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Kemp's Ridley Sea Turtle Nesting Increasing in Texas

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Introduction

The critically endangered Kemp's ridley sea turtle (*Lepidochelys kempii*) has been the subject of intensive, long-term population restoration efforts. Most Kemp's ridley nesting occurs in the vicinity of Rancho Nuevo, Tamaulipas, Mexico (Márquez et al. 1982). In 1947, an estimated 40,000 adult females nested at Rancho Nuevo on one day (Hildebrand 1963). The Mexican government initiated protection efforts at the Rancho Nuevo nesting beach in 1966 (Márquez 1970), but the nesting population had been depleted and continued to plummet. By 1977, it was feared that the Kemp's ridley would become extinct within a few years unless immediate further steps were taken (Carr 1977).

A binational, multi-agency experimental project was initiated in 1978 to aid in the recovery of Kemp's ridley turtles by increasing nesting and re-establishing a nesting colony of this native species (Werler 1951; Hildebrand 1963; Carr 1967) at Padre Island National Seashore, located on North Padre Island, Texas, USA (Shaver 1989, 1990; Shaver and Miller 1999). It was thought that this nesting colony could provide a safeguard for the species, so that if a political or environmental catastrophe occurred in Rancho Nuevo, there would be an area in the USA where this species could nest and be protected.

Based on the strong nest site fidelity of adult females, Carr (1967) and others suggested that marine turtles might "imprint" to, and nest on, their natal beach. Attempts were made to experimentally imprint Kemp's ridley turtles to Padre Island National Seashore in hopes that they would later return to nest. During the period 1978–1988, 22,507 eggs were collected at Rancho Nuevo for experimental imprinting to Padre Island National Seashore by exposure of the eggs to the local sand and exposure of the resulting hatchlings to the local sand and surf. Experimentally imprinted turtles were transferred to the National Marine Fisheries Service Laboratory in Galveston, Texas, for rearing in captivity ("headstarting") in an attempt to increase their likelihood of survival after release and to enable tagging for future recognition (Fontaine et al. 1985; Fontaine and Shaver, in press). During the period 1979–1989, 13,211 headstarted yearling turtles from this project were released, most into the Gulf of Mexico off South Texas (Caillouet et al. 1995; Shaver, in press). An additional 300 headstarted turtles from this project were released after 2–16 years in captivity. Additionally, 10,198 headstarted yearling turtles that had been obtained as hatchlings from Rancho Nuevo in 1978, 1979, 1980, 1983, and 1989–2000 were released (most off Texas), with the objective that they would return to Mexico to reproduce (Caillouet et al. 1995; Shaver, in press; Higgins, pers. comm.).

The purpose of this paper is to describe detection efforts for Kemp's ridley nests on the Texas coast, records of nesting by turtles from the experimental imprinting and headstarting projects, and nesting trends in Texas.

Methods

Kemp's ridley nesting was detected through opportunistic reports from the public and directed searches. Efforts to detect and protect nesting Kemp's ridley turtles and their eggs on North Padre Island, and to determine results of the experimental imprinting and head-starting projects, began in 1986 (Shaver 1990). During the period 1986–2004, patrols were conducted along the entire 128 km Gulf of Mexico shoreline of North Padre Island, including 104 km within Padre Island National Seashore and 24 km north of the national seashore's north boundary. Patrols were conducted during daylight hours from about April through July. During patrols, the shoreline was searched for emergent turtles or their tracks. Mostly four-wheel drive trucks were used for patrols during the period 1986–1992 and mostly all-terrain vehicles during 1993–2004. Patrol effort increased over time (Shaver, in press). During 1986–1994, the entire North Padre Island target patrol area was covered from 2–5 days each week. During 1995–1997, the entire area was covered 7 days each week. During 1998–2004, the entire area was repeatedly traversed each day. This repeated coverage increased the likelihood of observing nesting females and locating their eggs.

During 1986–1998, North Padre Island was the only area on the Texas coast specifically patrolled to detect nesting sea turtles. However, repeated daily patrols were also conducted on South Padre Island beginning in 2000 and on Boca Chica Beach beginning in 1999.

Educational programs alerting beach visitors to report nesting Kemp's ridleys were implemented at Padre Island National Seashore in the mid-1980s and later expanded Texas coast-wide (Shaver 1990; Shaver and Miller 1999), to encourage the public to report sightings.

Whenever possible, Kemp's ridleys that nested in Texas were examined for the various tags used to mark turtles released from experimental imprinting and headstarting. Unfortunately, only some of the nesters were examined, since many re-entered the water before biologists arrived. Nesting turtles that were observed by biologists were marked with metal and passive integrated transponder tags.

The origins of Kemp's ridleys nesting on the Texas coast were categorized as “headstart that was experimentally imprinted to Padre Island National Seashore,” “headstart that had been obtained from Mexico as a hatchling,” “wild stock,” or “unknown.” Turtles were deemed to be headstarted if they possessed a living, coded wire, passive integrated transponder, and/or metal tag linking them to headstarting. Age of headstarted turtles was calculated based on year-class identified by the tag and nesting date.

Attempts were made to locate nests at all locations where nesting Kemp's ridleys or their tracks were found and reported in Texas. Kemp's ridley nests were classified as confirmed when biologists observed or examined photographs of either the eggs or emerging hatchlings to document reproduction, and either the nesting turtle or hatchlings to identify species.

Kemp's ridley nests found in Texas since 1978 were protected to enhance recruitment and thereby aid the program to re-establish a nesting colony. Of the 174 clutches located on the Texas coast during the period 1979–2004, five incubated *in situ* (at the nest site) on North Padre and Mustang Islands, 22 were transferred to corrals (screen enclosures) on South Padre Island and Boca Chica Beach, and 147 were packed into Styrofoam boxes and

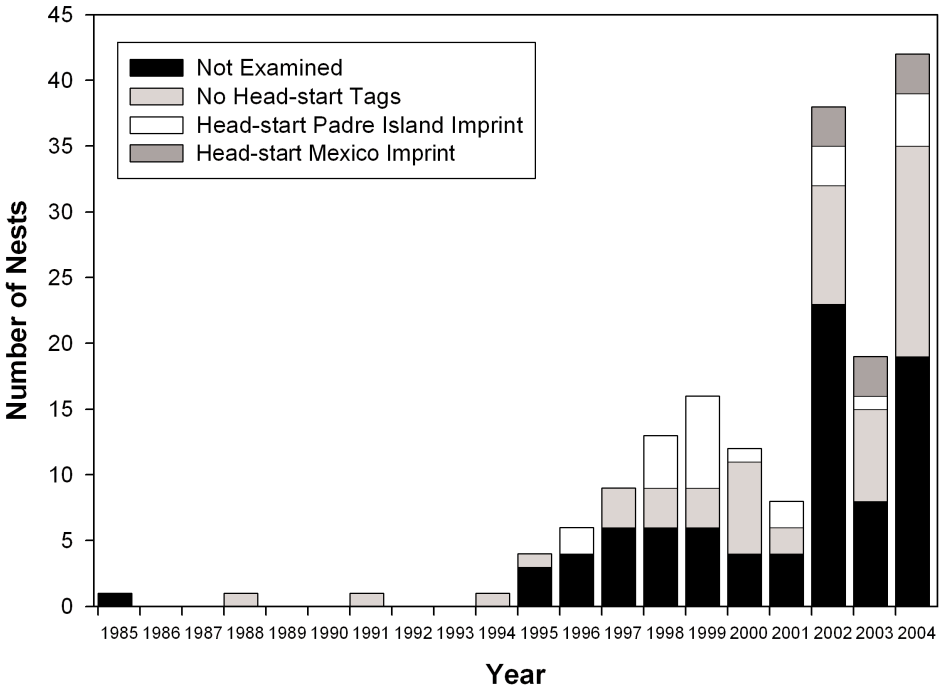
transported to an incubation facility at Padre Island National Seashore. Most hatchlings were released on the beach at the incubation sites without marking or retrieval in the surf, but hatchlings from one clutch were released on the beach at Padre Island National Seashore, recaptured after release, and transported to the National Marine Fisheries Service Laboratory for headstarting.

Results and discussion

Confirmed nests in the USA. Most Kemp’s ridley nests confirmed in the USA were found in South Texas during recent years. A Kemp’s ridley nest found at Padre Island National Seashore in 1948 was the first confirmed for this species in the USA (Werler 1951). During the period 1948–2004, 180 Kemp’s ridley nests were documented on the Texas coast (Shaver and Caillouet 1998; Shaver, in press). Other possible nests were reported, but could not be fully documented. Additional nests likely went unnoticed, particularly on stretches of beach that were difficult to travel and sparsely visited or patrolled.

One hundred seventy-one of the 180 nests were found between 1985 and 2004, with an overall increase beginning in 1995 (Shaver 1995, 1996a, 1997, in press; Shaver and Caillouet 1998; Shaver and Miller 1999; see Figure 1). The increase in the number of detected nests during that time may have reflected increased nesting, improved detection efforts, increased awareness and reporting by the public, or a combination of all of these factors.

Figure 1. Number of confirmed Kemp’s ridley nests found on the Texas coast, 1985–2004.



One hundred seventy of the 180 nests were found in south Texas and the remaining 10 on the upper Texas coast. During the period 1948–2004, more confirmed Kemp’s ridley nests were located at Padre Island National Seashore than at any other location in the USA (Shaver 1992; Shaver, in press; Shaver and Caillouet 1998).

During the period 1989–2004, only 20 Kemp’s ridley nests were documented at locations in the USA outside of Texas (Shaver, in press). Bowen et al. (1994) suggested that these nesting turtles could have been from the Texas imprinting project, since there were no previous confirmed records of Kemp’s ridleys nesting in these other regions, but there is no evidence from tag returns to support this hypothesis.

Nesting by project turtles. Experimentally imprinted and headstarted Kemp’s ridley turtles were documented nesting on the Texas coast and near Rancho Nuevo, but a variety of factors possibly limited records and assessment of project results. Of the 171 Kemp’s ridley nests found in Texas since 1985 (when headstarted turtles could have been mature and able to nest), nesting turtles were examined for tags at 89 of the nests (Figure 1; Shaver and Caillouet 1998; Shaver, in press). At 56 of those 89, the turtles did not possess any tags linking them to headstarting. However, 24 of the nests were conclusively linked to headstarted turtles experimentally imprinted to Padre Island National Seashore (Shaver 1996a, 1996b, 1997; Shaver, in press; Shaver and Caillouet 1998). Thirteen different turtles laid these 24 clutches. They represented five year-classes (1983, 1984, 1986, 1987, 1988) and ranged from 10 to 18 years of age when first detected nesting. The 24 nests were found in South Texas at Padre Island National Seashore (n=15), North Padre Island north of Padre Island National Seashore (n=4), and Mustang Island (n=5).

Eight headstarted individuals that had been obtained from Rancho Nuevo as hatchlings were documented laying nine clutches in Texas during 2002–2004 (Figure 1). The individuals were from four year-classes (1989, 1991, 1992, 1993) and were 10–15 years of age when first detected nesting. The nine nests were found statewide, including on Padre Island National Seashore (n=5), Galveston Island (n=3), and Bolivar Peninsula (n=1).

More headstarted turtles might have been detected nesting in Texas had the turtles from the earliest year-classes received living and coded wire tags. Some of the examined turtles that lacked project tags could have been members of the earliest year-classes, released without living and coded wire tags (Shaver 1998a). Also, more headstarted turtles might have been detected nesting had patrol efforts been more comprehensive on North Padre Island (Shaver and Fletcher 1992) and elsewhere in South Texas. Additional patrol effort would have increased opportunities to check the unexamined nesters for tags and perhaps locate other nestings that went undetected. Nesting observations were also likely limited by mortality of these turtles in the marine environment. Virtually all of the turtles imprinted to Padre Island National Seashore were released before mandatory usage of turtle excluder devices, designed to reduce mortality of sea turtles due to incidental capture in shrimp trawls.

The number of observations of headstarted turtles nesting in Texas also may have been limited by these turtles nesting elsewhere. However, only two Kemp’s ridley turtles that nested in Mexico or elsewhere in the USA from 1985 through 2004 were conclusively found to possess tags that connected them to headstarting. One experimentally imprinted to Padre Island National Seashore from the 1987 year-class was observed nesting at Rancho Nuevo

in 1998 (R. Márquez, pers. comm.). One turtle obtained from Mexico as a hatchling in 1989 nested twice in Mexico during 1999 (J. Peña, pers. comm.).

Origins of Kemp's ridleys nesting in Texas. Based on tag returns through 2004, Kemp's ridleys currently nesting in South Texas are a mixture of headstarted turtles experimentally imprinted to Padre Island National Seashore, headstarted turtles that were obtained from Rancho Nuevo as hatchlings, and turtles from the wild stock, with varying degrees of nest site fidelity and some wild individuals nesting both in Mexico and South Texas. In contrast, Kemp's ridleys nesting on the upper Texas coast are headstarted individuals that were obtained from Rancho Nuevo as hatchlings. However, more years of data collection are needed to investigate if these trends continue.

Mortality of adult Kemp's ridley turtles in South Texas waters may have reduced nesting on South Texas beaches. Sea turtles found stranded (washed ashore, alive or dead) on USA shores have been documented by the Sea Turtle Stranding and Salvage Network since 1980 (Shaver 1998b; Shaver, in press). During every year from 1986 to 2003, more adult Kemp's ridleys were found stranded in Texas (most dead) than in any other state in the USA (Shaver, in press), even though adult Kemp's ridleys forage in, and migrate through, nearshore waters of several other USA states (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992; Turtle Expert Working Group 1998; Shaver, in press). Most found on South Texas Gulf beaches were located during times when Gulf waters were open to shrimp trawling (Shaver, in press). Texas Parks and Wildlife Department regulations, passed in August 2000 to help sustain the shrimping industry in Texas, established a new annual closure of Gulf waters to shrimp trawling off South Texas beaches out to 8 km from shore, from 1 December through mid-May each year, preceding the existing annual Texas Closure, which extends out to 200 nautical miles from mid-May until mid-July each year. This new regulation went into effect on 1 December 2000. It may help protect adult Kemp's ridley turtles in South Texas (Lewison et al. 2003), and may have contributed to the increase in nesting documented in 2002 and 2004 (Figure 1).

The Kemp's ridley population has recently shown promising signs of increase (Burchfield 2003). As the Kemp's ridley population continues to increase and more turtles from the experimental imprinting and headstarting projects, as well as their offspring, reach maturity, it is likely that increasing numbers of Kemp's ridleys will nest in Texas. However, more years of data collection for stranded adult and nesting Kemp's ridley turtles and Kemp's ridley nests in Texas, as well as protection efforts for various life stages, are needed to evaluate the experimental project and Texas Parks and Wildlife Department regulations, and help continue the increase in Kemp's ridley nesting in Texas.

Summary and conclusions

From the late 1940s through the mid-1990s, about one Kemp's ridley nest was documented on the Texas coast every three years, but the number of nests found has increased during the last decade. During the last 50 years, more Kemp's ridley nests have been recorded at Padre Island National Seashore than at any other location in the USA. Kemp's ridleys that nest in Texas today are a mixture of headstarted turtles and others from the wild stock. As the Kemp's ridley population continues to increase and more turtles from the experimen-

tal imprinting and headstarting projects, and their offspring, reach maturity, it is likely that increasing numbers of Kemp's ridleys will nest in Texas. Protection efforts on the nesting beach and in the marine environment should be continued to help ensure future nesting increases in Texas.

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