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

April 27, 2009

L-2009-102
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
2008 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 the calendar year 2008.

Sincerely,

Eric S. Katzman
Licensing Manager
St. Lucie Plant

ESK/CAA

Attachment:
Florida Power & Light Company St. Lucie Plant Annual Environmental Report 2008
(63 pages)

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NRR

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT

ANNUAL ENVIRONMENTAL

OPERATING REPORT

2008

FLORIDA POWER & LIGHT COMPANY

JUNO 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 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-five annual environmental operating reports covering the period from 1983 through 2007. This report describes the 2008 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), 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 not adversely affect the Hutchinson Island rookery. Because of this concern, 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 2008, 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 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, 1991a). 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 fifteen 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 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 2008 have shown that power plant operation exclusive of nighttime intake/discharge construction has had no apparent effect on nesting.

From 1981 through 2008, 36 one-km-long segments comprising the island's coastline have been surveyed (Figure 3). The distribution of nests among these 36 survey areas depicts 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. Therefore, certain factors may affect a turtle's preference to emerge on a beach, while other factors may 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 due to 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 primary dunes during the 2004 hurricane season. Some of these projects were more

successful than others and 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 affect 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 affect 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 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 nearshore of 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, green turtles 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 et al., 1989) to lay additional nests during the season. In Florida, nesting has been increasing (Witherington and Koeppel, 2000; FWRI, 2006) 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. In fact, statewide loggerhead nesting has declined by over 40% since 1998. 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, except 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 549 for green turtles and from one to 366 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 or April 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 2008 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 have been at the lowest levels ever recorded for Hutchinson Island (<0.5%) over the past several years (Figure 9). It's possible that an epizootic disease such as distemper wiped out many of the raccoons on the island and there numbers have not fully recovered.

Ghost crabs have been reported by numerous researchers as important predators of sea turtle nests (Hopkins et al, 1979; Stancyk, 1982). 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. Currently, the four sea turtle biologists working at the power plant are contracted out by three separate companies, none of which is Quantum Resources. However, the group works under one marine turtle permit and methodologies employed in the canal capture program have remained essentially unchanged so that data collected in 1994 through the present are directly comparable to previous years' data.

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. This led to a subsequent decrease in mortalities due to turtles drowning in the nets. Records of daily canal observations were compared with capture data to assess capture efficiencies.

During daily, 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 the canal on a given day. 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 residency times during recent years.

Regardless of capture method, all turtles removed from the canal were 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, beginning in July 2001, Passive Integrated Transponder tags (PIT tags) were injected subcutaneous 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 Florida Fish and Wildlife Conservation Commission (FFWCC) personnel. 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.

Beginning in July 2004, 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 monthly on a website designed for this project by the University of Florida and will aid researchers, veterinarians and rehabilitation facilities. A current collaborative effort with the University of Georgia requires biopsy samples be taken from green turtles captured at the power plant as part of a study on green turtle genetics.

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 624 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. Additional years of capture data will be required before any long-term trends can be established, but clearly 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 predominated by juvenile animals with few subadult 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 in 2007, a year with the lowest number of green turtles captured since 1992, there were extended outages that lasted five months.

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. Each species has shown rather pronounced seasonal occurrences with over 60 percent of all leatherbacks captured in March and April, over 60 percent of hawksbills captured between July and September, and almost 90 percent of Kemp's ridley turtles caught between 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 obviously were 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 causal to power plant operation. Causal determinations are made by consultation with personnel from Florida Fish and Wildlife Conservation Commission (FFWCC) and/or a qualified veterinarian.

1.5.5 Mortalities and Injuries

Sea Turtle mortalities have been closely monitored throughout the life of the capture program at the canal in an attempt to assign probable cause and take appropriate remedial action to minimize future occurrences. Probable mortality factors identified from previous capture data were 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 (ABI, 1987). Since that analysis, design changes have addressed each of these problem areas and reduced mortalities significantly. Since 1996, mortalities from drowning in nets have been reduced to 0.13% of all captured turtles, mortalities associated with the intake wells have been reduced to 0.05%, mortalities caused by drowning in the intake pipes have been reduced to

0.02% of all turtles captured and there have been no injuries or mortalities associated with dredging operations in the intake canal.

Over the entire monitoring program's history (1976-2008), 150 (2.0%) of the 7523 loggerheads and 79 (1.5%) of the 5354 green turtles entrained in the canal were found dead. Mortalities spanned the range of size classes for loggerheads (SLCL = 39.8-108.0 cm), while green turtle mortalities primarily involved juveniles less than 48 cm in length. One exception was an adult male green turtle that was injured upon entrainment and was sent to a rehabilitation facility where it later expired. The four Kemp's Ridley mortalities documented at the plant during 1987 and 1988 were the only deaths for this species to date; no dead leatherback or hawksbill turtles have ever been recorded at the St. Lucie Plant.

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 less than 1.0% since 1990 (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 FFWCC 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 and boat interactions. Injuries causal to power plant operation are recorded and go 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), if FPL exceeds their incidental take limit established by the most recent Biological Opinion (BO) set forth by

National Marine Fisheries Service (NMFS), a Biological Assessment by the Nuclear Regulatory Commission (NRC) must be submitted to NMFS for review as part of the formal consultation process. 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 reinitiation of 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 the reinitiation 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 (e.g. 520 combined captures = take limit of 6). If any of these events occur, reinitiation of a Section 7 consultation will be required.

Based on the latest BO issued by NMFS, FPL did not exceed its take limit during 2008. In 2006, FPL did exceed their sea turtle take limit at the St. Lucie power plant and reinitiation of a Section 7 consultation was required. This consultation is currently ongoing between NMFS and the NRC. A new Biological Opinion is expected in 2009.

1.6.2 Barrier Net Maintenance

In 1978, a barrier net at the A1A bridge was constructed to confine turtles to the eastern most 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 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). The UIDS consisted, 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 its completion 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). There they were 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 small mesh barrier net was erected 150 meters east of the A1A barrier 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 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 the primary 5" barrier net and the larger mesh, A1A net is crucial to the continued reduction in residency times and mortality rates at 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 algal events. These algal events can cause undue stress to the net structure and cause it to fail. Net failure can increase the risk of sea turtle mortalities and allow turtles access to large portions of the canal.

Daily inspections are performed from a small boat to remove floating debris and to repair holes near or at the water 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". The new primary barrier net, with few exceptions, has performed as designed and effectively confines sea turtles to the eastern 200 meters of canal.

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. These scrapes vary in degree of severity, with most being minor and similar to those found on sea turtles that inhabit nearshore 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.

In October 2007, cleaning of the intake pipes and offshore intake structures began. Work inside the intake pipes required relatively calm seas. During October, November and December there were only a limited number of days where seas were at an acceptable level for diver safety. Despite weather days, the project managed to complete the cleaning of one 12' intake pipe and the offshore structure housing it. The project also completed cleaning of the other 12' intake pipe's offshore structure and removed loose debris (concrete chunks etc.) from inside the pipe. Other work completed during this project 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 initial construction. These pipe openings were inspected and effectively sealed off. The complete cleaning of the second 12' intake pipe and 16' pipe and associated offshore structure is scheduled for upcoming outages in 2009/2010. 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 mandating that both participation in the Sea Turtle Stranding and Salvage Network 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 (STSSN), FPL's sea turtle biologist 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 activity. The efforts of the Florida STSSN are critical to the Florida Fish and Wildlife Conservation Commission (FFWCC) conservation and recovery program. All permit holders participating in this program are required to complete a Sea Turtle Stranding and Salvage Network stranding report for each dead or debilitated turtle encountered. Completed stranding reports were sent to FFWCC. Results from stranding events in 2008 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 allow viewing of a nesting loggerhead sea turtle. This public service activity is mandated by the most recent Biological Opinion issued by NMFS and results from the 2008 season are presented in section 3.4 of this report.

Florida Power & Light Company'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 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 and the National Research Council. Results of projects and collaborative efforts conducted in 2008 are presented in section 3.4 of this report.

PART 2

1.0 NESTING SURVEY (2008 RESULTS)

In 2008, areas E-S were surveyed by the power plant sea turtle research group (Figure 3). Ecological Associates, Inc. surveyed areas A-D as part of a beach renourishment project south of Ft. 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 mid-March 2008 through April 6, 2008 several preliminary nest surveys were conducted along Hutchinson Island in areas E-S. Eight leatherback nests were recorded in areas E-S prior to the beginning of formal nesting surveys on April 7, 2008. From April 7, 2008 through September 25, 2008, 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 1-km-long survey areas A - S (Figure 3).

Data collected from beach nesting surveys were reported to the Florida Fish and Wildlife Conservation Commission (FFWCC) as part of the FFWCC 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 FFWCC and the National Marine Fisheries Service (NMFS) through the Sea Turtle Stranding and Salvage Network.

1.1 Loggerhead Turtle Nesting

In 2008, 4010 loggerhead nests were recorded for Hutchison Island (Figure 6). This figure marks the lowest nest total recorded since whole island surveys began. These numbers are consistent with the declining trend in loggerhead nesting observed throughout the state of Florida. The St. Lucie Plant sea turtle biologists observed 2658 loggerhead nests in the one-kilometer sections A-S, on the north end of the island. The first recorded nest was on April

24th and the last loggerhead nest was recorded on September 15th. There were 3105 loggerhead false crawls observed in the monitored area.

Forty-three of the 2658 loggerhead nests were marked and evaluated to assess nest productivity. The 43 nests contained a cumulative total of 4229 eggs. Of these, 3291 successfully hatched and emerged from the marked nests. This represents an emergence success rate of 77.82%. There were 81 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 2008, 268 green turtle nests were recorded on Hutchison Island (Figure 7). The relatively fewer number of green turtle nests deposited this year over last is in line with expectations given the cyclical, up-down, nature of green turtle nesting. However, this is one of the highest "low year" green turtle nesting totals for the island. The St. Luice plant sea turtle researchers observed a total of 116 green turtle nests in the one-kilometer sections A-S on the North end of the island. The first recorded nest was on June 7th and the last green turtle nest was recorded on September 27th. There were 225 green turtle false crawls observed in the surveyed areas A-S. Green turtle nesting has been on the rise over the last decade and is expected to increase given the high number of nests recorded in recent years.

Eleven of the 116 green turtle nests were marked and evaluated to assess nest productivity. The 11 nests contained a cumulative total of 1274 eggs. Of these, 986 successfully hatched and emerged from the marked nests. This represents an emergence success rate of 77.39%. There were 20 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 2008, 108 leatherback turtle nests were recorded on Hutchison Island (Figure 8). The relatively fewer number of leatherback sea turtle nests deposited this year over last is in line with expectations given the cyclical, up-down, nature of leatherback sea turtle nesting. The St.

Luice Plant sea turtle researchers observed a total of 73 leatherback sea turtle nests in the one-kilometer sections A-S on the North end of the island. The first recorded nest was on March 17th and the last leatherback sea turtle nest was recorded on July 26th. There were 17 leatherback sea turtle false crawls observed in the surveyed areas A-S. Leatherback sea turtle nesting has been on the rise over the last decade and expected to increase.

Three of the 73 leatherback turtle nests were marked and evaluated to assess nest productivity. The 3 nests contained a cumulative total of 267 eggs. Of these, 182 successfully hatched and emerged from the marked nests. This represents an emergence success rate of 68.16%. There were no live leatherback turtles found in any of these nests.

1.4 Predation

The St. Lucie Plant sea turtle researchers recorded a total of 36 predation events for Hutchinson Island in 2008 (within beach sections E-S, Figure 9). Sea turtle nests on Hutchinson Island were depredated by ghost crabs, raccoons, sea gulls, crows, and fire ants. Ghost crabs accounted for the majority of predation events with a total of 23 occurrences. The second most abundant predator was the raccoon with 8 events. It is noteworthy that this represents an increase in raccoon predation over previous years. However, data from future nest monitoring will be needed to determine whether this recent up-tick in raccoon activity is part of a larger trend on the island.

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 sea turtle nest's surface. Predators negatively affected eleven of the 57 nests evaluated for hatch success. Therefore, the percentage of sampled nests impacted by predators was 19.3%.

The visual surveys conducted only allowed for a partial accounting of overall predation activity. Nests were not observed on a 24-hour time frame and aquatic predation was not taken into account. Therefore, predation rates are likely to be much higher than indicated by data presented here.

2.0 INTAKE CANAL MONITORING (2008 RESULTS)

Since plant operation began in 1976, 13006 sea turtles (including recaptures) representing five different species have been removed from the intake canal. These include 7523 loggerhead (including 570 recaptures), 5354 green (including 1840 recaptures), 32 leatherback, 47 Kemp's Ridley and 50 Hawksbill turtle (Table 1).

During 2008, 725 sea turtles were removed from the intake canal, including 420 loggerheads, 299 green turtles, 2 Kemp's ridley and 4 hawksbill (Table 1, Figure 10). The majority of these turtles (96%) were captured alive and released back to the ocean. Twenty-one turtles (2.9%) were taken to rehabilitation facilities for treatment of injuries or disease and six turtles (0.8%) were found dead. Four of these turtles were entrained into the canal system post-mortem and the other two sea turtle mortalities were causal to power plant operation.

In 2008, 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, canal banks and headwall structures were moderately effective in capturing turtles with carapace lengths of about 30 cm or less. 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 in the vicinity of the barrier net. Hand capture efforts have had a significant impact in reducing residency times for turtles in the intake canal.

During 2008, 99.6 percent of all turtles entrapped in the canal were captured east of the A1A bridge; 471 by tangle nets, 16 at surface of primary barrier net, 40 by dip-net, 181 by hand capture, 13 between the primary barrier net and A1A barrier net and one by a special net. Because of their relatively small sizes, virtually all turtles reaching the intake wells are green turtles. During 2008, three of the 299 green turtle captures (1.0%) occurred at 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, 2410 recapture events (570 loggerheads and 1840 green turtles) have occurred. The recapture rate for loggerhead turtles in 2008 was 10.0% and the recapture rate for green turtles was 45.0%. The large number of green turtle recaptures probably reflects the saturation of the local green turtle aggregation by turtles tagged at the St. Lucie Plant. Occasionally, turtles are captured that have been tagged by other researchers. There were ten such captures in 2008 that included eight loggerheads and two green turtles. The majority of these turtles were originally captured and tagged in Florida however, the original capture and tagging information for two of the loggerheads could not be found and one of the green turtles was originally captured and tagged in Mexico.

2.1 Loggerhead Turtle Captures

The number of loggerheads captured in 2008 (420) represents the fourth highest annual total since intake canal monitoring began in May 1976. Loggerhead captures exhibit considerable year-to-year fluctuations, but since 1976 figures show a significant increase in loggerhead captures rates at the intake canal (Figure 10, Table1). Five of the last six years have had the highest capture rate numbers for the loggerhead. One of those years (2007) had the lowest annual total since 1997. This was likely due to extended power plant outages that lasted for five months. In 2008, there was only one power plant outage that lasted for 45 days.

During 2008, monthly captures of loggerheads ranged from 11 in November to 67 in July, with a monthly mean of 35 (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 420 loggerheads captured in 2008 for which straight line carapace lengths are available, 271 were juveniles with a straight line carapace length (SLCL) less than or equal to 70 cm, 65 were adults (SLCL $\geq$ 85 cm) and 84 were transitional (SLCL 70-85 cm) (Hirth, 1980, Figure 11). The latter group probably includes both mature and immature individuals. Of the 65 turtles classified as adults for whom sex was recorded, 60 were females and 5 were males, with females predominating by a ratio of 12:1.

2.2 Green Turtle Captures

The number of green turtles captured in 2008 (299) represents the seventh 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 reefs adjacent to the power plant's offshore intake structures.

During 2008, monthly green turtle captures ranged from 11 in June to 55 in October with a monthly mean of 24.9 (Table 3). The March 1996 capture total of 147 green turtles is the largest for any species, for any month on record. 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 2008, this seasonal pattern was less defined, with captures distributed more evenly throughout the year (Table 3).

Of the 299 green turtles captured in 2008, 286 were juveniles or sub-adults (SLCL < 83 cm) and 13 were adults (SLCL > 83 cm) (Witherington and Ehrhart, 1989, Figure 12). Of the 13 turtles classified as adults for whom sex was recorded, 9 were females and 4 were males, with females predominating by a ratio of 2.3:1.

2.3 Leatherback; Hawksbill; Kemp's Ridley Turtle Captures

In 2008 there were four hawksbill and two Kemp's ridley sea turtles captured in the intake canal of the St. Lucie Plant. No leatherback turtles were entrained into the canal system during the year. The four hawksbill turtles captured at the intake canal in 2008 were juvenile animals (33.0 – 52.0 cm SCL). Both the Kemp's ridley turtles captured in 2008 were also considered to be in their juvenile life stage (53.7 and 60.5 cm SCL).

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 2008, 93.1% (391) of all loggerheads found in the canal were alive and in good condition. Only 6.4% (27) of all loggerheads were individuals in fair or poor condition and 0.5% (2) were found dead. Of the 299 green turtles removed from the intake canal during 2008, 97.3% (291) were in good condition, 1.3% (4) were in fair or poor condition and 1.3% (4) were found dead. Conditions for all other sea turtles captured at the intake canal in 2008 were categorized as good.

Of the 725 turtles removed from the intake canal during 2008, 635 (88%) were observed having fresh cuts and scrapes that were incurred during transit through the intake pipes. The scrapes vary in degree of severity, with most of the scrapes being minor (55%) however; some of the scrapes are moderate (31%) to severe (2%). In 2008, there were three turtles that were found with severe scrapes including one of that was sent to a rehabilitation facility for treatment. The other two turtles were adult nesting females and their wounds were not life threatening. These turtles were released on the day of capture after consultation with personnel from FFWCC. These three incidents went against the take limit established in the most recent Biological Opinion by NMFS.

Of the 719 live turtle removals during 2008, 696 were released into the ocean on the same day of capture. Eighteen loggerheads and five 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, or to Clearwater Marine Aquarium for treatment and rehabilitation. All sick or injured turtles were sent to rehabilitation facilities after consultation with personnel from FWCC.

2.5 Mortalities and Injuries

In 2008, six mortalities were recorded at the St. Lucie power plant intake canal; two loggerheads and four green turtles. Two of the four green turtle mortalities were considered

causal to power plant operation. On August 29, a juvenile green turtle was recovered dead by divers from under the west side of the primary barrier net where it apparently drowned. The primary barrier net failed on August 20th during tropical storm Faye. This green turtle had apparently gone over the top of the barrier net when it failed and became trapped under the west side of the net as it was loaded with algae. This mortality went against the take limit established in the latest Biological Opinion.

On December 9, a juvenile green turtle was found dead at the surface of the primary barrier net with no wounds or abnormalities. This turtle was kept on ice and transported to Dr. Nancy Mettee at the Marinelife Center for necropsy. After consultation with FWCC personnel and after reviewing initial results from the gross necropsy it was likely that the turtle drowned and the incident was considered causal to power plant operation.

The other four mortalities (two loggerheads and two green turtles) were turtles that likely had pre-existing conditions that contributed to their demise prior to entering the canal. There was no evidence that there death was the direct result of power plant operation. Both loggerheads were found dead, extremely emaciated and covered in epibiota. One green turtle was found moderately decomposed floating in the canal and had apparently been pulled into the canal in the condition it was found. The second green turtle was found with a severed left front flipper from an apparent boat-related injury sustained before entering the canal system.

Injuries causal to power plant operation are recorded and go against the take limit established in the Biological Opinion set forth by NMFS. In 2008, there were three injuries causal to power plant operation. These involved one loggerhead and two green turtles. On June 28, an adult female loggerhead turtle sustained severe scrapes to her head due to entrainment through the intake pipes. Since this turtle was a nesting female and her wounds were not life threatening she was released back into the ocean after consultation with FWCC personnel. On July 23, a nesting adult green turtle also sustained severe scrapes anterior to her right eye as a result of entrainment through the intake pipes. After consulting with FWCC she was released back to the ocean on the same day of capture. On October 12, a small juvenile green turtle had sustained a blunt force puncture wound to the first costal scute on the left side of the carapace due to entrainment through the pipes. This injury was also considered causal to

power plant operation after consultation with FWCC. The turtle was transported to the Marinelife Center for rehabilitation and was eventually released back to the ocean, just south of the power plant on January 13, 2009.

3.0 SEA TURTLE PROTECTION ACTIVITIES (2008)

3.1 NMFS Section 7 Consultations

On May 4, 2001, NMFS issued its BO as part of the reinitiation 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 (e.g. 520 combined captures = take limit of 6). If any of these events occur, reinitiation of a Section 7 consultation will be required.

During 2008, there were two mortalities and three injuries of sea turtles causal to power plant operation. Based on the latest BO issued by NMFS, FPL did not exceed its take limit during 2008. However, in 2006, FPL did exceed their sea turtle take limit at the St. Lucie power plant and reinitiation of a Section 7 consultation was required. This consultation is currently ongoing between NMFS and the NRC. A new Biological Opinion is expected in 2009. FPL identified the contributing factors that led to exceeding the take limit in 2006. They have started to respond to the issues by initiating the intake pipe cleaning project and developing a plan to install turtle excluder grating at the offshore intake structures.

3.2 Barrier Net Maintenance

In 2008, quarterly inspections of the primary barrier net (5") and the A1A net (8") were completed. During these inspections debris was routinely removed from both nets and a total of eight holes were repaired on the primary barrier net. No holes were found in the A1A net. In addition to the regularly scheduled inspections, divers were brought in to clean the nets during algal events. These events were caused by the entrainment and subsequent impingement of copious amounts of drift algae. Algal events can compromise the integrity of the barrier nets and increase the risk of sea turtle mortalities due to impingement. During 2008, divers responded to six of these events and restored the nets to design specifications.

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 required relatively calm seas and during October, November and December there were only a limited number of days where seas were at an acceptable level for diver safety. Despite weather days, the project managed to complete the cleaning of one 12' intake pipe and offshore structure housing it. 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' eastward of the canal headwall and had originally been planned to be part of a back-flushing system that was abandoned during construction of the 12' intake pipes. These pipe openings were inspected and effectively sealed off.

During a refueling outage in April 2008 the project completed the cleaning of the other 12' intake pipe offshore structure and removed loose debris (concrete chunks etc.) from both 12' intake structures. The complete cleaning of the second 12' intake pipe and 16' pipe, including the associated offshore structures, is scheduled for upcoming outages in 2009/2010.

3.4 STSSN; Turtle Walks; Collaborative Efforts

As participants in the Sea Turtle Stranding and Salvage Network (STSSN), FPL's sea turtle biologist 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 activity. The efforts of the Florida STSSN are critical to the Florida Fish and Wildlife Conservation Commission (FFWCC) conservation and recovery program.

During 2008, FPL's contracted sea turtle biologists responded to 13 stranding events in St. Lucie County. Seven loggerheads, five green turtles and one hawksbill turtle were documented in various stages of decomposition. Stranding reports for all events were submitted to FFWCC. The cause of death for six of the stranded turtles was undetermined. Four of the turtles found had wounds consistent with boat/propeller strikes, two were found emaciated with heavy epibiont loads, and one was covered in petroleum tar.

Florida Power & Light Company conducts public service turtle walk programs 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; they are able to view a nesting loggerhead sea turtle. During 2008, FPL conducted 14 turtle walks between June 1 and July 31. During these programs a total of 526 people attended and on 11 of the 14 turtle walks they were able to view a nesting female loggerhead turtle.

Sea turtle biologists at the St. Lucie power plant continued to collaborate with other researchers in 2008 as part of two sea turtle studies. One project conducted by the University of Central Florida is looking at the migratory patterns of sub-adult green turtles of which little is known. Three sub-adult green turtles captured at the canal in 2008 were part of this study. Satellite tags were attached to their carapaces and released from Hutchinson Island. The tracks from these turtles (Hanna, Verne and Amelia) can be viewed at the website seaturtle.org. The second project conducted at the St. Lucie power plant is a collaborative study with the University of Georgia looking at green turtle genetics. During 2008, biopsies were taken from the rear flippers of 84 green turtles and sent to the University of Georgia for analysis. This analysis looks at common haplotypes at nesting beaches around the world and tries to assign natal origin of green turtles found in Florida waters. Preliminary results indicate that many of the juvenile animals found in Florida were hatched on beaches in Mexico and Costa Rica.

4.0 LITERATURE CITED

ABI (Applied Biology, Inc.), 1978, Ecological monitoring at the Florida Power & Light Co. St. Lucie Plant, annual report 1977, Volumes I and II, AB-101, Prepared by Applied Biology, Inc. for Florida Power & Light Co., Miami.

1980a, Florida Power & Light Company, St. Lucie Plant annual non-radiological environmental monitoring report 1979, Volumes II and III, Biotic monitoring, AB-244, Prepared by Applied Biology, Inc. for Florida Power & Light Co., Miami.

1980b, Turtle entrainment deterrent study, AB-290, Prepared by AppliedBiology, Inc. for Florida Power & Light Co., Miami.

1986, Florida Power & Light Company, St. Lucie Unit 2 annual environmental operating report 1985, AB-563, Prepared by Applied Biology, Inc. for Florida Power & Light Co., Juno Beach.

1987, Florida Power and Light Company, St. Lucie Unit 2 annual environmental operating report 1986, AB-579, Prepared by Applied Biology, Inc. for Florida Power & Light Co., Juno Beach.

1988. Florida Power & Light Company, St. Lucie Unit 2 annual environmental operating report 1987, AB-595, Prepared by Applied Biology, Inc. for Florida Power & Light Co., Juno Beach.

1989, Florida Power & Light Company, St. Lucie Unit 2 annual environmental operating report 1988. AB-596. Prepared by Applied Biology, Inc. for Florida Power & Light co., Juno Beach.

1994, Florida Power & Light Company, St. Lucie Unit 2 annual environmental monitoring report, AB-631, Prepared by Applied Biology, Inc., for Florida Power & Light Co., Juno Beach.

Carr, A. and L. Ogren, 1960, The ecology and migrations of sea turtles 4. The green turtle in the Caribbean Sea. Bulletin of the American Museum of Natural History 121: 1-48.

Carr, A., P. Ross, and S. Carr, 1974, Internesting behavior of the green turtle (*Chelonia mydas*) at a mid-ocean island breeding ground, Copeia 3, 703.

Carr, A., A. Meylan, J. Mortimer, K. Bjorndal and T. Carr, 1982, Surveys of sea turtle populations and habitats in the Western Atlantic, NOAA Technical Memorandum NMFS-SEFC-91:1-82.

Davis, G.E., and M.C. Whiting, 1977, Loggerhead sea turtle nesting in Everglades National Park, Florida, USA, Herpetologica 33:18-28.

Dodd, C.K., Jr. 1988, Synopsis of the biological data on the loggerhead sea turtle (Caretta caretta). U.S. Fish and Wildlife Service Biological Report 88(14).

Dutton, P.H., B.W. Bowen, D.W. Owens, A. Barragan and S.K. Davis, 1999, Global phylogeography of the leatherback turtle (*Dermochelys coriacea*). Journal of Zoology 248: 397-409.

Eckert, S.A., 1989, Diving and foraging behavior of leatherback sea turtles (*Dermochelys coriacea*). Canadian Journal of Zoology, 67, 28-34.

Ecological Associates Inc. 2000, Physical and Ecological Factors influencing Sea Turtle Entrainment Levels at the St. Lucie Power Plant 1976-1998, Submitted to FPL.

Herren, R. M., 1999, The effect of beach renourishment on loggerhead (*Caretta caretta*) nesting and reproductive success at Sebastian Inlet, Florida, M.S. thesis University of Central Florida. 148pp.

Hirth, H.F., 1980, Some aspects of the nesting behavior and reproductive biology of sea turtles, American Zoologist 20:507-523.

Hopkins, S.R., T.M. Murphy, Jr., K.B. Stansell and P.M. Wilkinson, 1979, Biotic and abiotic factors affecting nest mortality in the Atlantic loggerhead turtle, Proceeding Annual Conference of Southeastern Fish and Wildlife Agencies 32:213-223.

Limpus, C. J., 1993, The green turtle *(Chelonia mydas)* in Queensland : Breeding males in the southern Great Barrier Reef. Wildlife Research 20: 513-523.

Meylan, A.B., P.A. Meylan, H.C. Frick and J.N. Burnatt-Herks, 1992, Population structure of green turtles *(Chelonia mydas)* on foraging grounds in Bermuda. In : M. Salmon and J. Wyneken (compilers). Proceedings of the eleventh annual workshop on sea turtle biology and conservation. NOAA Technical Memorandum NMFS-SEFC-302:73.

Meylan, A.B., B. Schroeder and A. Mosier, 1995, Sea turtle nesting activity in the state of Florida, 1979-1992. Florida Marine Research Publications 52: 1-51.

Miller, J.D., 1997, Reproduction in sea turtles. In: P.L. Lutz and J.A. Musick (Eds). Biology of sea turtles. CRC Marine Science Series, CRC press. pp. 51-81.

Mrosovsky, N., 1987, Leatherback turtle off scale. Nature 327:286.

NMFS and USFWS 1991, Recovery plan for U.S. population of the loggerhead turtle (*Caretta caretta*). National Marine Fisheries Service, Washington D.C.

Quantum Resources Inc., 1995, Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 1994, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

1996, Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 1995, Prepared by Quantum Resources Inc, For Florida Power and Light Company, Juno Beach, FL.

1997. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 1996, Prepared by Quantum Resources Inc., For Florida Power and Light Company, Juno Beach, FL.

1998. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 1997, Prepared by Quantum Resources Inc.for Florida Power and Light Company, Juno Beach, FL.

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2002. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2001, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

2003. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2002, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

2004. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2003, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

2005. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2004, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

2006. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2005, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

2007. Florida Power and Light Co., St. Lucie Unit 2 Annual Environmental Operating Report 2006, Prepared by Quantum Resources Inc. for Florida Power and Light Company, Juno Beach, FL.

Schroeder, B.A. and Thompson, N.B., 1987, Distribution of the loggerhead turtle (*Caretta caretta*) and leatherback turtle (*Dermochelys coriacea*) in the Cape Canaveral, Florida area; results from aerial surveys. NOAA Technical Report, NMFS-53, 80pp.

Smith, N.P., 1982, Upwelling in Atlantic shelf waters of south Florida, Florida Scientist 45(2):125-138.

Sokal, R.R. and F.J. Rohlf, 1981, Biometry, The principles and practice of statistics in biological research, S.H. Freeman and Company, San Francisco, 859 pp.

Stancyk, S.E., 1982. Non-human predators of sea turtle and their control, Pages 139-152 in Bjorndal, K.A., ed. Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington, D.C.

Steinite, M. J., M. Salmon and J. Wyneken. 1998. Beach renourishment and loggerhead turtle reproduction: A seven year study of Jupiter Island, Florida. Journal of Coastal Research. 14(3):1000-1013.

Turtle Expert Working Group, 2000, Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western Atlantic. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SEFSC-444

Witherington, B.E. and L.M. Ehrhart, 1989. Status and reproductive characteristics of green turtles (*Chelonia mydas*) nesting in Florida. Pages 351-352 in Ogren, L., F. Berry, K. Bjorndal, H. Kumpf, R. Mast, G. Medina, H. Reichart and R. Witham, editors. Proceeding of the Second Western Atlantic Turtle Symposium, Mayaguez, Puerto Rico, 12-16 October 1987. NOAA Technical Memorandum NMFS-SEFC-226.

Witherington, B.E. and C. M. Koeppel, 2000, Sea turtle nesting in Florida, U.S.A. during the decade 1989-1998 : An analysis of trends. In: H. Kalb and T. Wibbles (compilers), Proceedings of the 19th annual symposium on sea turtle conservation and biology, 94-96. NOAA Technical Memorandum NMFS-SEFSC-443.

5.0 FIGURES

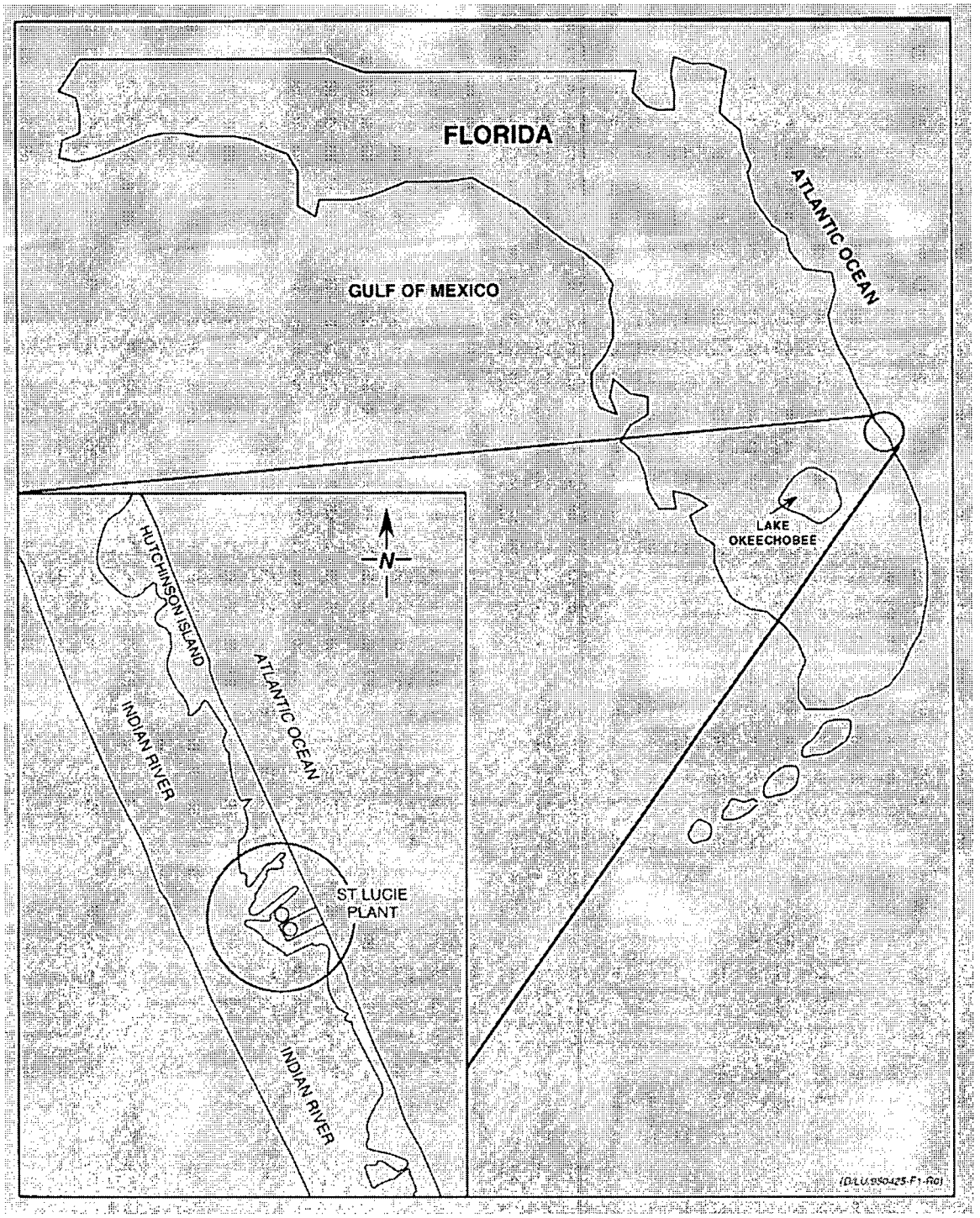


Figure 1. Location of St. Lucie Plant on Hutchinson Island, Florida.

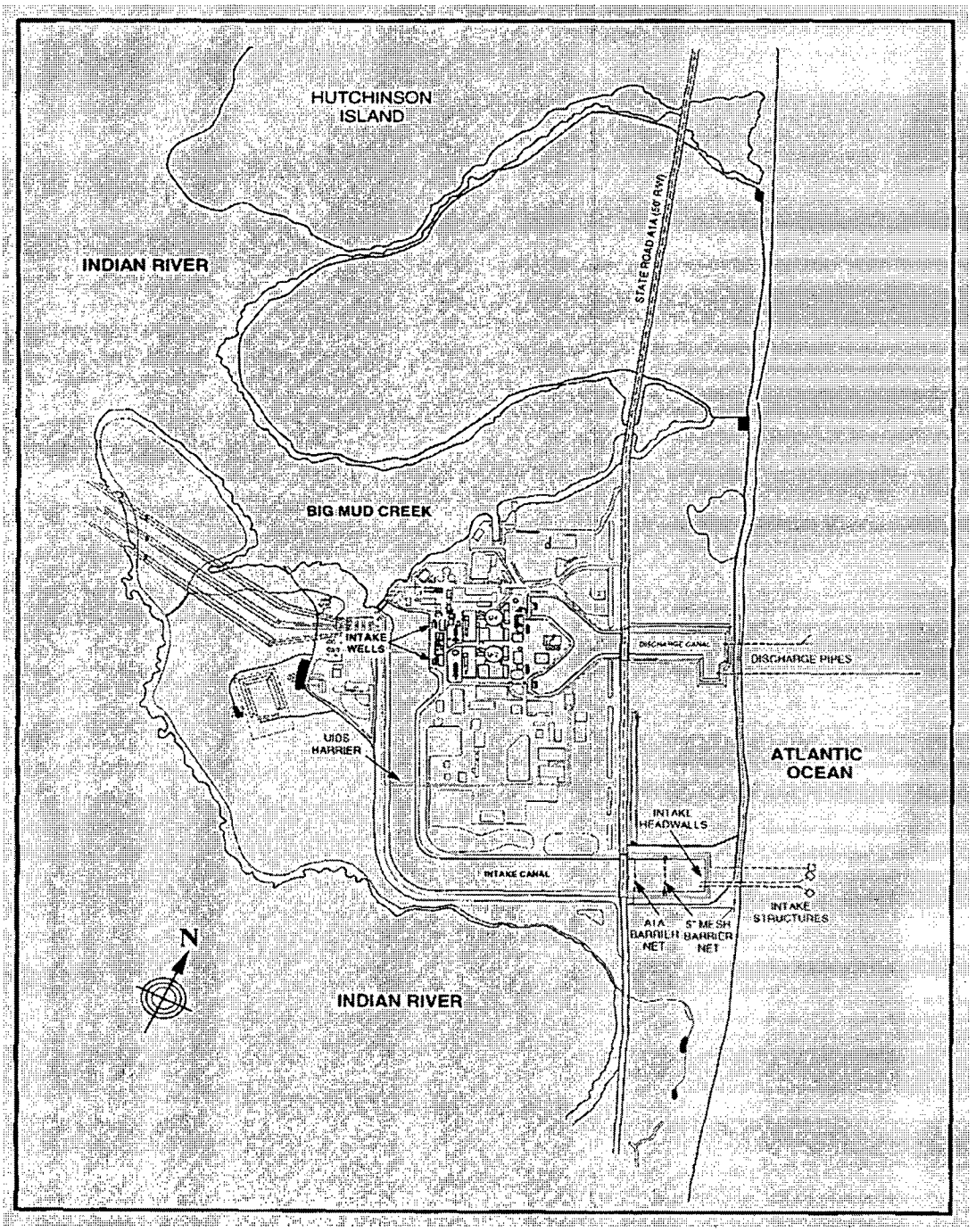


Figure 2. St. Lucie Plant cooling water intake and discharge System.

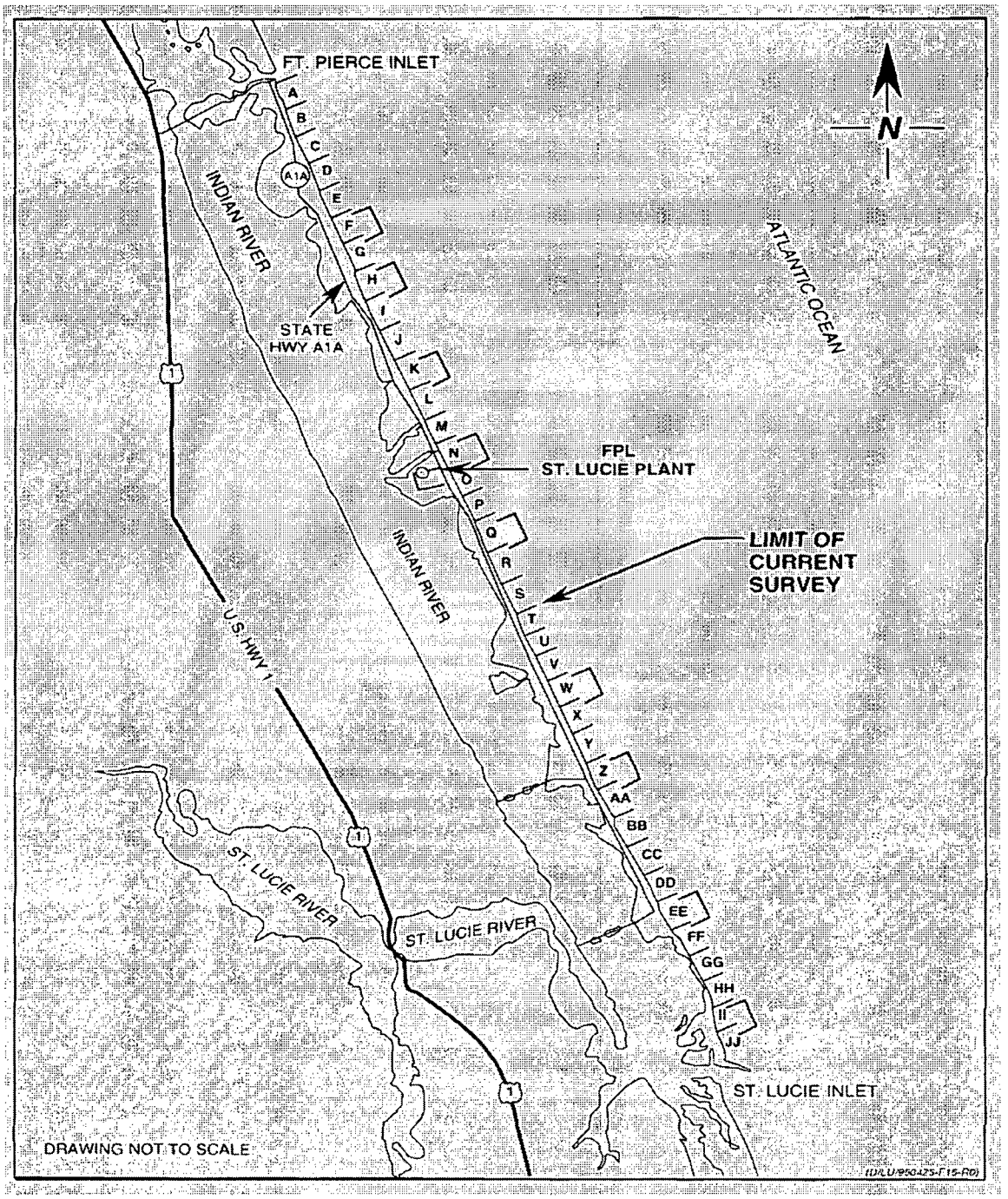


Figure 3. Designation and location of nine 1.25-Km segments and thirty-six 1-Km segments surveyed for sea turtle nesting, Hutchinson Island. 1971-2008.

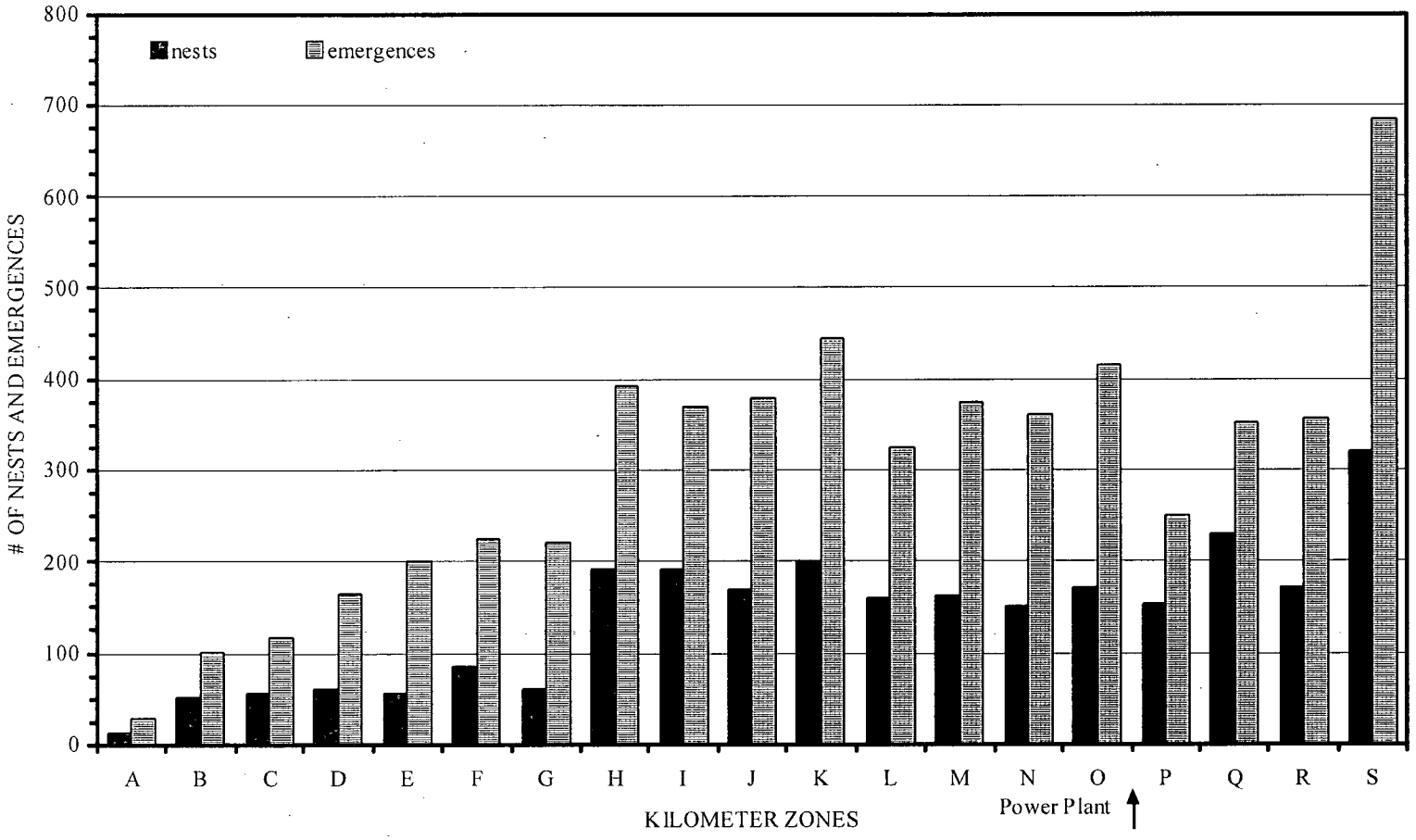


Figure 4. Number of loggerhead turtle nests and emergences for kilometer zones A through S (North to South), Hutchinson Island, April through September 2008.

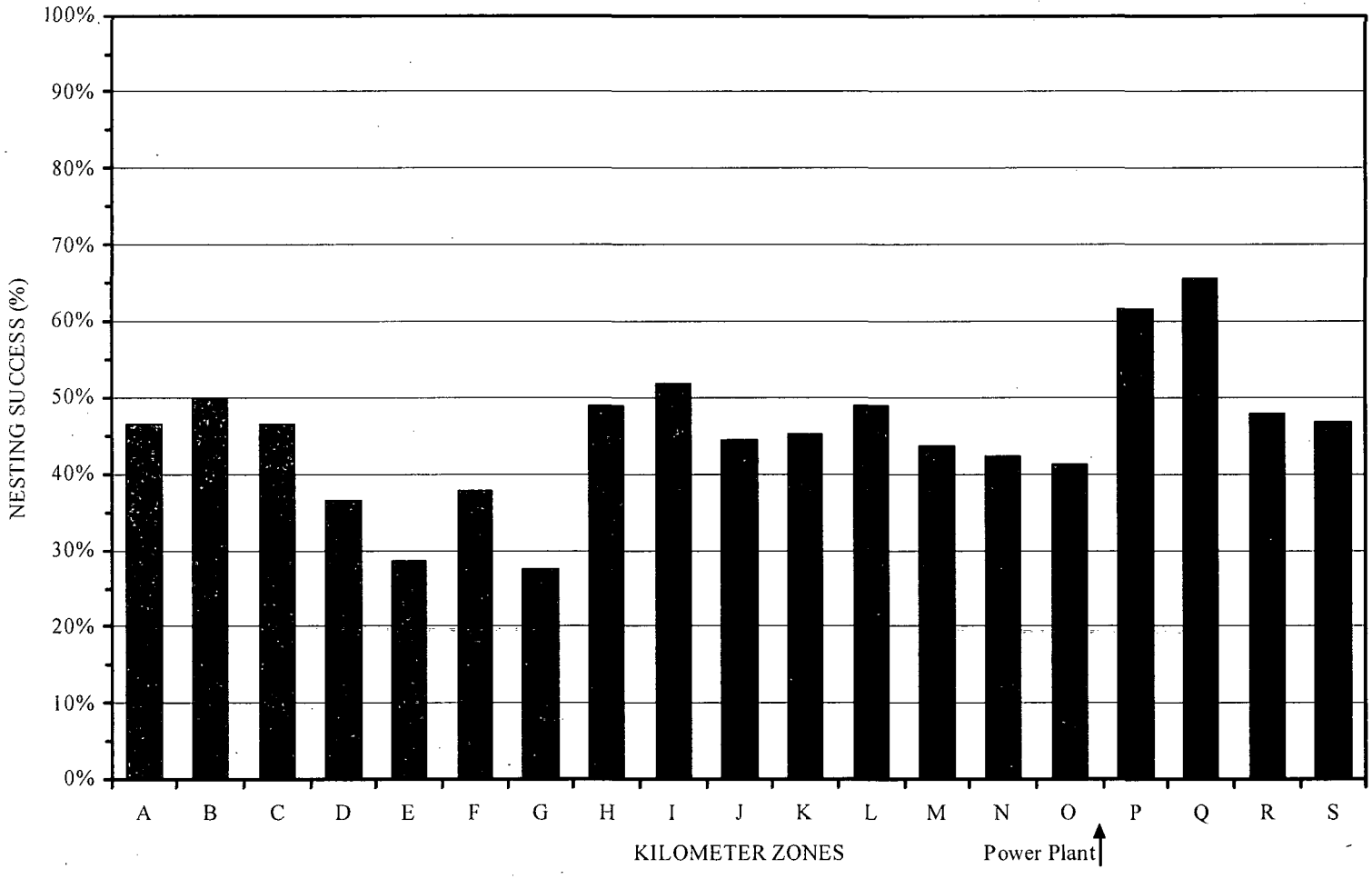


Figure 5. Loggerhead turtle nesting success (percentage of emergences resulting in nests) for kilometer zones A through S (North to South), Hutchinson Island, April through September 2008.

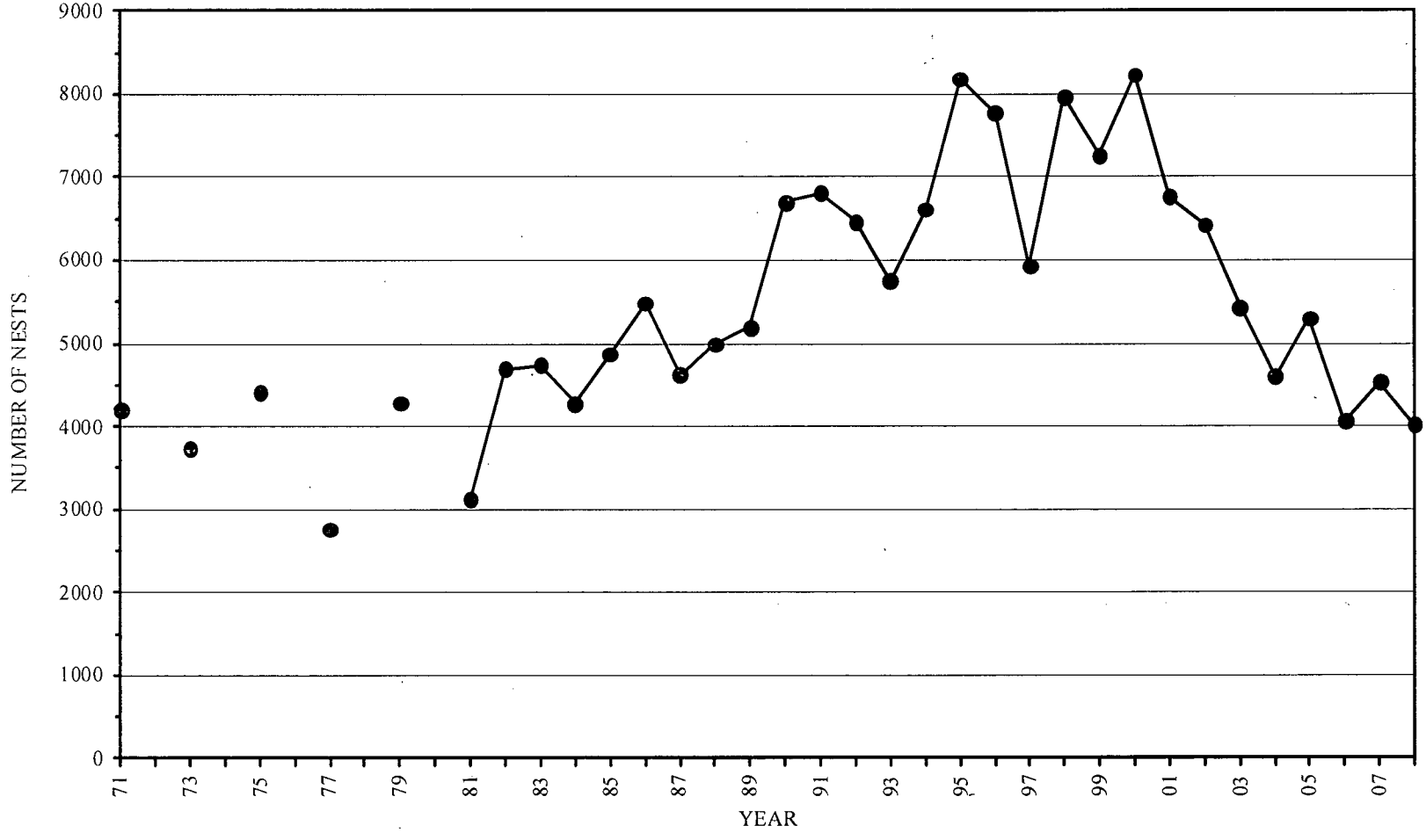


Figure 6. Number of loggerhead turtle nests, Hutchinson Island 1971 through 2008. Values for 1971 through 1979 are estimates (see text), values for 1981 through 2008 are from whole island surveys.

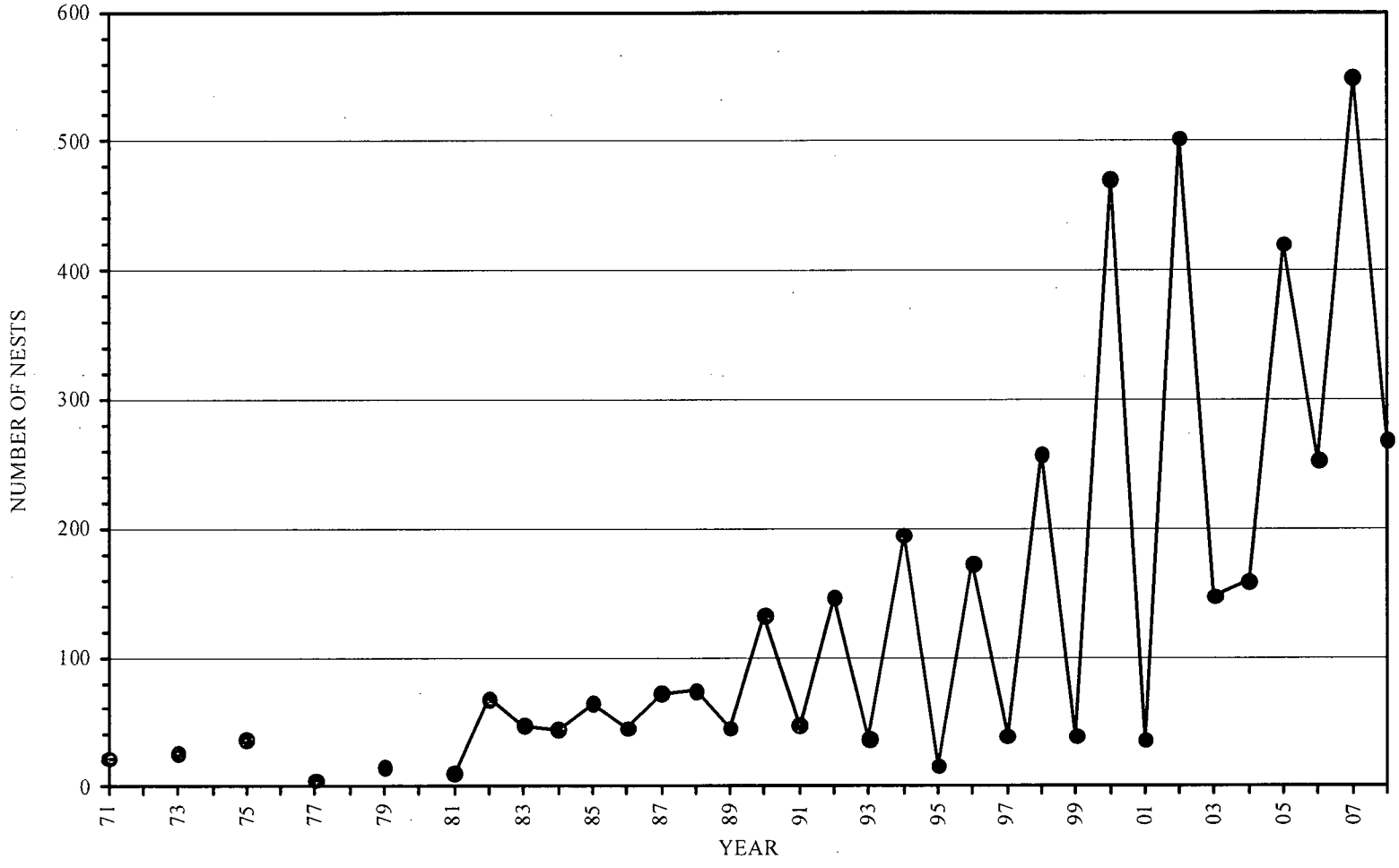


Figure 7. Number of green turtle nests, Hutchinson Island, 1971 through 2008. Values for 1971 through 1979 are estimates (see text). Values for 1981 through 2008 are from whole island surveys.

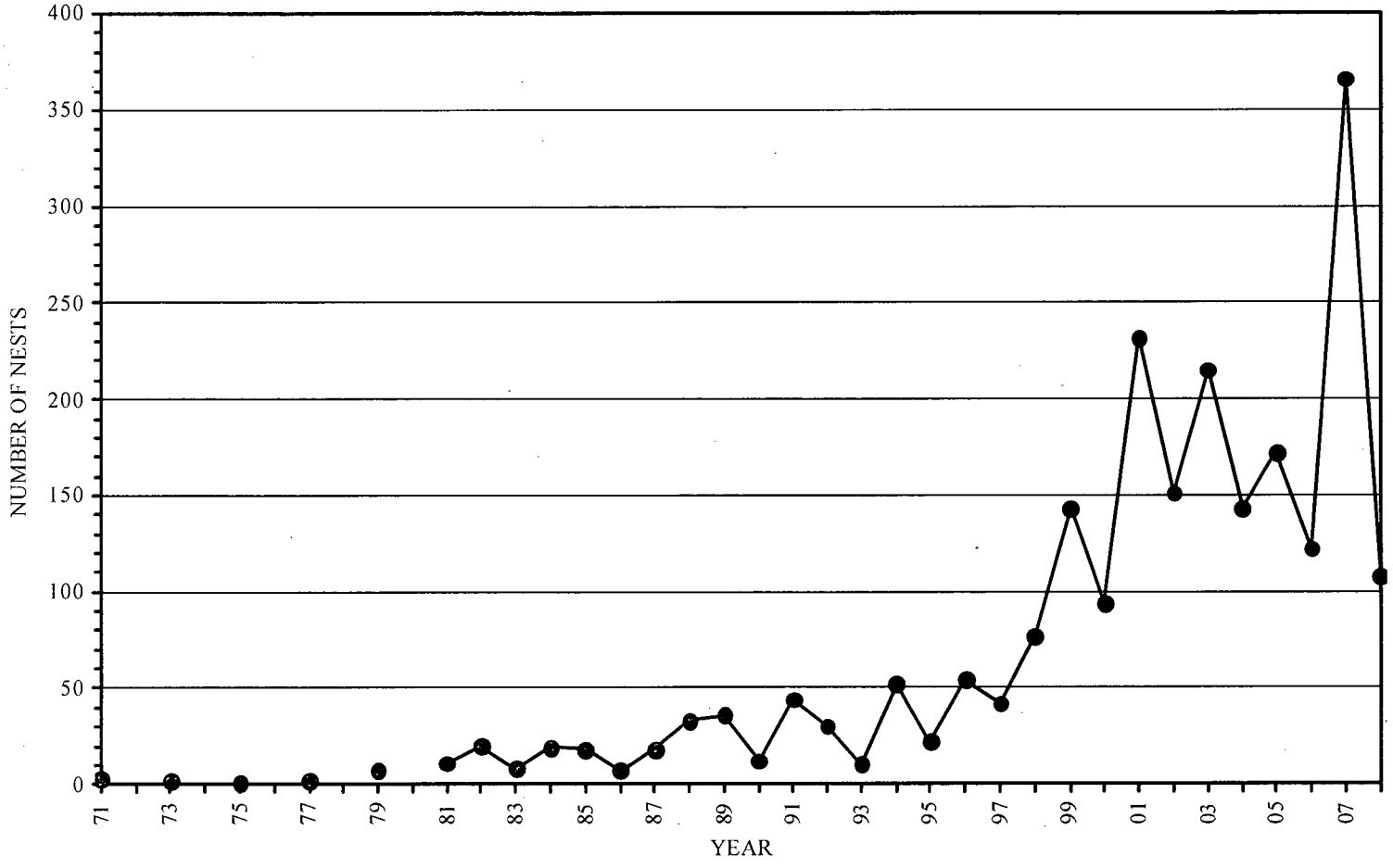


Figure 8. Number of leatherback turtle nests, Hutchinson Island, 1971 through 2008. Values for 1971 through 1979 are estimates (see text). Values for 1981 through 2008 are from whole island surveys.

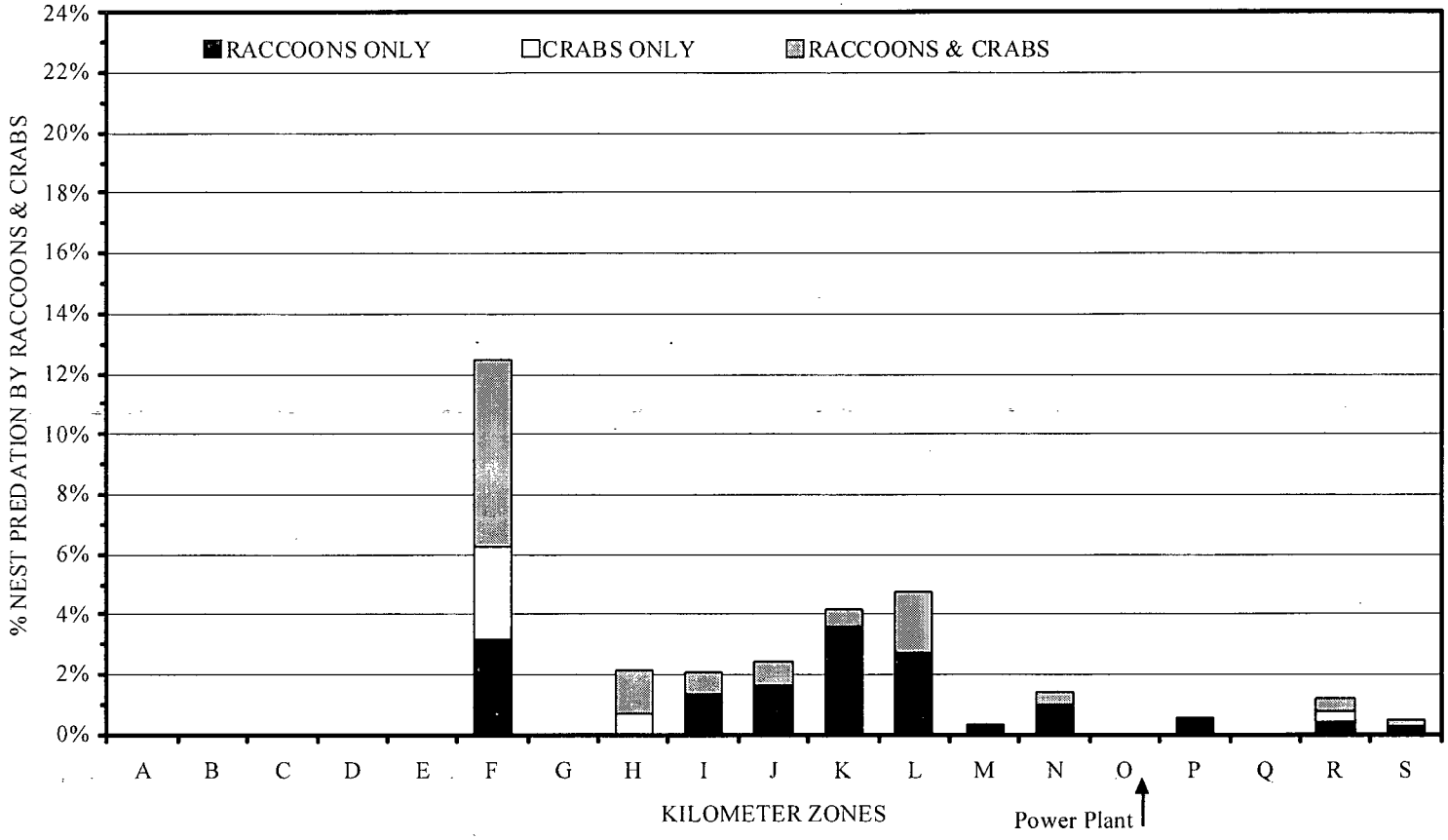


Figure 9. Percentage of loggerhead turtle nests depredated by raccoons and/or ghost crabs in kilometer zones A through S (North to South), Hutchinson Island, April through September 2008.

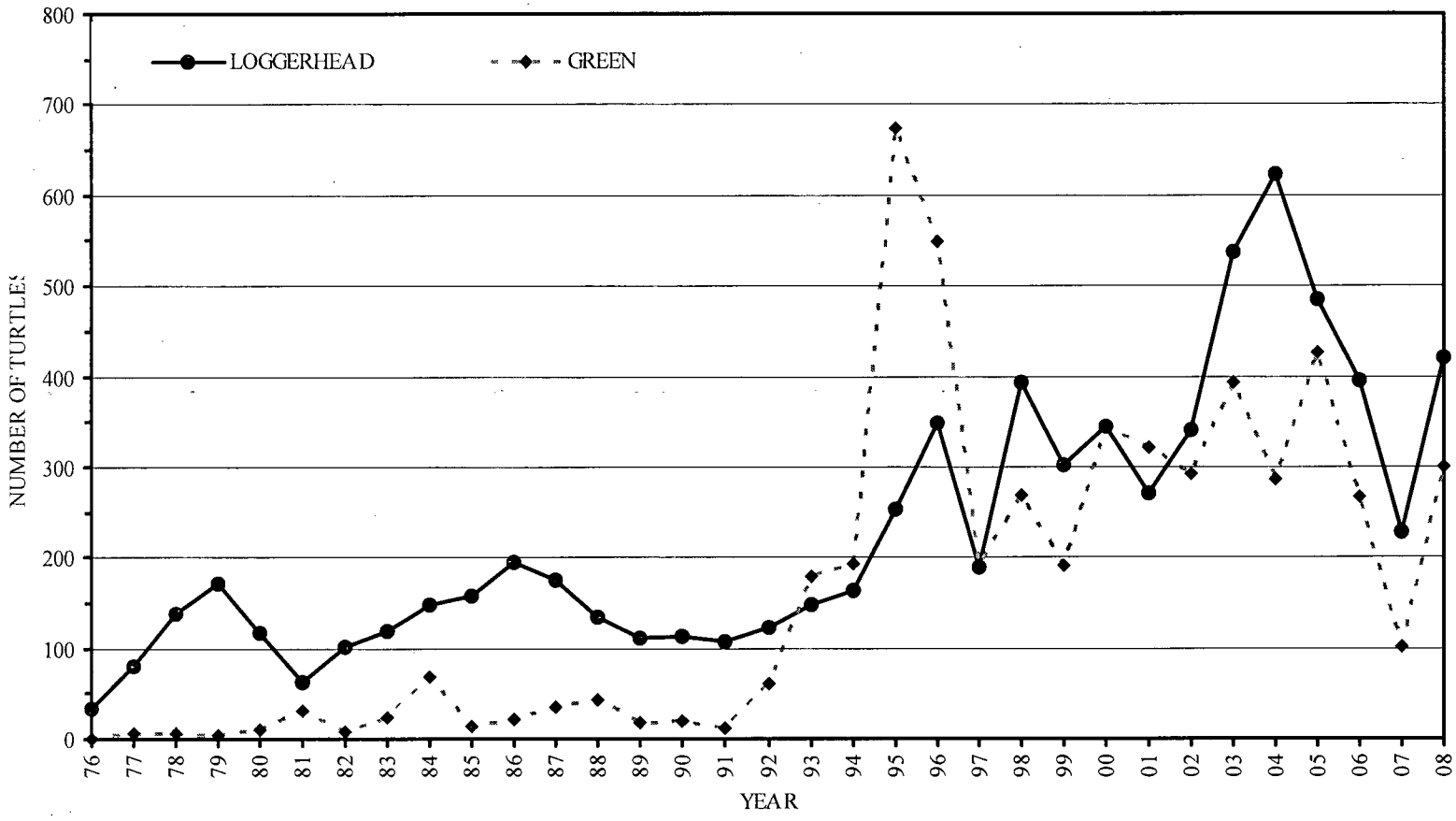


Figure 10. Number of loggerhead and green turtles removed each year from the intake canal at the St. Lucie Power Plant, 1976 through 2008.

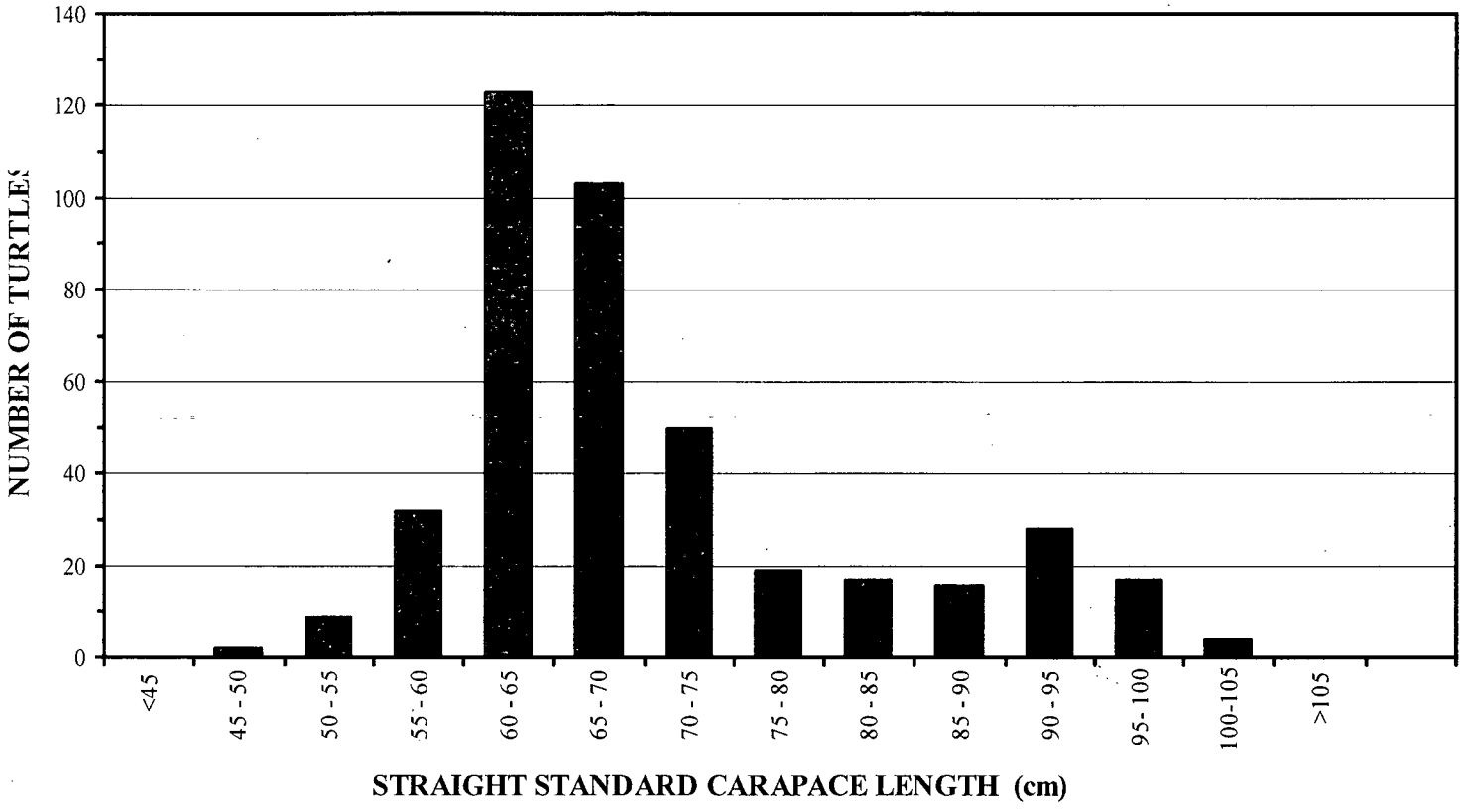


Figure 11. Size distribution (SSCL) of loggerhead turtles (n = 420) removed from the intake canal, St. Lucie Plant, 2008.

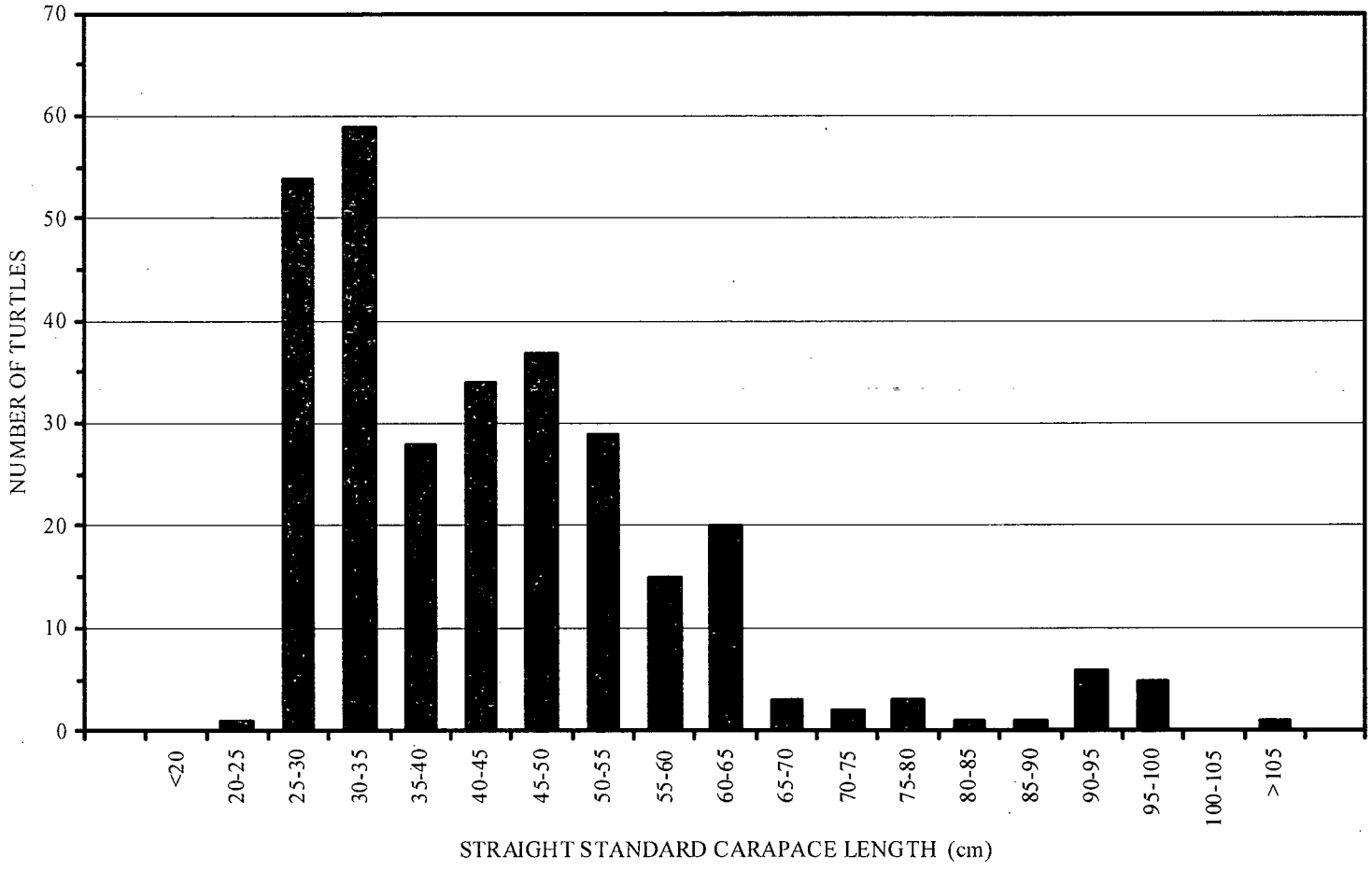


Figure 12. Size distribution (SSCL) of green turtles (n = 299) removed from the intake canal, St. Lucie Plant, 2008.

6.0 TABLES

Year	Species					Total
	Loggerhead	Green	Leatherback	Hawksbill	Kemp's ridley	
1976 - 1981	601 (51)	56 (9)	6	1	1	665 (53)
1982	101 (16)	8	1			110 (7)
1983	119 (4)	23 (4)				142 (16)
1984	148 (3)	69 (2)		1	2	220 (8)
1985	157 (4)	14		1		172 (5)
1986	195 (27)	22 (1)	1	1	1	220 (4)
1987	175 (11)	35		2	6	218 (28)
1988	134 (6)	42 (2)			5 (2)	181 (13)
1989	111 (4)	17 (1)	1	2	2 (2)	133 (10)
1990	112 (1)	20 (2)				132 (5)
1991	107 (1)	12		1	1	121 (3)
1992	123 (2)	61 (2)	1	2		187 (1)
1993	147	179 (1)	5	2	4	337 (4)
1994	164	193 (4)	2		2	361 (1)
1995	254 (1)	673 (15)	1		5	933 (4)
1996	349 (3)	549 (4)		5	3	906 (16)
1997	188	191 (5)	2	1		382 (7)
1998	393 (1)	268	1	2	2	666 (5)
1999	302 (2)	190 (4)	1	1	1	495 (1)
2000	344 (2)	345 (2)		2		691 (6)
2001	270 (1)	321 (5)	2	6	1	600 (4)
2002	341	292 (3)		3		636 (6)
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 (3)
2006	395 (1)	267 (2)	1	2	3	668 (4)
2007	227 (3)	101 (1)	1	1		330 (4)**
2008	420 (2)	299 (4)		4	2	725 (6)
Total	**7523** (150)	**5354** (79)	**32**	**50**	**45** (4)	**13004** (233)
Annual Mean*	234.1	167.3	1.0	1.6	1.4	405.3

* 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 2008. Number of mortalities are in parentheses.

Month	Number of Captures	Percent of All Captures	Minimum	Maximum	Mean	Standard Deviation	2008
January	744	9.9%	6	48	23.3	12.4	**33**
February	682	9.1%	5	38	21.3	17.0	**20**
March	809	10.8%	1	133	25.3	26.9	**34**
April	769	10.3%	0	71	24.0	20.1	**53**
May	646	8.6%	0	61	20.2	15.3	**24**
June	768	10.3%	3	66	24.0	18.0	**31**
July	967	12.9%	0	124	30.2	28.6	**67**
August	670	8.9%	2	43	20.9	14.4	**33**
September	468	6.2%	1	49	14.6	12.3	**49**
October	351	4.7%	0	27	11.0	7.5	**17**
November	277	3.7%	0	18	8.7	6.9	**11**
December	339	4.5%	1	48	10.6	9.4	**48**
Total*	**7490**		**0**	**133**			**420**
Mean	624.2				19.5		35.0
Std. Deviation	216.3				6.8		16.5

* 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 2008.

Month	Number of Captures	Percent of All Captures	Minimum	Maximum	Mean	Standard Deviation	2008
January	587	11.0%	0	61	18.3	19.0	**19**
February	543	10.1%	0	64	17.0	17.9	**12**
March	582	10.9%	0	147	18.2	30.1	**13**
April	420	7.8%	0	64	13.1	16.6	**36**
May	392	7.3%	0	91	12.3	19.7	**20**
June	364	6.8%	0	55	11.4	16.4	**11**
July	339	6.3%	0	61	10.6	15.8	**18**
August	357	6.7%	0	64	11.2	15.1	**13**
September	423	7.9%	0	77	13.2	18.8	**33**
October	528	9.9%	0	54	16.5	18.8	**55**
November	409	7.6%	0	50	12.8	14.3	**20**
December	410	7.7%	0	68	12.8	15.6	**49**
Total*	**5354**		**0**	**147**			**299**
Mean	446.2				13.9		24.9
Std. Deviation	89.1				2.8		14.9

Table 3. Total number of green turtles removed each month from the intake canal, St. Lucie Plant, 1977 through 2008.

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 2008 are presented in Table 1. Spikes in sponge ball loss have been identified as single events involving only one Unit; however both units experienced elevated losses throughout 2008 due to aging/ deficient liners on the waterboxes and tubesheets. The deteriorated liner peels off in chunks and collects on the strainers. The sponge balls become snagged on the strainer due do the excessive debris, and are lost during backwash. The site is in the process of installing new water box liners during refueling periods to eliminate this problem. Total sponge ball losses from Unit 1 were higher than Unit 2 in 2008. This was partially due to two peaks that occurred in June and October on Unit 1. The event in June was caused by wormrock and barnacle growth on the waterbox injection nozzles after an extended period of being out of service. The marine growth resulted in poor sponge ball recovery until the injection nozzles were augured out to restore flow. The event in October was caused by the previously mentioned tubesheet and waterbox liner debris. Unit 2 had one ball loss event in January potentially due to prolonged use of the same sponge balls. Only 3 sponge balls were found whole in the environment near the plant in 2008. 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. Gradual sponge ball loss throughout the system was experienced in 2008 due to aging waterbox and tubesheet liners. The degraded liner condition is scheduled to be corrected during refueling outages in 2009 and 2010. Average daily ball loss in 2008 is above the historic average, but was a decrease from 2006 (Figure 2). Estimated sponge ball loss from both units was 32.5 balls per day for 2008. Average daily sponge ball loss since system start-up has been approximately 17 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 2008.

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 2003.

5.4.1.2(c) Nonroutine Reports Submitted to the NRC for the Year 2008 in Accordance with EPP Subsection 5.4.2

On August 19, 2008 excessive rainfall from Tropical Storm Fay necessitated pumping 43,000,000 gallons of storm water into the Plant Intake Canal from approved outfall 008. A volume of 22,000 gallons of storm water that accumulated in the Unit-1 condenser bay was

pumped directly into the plant intake canal from an unapproved outfall. The evacuation of the storm water was required to mitigate personnel safety concerns, and protect critical plant equipment. The event was reported to the NRC on September 18, 2008 by FPL letter L-2008-206.

On January 28, 2008 an adult manatee (Trichechus manatus) was entrained in the St. Lucie Plant Intake cooling water canal. The manatee was captured and released under the direction of the Florida Fish and Wildlife Conservation Commission. The manatee was determined to be in good condition and released in the Indian River the same day. The event was reported to the NRC by FPL letter L-2008-032

On November 28, 2008 a manatee (Trichechus manatus) was entrained in the St. Lucie Plant Intake Cooling Water Canal. The manatee was captured on December 1, 2008 under the direction of Florida Fish and Wildlife Conservation Commission, and released into the Indian River in good condition that same day. The event was reported to the NRC by FPL letter L-2008-260.

On December 9, 2008 a dead juvenile green sea turtle (Chelonia mydas) was recovered from the St. Lucie Plane Intake 5-inch turtle barrier net. The final necropsy determined the mortality to be causal to plant operations. The required correspondence was submitted to the NRC on January 7, 2009 by FPL letter L-2009-006. This correspondence will also be included in the 2009 Annual Environmental Operating Report.

A notice of an approval for a minor revision to the St. Lucie Plant Industrial Wastewater Facility Permit was granted by the Florida Department of Environmental Protection on December 26, 2007. The revision request is pursuant to section 3.2.3 of the St. Lucie Units 1 and 2 Environmental Protection Plans. The NRC was notified on January 22, 2008 by FPL letter L-2008-009.

During the night of August 19, 2008 severe weather from Tropical Storm Fay resulted in damage to the suspension system that supports the 5-inch turtle barrier net located in the eastern most

region of the Plant Intake Cooling Water Canal. The compromised suspension system resulted in a partial loss of integrity of the 5-inch turtle barrier net which created an access path for sea turtles to travel downstream of the sequestered area as defined by the 5-inch turtle net. Compensatory measures to include augmented surveillance activities west of the failed 5-inch net were implemented to identify any sea turtles that may have migrated outside the confines of the 5-inch barrier net.

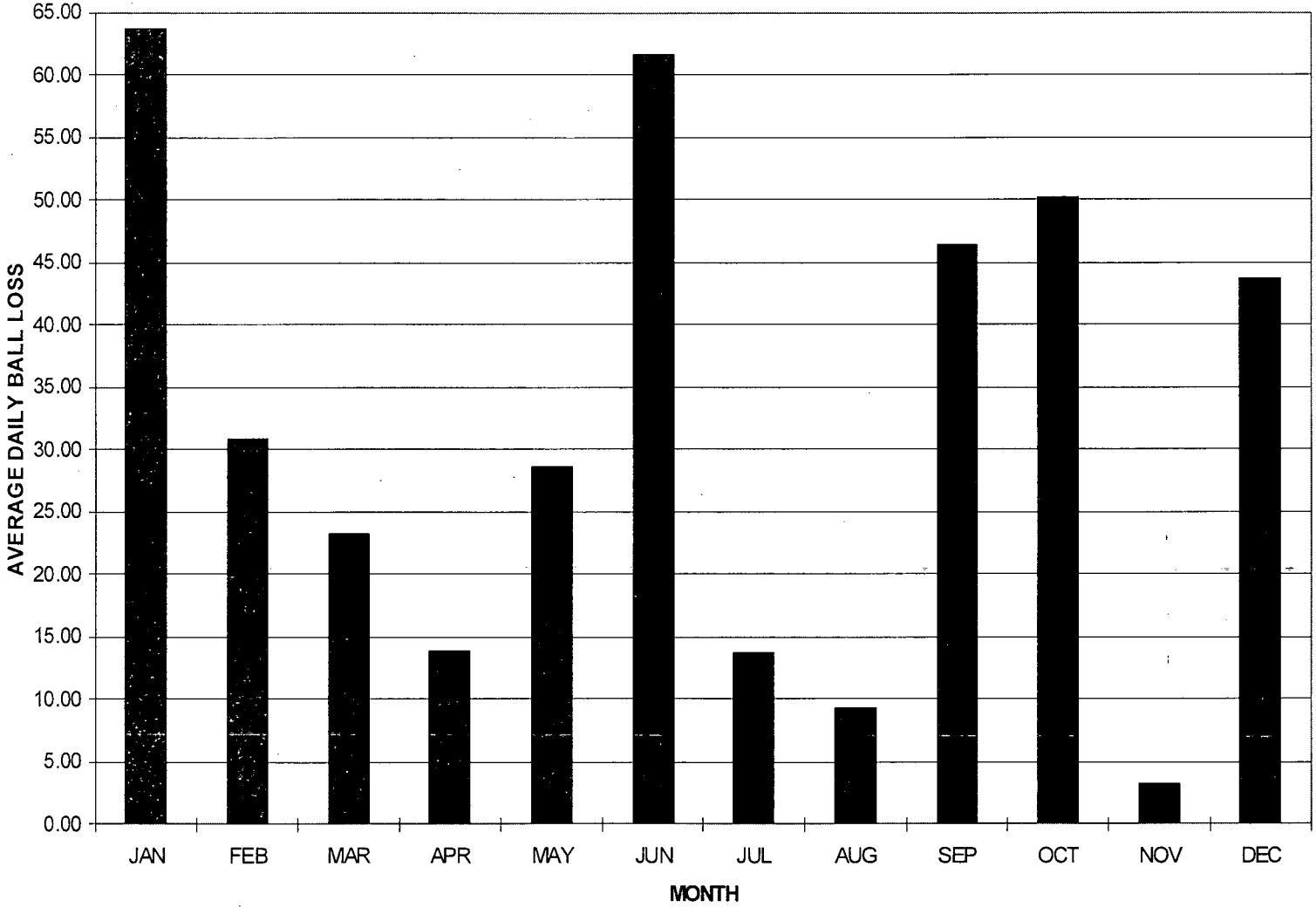
The mortality of a juvenile green sea turtle (Chelonia mydas) occurred during the night of August 28/29, 2008 and was a result of the failed net. As previously mentioned the NRC was notified of the turtle mortality by FPL letter L-2008-203. Repair activities on the 5-inch turtle net were completed on September 2, 2008.

TABLE 1

2008 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	11	9	549	1426*	0
February	12	12	756	139	1
March	8	16	618	102	0
April	9	13	248	166	0
May	16	16	464	422	1
June	8	17	1390	459	1
July	11	17	27	399	0
August	12	15	200	87	0
September	18	10	580	811	0
October	10	16	1596*	+37	0
November	0#	16	0	96	0
December	14	19	658	697	0
Total	129	176	7086	4767	3

\# Unit 1 system shutdown during refueling, 10/13/08 to 11/23/08.
\+ Net gain in inventory.
* Loss of abrasive balls.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AVERAGE DAILY BALL LOSS
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MONTH

Figure 1. Estimated Average Daily Sponge Ball Loss by Month from St. Lucie Plant (Both Units) for 2008.

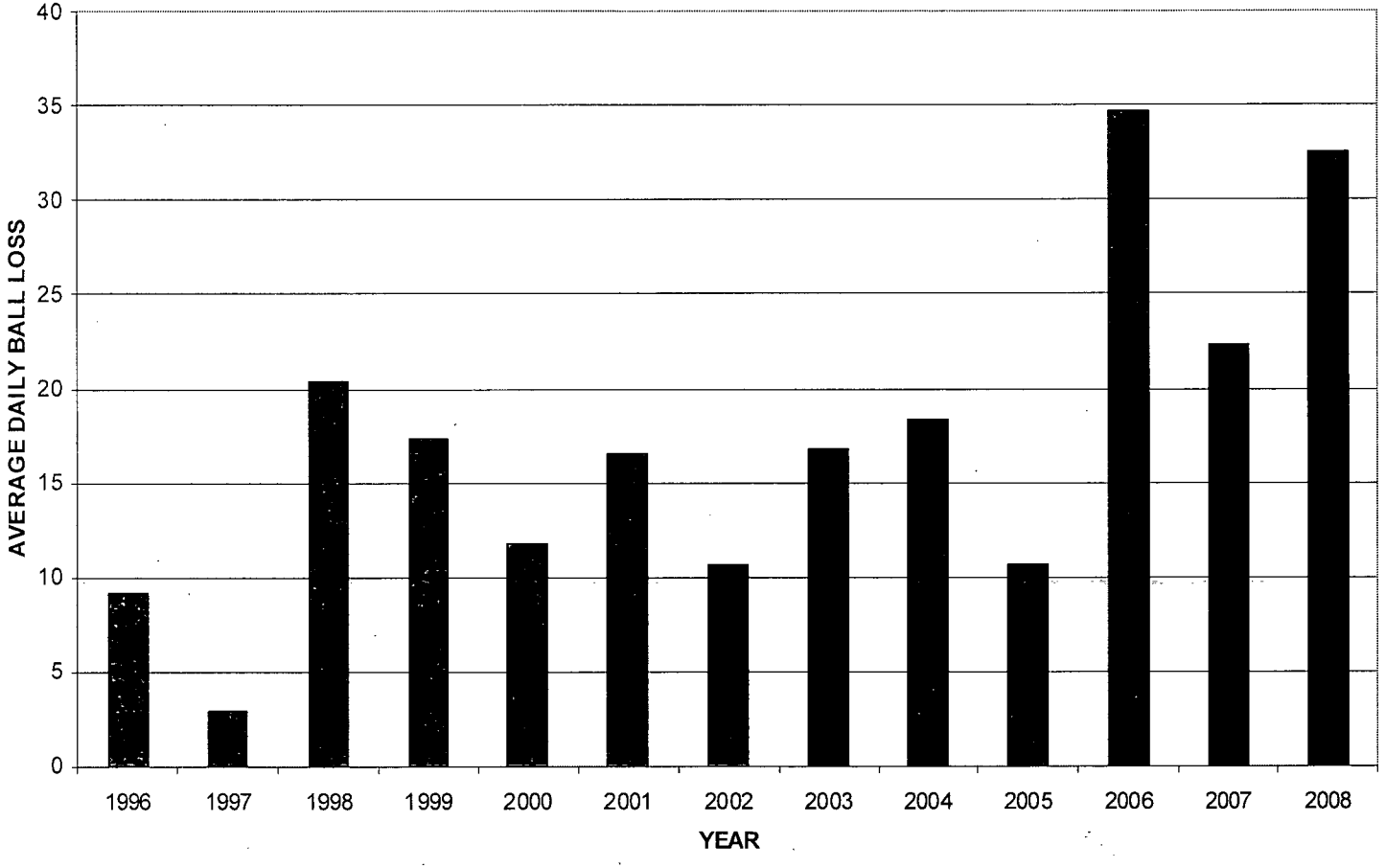

Figure 2. Average Daily Sponge Ball Loss from the St. Lucie Plant (Both Units) Since System Start-Up (January 1996).