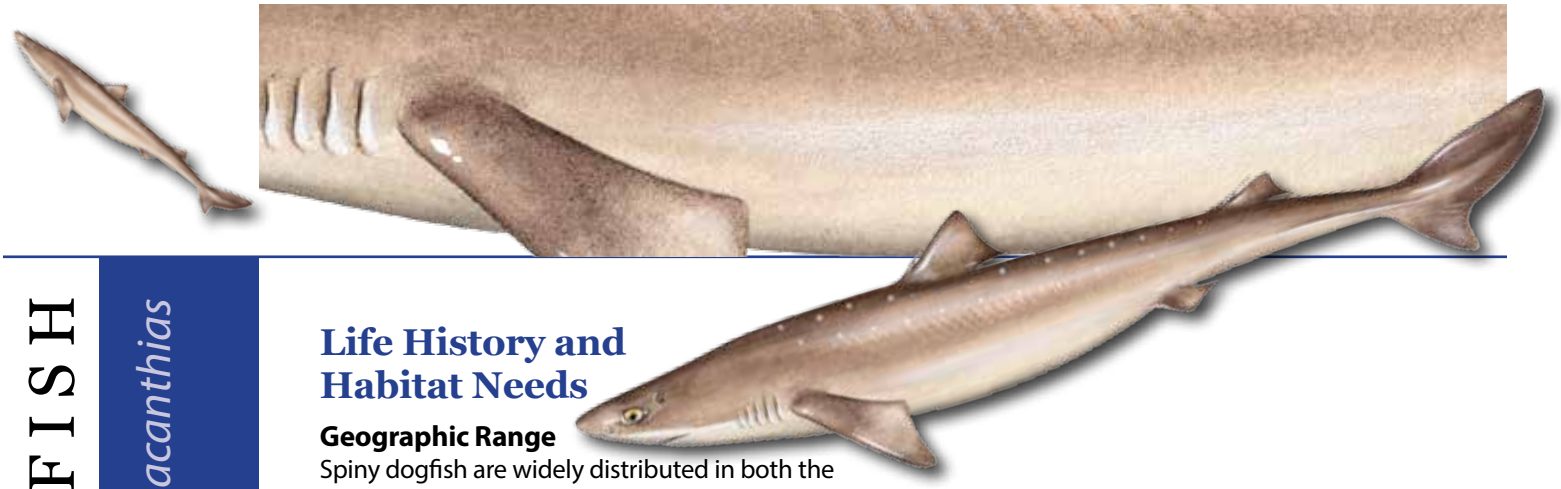

SPINY DOGFISH

Squalus acanthias

Life History and Habitat Needs

Geographic Range

Spiny dogfish are widely distributed in both the Atlantic and Pacific Oceans. In the western Atlantic, spiny dogfish range from Labrador, Nova Scotia to Florida, but are most abundant from Nova Scotia to Cape Hatteras, North Carolina.

Movement/Migration

Spiny dogfish are a highly migratory species and prefer water temperatures from 45 to 55°F (7 to 12°C) and, in general, are found inshore in summer and in deeper offshore waters in winter. Seasonal migrations are associated with water temperature. Spiny dogfish migrate north in spring and summer and south in fall and winter when temperatures. In summer, spiny dogfish are found throughout the Canadian Maritime Provinces (New Brunswick, Nova Scotia and Prince Edward Island). From fall to winter, the range of spiny dogfish is concentrated in U.S. waters between Long Island, New York and Cape Hatteras, North Carolina. Recent research has indicated there may be regional populations with separate migratory patterns (Carlson et al. 2014).

Reproduction

Spiny dogfish are an ovoviviparous shark and mate during winter in the North Atlantic. Females are fertilized internally and have an 18 to 24 month gestation period. Females give birth to live young on offshore wintering grounds. The average litter size is 6.6 pups but range from two to fifteen pups and the sex ratio at birth is typically 1:1. Pups are released live and fully formed at a length ranging from 20 to 33 cm with the majority ranging from 26 to 27 cm (10 inches). Juvenile spiny dogfish school by size until sexually mature and then aggregate by both size and sex. Female dogfish reach sexual maturity at 12 years (~29.5 inches), while males reach sexual maturity at six years (~23.6 inches). Spiny dogfish typically live up to 25 to 30 years of age and may reach a maximum size of 125 cm (50 inches) and up to 22 lbs. Based on growth rings in dorsal spines, a northwest Atlantic study estimated the maximum age of males and females was 35 and 40 years, respectively.

Habitat Use

Juveniles are widespread across the continental shelf from North Carolina to the eastern edge of Georges Bank. Although juvenile spiny dogfish prefer bottom water temperatures from 46-55°F (8-13°C) and depths between 50-150 m, some are found in waters with slightly lower temperatures that range from 44-50°F (7-10°C) and at shallower depths of 10-44 m. In general, the distribution and abundance of adults are similar to juveniles. Adults are found in high numbers along the outer continental shelf from Georgia to the northeast tip of Georges Bank, but are primarily females south of Cape Hatteras.

In spring, adults are abundant on the south shores of Nantucket Island, northeast of Cape Cod, and in Cape Cod Bay. In fall, adults are abundant off Nantucket Shoals, the eastern edge of Cape Cod, Cape Cod and Massachusetts Bays, and southwest of Nova Scotia. In winter, adults are widespread across the shelf from Georgia to the eastern edge of Georges Bank. Adults prefer bottom temperatures ranging from 45 to 55°F (7 to 12°C) and depths of 10 to 49 m. In fall, spiny dogfish are found in deeper waters (50 to 149 m) with bottom temperatures between 48 to 59°F (9 to 15°C). Spiny dogfish are tolerant of a wide range of salinities and can be found seasonally in coastal estuaries. In trawl studies, spiny dogfish have been observed to undertake daily vertical migrations, possibly following prey items. Considering their prey, habitat inferences can be made based on prey distribution and availability and other biological components of the habitat such as predators and competitors. They are rapacious, opportunistic feeders and their diet composition ranges widely from mollusks and crustaceans to bony fishes. Fish, squid and ctenophores dominated the stomach contents of spiny dogfish collected during northeast Atlantic trawl surveys.

Threats to Habitat

- Coastal development
- Water withdrawal
- Nonpoint source pollution
- Dredging and dredge spoil placement
- Beach nourishment and sand mining
- Wetlands loss and degradation
- Sewage disposal
- Mobile gear (such as trawls) that contacts the ocean bottom

ASMFC Habitat Areas of Particular Concern

Spiny dogfish are predominately epibenthic species and bottom habitat is important for all life stages of spiny dogfish. Spiny dogfish may also rely heavily on estuarine areas for refuge, foraging, or both.

Recommendations to Improve Habitat Quality

- Prohibit dredging and filling of wetlands and shallow coastal waters.
- Regulate water withdrawals to provide adequate water volume and flow into important spiny dogfish habitat.
- Coordinate development and implementation of nonpoint source pollution control plans.
- Develop contaminated sediment remediation plans.

Habitat Research Needs

- Assess information from seabed video of the activities and feeding behavior of spiny dogfish near various bottom types or features
- Investigate how diet selection of young-of-the-year and recruits influences habitat choice.
- Identify how spiny dogfish abundance and movement affect other organisms.
- Compile information on seasonal use of estuaries by spiny dogfish.
- Determine whether or not there is an identifiable area used for pupping.
- Investigate the distribution of spiny dogfish beyond the depth range of current trawl surveys.
- Investigate distribution, movements, and abundance of spiny dogfish overwinter south of Cape Hatteras.
- Identify spiny dogfish habitats associated with different life stages and areas of higher density and use by spiny dogfish for protection and/or restoration.
- Model the potential impact of global temperature increase upon the distribution of spiny dogfish.

Additional Information

Spiny dogfish are managed jointly by ASMFC and the MAFMC. Commission management falls under the Interstate Fishery Management Plan for Spiny Dogfish and its associated Addenda (I-IV). These documents can be obtained on the ASMFC website www.asmfc.org or by contacting the ASMFC Habitat Program Coordinator at 703.842.0740.

Literature Cited

Carlson, A. E., E. R. Hoffmayer, C. A. Tribuzio, J. A. Sulikowski. 2014. The use of satellite tags to redefine movement patterns of spiny dogfish (Squalus acanthias) along the U.S. east coast: implications for fisheries management. Plos One DOI: 10.1371/journal.pone.0103384.

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