

A Note on the Plausibility of the New Baseline Estimate of Halibut Abundance

R A Rademeyer and D S Butterworth

May 2009

The New Baseline SCAA assessment (Butterworth and Rademeyer, 2009) of the 2+3K-O halibut resource yields an estimate of the 2008 exploitable biomass (which we approximate here as the biomass of ages 5-9) of 326 000 tons, which compares with that from XSA (Healey and Mahé, 2008) of 68 000 tons.

The much higher estimate from the SCAA begs the question of realism - could halibut abundance be so high in absolute terms? We attempt here to address this issue coarsely by means of a comparison of the implied biomass per unit area ("density") of halibut in Division 2+3K-O with that in Divisions 0, 1 and 4RST.

A complication of this comparison is that of comparable units. The SCAA/XSA computations provide estimates of abundance in absolute terms, but it is unclear exactly how closely these might relate, for example, to biomass densities derived from surveys using a swept-area approach. Nevertheless, given that surveys are usually covering the area over which the fish can be taken, these swept area estimates should calibrate reasonably well to assessment-based estimates of exploitable biomass.

In Table 1 we compare such density estimates for Divisions 0 (Treble, 2002), 1 (Jørgensen, 2008) and 4RST (Bernier, pers. comm) with those from the New Baseline SCAA and XSA assessments for Divisions 2+3K-O. The area used for the 2+3K-O density estimates was taken to be that between depths 400 to 1500 m to correspond reasonably with the areas for which the swept area estimates are available for the other Divisions.

Table 1 suggests a halibut density ranging from about 0.5 to 2.5 tons/sq km in Divisions 2+3K-O, corresponding respectively to the XSA and New Baseline SCAA results. Comparing to results for Divisions 0 and 1 (ignoring Division 4RST as this covers only a relatively narrow depth range), it is evident that (within the caveats noted above) neither XSA nor SCAA results for Divisions 2+3K-O are incompatible with those from surveys in Divisions 0 and 1.

References

- Butterworth DS and Rademeyer RA. 2009. Extensions to SCAA applications reported in: "Further applications of Statistical Catch-at-Age Assessment methodology to the 2J3K-O Greenland Halibut resource.
- Healey BP and Mahé J-C. 2008. An assessment of Greenland halibut (*Reinhardtius hippoglossoides*) in NAFO Subarea 2 and Divisions 3KLMNO. NAFO SRC Doc. 08/48, Ser. No N5550.
- Jørgensen OA. 2008. Survey for Greenland Halibut in NAFO Divisions 1C-1D, 2007. NAFO SRC Doc. 08/17, Ser. No 5510.
- Treble MA. 2002. Analysis of Data from the 2001 Trawl Survey in NAFO Subarea 0. NAFO SRC Doc. 02/47, Ser. No N4659.

Table 1: Greenland Halibut density estimates for Divisions 0, 1, 4RST and 2+3KLMNO

Depth m	0A	0B	1C		1D	4RST	2+3K-O			
	Mean Biomass (total survey) t/sq. km	Mean Biomass (survey >44cm) t/sq. km	Mean Biomass (NB model B5-9) t/sq. km	Mean Biomass ("Start in 1975" B5-9) t/sq. km	Mean Biomass (XSA model B5- 9) t/sq. km					
401-500	0.36	0.22	401-600	0.00	0.27	185-366	0.53			
501-750	1.89	0.74	601-800	0.28						
751-1000	3.33	1.59	801-1000	1.63	1.84					
1001-1250	2.60	2.52	1001-1200	2.92	2.88					
1251-1500	0.42	2.05	1201-1400		2.51					
			1401-1500		1.98					
401-1500	2	1.11	401-1500	1.48		401-1500	400-1500	2.51	1.03	0.52