Northwest Atlantic Fisheries Organization

Serial No. N5127 **NAFO SCR Doc. 05/41**

SCIENTIFIC COUNCIL MEETING – JUNE 2005

Assessment of Other Finfish in NAFO Subarea 1

by

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Abstract

At the NAFO 2005 June meeting Scientific Council is requested to provide advice for 2006 and 2007 on management 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, 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, the stocks of American plaice, Atlantic and spotted wolfish indicate significant recovery potential due to increased recruitment. They are presently composed of small and mainly juvenile specimens. Good recruitment was also recorded in the cod stock off West and East Greenland and juvenile haddock has been registered in Greenland waters since 2003.

1. Introduction

The NAFO Scientific Council was requested to provide advice on the scientific basis for management in 2006 and 2007 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, Atlantic and spotted wolffish and thorny skate were analysed which contributed major parts to the demersal fish assemblage off West Greenland.

2. Description of the Fisheries

Fisheries for other finfish such as, Greenland cod (*Gadus ogac*), American plaice (*Hippoglossoides platessoides*), Atlantic wolffish (*Anarhichas lupus*), spotted wolffish (*A. minor*), thorny skate (*Raja radiata*), lumpsucker, Atlantic halibut (*Hippoglossus hippoglossus*) and sharks 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, redfish and Greenland halibut. From 1 October 2000, sorting grids are obligatory for the shrimp fisheries and are expected to reduce the amount of by-catches of young finfish.

In 2004 an experimental fishing survey with three Spanish commercial vessels was carried out in Subarea 1, inside the territorial waters of Greenland, from July to December 2004 (Del Rio, 2005). The main catches were Greenland halibut (73%), northern prawn (9%) and cod (5%), but also minor catches of *Sebastes* spp., *Hippoglossoides platessoides* and *Macrourus berglax* has been reported.

For the period 1995-2004, catches are listed in Table 1. The values were adopted from the Denmark/Greenland and Spanish research report (Siegstad, 2005, Gonzalez, 2005). Estimated catches of other finfish in 2003 and 2004 amounted to around 10 000 tons, representing an increase of about 2 000 tons compared to the 2002 catch. This was mainly caused by an increase in catch of lumpfish from 5 800 tons in 2002 to around 8 000 tons in both 2003 and 2004. Catches of wolffish also showed a minor increased from the 2002 level at 120 tons to 400 tons in 2003, and 330 tons in 2004. Atlantic halibut catches decrease from 45 tons in 1999 to less than 1 tons since 2001.

The catch figures do not include the weight of fish discarded by the trawl fisheries directed to shrimp.

3. **Assessment**

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

4.1. **Input Data**

4.1.1. **Commercial fishery data**

The Spanish experimental fishery in NAFO Subarea 1 caught 5.4 tons American plaice (*Hippoglossoides platessoides*) (Del Rio *et al*., 2005). Length composition for American plaice showed that catches was dominated by small fish, less than 20 cm. No data on CPUE of catches of other finfish were available. No quantitative information on the amount of juvenile fish in the by-catches of the shrimp fishery was available.

4.1.2. **Survey data**

EU-German groundfish survey. Annual abundance and biomass indices were derived from stratified-random bottom trawl surveys commencing in 1982 (Rätz and Stransky, 2005). 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 1990s and remained low (Fig. 1-5). However, the stocks of American plaice, Atlantic and spotted wolfish indicate significant recovery potential due to increased recruitment. They are presently composed of small and mainly juvenile specimens.

Greenland-Japan and Greenland groundfish surveys. During 1987-95, cooperative trawl surveys directed to Greenland halibut and roundnose grenadier have been conducted on the continental slope in Div. 1A-1D at depths between 400 and 1 500 m. This Greenland-Japan deep-water survey was discontinued in 1996. From 1997, a Greenland survey was initiated with another vessel and changed gear (Jørgensen, 2005). In 1999, estimates of biomass indices for American plaice were very low and amounted to 135 tons. Very few American plaice has been recorded in the survey since 1999. Therefore, no biomass estimated is available from this survey.

Greenland groundfish/shrimp survey. Since 1988, a shrimp survey was conducted by Greenland covering the Div. 1A to 1F down to 600 m depth (Stor-Poulsen and Jørgensen, 2005). 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, spotted wolffish and thorny skate were very low (Fig. 1-5). All stocks mentioned were dominated by juveniles as derived from length measurements.

4.2. **State of the stocks**

Abundance and biomass of American plaice *Hippoglossoides platessoides* has been significantly reduced since the early 1990s (Fig. 1). The recently increased stock is predominantly composed of small fish below 20 cm, which is evidence in both the EU-German and Greenland survey. The catchability of flatfish by the survey gear is considered poor but the time series seems to represent the stock development. Consequently, the abundant juveniles imply a certain recovery potential.

American plaice SSB was derived from German length disaggregated abundance indices to which a length-maturity ogive was applied (Lloret, 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-1980s. 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 good recruitment despite of at low SSB, which can be the result of improved environmental conditions.

Atlantic wolfish *Anarhichas lupus* 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 30 cm. The abundant recruiting sizes below 30 cm imply a certain recovery potential.

The estimation of Atlantic wolfish 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 (Möller and Rätz, 1998). Since 1982, the SSB decreased drastically and remains severely depleted since the early 1990s (Fig. 4). In contrast, until 1994 recruitment increased almost continuously. Recruitment was at a very low level in 1995, increased again in the late 1990s, although it varied considerably. Recruitment in 2004 increased again to the 1995-1996 levels. However, abundant recruits has still not contribute significantly to the SSB (Fig. 5).

Biomass indices for spotted wolffish derived from the German groundfish survey and the Greenland shrimp/groundfish survey, show a weak increase since 2000 (Fig. 1). The German groundfish survey biomass indices for thorny skate show a decrease since 2000, but data derived from the Greenland shrimp/groundfish survey fluctuated without trend since 1995.

For thorny *Raja radiata* skate the German groundfish survey biomass indices show a decrease since 2000, but data derived from the Greenland shrimp/groundfish survey fluctuated without 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. However, the stocks of American plaice, Atlantic and spotted wolfish indicate significant recovery potential due to increased recruitment. They are presently composed of small and mainly juvenile specimens. Good recruitment was also recorded in the cod stock off West and East Greenland (ICES CM, 2005) and juvenile haddock occurred in Greenland waters (Stein, 2004, M. Storr Poulsen, 2005).

4.3. **Assessment results**

In general, stocks sizes have declined significantly until the early 1990s and remained low. However, the stocks of American plaice, Atlantic and spotted wolfish indicate significant recovery potential due to increased recruitment. They are presently composed of small and mainly juvenile specimens.

Based on the above it can be concluded that the status of these stocks remains depleted. Taking the poor stock status of American plaice, Atlantic wolffish, spotted wolffish and thorny skate into account; even low amounts of fish taken and discarded by the shrimp fishery might be sufficient to retard the recovery potential of these stocks. The continued failure of the recruits to rebuild the spawning stocks indicates high mortality rates in excess of the sustainable level. The probability of stock recovery would be enhanced by minimising the by-catch of finfish in SA1 to the lowest possible level. The application of obligatory sorting grids since 1 October 2000 should help to reduce these by-catches.

4.4. **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. Official annual nominal catches of other finfish in Subarea 1 (Siegstad, 2005, Del Rio, 2005).

Nominal reported catches (tons) are as follows:

Species	1995	1996	1997	1998	1999	2000	2001[1]	2002[1]	2003[1]	2004[1]
Greenland cod	2 526	2 117	1 729	1 717	1899	931	1152	939	1288	963
Wolffishes	51	47	68	30	33	59	75	118	393	334
Atlantic halibut	23	34	22	22	45	9	1	1	0	4,3[2]
Lumpsucker	447	425	1 158	2 143	3058	1211	3216	5795	8832	8199
Sharks	46	135	nd	nd	nd	nd	nd	nd	nd	3
Non-specified finfish	618	609	1 269	588	nd	769	589	584	475	663
Sum	3 711	3 367	4 246	4 500	5035	2979	5033	7437	10988	10162

[1]Estimated - [2]Including catches from the spanish experimental fishery

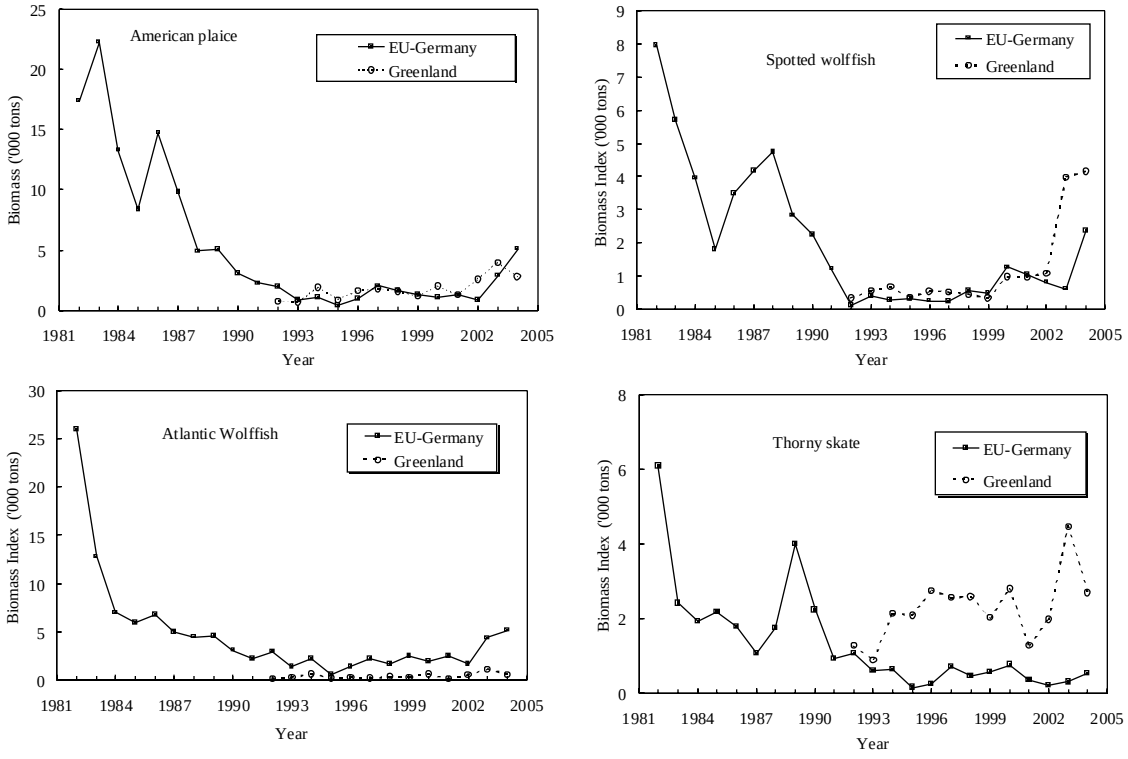

Fig. 1. Finfish in Subarea 1: Estimates of biomass indices from German groundfish surveys and the Greenland shrimp/groundfish survey for American plaice, spotted and Atlantic wolffish and thorny skate.

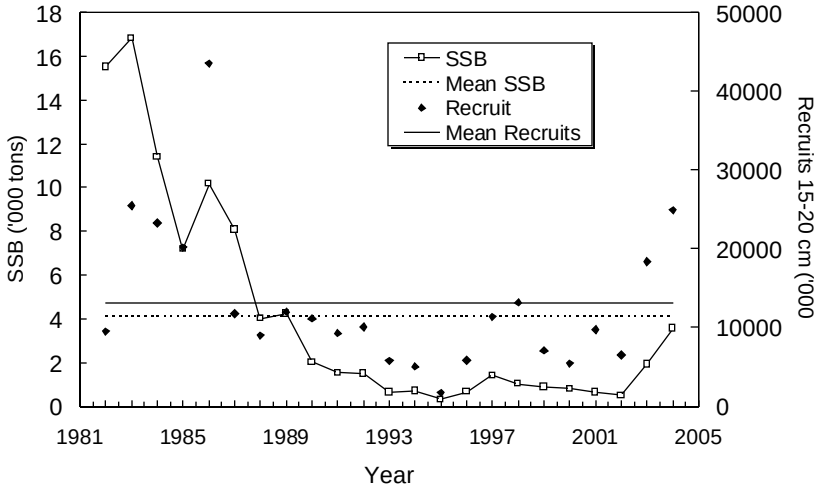

Fig. 2. American plaice Subarea 1. SSB and recruitment indices as derived from the German groundfish survey.

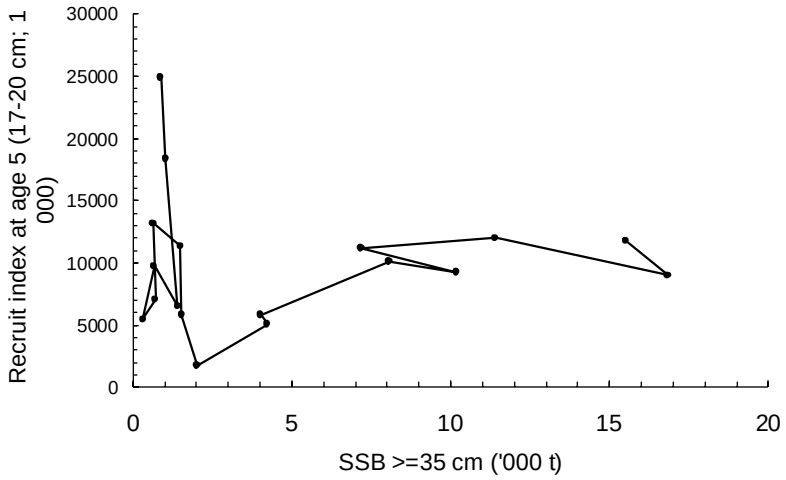

Fig. 3. American plaice Subarea 1. SSB-recruitment plot.

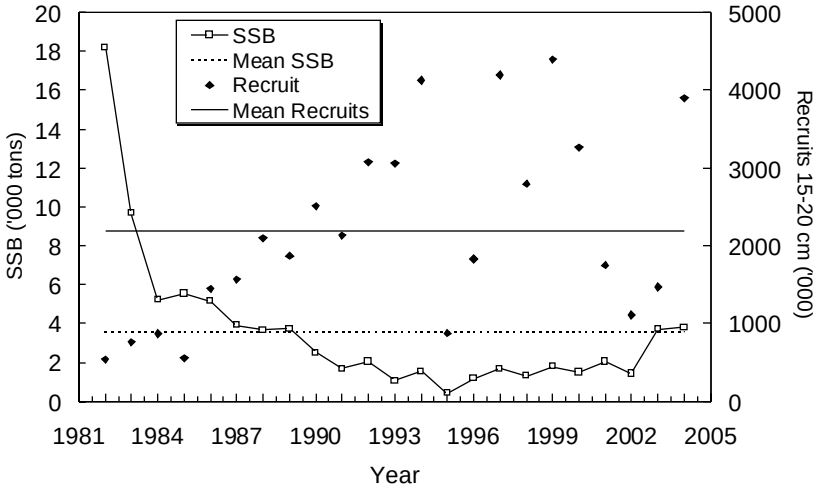

Fig. 4. Atlantic wolffish Subarea 1. SSB and recruitment indices as derived from the German groundfish survey.

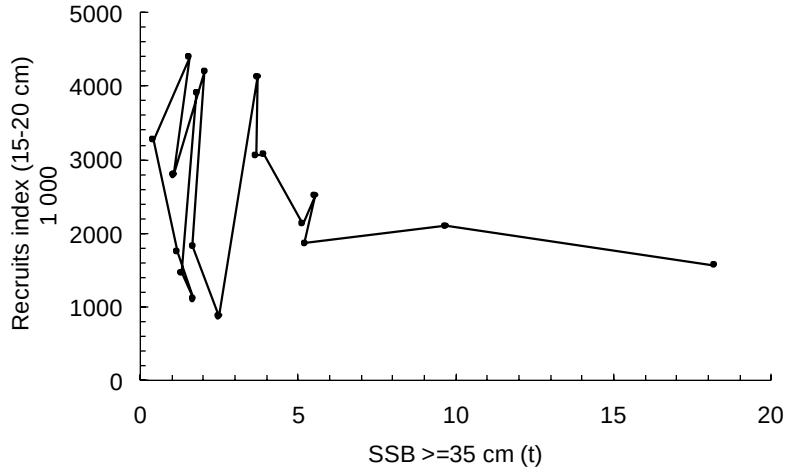

Fig. 5. Atlantic wolffish Subarea 1. SSB-recruitment plot.