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The Catch Statistics of the Shrimp Fishery (*Pandalus borealis*)
in the Denmark Strait in the Years 1980-1996

by

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Abstract

In this paper detailed data on the catch, effort and CPUE from the shrimp fishery in the Denmark Strait for all countries in the years 1989 to 1995 are shown. Total effort and mean CPUE of all countries combined has been calculated using the figures for nominal catch for every country going as far back as 1978. It is considered here that the shrimp stock is the same on both sides of the midline between Iceland and Greenland in the so-called north and east area. The so-called middle and south areas may represent different stocks so the data coming from those will be kept separate from the north at present.

The catch rates in the traditional north and east area were low in the years 1989 through 1992, namely from 90 to 109 kg. The catch rate then increased to 200 kg in 1994 and has since decreased to 112 kg in 1996. This coincided with the effort being directed more to the two new areas south of 65°N.

The nominal catch has in recent years decreased a great deal and was only some 4 000 tons in 1995 in the north area, but 5 400 tons in the southern areas in 1995. The preliminary figures for 1996 (January-October) indicate that the total catch in the north will decline from the 1995 value.

Introduction

Shrimp in fishable concentrations in the Denmark Strait area was first found in September 1976 but a fishery was first commenced in 1978 by Iceland and a year later the Norwegians started fishing in the area as well, and by 1980, Greenland, Denmark, Faroe Islands and France joined in. From then on the fishery was carried out by all these 6 countries. However France has not been fishing since 1991. The fishery in the southern areas started in 1993 after the search of Lehmann (1990) and by the opening of the redfish box in 1993 which lies near the so-called middle area (Fig. 1).

In this paper all data available on the catch, effort and the CPUE, are gathered by month for all countries and strata within each area and then combined for the years 1989-1996. Similar proceedings have been carried out for the previous years 1980-1988 (Skúladóttir, 1991).

Throughout the paper the data are separated into north and south area respectively.

Material and Methods

For most of the catch there are logbook data which include catch and effort. The individual authors have also calculated the CPUE by dividing the catch per month (in kg) by the corresponding effort (in trawling hours). In order to assess the overall CPUE per every half year, all the effort in the period January to June was summed. Then only the catches that correspond to stated effort are summed by every half year. The subtotal sum of the catch is divided by the subtotal sum of effort to get the CPUE per every half year. In order to assess the total effort exerted by each country in the area, the nominal catch per month is summed by every half year. The nominal catch is often higher than the catch reported in logbooks. Therefore the effort was corrected by every half year by dividing the nominal total catch by the CPUE of the same half year. The effort that is proportional to the nominal catch is calculated by dividing the nominal catch by the CPUE of the same period. It has been assumed here that the gear and the efficiency of all vessels of a country is more like that of the ones not reporting of the same country than that of other countries. Therefore the effort was first corrected by individual countries.

Results and Discussion

The effort, catch and nominal catch as well as the calculated CPUE are presented in tables 1 to 6 for the six countries for the north area, including the east area which is only fished by Iceland (Table 4) namely north of 65°N. The data for the middle and south areas combined, namely south of 65°N, are presented in tables 8 - 11.

For the first years the CPUE and effort was taken from the NAFO Scientific Council Reports 1980 and 1983 (Skúladóttir 1991). Later the CPUE and effort data were obtained from the scientists of the respective countries. For Norway, the data come from Smedstad and Torheim (1992) and after that from Godø (personal communication). For France the data come from Bertrand, Battaglia and Poulard (personal communication). The nominal catch data were obtained from Carlsson and Kannevorff (1992) and now from Siegstad (1996).

Table 7 which has data for the north area for all countries by half years goes back to 1978. From table 7 it is notable that there is considerable variation in the CPUE of the different countries. This could be due to different gear sizes and the difference in power of the respective vessels. For the Icelandic vessels it is known that gear size was about 2400 meshes (circumference) for many years, but increased in 1993 to about 2700 meshes. The mean size of trawl has gone down again for 1994 and 1995, being some 2100 and 2300 meshes respectively. In 1996 the mean size of Icelandic trawls increased to 3120 meshes. There is also a fall in CPUE in the latter half of year 1995. However a second peak in catch rates can occur late in the year. Twin trawls were accounted for by doubling the effort where twin trawls are being used.

The yearly catch rate is calculated in table 12 where the half years are added together. The CPUEs have been falling gradually since the years 1980 and 1981 or from 245 kg per hour to 90 kg in 1991. In spite of doubling the effort there was little gain in addition to the 11 thousand tons fished in 1986. However by 1993 the effort has decreased considerably or from 108 thous. hours in 1989 to some 40 thous. hours in 1993. In 1994 there is the most dramatic drop in effort or down to some 15 thous. hours. The catch in the traditional area has gone down drastically as well at the same time as the new areas come into use. The CPUE has now increased to 201 kg in 1994 in the traditional area, but has fallen to 110 kg in 1996 in spite of very little effort in the past 3 years.

Table 13 contains the logbook data gathered together for the four countries for the middle and south area combined from 1993 through 1996. Apart from the huge CPUE that the Faroe Islands and Greenland report in the second half of 1993, 1895 and 1138 kg per trawling hour respectively with only little effort spent, the CPUEs are not much higher than they were in the beginning of the eighties in the traditional north area as average annual CPUE. The mean CPUE was 77 kg in 1993 increasing after that to 265 kg in 1996 (table 14).

The total catch is listed in Table 15 as well as advised TAC by the Scientific Council of NAFO, by years. Through the years the effective TAC by Greenlandic authorities has usually been moderate and similar to the advised TAC. However from the year 1990 onwards the effective TACs have been far too high. Those unrealistic TACs of some 13 000 to 14 500 tons have never been reached in Denmark Strait not even with the additional catch east of the midline which is not included in the TAC set by Greenland. In the north area the yearly catch has been gradually falling as the new areas south of 65° N seemed more attractive. The total catch was only 3 100-4 000 tons in the traditional area in 1993-1996 as compared to 7 500 tons in 1992. In the south areas the catch increased from 3 000 in 1993 to 6 600 in 1994. It was 5 400 tons in 1995. In 1995 there appears to be a slightly increased fishery in the north area. The catch in the east area (Icelandic side of the midline) in 1996 is the lowest in 5 years as availability was low and ice conditions were also heavy at times. In the whole area (north and south) altogether 9 800 tons were fished in 1994 and 9 500 tons in 1995. The provisional catch for 1996, the months January-September is 6 500 tons.

Conclusion

The stock in the traditional area of Denmark Strait appears to have reached the stage in 1995 where stock level has reached a higher stable level than in the years 1989 to 1993 as judged by CPUE although not as high as that of the early eighties. The reduced annual removals from the shrimp stock in the north area of Denmark Strait appear to have had a beneficial influence on the state of stock when looking at the CPUEs of 1994 and 1995. The CPUE of 1996 is however quite low and cannot be easily explained. It is not certain if a connection exists between the northern area and the southern areas to allow for a migration of part of the stock to the south in recent years, but concentrations in the south do not seem to be diminishing at present.

References:

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Table 1. North area. Catch rates (kg per hour) effort (hours trawling) and corresponding catch (tons) from the shrimp fishery in Denmark Strait, in the traditional north area, i.e. north of 65° N, by Greenland in two periods of the year.

Year	January - June				July - December				
	Month	Cpue	Effort	Catch	Month	Cpue	Effort	Catch	
1989	Jan	249	6602	1646.6	Jul	27	15	0.4	
	Feb	214	6361	1361.0	Aug	44	713	31.3	
	Mar	131	3905	512.1	Sep	59	2290	135.3	
	Apr	197	3505	690.6	Oct	96	2600	248.7	
	May	68	2322	157.5	Nov	67	7031	474.1	
	Jun	39	137	5.4	Dec	84	7107	598.9	
	Subtotal	192	22832	4373.2	Subtotal	75	19756	1488.7	
	Total	192	23343	4471.0	Total	75	20039	1510.0	
	1990	Jan	139	8602	1196.8	Jul	94	82	7.7
Feb		185	8289	1533.1	Aug	59	352	20.6	
Mar		143	8299	1186.1	Sep	64	710	45.2	
Apr		473	1050	496.9	Oct	58	1734	101.4	
May		455	2133	971.5	Nov	65	2121	138.7	
Jun		45	116	5.2	Dec	79	5160	408.5	
Subtotal		189	28489	5389.6	Subtotal	71	10159	722.1	
Total		189	28956	5478.0	Total	71	10298	732.0	
1991		Jan	142	6812	964.0	Jul	0	38	0.0
	Feb	129	7205	926.0	Aug	0	0	0.0	
	Mar	101	6403	646.0	Sep	74	404	30.0	
	Apr	128	7700	987.0	Oct	64	375	24.0	
	May	85	5084	434.0	Nov	91	505	46.0	
	Jun	72	471	34.0	Dec	106	897	95.0	
	Subtotal	119	33675	3991.0	Subtotal	88	2219	195	
	Total	119	33582	3980.0	Total	88	2560	225.0	
	1992	Jan	94	3698	346.0				
Feb		113	3802	431.0					
Mar		123	5423	665.0	Oct	35	143	5.0	
Apr		73	3682	268.0	Nov	84	358	30.0	
May		101	1260	127.0	Dec	104	1669	174.0	
Subtotal		103	17865	1837.0	Subtotal	96	2170	209.0	
Total		103	17612	1811.0	Total	96	2087	201.0	
1993		Jan	85	6216	528.0				
		Feb	93	5066	469.0				
	Mar	120	2347	282.0					
	Apr	85	390	33.0					
	May	0	26	0.0	Dec	176	95	16.7	
	Subtotal	93	14045	1312.0	Subtotal	176	95	16.7	
	Total	93	15073	1408.0	Total	176	97	17.0	
	1994	Jan	217	844	183.0				
		Feb	172	3037	523.1				
Mar		155	2194	339.6					
Apr		37	76	2.8					
May			2	0.0					
Subtotal		170	6153	1048.5					
Total		170	6197	1056.0					
1995	Jan	262	3801	996.0					
	Feb	193	2691	518.1					
	Mar	174	1907	332.0					
	May	0	1	0.0	Dec	54	964	52.1	
	Subtotal	220	8400	1846.1	Subtotal	54	964	52	
	Total	220	8468	1861.0	Total	54	962	52.0	
1996	Jan	87	1746	151.1	Jul		7		
	Feb	152	25	3.8					
	Subtotal	87	1771	154.9					
	Total	87	1864	163.0					

Table 2. North area. Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in Denmark Strait, by France in two periods of the year.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1987	Apr	227	400	90.9	Sep			94.0
	May	250	578	144.7	Oct			59.0
					Nov			170.0
	Subtotal	241	978	235.6	Subtotal			323.0
	Total	241	2599	626.0	Total			405.0
1988	Apr	147	462	68.1	Aug			2.0
	May	136	473	64.2	Sept			48.0
	Subtotal	141	935	132.3				
	Total	141	3138	444.0	Total			50.0
1989	Mar	203	247	50.2	Jul	58	116	6.7
	Apr	192	907	174.2	Aug	59	409	24.0
	May	23	23	0.5				
	Subtotal	191	1177	225	Subtotal	58	525	30.7
	Total	191	1525	291.3	Total	58	1536	89.8
1990	Mar	126	172	23.3				
	Subtotal	126	172	23.3				
	Total	126	286	36.0	Total			15.0
1991	Feb	141	206	29.0				
	Mar	93	350	32.7				
	Apr	119	468	55.8				
	Subtotal	115	1024	117.5				
	Total	115	1024	117.5				

Table 5. North area. Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in the Denmark Strait, north of 65°N, by Faroe Islands.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1989	Jan	158	862	136.2				
	Feb	122	781	95.1				
	Mar	108	781	84.3	Nov	51	430	22.0
	Apr	297	230	68.3	Dec	108	1202	130.3
	Subtotal	145	2654	383.9	Subtotal	93	1632	152.3
	Total	145	3035	439.0	Total	93	1672	156.0
1990	Jan	93	1205	112.5				
	Feb	109	1307	142.2				
	Mar	85	957	81.2	Nov	65	307	13.9
	Apr	23	113	2.6	Dec	62	1357	122.7
	May	269	660	177.5	Subtotal	82	1664	136.6
	Subtotal	122	4242	516.0	Total	82	1925	158.0
	Total	122	5631	685.0				
1991	Jan	112	1980	221.6	Sep	83	262	21.7
	Feb	91	2922	266.7	Oct		274	13.2
	Mar	68	1790	122.5	Nov	60	1333	79.6
	Apr	129	330	42.5	Dec	88	2759	244.1
	Subtotal	93	7022	653.3	Subtotal	77	4628	358.6
	Total	93	8610	801.0	Total	77	2659	206.0
1992	Jan	69	2040	140.0				
	Feb	66	1536	101.2				
	Mar	96	1135	108.6	Oct	25	290	9.1
	Apr	52	356	18.4	Nov	81	2120	171.6
	May	50	1234	61.7	Dec	112	3131	350.2
	Subtotal	68	6301	429.9	Subtotal	96	5541	530.9
	Total	68	7446	508.0	Total	96	6095	584.0
1993*	Jan	66	2634	175.0				
	Feb	70	2394	167.0				
	Mar	63	1674	105.0				
	Apr	57	721	41.0				
	May	43	23	1.0				
	Subtotal	66	7446	489.0				
	Total	66	8436	554.0				
1994*	Jan	398	133	53.0				
	Feb	173	596	103.0				
	Mar	167	293	49.0				
	Apr	64	235	15.0	Nov	52	287	15.0
	May	90	189	17.0	Dec	178	381	68.0
	Subtotal	164	1446	237.0	Subtotal	124	668	83.0
	Total	164	1745	286.0	Total	124	668	83.0
1995	Jan	114	1569	179.0				
	Feb	82	1242	102.0	Sep	93	354	33.0
	Mar	99	1106	109.0	Oct	79	191	15.0
	Apr	46	259	12.0	Nov	38	158	6.0
			0	0.0	Dec	57	1815	104.0
	Subtotal	96	4176	402.0	Subtotal	63	2518	158.0
	Total	96	5558	535.0	Total	63	3347	210.0
1996*	Jan	58	2921	170.0				
	Feb	43	768	33.0				
	Mar	184	461	85.0				
	Subtotal	69	4150	288.0				
	Total	69	4943	343.0				

Table 6. North area. Catch rates, corresponding effort (trawling hours) and catch (tons) from the shrimp fishery in the Denmark Strait by Denmark, north of 65°N.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1989	Jan	232	346	80.1	Aug	52	112	5.8
	Feb	277	474	131.4	Sept	51	418	21.4
	May	169	415	70.0	Oct	68	305	20.7
	Jun	13	105	1.4	Nov	48	337	16.3
					Dec	72	264	19.0
	Subtotal	211	1340	282.9	Subtotal	58	1436	83.2
	Total	211	1336	282.0	Total	58	1450	84.0
1990	Jan	100	243	24.3	Jul	46	316	14.5
	Feb	74	140	10.3	Aug	43	454	19.3
	Mar	93	338	31.3	Sep	38	373	14.2
					Oct	47	414	19.4
					Nov	46	406	18.7
					Dec	17	186	3.1
	Subtotal	91	721	65.9	Subtotal	42	2149	89.2
Total	91	3304	302.0	Total	42	2120	88.0	
1991	Mar	52	349	18.2	Sep	45	230	10.3
	Apr	81	424	34.4	Oct	69	521	35.7
	May	78	328	25.6	Nov	0	3	0.0
					Dec	52	294	15.2
	Subtotal	71	1101	78.2	Subtotal	58	1048	61.2
Total	71	3295	234.0	Total	58	2123	124.0	
1992	Jan	59	70	4.1	Nov	37	115	4.3
	Mar	41	293	11.9	Dec	53	217	11.4
	Apr	42	212	9.0				
	Subtotal	43	575	25.0	Subtotal	47	332	15.7
	Total	43	3013	131.0	Total	47	613	29.0
1993	Jan	34	451	15.5				
	Feb	46	566	25.9				
	Mar	44	477	21.2	Dec	72	167	12.0
	Apr	33	222	7.3	Subtotal	72	167	12.0
	Subtotal	41	1716	69.9	Total	72	353	25.4
Total	41	2094	85.3					
1994*	Jan	150	147	22.0	Sept	49	41	2.0
	Feb	77	65	5.0	Oct	72	125	9.0
	Mar	102	283	29.0	Nov	66	122	8.0
	Apr	55	110	6.0	Dec	178	557	99.0
	May	51	59	3.0				
	Subtotal	102	605	62.0	Subtotal	140	845	118.0
	Total	102	634	65.0	Total	140	952	133.0
1995	Jan	203	659	134.0	Dec	15	34	1.0
	Feb	108	721	78.0				
	Mar	228	127	29.0	Subtotal	15	34	1.0
	Subtotal	160	1507	241.0	Total	15	34	1.0
	Total	160	1507	241.0				
1996*	Jan	101	148	15.0				
	Jun	67	15	1.0				
	Subtotal	98	163	16.0	Subtotal			
	Total	98	163	16.0	Total			

Table 7. North area. Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in Denmark Strait north of 65° N, by all nations combined in two periods of the year.

Year	January-June			July - December			
	Country	CPUE	Effort	Catch	CPUE	Effort	Catch
1978	Iceland	215	298	64.2	314	952	299.2
1979	Iceland	186	166	30.9	229	1982	454.4
1980	Greenland, Denmark	350	1665	582.0	129	2483	320.0
	France			50.0			
	Norway	468	3108	1455.0	124	8106	1006.0
	Iceland	125	1760	219.3	101	5318	539.4
	Faroe Islands	427	9115	3892.0			341.0
	Subtotal	393	15648	6148.3	117	15907	1865.4
	Total	393	15775	6198.3	117	18815	2206.4
1981	Greenland, Denmark	395	4013	1585.0			
	France	246	1436	353.0			
	Norway	216	9296	2006.0	43	232	10.0
	Iceland	99	688	68.0	67	848	56.9
	Faroe Islands			686.0			27.0
	Subtotal	260	15433	4012.0	62	1080	66.9
	Total	260	18072	4698.0	62	1516	93.9
1982	Greenland, Denmark	220	8432	1855.0			
	France	226	1833	414.0			
	Norway	203	9337	1894.0			
	Faroe Islands			737.0			
	Subtotal	212	19602	4163.0			
	Total	212	23072	4900.0			
1983	Greenland	255	5752	1467.0			
	France	192	1516	291.0			
	Norway	163	6830	1114.0	101	6100	613.0
	Iceland	99	52	5.1	161	238	38.3
	Denmark			204.0			
	Faroe Islands			443.0			
	Subtotal	203	14150	2877.1	103	6338	651.3
	Total	203	17332	3524.1	103	6338	651.3
1984	Greenland	340	6627	2250.0			
	France	256	1951	500.0			
	Norway	191	11141	2128.0			
	Iceland	42	53	2.2	103	7164	739.6
	Denmark			443.0			
	Faroe Islands			576.0			92.0
	Subtotal	247	19772	4880.2	103	7164	739.6
	Total	247	23900	5899.2	103	8074	831.6
1985	Greenland	270	6469	1744.0	251	3389	852.0
	France	194	2594	504.0	170	814	138.0
	Norway	166	12355	2051.0			
	Iceland	88	4485	396.0	94	14944	1398.0
	Denmark			150.0	137	1482	203.0
	Faroe Islands			404.0			270.0
	Subtotal	181	25903	4695.0	126	20629	2591.0
	Total	181	28959	5249.0	126	22779	2861.0

Table 7 continued

Year	Country	January-June			July - December		
		CPUE	Effort	Catch	CPUE	Effort	Catch
1986	Greenland	288	14285	4114.0	437	3811	1667.0
	France	175	3415	597.0	218	841	183.0
	Norway	145	12845	1861.0	123	1340	165.0
	Iceland	73	3205	234.0	103	8893	916.0
	Denmark	226	1962	443.0	226	252	57.0
	Faroe Islands	93	5428	506.0	416	531	221.0
	Subtotal	189	41140	7755.0	205	15668	3209.0
	Total	189	41140	7755.0	205	15668	3209.0
1987	Greenland	314	17667	5547.0	144	7502	1080.0
	Norway	135	11353	1533.0	96	5261	507.0
	Iceland				79	16835	1330.0
	France	241	2599	626.0			405.0
	Denmark	144	2997	431.0	99	1250	124.0
	Faroe Islands	229	1635	375.0	106	2068	220.0
	Subtotal	235	36251	8512.0	99	32916	3261.0
	Total	235	36251	8512.0	99	37004	3666.0
1988	Greenland	219	24111	5285.0	157	13820	2165.0
	Norway	83	15314	1274.0	83	9332	778.0
	Iceland	107	1769	189.5	54	22735	1234.5
	France	141	3138	444.0			50.0
	Denmark	95	3479	329.0	98	1172	115.0
	Faroe Islands	166	4031	669.0			10.0
	Subtotal	158	51842	8190.5	91	47059	4292.5
	Total	158	51842	8190.5	91	47717	4352.5
1989	Greenland	192	23343	4471.0	75	20039	1510.0
	Norway	84	8354	704.0	52	27056	1394.0
	Iceland	108	7835	847.3	45	10722	478.7
	France	191	1525	291.3	58	1536	89.8
	Denmark	211	1336	282.0	58	1450	84.0
	Faroe Islands	145	3035	439.0	93	1672	156.0
	Subtotal	155	45428	7034.6	59	62475	3712.5
	Total	155	45428	7034.6	59	62475	3712.5
1990	Greenland	189	28956	5478.0	71	10298	732.0
	Norway	98	11982	1176.0	50	26247	1324.0
	Iceland	80	2538	203.9	66	1165	77.1
	France	126	286	36.0			15.0
	Denmark	91	3304	302.0	42	2120	88.0
	Faroe Islands	122	5631	685.0	82	1925	158.0
	Subtotal	150	52697	7880.9	57	41740	2379.1
	Total	150	52697	7880.9	57	42003	2394.1
1991	Greenland	119	33582	3980.0	88	2560	225.0
	Norway	68	23703	1600.0	56	16195	904.0
	Iceland	218	1930	421.1	104	423	43.7
	France	115	1024	117.5			
	Denmark	71	3295	234.0	58	2123	124.0
	Faroe Islands	93	8610	801.0	77	2659	206.0
	Subtotal	99	72144	7153.6	63	23960	1502.7
	Total	99	72144	7153.6	63	23960	1502.7
1992	Greenland	103	17612	1811.0	96	2087	201.0
	Norway	63	23938	1514.0	68	14448	986.0
	Iceland	211	8232	1733.3	101	169	17.1
	Denmark	43	3013	131.0	47	613	29.0
	Faroe Islands	68	7446	508.0	96	6095	584.0
	Total	95	60241	5697.3	78	23412	1817.1

Table 7 continued

Year	January-June				July - December		
	Country	CPUE	Effort	Catch	CPUE	Effort	Catch
1993	Greenland	93	15073	1408.0	176	97	17.0
	Iceland	184	13854	2548.4	216	21	4.8
	Denmark	41	2084	85.3	72	353	25.4
	Faroe Islands	66	8436	554.0			
	Total	116	39457	4595.7	100	471	47.0
1994*	Greenland	170	6197	1056.0			
	Iceland	286	5233	1498.9	92	167	15.4
	Denmark	102	634	65.8	140	952	133.0
	Faroe Islands	164	1745	286.0	124	680	82.0
	Total	210	13809	2906.7	130	1779	230
1995*	Greenland	220	8458	1861.0	54	964	52.0
	Iceland	309	3721	1150.0	171	7	1.2
	Denmark	160	1507	241.0	15	34	1.0
	Faroe Islands	96	5558	535.0	63	3347	210.0
	Total	197	19254	3787.0	61	4352	264.2
1996*	Greenland	87	1864	163.0			
	Norway	105	10134	1060.4			
	Iceland	242	2306	559.0	163	41	6.7
	Denmark	98	163	16.0			
	Faroe Islands	69	4943	343.0			
	Total	110	19410	2141.4	163	41	6.7

Table 8. Middle and South area. Catch rates, corresponding effort and catch (tonnes) from the shrimp fishery in the middle area in the Denmark Strait, i.e. south of 65° N by Greenland in two periods of the year.

Year	January - June				July - December				
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch	
1993	Jan	149	74	11.0					
	Feb	69	350	24.0					
	Mar	162	802	130.0					
	Apr	181	2422	438.0					
	May	329	923	304.0	Dec	1138	80	91.0	
	Subtotal	198	4571	907.0	Subtotal	1138	80	91.0	
	Total	198	4168	827.0	Total	1138	80	91.0	
1994*	Jan	439	2015	884.0	Jul	463	19	8.8	
	Feb	322	1123	362.0	Aug	460	904	415.5	
	Mar	191	642	122.8	Sept	383	92	35.2	
	Apr	288	835	240.4	Oct	250	32	8.0	
	May	239	493	117.7	Nov	512	813	416.0	
					Dec	323	878	283.6	
	Subtotal	338	5108	1726.9	Subtotal	426	2738	1167	
	Total	338	5037	1703.0	Total	426	2738	1167.0	
	1995	Jan	362	785	284.2	Jul	439	31	13.6
		Feb	163	452	73.9	Aug	380	499	189.4
Mar		33	24	0.8	Sept	126	109	13.7	
May		481	405	194.7	Oct	546	37	20.2	
					Nov	393	1162	456.9	
					Dec	367	2368	869.5	
Subtotal		332	1666	553.6	Subtotal	372	4206	1563	
Total		332	1679	558.0	Total	372	4243	1577.0	
1996*	Jan	320	1564	500.0	Jul	344	780	268.4	
	Feb	453	1259	570.0	Aug	399	1004	400.3	
	Mar	469	505	237.0					
	Apr	441	399	176.0					
	May	50	8	0.4					
	June	375	24	9.0					
	Subtotal	397	3759	1492.4	Subtotal	375	1784	669	
	Total	397	3962	1573.0	Total	375	1878	704.0	

Table 9. Middle and South area. Catch rates, corresponding effort and catch (tons) from the shrimp fishery south of 65° N by Norway in two periods of the year.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1993	Jan	51	4366	223.2				
	Feb	77	4582	352.2	Sep	43	1033	44.7
	March	56	5459	303.2	Oct	39	2970	116.3
	April	58	5622	326.6	Nov	24	3136	76.2
	May	81	2307	186.3	Dec	78	1050	82.4
	Subtotal	62	22336	1391.5	Subtotal	39	8189	319.6
	Total	62	23548	1467.0	Total	39	8635	337.0
1994*	Jan	175	313	54.8	Aug			
	Feb	228	1053	240.3	Sep	74	2265	168.1
	March	167	1836	307.3	Oct	57	2230	128.0
	April	111	4996	556.3	Nov	87	2230	193.0
	May	82	1429	116.5	Dec	210	1012	212.5
	Subtotal	132	9627	1275.2	Subtotal	91	7737	701.6
	Total	132	12204	1616.6	Total	91	9808	889.4
1995*	Jan	130	2653	343.6	Aug	363	152	55.1
	Feb	58	854	49.8	Sep	92	4553	416.7
	March	106	2835	299.7	Oct	65	3953	256.8
	April	64	1724	111.0	Nov	60	5101	304.3
	May	109	799	87.1	Dec	69	2672	185.3
	Subtotal	101	8865	891.2	Subtotal	74	16431	1218.2
	Total	101	10527	1058.3	Total	74	19513	1446.7
1996*	Jan	114	108	12.3	Aug			
	Feb	108	1553	167.8	Sep			
	March	108	1513	163.9	Oct			
	April	188	1011	189.7	Nov			
	May	93	1186	109.9	Dec			
	Subtotal	120	5371	643.6	Subtotal			
	Total	120	8559	1025.6	Total			

Table 10. Middle and South area. Catch rates, corresponding effort and catch (tons) from the shrimp fishery south of 65° N by Faroe Islands in two periods of the year.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1993	Feb	39	153	6.0				
	Mar	73	875	64.0				
	Apr	65	1332	87.0				
	May	32	180	5.7	Dec	1895	38	72.0
	Subtotal	64	2540	162.7	Subtotal	1895	38	72.0
	Total	64	2389	153.0	Total			
1994*	Jan	326	500	163.0				
	Feb	183	556	102.0				
	Mar	168	161	27.0	Oct	130	254	33.0
	Apr	229	380	87.0	Nov	236	554	131.0
	May	106	310	33.0	Dec	288	472	136.0
	Subtotal	216	1907	412.0	Subtotal	234	1280	300.0
	Total	216	2106	455.0	Total	234	1370	321.0
1995*	Feb	91	527	48.0	Sep	127	71	9.0
	Mar	77	261	20.0	Dec	890	91	81.0
	Apr	71	268	19.0	Subtotal	556	162	90.0
	Subtotal	82	1056	87.0	Total	556	216	120.0
	Total	82	1408	116.0				
1996*	Feb	154	227	35.0				
	Mar	142	952	135.0				
	Apr	268	306	82.0				
	Subtotal	170	1485	252.0				
	Total	170	1762	299.0				

Table 11. Middle and south area. Catch rates, corresponding effort and catch (tons) from the shrimp fishery in the Denmark Strait, i.e. south of 65° N, by Denmark.

Year	January - June				July - December			
	Month	CPUE	Effort	Catch	Month	CPUE	Effort	Catch
1993	Apr	65	361	23.4				
	May	120	183	21.9				
	Subtotal	83	544	45.3				
	Total	83	572	47.6				
1994*	Jan	100	10	1.0	Aug	268	473	127.0
	Feb	0	8	0.0	Sep	184	331	61.0
	Apr	158	303	48.0	Oct	175	744	130.0
	May	90	120	10.8	Nov	231	432	100.0
					Dec	211	57	12.0
	Subtotal	136	441	60	Subtotal	211	2037	430.0
	Total	136	391	53.0	Total	211	2061	435.0
1995	Feb	205	22	4.5	Jul	579	247	143.0
					Aug	326	427	139.0
	May	418	39	16.3	Sep	276	257	71.0
					Oct	221	408	90.0
					Nov	194	376	73.0
					Dec	157	338	53.0
	Subtotal	341	61	20.8	Subtotal	277	2053	569.0
Total	341	62	21.0	Total	277	2035	564.0	
1996*	Jan	455	176	80.0	Jul	454	348	158.0
	Feb	169	160	27.0	Aug			
	Mar	420	319	134.0	Sep			
	Apr	413	387	160.0	Oct			
	May	279	340	95.0	Nov			
	Jun	322	369	119.0	Dec			
	Subtotal	351	1751	615.0	Subtotal	454	348	158.0
	Total	351	1765	620.0	Total	454	348	158.0

Table 12. North area Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in Denmark Strait north of 65° N, by years.

Year	Periods	CPUE	Effort	Catch
1980	Jan-Jun	393	15775	6198.3
	Jul-Dec	117	18815	2208.4
	Mean/Total	243	34590	8404.7
1981	Jan-Jun	260	18072	4698.0
	Jul-Dec	62	1516	93.9
	Mean/Total	245	19588	4791.9
1982	Jan-Jun	212	23072	4900.0
	Jul-Dec	-	-	-
	Mean/Total	212	23072	4900.0
1983	Jan-Jun	203	17332	3524.1
	Jul-Dec	103	6338	651.3
	Mean/Total	176	23670	4175.4
1984	Jan-Jun	247	23900	5899.2
	Jul-Dec	103	8074	831.6
	Mean/Total	211	31974	6730.8
1985	Jan-Jun	181	28959	5249.0
	Jul-Dec	126	22779	2861.0
	Mean/Total	157	51738	8110.0
1986	Jan-Jun	189	41140	7755.0
	Jul-Dec	205	15668	3209.0
	Mean/Total	193	56808	10964.0
1987	Jan-Jun	235	36251	8512.0
	Jul-Dec	99	37004	3666.0
	Mean/Total	166	73255	12178.0
1988	Jan-Jun	158	51842	8190.5
	Jul-Dec	91	47717	4352.5
	Mean/Total	126	99559	12543.0
1989	Jan-Jun	155	45428	7034.6
	Jul-Dec	59	62475	3712.5
	Mean/Total	100	107903	10747.1
1990	Jan-Jun	150	52687	7880.9
	Jul-Dec	57	42003	2394.1
	Mean/Total	109	94700	10275.0
1991	Jan-Jun	99	72144	7153.6
	Jul-Dec	63	23960	1502.7
	Mean/Total	90	96104	8656.3
1992	Jan-Jun	95	60241	5697.3
	Jul-Dec	78	23412	1817.1
	Mean/Total	90	83653	7514.4
1993	Jan-Jun	116	39457	4595.7
	Jul-Dec	100	471	47.0
	Mean/Total	116	39928	4842.7
1994	Jan-Jun	210	13809	2906.7
	Jul-Dec	98	1779	230.0
	Mean/Total	201	15588	3136.7
1995*	Jan-Jun	197	19254	3787.0
	Jul-Dec	61	4352	284.2
	Mean/Total	172	23606	4051.2
1996*	Jan-Jun	110	19410	2141.4
	Jul-Dec	163	41	6.7
	Mean/Total	110	19451	2148.1

Table 13. Middle and south area. Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in the middle area of Denmark Strait, i.e. south of 65°, by all nations combined in two periods of the year.

Year	Country	January-June			July - December		
		CPUE	Effort	Catch	CPUE	Effort	Catch
1993	Greenland	198	4168	827.0	1138	80	91.0
	Norway	62	23548	1467.0	39	8635	337.0
	Denmark	83	572	47.6			
	Faroe Islands	64	2389	153.0	1895	38	72.0
	Total	81	30677	2494.6	57	8753	500.0
1994	Greenland	338	5037	1703.0	426	2738	1167.0
	Norway	132	12204	1616.6	91	9808	889.4
	Denmark	136	391	53.0	211	2061	435.0
	Faroe Islands	216	2106	455.0	234	1370	321.0
	Total	194	19738	3827.6	176	15977	2812.4
1995*	Greenland	332	1679	558.0	372	4243	1577.0
	Norway	101	10527	1058.3	74	19513	1446.7
	Denmark	339	62	21.0	277	2035	564.0
	Faroe Islands	82	1408	116.0	556	216	120.0
	Total	128	13676	1753.3	143	26007	3707.7
1996*	Greenland	397	3962	1573.0	375	1878	704.0
	Norway	120	8559	1025.6			
	Denmark	351	1765	620.0	454	348	158.0
	Faroe Islands	170	1762	299.0			
	Total	219	16048	3517.6	387	2226	862.0

Table 14. Middle and south area. Catch rates (kg per hour trawling) and corresponding effort (hours trawling) and catch (tons) from the shrimp fishery in the middle area of Denmark Strait south of 65° N by years.

Year	Periods	CPUE	Effort	Catch
1993	Jan-Jun	81	30677	2494.6
	Jul-Dec	57	8753	500.0
	Mean/Total	76	39430	2994.6
1994	Jan-Jun	194	19738	3827.6
	Jul-Dec	176	15977	2812.4
	Mean/Total	186	35715	6640.0
1995*	Jan-Jun	128	13676	1753.3
	Jul-Dec	143	26007	3707.7
	Mean/Total	138	39683	5461.0
1996*	Jan-Jun	219	16048	3517.6
	Jul-Dec	387	2226	862.0
	Mean/Total	240	18274	4379.6

Table 15. Nominal catch (tonnes) of shrimp in the Denmark Strait.

Nation	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ***	1996 ***	1997	
North area																					
Denmark	-	-	702	581	740	204	443	353	500	555	444	366	390	358	160	111	199	242	16		
Faroe Islands	-	-	4233	713	737	443	668	674	727	595	679	595	843	1007	1092	554	368	745	343		
France	-	-	50	353	414	291	500	642	780	1030	494	381	51	118	-	-	-	-	-		
Greenland	-	-	200	1004	1115	1467	2250	2596	5781	8627	7456	5976	6210	4205	2012	1425	1056	1913	163		
Iceland	363	485	759	125	0	43	742	1794	1150	1330	1431	1326	281	465	1750	2553	1514	1151	566		
Norway	-	800	2461	2016	1896	1727	2128	2051	2026	2041	2052	2098	2500	2504	2500	-	-	-	1060		
Total	363	1285	8405	4792	4902	4175	6731	8110	10964	12178	12556	10742	10275	8657	7514	4643	3137	4051	2148		
Middle and south area																					
Denmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	488	585	778		
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	225	776	236	299		
Greenland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	918	2870	2135	2277		
Norway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1804	2507	2505	1026		
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2995	6641	5461	4380		
Σ eastern side	363	485	759	125	0	43	742	1794	1150	1330	1431	1326	281	465	1750	2553	1514	1151	566		
Σ north area not eastern side	0	800	7646	4667	4902	4132	5989	6316	9814	10848	11125	9416	9994	8192	5764	2090	1623	2900	1582		
Σ middle and south area																2995	6641	5461	4380		
Σ western side	0	800	7646	4667	4902	4132	5989	6316	9814	10848	11125	9416	9994	8182	5764	5085	8264	8361	5962		
ΣΣ all areas	363	1285	8405	4792	4902	4175	6731	8110	10964	12178	12556	10742	10275	8657	7514	7638	9778	9512	6528		
Advised TAC	-	-	-	-	4200	4200	4200	5000	-	-	-	10000*	10000*	10000*	10000*	8000	5000	5000	5000	5000	
Effective TAC western side	-	-	-	8000	4500	5725	5245	6090	7525**	7725**	8725**	9025**	14100	14500	13000	9563	9563	9563	9563	9563	

* Advised for a few years as a precautionary measure.

** not including Greenland fishery north of 66°30' N.

*** Provisional

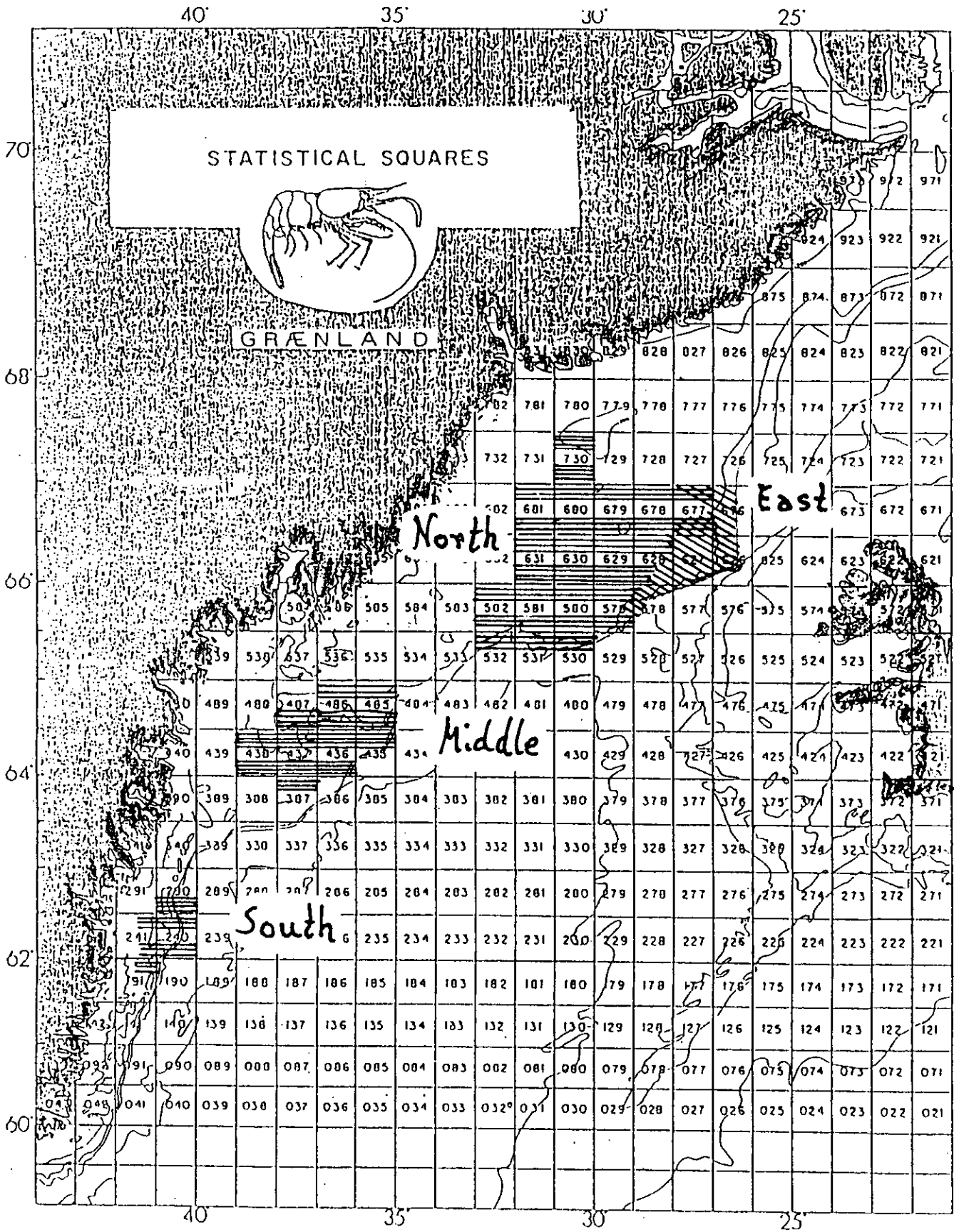


Fig. 1. The strata numbers in the Denmark strait.