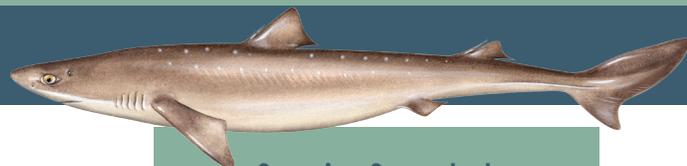


Species Profile: Spiny Dogfish



Fishermen and Processors Seek New Markets for this Abundant Resource

Introduction

The Commission and the Mid-Atlantic Fishery Management Council (Council) have jointly managed spiny dogfish since 2000. Spiny dogfish were declared rebuilt in 2009 -- going from severely depleted to a sustainable resource in under a decade. The science-based rebuilding quotas not only worked, but rebuilt the stock much quicker than expected. Because the stock has rebuilt, the spiny dogfish fishery has started a new chapter under higher quotas based on the significantly higher target fishing mortality rate. Based on this new target, the 2014/2015 annual quota was set at 51 million pounds in both state and federal waters.

There is continuing concern about the impacts of the rebuilt spiny dogfish population on the ecosystem and other fisheries. Recent changes in the European market have drastically decreased the demand for domestic dogfish. Fishermen and processors are working to develop new domestic markets to address the overabundance of the species in US waters. Ideas under consideration include using spiny dogfish as fertilizer and creating a market for dogfish fish and chips. Given that other New England stocks are overfished or experiencing overfishing, spiny dogfish provides a sustainable alternative for fishermen, processors, and seafood consumers.

Life History

Spiny dogfish inhabit both sides of the North Atlantic and North Pacific Oceans, mostly in the temperate and subarctic areas. In the Northwest Atlantic, the stock ranges from Labrador to Florida, and is most abundant from Nova Scotia to Cape Hatteras. Spiny dogfish migrate north in the spring and summer and south in the fall and winter. In the winter and spring, they congregate primarily in Mid-Atlantic waters but also extend onto the shelf break of southern Georges Bank. In the summer, they are located farther north in Canadian waters and move inshore into bays and estuaries. By autumn, dogfish have migrated north with high concentrations in Southern New England, on Georges Bank, and in the Gulf of Maine. They remain in northern waters throughout autumn until water temperatures begin to cool and then return to the Mid-Atlantic.

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). Mating occurs in the winter months and the pups are delivered on the offshore wintering grounds. Females give birth every two years with litters ranging from two to 15 pups. While carrying one litter, the female will begin developing eggs for the fertilization of her next litter. After an 18 to 24 month gestation period, the longest of any vertebrate, pups are released live and fully formed at about 14 inches.

Whales, dolphins, silver hake, white hake, weakfish, goosefish, Atlantic cod, bluefish, striped bass and other large predatory species feed on dogfish. Spiny dogfish are opportunistic feeders, eating several commercially important species, such as Atlantic herring, Atlantic mackerel, squid, and to a lesser extent cod and haddock.

Commercial Fisheries

Prior to the Fishery Conservation and Management Act of 1976 (now known as the Magnuson-Stevens Reauthorization Act), foreign fleets caught the majority of dogfish in U.S. waters but U.S. fishermen have had uncontested access ever since the Act's passage. The National Marine Fisheries Service (NMFS) encouraged commercial fishermen to target the bountiful stocks of spiny dogfish in the 1980s and 1990s when stocks of other commercially valuable fish in the Northeast declined. Then in 1998, NMFS determined that spiny dogfish were overfished and implemented stringent harvest restrictions in federal waters to allow the stock to rebound. The states followed shortly after with complementary regulations for state waters.

Today, commercial fishermen catch spiny dogfish using longlines, trawls, and purse seines. Fishermen target female dogfish because the females grow larger than males and tend to school together. Processors prefer the larger dogfish because they are easier to hold and cut. Until recently, dogfish were sent to European food fish markets that use dogfish 'belly flaps' for fish and chips in England and as a popular beer garden snack called shillerlocken in Germany. There is also a small scientific fishery in Maine, which uses spiny dogfish

Species Snapshot

Spiny Dogfish *Squalus acanthias*

Common Names:

Spurdog, mud shark, piked dogfish. The common name "dogfish" originated from fishermen who described these fish as chasing smaller fish in large doglike packs.

Interesting Facts:

- Longest gestation period of any vertebrate (18-24 months), gives birth to live young with litters from 2-15 pups (average 6 pups).
- Genus name *Squalus* is Latin for "a kind of sea-fish" while the species name *acanthias* translates as "a prickly thing," describing the spines found on the dorsal fins.

Oldest Recorded: 100 years

Age/Length at Maturity:

- Females - 12 years/29.5 - 31.5"
- Males - 6 years/23.6"

Age/Length at Recruitment:

- Females - 10-13 years/32.3-34.3"
- Males - 15-18 years/29.1-30.7"

Stock Status:

Rebuilt, not overfished nor experiencing overfishing

to study several of the species' unique biological characteristics. Dogfish have an organ called a rectal gland whose study helps scientists better understand the function of human kidneys. They also secrete a molecule called squalamine, which has strong antibiotic characteristics and shows promise as an anticancer agent.

Landings were approximately 37.2 million pounds in 1992, gradually increasing to a peak of about 60 million pounds in 1996. In the late 1990s, landings declined to an average of around 40 million. After federal and state regulations were implemented in the early 2000s, landings declined to less than five million pounds in 2001 and 2002. They then ranged between two and eight million pounds between 2003 and 2009. As the stock began to improve, landings were increased to 12 million pounds in 2009 and 2010 respectively. Commercial landings continue to be mostly female dogfish, with female landings comprising about 98% of the total commercial catch. The 2013/2014 landings were about 12 million pounds, well below the 41 million pound quota.

Stock Status

The most recent stock assessment document is the Northeast Fisheries Science Center's Update on the Status of Spiny Dogfish in 2013 and Projected Harvest at the F_{msy} Proxy report. The report is based on the 2010 Transboundary Resource Assessment Committee assessment. The updated fishing mortality target is 0.244 and the threshold is 0.325. The updated SSB target and threshold are 351 and 176 million pounds, respectively. The NEFSC Update estimated the SSB continued to exceed the target in 2013 (for the fifth year in a row) at 466 million pounds.

Atlantic Coastal Management

In 1998, NMFS declared spiny dogfish overfished and initiated the development of a joint fishery management plan (FMP) between the Mid-Atlantic (MAFMC) and New England Fishery Management Councils (NEFMC) in 1999. The Commission began development of an Interstate FMP to complement the federal plan in 1999. The Interstate FMP was approved in late 2003 and implemented for the 2003-2004 fishing year. Both the Commission and federal plans use a fishing mortality rate to set annual quotas and trip limits.

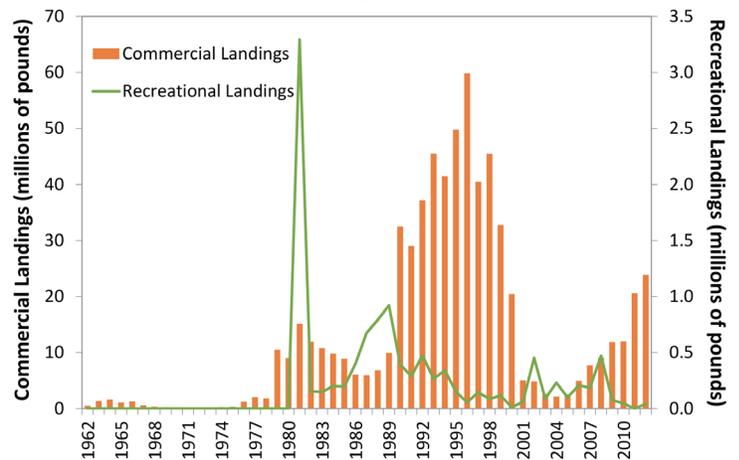
Subsequent addenda (Addendum I – IV) addressed various aspects of spiny dogfish management. Currently, 58% of the quota is allocated to the states of Maine to Connecticut, with individual state-shares for the southern states (New York to Virginia). The interstate plan also includes multi-year specification setting, paybacks for quota overages, allows for a five percent rollover once the stock is rebuilt, and allows for up to 1,000 spiny dogfish to be harvested for biomedical supply.

The Commission's Spiny Dogfish Management Board recently increased its spiny dogfish quotas for the 2014/15 and 2015/16 fishing seasons (May 1 – April 30) in response to increases in spawning stock biomass. The 2014/2015 quota is now set at 49,037,000 pounds (previously 41,784,000 pounds) and the 2015/1016 quota is set at 50,612,000 pounds (previously 41,578,000 pounds), with a maximum possession limit of 4,000 pounds per day for the northern region states (Maine through Connecticut). The quota is subdivided into a northern region (Maine - Connecticut) share of 58% and state-specific shares for the southern region, allocated as follows New York (2.707%); New Jersey (7.644%); Delaware (0.896%); Maryland (5.92%); Virginia (10.795%); and North Carolina (14.036%). Any overages from the previous fishing seasons will be paid back by the region or state in the following season, as has been done in the past.

In October 2014, the Board approved Addendum V, which ensures consistency in spiny dogfish management with the Shark Conservation Act of 2010 by prohibiting processing at-sea, including the removal of fins. Prior to approval, states could process spiny dogfish at-sea, so long as the ratio of fins aboard the vessel did not exceed 5% of the ratio of carcasses aboard the vessel. The Board set an implementation date of May 1, 2015 for states to promulgate this measure.

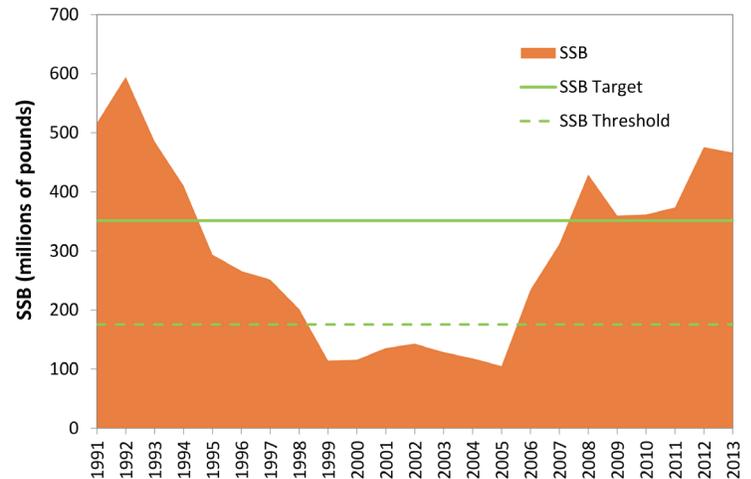
Spiny Dogfish Landings

Source: NEFSC Update on the Status of Spiny Dogfish in 2013 and Projected Harvests at the F_{msy} Proxy & P_{STAR} of 40%, 2013



Spiny Dogfish Spawning Stock Biomass (SSB) (>=80 cm)

Source: NEFSC Update on the Status of Spiny Dogfish in 2013 and Projected Harvests at the F_{msy} Proxy and P_{STAR} of 40%



Timeline of Management Actions: Emergency Action (2000); FMP (2003); Addendum I (2005); Addendum II (2008); Addendum III (2011), Addendum IV (2012)