



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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MEMORANDUM FOR: James Lecky, Ph.D.
Director, Office of Protected Species

FROM: Nancy B. Thompson, Ph.D. *Nancy B Thompson*
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SUBJECT: Loggerhead Turtle Expert Working Group Update

The Loggerhead Turtle Expert Working Group (TEWG) is currently drafting their final report on the status of loggerhead turtles in the North Atlantic. The TEWG is providing this interim update of the potential cause(s) of the current decline of loggerhead nests in Florida.

Florida represents the largest loggerhead nesting aggregation in the Atlantic Ocean and the **number of nests** has declined since peaking in 1998 with 59,918 nests on index beaches which represent about 25% of all nesting habitat [Florida Fish and Wildlife Conservation Commission (FFWCC); <http://research.myfwc.com>]. From 1989 to 1998, the number of nests increased 25% but since 1998 the number of nests has declined approximately 40% with 28,074 nests recorded on index nesting beaches in 2007 (FFWCC). This must be interpreted literally and limited to describe a decline in number of nests, as a decline in nest counts does not necessarily mean the number of adult females is declining nor does it mean the population or stock as a whole is declining. Interestingly, over the same time period, green and leatherback turtle nests have increased in Florida. For both of these species, the increases have been dramatic and significant with green turtles increasing from 5,557 in 1998 to 9,642 nests in 2005 and leatherbacks increasing from 351 to 762 over the same period (FFWCC). Given the available data, interpreting the meaning of a decline in nest counts is difficult as the number of nests serves as a proxy for the size of the adult nesting female population. However, converting nest to females is confounded by several issues such as variability in number of nests per female per year; variability in remigration interval; and, as the ability to nest is resource-dependent, the effect of habitat changes and the availability of food resources. Nest counts alone provide no insight into the status of other age classes or the male population. For example, if we had a time series of juvenile or sub-adult abundance (e.g., CPUE), we could project this data relative to an expectation of nest counts in the near future.

The TEWG is continuing to explore several hypotheses of why we are seeing a decline in nests, which will be more fully discussed in the final report and fall into the following general categories:



- (1) The current decline is a part of natural population cycling we do not fully understand because of the limited time series of data. Loggerhead turtles take an average of 20 to 30 years to achieve maturity. The signal we continue to rely on, nest counts, can represent the result of events that took place 30 years ago, cumulative events, or be the result of a proximal cause impacting adult females and/or males only. It is possible, given the protracted period to maturity and, in this context, the limited time series available even for nest counts, that over a much longer period, this could represent a natural cycle or readjustment to the natural baseline.
- (2) Changes in life history parameters, such as fecundity, annual survival rate, etc., result in failure to recruit to the adult female stage class, shortened adult life, and increase in number of years between nesting.
- (3) Changes in age distribution from past perturbations have created a pulse of juveniles and sub-adults which have not started to nest.
- (4) Directed turtle fisheries in other countries.
- (5) Changes in sex ratio over time.
- (6) Preferred habitats have increased vulnerability to mortality by age or sex class due to increased interactions with human activities and/or environmental changes impacting habitat/resource availability and quality.
- (7) Bycatch in fisheries.

We have explored these hypotheses to the greatest extent possible; the data available do not permit the TEWG to fully investigate many of these hypotheses. The draft TEWG is currently in the process of being reviewed by the NOAA Fisheries CIE. Our only long-term, consistent metric is nest count data which may not reflect what is occurring in the population as a whole or even with the number of nesting females. For example, a large influx of neophyte nesters would result in lower nest counts as first time nesters lay fewer clutches. Alternatively, reduced food availability would increase the years between nesting and reduce the nests per year for all females. In short, nest counts allow us to assess total production in a given year but do not provide any information on the root cause(s) of any increase or decrease in nest number.

The numerous possible explanations as to why the numbers of nests have continually decreased since 1998 demonstrate the need for more directed turtle research and associated funding. Nests counts, fishery dependent, and strandings data do not provide the necessary insight into loggerhead turtle population dynamics to properly assess species status. Without an increase in in-water and nesting beach research, it may not be possible to answer questions on why we see increases or decreases in the numbers of nests.

We are concerned about this decline. To test the above hypotheses, immediately we recommend:

- (1) Investigating available data to assess changes in survival, sex ratio, and age class distribution, where possible.
- (2) Collaborating with foreign colleagues to determine any effect from directed fisheries.

- (3) Summarizing all available bycatch data to determine changes in CPUE and shifts in effort.

Longer term, we need to implement a program that provides annual estimates of turtles for the NE and SE regions. These would include a survey program to obtain estimates of total turtle in-water tagging studies and nesting beach tagging studies to establish time series data and address gaps in life history information so that in the future we can determine the causes of changes in trends of numbers, including nest numbers.