

DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM AS A MANAGEMENT TOOL TO REDUCE BYCATCH OF SEA TURTLES IN U.S. ATLANTIC OCEAN AND GULF OF MEXICO FISHERIES

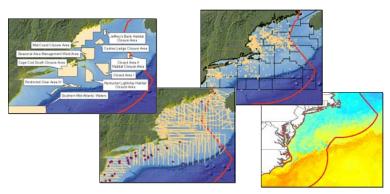


¹Connie Y. Moy, ²Ken Buja, ³Tanya J. Dobrzynski, ⁴Ellen P. Keane, and ⁵Dennis L. Klemm

¹Aster Engineering at NOAA National Ocean Service, National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Silver Spring, MD, ²NOAA, National Ocean Service, National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Silver Spring, MD, 3NOAA, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD, 4NOAA, National Marine Fisheries Service, Northeast Regional Office, Gloucester, MA, 5NOAA, National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, FL

ABSTRACT

Incidental capture (bycatch) of sea turtles in fishing gear is a major factor affecting recovery of sea turtle populations in the Atlantic Ocean and Gulf of Mexico. All species of sea turtles inhabiting these waters are listed as either endangered or threatened under the Endangered Species Act (ESA). To help meet ESA mandates and recovery goals for sea turtles, NOAA's National Marine Fisheries Service (NMFS) implemented the Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic Ocean and Gulf of Mexico Fisheries (Strategy). The Strategy's goal is to reduce incidental capture of sea turtles in U.S. fisheries by evaluating sea turtle bycatch and developing and implementing solutions to reduce bycatch by gear type. NOAA National Ocean Service's Biogeography Team has been partnering with NMFS to develop a geographic information system (GIS) to support the Strategy, The GIS will greatly facilitate spatial analyses and the dissemination of information regarding sea turtle and fisheries interactions by integrating commercial fishing effort, known sea turtle distribution and sampling effort, observed sea turtle bycatch and observer effort, existing regulations relevant to sea turtle bycatch, and oceanographic features that likely influence sea turtle behavior. This is the first comprehensive GIS management tool dedicated to addressing the problem of sea turtle bycatch across gears in the Atlantic and Gulf of Mexico regions.



GIS DATA LAYERS & SOURCES

- Available commercial fishing effort for gear types fished in the region (Source: NOAA) vessel trip report and logbook programs)
- Known sea turtle distribution and sampling effort based on dedicated aerial and shipboard surveys (Source: NOAA, North Atlantic Right Whale Consortium Database, U.S. Navy)
- Observed bycatch of sea turtles and observer effort (Source: NOAA observer programs)
- Existing federal regulations under current mandates that are designed to or have the potential to reduce sea turtle bycatch (Source: U.S. Code of Federal Regulations)
- Relevant oceanographic features such as sea surface temperature, chlorophyll a concentration, and bathymetry (Source: NOAA)

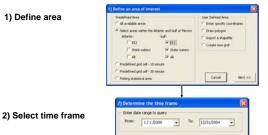


Credit: NOAA Biogeography Team

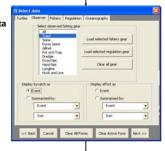
SEA TURTLE GRAPHICAL USER INTERFACE

The objective of the sea turtle graphical user interface is to allow users to query essential datasets to display available information in a format designed to improve understanding of the interactions between sea turtles and fisheries within particular areas of interest and time periods. Users will be able to define: an area of interest; determine a time frame; select survey observer, fishery, regulation, and oceanographic data; and select summary options for the data.

SAMPLE USER FLOWCHART



3a) Select observer data



3b) Select fishery data

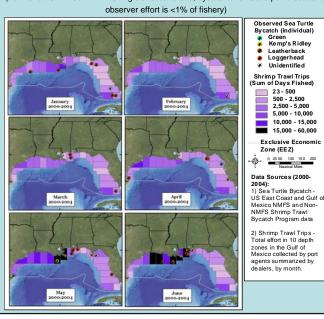


4) Select summary



SAMPLE PRODUCT: Monthly Trawl Fishing Effort & Observed Sea Turtle Bycatch for 2000-2004 in the U.S. Atlantic and Gulf of Mexico

(trawl effort summed within fishing statistical areas; bycatch events are point locations;



DISCUSSION

The GIS will facilitate the evaluation of sea turtle bycatch by gear type by enabling fishery managers to view where fisheries are operating and how they are or could be managed spatially. In addition, GIS can help identify potential sea turtle bycatch hotspots in need of further management, such as areas where sea turtles and specific gears known to interact with sea turtles overlap. These benefits are results of having accurate data of a reasonable spatial scale on fisheries effort, sea turtle distribution. and bycatch events. The GIS will also be helpful in identifying data limitations and important data gaps that need to be filled. For example, sea turtle

> bycatch information in certain fisheries is lacking due to the limited number of observer programs that exist and the primary focus of various observer programs (e.g., finfish vs. turtle bycatch). Another important limitation is the lack of fishing effort data for every fishery in every region and the lack of consistency

> > between regions and data collection programs. Improvements to the GIS will result from more detailed data on fisheries effort, fishing gear characteristics and deployment, sea turtle distribution and bycatch, and oceanographic and habitat features, especially benthic characterization.



Shrimp trawler with turtle excluder devices (TEDs), Credit: Folsom. NOAA/NMFS: Turtle escapes through the TED, Credit: NOAA OAR NURP