



Photo credit: Marine Biological Laboratory.

### KEY INFORMATION

#### Area of Concern

From Labrador to southern New England in the northwest Atlantic.

**Year Identified as “Species of Concern”**  
2004

#### Factors for Decline

- Fishing

#### Conservation Designations

IUCN: Endangered

American Fisheries Society: Threatened

#### Brief Species Description:

Atlantic halibut can be distinguished from other right-eyed flounders by their large size, concave caudal fin, large, gaping mouth, and arched lateral line (Collette and Klein-MacPhee 2002). This is a long lived species that is slow to mature. Average age at maturity is believed to be about 10 years (Collette and Klein-MacPhee 2002). Large halibut are prolific, producing up to seven million eggs in a single season (Haug and Gulliksen 1988 in Collette and Klein-MacPhee 2002). Females are batch spawners, producing several batches of eggs each year. The spawning period varies depending on location. In Canadian waters, Atlantic halibut spawn from late winter to early spring, and spawning can last through September for fish from Georges Bank to the Grand Banks (Collette and Klein-MacPhee 2002). The range of this species of concern is shown in Figure 1.

Fish up to 12 inches (30 cm) in length feed almost exclusively on invertebrates, fish 12 to 31.5 inches (30-80 cm) in length feed on both invertebrates and fishes, and those greater than 31.5 inches (80 cm) feed almost exclusively on fishes (Kohler 1967 in Collette and Klein-MacPhee 2002).

This is one of the largest fish found in the Gulf of Maine, surpassed only by swordfish, tuna, and some larger sharks (Collette and Klein-MacPhee 2002). The largest halibut recorded was taken off Cape Ann and weighed

620 pounds (280 kg) eviscerated (Collette and Klein-MacPhee 2002). According to Collette and Klein-MacPhee (2002), these large fish are rare; full grown females average 100 to 150 pounds (45.5 to 68 kg) while males tend to be smaller.

These fish are marine, living in coastal to upper slope areas. They are [boreal](#), and bottom-oriented.

#### Rationale for “Species of Concern” Listing:

##### **Demographic and Genetic Diversity Concerns:**

Atlantic halibut are very large, with low to very low productivity (Beverton and Holt 1959, Pauly 1978b; Haug 1990 in Collette and Klein-MacPhee 2002). The Northeast Fishery Science Center (NEFSC) spring and autumn survey data show that biomass within the Gulf of Maine and Georges Bank remains very low. Population size indices have fluctuated considerably since the 1960s, and overall have declined. There is high inter-annual variability since few halibut are caught during these surveys and in some years, no halibut are caught (NEFSC 2002). It is not known if abundance trends in the



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Gulf of Maine and Georges Bank have been influenced by changes in seasonal distribution and availability of Atlantic halibut (NEFSC 2002). The NEFSC spring survey indices for 2002-2005 ranged from a high of 554 metric tons (mt) in 2004 to a low of 83 mt in 2005, while the fall indices for 2002-2004 ranged from 224-228 mt (Mayo and Terceiro 2005).

### **Factors for Decline:**

Atlantic halibut were heavily overfished in the 19<sup>th</sup> century, and there are no signs of recovery to date (Bigelow and Schroeder 1953, Brodziak 2000). Landings data are available from the late 1800s to the present. These data indicate that landings have declined from a high of 4908 mt in 1896 to a low of 17 mt in 1998 and 2000. In 2004, total reported commercial landings increased to 25 mt (Mayo and Terceiro 2005). According to Mayo and Terceiro (2005), in 2004, 36 % of the total landings (9 mt) were landed by U.S. fishermen while the remainder (16 mt) was landed by Canadian fishermen. No estimates of fishing mortality exist; however, exploitation rate indices (annual landings/5-year moving average of survey index) suggest that exploitation rates were relatively stable between the 1970s and 1980s and declined in the 1990s (Mayo and Terceiro 2005). The fall exploitation rate index increased to 0.09 in 2004 (a 28% increase from 0.07 in 2000), but this is still much lower than the rates observed during the 1970s and 1980s (Mayo and Terceiro 2005). The 5-year average stock biomass index was 288 mt in 2004, and based on this, the Gulf of Maine-Georges Bank Atlantic halibut stock remains overfished (Mayo and Terceiro 2005). Because estimates of fishing mortality are unavailable, overfishing status is unknown (Mayo and Terceiro 2005).

Recommended [overfishing](#) definition reference points for halibut are as follows: biomass corresponding to maximum sustainable yield ( $B_{MSY}$ ) = 5,400 mt, and there is currently no fishing mortality rate which results in maximum sustainable yield ( $F_{MSY}$ ) proxy for this stock. The biomass threshold is set at 1/2 of  $B_{MSY}$ , (i.e., 2700 mt). Maximum rebuilding time for this stock is undefined.

Stock structure of Atlantic halibut in the northwest Atlantic is unknown. In a study conducted by Reid et al. (2005), the population structure of Atlantic halibut was analyzed by examining 160 fish from four locations in the northwest Atlantic (Bay of Fundy, Scotian Shelf, Gulf of St. Lawrence, and Iceland). Eighteen microsatellite markers were used in the analysis and results revealed no significant differentiation between samples (Reid et al. 2005). However, the researchers indicated that the uncertainties regarding Atlantic halibut reproductive behavior led to questions regarding whether only a single breeding population had been sampled from each location, and thus, additional studies are needed. The authors concluded that the genetic homogeneity indicated by this study could occur due to several reasons: (1) Atlantic halibut form a single, large interbreeding population throughout the northwest Atlantic; (2) multiple, self-recruiting populations exist with low levels of [gene flow](#) between them; (3) the lack of differentiation could be a result of the [founder effect](#) (e.g., there may not have been enough time since the recent recolonization of the North Atlantic after the last glaciation for significant genetic differences to appear) (Reid et al. 2005).

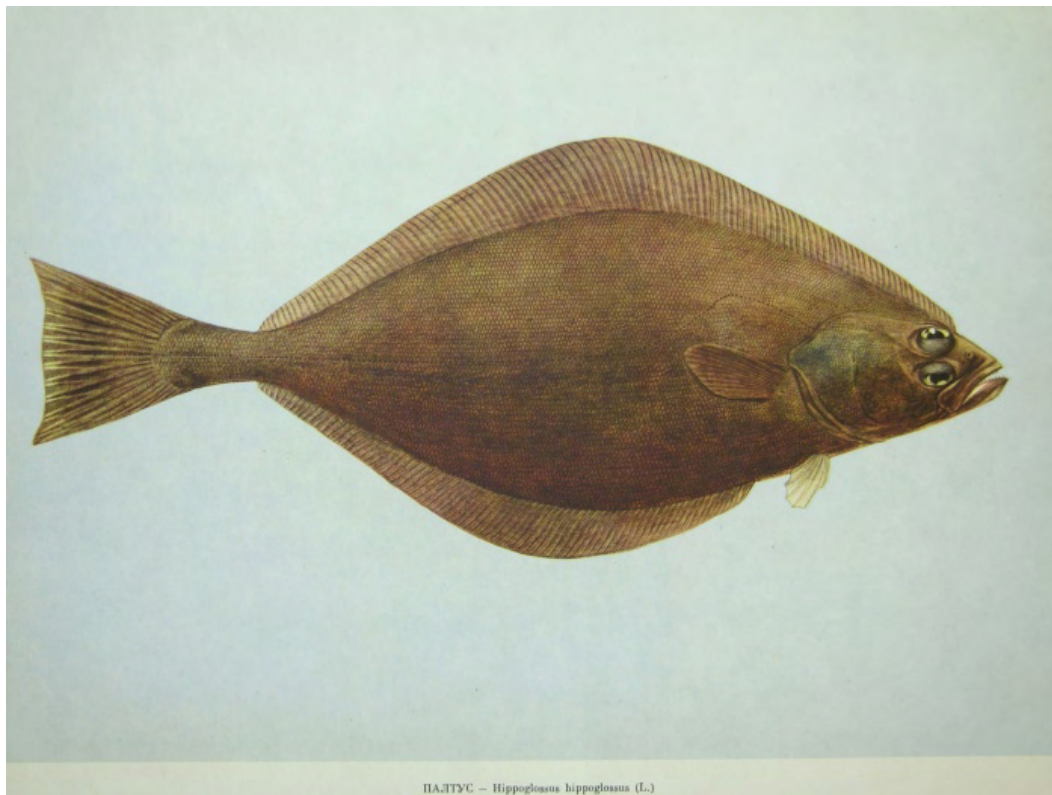
Movements between Georges Bank and Browns Bank were documented in one study from the late 1950s but movement rates were not estimated (Mayo and Terceiro 2005). According to Mayo and Terceiro (2005), preliminary tag/recapture data from the Maine Department of Marine Resources indicate that about 23% of Atlantic halibut recaptures were reported in Canadian waters. Consequently, the population within the Gulf of Maine and Georges Bank is considered a



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transboundary stock, and conservation measures may be needed from both Canada and the U.S. to rebuild this stock.



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### Status Reviews/Research Underway:

None.

### Data Deficiencies:

Very little is known about the biology of northwest Atlantic stocks such as location of spawning events, basic information on egg and larval stages, migratory patterns of juveniles, habitat types utilized by all life stages, and extent of genetic differentiation between [stocks](#). Also, it is unclear to what extent discard rates are affecting the species and how often Atlantic halibut landings are misreported. Additionally, more fishery-dependent data on the size and age composition of Atlantic halibut catches are needed.

### Existing Protections and Conservation Actions:

No directed fishing mortality is permitted ( $F = 0$ ) until the stock is rebuilt (provisional control law). Atlantic halibut was added to the Northeast Multispecies Fishery Management Plan (FMP) in October 1999 (64 FR 55821). Amendment 9 to the FMP implemented a 1 fish halibut possession limit for both commercial and recreational (party/charter) vessels with a minimum size of 36 inches in 1999. A total



prohibition was rejected by the Council because it was believed that such a measure would not provide any substantive conservation benefits, since mortality would still occur due to incidental catch (64 FR 55821). There is no Amendment 13 rebuilding trajectory for Gulf of Maine-Georges Bank Atlantic halibut.

## Atlantic Halibut SOC Range

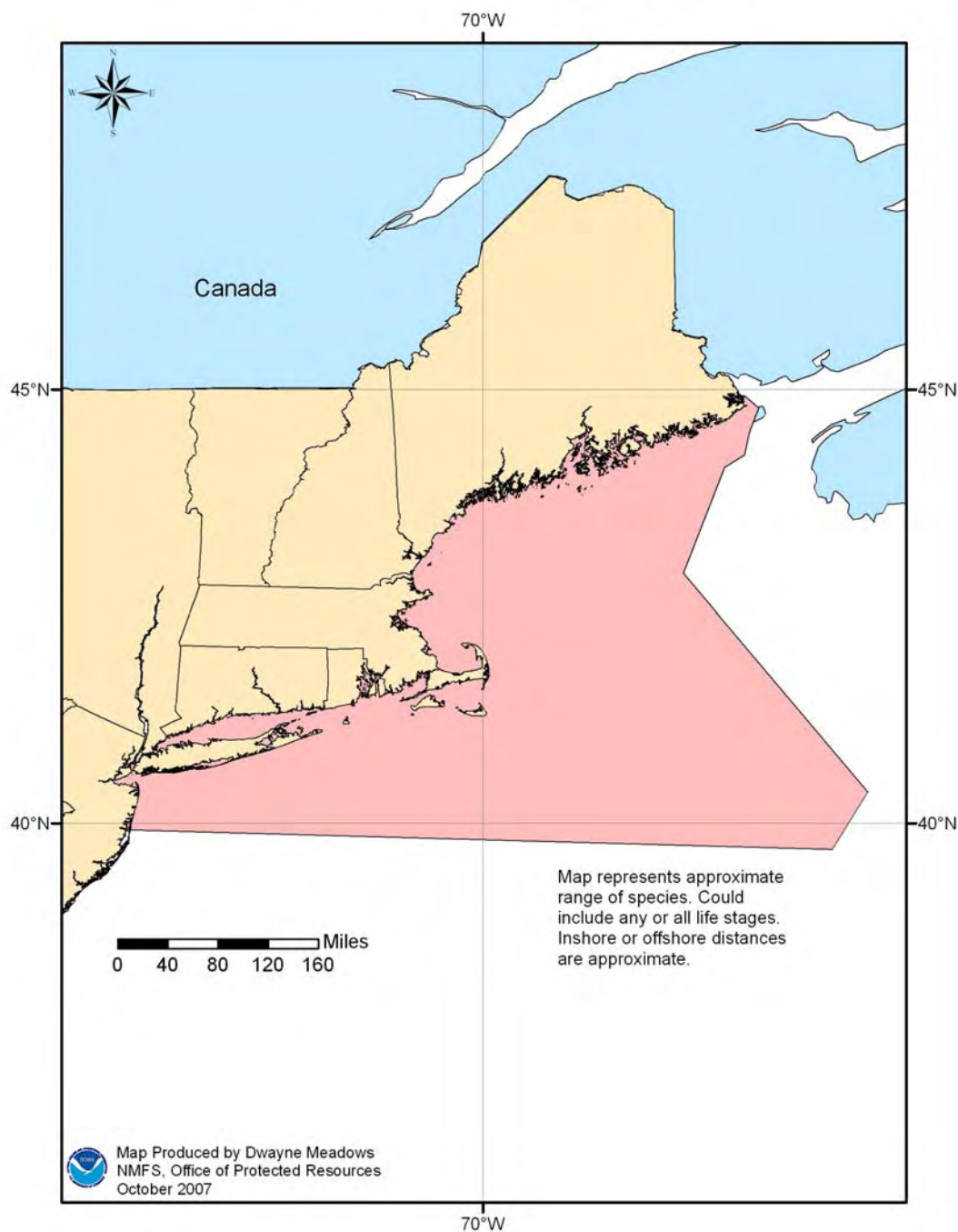


Figure 1. Map of the range of the Atlantic halibut species of concern.



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- Northeast Fisheries Science Center (NEFSC). 2002. Final Report of the Working Group on Re-Evaluation of Biological Reference Points for New England Groundfish. Northeast Fisheries Science Center Ref. Doc. 02-04, 249 p.
- Reid, D.P., S. Pongsomboon, T. Jackson, C. McGowan, C. Murphy, D. Martin-Robichaud, and M. Reith. 2005. Microsatellite analysis indicates an absence of population structure among *Hippoglossus hippoglossus* in the northwest Atlantic. Journal of Fish Biology. 67: 570-576.

### 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](mailto: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](mailto:Kimberly.Damon-Randall@noaa.gov).