



Photo credit: NOAA

KEY INFORMATION

Areas of Concern

Georges Bank and western Gulf of Maine

Year Identified as “Species of Concern”
2004

Factors for Decline

- Commercial fishing
- Bycatch
- Habitat degradation from trawls and dredges

Conservation Designations

IUCN: Not Evaluated

Brief Species Description:

Wolffish may reach lengths of 59 inches (150 cm) and weights of 40 pounds (18 kg). They are generally a solitary fish although some coloniality has been documented (Collette and Klein-MacPhee 2002). They are characterized by canine-like teeth in the front jaw, dark transverse bars along their body, and firm musculature (O’Dea and Haedrich 2000). Atlantic wolffish have a cluster of five or six smaller canines behind the primary canine teeth as well as three sets of crushing teeth on the roof of their mouth (Collette and Klein-MacPhee 2002). Their dorsal fin spines are flexible at their tips, and they have no pelvic fins (Collette and Klein-MacPhee 2002). Their color varies from a slate-blue to a purplish brown or dull olive green (O’Dea and Haedrich 2000).

Atlantic wolffish can be found to depths of 500 m (1640 ft), they prefer depths of 80 to 120 m (260 to 390 ft) (Collette and Klein-MacPhee 2002). Bigelow and Schroeder reported a temperature range of -1.3 to 10.2°C in the Gulf of Maine (Collette and Klein-MacPhee 2002). Wolffish are able to survive in these temperatures due to high concentrations of an antifreeze compound in their blood (King et al. 1989 cited in Collette and Klein-MacPhee 2002).

Wolffish appear to prefer areas with complex bottom substrates such as rocky outcroppings or seaweed beds (Collette and Klein-MacPhee 2002). Collette and Klein-MacPhee (2002) suggest that feeding takes place away from these shelter sites. Atlantic wolffish feed primarily on **benthic** fauna. While the diet of this species shows strong regional variation, it broadly consists of various species of mollusks, crustaceans, echinoderms and less frequently, fishes. Their teeth are quickly worn down by the grinding of hard-shelled prey and are replaced annually after the spawning season. They fast during this replacement until the new teeth are fully functional (Collette and Klein-MacPhee 2002). As predators, Atlantic wolffish may also be key factors in controlling the density and distribution of certain benthic invertebrates, such as sea urchins (O’Dea and Haedrich 2000).



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This is a large, slow growing, and late maturing species (COSEWIC 2000). Maturity varies by region due to temperature influences, but most mature by age 6 and about 40 cm total length (Collette and Klein-MacPhee 2002). Males and females form bonded pairs during the spring and summer. The spawning period for Atlantic wolffish remains unclear, but most likely varies temporally depending on latitude. Prior to spawning, ripe female wolffish exhibit a pronounced pot-belly (Collette and Klein-MacPhee 2002). Females produce between 5,000 and 12,000 eggs, with female fecundity increasing with fish size. Incubation is believed to last four to nine months, depending on the water temperature (Collette and Klein-MacPhee 2002). Eggs are laid in large clusters and are guarded by the parental male. The male stops feeding during this period and becomes more aggressive in his role as protector (Collette and Klein-MacPhee 2002).

Prolarvae (about 22 – 24 mm or 1 inch) retain yolk sac remnants and an oil globule, and also have small teeth and an eye diameter that measures one-half the head depth (Collette and Klein-MacPhee 2002). Larvae (>28 mm or 1") have an increased body depth (Collette and Klein-MacPhee 2002). Larvae and early juveniles are pelagic at 20 to 40 mm (0.8 to 1.6 inches) TL before transitioning to their benthic habitat (Collette and Klein-MacPhee 2002). Fifty percent of wolffish mature between 52 and 60 cm (20.5 to 24 inches), which is 1.02 to 1.57 kg (2.25 to 3.5 lbs), and between 8 to 10 years old. They may live up to 20 years (O'Dea and Haedrich 2000).

Rationale for "Species of Concern" Listing:

Demographic and Genetic Diversity Concerns:

West of the Scotian Shelf, the highest abundance of wolffish appears to be in the southwestern portion of the Gulf of Maine from Jeffreys Ledge to Great South Channel at depths of 80 to 120 m (260 to 330 feet). NMFS Northeast Fisheries Science Center spring bottom trawl survey biomass index fluctuated between 1.0 kg/tow and 2.0 kg/tow between 1968 and 1988, but has shown a consistent downward trend since the late 1980s. 1997 to 1999 biomass indices were less than 0.2 kg/tow, which is the lowest in the survey time series at about 8% of the 1968-1988 average. This [stock](#) remains overexploited and severely depleted.

Factors for Decline:

They are primarily taken as [bycatch](#) in the otter trawl fishery, although there has been a component taken in mixed trawl fisheries. Recreational catches are insignificant. In the last two decades, U.S. vessels have taken more than 85% of the total Georges Bank-Gulf of Maine catch; the remainder were taken by Canadian fishermen. According to Mayo (2000), the commercial catch of this species in the U.S. has been evenly divided between Georges Bank and the Gulf of Maine since 1970. In 1970, total U.S. landings from this area were approximately 200 metric tons (mt). This increased to approximately 1,200 mt in 1984, but declined sharply to less than 500 mt in 1992. Landings declined even further to 300 mt in 1998, 249.6 mt in 2001, and 163t in 2002 (DFO 2002). In addition to a decrease in population numbers, the average size of an Atlantic wolffish has also declined by over 50% from the 1980s to 2000 with a concomitant change in mass from 1 kg (2.2 lbs) in 1978 to less than 500 g (1.1 lbs) in 1990 to 1999 (O'Dea and Haedrich 2002).

Early life stages are preyed upon by Greenland sharks, Atlantic cod, haddock, and gray seal. Larval cannibalism and spotted wolffish predation also occurs.



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The Atlantic wolffish is also affected by indirect negative impacts from human activities. In 2000, Atlantic wolffish were listed as a species of special concern in Canada. One of the reasons cited for this designation was that in addition to being taken as bycatch, this species is also likely impacted by the degradation of its habitat from trawling and dredging activities (O’Dea and Haedrich 2002). Bottom trawling causes the re-suspension of bottom sediments, which can smother spawning areas, damage gills, and release settled toxic heavy metals. Their nesting habit and the restricted dispersal of larvae, along with slow growth rates, also may limit recovery (COSEWIC 2000).

Status Reviews/Research Underway:

A petition to list this species under the Endangered Species Act was submitted by the Conservation Law Foundation on 1 October 2008. As of 5 January 2009, and based on this petition, the species is a candidate for listing (74 FR 249), and a status review is being conducted to determine whether it warrants listing.

Data Deficiencies:

Currently, population estimates are not available for this species. Also, data regarding stock structure are lacking. Direct studies on factors responsible for the declines observed in wolffish abundance have yet to be conducted.

Existing Protections and Conservation Actions:

In Canada, this species is protected under the Species at Risk Act (SARA) as a special concern species. According to SARA, a management plan must be prepared within five years for a special concern species. In the U.S., Atlantic wolffish have been proposed for addition to the list of managed species under Amendment 16 to the Northeast Multispecies Fishery Management Plan. However, currently, there are no management measures in place for this species.

Atlantic Wolffish SOC Range

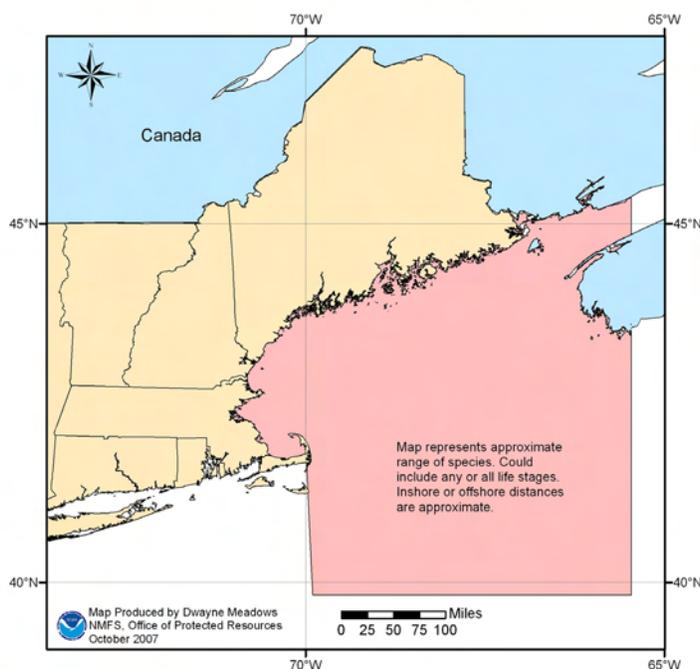


Figure 1. Area of concern for Atlantic wolffish species of concern.



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Videos:

feeding (0:49) <http://www.youtube.com/watch?v=F4yilHauG4M>
in Woods Hole Aquarium, MA (1:47) <http://www.youtube.com/watch?v=jQfZFD08cq8>

References:

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Northeast Fisheries Science Center (NEFSC). 2000. Status of fisheries resources off Northeastern United States - Atlantic wolffish. January 2000. <http://www.nefsc.nmfs.gov/sos/spsyn/og/wolf/>.

O'Dea, N.R. and R.L. Haedrich. 2000. COSEWIC status report on the Atlantic wolffish *Anarhichas lupus* in Canada, In: COSEWIC assessment and status report on the Atlantic wolffish *Anarhichas lupus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 21 p.

O'Dea, N.R. and R. L. Haedrich. 2002. A Review of the status of the Atlantic wolffish, *Anarhichas lupus*, in Canada. The Canadian Naturalist. 116:423-432.

Point(s) of contact for questions or further information:

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301) 713-1401, soc.list@noaa.gov; <http://www.nmfs.noaa.gov/pr/species/concern/>, or Kimberly Damon-Randall, NMFS, Northeast Region, One Blackburn Drive, Gloucester, MA 01930-2295, (978) 281-9328, x6535, Kimberly.Damon-Randall@noaa.gov.