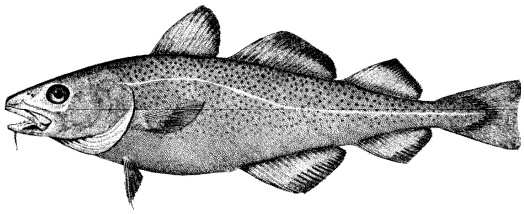
UPDATE OF INDICATORS OF THE STATUS OF THE NORTHERN GULF OF ST. LAWRENCE (3Pn, 4RS) COD STOCK IN 2012



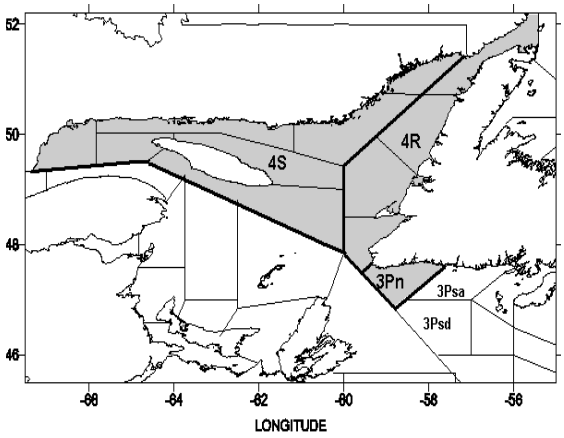


Figure 1. Cod stock management area in the northern Gulf of St. Lawrence. For reference, fishing areas 3Psa and 3Psd are indicated.

Context

The assessment of cod (*Gadus morhua*) in the northern Gulf of St. Lawrence (3Pn, 4RS) (Figure 1) is conducted every two years, with the most recent assessment completed in February 2012. In interim years, a summary review of the resource's main indicators is conducted in order to determine whether major changes in the stock status would warrant more in-depth study prior to the planned assessment in winter 2014. This report was prepared in order to update Fisheries Management with recent information concerning the stock status following 1500 t of commercial fishing in 2012 and unknown recreational fishery landings.

A conservation limit reference point (LRP) was established for the northern Gulf of St. Lawrence cod (Duplisea and Fréchet 2011). This reference point defines the boundary between the critical and cautious zones within the Precautionary Approach framework and it defines the stock level below which the stock has suffered serious harm. According to the most recent assessment (February 2012), the stock was well below the LRP of 116 000 t. For the last 22 years the northern Gulf of St. Lawrence cod stock has been in the critical zone. Catches over the past few years have not allowed the stock to grow. The most recent stock status report indicated that in keeping with the precautionary approach, catches in 2012 and 2013 should be as small as possible. It was recommended to close the commercial and recreational cod-directed fisheries and to implement measures to prevent any increase in bycatches (DFO 2012).

This Science Response from the DFO Canadian Science Advisory Secretariat summarizes the findings of a Science Special Response Process that took place December 17, 2012, at the Maurice Lamontagne Institute, Mont-Joli, Qc.

The stock status for the northern Gulf of St. Lawrence cod was updated based on relevant information collected over the course of 2012. Those attending the meeting reviewed: (1) landings; (2) information from the DFO research survey (1990-2012) (relative abundance and biomass indices); (3) information from the mobile trawl research survey carried out as part of the Sentinel Fisheries Program (1995-2012); and (4) information from the fixed gear Sentinel Fisheries Program (longline and gillnet indices).

Analysis

Reported Landings

Cod landings in the northern Gulf of St. Lawrence exceeded 100,000 tonnes (Figure 2) from 1982 to 1984. Landings then steadily declined until 1993. The fishery was under a moratorium from 1994 to 1996. The moratorium was lifted in 1997. Since then, landings and total allowable catches (TACs) have varied between 1,500 t and 7,500 t, except in 2003 during the second moratorium. Preliminary landings reported for 2012 total 1,293 t for a TAC of 1,500 t. These landings do not include recreational fishery catches because they are not recorded.

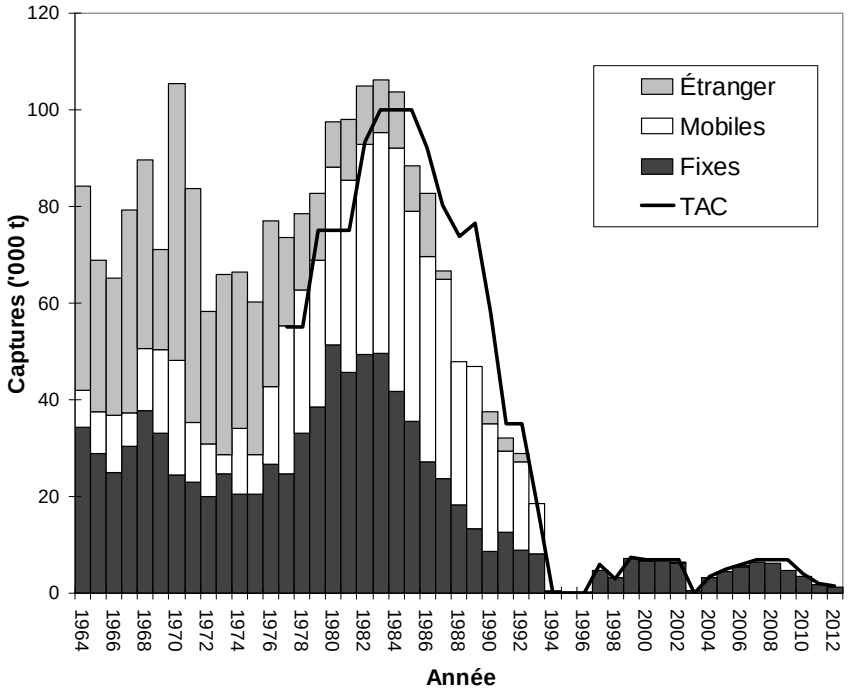


Figure 2. Landings and total allowable catches (TACs) by management year.

Stock Trends

DFO BottomTrawl Research Survey

The DFO trawl survey indicates a sharp decline in the relative abundance and biomass indices for cod between 1991 and 1993, followed by an increase until 2000. The period of increase corresponds with the first moratorium in place from 1994 to 1996 (Figure 3). From 2001 to 2012

the indices fluctuated showing no particular trend. The 2012 relative abundance and biomass index values are equal to the 1990 to 2011 series average and comparable to values from 2000.

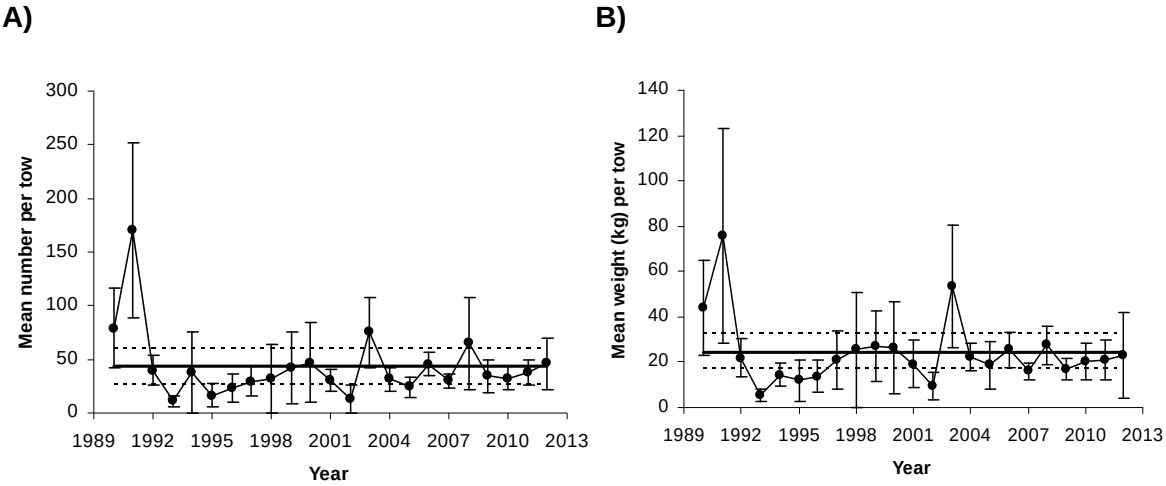


Figure 3. Mean number (A) and weight (B) per 15 minutes tow during the DFO research survey. The error bars indicate 95% confidence intervals. The solid line represents the 1990-2011 series average and the dashed lines ± ½ standard deviation around the series average.

Sentinel Fisheries Program Mobile Gear Survey

This survey followed a depth-stratified random sampling protocol similar to that used in the DFO research survey. In July 2003, three new shallow strata with depths ranging from 10 to 20 fathoms (18 to 37 m) were added in Division 4R. To account for these new strata, the survey index was divided into two periods: (1) an index for the 1995–2012 period based on sampling strata 20 fathoms and deeper, and (2) an index beginning in 2003 including all strata, i.e., 10 fathoms and more (Fréchet et al. 2009).

Indices of 20 fathoms and more (1995-2012)

The indices of 20 fathoms and more from the July Sentinel Fisheries Program Mobile Gear Survey showed an increasing trend in the abundance and biomass of the stock from 1995 to 2001, followed by a decrease in 2002 (Figure 4). The numbers then fluctuated without presenting a clear trend. The 2011 values were the highest of the series. These increases were the result of high catch within one stratum of the Northwest Atlantic Fisheries Organization (NAFO) Division 4R. In 2012, the values were the lowest of the series. This significant decrease is largely due to a widespread reduction in catches in Division 4R.

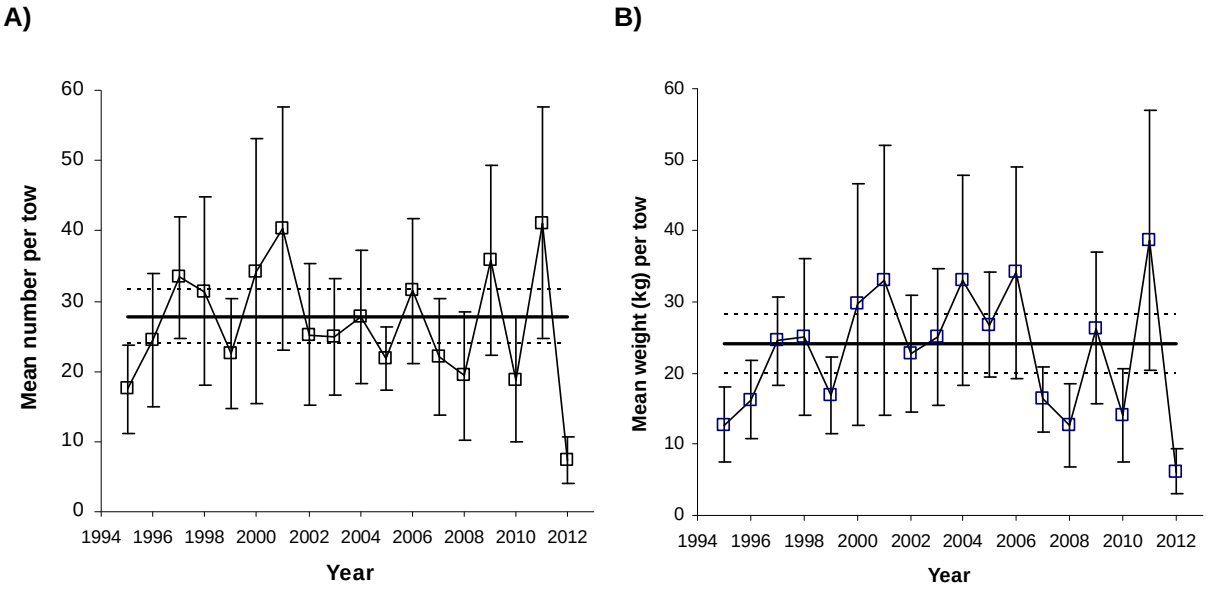


Figure 4.Mean number (A) and mean weight (B) per 30 minute tow observed during the Sentinel Fisheries Program Mobile Gear Survey. The error bars indicate 95% confidence intervals. The solid line represents the 1995-2011 series average and the dashed lines ± ½ standard deviation around the series average.

Indices of 10 fathoms and more (2003-2012)

The index from the Sentinel Fisheries July survey, including all strata, showed no trend in stock abundance and biomass from 2003 to 2011. The 2012 values were however the lowest for this short series.

Sentinel Fisheries Fixed Gear Program

The Sentinel Fisheries Fixed Gear Program using gillnets and longlines (Fréchet et al, 2009, http://ogsl.ca/fr/sentinelles/donnees/fixe.html) includes more than 30 fishing sites operating alternately from January to December. This program's Catch per Unit Effort (CPUE) data allows for the generation of indices of annual trends of cod abundance in coastal waters. The 2012 data presented for this update is preliminary and includes fishing activities that took place from the beginning of January through mid-November.

CPUEs for the two gear types reached a maximum in 2006 and decreased steadily until 2010 (Figure 5) to values below the series average. Both indices increased in 2011 and 2012. This increase is smaller in the longline index where the 2012 value is close to the series average. For gillnet, the index showed a sharp increase in 2011 and remained fairly stable in 2012, presenting a value similar to 2006. This increase seems generalized to all gillnet fishing areas included in the Sentinel Fisheries program.

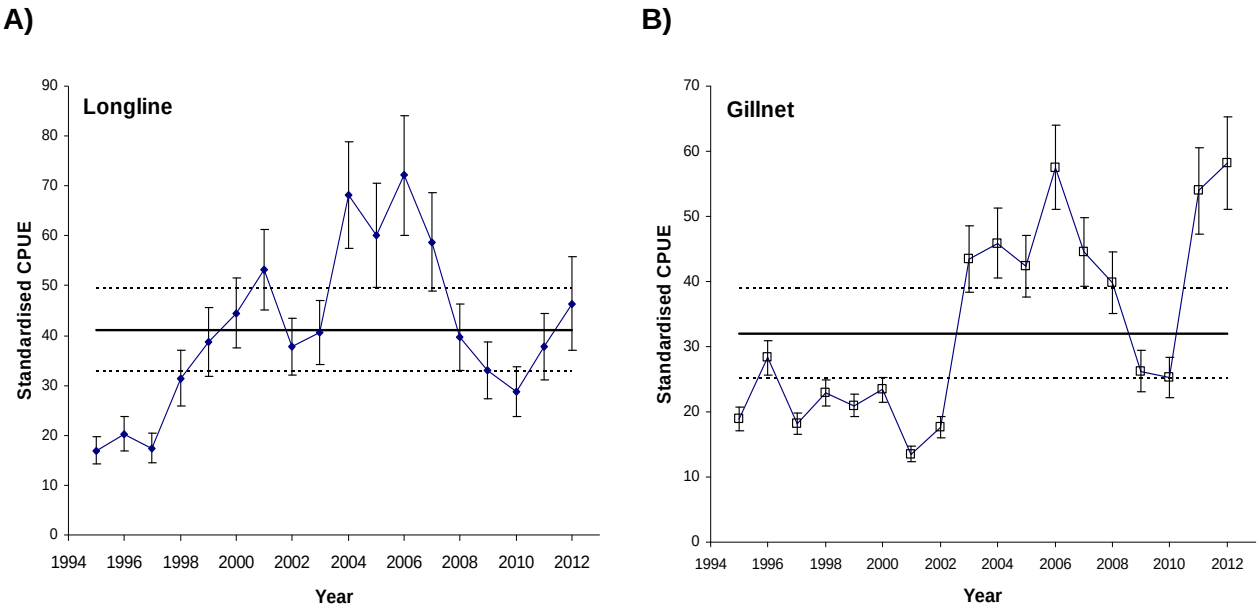


Figure 5. Standardised Catch per Unit of Effort (CPUE) for A) longline, B) gillnet, for the Sentinel Fisheries Fixed Gear Program. The error bars indicate 95% confidence intervals. The solid line represents the series average for 1995-2011, and the dotted lines ± ½ standard deviation around the average.

Conclusions

- The preliminary landings recorded in 2012 were 1,293 t, for a TAC of 1,500 t. These landings do not include recreational fishery catches because they are not recorded. The TAC allocation for the recreational fishery is 80 t.

- No modelling of the spawning stock biomass was completed for this update. However, because the index values observed in 2012 for the DFO Survey, the Sentinel Fisheries Program Mobile Gear Survey and the Sentinel Fisheries Fixed Gear Program were similar to or below those observed in 2011, it can be concluded that the stock still remains in the critical zone and well below the LRP. As a result, the most recent advice remains valid for the 2013 fishing season.

- The most recent Science Advisory Report's conclusion was that the 2012 and 2013 catches should be maintained at the lowest possible level. It was recommended that commercial and recreational directed fisheries be closed and measures be put in place to prevent increase in cod by-catches.

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Date: February 11, 2013

Sources of information

This Science Response Report results from the December 17, 2012 on the 2012 Groundfish and Shrimp Abundance and Biomass Index Trends from the DFO Multidisciplinary Survey in the Northern Gulf of St. Lawrence. Additional publications from this process will be posted as they become available on the Fisheries and Oceans Canada Science Advisory Schedule at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

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Duplisea, D. and Fréchet, A. 2011. Updated Reference Point Estimates for northern Gulf of St. Lawrence (3Pn4RS) Cod (*Gadus morhua*) based on Revised Beginning of Year Weights at Age. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/003 iv + 8 p.

Fréchet, A., Gauthier, J., Schwab, P., Lambert, Y., Le Bris, A. Tournois C., Way, M. and Collier, F. 2009. The status of cod in the northern Gulf of St. Lawrence (3Pn, 4RS) in 2008. DFO Can. Sci. Advis. Sec. Res. Doc. 2009/090. iv + 104 p.

This report is available from the:

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