

4.3.3 Haddock (*Melanogrammus aeglefinus*) in Division 5.b (Faroes grounds)

ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2017 should be no more than 0.17. ICES is not in a position to advise on the corresponding level of fishing effort.

Stock development over time

The spawning-stock biomass (SSB) has decreased since 2003 and is estimated to have been below B_{lim} since 2010. The fishing mortality (F) has decreased in recent years and is now slightly above F_{MSY} . Recruitment (age 2) from 2005 onwards has been well below the long-term average. However, the 2015 year class is estimated to be above average.

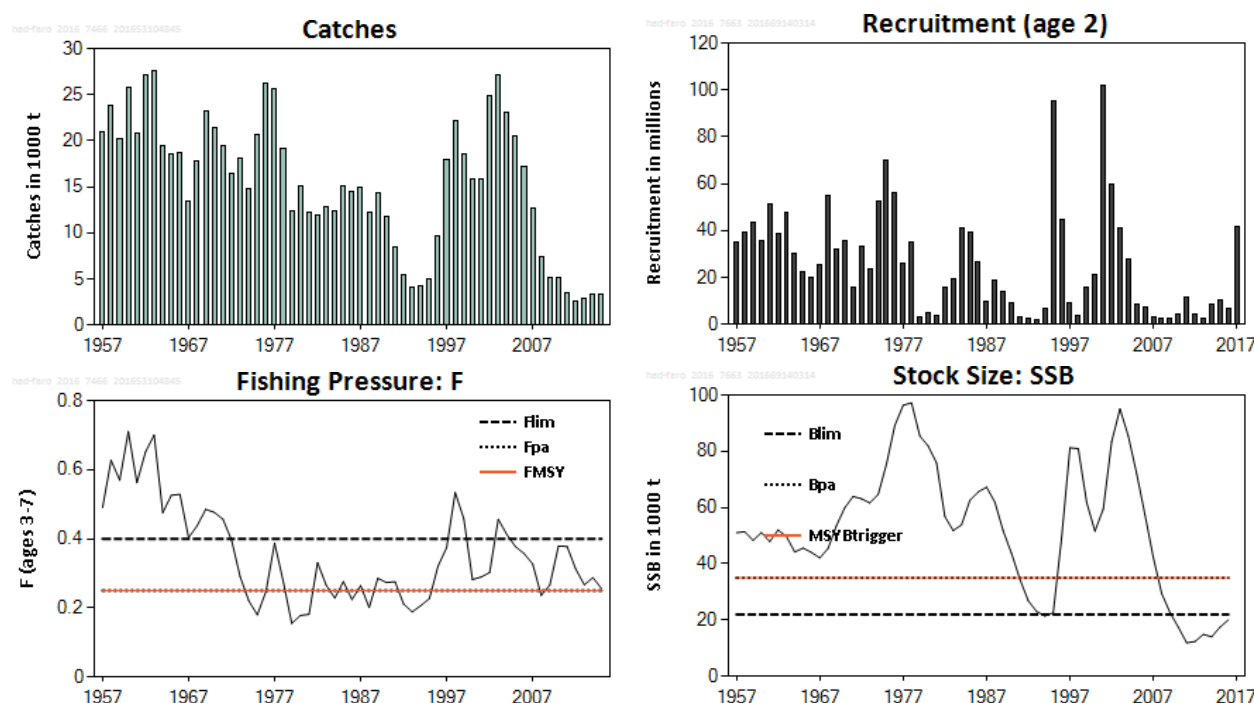


Figure 4.3.3.1 Haddock in Division 5.b (Faroes grounds). Summary of the stock assessment (weights in thousand tonnes).

Stock and exploitation status

Table 4.3.3.1 Haddock in Division 5.b (Faroes grounds). State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	F_{MSY}	✗	✗	✗	MSY	✗	✗
				Above	$B_{trigger}$	✗	Below trigger
Precautionary approach	F_{pa} F_{lim}	○	○	○	B_{pa} , B_{lim}	✗	✗
				Increased risk			Reduced reproductive capacity
Management plan	F_{MGT}	-	-	-	SSB_{MGT}	-	-
				Not applicable			Not applicable

Catch options

Table 4.3.3.2 Haddock in Division 5.b (Faroes grounds). The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–7 (2016)	0.27	ICES (2016a)	Unscaled averages for 2013–2015.
SSB (2017)	23.8 kt	ICES (2016a)	
R _{age2} (2017)	41.9 mill.	ICES (2016a)	Derived from age 1 estimate in the 2016 assessment.
R _{age2} (2018)	5.9 mill.	ICES (2016a)	Geometric mean since 2005.
Total catch (2016)	4.3 kt	ICES (2016a)	

Table 4.3.3.3 Haddock in Division 5.b (Faroes grounds). The catch options.

Rationale	F (2017)	Catch (2017)	Basis	SSB (2018)	%SSB change *
MSY approach	0.17	3.5	$F_{MSY} \times SSB_{2017}/B_{trigger}$	42.5	78
F_{MSY} and F_{pa}	0.25	5	$F_{MSY} (F_{sq} \times 0.93)$	41	72
Zero catch	0	0	$F = 0$	46.6	96
Other options	0.14	2.8	$F_{sq} \times 0.50$	43.5	83
	0.27	5.3	F_{sq}	40.8	71
	0.32	6.2	$F_{sq} \times 1.20$	39.8	67

Weights in thousand tonnes.

* SSB 2018 relative to SSB 2017.

Basis of the advice

Table 4.3.3.4 Haddock in Division 5.b (Faroes grounds). The basis of the advice.

Advice basis	MSY approach.
Management plan	There is no management plan for this stock. A preliminary management plan, including a recovery plan, was formulated in 2011, but has not been implemented.

Quality of the assessment

The landings data are considered accurate. There are no strong incentives to discard fish under the effort management system. The sampling of the landings is believed to be adequate. No major problems have been observed with the tuning indices (the two surveys).

The growth in SSB forecasted for 2018 assumes a strong recruitment-at-age 2 in 2017 (42 mil.), based on the number of 1-year-olds from this year's spring survey. When new data becomes available next year the strength of this year class can be verified.

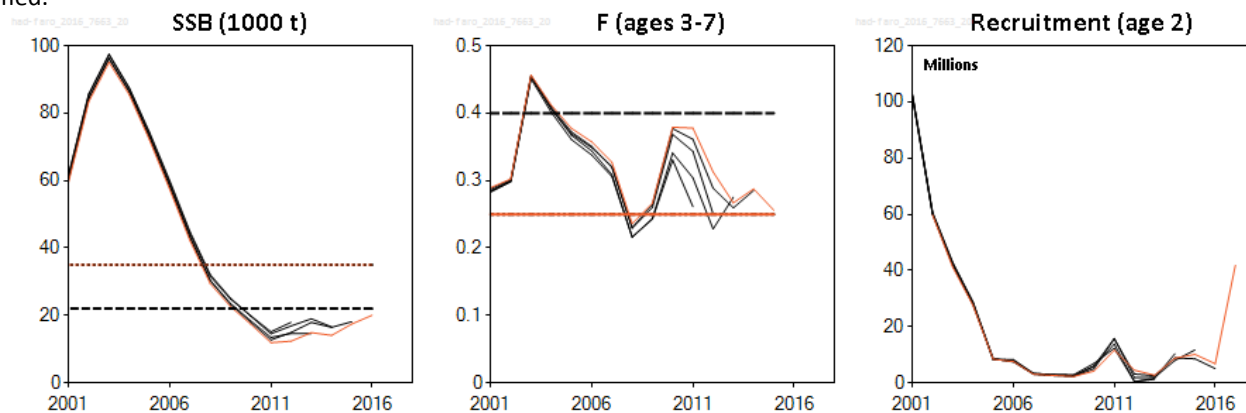


Figure 4.3.3.2 Haddock in Division 5.b (Faroes grounds). Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

An effort management system has been used since 1996. The Faroese Parliament decides the number of allocated fishing days for each new fishing season. The number of fishing days used by the main fleet targeting haddock (longliners) only amounts to around half of the allocated days. With surplus allocated fishing days, current effort control is not limiting fishing pressure.

ICES has not quantified the relationship between effort and F for this stock, since there is no apparent relationship between effort and F in the available data.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery. In the current state of both stocks (around B_{lim}), and with effort control not limiting fishing pressure, further development of management measures that includes the mixed-fishery issue would be useful.

The advice is given by calendar year, though the fishing year runs from 1 September to 31 August of the following year.

Since the stock is predicted to be above B_{lim} in 2017, the advice this year is based on the MSY approach and F in 2017 should be no more than $0.17 (F_{MSY} \times B_{2017} / MSY B_{trigger})$.

Reference points

Table 4.3.3.5 Haddock in Division 5.b (Faroes grounds). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	$MSY B_{trigger}$	35 000 t	B_{pa}	ICES (2011)
	F_{MSY}	0.25	Stochastic simulations.	ICES (2011)
Precautionary approach	B_{lim}	22 000 t	Lowest observed SSB.	ICES (1998)
	B_{pa}	35 000 t	$B_{lim} \times e^{1.645\sigma}$, with $\sigma = 0.3$.	ICES (1998)
	F_{lim}	0.40	$F_{pa} \times e^{1.645\sigma}$, with $\sigma = 0.3$.	ICES (1998)
	F_{pa}	0.25	$F_{med} (1998) = 0.25$.	ICES (1998)
Management plan	SSB_{MGT}	Not defined		
	F_{MGT}	Not defined		

Basis of the assessment

Table 4.3.3.6 Haddock in Division 5.b (Faroes grounds). The basis of the assessment.

ICES stock data category	1 (ICES, 2016b)
Assessment type	XSA with catch-at-age data and age-disaggregated indices, using catches in the model and in the forecast.
Input data	Commercial catches (mainly Faroese catches, ages and length frequencies from catch sampling); survey indices (FO-GFS-Q1&3); annual maturity data from FO-GFS-Q1; natural mortalities set at 0.2.
Discards and bycatch	Discarding is assumed to be negligible.
Indicators	None
Other information	A benchmark for this stock is planned for 2017.
Working group report	North-Western Working Group (NWWG)

Information from stakeholders

There is no information available.

History of the advice, catch, and management

Table 4.3.3.7 Haddock in Division 5.b (Faroes grounds). History of ICES advice, the agreed TAC, and ICES estimates of landings.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987	No increase in F	17		14.9
1988	No increase in F	18		12.2
1989	No increase in F	11		14.3
1990	No increase in F	11		11.7
1991	TAC	11		8.4
1992	TAC	13–15		5.5
1993	Reduction in F	8		4.0
1994	No fishing	0	6.2	4.3
1995	No fishing	0	6.2	4.9
1996	TAC	8.3	12.6	9.6
1997	$F = F(95)$	9.3		17.9
1998	$F = F(96)$	16		22.2
1999	$F < \text{proposed } F_{pa} (0.25)$	9		18.5
2000	$F < \text{proposed } F_{pa} (0.25)$	22		15.8
2001	$F < \text{proposed } F_{pa} (0.25)$	20		15.9
2002	No fishing	0		24.9
2003	$F < \text{proposed } F_{pa} (0.25)$	12		26.9
2004	$F < \text{proposed } F_{pa} (0.25)$	21		23.1
2005	$F < \text{proposed } F_{pa} (0.25)$	19		20.3
2006	$F < \text{proposed } F_{pa} (0.25)$	18		17.2
2007	$F < 0.20$	16		12.6
2008	F_{pa}	14		7.3
2009	No fishing and recovery plan	0		5.2
2010	No fishing and recovery plan	0		5.2
2011	No direct fishing; minimize bycatch, implement recovery plan	0		3.5
2012	No direct fishing; minimize bycatch, implement recovery plan	0		2.6
2013	No direct fishing; minimize bycatch, implement recovery plan	0		3.0
2014	No direct fishing; minimize bycatch, implement recovery plan	0		3.2
2015	No direct fishing; minimize bycatch, implement recovery plan	0		3.4
2016	No direct fishing; minimize bycatch, implement recovery plan	0		
2017	MSY approach ($F \leq 0.17$)	≤ 3.5		

Weights in thousand tonnes.

* Not applicable since 1997.

History of catch and landings

Table 4.3.3.8 Haddock in Division 5.b (Faroes grounds). Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings		Discards
3.395 kt	81% longliners	19% trawlers	Negligible
	3.395 kt		

Table 4.3.3.9 Haddock in Division 5b. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1903	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8
1904	0	0	0	0	0	0	0	6	0	0	1046	0	0	0	0	1052
1905	23	0	0	0	0	0	0	66	0	0	851	0	0	0	0	940
1906	23	0	9713	0	0	0	0	155	0	0	1118	0	0	0	0	11009
1907	11	0	8653	0	0	0	0	279	0	0	1192	0	0	0	0	10135
1908	0	0	5494	0	0	0	0	190	0	0	767	0	0	0	0	6451
1909	14	0	7397	0	0	0	0	242	0	0	559	0	0	0	0	8212
1910	0	0	6697	0	0	0	0	40	0	0	635	0	0	0	0	7372
1911	24	0	5990	0	0	0	0	18	0	0	529	0	0	0	0	6561
1912	0	0	7500	0	0	0	0	0	0	0	1334	0	0	0	0	8834
1913	0	0	7935	0	0	0	0	36	0	0	1675	0	0	0	0	9646
1914	0	0	5301	0	0	0	0	2	0	0	2282	0	0	0	0	7585
1915	0	0	2359	0	0	0	0	0	0	0	1796	0	0	0	0	4155
1916	0	0	0	0	0	0	0	0	0	0	1447	0	0	0	0	1447
1917	0	0	0	0	0	0	0	0	0	0	557	0	0	0	0	557
1918	0	0	0	0	0	0	0	0	0	0	217	0	0	0	0	217
1919	0	0	6040	0	0	0	0	0	0	0	3519	0	0	0	0	9559
1920	0	0	2657	0	0	0	0	0	0	0	1010	0	0	0	0	3667
1921	0	0	1812	0	0	0	0	0	0	0	380	0	0	0	0	2192
1922	0	0	3808	0	0	0	0	6	0	0	1900	0	0	0	0	5714
1923	0	0	5688	0	0	37	0	0	0	0	1982	0	0	0	0	7707
1924	0	0	7639	0	0	0	0	0	0	0	1547	0	0	0	0	9186
1925	0	0	6289	0	0	0	0	0	0	0	1251	0	0	0	0	7540
1926	0	0	6567	0	0	0	0	17	0	0	2057	0	0	0	0	8641
1927	0	0	7515	0	0	0	0	0	0	0	2025	0	0	0	0	9540
1928	1	0	8240	0	4	8	0	17	0	0	1438	0	0	0	0	9708
1929	0	0	6662	0	0	3	0	0	0	0	905	0	0	0	0	7570
1930	0	3	7294	0	0	0	0	1	0	0	1718	0	0	0	0	9016
1931	0	2	9188	3	0	0	0	0	0	0	2382	0	0	0	0	11575

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1932	0	0	12065	10	0	0	0	86	0	0	2437	0	0	0	0	14598
1933	0	15	8595	1	0	0	0	0	0	0	2050	0	0	0	0	10661
1934	3	0	8591	2	0	0	0	0	0	0	1938	0	0	0	0	10534
1935	0	0	9796	1	0	0	0	0	0	0	2745	0	0	0	0	12542
1936	0	0	10422	21	0	0	5	0	0	0	3574	0	0	0	0	14022
1937	0	2	9539	81	0	0	0	0	0	0	3495	0	0	0	0	13117
1938	0	1	10885	145	0	0	0	0	0	0	3708	0	0	0	0	14739
1939	0	0	0	145	0	0	0	0	0	0	1807	0	0	0	0	1952
1940	0	0	0	0	0	0	0	0	0	0	3799	0	0	0	0	3799
1941	0	0	0	0	0	0	0	0	0	0	2353	0	0	0	0	2353
1942	0	0	0	0	0	0	0	0	0	0	3267	0	0	0	0	3267
1943	0	0	0	0	0	0	0	0	0	0	5099	0	0	0	0	5099
1944	0	0	0	0	0	0	0	0	0	0	3770	0	0	0	0	3770
1945	0	0	0	0	0	0	0	0	0	0	2546	0	0	0	0	2546
1946	0	0	8533	0	0	0	0	0	0	0	5277	0	0	0	0	13810
1947	0	0	6009	0	0	0	0	0	0	0	6522	0	0	0	0	12531
1948	0	0	3568	0	0	0	0	0	0	0	6511	0	0	0	0	10079
1949	0	0	3126	0	0	0	0	0	0	0	6679	0	0	0	0	9805
1950	0	0	3935	0	0	0	0	0	0	0	8048	0	0	0	0	11983
1951	0	0	6465	0	0	0	0	0	0	0	7944	0	0	0	0	14409
1952	0	0	7535	83	0	0	0	0	0	0	6653	0	0	0	0	14271
1953	0	0	5820	2788	0	0	0	0	0	0	6404	0	0	0	0	15012
1954	0	0	5925	2654	0	1	0	0	0	0	6832	0	0	0	0	15412
1955	0	0	5008	3865	0	33	0	0	0	0	7667	0	0	0	0	16573
1956	0	0	5762	4221	0	20	0	0	0	0	7512	0	0	0	0	17515
1957	0	0	6902	4453	0	38	0	0	0	0	9602	0	0	0	0	20995
1958	0	0	7429	6850	0	19	0	0	0	0	9573	0	0	0	0	23871
1959	0	0	5339	5670	0	10	0	0	0	0	9220	0	0	0	0	20239
1960	0	0	7006	7772	0	6	0	0	0	0	10943	0	0	0	0	25727
1961	0	0	2643	8454	0	22	0	0	0	0	9590	0	0	0	0	20709
1962	0	0	3766	7042	166	18	0	0	0	0	16159	0	0	0	0	27151
1963	0	0	4655	6336	792	20	0	0	0	0	15766	0	0	0	0	27569
1964	0	0	3442	6952	1866	33	0	0	111	0	7087	0	0	0	0	19491
1965	0	0	3385	6673	1939	15	0	0	40	0	6355	0	0	0	0	18407

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1966	0	0	2867	6902	2717	36	0	0	0	0	6240	0	0	0	0	18762
1967	0	8	2347	5246	1091	24	0	0	0	0	4656	0	0	0	0	13372
1968	0	0	2445	6751	2286	36	0	0	0	0	6339	0	0	0	0	17857
1969	0	0	1976	11122	3387	0	0	0	0	0	6815	0	0	0	0	23300
1970	0	0	1137	11791	2006	14	0	0	0	0	6421	0	0	0	0	21369
1971	0	0	2323	10488	790	19	0	29	0	0	5762	0	0	0	0	19411
1972	0	0	3369	8314	2666	25	0	0	844	0	1267	0	0	0	0	16485
1973	0	0	2426	6018	3508	46	0	0	0	1190	4788	0	1236	0	0	19212
1974	0	0	1617	4811	1451	70	0	0	5	685	6072	52	807	0	0	15570
1975	0	0	2426	8757	2298	173	0	383	56	544	6078	0	1100	0	0	21815
1976	6	0	2284	12714	2542	22	0	175	20	448	8000	0	651	0	0	26862
1977	0	0	709	20079	700	49	0	26	57	5	3928	0	80	0	0	25633
1978	0	0	48	18182	71	8	0	0	130	0	761	0	0	0	0	19200
1979	0	0	35	11975	50	2	0	0	45	0	317	0	0	0	0	12424
1980	0	6	158	14323	31	4	0	0	17	0	477	0	0	0	0	15016
1981	0	0	0	11994	113	0	0	0	27	0	99	0	0	0	0	12233
1982	0	0	0	11852	2	1	0	0	13	0	48	0	0	0	0	11916
1983	0	0	0	12865	2	0	0	0	14	0	13	0	0	0	0	12894
1984	0	0	0	12343	20	0	0	0	15	0	0	0	0	0	0	12378
1985	0	0	0	15071	23	0	0	0	24	0	25	0	0	0	0	15143
1986	0	1	0	14409	8	1	0	0	32	0	26	0	0	0	0	14477
1987	0	8	2	14786	22	1	0	0	18	0	45	0	0	0	0	14882
1988	0	4	0	12027	14	0	0	0	97	0	15	0	0	0	0	12157
1989	0	0	0	14165	0	0	0	0	127	0	30	0	0	0	0	14322
1990	0	0	7	11431	0	0	0	0	191	0	0	0	0	0	0	11629
1991	0	0	0	8291	0	0	0	0	129	0	0	0	0	0	0	8420
1992	0	0	54	4993	164	0	0	0	94	0	149	0	0	0	0	5454
1993	0	0	81	3807	0	0	0	0	36	0	102	0	0	0	0	4026
1994	0	0	31	4028	0	0	0	0	23	0	170	0	0	0	0	4252
1995	0	0	23	4852	0	5	0	0	29	0	39	0	0	0	0	4948
1996	0	0	5	9490	0	0	0	0	85	0	62	0	0	0	0	9642
1997	0	0	22	17718	0	0	0	0	49	0	135	0	0	0	0	17924
1998	0	0	30	21945	2	0	0	0	131	0	102	0	0	0	0	22210
1999	0	0	59	17753	0	33	0	0	414	0	193	0	0	0	30	18482

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
2000	0	0	19	15185	6	1	0	0	403	0	185	0	0	0	22	15821
2001	0	0	4	15405	6	1	0	0	323	0	148	0	0	0	0	15887
2002	0	0	11	24474	2	6	4	0	255	0	177	0	0	0	4	24933
2003	0	0	14	26549	4	1	0	0	282	0	185	0	0	0	0	27035
2004	0	0	8	22589	1	6	0	0	246	0	186	49	0	16	0	23101
2005	0	0	1	20616	0	0	0	0	257	0	126	0	0	0	0	21000
2006	0	0	1	16975	12	1	0	0	58	0	106	0	0	0	1	17154
2007	0	0	35	12499	4	0	0	0	69	0	15	0	0	0	4	12626
2008	0	0	60	7284	3	0	0	0	26	0	5	0	0	10	0	7388
2009	0	0	64	5451	2	0	0	0	8	0	5	0	0	0	6	5536
2010	0	0	73	5110	1	0	0	0	5	0	0	0	0	0	12	5201
2011	0	0	0	3544	3	0	0	0	0	0	0	0	0	0	0	3547
2012	0	0	0	2634	0	0	3	0	0	0	0	0	0	0	1	2638
2013	0	0	0	2924	0	0	26	0	0	0	0	0	0	0	0	2950
2014	0	0	350	2827	0	0	0	0	3	0	74	0	0	0	0	3254
2015	0	0	449	2940	0	0	0	0	6	0	0	0	0	0	0	3395

Summary of the assessment

Table 4.3.3.10 Haddock in Division 5.b (Faroes grounds). Assessment summary.

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year ⁻¹
1957	35106	51049	20995	0.49
1958	39212	51409	23871	0.627
1959	43417	48340	20239	0.57
1960	35763	51101	25727	0.71
1961	51279	47901	20831	0.562
1962	38537	52039	27151	0.651
1963	47362	49706	27571	0.7
1964	30110	44185	19490	0.475
1965	22644	45605	18479	0.526
1966	20203	44027	18766	0.529
1967	25356	42086	13381	0.403
1968	54851	45495	17852	0.438
1969	31975	53583	23272	0.485
1970	35600	59957	21361	0.476
1971	15457	63920	19393	0.456
1972	33213	63133	16485	0.396
1973	23702	61620	18035	0.29
1974	52333	64629	14773	0.221
1975	70052	75403	20715	0.18
1976	55970	89217	26211	0.248
1977	26192	96371	25555	0.387
1978	35098	97225	19200	0.278
1979	2784	85392	12424	0.155
1980	4944	81895	15016	0.178
1981	3491	75838	12233	0.181
1982	15833	56797	11937	0.331
1983	19610	51803	12894	0.265
1984	40750	53808	12378	0.229
1985	39398	62576	15143	0.276
1986	26461	65563	14477	0.224
1987	9425	67247	14882	0.265
1988	18742	61842	12178	0.201
1989	14057	51668	14325	0.286
1990	9363	43617	11726	0.274
1991	2979	34532	8429	0.276
1992	2671	26835	5476	0.212
1993	1825	23072	4026	0.188
1994	6409	21444	4252	0.207
1995	94985	22571	4948	0.227
1996	44662	49203	9642	0.321
1997	8928	81257	17924	0.375
1998	3731	80936	22210	0.534

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year ⁻¹
1999	15448	61819	18482	0.458
2000	21180	51599	15821	0.282
2001	101770	59520	15890	0.289
2002	59738	83361	24933	0.302
2003	41119	95070	27072	0.456
2004	27641	85459	23101	0.412
2005	8439	72052	20455	0.377
2006	7585	57336	17154	0.357
2007	3085	42218	12631	0.327
2008	2659	29458	7388	0.236
2009	2295	22676	5197	0.267
2010	4224	17439	5202	0.379
2011	11657	11917	3540	0.378
2012	4512	12376	2634	0.313
2013	2746	14903	2950	0.267
2014	8801	14082	3276	0.288
2015	10125	17455	3395	0.256
2016	6828	20056		
2017	41852			
Average	25572	52745	15339	0.355

Sources and references

ICES. 1998. Report of the North-Western Working Group (NWWG), 28 April–06 May, 1998, ICES Headquarters, Copenhagen. ICES CM 1998/ACFM:19. 350 pp.

ICES. 2011. Report of the North-Western Working Group (NWWG), 26 April–03 May, 2011, ICES Headquarters, Copenhagen. ICES CM 2011/ACOM:07. 989 pp.

ICES. 2016a. Report of the North-Western Working Group (NWWG), 27 April–4 May, 2016, ICES Headquarters, Copenhagen. ICES CM 2016/ACOM:08.

ICES. 2016b. General context of ICES advice. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.