

2001 SEA TURTLE SUMMARY BREEDING AND STRANDING ACTIVITIES CAPE HATTERAS NATIONAL SEASHORE

Part 1 - Breeding Activity

Cape Hatteras National Seashore (CAHA) beaches were patrolled daily between June 1 and September 1, 2001 in search of turtle crawls. CAHA volunteers, Student Conservation Association volunteers and CAHA staff conducted patrols. Approximately 55 miles were monitored each day on Bodie, Hatteras and Ocracoke Islands.

Nest Composition and Distribution

Seventy-five confirmed nests were located in 2001 (Table 1). Sixty-three nests (84%) were found on Hatteras Island, 12 nests were found on Ocracoke Island (16%), and no nests were located on Bodie Island. Hatteras Island had one more recorded nest than last season, Ocracoke had ten less, and Bodie Island remained the same (none). The first known nest of the season was found on May 28 and the last nest was laid on August 26. This season was the fifth-highest season on record since extensive monitoring began in 1987 (Chart 1, Table 2).

Two species of sea turtle were known to have nested on CAHA beaches in 2001. These included 73 loggerhead nests (*Caretta caretta*) and two green nests (*Chelonia mydas*) (Table 1). This is the seventh year green turtle nests were recorded at CAHA in the past twenty-one years.

Nests were documented by patrols surveying the beaches beginning at dawn each day. However, there were two instances where CAHA staff was informed of unrecorded nests. On one occasion, a NPS lifeguard reported finding approximately 30 eggshells at the tide line just south of the groins at Lighthouse beach. It is believed that this nest was laid before turtle patrols began on June 1, hatched and not discovered until the eggs were exposed by erosion. In the other case, a visitor reported a nest that had been overlooked by morning patrols on June 30th. This nest was located the next day .8 miles south of Frisco Pier and protected as all others.

Treatment

Beaches used for most nest relocations were 1) Hatteras Lighthouse beach and 2) Haul Over ocean beach. Several nests, however, were relocated in areas other than the above locations closer to the original nest sites. In general nest relocation has been discouraged the past two seasons under recommendations of the North Carolina Wildlife Resources Commission (NCWRC) and the U.S. Fish and Wildlife Service (USFWS); therefore, nest relocation was confined to nests that might be threatened by erosion or overwash.

In a situation where eggs were believe present but could not be found, the activity was categorized as a "dig". Rather than abandoning the site because staff could not locate eggs (recognizing the possibility of human error), these sites were treated exactly like nest sites, with all information recorded, poles labeled, and transponders inserted underground. A total of four digs were recorded. All four digs were confirmed to be nests when hatchling activity was discovered or if eggs were located afterward. It should be noted that these dig sites have been included in the nest numbers and calculations.

Forty-three nests (57%) were protected at the original site where found and 32 (43%) were relocated (Table 3). More specifically, 29 nests (46%) were relocated on Hatteras Island and 3 (25%) on Ocracoke Island (Table 2). Of the 32 relocated nests, 23 (72%) were moved because of natural factors, 7 (22%) due to potential human disturbance, and 2 (6%) because both human and natural factors threatened the nest. Nests were relocated due to high erosion rates, close proximity to the tide line or to an unstable, escarped dune line. Many of CAHA beaches are narrowing since the artificial dune line is preventing natural overwash which would create additional beach habitat. CAHA staff attempts to leave nests in place, even within ORV areas, if the site appeared to be suitable habitat. A common human factor causing relocation occurs when nests are located within a mile of a fishing pier. Piers emit light pollution attracting hatchlings, which fall prey to fish that congregate near piers. The Resource Management Division has submitted recommendations to the superintendent that would decrease light pollution generated by the three fishing piers. The piers are CAHA concessions and operate under permits. Management at Avon Pier is working with CAHA Concessions and Resource Management Specialists in modifying their fixtures to be more "turtle friendly". The groins in Buxton are artificial structures causing relocation of nests laid in that area. The beaches around the groins are very susceptible to sudden shoreline changes.

Hatching Success

All nests were examined to determine productivity rates. Nests were excavated at a minimum of 72 hours after hatching events. In cases where hatching events or dates were unknown, nest cavities would be unearthed 80-90 days after the laying date. A total of 3,575 known eggs hatched. Of these, 3,361 hatchlings emerged from the nest cavities. The season's overall hatching success at CAHA in 2001 was 42% (Table 4). Individual nest success ranged from 0% to 98%.

Overall in CAHA, relocated nests had a 56% hatch success while non-relocated nests had a 31% hatch success rate (Table 4). It is vital to state that the low percentages are not directly related to the non-relocation of nests, and these percentages are not to suggest that relocating nests increases hatching success. Hatch rates could most often be correlated with frequency of overwash and/or sand deposition.

Nest Protection

Any single nest left in place or relocated to another site was protected by an approximately 30'x30' posted closure during the incubation period. Fifty-five days into incubation, these small closures were expanded to the surf line and to a width of 150'-300' parallel to shoreline. Opposite to the surf line on the upper end of the enclosure, the closed area was expanded to a minimum of 50' duneward from the nest. If present, all vehicle tracks were smoothed over manually with rakes or with a steel mat attached to an ATV, so as not to impede hatchlings attempting to reach the surf. In several cases silt fence was used behind nests nearing hatching dates. Fencing was used to block light pollution from the villages and as an added safeguard in ORV areas. Larger signs were posted to notify drivers that the established closures included the surf line at all tides. Interpretive signs warned how vehicle traffic could harm eggs and hatchlings. Traffic detours behind the nest area were clearly marked with signs and reflective arrows. There were eight of these partial closures in ORV beaches in 2001. Once ORV tracks became well established along the detour route, compliance was high. Pedestrians often walked through the closure along the ocean's edge but footprints were seldom seen above the tide line. Signs were removed after the excavation of the nest was complete, but no earlier than 72 hours after hatching occurred.

In the 2001 season there were eight nest sites requiring dune to surf closures during the expected hatching period in ORV designated beaches. These complete closures excluded all ORV traffic from dune to ocean at a width of 200'-300' parallel to shoreline. These temporary closures were necessary due to the nest

location on the upper beach or in the dunes. There was not enough room between the nest and the dunes for ORV traffic to pass behind the nests. These areas were well posted and large signs warned visitors at ORV ramps of "No through traffic to the next ramp". Two of these eight nests received heavy overwash and sand deposition from storm tides. The nests were excavated as the close dates approached to examine egg condition. Both nests had an additional 3'-4' of sand deposited over the egg chamber. Eggs from one nest were in a state of arrested development and no longer viable. Coloration and condition of eggs from the other nest appeared to be good and were relocated to a non-ORV beach. Full beach closure for these two nests was not necessary. A third nest, located in front of Rodanthe village, required full closure only if the beach was reopened to ORV traffic on its scheduled date of September 10th. Nest hatch date and the reopen date for ORV traffic were close enough to each other that Protection Rangers for the district kept the beach closed to ORV's until hatching occurred. Five nests between ramps 23 and 38 were closed as scheduled. ORV violations were documented at each of these sites. ORV's frequently passed in front of the nest site at the low tide mark. On four separate occasions ORV's drove around signs posted at the dune line, over dunes and vegetation, and through a nest site. ORV's gave little to no compliance at a nest site south of Avon Pier. Several ORV's drove through the area at low tide on a daily basis, breaking string and signposts, and creating deep tire ruts. Daily maintenance was high at this site replacing signs and smoothing out ruts.

In the past a relocation area located near mile 32 on Hatteras Island was maintained as a complete closure to traffic during the hatching period. This area was not used this year as most nests were not relocated or relocated nearby the original nest location. Again efforts were made to leave nests in place as USFWS and NCWRC recommended.

The public was notified of closures that would temporarily limit ORV traffic. A press release was sent to local and regional newspapers. Local tackle shops and ORV organizations were contacted when closures were established or reopened. A notice explaining that commercial fishing activities were not allowed in any of these posted areas were given out with annual commercial fishing permits. In addition, volunteers were stationed at some nests nearing hatching dates to protect emerging hatchlings and educate people in the vicinity.

False Crawls

A total of forty-nine false crawls were found during the 2001-breeding season (Table 5). Of these, twenty-eight (57%) were found in areas open to ORV use. Six false crawls (12%) were located in heavy day use areas such as lifeguard beaches and other sites serviced by parking lots. Five (10%) false crawls were on beaches adjacent to village development, and two (4%) were located in areas within one mile of a pier. It should be noted that the pier areas are also in the vicinity of village beaches, in Rodanthe, Avon, and Frisco, but were included in the pier data group. The remaining eight (16%) were found on beaches which did not fall into the previous mentioned categories and thus had lower concentrations of human activity. The highest percentage of false crawls (69%) occurred on Hatteras Island.

Factors Influencing Nest Success

The dynamic nature of CAHA beaches affected many nests this year. Although spared from the direct force of hurricanes this season, the offshore passing of hurricane Aaron along with other weather related events took a toll on nests. A low-pressure systems coupled with new moon tides at the end of July and beginning of August caused frequent overwash, erosion, and sand deposition to several nests. Three nests were completely lost to erosion during this time. Another event began September 10th with the offshore passing of Hurricane Aaron and continued through September 20th with back to back low-pressure systems. Nests remaining during this time once again were effected by overwash, sand deposition, and

erosion. Some nests remained underwater for extended periods of time, while others received 2'-4' of sand deposition. Eight nests were completely washed out in the 10 days of this storm event. Most nests receiving overwash and sand deposition did not hatch. When excavated, eggs were found to be infertile or in a state of arrested development.

Aside from storm activity, this season's turtle nests were targeted by red fox (*Vulpes vulpes*). The first documented instance of fox predation on a sea turtle nest within CAHA was in 1999 at Bodie Island. Reports of red fox on Hatteras Island did not surface until the winter of 2000-2001. The summer of 2001 documented fox tracks 33 times within posted nest closures. Animals were seen nine times within closures. The sightings increased as estimated hatchlings dates approached. The first nest to be disturbed was dug into on two consecutive nights. Forty to forty-five eggs were broken into and contents of most consumed. A wire screen was then anchored over the remaining eggs. None of these successfully developed likely due to bacterial or fungal growth from traces of albumen and yolk that seeped down into the cavity before damaged eggs were removed. A second nest adjacent to the depredated nest was also screened. After discussions with Dave Allen and Steve Johnson of the NCWRC, it was decided not to immediately screen all nests in the vicinity. It was possible that just a single fox passing through the area may have been responsible. Nests were monitored to see if a pattern appeared. No other fox problems arose until nests approached the hatching window. In mid-August, the second nest that had been previously screened was targeted. On two consecutive nights, fox apparently dug through the screen. The 2" x 4" openings in the screen limited the depth of digging. The disturbance was too shallow to penetrate the nest chamber. Since this occurred within a few days of the expected hatch date, it is unknown if some hatchlings were scooped out and consumed as they dug towards the surface. Within a few days fox dug up a second nest as the hatchlings emerged. Fox and turtle tracks covered the ground near the nest chamber. No turtle tracks appeared to reach the surf line; no dead hatchlings were found. Another nest, approximately a week from its anticipated hatching period was completely dug up and all eggs consumed. Based on predator trails leading to and from the nest, it appeared that three to five fox were involved. Attempts were then made to screen all nests along a three-mile stretch of beach as they neared estimated hatching dates. Two nests containing developing eggs were destroyed while five others were dug into but the screen reduced damage. Three nests had known depredation of hatchlings. On three separate occasions one to two fox moved into the closures as volunteers were monitoring hatching events. Attempts to scare away predators were not highly successful. However, the volunteers were able to protect most of the hatchlings as they crawled to the surf.

CAHA has little information on localized impacts of ghost crab predation. Ghost crab burrows were observed near some nest cavities this season. Hatteras Island had five documented cases of ghost crab presence in or on top of nest areas, while Ocracoke reported two. In one case on Ocracoke, a total of 20 eggs were found in two ghost crab tunnels that penetrated directly into the nest cavity. On Hatteras Island one dead and two live hatchlings were found in or near ghost crab holes, and there was one observation of a crab dragging an injured hatchling down the beach.

Human Disturbance

It is unknown how often nesting attempts are aborted due to human disturbance. In the 2001 breeding season there was one reported incident where visitors disturbed a turtle. The female turtle came ashore by Avon village where she was spotted and surrounded by people with flashlights. The turtle retreated into the ocean without laying eggs. Since there is an increase in many types of visitor use after dark, other cases of human disturbance likely occurred but went unreported. Beach fires are more frequently seen, especially near the villages, day use areas, campgrounds and ORV ramps. These are a source of artificial light known to disturb nesting females and attract emerging hatchlings. Fires that were not in compliance with CAHA regulations (relative to distance from dunes and tide lines) were documented again this

summer. Numbers reveal a dramatic increase of this activity within CAHA. Between April 29 and August 30, 2001 a total of 773 beach fires were documented. More specifically Hatteras Island recorded 672 fires, Ocracoke Island documented thirty-eight, while Bodie Island had sixty-three. This, in comparison to the 174 beach fires recorded in 2000, shows a 77% increase in this activity. Beach fires remains are a hazard to visitors as well as turtles. Large smoldering pits containing broken bottles, burnt cans, and nails from burnt lumber were commonly left behind. Fireworks are sold locally and are commonly used, although illegal, on CAHA beaches. ORV's are permitted to operate on CAHA beaches after dark.

On two occasions attempts were made to disturb egg chambers on Hatteras Island. In the first case, a mother was standing outside of a turtle closure while her son was digging inside. When approached by a volunteer, she explained she wanted her son to see what turtle eggs looked like. In the second case, human footprints and digging were found inside a turtle closure but only after the people had left. No damage was found to the nest or eggs in either incident. All sites were clearly marked with signs. In four separate occasions, signs posted to protect nests were intentionally pulled out of place, stolen, broken, and/or turned in such a way that other visitor would not be able to read them. On four additional occasions, strategically placed poles used to help staff relocate nest cavities were removed.

Most pedestrians respected the posted areas. Ninety-two incidents of human tracks were documented. Numbers of tracks recorded in each case varied from one to "heavy pedestrian traffic". In addition to these reports, there were three instances where people were observed utilizing the closures. On two of these occasions, surfers were observed leaving their belongings within the closure boundaries while they were in the water. On the third occasion, sunbathers were discovered within the nest closure.

As in previously discussed cases, many but not all beach drivers respected marked turtle areas (See Nest Protection). In total, 102 sets of vehicle tracks were noted within closures, often along the tide line. This is likely a conservative number since observers were not present at all sites at all times. Additionally, evidence of tire tracks washed away with each high tide. ORV's drove through areas where signs clearly marked established detours behind the closures. Most ORV's drove in front of the nest areas during periods of low tide. Signs could not be placed in the low tide area, since they would wash away with the approach of each high tide and accompanying waves. Signs placed at the high water mark did state the surf line was closed at all tides and were interspersed with reflective arrows to detour traffic behind the nest. Also, PVC pipes were driven into the sand from the signs to the low tide line and marked with string and flagging emphasizing the tidal closure. A nest site in Avon Village requiring a full beach closure received daily violations. It is unknown if hatchlings were caught in tire tracks or if passing vehicles drove over any. In addition, there were at least six documented incidents of vehicles breaking through the posted areas well above the high tide line, and four incidents documenting ORV's driving directly over nests. There were 146 cases reported of property damage to signs, posts and twine.

One crawl was so obscured by ORV tracks that staff had difficulty locating the body pits and nest cavity. Tire tracks were less than one foot away from the egg chamber. Either the ORV's were driving at night or early morning, before the patrol was able to reach the site. Nests are likely missed each year hidden by vehicle tracks or in some cases heavy pedestrian tracks.

Artificial lights have misdirected hatchlings in past seasons. Filter fencing is used to block lighting from villages, piers, and areas of high nighttime ORV use. With an increase in nighttime activities and village development, the use of this filter fence is becoming more and more common. Fencing is often buried and/or removed by high tides and strong winds and often damaged in the process. The use of filter fencing requires daily maintenance of the site. Maintenance is time consuming. Often it required entire sections of fencing to be unearthed and repaired before being put in place again.

Dog/Cat Disturbance

Dog tracks were documented within closures on 60 different occasions. In one case, dog tracks were documented along side turtle tracks on an aborted nesting attempt on Ocracoke. It is unknown if the dog was present when the turtle emerged from the ocean and caused her to return to the water without nesting, or if the dog came upon the turtle tracks after she had already retreated. In addition, there were three occasions where dogs were observed off leash and running through closures. A pet leash law, carrying a \$100 fine, exists at CAHA. The regulation is not consistently enforced in all areas at CAHA. Most dogs on the beach are not leashed or only leashed by their owners as CAHA vehicle approach. Dogs can be a serious threat by digging up incubating eggs. On one occasion both dog and cat tracks, along with dog feces, were found in a closure on the actual hatch day of the nest.

There were 10 separate incidents of cat tracks in turtle nest areas this year. Most were likely feral cats. It is unknown if any hatchlings fell prey to the cat that was present during the hatching event. There was no evidence of disturbance, but cat predation on green turtle hatchlings has been documented off the coast of Australia.

Part 2 – Stranding Activity

In 2001, 69 stranded sea turtles were documented along shores of CAHA (Table 6, chart 2). This represents a 79% decrease from last year's record high of 332 stranded sea turtles. Annual totals between 1996 and 1998 fell between 47 and 98 turtles, and increased significantly in 1999 and 2000. This season, strandings decreased on ocean beaches as well as inshore (soundside) beaches. Forty-six (67%) turtles were recovered from the ocean beach and 23 (33%) on the soundside. Hatteras and Ocracoke reported the highest stranding numbers. Stranding totals on CAHA shores were identified as; 41 (59%) loggerhead, 11 (16%) green, 11 (16%) Kemp's ridley, 4 (6%) leatherback, and 2 (3%) unknown.

Three turtles (4%) were alive when discovered. They were transported to Roanoke Island Animal Hospital. Veterinarians make health assessments and if possible the animals are transported to holding tanks at the North Carolina Aquarium on Roanoke Island. Network for Endangered Sea Turtles (NEST), a volunteer group based in Nags Head, NC, cares for them until released. Two of these animals were victims of hypothermia when sound side water temperatures suddenly plummeted in response to a cold front in the early winter. The third stranding was due to unknown causes. Once recuperated, the U.S. Coast Guard releases the animals in the Gulf Stream.

Sixty-six (96%) turtles were dead when found. Though carcasses were found throughout the year, there were two peaks occurring in the spring/early summer and fall. The first occurred between the months of May and July. Twenty-eight stranded sea turtles were documented during this time. This is a significant decrease in comparison to over 270 reported during the same time in 2000. The National Marine Fisheries Service (NMFS) enacted new regulations for this season's offshore monkfish (*Lophius americanus*) fisheries. Fishery biologists concluded that the northbound turtle migration encountered a "wall" of cold water off Cape Hatteras in 2000. This caused turtles to concentrate in the area and many became entangled in monkfish nets set off the coast. The new regulations changed the latitude in which the fisheries could operate to ensure the nets would not again interfere with the turtle migration. CAHA staff has documented stranding events in the spring to early summer for five consecutive years. The episode in 2000 was the largest. The second peak occurred over the three-month period between October and December where thirty subadults stranded, seventeen (57%) on inshore beaches and thirteen (43%) on ocean beaches. This is in comparison to eighty strandings documented in 2000. During this time CAHA

staff and NCWRC sea turtle biologists conducted soundside beach surveys for turtle strandings. For the second consecutive year biologists worked in cooperation with NMFS to monitor the fall flounder fisheries impacts on sea turtles. This was in response to high numbers of strandings that occurred during the fall of 1998 and 1999. A ban on using deep-water gill nets was adopted in the fall of 2001, in attempts to reduce sea turtle by-catch and mortality. Similar to the past three years, most strandings during this period in 2001 were found on Hatteras and Ocracoke Islands. Cold stunning was responsible for some of the strandings when water temperatures suddenly dropped in mid-December. Composition of the thirty strandings during this period was; fourteen (47%) loggerheads, eight (27%) Kemp's ridley, eight (27%) green, one (3%) leatherback, and one (3%) unknown. The decrease in strandings during this time period may be attributed to net restrictions established this year before flounder season opened.

Part 3 - Conclusions and Recommendations

Breeding Activity

Breeding activity was fairly active this season. Hatching success was impacted by two coastal storm systems, one of which was an offshore hurricane, and fox predation. False crawls constituted 40% of sea turtle activity this season. It is unknown how many nesting attempts were aborted due to natural or human disturbances.

Narrow beaches are becoming increasingly common. The presence of artificial dune lines within CAHA inhibits natural overwash processes. Future storms and rising sea levels will eventually push back the man-made dunes, creating nesting habitat. Until then, beaches will continue to erode towards the artificial dune line resulting in a decrease of suitable nesting habitat. Quality habitat will not develop in areas where North Carolina Department of Transportation (NCDOT) continues to rebuild and maintain the existing dunes for Highway 12 protection. Quality habitat will not develop where natural processes such as overwash are stopped. A sound side causeway and other options need to be considered that will preserve the natural processes needed for breeding and germination and reduce the rebuilding of Highway 12 after overwash events.

Red fox predation was a large threat to turtle nest success for the first time in 2001. Nest protection devices were implemented, as the problem became more evident. Protection of nests by anchoring a flat screen with 2" X 4" openings limited the depth a fox could dig, but did not deter digging all together. While not possible to penetrate the egg chamber through the screening, fox may have been able to capture hatchlings as they dug towards the surface. Additional methods of nest protection should be researched and utilized to determine which is best suited for CAHA beaches. Removal of red fox should be seriously considered, especially while the population is still small on Hatteras Island. Such actions taken to protect threatened and endangered sea turtles are in agreement with NPS Management Policies and CAHA's predator control policy. In addition, research efforts on fox behavior and their movements within CAHA should be emphasized.

CAHA is reducing the number of nests relocated due to potential human disturbances. Though ORV driver compliance was fairly good, there were still a significant amount of drivers who disregarded the posted closures. Violations were most common in high ORV use areas where closures temporarily restricted through traffic. Many closures had to be maintained longer than expected due to prolonged incubation periods. Nests in high visitor use sites need to be closely monitored to protect eggs and hatchlings. This aspect has been improved with a Biological Science Technician working throughout the nesting season and with the addition of "nest watch" volunteers. Site closures may need to be modified or enlarged to better serve their purpose. Law enforcement presence needs to be increased. Public educate

the through the media should continue. In the 2001-breeding season, three press releases about the sea turtle program were issued to local and regional newspapers. Local bait and tackle shops were notified of all beach closures and any changes in these closures. Nighttime activities potentially impacting breeding activities need to be continually examined at CAHA. These include beach driving, village light pollution and campfire activity.

Stranding Activity

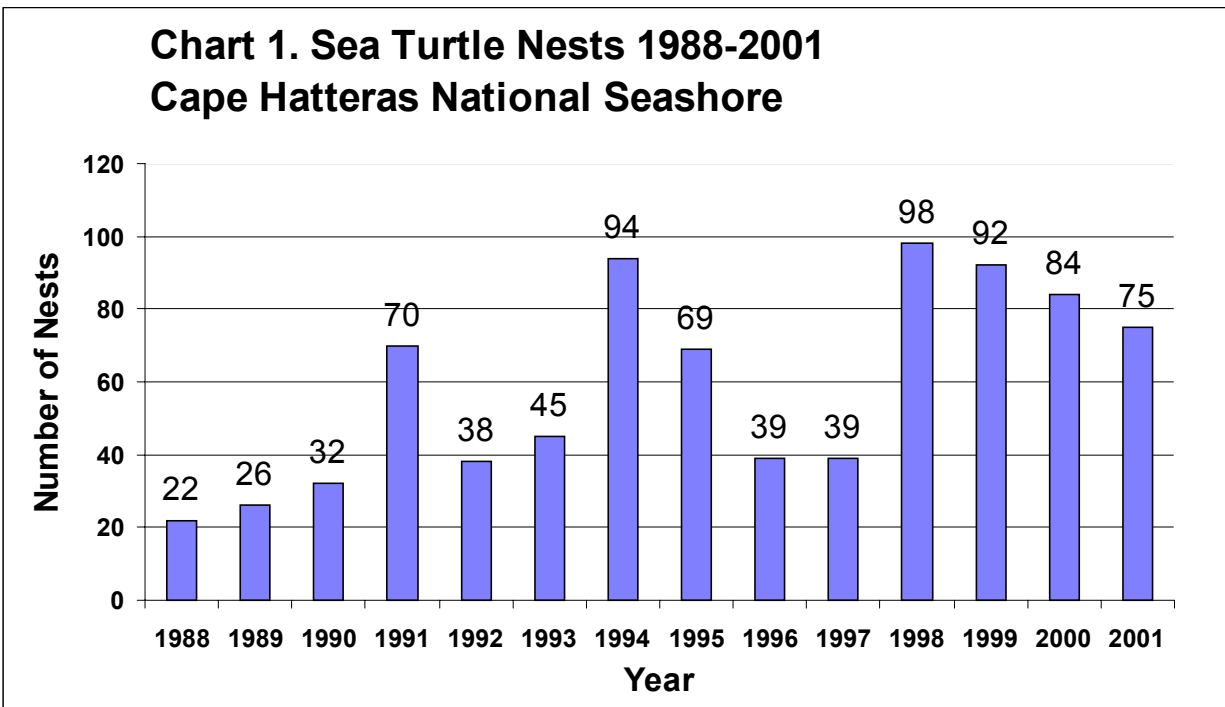
For the past several years, turtle mortality has been high at CAHA compared to other North Carolina sites. While stranding numbers decreased this year, it is likely many strandings on the soundside go unreported due to limited accessibility. NCWRC Stranding Network volunteers were of great assistance to CAHA staff. Efforts this year and in past years, while appreciated, fail to monitor large sections of the sound side habitat to document threatened and endangered sea turtle strandings. Sick and injured animals rescued are often successfully rehabilitated. Valuable information, from rehabilitated turtles, is collected and made available to other Federal and State agencies responsible for the protection and recovery of these species. We must continue to increase our efforts to fulfill our responsibility for preservation of endangered species.

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**Table 1. 2001 Sea Turtle Nests
Cape Hatteras National Seashore**

Species	# of Nests
Loggerhead	73
Green	2
Total	75

**Chart 1. Sea Turtle Nests 1988-2001
Cape Hatteras National Seashore**



**Table 2. Sea Turtle Nests 1987-2001
Cape Hatteras National Seashore**

1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
11	22	26	32	70	38	45	94	69	39	39	98	92	84	75

**Table 3. 2001 Relocated Nests
Cape Hatteras National Seashore**

	Total for CAHA	
Relocated nests	32	43%
Non-relocated nests	43	57%
Total	75	

	HATTERAS ISLAND	
Relocated nests	29	46%
Non-relocated nests	34	53%
Total	63	

	OCRACOKE ISLAND	
Relocated nests	3	25%
Non-relocated nests	9	75%
Total	12	

	BODIE ISLAND	
Relocated nests	0	0%
Non-relocated nests	0	0%
Total	0	

**Table 4. 2001 Hatch Success
Cape Hatteras National Seashore**

	# of Nests	Hatch Success (%)
Relocated Nests	32	56
Non-Relocated Nests	43	31
Total Nests	75	42

**Table 5. 2001 Number of False Crawls by Area Type
Cape Hatteras National Seashore**

Area Type	# of False Crawls
ORV use	28
Day use	6
Village	5
Pier	2
Other	8
Total	49

ORV use - beaches opened to off road vehicles

Day use - beaches adjacent to day use parking lots (also used after dark)

Village - beaches bordering village development

Pier- areas within one mile on either side of a pier

Other - beaches on which there is not a high volume of human activity

**Table 6. Sea Turtle Strandings 1996-2001
Cape Hatteras National Seashore**

Year	Stranding Totals	Species Composition*					Location	
		CC	LK	CM	DC	uk	Oceanside	Soundside
1996	47	26	8	10	3			
1997	98	64	17	10	3	4	62	36
1998	85	45	25	12	2	1	53	32
1999	226	149	55	22	0	0	138	88
2000	332	226	31	43	2	2	245	87
2001	69	41	11	11	4	2	46	23

*

CC = Loggerhead

LK = Kemp's ridley

CM = Green

DC = Leatherback

uk = unknown

**Chart 2. 2001 Sea Turtle Strandings
Cape Hatteras National Seashore**

