

Overview: DFO provided background information from the 2012 NAFO Scientific Council Report on the 2013 NAFO total allowable catch recommendation and potential risk implications of different total allowable catch scenarios (Appendix C). NAFO recommends that the total allowable catches in the two areas remain the same, i.e.: 13,000 tonnes for Divisions 0A+1AB, and 14,000 tonnes for Divisions 0B +1C-F. The reasoning is as follows:

Divisions 0A+1AB:

- The total allowable catch was increased from 4,000 tonnes in 2000 to 13,000 tonnes in 2006.¹
- Biomass² and catch per unit effort³ have stayed relatively stable over approximately the past decade.
- Fishing effort has gradually increased.
- The length of caught fish has stayed stable in recent years.
- Note: No specific information was provided in the NAFO report on risk analysis for different total allowable catch scenarios for this area.

Divisions 0B +1C-F:

- The total allowable catch was increased in 2010.¹
- Biomass has generally increased over 14 years.
- Catch per unit effort has been gradually increasing since 2004.
- The length of caught fish has stayed stable in recent years.
- Increasing the total allowable catch by 10% or 15% could lead to an increased fishing mortality (or rate of removal of fish from the stock) that is higher than long-term average levels, which could put this sub-stock at risk.
- The recommended total allowable catch level poses a low risk.

Risk assessment: The NAFO Scientific Council indicated that it could not perform the requested quantitative risk analysis. They did attempt an analysis, but found the “F ratio” method⁴ was very sensitive to yearly changes in biomass estimates and only useful over longer time periods. They recommended investigating this method further. The NAFO Scientific Council also emphasized that current methods for determining turbot age may be inaccurate, and turbot in the area may live longer and grow more slowly than previously thought. It only made qualitative statements about risk at this time.

Prepared By: Anna Magera, Fisheries Management Biologist

Date: October 2, 2012

¹ The combined total allowable catches for Divisions 0A+1AB and Divisions 0B +1C-F were cut back drastically in the mid-1990s, and have been increasing since that time. They are now slightly higher than in the late 1970s-early 1990s (see plot in Appendix C).

² *Biomass* is a measure of the quantity of fish in a stock at a given time, typically measured in a unit of weight such as tonnes.

³ *Catch per unit effort* (or CPUE) is a measure of the amount of fish caught with a standard unit of fishing effort (e.g. number of fish per 1,000 hooks per day, or weight of fish caught or per hour of trawling). Catch per unit effort is one indicator of fish abundance in a stock at a given time and economic efficiency of a fishery.

⁴ The F ratio method uses a ratio of the fishing mortality (or proportion of stock caught in a year) of the oldest age group of fish to the fishing mortality on preceding age group.

Appendix A. Request for NWMB recommendation from DFO



Fisheries and Oceans
Canada

Pêches et Océans
Canada

SEP - 5 2012

Your File Votre référence

Our File Notre référence

Mr. Peter Kusugak
Acting Chairperson
Nunavut Wildlife Management Board
P.O. Box 1379
Iqaluit, Nunavut
X0A 0H0

RECEIVED
SEP 17 2012

Dear Mr. Kusugak,

The Northwest Atlantic Fisheries organization (NAFO) Scientific Council has provided the Department with its Total Allowable Catch (TAC) recommendations for Greenland halibut in Division 0A +1AB and Division 0B+1C-F respectively for the 2013 season.

For 2013, the Scientific Council recommended that the TAC levels for 2013 for Divisions 0A+1AB and 0B+1C-F remain unchanged from 2012 levels (i.e. 13,000t and 14,000t respectively). I would like to note that there was no new biomass data available for Division 0A +1AB for the Scientific Council to assess at its June 2012 meeting. The last survey in this area was done in 2010 and was included in the Scientific Council assessment for the 2012 TAC levels.

The Department is seeking the advice of the NWMB on the recommended NAFO TAC for the respective Divisions. Please find attached the June 2012 meeting report of the Scientific Council for your reference. Relevant sections of the NAFO Scientific Council report are at pages 52-54. Supporting documents including the 2012 Canadian request to the Scientific Council can be found online at the following link:

<http://www.nafo.int/publications/frames/science.html>

I look forward to hearing from the Board on this matter. Your earliest response is appreciated to assist in allowing time for any required follow up discussions and timely opening of the fishery.

Sincerely,

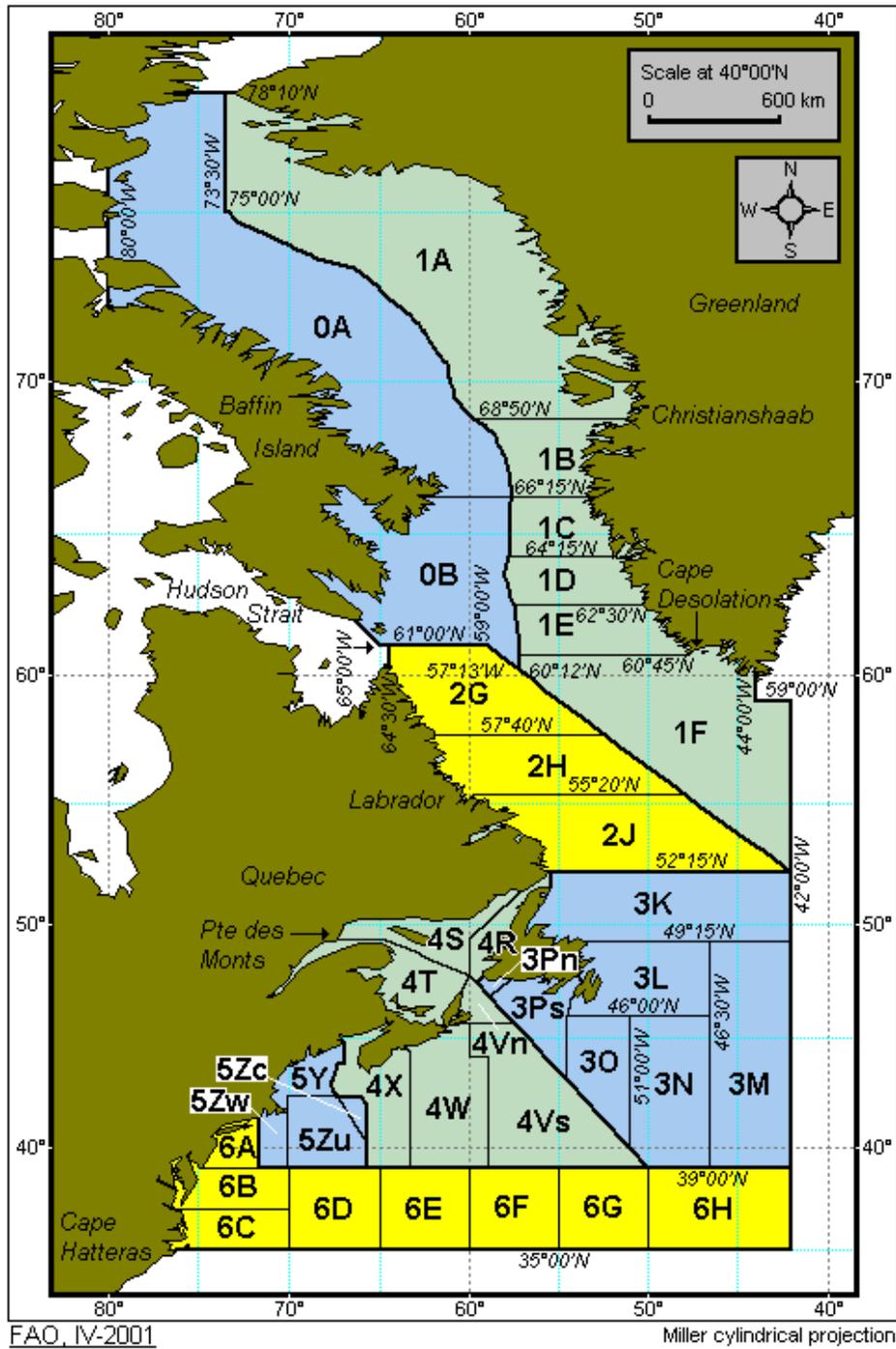

Arthur Willett
A/Director General
Resource Management

Attachment

Canada

Ottawa, Canada
K1A 0E6

Appendix B. Northwest Atlantic Fisheries Organization (NAFO) Divisions



Appendix C. Excerpt from the Northwest Atlantic Fisheries Organization (NAFO) 2012 Scientific Council Meeting Report (NAFO SCS Doc. 12/19, Serial No. N6072, pages 52-54)

2. Coastal States

a) Request by Canada and Denmark (Greenland) for Advice on Management in 2013 (Annexes 2 and 3)

i) Greenland halibut in Div. 0B + Div. 1C-F

The Council, is requested to provide an overall assessment of status and trends in the total stock area throughout its range and comment on its management in Subareas 0+1 for 2013, and to specifically advise on appropriate Total Allowable Catch levels for 2013, separately, for Greenland halibut in the offshore area of Divisions 0A+1AB and Divisions 0B+1C-F. The Scientific Council is also asked to advise on any other management measures it deems appropriate to ensure the sustainability of these resources.

The Scientific Council responded:

Greenland halibut in SA 0 + Div. 1A offshore and Div. 1B-1F

Recommendation: Div. 0A+1AB: Considering the increases in TAC from 4 000 t in 2000 to 13 000 t in 2006, the relative stability in biomass and CPUE indices for Greenland halibut in Div. 0A and 1AB Scientific Council advises for Div. 0A and Div. 1A off shore + Div. 1B that the TAC for 2013 remain unchanged and should not exceed 13 000 t.

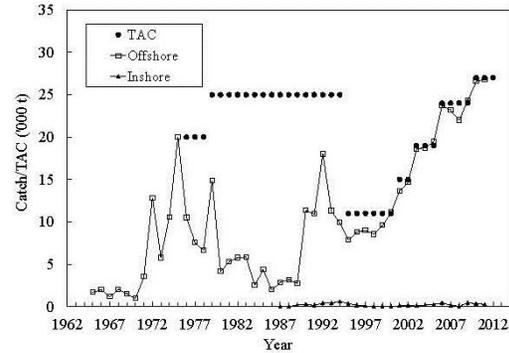
Div. 0B+1C-F: TAC was increased in 2010. The biomass and CPUE indices have been relatively stable. An increase in TAC of 10% or 15% will lead to an increase in Fr (index of fishing mortality) to above the long term mean, therefore an increase in TAC at this time could pose a risk to the sub-stock. Scientific Council advises that there is a low risk to the Greenland halibut in Div. 0B and Div. 1C-F if the TAC for 2013 remains unchanged and should not exceed 14 000 t.

Background: The Greenland halibut stock in Subarea 0 + Div. 1A offshore and Div. 1B-1F is part of a common stock distributed in Davis Strait and southward to Subarea 3. Since 2002 advice has been given separately for the northern area (Div. 0A and Div. 1AB) and the southern area (Div. 0B and 1C-F).

Fishery and Catches: Due to an increase in offshore effort, catches increased from 3 000 tons in 1989 to 18 000 tons in 1992 and remained at about 10 000 tons until 2000. Since then catches increased gradually to 26 900 tons in 2010 primarily due to increased effort in Div. 0A and in Div. 1A but effort was also increased in Div. 0B and 1CD in 2010. Catches were at the 2010 level in 2011.

Year	Catch ('000 t)		TAC ('000 t)	
	STACFIS	21	Recc.	Agreed
2009	25	25	24 ¹	24
2010	27	27	27 ¹	27
2011	27	27	27 ¹	27
2012			27 ¹	27

¹ Including 13 000 t allocated specifically to Div. 0A and 1AB since 2006.

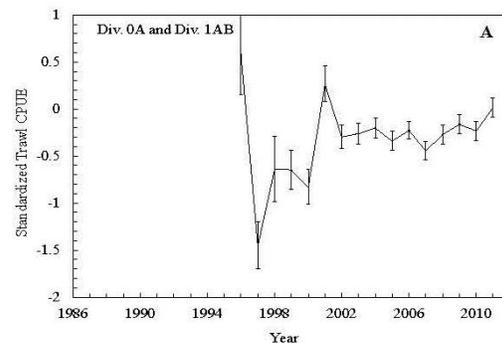


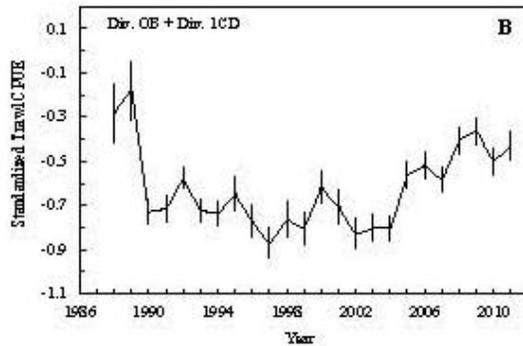
Data: Length distributions were available for assessment from SA0 and SA1. Unstandardized and standardized catch rates were available from Div. 0A, 0B, 1AB and 1CD. Biomass estimates from deep sea surveys in 2011 were available from Div. 0B and Div. 1CD. Further, biomass and recruitment data were available from shrimp surveys in Div. 1A-1F from 1989-2011.

Assessment: No analytical assessment or risk analysis could be performed, therefore only qualitative statements on risk can be provided.

Commercial CPUE indices. Combined standardized catch rates in Div. 0A and Div. 1AB have been stable during 2002-2011.

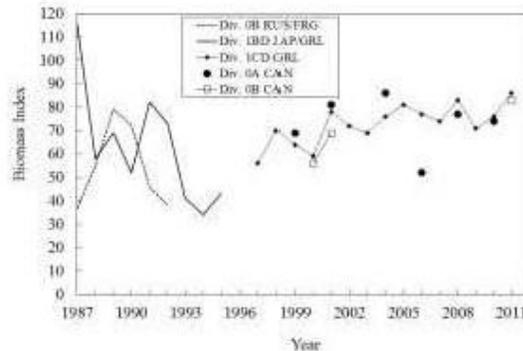
The combined Div. 0B and 1CD standardized catch rates have been stable from 2002 to 2004. Since then the standardized catch rates have increased gradually and were in 2009 at the highest level seen since 1989. CPUE decreased in 2010 but increased again in 2011 and is among the highest in the time series.



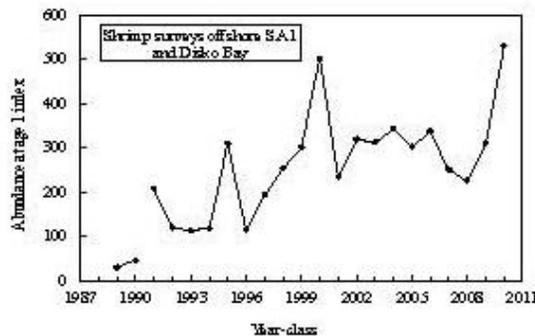


Biomass: The survey biomass index in Div. 0B has increased compared to previous years (2000 and 2001) and was at same level as in Div. 1CD.

The survey biomass index in Div. 1CD has increased gradually over the fourteen year time series and was the highest observed in 2011.



Recruitment: The abundance of the 2000 and 2010 year-classes at age 1 in the entire area covered by the Greenland shrimp survey were the highest in the time series, while the 2002-2006 and 2009 year-classes were above average. The recruitment of the 2007 - 2010 year-class in the offshore nursery area (Div. 1A (South of 70°37.5'N) - Div. 1B) was below average.



Fishing Mortality: Level not known.

State of the Stock: Div. 0A+1AB: Length compositions in the catches have been stable in recent years. Standardized catch rates have been stable in recent years.

Div. 0B+1C-F: Length compositions in the catches and deep sea surveys have been stable in recent years.

Survey biomass in Div. 1CD and Div. 0B has shown an increasing trend. In Div. 1CD the abundance increased between 1997 and 2001 and has been relatively stable since 2002. In Div. 0B the abundance was lower than in 2001 but higher than in 2000.

CPUE indices in Div. 0B and 1CD have shown an increasing trend since 2004, decreased between 2009 and 2010, increased again in 2011 and is among the highest in the time series.

Reference Points: Scientific Council is not in a position to propose reference points at this time.

Special Comments: A quantitative assessment of risk at various catch options is not possible for this stock. An approach using *F* ratio was used. It was noted that the method is very sensitive to annual changes in biomass estimates and the method is only meaningful if changes in *F* and biomass are considered over a range of years. Scientific Council recommended that the method should be investigated further.

Scientific Council noted that there is considerable uncertainty about accuracy in the current age reading methods. Results from validation for the SA0 and Div. 1A (offshore) and Div. 1B-F stock indicate longevity is greater and growth rates lower than previously estimated.

The next Scientific Council assessment of this stock will be in 2013.

Sources of Information: SCR Doc. 12/3, 16, 23, 31; SCS Doc. 12/5, 10, 13, 14.