

FLORIDA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

PROJECT FINAL REPORT

TITLE: Incubation temperatures and sex ratios of loggerhead sea turtles (*Caretta caretta*) hatched on Northwest Florida beaches

PRINCIPAL INVESTIGATOR: Dr. Raymond R. Carthy

RESEARCH WORK ORDER #: 197A

FUNDING AGENCY: U.S. Fish & Wildlife Service

START DATE: 08/___/99 **END DATE:** 12/31/00

Northwest Florida provides reproductive habitat for a small but significant group of loggerhead turtles (*Caretta caretta*) that nest on beaches extending from Escambia to Franklin Counties. Genetic work by Encalada et al. (1998) has indicated that loggerheads nesting in Northwest Florida are a genetically distinct group that shares little gene flow with the other two southeastern U.S. loggerhead groups (Southern Florida and Northeast Florida to North Carolina). These new data suggest the need to characterize the panhandle loggerhead population so that effective conservation management plans can be developed. The ratio of males to females in a population is an important feature of population structure, influencing its size and stability. Determination of incubation temperatures and hatchling sex ratios of the Northwest Florida loggerhead nesting population will provide information needed to develop effective conservation efforts for this small, threatened group of turtles.

The purpose of this project was to collect sand and nest temperature information from loggerhead nesting beaches and *in situ* nests in Northwest Florida, perform sex ratio analysis on eggs collected from those nests, and describe general sand characteristics and variations in weather conditions within the experimental area. This information was to be used to determine what variations in sand temperatures and loggerhead nest incubation temperatures exist across Northwest Florida, evaluate differences in sand characteristics and weather conditions throughout the Florida Panhandle and how these differences relate to variations in incubation temperatures, and determine the sex ratios of loggerhead sea turtles produced on Northwest Florida beaches.

Although the incubation temperature study was initiated in May 1998, the start date of this work order was August 1999. Between May 1998 and August 1999, the majority of the field data for the project was collected. Four nesting beaches were selected in the Florida Panhandle – St. George Island, St. Joseph peninsula, Walton County, and Perdido Key. In May 1998 temperature data loggers were placed in two control profiles at each site. Additionally data loggers were placed in nine loggerhead nests on St. George Island, eight nests on St. Joseph Peninsula, four nests in Walton County, and five nests on Perdido Key. Sand was collected at each location where data loggers were deployed for grain size analysis and determination of light reflecting properties. Weather data was obtained from weather stations near each site for comparison with temperature data. Data collection ended in September of 1998 when Hurricanes Earl and Georges struck Northwest Florida and caused the loss of most remaining loggerhead nests and approximately 30% of the project's data loggers.

In 1999, three control profiles were placed at each of the four sites in May and were removed in October. During June and July data loggers were placed in nine nests on St. George Island, nine nests on St. Joseph Peninsula, seven nests in Walton County, and six nests on Perdido Key. Sand and weather data were collected for each site. Three to five nests from each site were transported to incubators a few days prior to hatching. The eggs were hatched in the incubators, egg fluid and blood samples were collected from hatchlings, and all hatchlings were released on their natal beaches. Egg fluid samples collected at the time are currently being stored at the University of Florida while blood samples are in storage at the University of Alabama at Birmingham. To date, no analysis of these samples has been conducted.

In 2000 sand temperatures were collected at 10 sites in the panhandle. Three control profiles were monitored at the original four sites plus St. Vincent Island, St. Joseph Peninsula State Park, Tyndall Air Force Base, Panama City Beach, and two sites on Santa Rosa Island. No additional data was collected from loggerhead nests during the 2000 nesting season. Sand was not collected, but weather data was.

Data collected during the 1998, 1999, and 2000 nesting seasons is currently being analyzed. Sand and nest temperatures will be compared between sites, and will be analyzed for their relationship to physical characteristics of each site. Although samples have not been analyzed to determine sex ratios, nest temperatures and incubation durations will be used to estimate sex ratios. Data analysis should be completed by the end of February 2001. Upon completion of data analysis and publication of final results, this information will be provided to the funding agency. The results of the project will also be presented at the 2002 Sea Turtle Symposium.