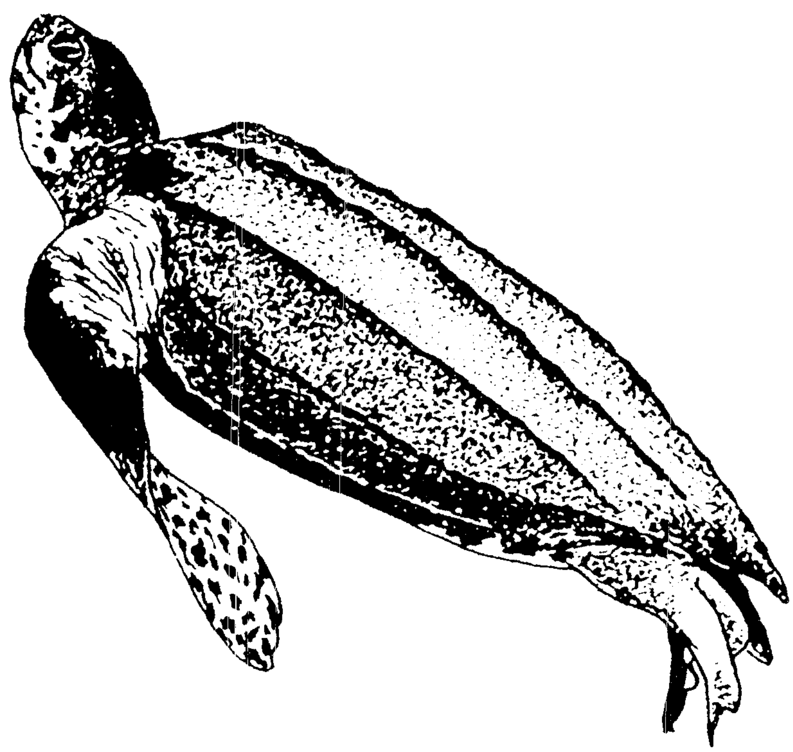
NOAA Technical Memorandum NMFS-SEFSC-387

PROCEEDINGS OF THE FIFTEENTH ANNUAL SYMPOSIUM ON SEA TURTLE BIOLOGY AND CONSERVATION

20-25 February 1995
Hilton Head, South Carolina

Compilers:

John A. Keinath
Debra E. Barnard
John A. Musick
Barbara A. Bell



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, FL 33149

June 1996

allomorphosis among four size classes were significantly different in most of the characters examined. On the other hand, as is well-known, habitats of sea turtles are shifted in accordance with their growth. Thus, changes in growth pattern are expected to be related to ecological, ethological, and physiological (e.g., habitat, food, and reproduction) shifts of turtles.

==

USE PROTECTION!, OR A CASE OF VIBRIO INFECTION FROM A SEA TURTLE

John A. Keinath

Virginia Institute of Marine Science, School of Marine Science, College of William and Mary, Gloucester Pt., VA 23062

Approximately 200 sea turtles strand annually in Virginia. The majority of the fresh carcasses are necropsied by members of the VIMS Sea Turtle Research Project to determine sex, sample gut contents, and to try to determine cause of death. On the morning of 24 May a fresh dead loggerhead was brought to VIMS. I, as usual, necropsied the animal without gloves, which I find cumbersome. Early the following morning (3 am) I awoke with a large (3 cm diameter) pustule on the right front index finger, accompanied by intense pain and swelling. In addition, a secondary infection of the lymph system was progressing toward the elbow. A physician initially prescribed Lincocin injection and Augmentin tablets, and amputation of the finger was discussed as a possibility. By 3 pm the pustule had become larger, and the lymph infection had progressed passed the elbow. The physician became very concerned, since this was now a life threatening situation. Because time was a major factor, there was no culture to determine the exact infective agent, it was determined that the primary infection was Vibrio, most likely Vibrio vulnificus, a virus ubiquitous in the marine environment. Seftin and Rocephin was administered for the next several days, along with Darvon for pain. The infection abated and the wound healed, however a fair (sic) amount of anxiety was involved! Although I have necropsied several hundred sea turtles without gloves, I will not do so in the future. Although infection from Vibrio vulnificus is rare, it infected individuals had a death rate in Virginia of 7 - 22%! (Schmidt and Hoyt, 1985).
PLEASE USE PROTECTION!

LITERATURE CITED

Schmidt, S. and R. Hoyt. 1985. Potential risk of Vibrio infection in Virginia. Va. Sea Grant Mar. Res. Advisory #29.

==

PRELIMINARY ASSESSMENT OF COMPETITION FOR PREY BETWEEN LEATHERBACK TURTLES AND OCEAN SUNFISH IN NORTHEAST SHELF WATERS

Robert D. Kenney

Graduate School of Oceanography, Box 41 Bay Campus, University of Rhode Island, Narragansett, RI 02882-1197

Leatherback sea turtles are regular, albeit relatively rare, inhabitants of continental shelf waters off the northeast U.S., with a regional population estimated at several hundred individuals (Shoop and Kenney, 1992). Their peak occurrence in the Northeast region, in late summer when water temperatures are at their peak, coincides with the seasonal occurrence of their principal prey, jellyfish and other gelatinous organisms. Recovery of critically endangered leatherback populations can obviously be retarded or prevented by direct impacts such as incidental take in commercial fisheries, egg poaching, or loss of nesting habitat. However, recovery can also be slowed by more indirect impacts, including competition for prey resources. Other predators which similarly specialize on gelatinous organisms are not particularly common, however one species which may be a significant competitor for this resource is the ocean sunfish. I conducted a preliminary assessment of the potential for an effect of prey competition on leatherbacks by looking at the distribution and abundance of ocean sunfish in northeast shelf waters, based on data from aerial surveys for marine mammals and turtles.

METHODS

Estimates of abundance of ocean sunfish in shelf waters in the region from Cape Hatteras to the Gulf of Maine were computed using line-transect methods from dedicated aerial surveys conducted during the Cetacean and Turtle Assessment Program from 1979 to 1981 (CETAP, 1982). Since sunfish were not a target species of the CETAP study, the right-angle distance data necessary to derive sighting probability functions were not collected. The probability functions derived for loggerhead turtles were used as a substitute, since loggerheads and sunfish are about the same size, provide similar sighting cues, and occur in similar areas and seasons. Seasonal estimates for each of four regions of the northeast shelf - Gulf of Maine, Georges Bank, Southern New England, and Mid-Atlantic Bight - were computed by combining all aerial survey lines conducted over the three-year study in that region/season as replicate samples. Seasonal maps of distributions of ocean sunfish were also plotted including all available sighting data.

RESULTS

Between 1974 and 1992, there were 1,834 sightings of ocean sunfish off the northeast U.S., with almost 94% of the sightings coming from the CETAP surveys in 1979-1981. The sighting records include some data from shipboard surveys, however the large majority of sunfish sightings were made from aerial surveys. Sightings were most common during the warmest months of the year, with 90% of all sightings between May and September. The peak monthly sighting frequency was in August, with 27.3% of all sightings.

Ocean sunfish are very abundant in the region (Table 1). Peak abundance was in the spring on Georges Bank and in the summer in the Gulf of Maine. The Southern New England and Mid-Atlantic Bight regions each had roughly equivalent sunfish abundances in spring and summer. The total ocean sunfish population off the northeast United States was estimated to be as high as 12,000 individuals during the spring season, and 18,000 during the summer.

Table 1. Seasonal estimates of abundance (95% confidence intervals) of ocean sunfish in four regions off the northeast United States, 1979-1981. GOM=Gulf of Maine; GBK=Georges Bank; SNE=Southern New England; MAB=Mid-Atlantic Bight.

Region	Winter	Spring	Summer	Fall
GOM	0	0-274	3,067-11,313	518-2,835
GBK	0	1,928-6,771	422-1,851	284-1,436
SNE	0	1,140-2,906	1,369-3,530	0-501
MAB	0-128	721-2,219	712-1,742	140-421
All	0-128	3,739-12,170	5,570-18,436	869-5,193

The geographic distributions of sightings show spatial and temporal patterns similar to that seen in the abundance data (Fig. 1). Sightings were rare in the winter, and largely confined to the southernmost portions of the study area. In the spring, the number of sightings increased dramatically, with sightings over much of the study area from North Carolina to Georges Bank, and scattered sightings in the Gulf of Maine. The number of sightings increased still further during the summer, with sunfish occurring everywhere in the study area except near North Carolina. Fall sightings were much reduced in number, and occurred throughout the area.

DISCUSSION

Ocean sunfish are extremely common off the northeast U.S. The abundance estimates presented here indicate a population perhaps 20 times that of leatherback sea turtles. In addition, the temporal occurrence patterns of sunfish and leatherbacks are nearly identical, with a peak in late summer (Shoop and Kenney, 1992). The potential for a competitive effect on leatherback recovery is certainly there, although there are many gaps in our knowledge of both species which need to be filled before any more definitive conclusions can be reached. Data requirements include information (for both species) on metabolic rates, feeding rates, and prey preferences, as well as good data on availability of various gelatinous prey.

Existing information on growth and fecundity, though sparse, suggests that ocean sunfish have the potential to increase at extremely rapid rates given the proper conditions. Studies of captive animals indicate that sunfish can attain body weights of over 100 kg by the age of two years (Sommer et al., 1989). One moderate-sized female sunfish was found to contain 300,000,000 eggs (Hart, 1973). This would suggest that sunfish are much more capable than sea turtles of expanding into a vacated niche and quickly increasing in abundance in the absence of competition.

As with the sea turtles, estimates of abundance of ocean sunfish account only for individuals at or very near the surface at the moment the survey aircraft passes overhead, and so are acknowledged to be underestimates. Sunfish have no requirement to surface to breathe, unlike turtles or cetaceans, so this problem becomes even more difficult to assess. It is very likely that the vertical movement of sunfish in the water column is a complex function of season, location, temperature, sunlight, prey distribution, and other factors. Very limited data from the Pacific suggested a correction factor of approximately 10X for basking sharks (Owen, 1984), but we apparently have no data at all available to make such an estimate for sunfish.

I have purposely avoided using a scientific name for the sunfish species in question. During our surveys, we generally presumed that we were sighting the common ocean sunfish (Mola mola). However, two other sunfish species also occur in the North Atlantic - the sharp-tailed sunfish (Masturus lanceolatus) and the elongate sunfish (Ranzania laevis) (Nelson, 1994). Ranzania has a very different shape and is much smaller (< 80 cm), and likely would have been recognized as something different. However, Mola and Masturus are of similar size and shape, and both are known from stranding records on the northeast coast (J.G. Mead, Smithsonian Inst., pers. comm.). The few individuals where we have managed to get clear photographs or video have been Mola mola, however without firm evidence, I can not conclude that the information presented here represents only that single species.

LITERATURE CITED

Cetacean and Turtle Assessment Program. 1982. A Characterization of Marine Mammals and Turtles in the Mid- and North-Atlantic Areas of the U.S. Outer Continental Shelf, Final Report. Contract No. AA551-CT8-48. Bureau of Land Management, Washington, DC.

Hart, J. L. 1973. Pacific Fishes of Canada. Bulletin 180, Fisheries Research Board of Canada, Ottawa, Ontario.

Nelson, J. S. 1994. Fishes of the World, 3rd edition. John Wiley & Sons, New York, NY.

Owen, R. E. 1984. Distribution and Ecology of the Basking Shark Cetorhinus maximus (Gunnerus, 1765). Unpublished Master of Science thesis, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI.

Shoop, C. R. and R. D. Kenney. 1992. Distributions and abundances of loggerhead and leatherback sea turtles in northeastern United States waters. Herpetol. Monogr. 6: 43-67.

Sommer, F., J. Christiansen, P. Ferrante, R. Gary, B. Grey, C. Farwell, and D. Powell. 1989. Husbandry of the ocean sunfish, Mola mola. AAZPA Regional Proceedings 1989: 410-417.

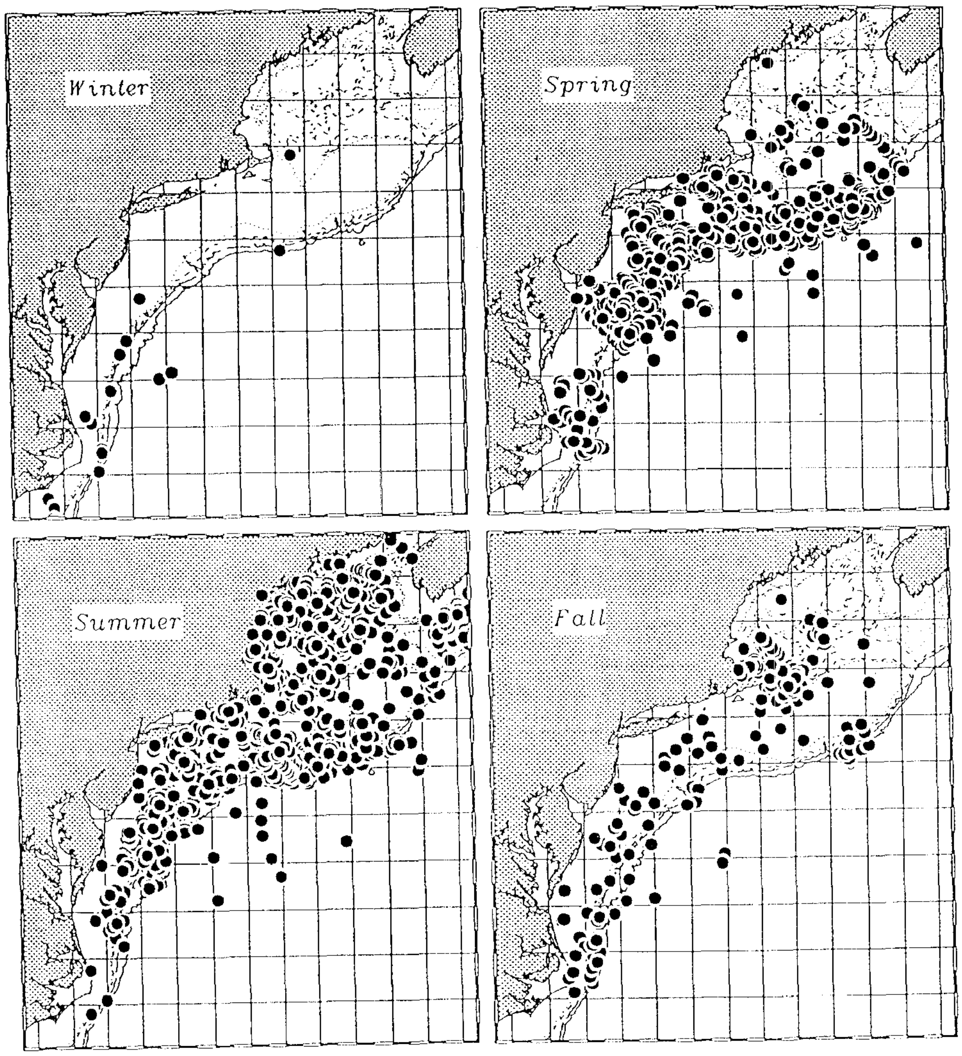


Figure 1. Seasonal distributions of sightings of ocean sunfish (Molidae) off the northeastern United States, 1974 - 1992. The latitude/longitude grid lines are at one degree intervals. The isobaths shown are at 100, 200, 1000, and 2000 meters.