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Assessment of Other Finfish in NAFO Subarea 1

by

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Abstract

At the NAFO 2011 June meeting Scientific Council is requested to provide advice for 2012 and 2013 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 Atlantic wolffish (*Anarhichas lupus*), spotted wolffish (*Anarhichas minor*), American plaice (*Hippoglossoides platessoides*) and thorny skate (*Amblyraja radiata*) 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 in general have some indications of recovery with increasing survey indices since 2002, which coincides with the implementation of sorting grids in shrimp trawl fishery.

Introduction

The NAFO Scientific Council was requested to provide advice on the scientific basis for management in 2012 and 2013 for any stock of finfish in Subarea 1 of commercial interest, for which data allow a status report. Atlantic wolffish (*Anarhichas lupus*), spotted wolffish (*Anarhichas minor*), American plaice (*Hippoglossoides platessoides*) and thorny skate (*Amblyraja radiata*) were analysed, which contributed major parts to the demersal fish assemblage off West Greenland.

Description of the Fisheries

Atlantic wolffish and spotted wolffish.

Catch statistics for both wolffish species are combined, since no species-specific data are available from logbooks or factory landings reports. Catches of wolffish in SA1 were at a level around 5000 t/yr from 1960 to 1980 (Table 1. and Fig 1.). Catches then decreased to <100 t/yr during the 1980s and remained low until 2002. The majority of the catches since 2002 of wolffish originate from factory landing reports implying that catches are mainly taken inshore by small vessels less than 30 feet, since these vessels are not obligated to provide logbooks.

American plaice

Catches of American plaice developed during the 1970s, decreased in the beginning of the 1980s and has been at a very low level since then (Table 1. and Fig 2). The potential by-catches of skates are unlikely to have been included in the catch statistics.

Thorny skate

Catches of thorny skate are reported as skates combined (SKA), but it seems likely that thorny skate constitutes a significant proportion of the reported catches. Catches or reporting seems to have been sporadic but were >100 t/yr in 1984 and 1985 (Table 1. and Fig 3.). Since then catches seems to have been insignificant.

All of these species are also taken as by-catch in the trawl fisheries directed to shrimp, cod, redfish and Greenland halibut. To reduce the number of juvenile fish discarded in the trawl fishery targeting shrimp, sorting grids have been mandatory since October 2000 (fully implemented offshore since 2002), resulting in a nearly complete protection of larger individual depending on the species in question. The by-catch of juvenile finfish discarded in the shrimp fishery after the implementation of sorting grids has been estimated to ~0.24 % American plaice, ~0.01% Atlantic wolffish and ~0.001% spotted wolffish, of the shrimp catch. The catch figures do not include the weight of fish discarded by the trawl fisheries directed to shrimp. In recent years, there have been no reported catches or by-catch of American plaice or skates in either logbooks or factory landing reports from SA1.

Assessment

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

Commercial fishery data

No data on length distribution in catches were available. Wolffish do appear in the logbooks but since wolffish are not the target species no CPUE is presented. Skates and American plaice do not appear in logbooks or in factory landings reports. Also, no quantitative information on the amount of juvenile fish discarded in the by-catches of the shrimp fishery was available.

Survey data

The EU-Germany groundfish survey. Annual abundance and biomass indices were derived from stratified-random bottom trawl surveys commencing in 1982, covering NAFO 1BCDEF from the 3-mile limit to the 400 m isobaths (SCR 11/04).
The *Greenland shrimp fish survey*. Annual abundance and biomass indices were derived from the random stratified bottom trawl survey commencing in 1988, covering NAFO 1ABCDEF from 50 to 600 m isobaths (SCR 11/24).

Spotted wolffish:

Biomass indices decreased significant in the 1980s in the EU-Germany groundfish survey, but increased in both surveys after 2000 to above average levels (Fig 4.). No distinct new incoming year classes were observed prior to the increasing biomasses and the surveys may not fully cover the distribution of this stock. The stock consists of all sizes including very large individuals with no signs of distinct year-classes, except for a mode at 12 cm in 2010 (Fig 9).

Atlantic wolffish:

Biomass indices decreased significant in the 1980s in the EU-Germany groundfish survey (Fig. 4). From 2002 to 2005 biomass indices increased in both surveys to above average levels. After 2005 the biomass has shown a decreasing trend in both surveys. The stock is mainly composed of individuals less than 45 cm with almost no individuals above 60 cm (Fig 9). The Atlantic wolffish spawning stock biomass was estimated assuming knife edge maturity at 35 cm applied to the length disaggregated abundance indices derived from the EU-German survey. Recruitment was estimated as the abundance of length groups 15-20 cm, taken as proxies for Atlantic wolffish recruitment at age 3.
Since 1982, the SSB decreased drastically and remained severely depleted until the early 1990s (Fig. 5). In contrast, recruitment increased almost continuously until 1994 and has varied considerably since then. The SSB plotted against recruitment at age 3 reveals decreasing values of both SSB and recruitment (Fig 6). The stock is mainly composed of small fish below 45 cm (Fig 9), which might imply a certain recovery potential. However, in during the past 5 years both SSB and recruitment has been at a low level.

American plaice:

Biomass indices decreased significant in the 1980s in the EU-Germany groundfish survey. From 2002 to 2005 biomass indices increased somewhat, but has since then decreased again. The general trend has however been increasing during the past decade (Fig. 4). American plaice SSB was derived from German length disaggregated abundance indices to which a length-maturity ogive was applied. During 1982-91, the SSB decreased continuously and remained low until 2002 (Fig. 7). 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. From 2005 to 2009, both SSB and recruitment decreased to pre 2003 levels. In 2010 however SSB has increased again and the highest recruitment value is seen since the 1980s. The SSB plotted against recruitment at age 5 reveals decreasing values of both SSB and recruitment, with a few incidents of high recruitment (Fig 8). The stock is mainly composed of individuals less than 35 cm (Fig 9.).

Thorny skate:

Biomass indices decreased significant in the 1980s in the EU-Germany groundfish survey and have remained at low levels since 1991 (Fig 4.). In the Greenland shrimp-fish survey some of the lowest index values are found within last 6 years. Length distributions of thorny skate typically reveals clear modes at 12-13 cm but also at 43 to 45 cm (Fig 9).

Assessment results

Spotted wolffish
Biomass indices for spotted wolffish are currently above average values in the EU-Germany groundfish survey. No new distinct year-classes can be identified in the length distributions in past years, and the increasing biomasses since 2002 may rely on immigration from areas not covered by the surveys. This could be inshore where the majority of wolffish catches takes place. The stock cannot reliably be assessed with the given data.

Atlantic wolffish
The Atlantic wolffish stock in SA1 is mainly composed of small individuals. After an apparent increase in biomass from 2002 to 2005 the indices have decreased again in the EU-Germany groundfish survey, and indices are far below the values of the beginning of the time series. Nevertheless, the Stock of Atlantic wolffish has shown some recovery potential due to increased recruitment and slightly increasing biomass trends in the past decade.

American plaice
The stock of American plaice has shown recovery potential with incidents of higher recruitment and increasing biomass indices in both surveys since 2002. Nevertheless, the biomass indices of the EU-Germany groundfish survey are far below their initial values of the 1980s. The stock is mainly composed of individuals less than 30 cm. The stock must be regarded below appropriate levels.

Thorny skate
Length distributions of thorny skate typically reveals clear modes at 12-13 cm but also at 43 to 45 cm. Biomass indices in both surveys are far below their initial values, and the stock seems to be in a poor condition.

The general increasing indices of all species (except thorny skate) since 2002 coincides with the full implementation of sorting grids in the trawl fishery directed to shrimp, which could imply the success of these initiatives. It is recommendable that sorting grid should also be fully implemented on the smaller vessels targeting shrimp inshore.

References

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Nygaard R. and Jørgensen O.A. 2011. Biomass and abundance of demersal fish stocks off West Greenland estimated from the Greenland Shrimp-Fish Survey, 1988-2010. NAFO SCR Doc. 11/24, Ser. No. N5908.

Table 1. Annual nominal catches of other finfish in Subarea 1 derived from Statlant 21

Year	Wolffish	American plaice	Skates
1960	4403	15	
1961	5560		2
1962	4943	9	2
1963	6113	44	9
1964	4853	5	11
1965	5779	43	3
1966	5385	14	9
1967	5123	58	8
1968	4559	62	18
1969	3553		
1970	3103	133	
1971	2510	786	5
1972	3276	101	
1973	4879	1163	1
1974	6294	1978	2
1975	6378	2311	9
1976	6105	1865	3
1977	6259	3459	
1978	6212	5563	
1979	16655	5503	42
1980	5412	1300	
1981	3426	161	
1982	3929	884	
1983	3269	73	
1984	1830	1	143
1985	1804	9	102
1986	1667	5	1
1987	29		
1988	1876		2
1989	1009		
1990	603		
1991	340	2	
1992			
1993			
1994			7
1995	51		
1996	47		2
1997	68		
1998	30	4	
1999	85	3	
2000	59		14
2001	75	3	5
2002	118		9
2003	393		10
2004	313		3
2005	524		3
2006	764		2
2007	880		
2008	1195		2
2009	1175[1]		9
2010	1315[1]		

[1] Provisional (Greenland catch and Statlant 21 combined)

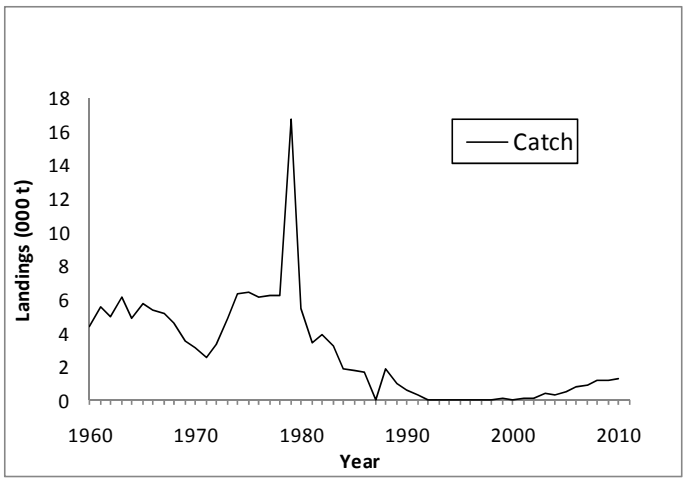

Fig 1. Catches of spotted wolffish and Atlantic wolffish in SA1 combined from 1960 to present.

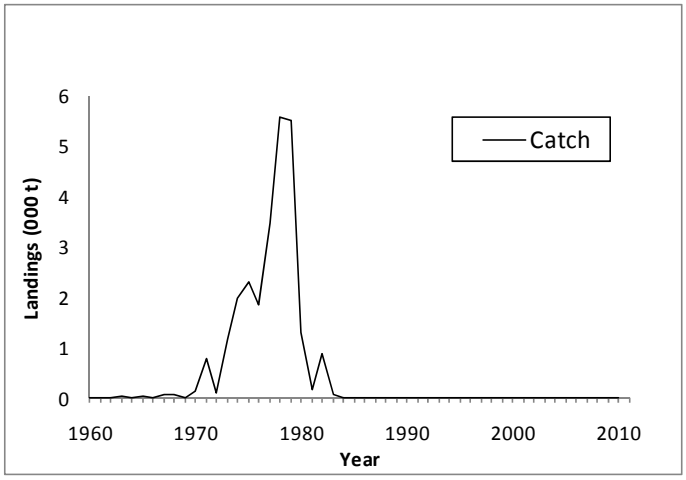

Fig 2. Catches of American plaice in SA1 from 1960 to present.

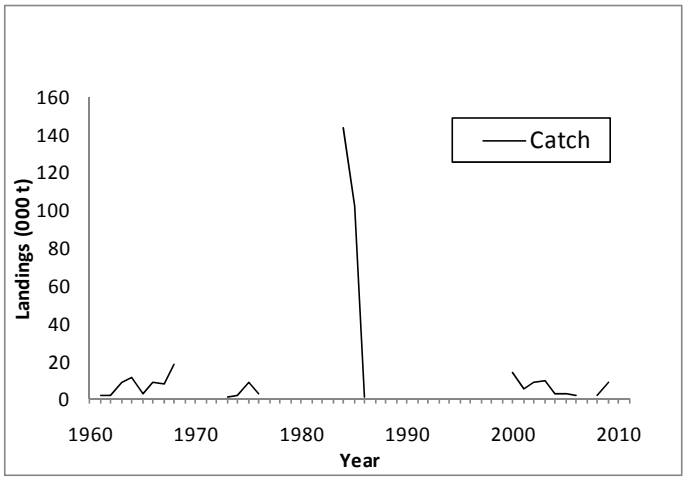

Fig 3. Catches of skates in SA1 from 1960 to present.

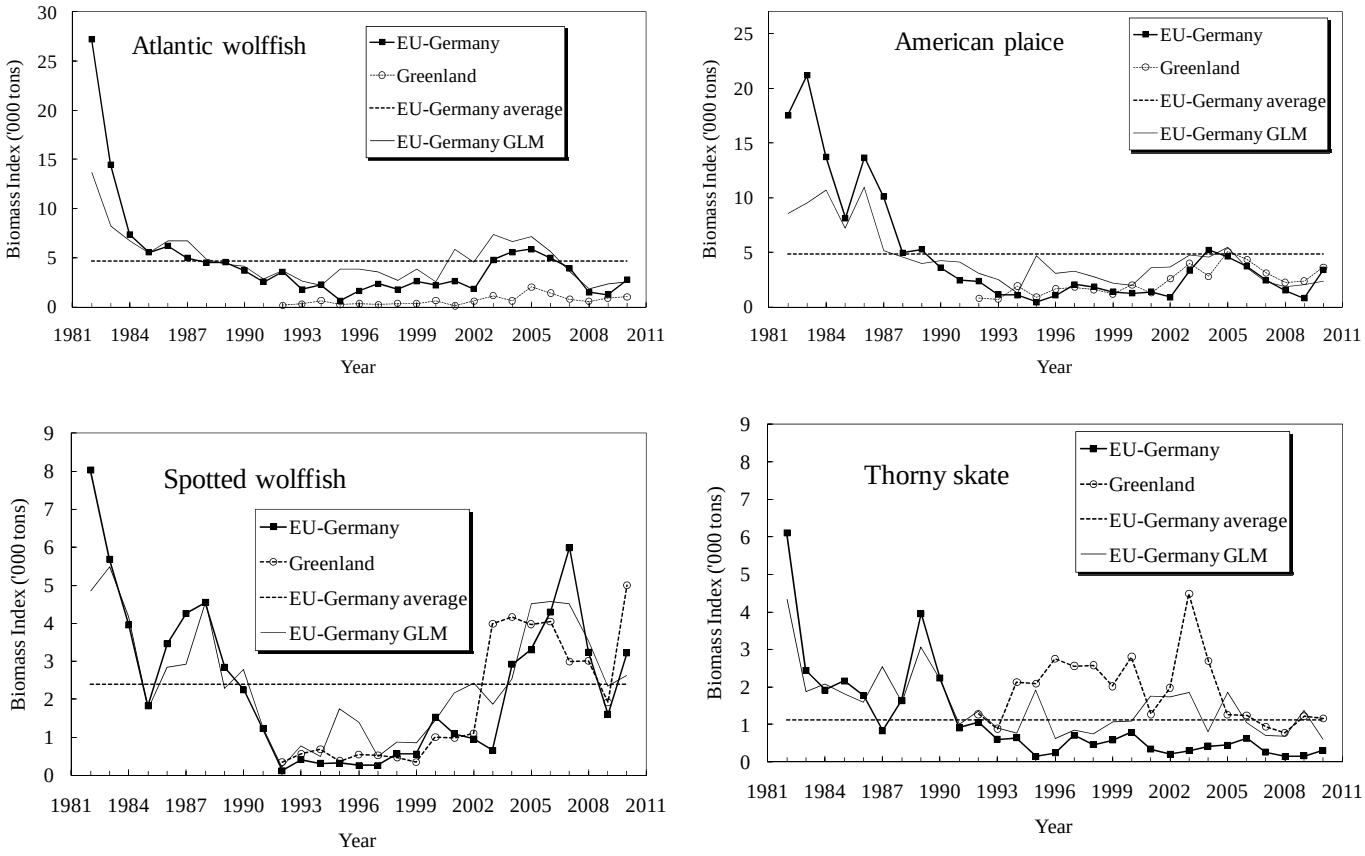

Fig. 4. Finfish in Subarea 1: Biomass indices from The Eu-Germany groundfish surveys and the Greenland shrimp/groundfish survey for American plaice, spotted wolffish, Atlantic wolffish and thorny skate.

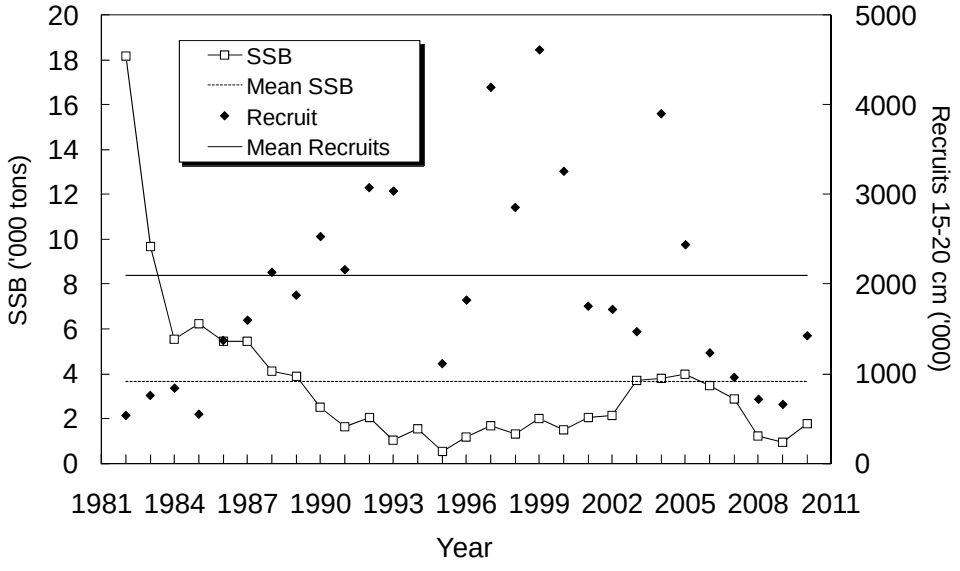

Fig. 5. Atlantic wolffish Subarea 1. SSB and recruitment indices as derived from the Eu-Gernany groundfish survey.

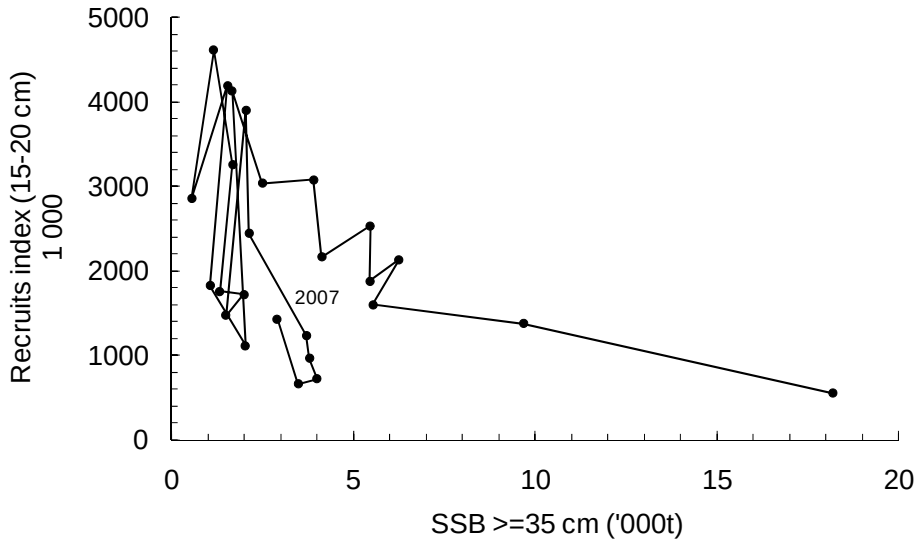

Fig. 6. Atlantic wolffish Subarea 1. SSB-recruitment plot.

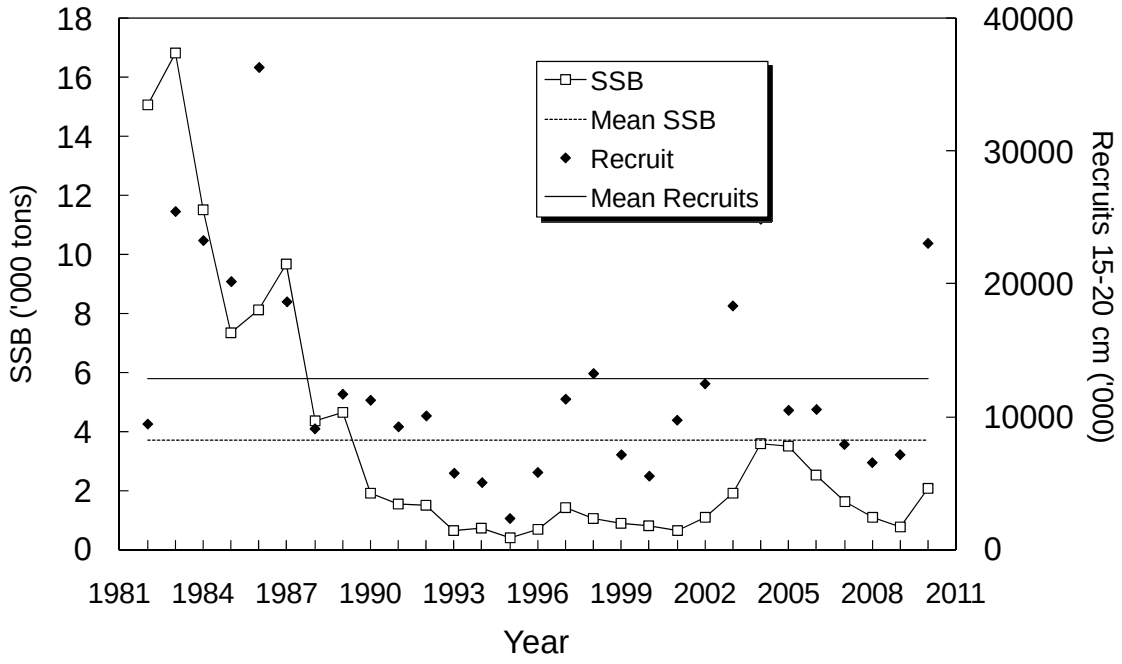

Fig. 7. American plaice Subarea 1. SSB and recruitment indices as derived from the EU-Germany groundfish survey.

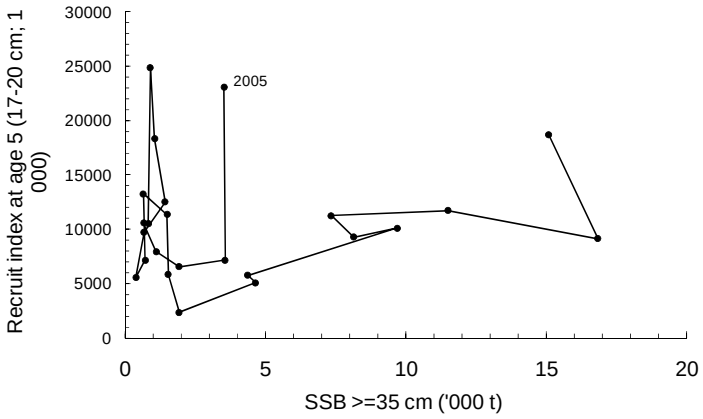

Fig. 8. American plaice Subarea 1. SSB-recruitment plot.

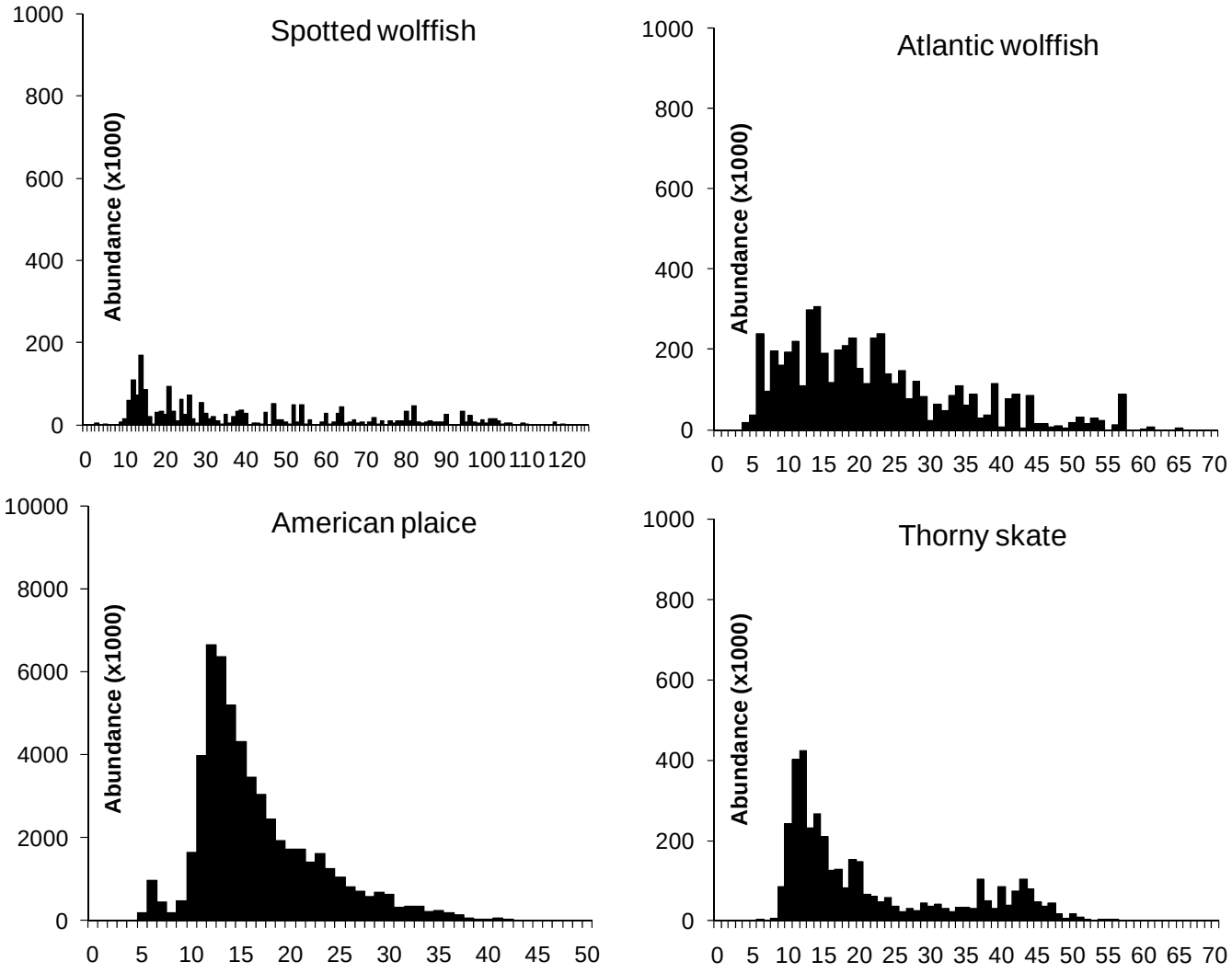

Fig 9. 2010 Length distributions derived from the Greenland Shrimp-Fish survey.