

TABLE 1: AVAILABLE DATA**COMMON
NAME:**

GREENLAND HALIBUT

SPECIES:*Reinhardtius hippoglossoides***AREA:**

NORTHWEST ATLANTIC

STOCK:

SUBAREA 2+DIV. 3KLMNO

CREATED BY:JOANNE MORGAN
SUSANA JUNQUERA**UPDATED BY:**

JOANNE MORGAN 2002-03-25

Data status									
Year	Stock size	Stock composition	Age	Sex ratio	Maturity	Fecundity	Weight	Condition	Additional data
2001									
2000	√	√	√	(√)	√		√	(√)	
1999	√	√	√	(√)	√		√	(√)	
1998	√	√	√	(√)	√		√	(√)	
1997	√	√	√	(√)	√	√	√	√	
1996	√	√	√	(√)	√	√	√	√	
1995	√	√	√	(√)	√	√	√	√	
1994	√	√	√	√	√	√	√	√	
1993	√	√	√	√	√	√	√	√	
1992	√	√	√	√	√	√	√	√	
1991	√	√	√	(√)	√		√	√	
1990	√	√	√	(√)	√		√	(√)	
1989	√	√	√	(√)	√		√		
1988	√	√	√	(√)	√	√	√		
1987	√	√	√	(√)	√	(√)	(√)		
1986	√	√	√	(√)	√		(√)		
1985	√	√	√	(√)	√		(√)		
1984	√	√	√	(√)	√		(√)		
1983	√	√	√	(√)	√		(√)		
1982	√	√	√	(√)	√		(√)		
1981	√	√	√	(√)	√		(√)		
1980	√	√	√	(√)	√	(√)	(√)		
1979	√	√	√	(√)	√	(√)	(√)		
1978	√	√	√	(√)	√	(√)	(√)		

Data status									
Year	Stock size	Stock composition	Age	Sex ratio	Maturity	Fecundity	Weight	Condition	Additional data
1977	√	√	√			√	(√)		
1976	√	√	√			(√)	(√)		
1975	√	√	√			(√)	(√)		
1974									
1973									
1972									
1971									
1970									
1969						√			
1968						(√)			
1967						(√)			

TABLE 2: DATA BASIS, FORMAT AND QUALITY

COMMON NAME:	GREENLAND HALIBUT	
AREA:	NORTHWEST ATLANTIC	
STOCK:	SUBAREA 2+DIV. 3KLMNO	
REPRODUCTIVE STRATEGY:	DETERMINATE SPAWNER SINGLE BATCH	REF. NO.: 16,17
TIMING OF SPAWNING:	WINTER/SPRING JULY-AUGUST	REF. NO.: 15 12
OPTIMAL TIME FOR MATURITY SAMPLING:		REF. NO.:

Data basis, format and quality						
Variables	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Stock size	1975-1977	A	CL	Q	VPA starting 1975 uncertainties in historical trajectory	1,2
	1978-1987	A,L	CC,CL,S	Q,Q,Y		1,2
	1988-1995	A,L	CC,CL,S	Q,Q,B		1,2,13
	1996-2000	A,L	CC,CL,S	Q,Q,3/yr		1,2,13,18
Stock composition	1975-1977	A	CL	Q	See above	1,2
	1978-1987	A,L	CC,CL,S	Q,Q,Y		1,2
	1988-1995	A,L	CC,CL,S	Q,Q,B		1,2,13
	1996-2000	A,L	CC,CL,S	Q,Q,3/yr		1,2,13,18
Age determination	1975-1977	A	CL	Q	See above	1,2
	1978-1990	A,L	CC,CL,S	Q,Q,Y		1,2
	1991-2000	A,L	CC,CL,S	Q,Q,B		1,2,13
Sex ratio	1978-1995	A,L	S	Y		3
	1996-2000	A,L	S	B		3,18
	1992-1994	A,L	CC	M		14
Maturity:						
A. Ogives (E)	1978-2000	A,L	S	Y	Only some years cover whole stock area includes more of stock area but limited at age, includes 0B 3LMNO	4
	1978-1995	A,L	CL,S	VARIOUS, Y		5
	1990-1997	L	CC,S	M		6
B. Skip of spawning						
C. Spawning probability						

Data basis, format and quality						
Variables	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
D. Other						
Fecundity:						
A. Estimation	1969	A,L	CL,S	VARIOUS	Data 1967-1969 combined	7
	1976-1977	A,L	S	FALL	Data 1975-80, 1987-88 combined, included data from 0B	8
	1988	A,L,W	S	FALL		9
	1992-1997	A,L,W	CC,S	M,Y	all studies (6,7,8,9) cover only part of stock area	6
B. First time vs. repeat spawners						
C. Atresia	1990-1997	L,W	CC	M,Y	Part of stock area	6
D. Other						
Weight:						
A. Commercial fisheries data	1975-1999 2000	L L	CC,CL CC,CL	Q,Q Q,Q	Length/weight relationship	10,11 3
B. Survey data	1988-2000 1990-2000	A,L A,L	S S	Y Y	3M	3,11 13
C. Other						
Condition:						
A. Fulton	1991-1997 1990-2000	A A,L	CC,S S	M,Y Y	3M only some years cover entire area	6 3
B. HSI	1990-2000	A,L	S	Y	Only some years cover entire stock area	3
C. Energy						
D. Other	1990-2000	A,L	S	Y	GSI: only some years cover entire stock area	3
Egg viability:						
A. Egg quality						
B. Fertilisation success						
C. Egg mortality						
D. Other						
Larval viability:						
A. Hatching success						
B. Larvae quality						
C. Mortality						
D. Other						

Data basis, format and quality						
Variables	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Spawning time	1990-1991	L	CC	M	3LM, some spawning fish present year round	12
	1909		S	MAY-JUL	Davis Strait	15
Contamination						
Environmental key factors						
Other factors or parameters						

TABLE 3: STUDIES OF REPRODUCTIVE POTENTIAL

COMMON NAME:	GREENLAND HALIBUT
AREA:	NORTHWEST ATLANTIC
STOCK:	SUBAREA 2+DIV. 3KLMNO

Estimation of reproductive potential			
Subject	Brief description	Year range	Ref. No.
Potential or realised egg production	Potential egg production calculated from 1969-1988 using single fecundity at age relationship. Survival from eggs to recruits related to water temperature.	1969-1988	9
	Comparison with stock abundance. Interannual variations. relationship with age.	1990-1997	6
Viable egg and larvae production			
Critical life stages			
Environmental influences			
Stock recruitment relations			
Other studies			

TABLE 4: DATA SOURCES

COMMON NAME:	GREENLAND HALIBUT
AREA:	NORTHWEST ATLANTIC
STOCK:	SUBAREA 2+DIV. 3KLMNO

Data sources (literature reference or contact person)
1. MAHE, J-C. AND W. R. BOWERING. MS 2001. An assessment of stock status of the Greenland halibut resource in NAFO Subarea 2 and Divisions 3KLMNO based on extended survivors analysis. <i>NAFO SCR Doc.</i> , No. 80, 18 p.
2. BOWERING, W.R. MS 2001. Population trends in the Greenland halibut (<i>Reinhardtius hippoglossoides</i>) resource of NAFO Subarea 2 and Divisions 3KLMNO based on Canadian research vessel surveys during 1978-2000. <i>NAFO SCR Doc.</i> , No. 39, 42 p.
3. UNPUBL. DATA: W.R. BOWERING, DFO, PO Box 5667, St. John's, NF, A1C 5X1, Canada (boweringr@dfo-mpo.gc.ca).
4. MORGAN, M. J. and W. R. BOWERING. MS 2001. Further comparisons of estimates of maturity for Greenland halibut for surveys covering different portions of the stock area. <i>NAFO SCR Doc.</i> , No. 49, 10 p.
5. MORGAN, M. J. and W. R. BOWERING. 1997. Temporal and geographic variation in maturity at length and age of Greenland halibut (<i>Reinhardtius hippoglossoides</i>) from the Canadian north-west Atlantic with implications for fisheries management. <i>ICES J. Mar. Sci.</i> , 54 : 875-885.
6. JUNQUERA, S., E. ROMAN, X. PAZ, and G. RAMILO. 1999. Changes in Greenland halibut growth, condition and fecundity in the northwest Atlantic (Flemish Pass, Flemish Cap and southern Grand Bank). <i>J. Northw. Atl. Fish. Sci.</i> , 25 : 17-28.
7. LEAR, W. H. 1970. Fecundity of Greenland halibut (<i>Reinhardtius hippoglossoides</i>) in the Newfoundland-Labrador area. <i>J. Fish. Res. Board Canada</i> , 27 : 1880-1882.
8. BOWERING, W. R. 1980. Fecundity of Greenland halibut, <i>Reinhardtius hippoglossoides</i> (Walbaum), from southern Labrador and southeastern Gulf of St. Lawrence. <i>J. Northw. Atl. Fish. Sci.</i> , 1 : 39-43.
9. SEREBRYAKOV, V. P., A. K. CHUMAKOV, and I. I. TEVS. 1992. Spawning stock, population fecundity and year-class strength of Greenland halibut (<i>Reinhardtius hippoglossoides</i>) in the northwest Atlantic, 1969-88. <i>J. Northw. Atl. Fish. Sci.</i> , 14 : 107-113.
10. BOWERING, W. R. and D. E. STANSBURY. 1984. Regressions of weight on length for Greenland halibut, from Canadian waters of the Northwest Atlantic. <i>J. Northw. Atl. Fish. Sci.</i> , 5 : 107-108.
11. GUNDERSEN, A. C. and W. B. BRODIE. MS 1999. Length-weight relationships for Greenland halibut (<i>Reinhardtius hippoglossoides</i>) in NAFO Divisions 2GHJ and 3KLMNO, 1990-1997. <i>NAFO SCR Doc.</i> , No. 31, 21 p.
12. JUNQUERA, S. and J. ZAMARRO. 1994. Sexual maturity and spawning of Greenland halibut (<i>Reinhardtius hippoglossoides</i>) from Flemish Pass area. <i>NAFO Sci. Coun. Studies</i> , 20 : 47-52.
13. SABORIDO-REY, F. and A. VAZQUEZ. MS 2001. Results from the bottom trawl survey on Flemish Cap of July 2000. <i>NAFO SCR Doc.</i> , No. 22, 56 p.
14. DeCARDENAS, E. MS 1996. The females ratio by length as an indicator of sexual differences in mortality of Greenland halibut (<i>Reinhardtius hippoglossoides</i>) at age 8+. <i>NAFO SCR Doc.</i> , No. 35, 10 p.
15. JENSEN, A. S. 1935. The Greenland halibut (<i>Reinhardtius hippoglossoides</i> (Walb.)) its development and migrations. <i>K. danske vidensk. Selsk. Skr. 9 Rk.</i> , 6 : 1-32.
16. JUNQUERA, S. and F. SABORIDO-REY. 1995. Histological assessment of sexual maturity in Greenland halibut in Div. 3LM. <i>NAFO SCR Doc.</i> , No. 28, 9 p.

Data sources (literature reference or contact person)
17. STENE, A., A. C. GUNDERSEN, O. T. ALBERT, K. H. NEDREAAS, and P. SOLEMDAL. 1999. Early development of northeast Arctic Greenland halibut (<i>Reinhardtius hippoglossoides</i>). <i>J. Northw. Atl. Fish. Sci.</i> , 25 : 171-177.
18. PAZ, X., E. ROMAN, and P. DURAN MUNOZ. 2000. Results from the 2000 Spanish bottom trawl survey in the NAFO regulatory area for Divisions 3NO. <i>NAFO SCR Doc.</i> , No. 46, 18 p.

