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Assessment of Other Finfish in NAFO Subarea 1

by

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and

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Abstract

At the NAFO 2008 June meeting Scientific Council is requested to provide advice for 2009 and 2010 on management for any stock of finfish in Subarea 1 of commercial interest, for which data allow a status report. Available survey data for the stocks of American plaice, Atlantic and Spotted wolffish and Thorny skate were analysed, which contributed major parts to the demersal fish assemblage off West Greenland. In general, stocks sizes have declined significantly until the early 1990s and remained low. However, since 2003 some recovery has been observed in the stocks of Atlantic wolffish and especially in Spotted wolffish.

1. Introduction

The NAFO Scientific Council was requested to provide advice on the scientific basis for management in 2009 and 2010 for any stock of finfish in Subarea 1 of commercial interest, for which data allow a status report. Under this item, available survey data for the stocks of American plaice (*Hippoglossoides platessoides*), Atlantic (*Anarhichas lupus*) and Spotted wolffish (*Anarhichal minor*) and Thorny skate (*Amblyraja radiata*) which contributed major parts to the demersal fish assemblage off West Greenland were analyzed, since all of these species commonly occur in the offshore areas of west Greenland.

2. Description of the Fisheries

Fisheries for other finfish such as, American plaice, Atlantic wolffish, spotted wolffish and Thorny skate have been prosecuted by longliners operating both inshore and offshore and by pound net and gillnet fisheries in inshore areas only. These stocks are also taken as by-catch by in offshore trawl fisheries directed to shrimp, cod and Greenland halibut.

Catches from 1995-2007 are listed in Table 1. The resent values were adopted from the Denmark/Greenland research report (SCS 08/11). Catches of spotted and Atlantic wolffish combined where estimated to 604 tonnes in 2007. No catch data was available for American plaice and Thorny skate. The catch figures do not include the weight of fish discarded by the trawl fisheries.

Substantial numbers of finfish are discarded in the shrimp fishery. From Oct. 1 2000, sorting grids have been mandatory in the shrimp fishery in order to reduce the amount of juvenile redfish taken as by-catch significantly (completely implemented in 2002). Results of experimental fishing with 22mm sorting grids show a nearly complete

protection of finfish larger than about 20 cm, but poor protection of the smallest fish (Engelstoft *et al.*, 2001). Studies conducted in 2006 to 2007 have estimated the level of discard of fish in the shrimp fishery to 2.2% of the shrimp catch (Sünksen 2007). In areas 1B to 1E, a major fraction of this by-catch was composed of small American plaice (~0.24 % of the shrimp catch) and only a minor fraction was composed of small wolffishes (Atlantic wolffish ~0.01 % and Spotted wolffish ~0.001 % of the shrimp catch). Recent and historical catch figures do not include the weight of the substantial numbers of small finfish discarded by the trawl fisheries directed to shrimp.

3.1. Input Data

3.1.1. Commercial fishery data

No quantitative information on the amount of juvenile fish in the by-catches of the shrimp fishery was available.

3.1.2. Survey data

EU-German groundfish survey. Annual abundance and biomass indices were derived from stratified-random bottom trawl surveys commencing in 1982 (SCR 08/16). These surveys covered the areas from the 3-mile limit to the 400 m isobath of Div. 1B to 1F, and were primarily designed for cod as target species. In general, all stocks sizes have declined significantly until the early 1990's and remained low since then (Fig. 1-5). However, the stocks of American plaice, Atlantic and spotted wolffish indicate significant recovery potential due to increased recruitment. Whereas American plaice and Atlantic wolffish are presently composed of small and mainly juvenile specimens, Spotted wolffish shows large variation in body length as a result of low catches.

Greenland groundfish/shrimp survey. Since 1988, a shrimp survey was conducted by Greenland covering the Div. 1A to 1F down to 600 m depth (SCR 08/28). Due to changes in survey strategy and sampling of fish, determinations of abundance and biomass indices and length composition were considered comparable since 1992. Abundance and biomass indices of American plaice, Atlantic wolffish and Thorny skate have been low since the beginning of the survey (Fig. 1-5). Abundance and biomass indices of Spotted wolffish increased in 2003 and have remained stable since then although a minor decrease is observed in 2007. All stocks mentioned were dominated by juveniles as derived from length measurements except for Spotted wolffish. As in the EU-German groundfish survey, Spotted wolffish showed high variation in body length without any signs of dominating year-classes.

3.2. State of the stocks

American plaice abundance and biomass has been significantly reduced since the early 1990s (Fig. 1). After an increase predominantly of small fish below 20 cm in 2003 and 2004, both biomass and abundance has decreased again in 2007. The catchability of flatfish by the survey gear is considered poor but the time series seems to represent the stock development.

American plaice SSB was derived from German length disaggregated abundance indices to which a length-maturity ogive was applied (Loret, 1997). During 1982-91, the SSB decreased continuously and remained low until 2002 (Fig. 2). SSB increased in 2003 and 2004, but is still considered to be at low level compared to the early and mid 80's. Recruitment is presented as abundance of small fish 15-20 cm representing age group 5 and indicates an increase above the average level in 2003 and 2004. The recruitment-SSB plot (Fig. 3) indicates both poor recruitment and low SSB.

Atlantic wolffish shows a continuous decrease in survey biomass estimates until 2002, since then a minor increase is observed (Fig. 1). The stock is mainly composed of small fish below 40 cm. The abundant recruiting sizes below 40 cm imply a certain recovery potential. The estimation of Atlantic wolffish SSB and recruitment was performed in the same manner as for American plaice, i.e. using a length-maturity ogive and fish of 15-20 cm representing 3 year old recruits. Since 1982, the SSB decreased drastically and remains severely depleted since the early 1990's (Fig. 4). In contrast, until 1994 recruitment increased almost continuously. Recruitment was at a very low level in 1995, increased again in the late 1990's, although it varied considerably. Recruitment in 2004 increased again to the 1995-1996 levels. The recruitment-SSB plot (Fig. 3) indicates poor recruitment but an increasing SSB (Fig. 5).

Spotted wolffish biomass and abundance indices derived from the EU-German groundfish survey and the Greenland shrimp/Groundfish survey increased since 1999. However, both the Greenland shrimp/groundfish survey and the EU-German groundfish survey GLM model show a decrease in abundance and biomass in 2007 (Fig. 1).

Thorny skate biomass and abundance estimates from the German groundfish survey show a decrease since 2000, but data derived from the Greenland shrimp/groundfish survey fluctuated without a clear trend since 1995 (Fig.1). The size composition is dominated by small fish below 25 cm body length.

In general, stocks sizes have declined significantly until the early 1990s and remained low, although the stocks of Atlantic and spotted wolffish have indicated some recovery.

4.1 Assessment

Due to a lack of adequate commercial data no analytical assessment could be formulated. Therefore, the assessment was based on survey indices.

4.2. Assessment results

The stocks of Atlantic and Spotted wolffish indicate some recovery potential due to increased recruitment, as well as the observed increase in biomass seen within the recent 5 years. Particularly biomass indices for Spotted wolffish have increased in to levels near or above the series means, but strong year-classes that might explain the increase have not been observed. The Atlantic wolffish stock is presently composed of small and mainly juvenile individuals.

Taking the poor stock status of American plaice and Thorny skate into account and the apparent lack of new incoming Spotted wolffish year-classes, even the low amounts of fish taken and discarded by the shrimp fishery might be sufficient to retard the recovery potential of these stocks. The failure of the recruits to rebuild the spawning stocks indicates high mortality rates in excess of the sustainable level. Minimising the by-catch of finfish in SA1 to the lowest possible level would enhance the probability of stock recovery.

The survey estimates from 2007 did not alter the perception of the status of the American plaice, Atlantic wolffish and Thorny skate stocks, although improvements have been observed in the stock of Atlantic wolffish.

4.3. Reference points

Due to a lack of appropriate data, STACFIS was unable to propose any limit or buffer reference points for fishing mortality or spawning stock biomass for American plaice, Atlantic wolffish, Spotted wolffish and Thorny skate in Subarea 1. Nevertheless, the recently depleted spawning stocks as derived from survey results are considered far below appropriate levels of B_{lim} .

References

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Table 1. Reported annual catches and TAC (tonnes) of other finfish in NAFO SA1 (SCS Doc. 08/11). Estimates for Spotted and Atlantic wolffish are combined:

Species	1995	1996	1997	1998	1999	2000	2001 ¹	2002 ¹	2003 ¹	2004 ¹	2005	2006	2007
STACFIS	51	47	68	30	33	64	82	118	393	342	272	655	604
TAC										1000	1000	1000	1000

¹Estimated

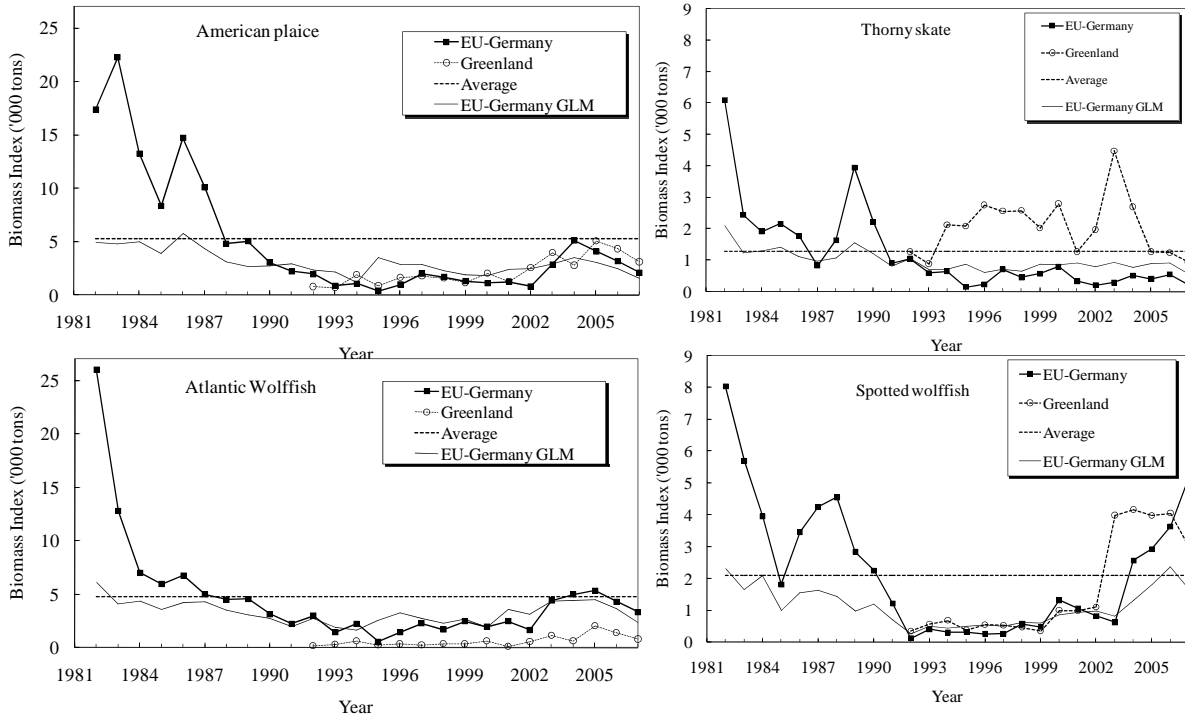


Fig. 1. Finfish in Subarea 1: Estimates of biomass indices from German groundfish surveys and the Greenland shrimp/groundfish survey for American plaice, spotted and Atlantic wolffish and Thorny skate.

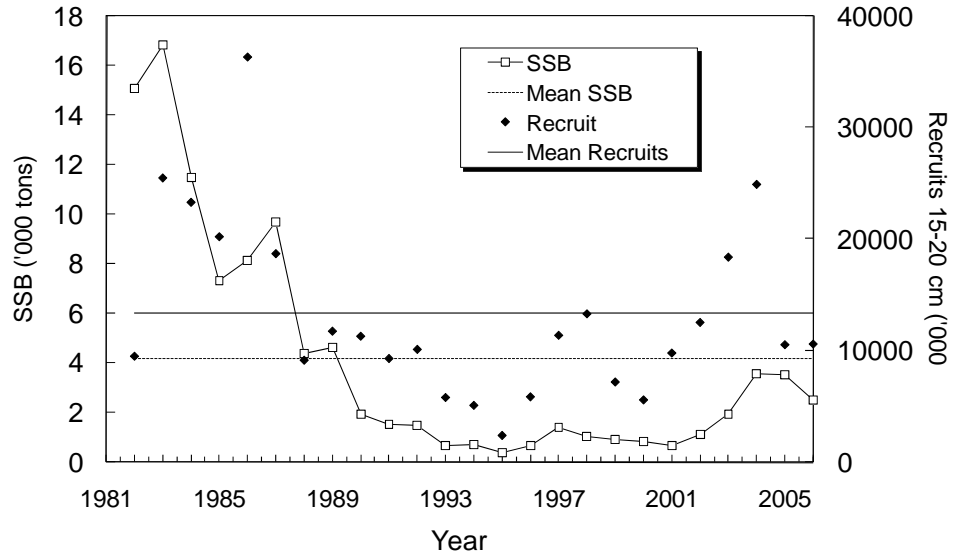


Fig. 2. American plaice in SA1. SSB and recruitment indices as derived from the German groundfish survey.

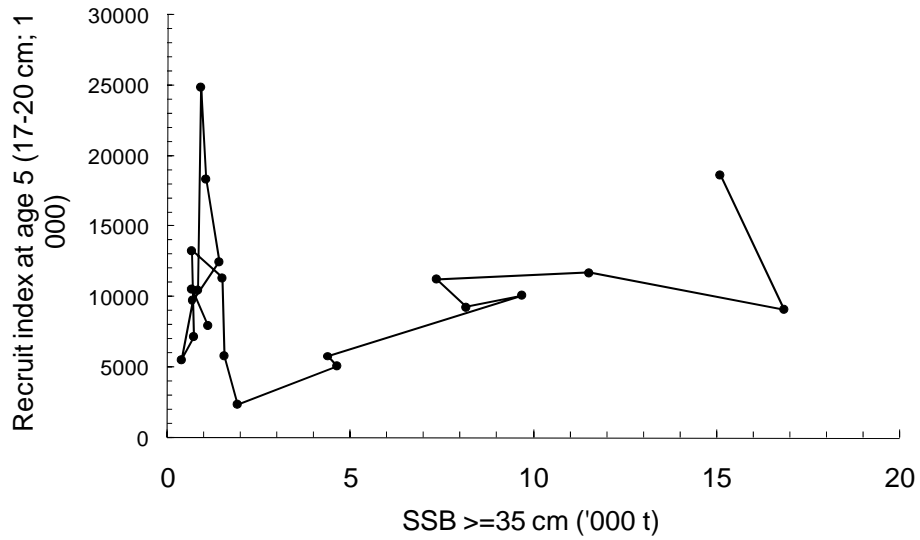


Fig. 3. American plaice Subarea 1. Recruitment at age 5 plotted against SSB 5 years before.

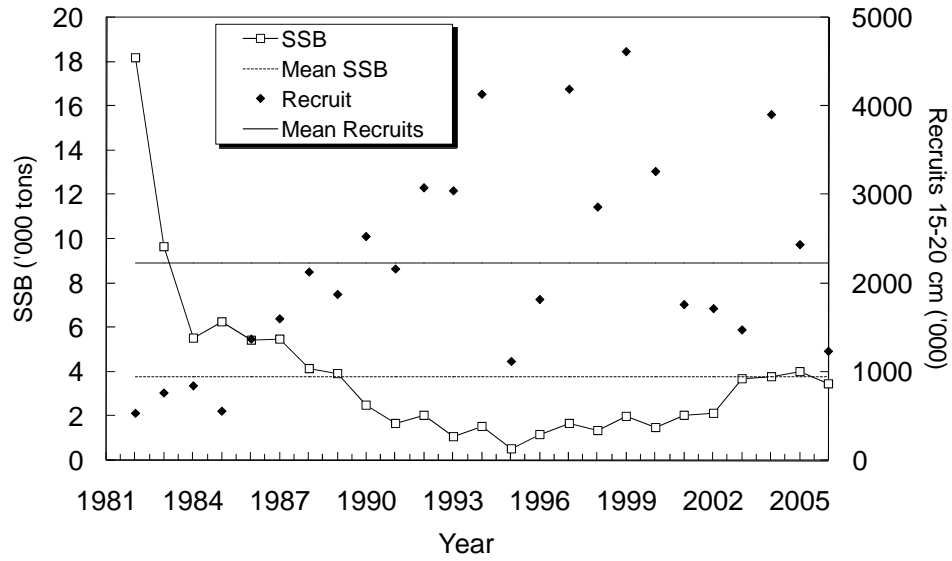


Fig. 4. Atlantic wolffish Subarea 1. SSB and recruitment indices as derived from the German groundfish survey.

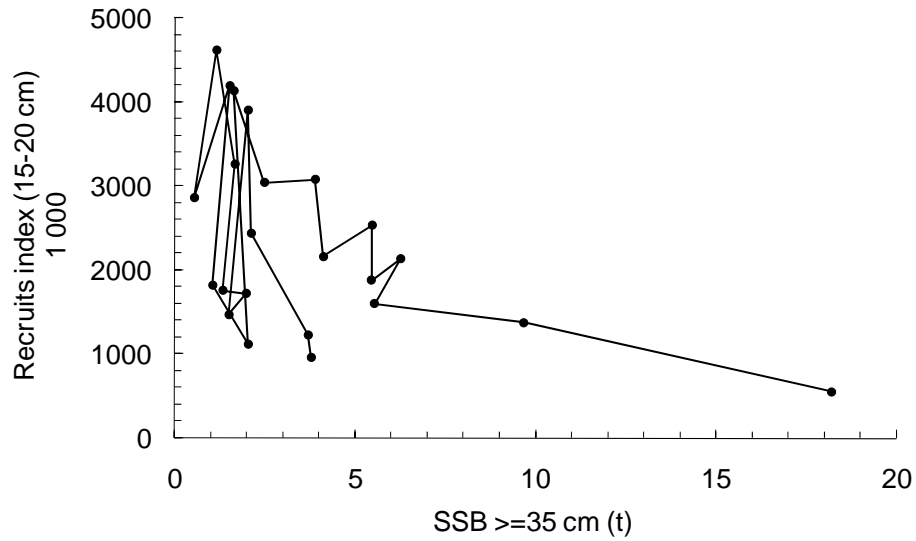


Fig. 5. Atlantic wolffish Subarea 1. Recruitment at age 3 plotted against SSB 3 years before.