	0.00

Table 1. (cont.)

DATE	TRANSECT NUMBER	AREA COVERED	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)	TRANSECT LENGTH (km)	*Cm* sighted	*Cc* sighted	*Cm* per km/transect	*Cc* per km/transect
6/15/2005	11	South of Little Munyon Island to SE of Little Munyon Island	N26.80053 W80.04468	N26.80216 W80.03757	2.78	9	0	3.24	0.00
6/15/2005	12	SE Little Munyon Island	N26.80103 W80.03735	N26.80516 W80.04350	2.62	2	0	0.76	0.00
9/26/2005	13	Boynton Inlet area and north.	N26.54546 W80.04895	N26.55018 W80.04771	4.46	0	0	0.00	0.00
9/26/2005	14	South of Southern Blvd bridge	N26.66978 W80.04547	N26.67070 W80.04393	2.35	0	0	0.00	0.00
9/26/2005	15	Little Munyon Island area	N26.80091 W80.04487	N26.80661 W80.03763	1.98	1	0	0.51	0.00
9/26/2005	16	Little Munyon Island area	N26.80278 W80.03803	N26.80292 W80.03732	1.50	0	0	0.00	0.00
9/26/2005	17	Little Munyon Island to south of LW inlet	N26.80271 W80.03725	N26.76245 W80.04209	9.55	1	0	0.10	0.00
9/27/2005	18	Little Munyon Island area	N26.80026 W80.04356	N26.80257 W80.03777	3.20	6	0	1.88	0.00
9/27/2005	19	North LWL to Kelsey Park area	N26.79976 W80.04956	N26.80932 W80.04515	2.39	3	0	1.26	0.00
9/27/2005	20	Little Munyon Island area to north LWL	N26.81106 W80.04151	N26.83539 W80.05304	8.34	1	0	0.12	0.00
9/28/2005	21	Little Munyon Island area	N26.79972 W80.04401	N26.80009 W80.03888	0.63	4	0	6.35	0.00
9/28/2005	22	Little Munyon Island area	N26.80271 W80.03689	N26.80016 W80.03724	5.12	0	0	0.00	0.00
9/28/2005	23	Little Munyon Island area to north LWL	N26.80528 W80.04046	N26.81537 W80.05168	7.71	6	0	0.78	0.00

Table 1. (cont.)

DATE	TRANSECT NUMBER	AREA COVERED	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)	TRANSECT LENGTH (km)	*Cm* sighted	*Cc* sighted	*Cm* per km/transect	*Cc* per km/transect
1/9/2006	24	Little Munyon Island area	N26.80046 W80.04535	N26.80381 W80.04060	4.84	3	0	0.62	0.00
1/9/2006	25	Kelsey Park West side of lagoon.	N26.81408 W80.05125	N26.79608 W80.04821	2.01	0	0	0.00	0.00
1/9/2006	26	Inlet and south to Rybovich	N26.77574 W80.04060	N26.77930 W80.04512	8.69	0	0	0.00	0.00
1/9/2006	27	Little Munyon Island area	N26.79907 W80.04412	N26.80131 W80.04421	2.75	1	0	0.36	0.00
1/10/2006	28	Little Munyon Island area	N26.80355 W80.03939	N26.80346 W80.03661	0.74	0	0	0.00	0.00
1/10/2006	29	South of Peanut Island to Sailfish Marina	N26.76409 W80.04852	N26.78037 W80.04296	4.94	0	0	0.00	0.00
1/11/2006	30	Little Munyon Island area	N26.80453 W80.03758	N26.80434 W80.03733	2.01	0	0	0.00	0.00
1/11/2006	31	Little Munyon Island area to McCarthur park	N26.80274 W80.03751	N26.83693 W80.05123	6.89	8	0	1.16	0.00
1/11/2006	32	West side of lagoon north of Blue Heron bridge	N26.80316 W80.04981	N26.78677 W80.04625	2.92	0	0	0.00	0.00
3/21/2006	33	Little Munyon Island area	N26.80211 W80.04369	N26.80605 W80.03932	2.00	3	0	1.50	0.00
3/21/2006	34	West side of lagoon north of Blue Heron bridge	N26.79825 W80.05106	N26.78253 W80.04511	2.03	0	0	0.00	0.00
3/22/2006	35	Little Munyon Island area	N26.80303 W80.04273	N26.80574 W80.04034	4.86	2	0	0.41	0.00
6/26/2006	36	Little Munyon Island area	N26.80298 W80.03804	N26.80286 W80.03784	0.31	0	0	0.00	0.00

Table 1. (cont.)

DATE	TRANSECT NUMBER	AREA COVERED	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)	TRANSECT LENGTH (km)	*Cm* sighted	*Cc* sighted	*Cm* per km/transect	*Cc* per km/transect
6/26/2006	37	Little Munyon Island area	N26.80258 W80.03879	N26.80176 W80.04058	3.15	2	0	0.63	0.00
6/26/2006	38	Little Munyon Island area	N26.80007 W80.04075	N26.80132 W80.03964	1.49	0	0	0.00	0.00
6/26/2006	39	Little Munyon Island area	N26.80309 W80.04159	N26.79587 W80.04384	0.94	0	0	0.00	0.00
6/27/2006	40	Bird Island to Ocean Ave. Bridge	N26.53229 W80.05331	N26.53974 W80.05148	8.89	0	0	0.00	0.00
6/28/2006	41	Little Munyon Island area	N26.80112 W80.04344	N26.81002 W80.03965	5.11	24	0	4.70	0.00

Table 2. Location of sea turtles sighted on transect in Lake Worth Lagoon, Palm Beach County, 2005/2006.

DATE	SPECIES	LOCATION (LAT/LONG)	TRANSECT NUMBER
3/7/2005	*Chelonia mydas*	N26.75181 W80.04921	2
6/13/2005	*Chelonia mydas*	N26.80217 W80.03721	8
6/15/2005	*Chelonia mydas*	N26.79903 W80.04250	11
6/15/2005	*Chelonia mydas*	N26.79850 W80.04001	11
6/15/2005	*Chelonia mydas*	N26.80018 W80.03957	11
6/15/2005	*Chelonia mydas*	N26.80141 W80.03852	11
6/15/2005	*Chelonia mydas*	N26.80149 W80.03702	11
6/15/2005	*Chelonia mydas*	N26.80134 W80.03688	11
6/15/2005	*Chelonia mydas*	N26.80131 W80.03687	11
6/15/2005	*Chelonia mydas*	N26.80162 W80.03720	11
6/15/2005	*Chelonia mydas*	N26.80202 W80.03746	11
6/15/2005	*Chelonia mydas*	N26.79928 W80.03683	12
6/15/2005	*Chelonia mydas*	N26.80116 W80.03590	12
9/26/2005	*Chelonia mydas*	N26.80234 W80.03696	15
9/26/2005	*Chelonia mydas*	N26.80112 W80.03995	17
9/27/2005	*Chelonia mydas*	N26.80157 W80.04013	18
9/27/2005	*Chelonia mydas*	No Data	18
9/27/2005	*Chelonia mydas*	N26.80089 W80.03817	18
9/27/2005	*Chelonia mydas*	N26.80281 W80.03683	18
9/27/2005	*Chelonia mydas*	No Data	18
9/27/2005	*Chelonia mydas*	N26.80273 W80.03765	18
9/27/2005	*Chelonia mydas*	N26.80444 W80.05048	19
9/27/2005	*Chelonia mydas*	N26.80829 W80.04568	19
9/27/2005	*Chelonia mydas*	N26.80894 W80.04433	19
9/27/2005	*Chelonia mydas*	N26.80014 W80.04149	20
9/28/2005	*Chelonia mydas*	N26.79930 W80.04211	21
9/28/2005	*Chelonia mydas*	N26.79978 W80.04007	21
9/28/2005	*Chelonia mydas*	N26.80039 W80.03946	21
9/28/2005	*Chelonia mydas*	N26.80023 W80.03898	21
9/28/2005	*Chelonia mydas*	N26.80108 W80.04457	23
9/28/2005	*Chelonia mydas*	N26.79911 W80.04202	23
9/28/2005	*Chelonia mydas*	N26.79896 W80.04559	23

Table 2 (Cont.)

9/28/2005	*Chelonia mydas*	N26.80025 W80.04528	23
9/28/2005	*Chelonia mydas*	N26.80137 W80.04502	23
9/28/2005	*Chelonia mydas*	N26.80124 W80.04449	23
1/9/2006	*Chelonia mydas*	N26.80028 W80.03993	24
1/9/2006	*Chelonia mydas*	N26.80329 W80.03994	24
1/9/2006	*Chelonia mydas*	N26.80316 W80.03957	24
1/9/2006	*Chelonia mydas*	N26.80096 W80.03826	27
1/11/2006	*Chelonia mydas*	N26.80555 W80.04274	31
1/11/2006	*Chelonia mydas*	N26.80606 W80.04337	31
1/11/2006	*Chelonia mydas*	N26.80719 W80.04405	31
1/11/2006	*Chelonia mydas*	N26.80622 W80.04139	31
1/11/2006	*Chelonia mydas*	N26.80627 W80.04103	31
1/11/2006	*Chelonia mydas*	N26.80626 W80.03957	31
1/11/2006	*Chelonia mydas*	N26.80627 W80.03922	31
1/11/2006	*Chelonia mydas*	N26.80687 W80.03836	31
3/21/2006	*Chelonia mydas*	N26.80275 W80.04034	33
3/21/2006	*Chelonia mydas*	N26.80417 W80.03851	33
3/21/2006	*Chelonia mydas*	N26.80661 W80.03964	33
3/22/2006	*Chelonia mydas*	N26.80828 W80.03751	35
3/22/2006	*Chelonia mydas*	N26.80536 W80.04089	35
6/26/2006	*Chelonia mydas*	N26.80478 W80.03699	37
6/26/2006	*Chelonia mydas*	N26.80218 W80.04285	37
6/28/2006	*Chelonia mydas*	N26.80149 W80.04094	41
6/28/2006	*Chelonia mydas*	N26.80154 W80.04028	41
6/28/2006	*Chelonia mydas*	N26.80161 W80.03960	41
6/28/2006	*Chelonia mydas*	N26.80266 W80.03703	41
6/28/2006	*Chelonia mydas*	N26.80814 W80.04025	41
6/28/2006	*Chelonia mydas*	N26.80852 W80.03976	41
6/28/2006	*Chelonia mydas*	N26.80862 W80.03959	41
6/28/2006	*Chelonia mydas*	N26.80893 W80.03909	41
6/28/2006	*Chelonia mydas*	N26.81014 W80.03955	41
6/28/2006	*Chelonia mydas*	N26.81060 W80.04140	41
6/28/2006	*Chelonia mydas*	N26.80959 W80.04363	41
6/28/2006	*Chelonia mydas*	N26.80133 W80.03770	41
6/28/2006	*Chelonia mydas*	N26.80166 W80.03795	41

Table 2 (Cont.)

6/28/2006	*Chelonia mydas*	N26.80499 W80.03836	41
6/28/2006	*Chelonia mydas*	N26.80579 W80.03859	41
6/28/2006	*Chelonia mydas*	N26.80601 W80.03867	41
6/28/2006	*Chelonia mydas*	N26.80796 W80.03936	41
6/28/2006	*Chelonia mydas*	N26.80807 W80.03939	41
6/28/2006	*Chelonia mydas*	N26.80824 W80.03944	41
6/28/2006	*Chelonia mydas*	N26.80831 W80.03946	41
6/28/2006	*Chelonia mydas*	N26.80841 W80.03948	41
6/28/2006	*Chelonia mydas*	N26.80863 W80.03952	41
6/28/2006	*Chelonia mydas*	N26.80899 W80.03956	41
6/28/2006	*Chelonia mydas*	N26.80912 W80.03958	41

Table 3. Non-transect sightings and locations of sea turtles in Lake Worth Lagoon, Palm Beach County, March 2005 - March 2006.

DATE	SPECIES	LOCATION (LAT/LONG)	Captured?
3/8/2005	*Chelonia mydas*	N26.79904 W80.05063	YES
3/9/2005	*Chelonia mydas*	N26.80294 W80.04350	YES
3/10/2005	*Chelonia mydas*	N26.80533 W80.04321	NO
3/10/2005	*Chelonia mydas*	N26.80236 W80.04294	NO
3/10/2005	*Chelonia mydas*	N26.80209 W80.04299	NO
3/10/2005	*Chelonia mydas*	N26.80198 W80.04263	NO
6/13/2005	*Caretta caretta*	N26.80427 W80.03947	YES
6/13/2005	*Chelonia mydas*	N26.80453 W80.03842	NO
6/13/2005	*Chelonia mydas*	N26.80089 W80.03872	NO
6/13/2005	*Chelonia mydas*	NET SET #8	YES
6/13/2005	*Chelonia mydas*	NET SET #8	YES
6/13/2005	*Chelonia mydas*	NET SET #8	YES
6/14/2005	*Chelonia mydas*	N26.80456 W80.03714	NO
6/14/2005	*Chelonia mydas*	N26.80525 W80.04095	NO
6/15/2005	*Chelonia mydas*	N26.80232 W80.03724	NO
6/15/2005	*Chelonia mydas*	N26.80243 W80.03703	NO
6/15/2005	*Chelonia mydas*	N26.80166 W80.03700	NO
6/15/2005	*Chelonia mydas*	N26.80195 W80.03756	NO
6/15/2005	*Chelonia mydas*	N26.80219 W80.03750	NO
6/15/2005	*Chelonia mydas*	N26.80132 W80.03745	NO
6/15/2005	*Chelonia mydas*	N26.80236 W80.03738	NO
6/15/2005	*Chelonia mydas*	N26.80130 W80.03675	NO
6/15/2005	*Chelonia mydas*	NET SET #11	YES
6/15/2005	*Chelonia mydas*	N26.80242 W80.03737	NO
6/15/2005	*Chelonia mydas*	N26.80160 W80.03734	NO
6/15/2005	*Chelonia mydas*	N26.80212 W80.03765	NO

Table 3 (Cont.)

DATE	SPECIES	LOCATION (LAT/LONG)	Captured?
6/15/2005	*Chelonia mydas*	NET SET #12	YES
6/15/2005	*Chelonia mydas*	NET SET #12	YES
9/26/2005	*Chelonia mydas*	N26.80014 W80.04103	NO
9/26/2005	*Chelonia mydas*	N26.80195 W80.03730	NO
9/27/2005	*Chelonia mydas*	N26.80027 W80.04363	NO
9/27/2005	*Chelonia mydas*	N26.80126 W80.03824	NO
9/27/2005	*Chelonia mydas*	N26.80192 W80.04173	NO
9/27/2005	*Chelonia mydas*	N26.80217 W80.03732	NO
9/27/2005	*Chelonia mydas*	N26.80293 W80.03767	NO
9/28/2005	*Chelonia mydas*	N26.80034 W80.03969	NO
9/28/2005	*Chelonia mydas*	N26.79934 W80.04044	YES
9/28/2005	*Chelonia mydas*	N26.79860 W80.04042	YES
9/28/2005	*Chelonia mydas*	N26.79860 W80.04042	NO
9/28/2005	*Chelonia mydas*	N26.80087 W80.03868	NO
9/28/2005	*Chelonia mydas*	N26.80295 W80.04055	NO
9/28/2005	*Chelonia mydas*	N26.80296 W80.04055	NO
9/28/2005	*Chelonia mydas*	N26.80344 W80.04086	NO
1/9/2006	*Chelonia mydas*	NET SET #20	YES
1/9/2006	*Chelonia mydas*	N26.80400 W80.04050	NO
1/9/2006	*Chelonia mydas*	NET SET #20	YES
1/9/2006	*Chelonia mydas*	NET SET #20	YES
1/9/2006	*Chelonia mydas*	N26.80349 W80.03975	NO
1/9/2006	*Chelonia mydas*	NET SET #20	YES
1/9/2006	*Chelonia mydas*	NET SET #20	YES
1/10/2006	*Chelonia mydas*	NET SET #22	YES
1/10/2006	*Chelonia mydas*	NET SET #22	YES
1/10/2006	*Chelonia mydas*	NET SET #22	YES

Table 3 (Cont.)

DATE	SPECIES	LOCATION (LAT/LONG)	Captured?
1/10/2006	*Chelonia mydas*	NET SET #22	YES
1/10/2006	*Chelonia mydas*	N26.80432 W80.03938	NO
1/10/2006	*Chelonia mydas*	N26.80411 W80.03942	NO
1/10/2006	*Chelonia mydas*	N26.80442 W80.03882	NO
1/11/2006	*Chelonia mydas*	NET SET #24	YES
1/11/2006	*Chelonia mydas*	N26.80305 W80.04339	NO
3/20/2006	*Chelonia mydas*	N26.80399 W80.03820	NO
3/20/2006	*Chelonia mydas*	N26.80583 W80.04086	NO
3/20/2006	*Chelonia mydas*	N26.80548 W80.03945	NO
3/20/2006	*Chelonia mydas*	N26.80620 W80.03948	NO
3/20/2006	*Chelonia mydas*	N26.80628 W80.03967	NO
3/20/2006	*Chelonia mydas*	NET SET #28	YES
3/20/2006	*Chelonia mydas*	NET SET #28	YES
3/20/2006	*Chelonia mydas*	NET SET #28	YES
3/21/2006	*Chelonia mydas*	N26.80696 W80.03837	NO
3/22/2006	*Chelonia mydas*	NET SET #32	YES
3/23/2006	*Chelonia mydas*	NET SET #32	YES
6/26/2006	*Chelonia mydas*	N26.80190 W80.04309	NO
6/26/2006	*Chelonia mydas*	N26.80204 W80.04275	NO
6/26/2006	*Chelonia mydas*	NET SET #34	YES
6/26/2006	*Chelonia mydas*	NET SET #34	YES
6/28/2006	*Chelonia mydas*	N26.80858 W80.03818	NO
6/28/2006	*Chelonia mydas*	N26.80894 W80.03996	NO
6/28/2006	*Chelonia mydas*	N26.80901 W80.04003	NO

Table 4. Tangle net set locations for sea turtle sampling, Lake Worth Lagoon, Palm Beach County, 2005/2006.

DATE	NET SET NUMBER	LOCATION	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)
3/8/2005	1	East of Kelsey Park	N26.79975 W80.05065	N26.79822 W80.05081
3/9/2005	2	SE of Little Munyon Island	N26.80585 W80.03754	N26.80470 W80.03677
3/9/2005	3	SE of Little Munyon Island	N26.80182 W80.04260	N26.80297 W80.04361
3/10/2005	4	SE of Little Munyon Island	N26.80571 W80.04374	N26.80420 W80.04353
3/10/2005	5	SE of Little Munyon Island	N26.80334 W80.04325	N26.80198 W80.04263
3/10/2005	6	East of Little Munyon Island	N26.80726 W80.04403	N26.80599 W80.04421
6/13/2005	7	SE of Little Munyon Island	N26.80476 W80.03948	N26.80351 W80.04017
6/13/2005	8	SE of Little Munyon Island	N26.80125 W80.03861	N26.79989 W80.03873
6/14/2005	9	SE of Little Munyon Island	N26.80338 W80.03707	N26.80438 W80.03809
6/14/2005	10	SE of Little Munyon Island	N26.80493 W80.03817	N26.80456 W80.03663
6/15/2005	11	SE of Little Munyon Island	N26.80178 W80.03711	N26.80111 W80.03689
6/15/2005	12	SE of Little Munyon Island	N26.80225 W80.03770	N26.80118 W80.03684
9/26/2005	13	SE of Little Munyon Island	N26.80228 W80.03702	N26.80305 W80.03588

Table 4 (Cont.)

DATE	NET SET NUMBER	LOCATION	START LOCATION (LAT/LONG)	END LOCATION (LAT/LONG)
9/27/2005	14	North of Little Munyon Island	N26.80883 W80.04433	N26.80763 W80.04451
9/27/2005	15	North of Little Munyon Island	N26.80863 W80.04359	N26.80756 W80.04439
9/27/2005	16	SE of Little Munyon Island	N26.80255 W80.03728	N26.80167 W80.03857
9/27/2005	17	SE of Little Munyon Island	N26.80371 W80.03636	N26.80269 W80.03726
9/28/2005	18	SE of Little Munyon Island	N26.80008 W80.03893	N26.79907 W80.03978
9/28/2005	19	SE of Little Munyon Island	N26.79930 W80.04037	N26.79905 W80.04181
1/9/2006	20	SE of Little Munyon Island	N26.80438 W80.04083	N26.80349 W80.03975
1/10/2006	21	SE of Little Munyon Island	N26.80381 W80.03676	N26.80518 W80.03713
1/10/2006	22	SE of Little Munyon Island	N26.80435 W80.03986	N26.80366 W80.03845
1/11/2006	23	SE of Little Munyon Island	N26.80346 W80.03775	N26.80437 W80.03920
1/11/2006	24	SE of Little Munyon Island	N26.80434 W80.03733	N26.80402 W80.03878
1/11/2006	25	SE of Little Munyon Island	N26.80282 W80.04265	N26.80391 W80.04265
3/20/2006	26	SE of Little Munyon Island	N26.80404 W80.03876	N26.80266 W80.03894
3/20/2006	27	NE of Little Munyon Island	N26.80766 W80.04473	N26.80870 W80.04384

Table 4 (Cont.)

3/20/2006	28	East of Little Munyon Island	N26.80517 W80.03886	N26.80595 W80.04007
3/21/2006	29	SE of Little Munyon Island	N26.80554 W80.03897	N26.80663 W80.03953
3/21/2006	30	SE of Little Munyon Island	N26.80368 W80.03726	N26.80404 W80.03571
3/21/2006	31	SE of Little Munyon Island	N26.80381 W80.04344	N26.80493 W80.04267
3/22/2006	32	SE of Little Munyon Island	N26.80590 W80.04158	N26.80531 W80.04027
3/22/2006	33	SE of Little Munyon Island	N26.80520 W80.04145	N26.80387 W80.04164
6/26/2006	34	SE of Little Munyon Island	N26.80321 W80.03721	N26.80220 W80.03808
6/27/2006	35	North of Bird Island	N26.55499 W80.04497	N26.55354 W80.04517
6/27/2006	36	South of south Lake Worth Inlet	N26.54389 W80.04685	N26.54428 W80.04825
6/28/2006	37	East of Little Munyon Island	N26.80858 W80.03818	N26.80894 W80.03996
6/28/2006	38	SE of Little Munyon Island	N26.80361 W80.03875	N26.80373 W80.03721

Table 5. Morphometric data collected on sea turtles captured in Lake Worth Lagoon, Palm Beach County, 2005/2006.

Species	Date	Tag Number	SSCL (cm)	CSCL (cm)	SMCW (cm)	CMCW (cm)	Weight (kg)	Lavaged?	Blood Taken?	FP	Comments
Chelonia mydas	3/8/05		40.5	43.5	31.1	37.0	8.0	No	No	No	S shaped deep gouge in carapace, apparent boat propellar wound. Sent to Marinelife Center in Juno Beach for rehabilitation.
Chelonia mydas	3/9/05	XXQ561/XXQ562	52.8	57.7	45.9	53.3	22.3	No	Yes	No	Leeches present in inguinal area.
Chelonia mydas	6/13/05	XXY522/XXY523	46.7	50.5	35.4	42.2	15.0	Yes	No	Yes	Biopsy taken for DNA.
Caretta caretta	6/13/05		72.0	77.6	60.7	72.0	38.0	No	No	No	Large, healing propellar wound to carapace. Sent to Miami Seaquarium for rehabilitation.
Chelonia mydas	6/13/05	XXY521	29.8	31.8	21.5	25.7	3.6	Yes	No	No	Biopsy taken for DNA.
Chelonia mydas	6/13/05	XXY524/XXY525	45.4	48.7	37.1	43.4	13.2	Yes	Yes	No	
Chelonia mydas	6/15/05	XXY516	53.7	57.1	44.0	51.0	21.4	Yes	Yes	Yes	Leeches and leech cocoons present.
Chelonia mydas	6/15/05	XXY518	54.9	58.8	44.3	52.8	27.4	Yes	Yes	Yes	Leeches on inguinal area. Tail missing distal tip and pigals appear truncated. 1 cm round scar at nape of neck.
Chelonia mydas	6/15/05	XXY519	35.0	37.7	28.0	32.7	6.0	Yes	Yes	No	Barnacle on tomium.
Chelonia mydas	6/15/05	XXY520	30.9	32.8	25.1	29.0	3.9	Yes	Yes	No	Fat. Very white plastron.
Chelonia mydas	9/28/05	XXY501	37.2	39.7	29.5	34.4	6.9	No	Yes	Yes	
Chelonia mydas	9/28/05	XXY502	37.6	40.0	31.3	35.9	7.3	No	Yes	No	Leeches and cocoons present, few large barnacles on carapace.
Chelonia mydas	1/9/2006	XXY503	34.0	35.6	30.8	27.4	6.4	Yes	Yes	No	Few barnacles on carapace, 5 cm depression on 2nd left costal
Chelonia mydas	1/9/2006	XXY504/XXY505	50.0	53.5	46.9	40.5	17.9	Yes	No	No	Biopsy taken for DNA

Table 5 (cont.).

Species	Date	Tag Number	SSCL (cm)	CSCL (cm)	SMCW (cm)	CMCW (cm)	Weight (kg)	Lavaged?	Blood Taken?	FP	Comments
Chelonia mydas	1/9/2006	XXY506	41.8	45.3	39.8	34.4	10.4	Yes	Yes	Yes	PAPILLOMAS. Leeches and cocoons present.
Chelonia mydas	1/9/2006	XXY522/XXY523	50.3	54.3	45.8	39.0	18.4	No	Yes	Yes	RECAPTURE, from 6/13/05. PAPILLOMAS.
Chelonia mydas	1/9/2006		41.3	45.6	39.4	33.5	9.4	Yes	No	Yes	PAPILLOMAS. Straight carapace measurements taken to the right of large tumor at nuchal notch. PIT tag only. Biopsy taken.
Chelonia mydas	1/10/2006		44.4	47.2	43.0	36.5	12.6	No	No	Yes	PAPILLOMAS. Biopsy taken. Turtle sent to rehabilitation due to large papillomas and embedded monofilament line on LFF.
Chelonia mydas	1/10/2006	XXY507/XXY508	38.8	40.6	39.1	33.2	8.3	No	Yes	Yes	PAPILLOMAS. Few barnacles, minor scalloping of rear flippers.
Chelonia mydas	1/10/2006		37.5	41.9	37.0	31.8	9.3	No	Yes	Yes	PAPILLOMAS. Large healed notch on posterior left carapace with associated hump on 4th vertebral. PIT tag only.
Chelonia mydas	1/10/2006	XXY509/XXY510	42.9	45.2	38.5	34.0	10.8	Yes	Yes	No	Few barnacles on carapace.
Chelonia mydas	1/11/2006	XXY511	33.4	35.0	28.9	26.4	4.7	No	Yes	No	Few barnacles on carapace.
Chelonia mydas	3/20/2006	XXY512/XXY513		52.0		44.9	16.7	No	Yes	Yes	PAPILLOMAS. No calipers. Leeches on FF and neck.
Chelonia mydas	3/20/2006	XXY514/XXY515	43.3	45.8	34.2	39.5	12.6	No	Yes	Yes	PAPILLOMAS.
Chelonia mydas	3/20/2006	XXY517/XXY526	43.0	45.9	36.0	42.0	12.7	No	No	No	DNA sample obtained. Leeches and cocoons on all flippers. RRF injury.
Chelonia mydas	3/22/2006	XXY527	37.6	40.1	29.6	33.6	8.1	No	No	Yes	PAPILLOMAS. DNA sample obtained. Leeches and cocoons.
Chelonia mydas	3/22/2006	XXY528	44.9	47.6	35.7	42.4	12.9	No	Yes	Yes	PAPILLOMAS. Leeches and cocoons present.

Table 5 (cont.).

Species	Date	Tag Number	SSCL (cm)	CSCL (cm)	SMCW (cm)	CMCW (cm)	Weight (kg)	Lavaged?	Blood Taken?	FP	Comments
Chelonia mydas	6/26/2006	XXY529/XXY530	41.0	43.7	33.0	36.8	8.8	Yes	Yes	Yes	PAPILLOMAS.
Chelonia mydas	6/26/2006	XXY531/XXY532	44.9	47.6	35.7	42.4	12.9	Yes	Yes	Yes	PAPILLOMAS.