

## Crossing boundaries to increase nesting by Kemp's ridley sea turtles at Padre Island National Seashore and in South Texas

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### Introduction

The work to increase nesting by Kemp's ridley sea turtles (*Lepidochelys kempii*) at Padre Island National Seashore and in South Texas is a long-term, multi-faceted, and cooperative effort between the U.S. Geological Survey (USGS), National Park Service (NPS), and a variety of other entities in the USA and Mexico. This work has a focal area at the park. However, since Kemp's ridley is a highly migratory species, it has been necessary that these efforts extend well beyond the boundaries of Padre Island National Seashore.

Kemp's ridley is the most critically endangered sea turtle species in the world. Most Kemp's ridleys nest along the Gulf of Mexico coastline in Mexico, near the village of Rancho Nuevo (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992). An estimated 40,000 Kemp's ridley females were filmed nesting at Rancho Nuevo on one day in 1947. Unfortunately, by the time that scientists discovered the location of the Rancho Nuevo nesting beach in the early 1960s, the number of nesting Kemp's ridleys had plummeted.

### Experimental project

In 1978, it was feared that the Kemp's ridley would become extinct within a few years unless immediate steps were taken. A bi-national, multi-agency effort to save this species was initiated to augment the ongoing research and protection program at Rancho Nuevo. Part of the new effort was an experimental project to establish a secondary nesting colony of Kemp's ridley sea turtles in South Texas at Padre Island National Seashore, where some Kemp's ridley nests historically had been detected.

It was thought that establishing a secondary nesting colony there would provide a safeguard for the species, so that if a political or an environmental catastrophe were to occur in Rancho Nuevo, there would be an area in the USA where Kemp's ridleys could nest and be protected.

For the experimental project, attempts were made to imprint Kemp's ridleys to Padre Island National Seashore in hopes that they would return to South Texas as adults to mate and nest. From 1978-1988, Kemp's ridley eggs were collected in Rancho Nuevo, packed into Styrofoam boxes containing Padre Island sand, and shipped to Padre Island National Seashore for incubation (Shaver 1987; Shaver 1989a-b; Shaver and Chaney 1989; Shaver et al. 1989; Shaver and Fletcher 1992). The resulting hatchlings were released on the beach at Padre Island, were allowed to crawl down the beach and enter the surf, and were captured in the surf using aquarium dip nets. The captured hatchlings were shipped to the National Marine Fisheries Service Laboratory in Galveston, Texas, for rearing in captivity for 9-11 months—an experimental procedure termed “head-starting.” Prior to release, each turtle was tagged for future recognition. Tagging methods varied for the different year classes, as new technology developed.

### Detection efforts

The goals of the project now are to determine the results of the above experiment and to foster development of nesting in the area (Shaver 1990; Shaver 1992). The detection program includes extensive public education and outreach to alert beach visitors to report nesting observations—important since visitors report up to half of the Kemp's ridley nests documented on the Texas coast each year.

The detection program also includes daytime patrols via all-terrain vehicles, looking for nesting turtles and their tracks (Shaver 1999; Shaver 2000). A variety of partners are currently cooperating to conduct patrols in south Texas. Patrols began on North Padre Island in 1986. The patrol effort was very limited there prior to 1997 due to a lack of funding, but the effort increased and remained relatively stable during 1998-2000. USGS and NPS staff members and volunteers patrol the entire 128-km length of North Padre Island (including 104 km of Padre Island National Seashore) daily, from at least April through July. Patrols are conducted during daylight hours because Kemp's ridley turtles nest primarily during the day. This area is repeatedly patrolled each day in an attempt to see the nesting turtles, which are only on the beach for 45 minutes during nesting. Observing the nesting turtles enables (1) examination to determine if they are from the experimental project, (2) tagging, and (3) examination for tags to determine nesting chronology. Also, it is much easier to locate the nests for documentation and protection if the nesting turtles are found. Patrols began on South Padre Island in 2000 and on Boca Chica Beach in 1999 and have continued since; these two beaches encompass the area between North Padre Island and the Mexico-USA border.

### Nests found

Through 2000, 14 nests found in south Texas were conclusively linked to turtles from the experimental project (Shaver and Caillouet 1998; Shaver 1999; Shaver and Miller 1999; Shaver, in press). These 14 nests were from nine different nesting females that ranged from 10-15 years of age when their nesting was detected. The nine are a minimum estimate of the number of returnees to South Texas from the experimental project. Unfortunately, many of the nesting turtles re-entered the water prior to examination for tags. Also, some nests were likely missed, especially during years when patrol effort was low.

These nine were the first sea turtles of any species that are confirmed to have returned to nest in an area to which they were experimentally imprinted; the first head-started sea turtles of any species confirmed to have nested in the wild; and the first confirmed nestings in the wild by known, aged Kemp's ridley turtles (Shaver and Caillouet 1998). Only one other Kemp's ridley turtle from the experimental imprinting project has been documented nesting in the wild outside of South Texas, and it was found nesting at Rancho Nuevo. Results from this project are being used to evaluate the experimental imprinting and head-starting procedures used, which could have implications for sea turtle conservation worldwide.

During the last two decades, more Kemp's ridley nests have been documented in South Texas than anywhere else in the USA (Shaver, in press), but far more nests have been found in Mexico. Increased numbers of Kemp's ridley nests were found on the Texas coast during five of the six years from 1995 through 2000, with a total of 12 nests documented in Texas in 2000. Recent increases in the number of detected nests could reflect increased nesting by returnees and other turtles not from the project, improved detection efforts, increased awareness and reporting by the public, or a combination of these.

In Mexico, the number of nests documented per year fell to a low point of 702 in 1985, but has climbed since (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992; Marquez et al. 1999). In 2000, about 6,200 Kemp's ridley nests were found in Mexico, but the area patrolled to detect Kemp's ridley nesting

has increased in Mexico during the last decade (Marquez et al. 1999; Rene Marquez, personal communication). Although the Kemp's ridley population is thought to be increasing, the population is still far below former levels and levels at which it can be down-listed or de-listed (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992).

### **Satellite tracking**

Satellite transmitters are being deployed to track the movements of some Kemp's ridley turtles that nested in South Texas to delineate their movements during the inter-nesting interval and post-nesting. Kemp's ridley turtles nest an average of 2.5 times/year, and one objective of this work is to use tracking data to predict when and where these turtles will nest again, to increase the probability of detecting subsequent nesting. Another objective is to use the data to document where the turtles go between and after nesting, for use by agencies to develop protection strategies for them in the marine environment.

During 1997-2000, 15 transmitters were deployed. Two of the 15 turtles remained in South Texas after the nesting season was completed. The other 13 left South Texas after they were done nesting for the year; these turtles traveled parallel to the coastline and moved to off the upper Texas coast; the coasts of Louisiana, Mississippi, and Alabama; or the west coast of Florida. However, one of the 13 later traveled south to Mexico, then back north to the upper Texas coast.

### **Egg incubation, hatchling release, and associated data collection**

Suspected nest sites are investigated to determine the species involved and to locate eggs. Locating eggs allows documentation of nesting as well as protection of the eggs. Eggs from local beaches are transferred to the incubation facility at Padre Island National Seashore for protected care, where 85% of the eggs typically hatch (Shaver 1992; Shaver 1999; Shaver and Miller 1999; Shaver 2000). In contrast, only 17% of the eggs hatched from the six sea turtle clutches known to have incubated unprotected on Texas beaches during the last two decades. Hatchlings from these nests are released and allowed to go free. When possible, the public is invited to attend these releases, and over 1,000 visitors attended hatchling releases held at Padre Island National Seashore during 2000.

Data are collected from eggs and hatchlings to compare fecundity and vigor for wild versus head-started turtles, develop improved incubation techniques, yield optimum sex ratios, and attain high hatching success.

### **Stranded adult Kemp's ridley turtles**

The Sea Turtle Stranding and Salvage Network was established in 1980 to document strandings of marine turtles in the USA. A stranded sea turtle is one that is found washed ashore dead or alive; most stranded turtles found in Texas are dead by the time they are located. During 1992-2000, more dead adult Kemp's ridleys were found washed ashore on South Texas Gulf beaches than at any other location in the USA (Shaver, in press). These deaths could potentially affect efforts to establish a secondary nesting colony in South Texas.

A variety of human-related and natural factors affect sea turtle survival in the Gulf of Mexico, but incidental capture in shrimp trawls accounts for more sea turtle deaths than all other human activities combined (National Research Council 1990). To decrease this mortality, mandatory use of turtle excluder devices (TEDs) began in U.S. Gulf of Mexico waters in 1990. Despite current mandatory use of TEDs, there continues to be a relationship between Gulf shrimping and strandings on Gulf beaches along the Texas coast (Caillouet et al. 1996; Shaver 1998). The Texas Closure is an annual closure of Gulf waters out to 200 nautical miles off the Texas coast to shrimp trawling from mid-May to mid-July, to allow shrimp to grow larger prior to harvest. Of the 104 adult Kemp's ridley turtles found stranded on South Texas Gulf

beaches from 1995 through 2000, 101 were located during times when Gulf waters off the Texas coast were open to shrimp trawling, and only three were found during the Texas Closure.

During 1999-2000, the Texas Parks and Wildlife Department revised their shrimp fishery management plan to develop regulations to help sustain the shrimping industry. The department requested and used nesting, stranding, and satellite tracking data from this work in conjunction with their effort. One of the regulations (passed in August 2000) was the establishment of a shrimp-trawling closure of Gulf waters from the coast to 5 miles offshore from December 1 to May 15 each year. Thus, beginning in 2001, South Texas nearshore waters will be closed to shrimp trawling for the first time during the entire Kemp's ridley mating and nesting seasons. Many biologists hypothesize that this regulation will have side benefits to Kemp's ridleys that are in South Texas to mate and nest, Kemp's ridleys that are migrating to and from Mexico, and other sea turtles. However, this regulation was a compromise between the proposed regulations, desires of various environmental groups, and desires of the shrimping industry. Efforts are underway to evaluate the impacts of this regulation on stranding and nesting levels. If this regulation proves to be beneficial, it could serve as a model elsewhere around the world.

#### Future work

The project to increase Kemp's ridley nesting at Padre Island National Seashore and in South Texas has been ongoing since 1978. For the foreseeable future, patrols to detect, study, and protect nesting turtles and their eggs, as well as associated outreach activities, will be continued. Work with partners in the USA and Mexico will be continued, but it will be many more years before the results of these efforts are known. Data will be collected and analyzed regarding the results as they pertain to experimental imprinting, head-starting, age to sexual maturity, re-population of the area for nesting, nest number trends, and nest site fidelity, all of which are important in judging the long-term success of our efforts. It would also be beneficial to continue to examine the movements of adult Kemp's ridley females and quantify the impacts of the time and area closure on nesting and stranding levels. Hopefully these efforts will help restore these magnificent turtles so that they can be enjoyed by future generations in both the USA and Mexico.

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