Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

April 20, 2011

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10 CFR 50.4

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
2010 Annual Environmental Operating Report

In accordance with Section 5.4.1.2 of the St. Lucie Units 1 and 2 Environmental Protection Plans (EPP), attached is the Annual Environmental Operating Report for calendar year 2010.

Sincerely,

Eric S. Katzman
Licensing Manager
St. Lucie Plant

ESK/tlt

Attachment: Florida Power & Light Company St. Lucie Plant Annual Environmental Operating Report 2010 (66 pages)

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FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT

ANNUAL ENVIRONMENTAL

OPERATING REPORT

2010

FLORIDA POWER & LIGHT COMPANY

JUNO BEACH, FLORIDA

&

INWATER RESEARCH GROUP INC.

JENSEN BEACH, FLORIDA

ENVIRONMENTAL OPERATING REPORT

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PART I

1.0 INTRODUCTION

1.1 AREA DESCRIPTION

The St. Lucie Plant is located on a 457-hectare site on Hutchinson Island on Florida's east coast (Figures 1 and 2). The plant is approximately midway between Ft. Pierce and St. Lucie Inlets. It is bounded on the east side by the Atlantic Ocean and on the west side by the Indian River Lagoon. Hutchinson Island is a barrier island that extends 36 km between inlets and attains its maximum width of 2 km at the plant site. Elevations approach five meters atop dunes bordering the beach and decrease to sea level in the mangrove swamps that are common on the western side. The Atlantic shoreline of Hutchinson Island is composed of sand and shell hash with intermittent rocky promontories protruding through the beach face along the southern end of the island. Submerged coquinoid rock formations parallel much of the island off the ocean beaches. The ocean bottom immediately offshore from the plant site consists primarily of sand and shell sediments. The Gulf Stream (Florida Current), which flows parallel to the continental shelf margin, begins to diverge from the coastline at West Palm Beach. At Hutchinson Island, the current is approximately 33 km offshore. Oceanic water associated with the western boundary of the current periodically meanders over the inner shelf, especially during summer months.

1.2 POWER PLANT DESCRIPTION

The St. Lucie Power Plant is an electric generating station on Hutchinson Island in St. Lucie County, Florida. The plant consists of two 850 net MWe nuclear-fueled electric generating units that use near shore ocean waters for the plant's once-through condenser cooling system. Unit 1 was placed on-line in March 1976 and Unit 2 in April 1983. Water for this system enters through three submerged intake structures located about 365 m offshore (Figure 2). The intake structures are equipped with a velocity cap to minimize fish entrainment. Water passes through these structures and into submerged pipes (two 3.7 m and one 4.9 m in diameter) running under the beach. It then passes into a 1,500 m long intake canal, which transports it to the plant. After passing through the plant, the heated water is discharged into a 670 m long canal that leads to two buried discharge pipelines. These pipelines pass

underneath the dunes and along the ocean floor to the submerged discharges, the first of which is approximately 365 m offshore and 730 m north of the intake.

1.3 BACKGROUND

St. Lucie Units 1 and 2 use the Atlantic Ocean as a source of water for once through condenser cooling. Since 1971, the potential environmental effects resulting from the intake and discharge of this water have been the subject of FPL sponsored biotic studies at the site (ABI 1978, 1980, 1986-89, 1994). Jurisdiction for sea turtle studies is with the NRC, which is considered to be the lead federal agency relative to consultation under the Endangered Species Act. This document has been prepared to satisfy the requirements contained in Appendix B, Environmental Protection Plan (EPP); St. Lucie Units 1 and 2 Facility Operating Licenses No. DPR-67 and No. NPF-16. Previous results dealing with sea turtle studies are contained in twenty-seven annual environmental operating reports covering the period from 1983 through 2009. This report describes the 2010 environmental protection activities related to sea turtles, as required by Subsection 4.2 of the St. Lucie Units 1 and 2 Environmental Protection Plans. Other routine annual reporting requirements are addressed in Part III.

1.4 SEA TURTLE NESTING SURVEY SUMMARY

Hutchinson Island, Florida, is an important rookery for loggerhead turtles (*Caretta caretta*), and also supports nesting of green turtles (*Chelonia mydas*) and leatherback turtles (*Dermochelys coriacea*). The federal government has classified the loggerhead turtle as a threatened species under the Endangered Species Act of 1973. Leatherbacks and the Florida nesting population of green turtles are listed under the Act as endangered. Due to the endangered status of these marine turtles, one of FPL's prime environmental concerns is that the operation of the St. Lucie Plant does not adversely affect the Hutchinson Island rookery. For this reason, FPL has sponsored monitoring of marine turtle nesting activity on the island since 1971.

Daytime surveys to quantify nesting, as well as nighttime turtle tagging programs, were conducted in odd numbered years from 1971 through 1979. During daytime nesting surveys,

nine 1.25 km-long survey areas were monitored five days per week (Figure 3). The St. Lucie Plant began operation in 1976; therefore, the first three survey years (1971, 1973, and 1975) provided baseline data for nesting activity on Hutchinson Island. Though the power plant was not operating during 1975, St. Lucie Plant Unit 1 ocean intake and discharge structures were installed during that year. Installation of these structures included nighttime construction activities conducted offshore from and perpendicular to the beach. The plant was in full operation during the 1977 and 1979 surveys.

A modified daytime nesting survey was conducted in 1980 during the preliminary construction of the ocean discharge structure for St. Lucie Plant Unit 2. During this study, four of the previously established 1.25 km-long survey areas were monitored, and to mitigate any adverse affects associated with construction activities turtle nests proximal to the construction area were relocated.

Every year from 1981 through 2010, 36 one-km-long survey areas comprising the entire island were monitored seven days a week during the nesting season (Figure 3). Since the 1994 nesting season, the southern half of the island has been surveyed by Ecological Associates of Jensen Beach, Florida, and their data are included in this report. The St. Lucie Plant Unit 2 discharge structure was installed during the 1981 nesting season. Construction of the Unit 2 intake structure proceeded throughout the 1982 nesting season and was completed near the end of the 1983 nesting season. Mitigation activities associated with installation of both structures were similar to those conducted when Unit 1 intake and discharge structures were installed. Eggs from turtle nests potentially threatened by construction activities were relocated.

During 1991, another major offshore construction project was undertaken to replace damaged velocity caps on the three intake structures. A large elevated platform, from which repair activities were conducted, was erected around the three structures. Construction occurred throughout the nesting season. However, in contrast to previous offshore projects, work was restricted almost entirely to daylight hours, nighttime lighting of the work area was minimal, and no equipment or materials were used on the beach. A sea turtle protection plan, implemented in support of the project, included caging of nests along a 1,500 m section of

beach (west of the platform); and release of hatchlings to unaffected areas to the north and south. This plan was intended to mitigate any negative effects resulting from the required safety and navigational lighting on and near the platform.

Requirement 4.2.1 of the St. Lucie Unit 2 operating license Appendix B, Environmental Protection Plan, was complete with submission of the 1986 nesting survey data (ABI, 1987). The nesting survey was continued voluntarily through 1998 with agreement from federal and state agencies. In 1998, the continuation of the nesting survey program was mandated as part of the Biological Opinion and Incidental Take Statement issued by the National Marine Fisheries Service. An amendment to the Environmental Protection Plan was approved in 1999 to include these requirements.

1.4.1 Loggerhead Sea Turtle Nesting

The loggerhead turtle inhabits temperate, subtropical and tropical waters of the Atlantic, Pacific, and Indian Oceans. Most nesting occurs on warm temperate and subtropical beaches (Dodd, 1988). Approximately 42,000 to 74,000 loggerhead turtle nests are deposited annually on southern Florida beaches (TEWG, 2000), ranking this loggerhead turtle rookery the second largest in the world (NMFS and USFWS, 1991). The beaches in southeast Florida are especially prolific nesting areas, with Hutchinson Island being a critically important nesting beach (Meylan et al., 1995). Between 4,000 and 8,000 loggerhead nests have been deposited annually on Hutchinson Island during the last 29 years.

Nesting surveys on Hutchinson Island were initiated in response to concerns that the operation of the St. Lucie Plant might negatively impact the local sea turtle rookery. Previous analysis, using log-likelihood tests of independence (G-test; Sokal and Rohlf, 1981) demonstrated that the construction of the plant's offshore intake and discharge structures significantly reduced nesting at the plant site during construction years - 1975, 1981, 1982, and 1983 (ABI, 1987). However, nesting at the plant consistently returned to levels similar to or greater than those at a control site in years following the construction. During 1991 when offshore construction was restricted almost entirely to daylight hours, nests were more abundant at the plant site

than at the control site. Data collected through 2010 have shown that power plant operation exclusive of nighttime intake/discharge construction has had no apparent effect on nesting.

From 1981 through 2010, 36 one-km-long segments comprising the island's coastline have been surveyed (Figure 3). The distribution of nests among these 36 survey areas is characterized by an increase in nesting from north to south along the northern half of the island (ABI, 1987-1993, Figure 4). Though beach dynamics may sometimes affect the selection of nesting sites by loggerhead turtles, relationships between spatial nesting patterns and specific environmental conditions are often difficult to establish.

Not all ventures onto the beach by a female turtle culminate in successful nests. These "false crawls" (non-nesting emergences) may occur for many reasons and are commonly encountered at other rookeries. Davis and Whiting (1977) suggested that relatively high percentages of false crawls may reflect disturbances or unsatisfactory nesting beach characteristics. This means that while certain factors may affect a turtle's preference to emerge on a beach, there may be other factors that affect a turtle's tendency to nest after it has emerged. An index that relates the number of nests to the number of false crawls in an area is useful in estimating the post-emergence suitability of a beach for nesting (Figure 4). In the present study this index is termed "nesting success" and is defined as the percentage of total emergences that result in nests (Figure 5).

Historically, the distribution of loggerhead emergences on the island has been consistent with the distribution of nests (ABI, 1987-1994), with no difference in nesting success among areas. However, in recent years zones A through C have experienced lower nesting success, presumably due to periodic beach renourishment activities conducted just south of Ft. Pierce Inlet. This temporary drop in nesting success has been reported at other renourished beaches throughout Florida (Steinite et al. 1998; Herren, 1999).

Reconstruction of the primary dune in survey zone "O" was completed by the power plant prior to the beginning of the 2005 sea turtle nesting season. Dune restoration projects, such as this one, were conducted in St. Lucie and Martin counties due to the widespread obliteration of the primary dunes during the 2004 hurricane season. Despite the compact material and

erosion problems associated with the FPL dune, nesting success was not noticeably different than in unaffected survey zones to the north and south of the project area.

Cool water intrusions frequently occur over the continental shelf of southeast Florida during the summer (Smith, 1982). Typically these cold-water upwelling events last less than a week and have little effect on overall nest numbers for the season. While these natural fluctuations in temperature have been shown to temporarily affect loggerhead nesting patterns on Hutchinson Island, there has been no indication that power plant operation has had any effect on these temporal patterns (ABI, 1988).

1.4.2 Green Sea Turtle Nesting

The green turtle occurs in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. It is second to the loggerhead as the most common sea turtle on Florida nesting beaches. Female green turtles in Florida typically migrate from foraging areas to their natal beaches every two years (Witherington and Ehrhart, 1989b) and show a high degree of nest site fidelity (Miller, 1997). Mating may occur along the way to the nesting beach (Meylan et al., 1992), far from the nesting beach at distant mating grounds (Limpus, 1993), or near-shore to the nesting beach (Carr and Ogren, 1960). Approximately 99% of the green turtle nesting in Florida occurs on the Atlantic coast from Brevard through Broward Counties. On Hutchinson Island and throughout the state, green turtles generally have had alternating years of nesting; a high nesting year followed by a low nesting year with little fluctuation. This bimodal pattern is also seen at other green turtle rookeries throughout their nesting range. Females lay an average of three clutches at 10-17 day intervals (Miller, 1997) and will remain near the nesting beach during the inter-nesting period (Carr et al., 1974).

1.4.3 Leatherback Sea Turtle Nesting

The leatherback turtle is the most widely distributed reptile in the world (Mrosovsky, 1987) where it inhabits waters of the Atlantic, Pacific, and Indian Oceans. Nesting occurs on subtropical and tropical beaches and, after nesting, leatherbacks travel to temperate and sub-artic waters to forage. Leatherbacks inhabit Florida waters primarily during the nesting

season (March-June) and are generally found in higher densities close to shore, rather than offshore (Schroeder and Thompson, 1987). There they feed and/or rest during inter-nesting intervals (time between subsequent nests, typically nine days). Leatherbacks are not as site specific in their nest site selection as are the hard-shelled turtles (Dutton et al., 1999) and may relocate a hundred kilometers or more (Eckert, 1989) to lay additional nests during the season. In Florida, nesting has been increasing (Witherington and Koeppel, 2000) but it is unknown whether the increase is from new recruits to the population or if it represents migrants from other Caribbean nesting beaches. There were at least 200 individual females nesting in Florida as of 2005 (Stewart and Johnson, unpubl. data).

1.4.4 Long-Term Trends in Sea Turtle Nesting

Various methods were used prior to 1981 to estimate the total number of loggerhead nests on Hutchinson Island. All were based on the number of nests found in the nine 1.25 km-long survey areas (ABI, 1980a). Each of these methods was subsequently found to consistently overestimate island totals (ABI, 1987). Since whole-island surveys began in 1981, it has been possible to determine the actual proportion of total nests deposited in the nine areas. This has allowed extrapolation from the nine survey areas to the entire island for years 1981 to 2000. For instance, from 1981 through 1994, the total number of nests in the nine areas ranged from 32.5 to 35.6 percent of the total number of nests on the island. This is slightly higher than the 31.3 percent that would be expected based strictly on the proportion of linear coastline comprised by the nine areas. Using the 13-year mean of 33.81 percent, estimates of the total number of nests on Hutchinson Island can be calculated by multiplying the number of nests in the nine areas by 2.958. This technique, when applied to the nine survey areas during the 13 years in which the entire island was surveyed, produced whole-island estimates within 5.3 percent of the actual number of nests counted. Since the proportion of nests recorded in the nine survey areas remained relatively constant over the last 13 years, this extrapolation procedure provides a useable estimate of total loggerhead nesting for years prior to 1981, and is used to generate data points for 1971 through 1979 in Figure 6. In 2001, these nine 1.25 km sections were abandoned and whole island surveys were conducted in the existing 36 one-kilometer segments.

It is clear that loggerhead nesting activity on Hutchinson Island fluctuates considerably from year to year (Figure 6). Annual variations in nest densities are also common at other rookeries, and probably result from non-annual reproductive behavior. No relationships between annual fluctuations in nesting activity and power plant operation or intake/discharge construction were found. However, loggerhead nesting on Hutchinson Island mirrors trends in nesting statewide and has shown a significant decline over the past ten years. Statewide loggerhead nesting has declined by over 40% between 1998 and 2009. A similar decline in nesting has been observed on Hutchinson Island.

Green and leatherback turtles nest on Hutchinson Island, but in fewer numbers than loggerhead turtles. Prior to 1981, both survey (nine 1.25 km-long sections) and inter-survey areas were monitored for the presence of green and leatherback nests. Thirty-one kilometers of beach from the first 1.25 km segment south to the St. Lucie Inlet were included in that effort. During whole-island surveys from 1981 through 1993, only 2.6 percent (7) of the leatherback nests (n=266) and only 1.4 percent (12) of the green turtle nests (n=831) were recorded on the five kilometers of beach north of the first 1.25 km segment. Therefore, previous counts of green and leatherback nests within the 31 kilometers surveyed probably were not appreciably different from total densities for the entire island. Based on this assumption, green and leatherback nest densities may be compared among all survey years; with the exception of 1980 when less than 15 kilometers of beach were surveyed.

Since surveys began in 1971, the number of nests observed on the island has ranged from five to 565 for green turtles and from one to 475 for leatherbacks (Figures 7 and 8). Temporal nesting patterns for these species differ from the pattern for loggerhead turtles. Green turtles typically nest on Hutchinson Island from mid-June through the first or second week of September. Leatherback turtles usually begin nesting in March and continue to nest through early to mid-July. Considerable fluctuations in green turtle nesting on the island have occurred among survey years (Figure 7). This is not unusual since there are drastic year-to-year fluctuations in the numbers of green turtles nesting at other rookeries (Carr et al., 1982). Despite these fluctuations, data collected through 2010 suggest an overall increase in nesting since 1971 and may reflect an increase in the number of nesting females in the Hutchinson Island area. This increase in green turtle nesting is similar to increases seen statewide.

Previous surveys have shown that green turtles typically nest in greater numbers along the southern half of the island. One exception was the 2005 nesting season where there were a greater number of nests found along the northern half of Hutchinson Island.

Leatherback nest numbers have continued to increase on Hutchinson Island and mirror statewide nesting increases seen over the last 10 years. This increase in leatherback nesting has not only been reported for Hutchinson Island, but for nesting beaches to the north and south. These combined increases in nest activity likely reflect an overall increase in the number of nesting females on the Atlantic coast of Florida.

1.4.5 Predation on Sea Turtle Nests

Since nest surveys began in 1971, raccoon predation has been the leading cause of turtle nest destruction on Hutchinson Island. Researchers at other locations have reported raccoon predation levels as high as 70 to nearly 100 percent (Hopkins et al., 1979). Raccoon predation of loggerhead turtle nests on Hutchinson Island has not approached this level during any study year, though levels for individual 1.25 km-long areas have been as high as 80 percent. Overall predation rates for survey years 1971 through 1977 were between 21 and 44 percent, with a high of 44 percent recorded in 1973. A pronounced decrease in raccoon predation occurred after 1977, and overall predation rates for the nine areas have not exceeded 10 percent since 1979. A decline in predation rates on Hutchinson Island may be attributable to trapping programs, construction activities, habitat loss, and disease.

Raccoon predation rates in 2010 significantly increased (8.0% in 2010 as compared to less than 0.5% in 2009) with the greatest predation rates occurring in zone L (Figure 9). It is possible that the raccoon population has rebounded from a previous epizootic disease that may have accounted for the record low numbers in 2009.

Ghost crabs have been reported by numerous researchers as important predators of sea turtle nests (Hopkins et al, 1979; Stancyk, 1982) and are currently the most significant predators on Hutchinson Island. Ghost crab predation followed the same trend as the raccoon predation with a significant increase in 2010 (10.3%) verses 2009 (2.6%). Though turtle nests on

Hutchinson Island have probably been depredated by ghost crabs since nesting surveys began in 1971, quantification of ghost crab predation did not begin until 1983.

1.5 INTAKE CANAL MONITORING SUMMARY

Entrainment of sea turtles at the St. Lucie Plant has been attributed to the presumed physical attractiveness of the offshore structures housing the intake pipes rather than to plant operating characteristics (ABI, 1980b and 1986). The velocity caps, which are supported above the openings to each intake pipe, eliminate vertical water entrainment and substantially reduce current velocities near the structures by spreading horizontal draw over a wider area. Even when both units are operating at full capacity, turtles must actively swim into the mouth of one of the structures before they encounter current velocities sufficiently strong enough to entrain them. Consequently, a turtle's entrapment relates primarily to the probability that it will detect and subsequently enter one of the intake structures.

Removal of turtles from the intake canal has been an integral part of the St. Lucie Plant environmental monitoring program. Turtles entering the ocean intake structures are entrained with cooling water and rapidly transported through the intake pipes into an enclosed canal system where they must be manually captured and returned to the ocean. Since the plant became operational in 1976, turtles entrapped in the intake canal have been systematically captured, measured, weighed, tagged, and released. In July of 1994, responsibility for sea turtle research and conservation activities was transferred from Applied Biology, Inc. to Quantum Resources, Inc. Since 2005, the four sea turtle biologists working at the power plant were contracted by three separate companies other than Quantum Resources. Despite the non-cohesive suite of employers, the group worked under one marine turtle permit and methodologies employed in the canal capture program have remained essentially unchanged. Therefore, data collected from 1994 through the present are directly comparable to previous years' data. In August of 2009, responsibility for sea turtle research and conservation activities was transferred to Inwater Research Group, Inc. (A nonprofit organization).

Historically, most turtles entrapped in the St. Lucie Plant intake canal were removed by means of large-mesh tangle nets fished near the intake canal headwalls at the extreme eastern

end of the intake canal (Figure 2). Nets used were from 30 to 40 m in length, 3 to 4 meters deep and composed of 40 cm stretch mesh multifilament nylon. Large floats were attached to the surface, and un-weighted lines were used along the bottom. Turtles entangled in the nets generally remained at the water's surface until removed. Since its inception in 1976, the canal capture program has been under continual review and refinement in an attempt to minimize both entrapment time and injuries/mortalities to entrapped sea turtles. Prior to April 1990, turtle nets were usually deployed on Monday morning and retrieved on Friday afternoon. During periods of deployment, the nets were inspected for captures at least twice each day (mornings and afternoons). Additionally, St. Lucie Plant personnel checked the nets periodically, and biologists were notified immediately if a capture was observed. Sea turtle specialists were on call 24 hours a day to retrieve captured turtles from the plant intake canal system.

Beginning in April 1990, after consultation with NMFS, net deployment was scaled back to daylight hours only. Concurrently, surveillance of the intake canal was increased and biologists remained on site for the duration of each day's netting activities. This measure decreased response time for removal of entangled turtles from nets and provided an opportunity to improve daily assessments of turtle levels within the canal.

During each day's directed capture efforts, formal inspections of the intake canal were made to determine the numbers, locations and species of turtles present. Surface observations were augmented with periodic underwater inspections, particularly in and around the barrier nets. These observations allowed for a rough estimate of how many sea turtles were in each section of the canal on a given day. Records of daily canal observations were compared with capture data to assess capture efficiencies.

Capture activities at the intake canal included a variety of methods; large tangle nets and dip nets were used daily and hand capture methods were employed when water clarity was acceptable. Better utilization of currents and eddies, adjustments to tethering lines, multi-net deployments and increased efforts to hand capture turtles have contributed to reduced entrapment times in recent years.

Regardless of capture method, all turtles removed from the canal are identified to species, measured, weighed, tagged and examined for overall condition (wounds, abnormalities, parasites, etc.). Beginning in July 1994, all turtles captured were photographed dorsally and ventrally prior to release, and the photographs were retained for future reference. Additionally, as of July 2001, Passive Integrated Transponder tags (PIT tags) were injected subcutaneously into the right front flipper of all captured turtles as outlined in the Biological Opinion (issued by NMFS in May 2001). Healthy turtles were released into the ocean the same day of capture. Sick or injured turtles were treated and occasionally held for observation prior to release. When treatment was warranted, turtles were transported to an approved rehabilitation facility after consultation with the Florida Fish and Wildlife Conservation Commission (FWC). As of 1982, necropsies were conducted on all dead turtles found in fresh condition. Currently, all fresh dead turtles are held on ice and taken to a qualified veterinarian for necropsy.

From July 2004 until March 2008, blood was drawn from all turtles captured at the canal as part of a collaborative effort with the University of Florida, the Marinelife Center of Juno Beach and the Clearwater Aquarium. This was part of a study to catalog biochemical blood parameters for wild captured sea turtles. The samples collected at the power plant represent the largest database of sea turtle blood profiles ever compiled. These blood profiles are posted on a website designed for this project by the University of Florida and will aid researchers, veterinarians and rehabilitation facilities.

Florida experienced an extended period of unseasonably cold air temperatures in January and February 2010. The rapid drop in coastal water temperatures accompanying this cold weather resulted in a higher than normal number of sea turtles becoming cold-stunned, an ailment in which sea turtles become very lethargic and are often found floating at the water's surface. From January through March 2010, 267 cold-stunned sea turtles were captured in the intake canal of the Saint Lucie Nuclear Power Plant.

The hard-shelled sea turtles, or chelonids, are air-breathing reptiles and are unable to self-regulate their body temperature (Pritchard, 1997). As such, whenever water temperatures drop below certain levels, their metabolic processes can become disrupted. In this cold-

stunned state they are vulnerable to predation, can become immobile and drown, or simply succumb to hypothermia and die (Witherington and Ehrhart, 1989a).

Cold stun events are of particular interest to the power plant since they can be a contributing factor for increased sea turtle mortalities causal to plant operations. In the current flow conditions of the power plant intake canal, turtles may find it difficult to maintain position in the current or even stay above the water's surface to breath. During the 2010 cold stun event there were three mortalities causal to power plant operation from turtles drowning on the temporary 5-inch barrier net. There was a fourth causal mortality from a cold-stunned turtle that had been depredated while stranded on the barrier net.

1.5.1 Loggerhead Turtle Captures

Historically, loggerheads have been the most abundant species in the canal. Since 1977, the first full year of plant operation, the number of loggerheads captured each year ranged from 62 in 1981 to 623 in 2004 (Figure 10). Loggerhead capture rates have exhibited considerable year-to-year fluctuation, but overall have shown a persistent increase since the late 1980s (Figure 10). The decrease in loggerhead captures in 2007 was likely the result of an extended fueling outage at the power plant and not an indication of true decline in relative abundance. During outages, when one unit is taken off line, water flow through the intake canal system is half the normal volume, which in turn affects the number of turtles entrained into the canal system. The size frequency of loggerheads captured at the intake canal of the power plant ranges from predominately juvenile animals to sub-adult animals, with mature adult animals captured mainly during the nesting season (April – September).

1.5.2 Green Turtle Captures

The number of green turtles captured each year since 1977 has ranged from three in 1979 to a record high of 673 in 1995 (Figure 10, Table 1). The increasing number of captures over recent years suggests that there has been an increase in the number of turtles inhabiting the shallow coastal reefs adjacent to the power plant's offshore intake structures. There was a spike in green turtle captures during the mid 1990's that leveled off to a capture rate

consistently greater than numbers recorded prior to 1994. This increase has been mainly driven by small juvenile animals captured at the intake canal. Size frequencies of green turtles at the intake canal are dominated by juvenile animals with few sub-adult animals captured. Adult green turtles are captured in relatively small numbers during the nesting season (May-October).

Green turtle capture rates at the St. Lucie Power Plant vary from year to year and, like loggerhead captures, can be affected by power plant outages. For example, 2007 had the lowest numbers of green turtles captured since 1992, coinciding with extended outages that lasted five months out of the year.

1.5.3 Leatherback, Hawksbill, Kemp's ridley Turtle Captures

Captures of leatherback, hawksbill, and Kemp's ridley turtles have been infrequent and scattered throughout the years. However, each species has shown rather pronounced seasonality of occurrence. Over 60 percent of all leatherbacks were captured in March and April and over 60 percent of hawksbills were captured between July and September. This pattern of seasonal captures is even more pronounced with the Kemp's ridley sea turtle. Nearly 90 percent of all Kemp's ridleys were caught between the months of December and April.

1.5.4 Relative Condition

Turtles captured alive in the intake canal of the St. Lucie Plant are assigned a relative condition based on weight, activity, parasite infestation, barnacle coverage, injuries and any other abnormalities which might affect overall vitality. Relative condition ratings can be influenced by a number of factors, some related and others unrelated to entrainment and/or entrapment in the intake canal. A rating of good indicates that turtles have not been negatively impacted by their entrapment in the canal, at least as evidenced by physical appearance. Although ratings of fair or poor imply reduced vitality, the extent to which entrainment and entrapment are responsible is often indeterminable. In some instances, conditions responsible for lower ratings, such as boat collision, fisheries gear entanglement or

disease were obviously sustained prior to entrainment. However, in recent years turtles have been found with fresh scrapes and cuts incurred during entrainment. Some of these incidents have had a negative effect on a sea turtle's overall condition and been categorized as directly causal to power plant operation. Causal determinations are made by consultation with personnel from Florida Fish and Wildlife Conservation Commission (FWC) and/or a qualified veterinarian. The intake pipes at the St. Lucie Power Plant are currently in the process of being cleaned to alleviate the scrape issue.

1.5.5 Mortalities and Injuries

Sea Turtle mortalities have been closely monitored throughout the life of the capture program in an attempt to assign probable cause and take appropriate remedial action to minimize future occurrences. Previous analyses of canal capture data identified drowning in nets (A1A barrier net, UIDS barrier, and tangle nets), drowning in the intake pipes during periods of reduced intake flow, injuries sustained from dredging operations and injuries sustained from the mechanical rakes used in the intake wells as probable mortality factors (ABI, 1987) (FPL, 1995). Since that analysis, design changes have addressed each of these problem areas and have reduced mortalities significantly. Since 1996, drowning in nets has been reduced to 0.16% of all turtles captured, intake well mortalities have been reduced to 0.04%, drowning in the intake pipes has been reduced to 0.10%, and there have been no injuries or mortalities associated with dredging operations in the intake canal.

Over the entire monitoring program's history (1976-2010), 153 (1.9%) of the 8077 loggerheads and 86 (1.4%) of the 5959 green turtles entrained in the canal were found dead. Mortalities spanned the range of size classes for loggerheads (SSCL = 47.4-101.3 cm), while green turtle mortalities primarily involved juveniles less than 48 cm in length. However, one adult green turtle (a male) was injured upon entrainment in 2005 and later expired in a rehabilitation facility. The four Kemp's ridley mortalities documented at the St. Lucie Plant during 1987 and 1988 were the only deaths for this species. No dead leatherback or hawksbill turtles have been recorded.

Modifications to capture procedures, improvements to barrier nets and virtual elimination of low flow conditions within the intake pipes have resulted in a substantial reduction in sea turtle mortalities over the life of the canal capture program. Mortality rate, expressed as the percentage of total captures involving dead animals, declined from 7.8 percent during the period 1976-1984 to 1.4% for the period 1985 to present (Table 1).

Injuries and mortalities are categorized in two ways; causal to power plant operation or non-causal to power plant operation. These decisions are made by consultation with FWC and/or a qualified veterinarian. Not all mortalities and injuries are causal to power plant operation, as some sea turtles enter the canal in either a moribund state or have had pre-existing conditions related to fisheries, boat interactions, and/or disease. Injuries causal to power plant operation are recorded and are debited against the take limit established by the most recent Biological Opinion set forth by NMFS.

1.6 SEA TURTLE PROTECTION ACTIVITIES SUMMARY

1.6.1 NMFS Section 7 Consultations

In accordance with Section 7 of the Endangered Species Act (ESA), FPL must submit a Biological Assessment through the Nuclear Regulatory Commission (NRC) to the National Marine Fisheries Service (NMFS) for review as part of the formal consultation process if FPL exceeds their incidental take limit established by the most recent Biological Opinion (BO) set forth by NMFS. The BO is an analytical document that looks at the effects of a federal action on endangered and threatened species.

Section 7(b)(4) of the Endangered Species Act (ESA) refers to the incidental take of listed species. It sets forth the requirements when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA, and the proposed action may incidentally take listed species. NMFS is responsible for issuing a statement that specifies the impact of any incidental take of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided to minimize such impacts.

In 1999, FPL exceeded their anticipated incidental take limit established by the 1997 Biological Opinion (BO) set forth by NMFS. This required re-consultation under Section 7 of the Endangered Species Act. As part of this consultation FPL, through Ecological Associates Inc., submitted a report entitled "Physical and Ecological Factors Influencing Sea Turtle Entrainment Levels at the St. Lucie Nuclear Power Plant: 1976-1998." NMFS received the report in March of 2000 and considered this new information when developing the new Opinion. On May 4, 2001, NMFS issued its BO as part of this new consultation, subsequent to the 1997 BO.

In the new Opinion there were a number of changes, most importantly in the Incidental Take Statement. This, in summary, states that FPL will exceed their take limits for a calendar year if any of the following occur: more than 1000 sea turtles are captured, or more than 1% of the total number of loggerhead and green turtles (combined) are injured/killed causal to plant operation, or more than two Kemp's ridley sea turtles are injured/killed causal to plant operation, or if any hawksbill or leatherback sea turtles are injured/killed causal to plant operation. In a case where 1% of the combined loggerhead and green turtle captures is not a whole number it is rounded up (e.g. 520 combined captures = take limit of 6). If any of these events occur, re-initiating a Section 7 consultation will be required.

Based on the latest BO issued by NMFS, FPL did not exceed its take limit at the St. Lucie power plant during 2010. However, in 2006 FPL did exceed their sea turtle take limit and a new Section 7 consultation was required. This consultation is currently ongoing between NMFS and the NRC. A new Biological Opinion should be forthcoming soon.

1.6.2 Barrier Net Maintenance

In 1978, a barrier net at the A1A Bridge was constructed to confine turtles to the easternmost section of the intake canal, where capture techniques have been most effective. This net is constructed of large diameter polypropylene rope and has a mesh size of 20.3 cm x 20.3 cm. A cable and series of large floats are used to keep the top of the net above the water's surface and the bottom of the net is anchored by a series of concrete blocks. The net is inclined at a

slope of 1:1, with the bottom positioned upstream of the surface cable. This reduces bowing in the center and minimizes the risk of a weak or injured turtle being pinned underwater by strong currents.

In the past, the integrity of the barrier net was occasionally compromised, and turtles were able to move west of A1A. These turtles were further constrained downstream by an Underwater Intrusion Detection System (UIDS) consisting, in part, of a large barrier positioned perpendicular to the north-south arm of the canal (Figure 2). The UIDS security barrier has a mesh size of 22.9 cm x 22.9 cm. Prior to completion of the UIDS in December 1986, turtles unconfined by the A1A barrier net were usually removed from the canal at the intake wells of Units 1 and 2 (Figure 2). They were then retrieved by means of large mechanical rakes or specially designed nets. Following construction of the UIDS barrier, only the smallest individuals were able to reach the intake wells. Improvements made to the A1A barrier net during 1990 had effectively confined all turtles larger than 32.5 cm carapace length (28.7 cm carapace width) to the eastern end of the canal.

In response to the large numbers of small green turtles entrained at the intake canal in the 1990s, an improved design, small mesh barrier net was erected 150 meters east of the A1A net in January 1996. This barrier net was designed to confine all turtles with a carapace width greater than 18 cm to the extreme eastern portion of the intake canal. However, the integrity of this net was often compromised by incursions of seaweed, drift algae, jellyfish, and siltation. During these events, water velocities around the net increased dramatically creating an insufficient net slope that caused several sea turtle mortalities. To address this design problem and to further alleviate mortalities, FPL constructed a new net with a stronger mesh and added support structures. Dredging of the canal east of the A1A net was also conducted to minimize water velocities around the new barrier net. Construction was completed in November 2002. These improvements have enabled the new net to withstand events that caused design failure of the old barrier net, thus reducing the potential for sea turtle mortalities.

Maintaining the integrity of this primary 5" barrier net and the larger mesh, A1A net is crucial to the continued reduction in residency times and mortality rates in the St. Lucie Power Plant

intake canal. Quarterly inspections of these nets are conducted by FPL and cleaning the nets of debris is performed when warranted. In addition to scheduled inspections and cleaning of the nets, divers are deployed when the integrity of the nets are threatened by algae events. These algae events can cause undue stress to the net structure and cause the net to fail. Net failures increase both the risk of sea turtle mortalities and residency times. Turtles can become tangled in or pinned under a failed barrier net, leading to a causal drowning mortality. Furthermore, if turtles have access to larger portions of the intake canal, then it becomes more challenging to quickly capture and release these animals back into their natural environment.

Daily inspections are performed from a small boat to remove floating debris and to repair holes near or at the water's surface. The formal quarterly dive inspection includes hole repair, debris removal, and airlift dredging of accumulated silt if needed. Maintaining the integrity of the primary barrier net is essential to reducing mortality rates and residency times of entrained sea turtles and is mandated by the most recent Biological Opinion issued by the National Marine Fisheries Service. The Biological Opinion states "FP&L shall maintain a 5-inch barrier net across the intake canal, east of the existing 8 inch mesh barrier net". A new more robust barrier net is currently in the design phase and should be constructed by mid 2012.

1.6.3 Intake Pipe Cleaning and Maintenance

Since 2002, there has been a steady increase in the number of sea turtles incurring scrapes during transit through the power plant intake pipes. The scrapes vary in degree of severity, with most being minor and similar to those found on sea turtles that inhabit near-shore reefs. However, some of these scrapes are moderate to severe, causing some turtles to be sent to rehabilitation facilities for treatment. This prompted FPL to inspect the intake pipes in 2006 and schedule cleaning of bio-fouling and marine debris that were thought to be causing the scrapes to entrained sea turtles. This project is ongoing and results to date are provided in section 3.3 of this report.

1.6.4 Sea Turtle Stranding and Salvage Network, Turtle Walks and Collaborative Efforts

An amendment to the Environmental Protection Plan, Requirement 4.2.1 of the St. Lucie Unit 2 operating license Appendix B, was approved in 1999. This mandated that participation in the Sea Turtle Stranding and Salvage Network (STSSN) and Public Service Turtle Walks were to become part of the Biological Opinion and Incidental Take Statement issued by the National Marine Fisheries Service.

As participants in the Sea Turtle Stranding and Salvage Network, FPL's sea turtle biologists routinely respond to sea turtle strandings in St. Lucie and Martin Counties. This activity involves the collection of information on turtles that are found dead, debilitated, or that have been impacted by human-related activities. The efforts of the Florida STSSN are critical to the Florida Fish and Wildlife Conservation Commission's (FWC) conservation and recovery programs. All permit holders participating in this program are required to complete a STSSN stranding report for each dead or debilitated turtle encountered. Completed stranding reports are sent to FWC. Results from stranding events in 2010 are presented in section 3.4 of this report.

Florida Power & Light Company conducts public service turtle walk programs during the summer sea turtle nesting season. These turtle walks educate the public about relevant sea turtle protection issues and in most cases they are able to view a nesting loggerhead sea turtle. This public service activity is mandated by the most recent Biological Opinion issued by NMFS and results from the 2010 season are presented in section 3.4 of this report.

Florida Power & Light's contracted sea turtle biologists continue to assist other sea turtle researchers, universities, nonprofit organizations and state and federal agencies by providing data, specimens and/or public outreach. They have worked with the following organizations over the course of the programs existence : Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, US Fish and Wildlife Service, Marine Turtle Specialist Group, US Army Corps of Engineers, Smithsonian Institution, South Carolina Wildlife and Marine Resources Division, Center for Sea Turtle Research (University of

Florida), Florida Atlantic University, University of Central Florida, Texas A & M University, University of Rhode Island, University of South Carolina, University of Illinois, University of Georgia, Virginia Institute of Marine Science, Duke University Marine Lab, Western Atlantic Turtle Symposium, South Atlantic Fishery Management Council, Florida Marine Fisheries Commission, Harbor Branch Oceanographic Institution, Environmental Studies Center, Florida Oceanographic Society and the National Research Council. Results of projects and collaborative efforts conducted in 2010 are presented in section 3.4 of this report.

PART 2

1.0 NESTING SURVEY (2010 RESULTS)

In 2010, areas D-S were surveyed by Inwater Research Group, Inc. (Figure 3). Ecological Associates, Inc. surveyed areas A-C as part of a beach renourishment project south of the Fort Pierce inlet. Data from those areas as well as the south end of Hutchinson Island were supplied by Ecological Associates, Inc. and were used to provide whole-island nesting totals.

From February 26 through March 27, 2010 several preliminary nest surveys were conducted along Hutchinson Island in areas D-S. Only one sea turtle nest (leatherback) was recorded in zones D-S prior to the beginning of formal nesting surveys on April 2, 2010. From April 2 through September 28, 2010, nest surveys were conducted on a daily basis. Biologists used all terrain vehicles to survey the island each morning. New nests, non-nesting emergences (false crawls), and nests destroyed by predators were recorded for each of the one-km-long survey areas A - S (Figure 3).

Data collected from beach nesting surveys were reported to the Florida Fish and Wildlife Conservation Commission (FWC) as part of the Index Nesting Beach Survey and the Statewide Nesting Beach Survey. In a cooperative effort, data from stranded turtles found during beach surveys were routinely provided to the FWC and the National Marine Fisheries Service (NMFS) through the Sea Turtle Stranding and Salvage Network.

1.1 LOGGERHEAD TURTLE NESTING

In 2010, 6428 loggerhead nests were recorded on Hutchison Island (Figure 6), which is the highest number since 2001. This upsurge, which may or may not be the beginning of a new upward trend in loggerhead sea turtle nesting, was observed throughout the State of Florida with the exception of the panhandle region. Inwater Research Group biologists observed 2,950 loggerhead nests in the one-kilometer sections A-S, on the north end of the island. The first recorded nest was on May 1 and the last loggerhead nest was recorded on September 17. There were 4,353 loggerhead false crawls observed in the FPL monitored area.

Sixty-nine of the 2,950 loggerhead nests were marked and evaluated to assess nest productivity. The 69 nests contained a cumulative total of 5,395 eggs. Of these, 2858 successfully hatched and emerged from the marked nests. This represents an emergence success rate of 52.97%. There were 23 live loggerhead turtles found in the nests, which were released and not accounted for in the hatch success rate.

1.2 GREEN TURTLE NESTING

In 2010, a record 565 green turtle nests were observed on Hutchison Island (Figure 7), which is an increase from 2008 (331) and 2009 (216). Typical green turtle nesting patterns include a year of high nest numbers followed by a year with low numbers. However, the numbers for the past three years reflect a previously reported trend with green turtles to occasionally have two consecutive low nesting years followed by a high nesting year. This occurred in 2003 though 2005, where 2003 and 2004 were low years and 2005 was the high year. Green turtle nesting is expected to increase in subsequent years given the overall increase in number of nests during both low and high years. Inwater Research Group biologists observed a total of 175 green turtle nests in the one-kilometer sections A-S on the north end of the island. The first recorded nest was on June 15 and the last green turtle nest was recorded on September 28. There were 303 green turtle false crawls observed in the surveyed areas A-S.

Seventeen of the 175 green turtle nests were marked and evaluated to assess nest productivity. The 17 nests contained a cumulative total of 1,703 eggs. Of these, 969 successfully hatched

and emerged from the marked nests. This represents an emergence success rate of 56.90%. There were 27 live green turtles found in the nests, which were released and not accounted for in the hatch success rate.

1.3 LEATHERBACK TURTLE NESTING

In 2010, 361 leatherback turtle nests were recorded on Hutchison Island (Figure 8). This number marks the third highest nest total recorded since whole island surveys began. Leatherback turtles have a high-low bimodal nesting pattern similar to green turtles. Their nesting numbers have also been increasing in recent years; larger nesting numbers during successive high and low years. Inwater Research Group biologists observed a total of 113 leatherback sea turtle nests in the one-kilometer sections A-S on the North end of the island. The first recorded nest was on February 23 and the last leatherback sea turtle nest was recorded on July 17. There were 23 leatherback sea turtle false crawls observed in the surveyed areas A-S. Leatherback nesting has been on the rise over the past fifteen years. Given this rising trend in nesting numbers, further increases in the nesting population of leatherback sea turtles are anticipated in the future.

Eight of the 113 leatherback turtle nests were marked and evaluated to assess nest productivity. The 8 nests contained a cumulative total of 607 eggs. Of these, 164 successfully hatched and emerged from the marked nests. This represents an emergence success rate of 27.02%. There were no live leatherback turtles found in the nests.

1.4 PREDATION ON TURTLE NESTS

Inwater Research Group biologists recorded a total of 466 predation events for Hutchinson Island in 2010 (within beach sections D-S, Figure 9). Sea turtle nests on Hutchinson Island were depredated by ghost crabs, raccoons, seagulls, crows, fire ants and domestic dogs. Ghost crabs accounted for the majority of predation events with a total of 332 occurrences. The second most abundant predator was the raccoon with 259 events. Both values are a significant increase from 2009 and data from future nest monitoring will be needed to

determine if this increase, particularly in raccoon predation, is part of a larger island wide trend.

Nest excavation provides an opportunity to more accurately account for predation activity. For example, fire ant and ghost crab predation is not always evident from a cursory inspection of the nest's surface during routine morning time nesting surveys. Predators negatively affected 46 of the 94 nests evaluated for hatch success. Therefore, the percentage of evaluated nests impacted by predators was 48.9%. Predator analysis was most thorough on the relatively small number of nests that were examined in this manner. The tendency to underestimate predation rates based solely on what is visible from a nest's surface is further compounded by the fact that visual surveys only allow for a partial accounting of overall predation activity.

2.0 INTAKE CANAL MONITORING (2010 RESULTS)

Since plant operation began in 1976, 14180 sea turtles (including recaptures) representing five different species have been removed from the intake canal. These include 8077 loggerhead (including 617 recaptures), 5959 green (including 1971 recaptures), 35 leatherback, 54 Kemp's ridley and 55 Hawksbill turtles (Table 1).

During 2010, 750 sea turtles were removed from the intake canal, including 294 loggerheads, 444 green turtles, 2 leatherback, 3 hawksbills and 7 Kemp's ridleys (Table 1, Figure 10). The majority of these turtles (95.3%) were captured alive and released back to the ocean. Twenty-seven turtles (3.6%) were taken to rehabilitation facilities for treatment of injuries or disease and eight turtles (1.1%) were found dead. One of the 27 turtles taken to rehab facilities had injuries causal to power plant operation. Of the eight mortalities found in the canal system, four were determined to be causal to power plant operations.

In 2010, methods to remove sea turtles from the intake canal included the use of tangle nets, dip nets and hand capture by free diving. Long handled dip nets employed from small boats, the canal banks and headwall structures were moderately effective in capturing turtles with carapace lengths of about 40 cm or less. Forty-five or 15.3% of loggerhead sea turtles

removed from the intake canal in 2010 were caught with dip nets. Before 2009, only green turtles were captured in this manner. Divers were employed to hand capture turtles whenever underwater visibility permitted. This technique has proven highly effective in the capture of turtles of all sizes, particularly less active individuals often found partially buried in the sediment near the 5-inch barrier net. Hand capture efforts have had a significant impact in reducing residency times for turtles in the intake canal.

During 2010, 99.5% of all turtles entrapped in the canal were captured east of the primary barrier net; 202 by tangle nets, 151 off the 5-inch barrier net, 153 by dip-net and 240 by hand capture Proactive captures (hand capture and dip net) accounted for over half of the turtles removed from the intake canal in 2010. Four of the 750 turtles captured in 2010 (0.5%) were removed from the intake wells.

Since the St. Lucie Plant capture program began, most turtles removed from the intake canal have been tagged and released into the ocean at various locations along Hutchinson Island. Consequently, individual turtles can be identified as long as they retain their tags. Over the history of the program at the St. Lucie Plant, 2589 recapture events (617 loggerheads and 1971 green turtles) have occurred. The recapture rate for loggerhead turtles in 2010 was 5.1%. The recapture rate for green turtles in 2010 was 14.0%. This is much lower than the 43.5% recapture rate for green turtles seen in 2009. This is probably due to a "surge" in recruitment of new juvenile green turtles to the Hutchinson Island aggregation (as was seen in 1995 and 1996). Occasionally, turtles are captured that have been tagged by other researchers. There were thirteen such captures in 2010 that included two loggerheads and eleven green turtles. All of the tags identified were from sea turtles that were originally captured and tagged in Florida. Four turtles had "strange" tags for which we could not identify the tagging agency or source.

2.1 LOGGERHEAD TURTLE CAPTURES

The 294 loggerheads captured in 2010 represent the eleventh highest total since intake canal monitoring began in May 1976. Over the past 35 years, loggerhead captures have exhibited considerable year-to-year fluctuations. However, figures since 1976 have shown a significant

increase in loggerhead capture rates at the intake canal (Figure 10, Table1). In fact, thirteen of the last fifteen years have had the highest capture numbers for loggerhead sea turtles. The two low years (2007 and 2009) can be attributed to extended power plant outages lasting longer than 2 months. In 2009, there were three power plant outages that lasted for a total of 84 days. In 2010, there was only one outage that lasted approximately two months.

During 2010, monthly captures of loggerheads ranged from 9 in November to 54 in March, with a monthly mean of 24.5 (Table 2). Over the entire history of the capture program, monthly catches have ranged from 0 to 133, with the greatest number of captures occurring during March 2004. Of the 294 loggerheads captured in 2010, 41 were captured during the two major cold-stunning events that spanned from January through March.

Of the 294 loggerheads captured in 2010 for which straight line carapace lengths (SLCL) are available; 196 were juveniles (SLCL $\leq$ 70 cm), 31 were adults (SLCL $\geq$ 85 cm) and 67 were transitional (SLCL 70-85 cm) (Hirth, 1980, Figure 11). The latter group probably includes both mature and immature individuals. Of the 31 turtles classified as adults for whom sex was recorded, 28 were females and 3 were males, with females predominating by a ratio greater than 9:1.

2.2 GREEN TURTLE CAPTURES

The 444 green turtles captured in 2010 represent the third highest annual total since intake canal monitoring began in May 1976. The number of green turtles captured each year since 1977 has ranged from three in 1979 to a record high of 673 in 1995 (Figure 10, Table 1). The increase in number of captures over recent years suggests that there has been an increase in the number of turtles inhabiting the shallow coastal area adjacent to the power plant's offshore intake structures. Two of those years (2007 and 2009) with the lowest annual total since 1997 were presumably due to extended power plant outages that lasted for longer than a 2-month period.

During 2010, monthly green turtle captures ranged from 0 in May to 129 in March with a monthly mean of 37.0 (Table 3). In the past, seasonal abundance patterns of green turtles

have been more pronounced than for loggerheads, with over 50 percent of all captures occurring between January and March. From 1995 through 2010, this seasonal pattern was less defined, with captures distributed more evenly throughout the year (Table 3).

Of the 444 green turtles captured in 2010, 441 were juveniles or sub-adults (SLCL < 83cm) and three were considered adults (SLCL ≥ 83 cm) (Witherington and Ehrhart, 1989b; Figure 12). Of the three turtles classified as adults, two were females and one was a male.

Of the 444 green turtles captured in 2010, 220 were captured during to the cold-stunning events that spanned from January through mid-March.

2.3 LEATHERBACK, HAWKSBILL, AND KEMP'S RIDLEY CAPTURES

In 2010, there were two leatherback, three hawksbill and seven Kemp's ridley sea turtles captured in the intake canal of the St. Lucie Plant. The two leatherback turtles captured in 2010 were adult females (127.5 and 129.6 cm SSCL). Of the three hawksbill turtles captured at the intake canal in 2010, two were sexually immature individuals (SLCL = 59.1 and 67.5). The third turtle was an adult hawksbill-loggerhead hybrid with a SLCL of 84.9cm. This animal appeared to be predominantly hawksbill based on appearance. A biopsy was taken for genetic analysis and confirmation. Six of the seven Kemp's ridley turtles captured were juveniles (26.5 – 53.7 cm SLCL). One adult male Kemp's ridley with a SLCL of 65.2 cm was also captured and released from the intake canal in 2010.

More Kemp's ridley turtles were caught this year than in any other year in the power plant's history (Table 1). Of the seven Kemp's ridleys captured in 2010, five were caught during the cold-stunning events in the beginning of the year. No leatherback or hawksbill sea turtles were found cold-stunned in the canal.

2.4 RELATIVE CONDITION

Turtles captured alive in the intake canal of the St. Lucie Plant were assigned a relative condition based on weight, activity, parasite infestation, barnacle coverage, injuries and any

other abnormalities which might affect overall vitality. During 2010, 95.6% (281) of all loggerheads found in the canal were alive and in good condition. Only 3.7% (11) of all loggerheads were individuals in fair or poor condition and 0.7% (2) was found dead. Of the 444 green turtles removed from the intake canal in 2010, 88.3% (392) were in good condition, 10.4% (46) were in fair or poor condition and 1.3% (6) was found dead. Conditions for all individuals of the other sea turtle species captured at the intake canal in 2010 were categorized as good.

Of the 750 turtles removed from the intake canal during 2010, 682 (91%) were observed having fresh cuts and scrapes that may have been incurred during transit through the intake pipes. The scrapes varied in degree of severity and most (73%) were minor. However, some of the scrapes were moderate to severe (18%). In 2010, one turtle was sent to a rehabilitation facility for severe fresh scrapes, a juvenile green turtle which sustained a skull fracture attributed to entrainment through the FPL intake structures. This incident was debited against the take limit established in the most recent Biological Opinion by NMFS.

Of the 742 live turtle removals during 2010, 715 were released into the ocean. Eight loggerheads and nineteen green turtles in obvious ill health or suffering serious injuries were transported to either Sea World in Orlando, the Marinelife Center of Juno Beach, the Turtle Hospital in Marathon, Mote Marine Lab in Sarasota, Clearwater Marine Aquarium, and Miami Seaquarium in Key Biscayne or to the Gumbo Limbo Nature Center in Boca Raton for treatment and rehabilitation. All sick or injured turtles were sent to rehabilitation facilities after consultation with personnel from FWC.

2.5 MORTALITIES AND INJURIES

In 2010, eight mortalities were recorded at the St. Lucie power plant intake canal; two loggerhead and six green turtles. Four of the seven mortalities were considered causal to power plant operations (one loggerhead and three green turtles).

During the month of January, there were three non-causal mortalities that were reported in the intake canal. On January 5, a severely decomposed sub-adult loggerhead turtle was found

below the surface of the 5" mesh barrier net. Only the carapace and a few of the vertebral bones were found. This event was considered non-causal to power plant operation. On January 18, a juvenile green turtle was removed from below the surface of the primary barrier net. This turtle was found to be underweight with no wounds or abnormalities and had most likely succumbed to cold water temperatures from the "cold-stunning" event. The turtle was transported to the Marinelife Center by IRG biologists for necropsy. The staff veterinarian concluded that the mortality was most likely attributable to the cold-stunning event (based on gross necropsy) and was not causal to power plant operation. On January 27, a juvenile green turtle was found at the surface of the primary barrier net. This turtle was underweight and entangled with monofilament around both front flippers. In addition, large multi-lobed papillomas were present on the ventral surface of both rear flippers. This turtle was transported by IRG biologists to the Marinelife Center for necropsy and was also determined to be non-causal to power plant operation. On December 12, a juvenile green turtle was found moderately decomposed at the surface of the primary barrier net. This turtle was entrained into the intake canal post mortem. This event was also considered non-causal to plant operation.

In March 2010 there were four causal mortalities recorded at the intake canal. On March 1, a dead sub-adult loggerhead was found severely emaciated near the surface of the temporary barrier net with no other salient wounds or abnormalities. This turtle was transported by FWC personnel to the Marinelife Center in Juno Beach for necropsy. It was determined that the cause of death was drowning and that the turtle was already compromised by malnutrition and parasite infection. This event was considered causal to power plant operation. On March 7, a juvenile green turtle was found dead below the surface of the temporary barrier net where it had become entangled. The cause of death was determined to be drowning by gross necropsy and the incident was ruled as causal to power plant operation. On March 10, a juvenile green turtle was found at the surface of the temporary barrier net. This turtle appeared to have been depredated by a land predator after stranding on the net. Necropsy results confirmed the cause of death and this incident was considered causal to power plant operation. On March 12, a juvenile green turtle was found impinged below the surface of the temporary barrier net. This turtle appeared to have been in good condition with no wounds or

abnormalities. The cause of death was drowning (as per the necropsy results) and was considered causal to power plant operation.

Injuries causal to power plant operation are recorded and are debited against the take limit established in the Biological Opinion set forth by NMFS. In 2010, there was only one injury causal to power plant operations. On November 20, a juvenile green turtle was hand captured in the intake canal with a fracture of the skull. The wound was fresh and appeared to be caused from entrainment into the plant. The animal was transported to the Marinelife Center in Juno Beach by IRG staff after consultation with personnel from the Florida Fish & Wildlife Conservation Commission (FWC). The preliminary determination by Inwater Research Group (IRG) staff was that this injury was causal to power plant operations. Dr Nancy Mettee, DVM later confirmed this to be a causal injury. This turtle quickly rebounded and showed no further complications. The turtle was released on January 22, 2011 off Juno Beach.

3.0 SEA TURTLE PROTECTIVE ACTIVITIES (2010)

3.1 NMFS SECTION 7 CONSULTATIONS

On May 4, 2001, NMFS issued its BO as part of the reinitiating of consultation subsequent to the 1997 BO. In the new Opinion there were a number of changes, most importantly in the Incidental Take Statement. This, in summary, states that FPL will exceed their take limits for a calendar year if: more than 1000 sea turtles are captured, or more than 1% of the total number of loggerhead and green turtles (combined) are injured/killed causal to plant operation, or more than two Kemp's ridley sea turtles are injured/killed causal to plant operation, or if any hawksbill or leatherback sea turtles are injured/killed causal to plant operation. In a case where 1% of the combined loggerhead and green turtle captures is not a whole number it is rounded up. For example, 520 combined captures equals a take limit of six. If any of these events occur, reinitiation of a Section 7 consultation will be required.

During 2010, there was one sea turtle injury and four mortalities that were causal to power plant operations. No leatherback, hawksbill or Kemp's ridley turtles were injured or killed. A total of 750 turtles were captured in the FPL intake canal for the year. Based on the latest

BO issued by NMFS, FPL did not exceed its take limit during 2010. However, FPL did exceed their sea turtle take limit at the St. Lucie power plant in 2006 and reinitiating a Section 7 consultation was required. This consultation is currently ongoing between NMFS and the NRC. A new Biological Opinion is expected in 2011. FPL has identified the contributing factors that led to exceeding the take limit in 2006. The company has responded by beginning cleaning of the intake pipes and developing a plan to install turtle excluder grating on the offshore intake structures.

3.2 BARIER NET MAINTENANCE

In 2009, the primary 5-inch barrier net failed due to an algae event. In October of that year, hardware broke loose from the north concrete piling, submerging the north half of the net 2-5 feet underwater. "Underwater Engineering Services, Inc" (UESI) inspected the net the same day to assess the cause of the failure and look for turtles that may have been caught under the net. Inwater Research Group biologists increased turtle surveillance and capture efforts to include areas west of the primary net. UESI later installed large floats onto the primary net, creating an effective temporary barrier. A thorough inspection of the primary net was promptly completed by Florida Power & Light Co. and UESI, which included the concrete pilings, hardware, and cables. A permanent fix to the primary net is in the design phase and construction is scheduled to begin in late 2011.

In August of 2010, a heavy inundation of jellyfish caused the temporary 5-inch barrier net to fail. Underwater Engineering Services (UESI) was immediately dispatched to attach additional buoys to the temporary barrier net and begin cleaning. The net was brought above water and cleaning continued the next day. A helicopter survey was conducted on August 20 which revealed moderate to heavy concentrations of jellyfish up to 5km offshore, extending as far north as Vero Beach. Beginning on August 19, Inwater Research Group (IRG) biologists increased turtle surveillance and capture efforts by proactive means, such as hand capture and dip netting. IRG also increased monitoring efforts for jellyfish and algae and UESI was dispatched again on August 22 to clean the 5-inch net. The temporary barrier net failed three more times on the 24th, 25th and 26th. In each instance, the top of the barrier net was pulled down a maximum of one foot below the surface. Consequently, UESI performed

net cleanings on a 24-hour basis from the 24th to the 27th and remained "on call" until the 30th (when they performed their last cleaning for the month). Both the 5-inch and 8-inch nets were cleaned. It appears that proactive measures to maintain this barrier net were successful, as no turtles have been subsequently observed beyond the 5-inch net. The cause of the unusually high concentration of jellyfish in this area is unknown and may occur again in the future.

In 2010, quarterly inspections of the temporary 5-inch barrier net and the A1A (8") net were completed. During these inspections debris was removed from both nets and a total of four holes were repaired in the temporary barrier net. No holes were found in the A1A net.

3.3 INTAKE PIPE CLEANING AND MAINTENANCE

In October 2007, cleaning of the intake pipes and offshore intake structures began. Work inside the intake pipes requires relatively calm seas. During the months of October, November and December there were only a limited number of days where seas were at an acceptable level for diver safety. Despite these weather days, the south 12' intake pipe and the offshore structure housing it were cleaned. The north 12' intake pipe offshore structure was also cleaned and loose debris (concrete chunks etc.) was removed from the intake pipe. Other work completed in 2007 included sealing off two pipe openings that extended from the top of the two 12' intake pipes. These pipe openings were approximately 100' in from the headwall and had originally been planned to be part of a back-flushing system that was abandoned during construction of the 12' intake pipes.

During a refueling outage in April 2008 the project completed the cleaning of the south 12' intake pipe offshore structure and removed loose debris (concrete chunks etc.) from both 12' intake structures. The 16' pipe was cleaned during the unit 1 refueling outage in 2010. The continued cleaning of the north 12' intake pipe, as well as concrete cutting and debris removal for the offshore velocity caps is planned for 2011.

3.4 STSSN; TURTLE WALKS; COLLABORATIVE EFFORTS

As participants in the Sea Turtle Stranding and Salvage Network (STSSN), FPL's sea turtle biologists routinely respond to sea turtle strandings in St. Lucie and Martin Counties. This activity involves the collection of information on turtles that are found dead, debilitated, or that have been impacted by a human-related activity. The efforts of the Florida STSSN are critical to the Florida Fish and Wildlife Conservation Commission (FWC) conservation and recovery program.

During 2010, Inwater Research Group biologists responded to 38 stranding events in St. Lucie County and one in Martin County. Twelve loggerhead and 27 green turtle strandings were documented. Twenty-two turtles were found in various stages of decomposition. Cause of death was determined for twelve of the above turtles as follows: two entanglement mortalities, four shark attacks and six boat strikes. The remaining ten turtles were either too decomposed, had no wounds or abnormalities or the cause of death could not otherwise be ascertained. The seventeen live sea turtle strandings were either sent to a rehabilitation facility or, in the case of cold-stunned turtles, released at a later date when weather/ environmental conditions improved. These "rehab" turtles included seven cold-stunned turtles, one shark attack, one individual entangled in fishing line and seven others in suboptimal health conditions and/ or exhibiting abnormal behavior. After consultation with personnel from FWC, sick or injured turtles were sent to one of the following rehabilitation facilities: the Marinelife Center of Juno Beach, Gumbo Limbo Nature Center in Boca Raton, Florida Aquarium in Tampa or the Clearwater Marine Aquarium for treatment and rehabilitation. Stranding reports for all 39 stranding events were submitted to the FWC.

Florida Power & Light Company conducts public service turtle walks on Hutchinson Island during the summer sea turtle nesting season. These turtle walks educate the public about relevant sea turtle protection issues and in most cases allow the viewing of a nesting loggerhead sea turtle. During 2010, FPL conducted 15 turtle walks between June 1 and July 31. During these programs a total of 565 people attended and on 11 of the 15 turtle walks they were able to view a nesting female loggerhead turtle.

Inwater Research Group biologists at the St. Lucie power plant continued to collaborate with other researchers in 2010. Each year Inwater Research Group biologists collect tissue samples via biopsies for FWC for the genetic analysis of leatherback, hawksbill and hybrid turtles. This enables researches to determine sex ratios, track genetic subpopulations and monitor broader population trends. In 2010, a project conducted by Wright University was looking at the genetic bar-coding of marine leeches from Florida sea turtles and their divergence in host specificity. During this report period 31 samples were taken from loggerhead and green turtles and sent to Audrey Mcgowin at Wright University for analysis. This collaboration led to a publication in the Molecular Ecology Resources Journal.

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5.0 FIGURES

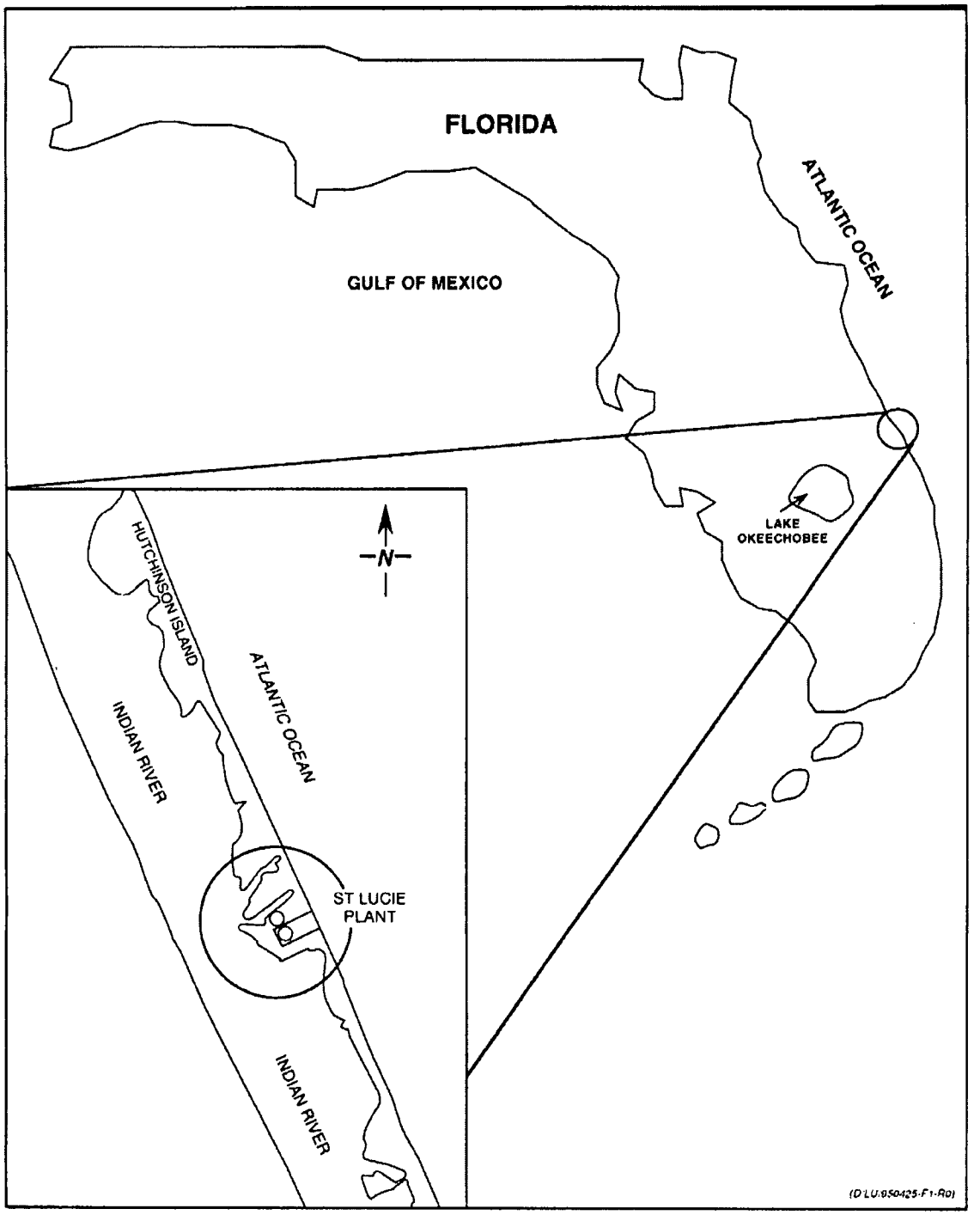

Figure 1. Location of St. Lucie Plant on Hutchinson Island, Florida.

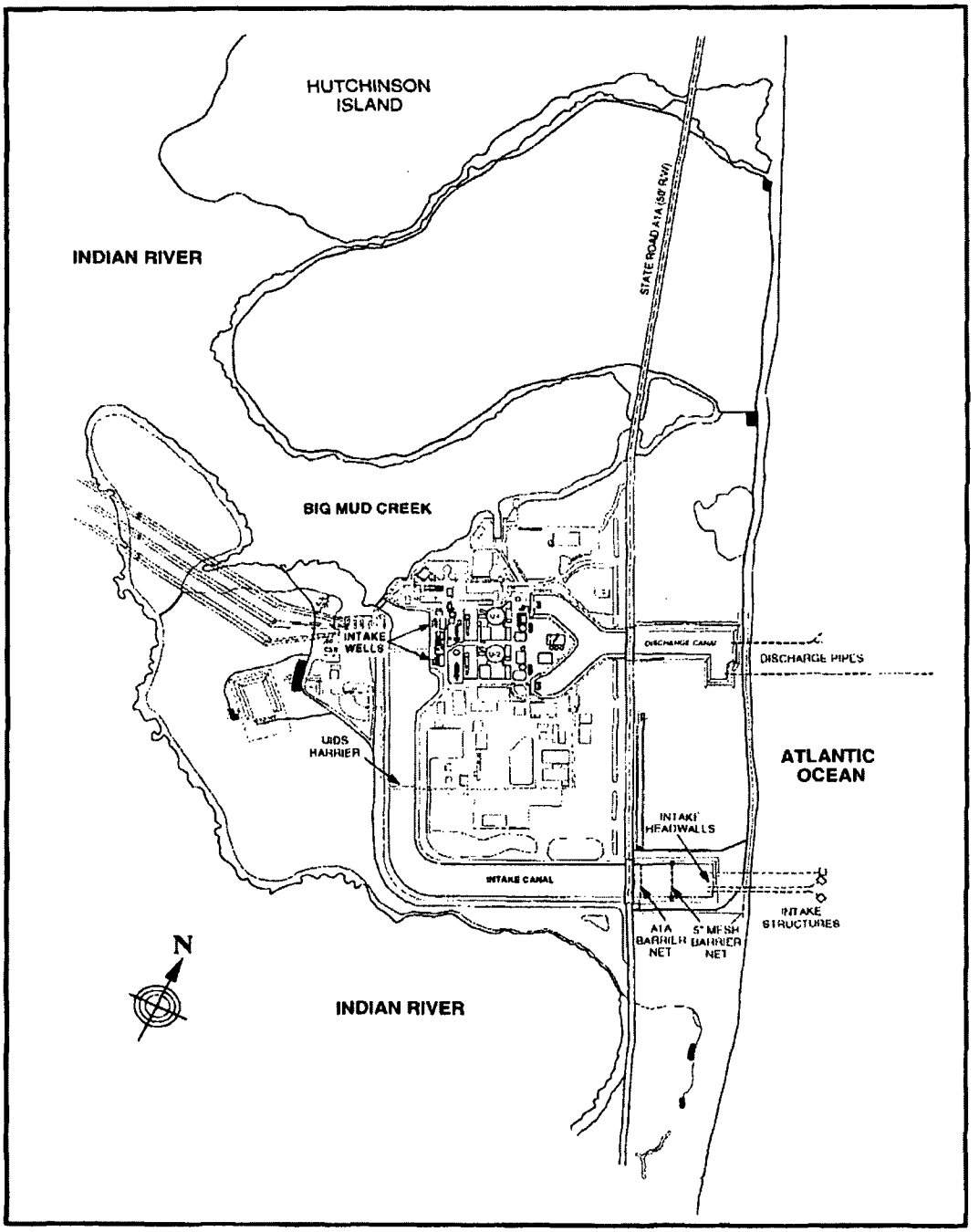

Figure 2. St. Lucie Plant cooling water intake and discharge system.

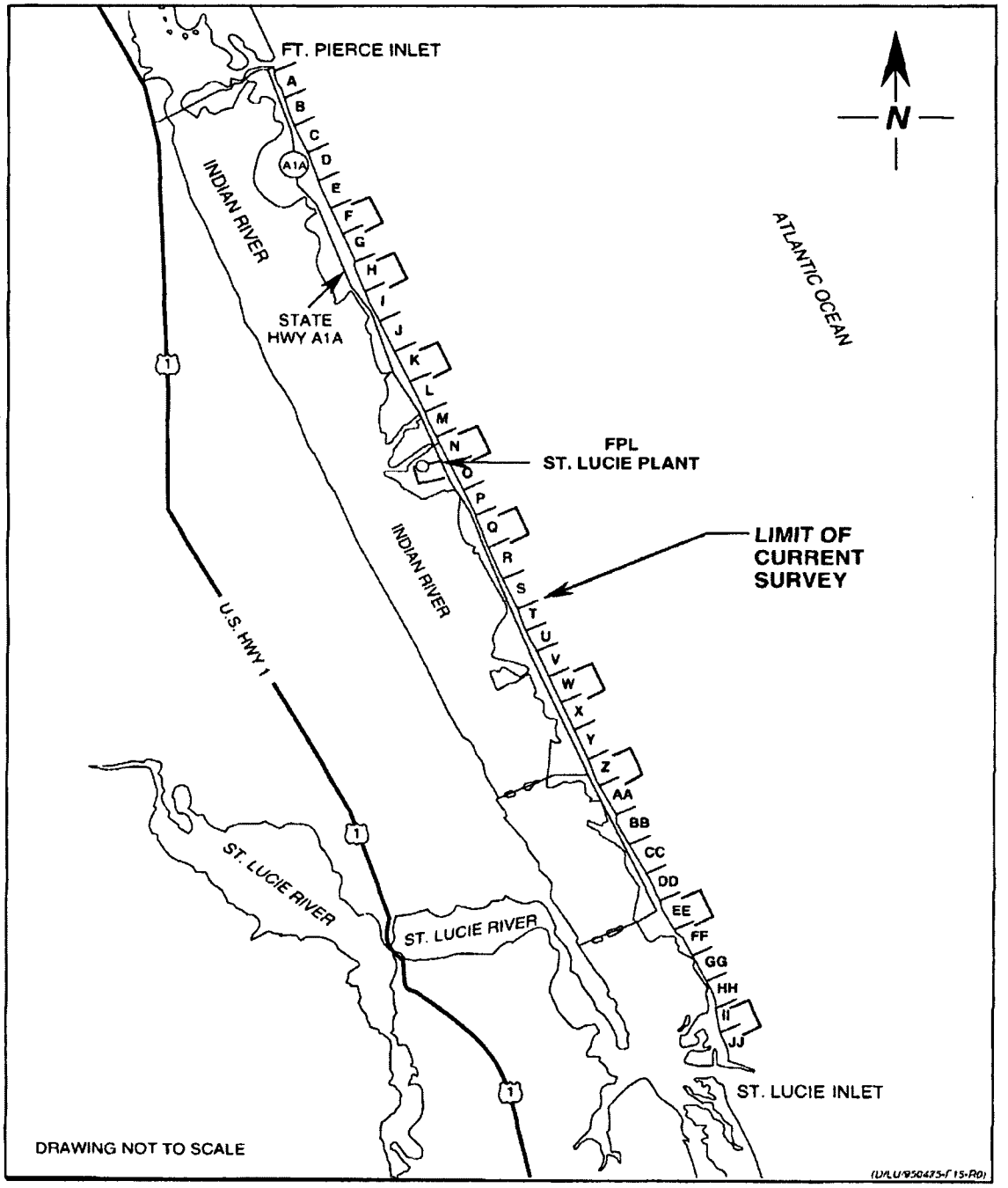

Figure 3. Designation and location of nine 1.25-km segments and thirty-six 1-km segments surveyed for sea turtle nesting, Hutchinson Island. 1971-2010.

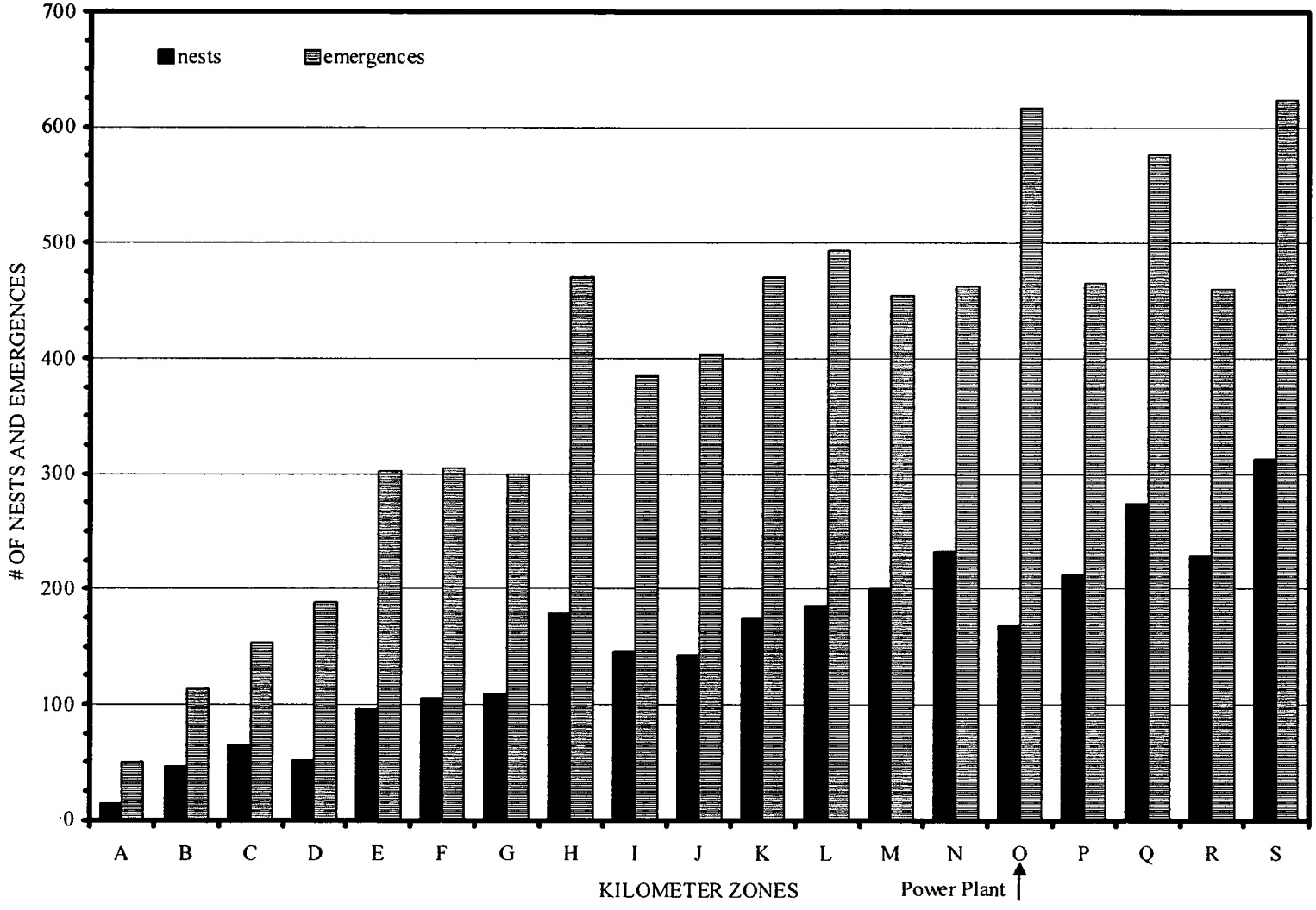

Figure 4. Number of loggerhead turtle nests and emergences for kilometer zones A through S (North to South), Hutchinson Island, April through September 2010.

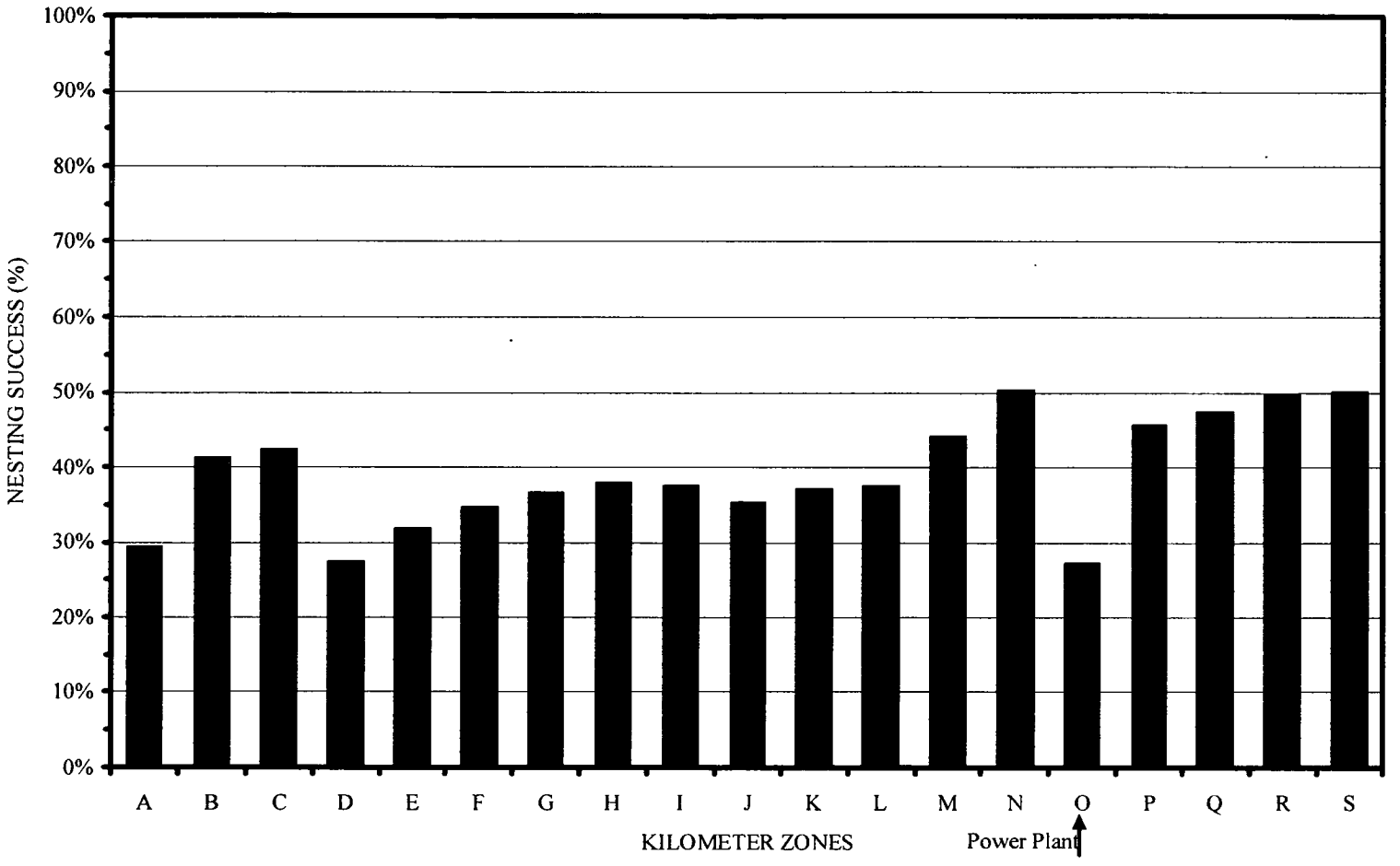

Figure 5. Loggerhead turtle nesting success (percentage of emergences resulting in nests) for kilometer zones A through S (North to South), Hutchinson Island, April through September 2010.

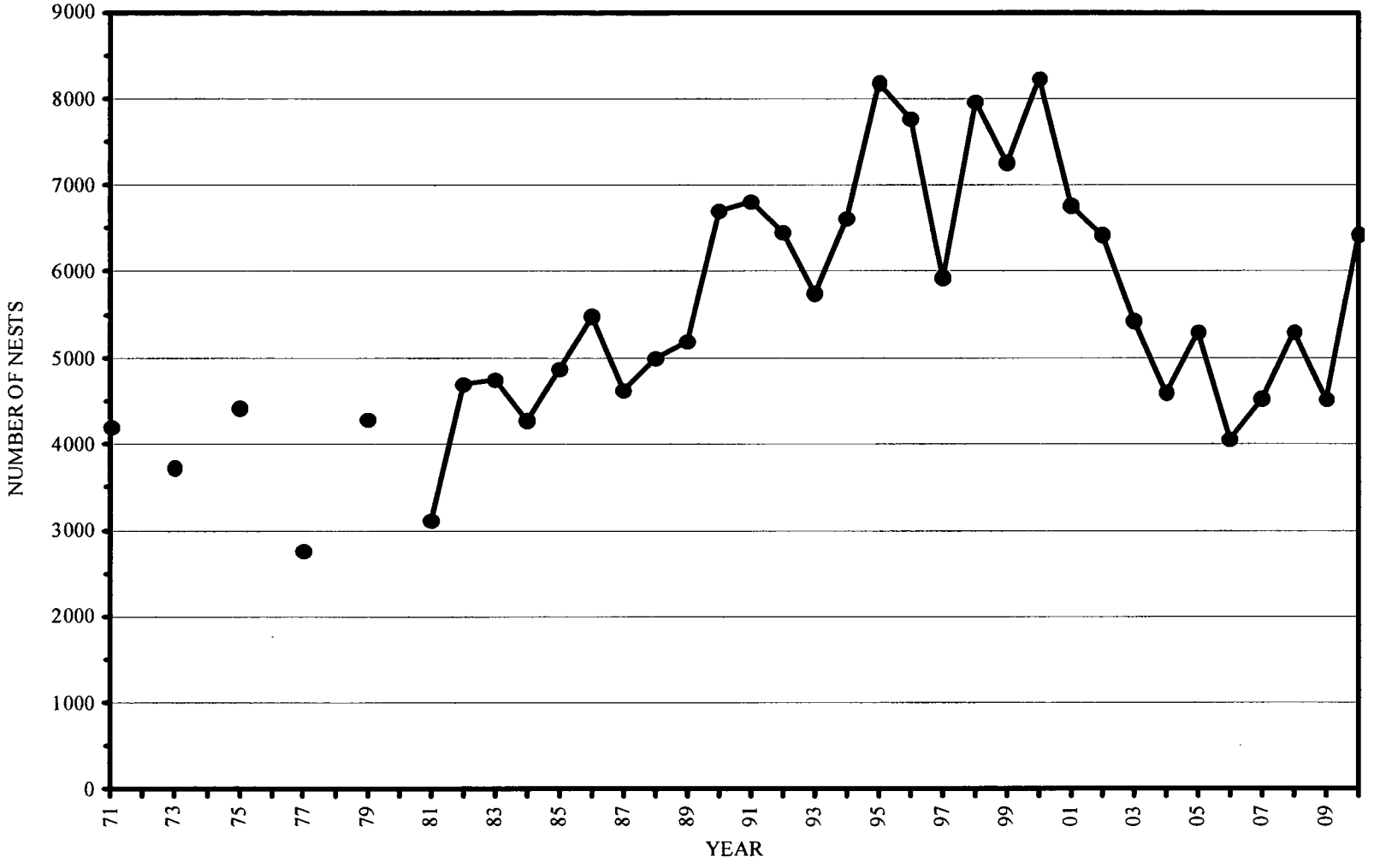

Figure 6. Number of loggerhead turtle nests for Hutchinson Island from 1971 through 2010. Values for 1971 through 1979 are estimates (see text) and values for 1981 through 2010 are from whole island surveys.

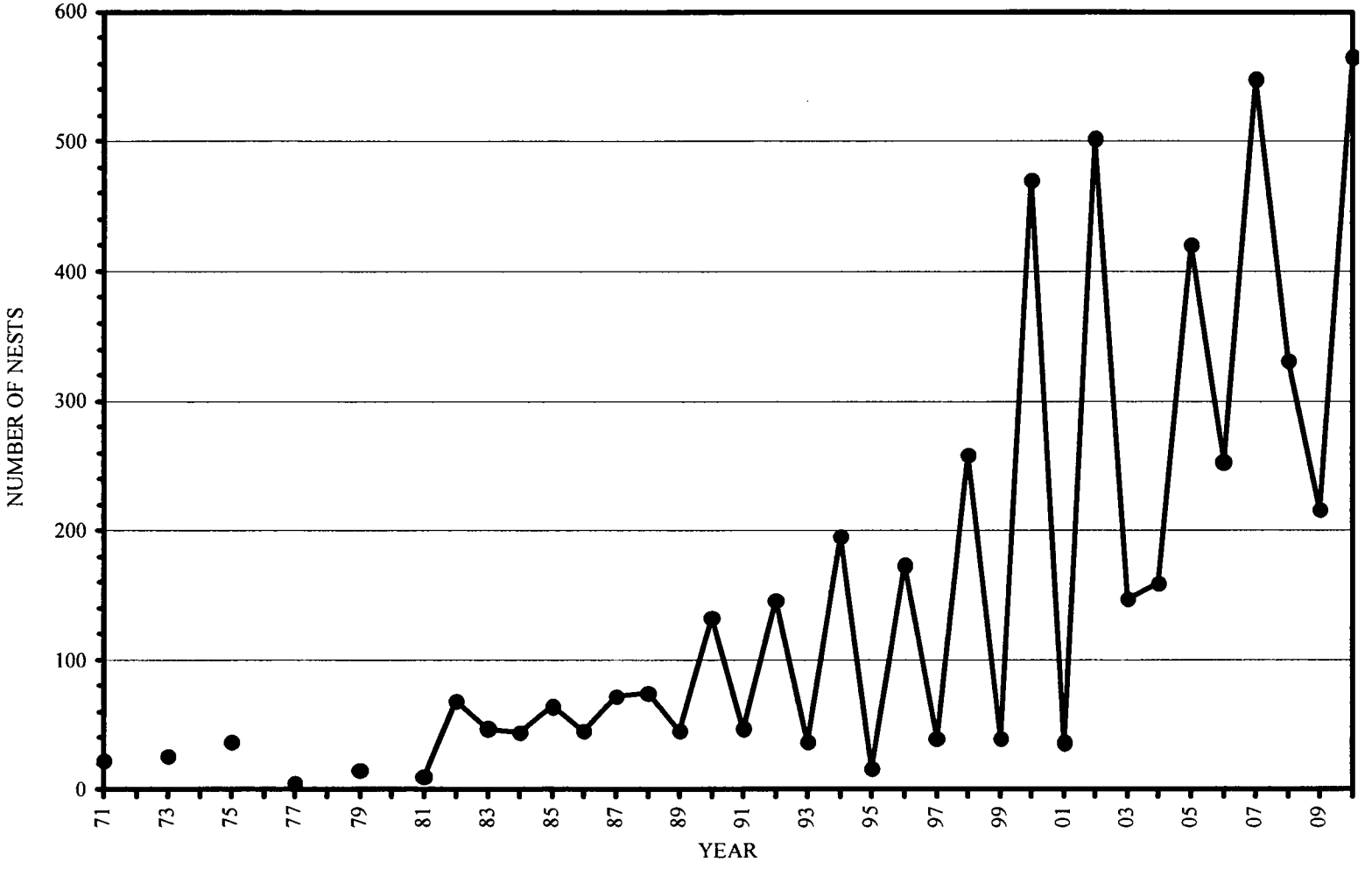

Figure 7. Number of green turtle nests, Hutchinson Island, 1971 through 2010. Values for 1971 through 1979 are estimates (see text). Values for 1981 through 2010 are from whole island surveys.

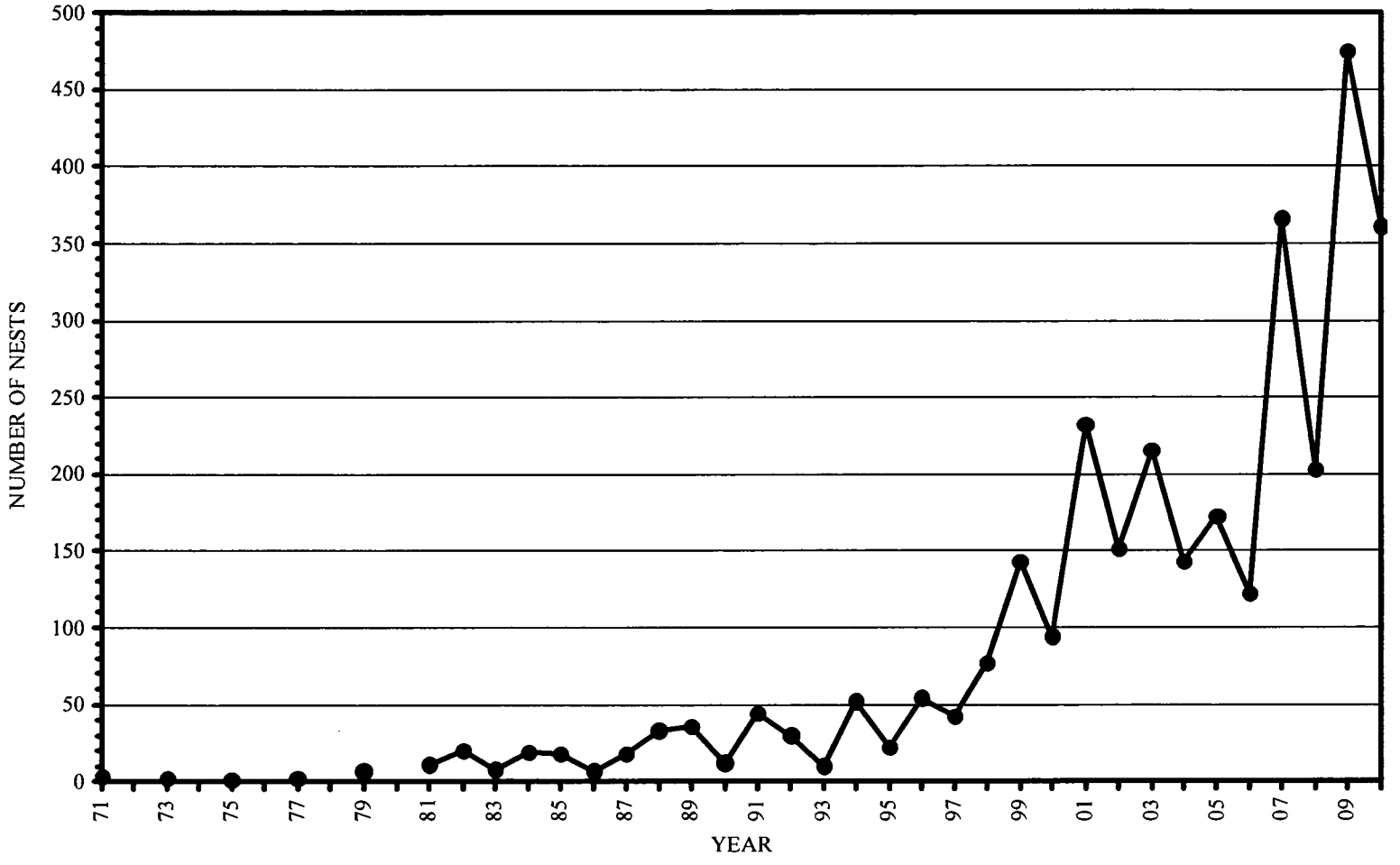

Figure 8. Number of leatherback turtle nests, Hutchinson Island, 1971 through 2010. Values for 1971 through 1979 are estimates (see text). Values for 1981 through 2010 are from whole island surveys.

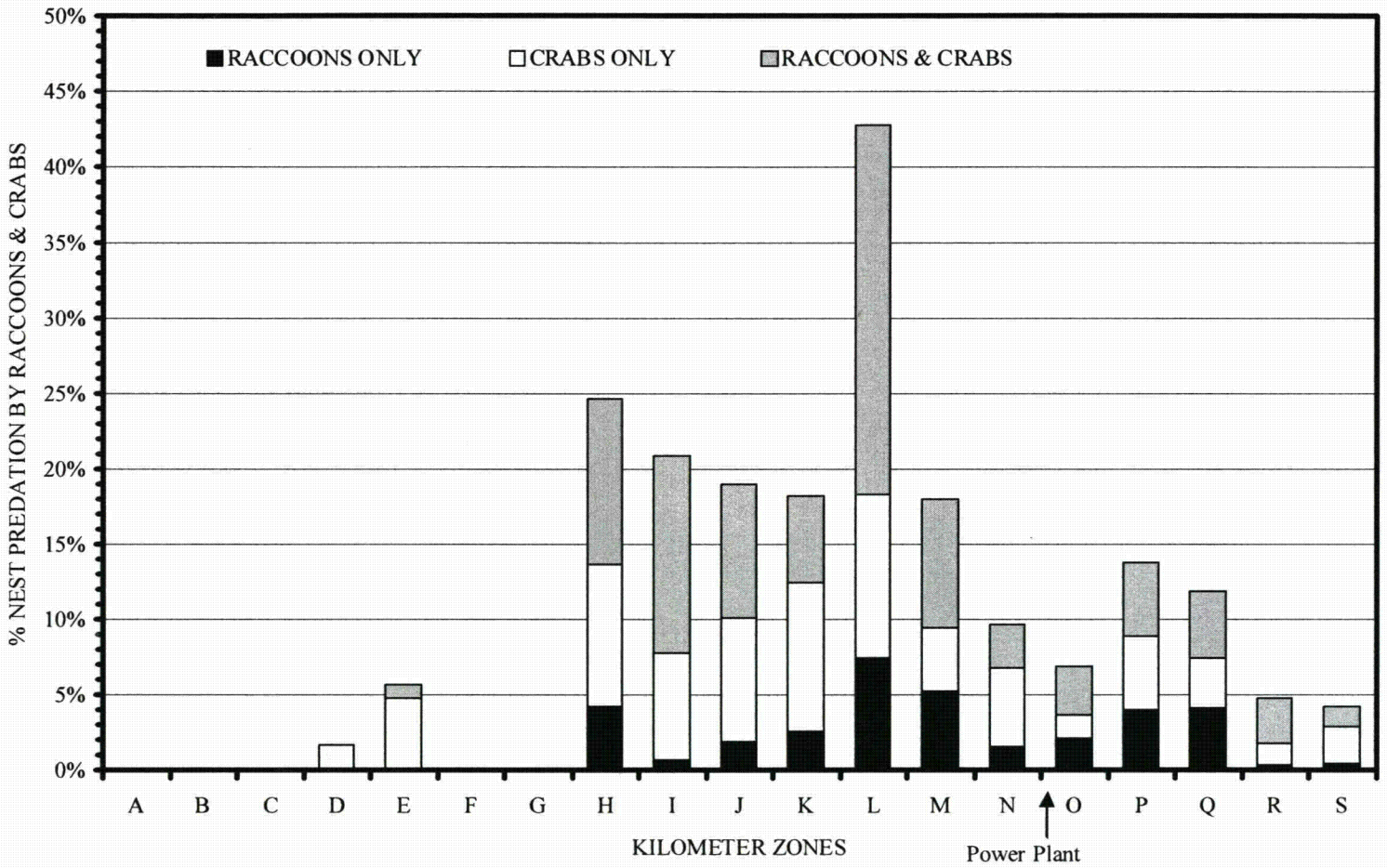

Figure 9. Percentage of sea turtle nests depredated by raccoons and/or ghost crabs in beach zones A through S (North to South), Hutchinson Island for April through September 2010.

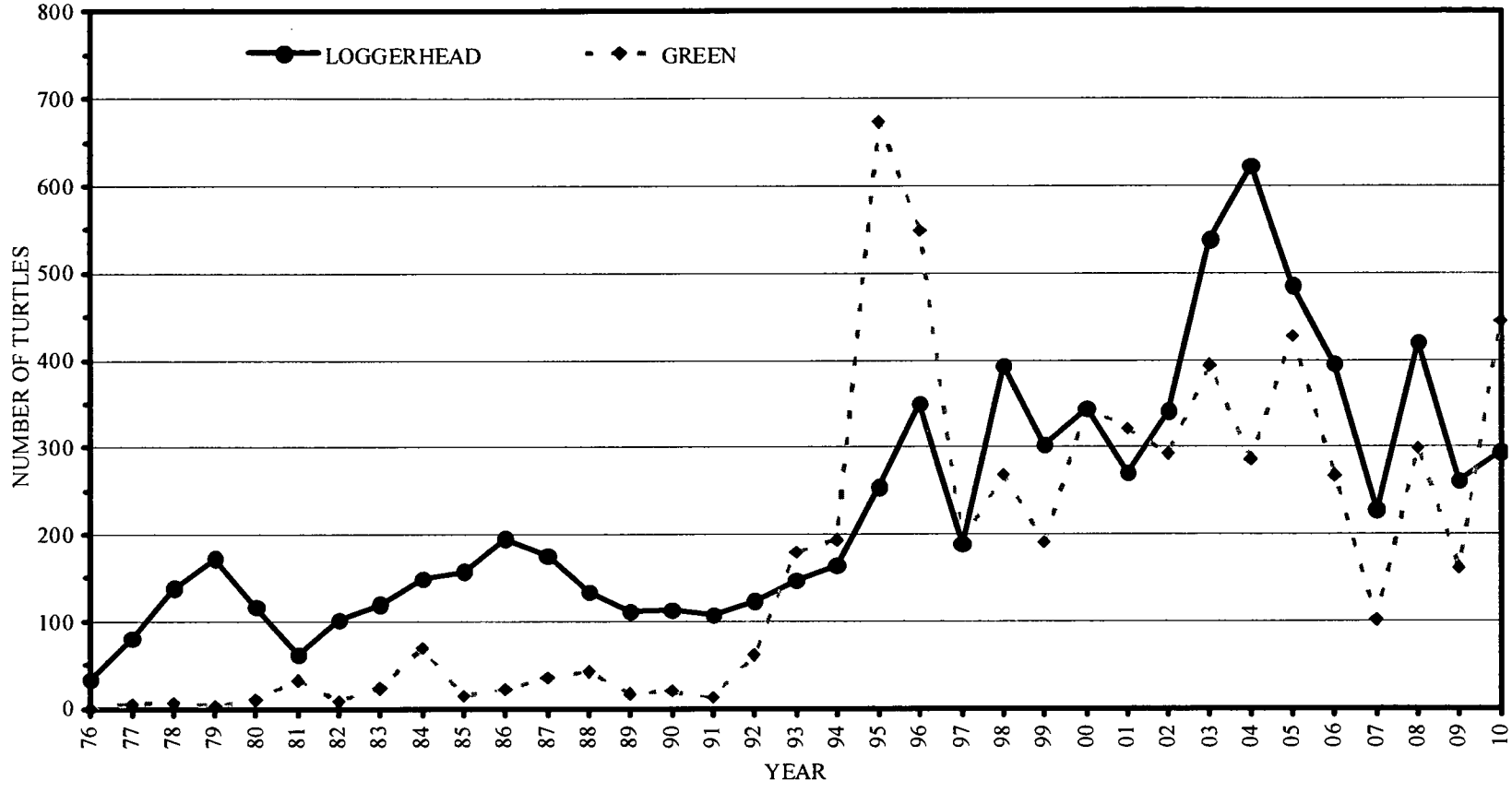

Figure 10. Number of loggerhead and green turtles removed each year from the intake canal at the St. Lucie Power Plant, 1976 through 2010.

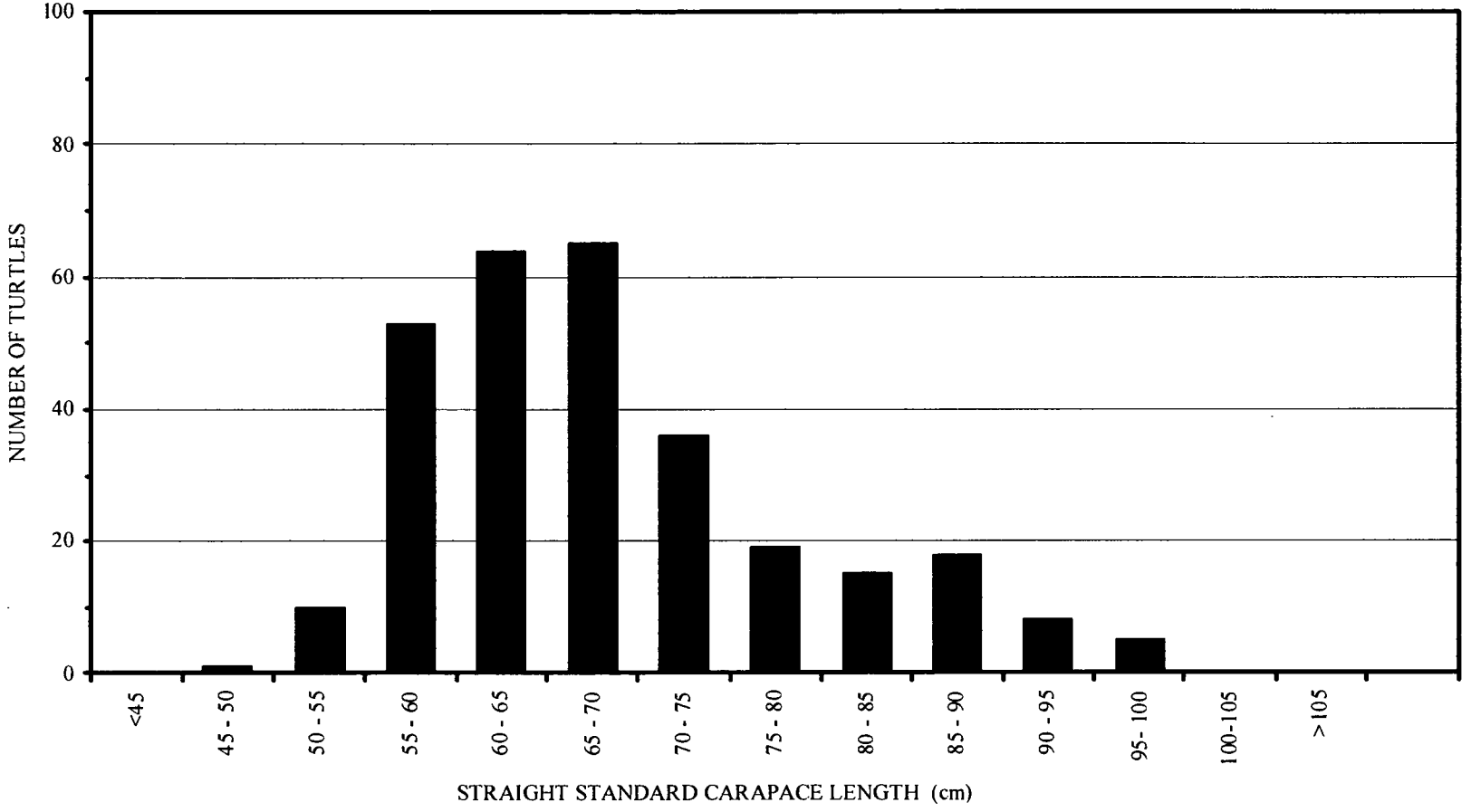

Figure 11. Size distribution (SSCL) of loggerhead turtles (n = 294) removed from the intake canal, St. Lucie Plant, 2010.

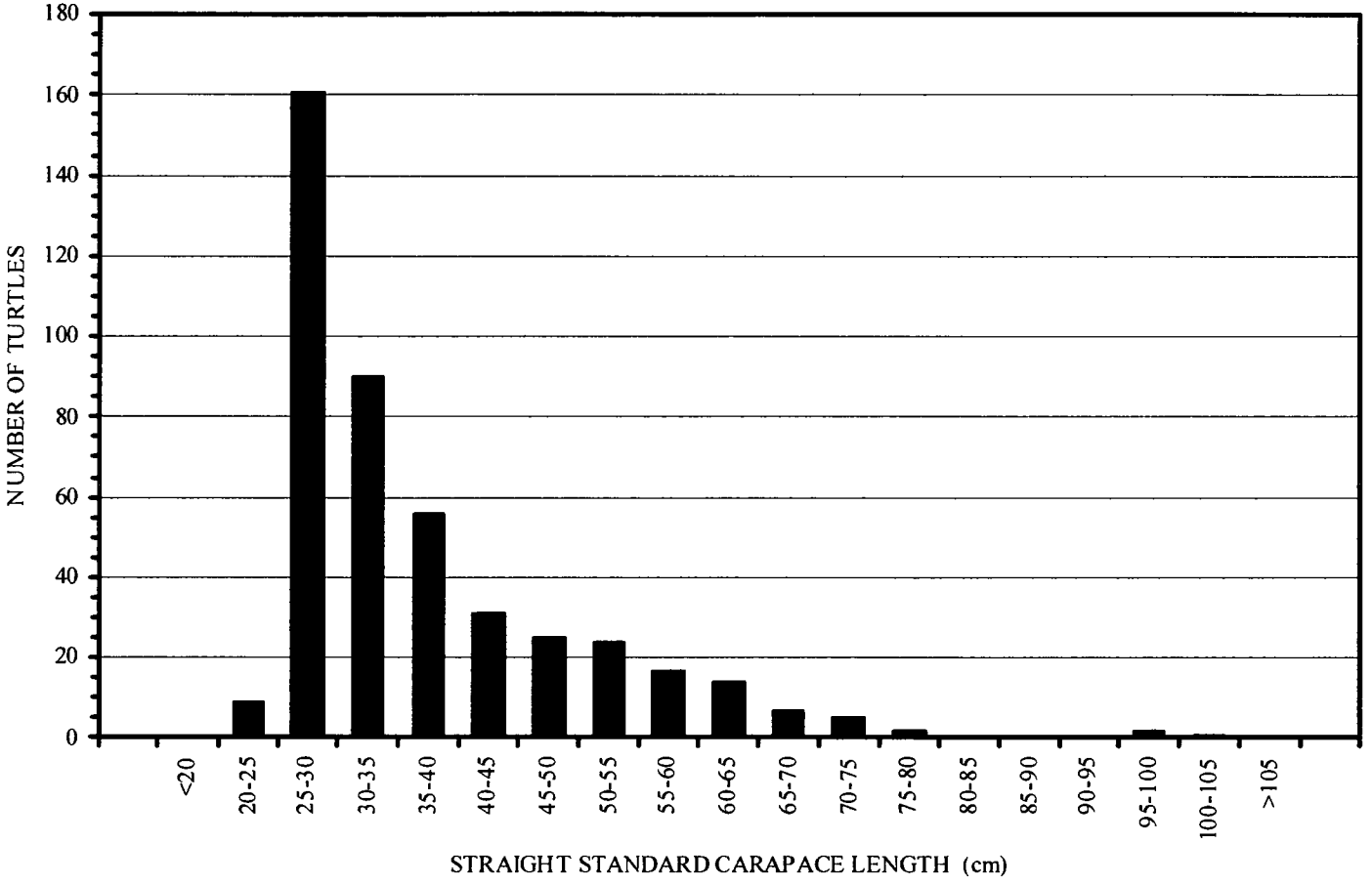

Figure 12. Size distribution (SSCL) of green turtles (n = 444) removed from the intake canal, St. Lucie Plant, 2010.

6.0 TABLES

Year	Species					Total
	Loggerhead	Green	Leatherback	Hawksbill	Kemp's ridley	
1976 - 1982	702 (67)	64 (9)	7	1	1	775 (76)
1983	119 (4)	23 (4)				142 (8)
1984	148 (3)	69 (2)		1	2	220 (5)
1985	157 (4)	14		1		172 (4)
1986	195 (27)	22 (1)	1	1	1	220 (28)
1987	175 (11)	35		2	6	218 (13)
1988	134 (6)	42 (2)			5 (2)	181 (10)
1989	111 (4)	17 (1)	1	2	2 (2)	133 (5)
1990	112 (1)	20 (2)				132 (3)
1991	107 (1)	12		1	1	121 (1)
1992	123 (2)	61 (2)	1	2		187 (4)
1993	147	179 (1)	5	2	4	337 (1)
1994	164	193 (4)	2		2	361 (4)
1995	254 (1)	673 (15)	1		5	933 (16)
1996	349 (3)	549 (4)		5	3	906 (7)
1997	188	191 (5)	2	1		382 (5)
1998	393 (1)	268	1	2	2	666 (1)
1999	302 (2)	190 (4)	1	1	1	495 (6)
2000	344 (2)	345 (2)		2		691 (4)
2001	270 (1)	321 (5)	2	6	1	600 (6)
2002	341	292 (3)		3		636 (3)
2003	538	394 (3)	4	6	2	944 (3)
2004	623 (2)	286 (1)	2	2	1	914 (3)
2005	485 (2)	427 (2)		2	3	917 (4)
2006	395 (1)	267 (2)	1	2	3	668 (3)**
2007	227 (3)	101 (1)	1	1		330 (4)
2008	420 (2)	299 (4)		4	2	725 (6)
2009	260 (1)	161 (1)	1	2		424 (2)
2010	294 (2)	444 (6)	2	3	7	750 (8)
Total	**8077** (153)	**5959** (86)	**35**	**55**	**54** (4)	**14180** (243)
Annual Mean*	236.6	175.3	1.0	1.6	1.6	416.1

* Excludes 1976 (partial year of plant operation).
** Excludes 21 loggerhead hatchling mortalities (not entrained from offshore)

Table 1. Total number of captured turtles removed from the intake canal, St. Lucie Plant, 1976 through 2010. The number of mortalities is in parentheses.

Month	Number of Captures	Percent of All Captures	Minimum	Maximum	Mean	Standard Deviation	2010
January	784	9.7%	6	48	23.1	12.2	**28**
February	755	9.4%	5	50	22.2	17.2	**50**
March	894	11.1%	1	133	26.3	26.5	**54**
April	807	10.0%	0	71	23.7	19.5	**18**
May	688	8.6%	0	61	20.2	14.9	**16**
June	822	10.2%	3	66	24.2	17.4	**30**
July	1019	12.7%	0	124	30.0	27.8	**29**
August	712	8.9%	2	43	20.9	14.0	**16**
September	509	6.3%	1	49	15.0	12.0	**18**
October	377	4.7%	0	27	11.1	7.3	**11**
November	299	3.7%	0	18	8.8	6.8	**9**
December	378	4.7%	1	48	11.1	9.5	**15**
Total*	**8044**		**0**	**133**			**294**
Mean	670.3				19.7		24.5
Std. Deviation	227.8				6.7		14.5

* Excludes 33 loggerhead captures from 1976 (partial year)

Table 2. Total number of loggerhead turtles removed each month from the intake canal, St. Lucie Plant 1977 through 2010.

Month	Number of Captures	Percent of All Captures	Minimum	Maximum	Mean	Standard Deviation	2010
January	722	12.1%	0	123	21.2	25.7	**123**
February	655	11.0%	0	86	19.3	21.0	**86**
March	734	12.3%	0	147	21.6	34.8	**129**
April	448	7.5%	0	64	13.2	16.1	**12**
May	400	6.7%	0	91	11.8	19.2	**0**
June	379	6.4%	0	55	11.1	15.9	**3**
July	345	5.8%	0	61	10.1	15.4	**3**
August	371	6.2%	0	64	10.9	14.7	**3**
September	457	7.7%	0	77	13.4	18.4	**26**
October	546	9.2%	0	54	16.1	18.4	**14**
November	437	7.3%	0	50	12.9	13.9	**14**
December	465	7.8%	0	68	13.7	15.6	**31**
Total*	**5959**		**0**	**147**			**444**
Mean	496.6				14.6		37.0
Std. Deviation	136.5				4.0		47.6

Table 3. Total number of green turtles removed each month from the intake canal, St. Lucie Plant, 1977 through 2010.

PART III

ANNUAL ENVIRONMENTAL OPERATING REPORT

1.0 INTRODUCTION

The St. Lucie Units 1 & 2 Environmental Protection Plans (EPP) require the submittal of an annual report for various activities at the plant site including the reporting on sea turtle monitoring programs, and other matters related to Federal and State environmental permits and certifications.

2.0 SEA TURTLE MONITORING AND ASSOCIATED ACTIVITIES

Surveillance and maintenance of the light screen to minimize sea turtle disorientation as required by Section 4.2.3 of the EPP is ongoing. The vegetation light screen located on the beach dune between the power plant and the ocean is routinely surveyed to determine its overall vitality. Evidence of sea turtle disorientation that occurs would also indicate any significant problems. Trees, vegetation or shade cloth are replaced as necessary to maintain the overall integrity of the light screen. Plant parking lot lighting is also designed and maintained to minimize light levels on the beach.

3.0 TAPROGGE CONDENSER TUBE CLEANING SYSTEM OPERATION

A Taprogge condenser tube cleaning system (CTCS) became operational on St. Lucie Unit 2 in January 1996 and on Unit 1 in July 1996. This system utilizes sponge balls, approximately 23 mm in diameter, to clean the condenser tubes through which seawater flows to cool steam after its pass through the plant's turbines. This system improves plant performance while reducing the need for chemical treatments such and biocides or chlorine to control biofouling.

Normally, the St. Lucie CTCS utilizes about 1800 sponge balls, which are continually re-circulated through each of four "water boxes" on each unit. These sponge balls are retained in

the system by a ball strainer located on the outlet of each water box. The ball strainers (mesh size 5 mm) are opened routinely to discharge debris, which can decrease flow and obstruct sponge ball movement through the system. The sponge balls are collected prior to opening, or back flushing, the ball strainers. At that time, the sponge balls are examined and replaced if they are worn to the point that they can no longer effectively clean the condenser tubes.

Sponge ball inventories and estimates of sponge ball loss to the environment have been performed since system start-up on both units. Number of ball strainer back flushes has also been tracked. In addition, daily beach surveys have been performed on plant property (approximately 2.5 miles) to note any sponge balls that may occur as a result of loss from the plant. This survey area has been extended during the turtle nesting season to almost 12 miles.

The results of the program for 2010 are presented in Table 1. Spikes in sponge ball loss have been identified as single events involving only one Unit. Two spikes in sponge ball loss were recorded in 2010. The first spike occurred on Unit 1 in February. The loss was the result of sponge balls being trapped in the system when a recirculating water pump over heated. A ball collection could not be performed prior to placing the system back in service. The second spike occurred on Unit 2 in August, and an investigation revealed that the losses were the result of varying causes involving different water boxes. One event was related to unexpected wormrock growth on the recently installed water box tube sheet liners, causing premature deterioration of the sponge balls and hang-up in the system resulting in poor recovery. A separate event involved water boxes still scheduled for tube sheet liner installation. These sponge ball losses were attributed to prolonged use of the same sponge balls and deficient water box tube sheet liners. Deteriorated liners have been known to peel off in chunks collect on the strainers. The sponge balls become snagged on the strainer due do the excessive debris, and are lost during backwash. The remaining water boxes with degraded liners are scheduled for repair during 2011refueling outages.

The water boxes were operated based on system availability or system engineer recommendation. The Unit 1 system did not run from April through June due to a scheduled maintenance outage. A circulating water pump replacement delayed the startup of the Unit 1

CTCS until August. Ball losses resulting from deteriorating water box liners have been well documented for two water boxes on Unit 1. These water boxes will remain out of service until tube sheet liner replacement has been completed. Unit 2 CTCS back wash was not performed in November or December; the system was run continuously with blue abrasive balls leading into the 2011 maintenance outage by system engineer recommendation. A ball recovery was performed during outage preparations.

Total sponge ball losses from Unit 2 were higher than Unit 1 in 2010. This was mainly due to the peak observed in August on Unit 2. Elevated ball loss observed on Unit 2 during August were revealed to be the result of worm rock growth on new tube sheet liners, prolonged use of the same sponge balls, and old tube sheet liner peels collecting on the strainers. Only 33 sponge balls were found whole in the environment near the plant in 2010, all related to the August sponge ball loss event. This number indicates that few balls actually reach the environment whole.

Figure 1 indicates that estimated sponge ball loss for both units generally remained low throughout the year, with exception to the previously discussed events. Average daily ball loss in 2010 is slightly above the historic average, and indicates a decrease in losses as the tube sheet liner replacement project continues (Figure 2). Estimated sponge ball loss from both units was 21.2 balls per day for 2010. Average daily sponge ball loss since system start-up has been approximately 18 balls per day.

4.0 OTHER ROUTINE REPORTS

The following items for which reporting is required are listed by section number from the plant's Environmental Protection Plan:

5.4.1.2(a) EPP Noncompliance Incidents and Corrective Actions Taken

No incidents of noncompliance under EPP Section 5.4.1(a) were determined to have occurred during 2010.

5.4.1.2(b) Changes In Station Design or Operation, Tests, and Experiments In Accordance With EPP Subsection 3.1

No plant site activities were determined to be reportable under Section 5.4.1(b) during 2010.

5.4.1.2(c) Non-routine Reports Submitted to the NRC for the Year 2010 in Accordance with EPP Subsection 5.4.2

On January 11, 2010, a manatee (Trichechus manatus) was entrained in the St. Lucie Plant Intake Cooling Canal. The manatee was captured by the FWC that day, and died later that night. The necropsy performed by the Florida Department of Environmental Protection was inconclusive however; many cold water stress indicators were identified in the necropsy. The event was reported to the NRC on February 5, 2010, by FPL letter L-2010-023.

On March 18, 2010, St. Lucie Plant submitted a request to change the St. Lucie Industrial Wastewater Permit to allow for an increase in the Plant's effluent discharge temperature. Notification to the NRC occurred by FPL letter L-2010-059.

Four sea turtle mortalities occurred March 1 to March 12, 2010, one sub adult loggerhead sea turtle (Caretta caretta), and three juvenile green sea turtles (Chelonia mydas) were found dead in the St. Lucie Intake canal. All mortalities deemed to be causal to plant operations. The events were reported to the NRC by FPL letter L-2010-061 dated March 24, 2010. The winter of 2009/2010 witnessed unprecedented long term severe cold weather resulting in sustained below normal water temperature conditions. The result of these severs conditions resulted in significant die off of marine life through out Florida. The cold water temperatures were a contributing factor to these mortalities.

The 2009 Annual Environmental Operating Report was submitted to the NRC on April 30, 2010, by FPL letter L-2010-085.

On June 10, 2010, FPL notified the NRC of a Request for Additional Information from the State of Florida pertaining to Request for Substantial Revision of the St. Lucie Plant Industrial Wastewater Facility Permit No. FL 0002208 by FPL letter L-2010-123.

On June 23, 2010, correspondence was sent to the EPA pertaining to a Consent Agreement and Final Order (CERCLA-04-2010-2036(b)) resulting from a sodium hypochlorite spill that occurred on October 6, 2009. Notifications were made by FPL letter L-2010-141.

Florida Power & Light Company submitted to the State of Florida a request for renewal of the St. Lucie Plant Industrial Wastewater Permit No. FL 0002208. Also enclosed is the Clean Water Act Section 316(b) Biological Characterization Report for St. Lucie Plant. The NRC was notified of the request by FPL letter L-2010-157 dated July 20, 2010.

On August 10, 2010, the NRC was notified by letter VPPSL019 that Florida Power & Light submitted a cashiers check for a civil penalty payment to the U.S. Environmental Protection Agency; Docket Number: CERCLA-04-2010-2036(b) pertaining to a release of sodium hypochlorite that occurred on October 6, 2009.

TABLE 1

2010 ST. LUCIE PLANT CONDENSER TUBE CLEANING

SYSTEM SUMMARY

	Strainer Back Flushes		Estimated Ball Loss		Balls Found
Month	Unit 1	Unit 2	Unit 1	Unit 2	On Beach
January	13	16	476	+350	0
February	16	13	993*	169	0
March	15	19	316	42	0
April	0#	17	0	259	0
May	0#	17	0	+151	0
June	0#	18	0	250	0
July	0	17	0	699	0
August	0	9	0	3619	5
September	5	17	275	114	26
October	6	9	+4	307	1
November	2	0	170	0	1
December	0	0	548	+1	0
Total	57	139	2774	4957	33

\# Unit 1 system shutdown during refueling, 4/04/10 to 6/14/10.
\+ Net gain in inventory.
* Loss of abrasive balls.

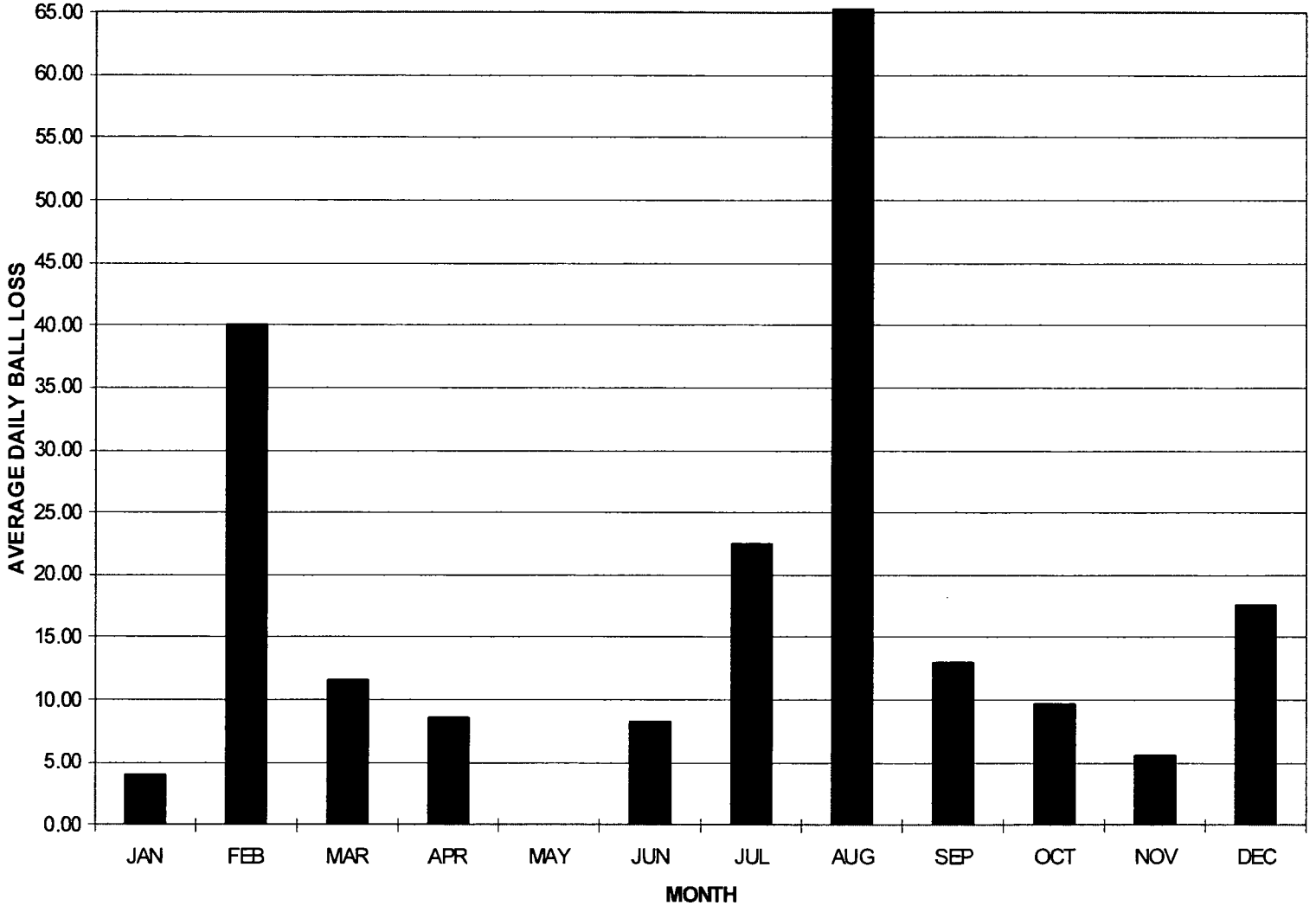

Figure 1. Estimated Average Daily Sponge Ball Loss by Month from St. Lucie Plant (Both Units) for 2010.

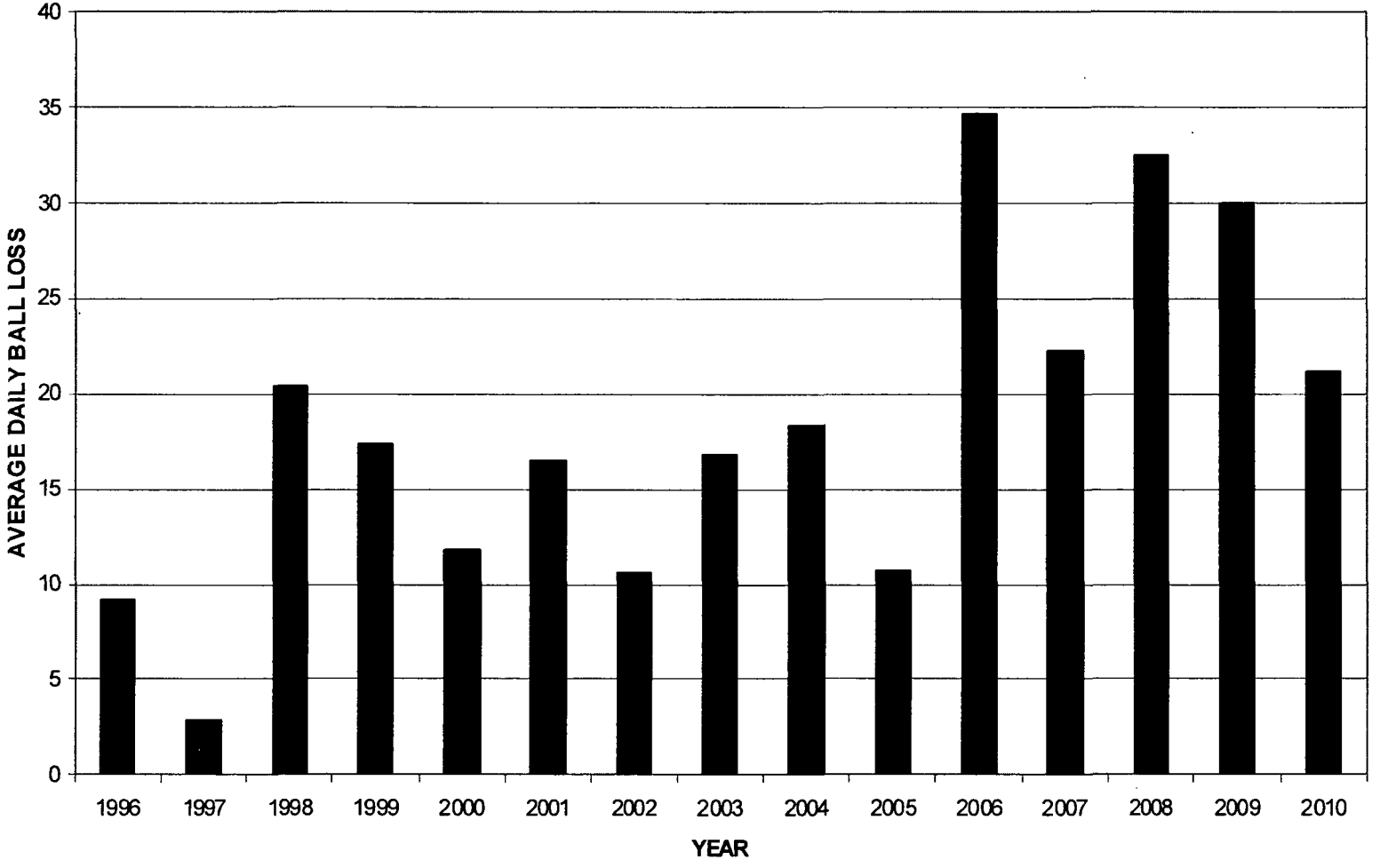

Figure 2. Average Daily Sponge Ball Loss from the St. Lucie Plant (Both Units) Since System Start-Up (January 1996).