

TABLE 1: AVAILABLE DATA

COMMON NAME:	COD	SPECIES:	<i>Gadus morhua</i>
AREA:	NORTH SEA	STOCK:	ICES AREA IV
CREATED BY:	PETER WRIGHT 2001-31-05	UPDATED BY:	

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	√	√	√	√	√				

Data status									
Year	Stock size	Stock composition	Age	Sex ratio	Maturity	Fecundity	Weight	Condition	Additional data
1979	√	√	√						
1978	√	√	√						
1977	√	√	√						
1976	√	√	√						
1975	√	√	√						
1974	√	√	√						
1973	√	√	√						
1972	√	√	√		√	√			
1971	√	√	√			√			
1970	√	√	√			√	√		
1969	√	√	√		√	√	√		
1968	√	√	√		√				
1967	√	√	√						
1966	√	√	√						
1965	√	√	√						
1964	√	√	√						
1963	√	√	√						
1962									
1961									
1960									
1934					√				
1893					√				
1891						√			
1920-63	√	√							

TABLE 2: DATA BASIS, FORMAT AND QUALITY

COMMON NAME:	COD		
AREA:	NORTH SEA		
STOCK:	ICES AREA IV		
REPRODUCTIVE STRATEGY:	DETERMINATE BATCH SPAWNER	REF. NO.:	16
TIMING OF SPAWNING:	JANUARY -APRIL	REF. NO.:	6,16
OPTIMAL TIME FOR MATURITY SAMPLING:	DECEMBER-JANUARY	REF. NO.:	6

Data basis, format and quality						
Parameters	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Stock size	1920-63 1963 –2000	A A	CL CL, CC in some areas after 1990	M M	VPA but high uncertainty in estimates Catch at age analysis (VPA)	20 1
Stock composition	1963 –2000 1970s, 1988-90, 1999	L, A L,A, W	CL CL,CC	M	Catch at age analysis (VPA) No routine weight measurements	1 11, 12, 13
Age determination	1963 –2000	otoliths	C,L	M	age based assessments	1
Sex ratio	1963-2000	L, A	S	A	Surveys	13
Maturity:						
A. Ogives	1883, 1924, 1968-72 1980-1995 1995-2001	A,L, W	S	 A	dedicated study dedicated study dedicated study analysis from ICES IBTS analysis of survey data in progress P. Wright, FRS	2 3 4 5 13
B. Skip of spawning						
C. Spawning probability	1953-90		S	A	from egg surveys review	6 7
D. Other						

Data basis, format and quality						
Parameters	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Fecundity:						
A. Estimation	<1891 1969 1970 -72 1999	A,L A,L A,L,W A,L,W	S S	A A	n=92 n=26	8 9 4 10
B. First time vs. repeat spawners						
C. Atresia						
D. Other						
Weight:						
A. Commercial fisheries data	1970s 1988-90		CC		no regular sampling	11 11 12
B. Survey data			S			
C. Other						
Condition:						
A. Fulton						
B. HSI	1969-70 1999		CC, S	M	few data 1 st quarter	11 10
C. Energy						
D. Other						
Egg viability:						
A. Egg quality	1970-72	A,L,W	S	A	n=30 weights	4
B. Fertilisation success						
C. Egg mortality					size selective mortality	14
D. Other						
Larval viability:						
A. Hatching success						
B. Larvae quality						
C. Mortality						
D. Other					study of temperature related larval development	15
Spawning time	1953-90		S	A	plankton surveys	5, 16
Contamination						
Environmental key factors			S		regional trophic studies temperature effects on recruitment	17, 18 19

Data basis, format and quality						
Parameters	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Other factors or parameters						

TABLE 3: STUDIES OF REPRODUCTIVE POTENTIAL

COMMON NAME:	COD
AREA:	ICES AREA IV
STOCK:	NORTH SEA

Estimation of reproductive potential			
Subject	Short description	Year range	Ref. No.
Potential or realised egg production			
Viable egg and larvae production			
Critical life stages	REVIEW OF GADOID STOCK CHANGES	1962-1993	21
Environmental influences			
Stock recruitment relations	REVIEW OF GADOID STOCK CHANGES	1962-1993	21
Other studies			

TABLE 4: DATA SOURCES

COMMON NAME:	COD
AREA:	NORTH SEA
STOCK:	ICES IV

Data sources (literature reference or contact person)
1. ICES. 2001. Report of the ICES Advisory Committee on Fishery Management, 2000. <i>ICES Co-op. Res. Report</i> , No. 242, 361-366.
2. HOLT, E.W.L. 1893. North Sea Investigations. <i>J. Mar. Biol. Assoc. UK</i> , III: 78-122.
3. GRAHAM, M. 1924. The annual cycle of the mature cod in the North Sea. <i>Fish. Invest., London</i> , 6: 1-77.
4. OOSTHUIZEN, E. and N. DAAN. 1974. Egg fecundity and maturity of North Sea cod, <i>Gadus morhua</i> . <i>Netherlands Journal of Sea Research</i> , 8: 378-397.
5. COOK, R. M., P. A. KUNZLIK, J. R. G. HISLOP, and D. POULDING. 1999. Models of growth and maturity for North Sea cod. <i>J. Northw. Atl. Fish. Sci.</i> , 25: 91-99.
6. BRANDER, K.M. 1994. The location and timing of cod spawning around the British Isles. <i>ICES J. Mar. Sci.</i> , 51: 71-89.
7. ICES. 1994. Spawning and life history information for North Atlantic cod stocks. K. Brander (ed.). <i>ICES Co-op. Res. Report</i> , No. 205.
8. FULTON, T.W. 1891. The comparative fecundity of sea fishes. <i>Report of the Fishery Board of Scotland</i> , 9: 243-268.
9. SCHOPKA, S. A. 1971. Fortpflanzungsrate bei Herings- und Kabeljaupopulationen. <i>Ber. dt. Wiss. Kommn. f. Meeresforsch N.F.</i> , 22: 31-79.
10. UNPUBL. DATA: P. J. WRIGHT, Fisheries Research Services, Marine Laboratory, Victoria Road, Aberdeen, AB11 9DB, Scotland (p.j.wright@marlab.ac.uk).
11. FISHERIES RESEARCH SERVICES, Marine Laboratory, Aberdeen, Scotland.
12. CEFAS FISHERY LABORATORY, Lowestoft, England other EU institutes
13. SPARHOLT, H. ICES International bottom trawl surveys, ICES headquarters.
14. RIJNSDORP, A. D. and A. JAWORSKI. 1990. Size-selective mortality in plaice and cod eggs: a new method in the study of egg mortality. <i>Journal de Conseil International pour l'Exploration de la mer</i> , 47: 256-263.
15. THOMPSON, B. M. and J. D. RILEY. 1981. Egg and larval development studies in the North Sea cod (<i>Gadus morhua</i> L.). <i>Rapp. P.-v Réun. Cons. int. explor. Mer.</i> , 178: 553-559.
16. HISLOP, J. R. G. 1984. A comparison of the reproductive tactics and strategies of cod, haddock whiting and Norway pout in the North Sea. In: <i>Fish Reproduction Strategies and Tactics</i> , G. W. Potts and R. J. Wootton (eds), Academic Press, London, p. 311-329.
17. MUNK, P. 1997. Prey size spectra and prey availability of larval and small juvenile cod. <i>J. Fish. Biol.</i> , 51(Suppl.A): 340-351.

Data sources (literature reference or contact person)	
18.	MUNK, P, P. O. LARSSON, D. DANIELSSEN, and E. MOKSNESS. 1995. Larval and small juvenile cod <i>Gadus morhua</i> concentrated in the highly productive areas of a shelf break front. <i>Mar. Ecol. Prog. Ser.</i> , 125 : 21-30.
19.	PLANQUE, B. and T. FRÉDOU. 1999. Temperature and the recruitment of Atlantic cod (<i>Gadus morhua</i>). <i>Can. J. of Fish. and Aquat. Sci.</i> , 56 : 2069-2077.
21.	ICES. MS 2001. Workshop on Gadoid stocks in the North sea during the 1960s and 1970s. The Fourth ICES/GLOBEC backward facing workshop. <i>ICES Co-op. Res. Report</i> , No. 244, 55 p.

