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Sustainable Yield of Shrimp (Pandalus borealis) in the Denmark Strait Area, 1978 to 1984

by

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The yield curve of the Pandalus stock in the Denmark Strait area has been estimated again, using the data shown in Table I, according to the modified method of Fox (1970). The application of his method regarding this material has previously been described by Skúladóttir (1985).

The data (see Table I) used for the estimation of the sustainable yield, shown in Fig. 1, came from all nations participating in the shrimp fishery, except for the two first years, i. e. 1978 and 1979.

As before the effort of 1984 was calculated as follows: a nation's total catch in a certain month was divided by the kg per hour for the same month for the same nation. There were more difficulties in calculating the total effort for all nations than ever before as no effort data came from the Faroe Islands and only one boat informed Greenland authorities regarding effort data (Carlsson 1985). Besides Icelandic effort data Poulard and Fontaine (1985) and Smestad and Torheim (1985) gave useful information on effort and catch in 1984.

The calculated maximum sustainable yield amounts now to 5000 tons which is similar to that calculated previously (Skúladóttir 1985).

References:

Carlsson, D. M. 1985: Data on the shrimp fishery at East Greenland in 1984 compared to earlier years. NAFO SCR Doc 85/I/12.

Fox, W. W., Jr. 1970: An exponential surplus-yield model for optimizing exploited fish populations. Trans. Am. Fish. Soc. 99.

Poulard, J. C. and Fontaine, B. 1985: Catch, Effort and Biological Data of Shrimp (Pandalus borealis) in the French Fishery off East Greenland in 1984. NAFO SCR Doc 85/I/10.

Skúladóttir, U. 1985: The sustainable yield of Pandalus borealis in the Denmark Strait area. NAFO SCR Doc 85/I/15.

Smestad, O. M. and Torheim, S. 1985: Norwegian investigations on shrimp in East Greeland Waters in 1984. NAFO SCR Doc 85/I/7.

Table 1. Catch and effort.

Year	Effort (hours)	Catch (tons)	CPUE (kg/hr)	Average effort (2 yr)	(3 yr)	Mean catch (4 yr)
1978	563	363.6	645.4	282	188	91
1979	2562	1285.0	501.5	1563	1042	412
1980	47457	8404.7	177.1	25010	16861	2513
1981	20450	4912.0	240.2	33954	23490	3741
1982	23620	4717.0	199.7	22035	30509	4830
1983	22361	4157.0	185.9	22991	22144	5548
1984	32281	6675.0	206.8	27321	26087	5115

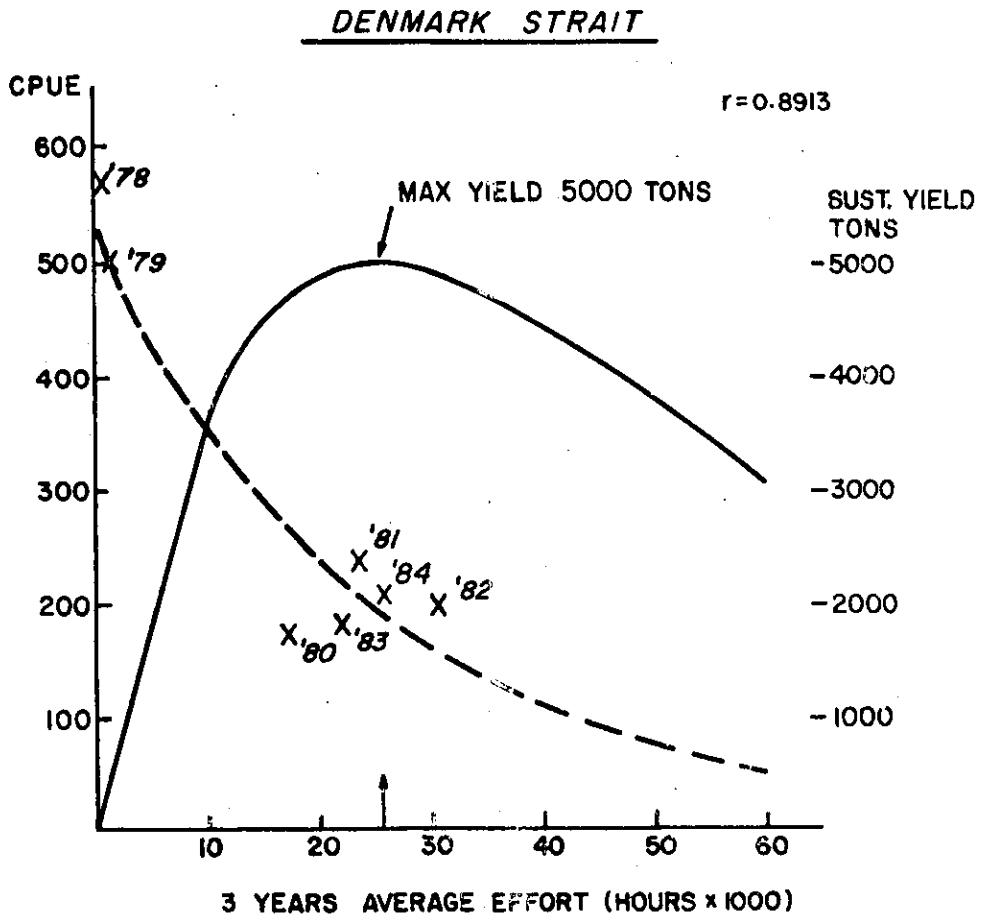

Fig. 1. The broken line represents the relationship between the catch per unit effort (CPUE) and 3 years average effort. The correlation factor is denoted by r. The solid line curve represents the sustainable yield. (See Skúladóttir 1985).

Appendix

The data used in the paper were obtained by pooling the basic data as listed in tables 2 and 3.

Table 2. The pooling of catch and effort for several countries in the Denmark Strait area in 1984 whereby monthly CPUE (kg/hr) and hence total effort for every month is calculated with respect to the total monthly catch of all Nations fishing in the area.

	Tr. hrs.	Catch tons	Kg/hr
		January	
Greenland	585	353	603.0
Denmark	-	(284)	-
Corrected Σ	1056	637	603.0
		February	
Greenland	1320	470	356.0
Denmark	-	(102)	-
Faroe Islands	-	(220)	-
Norway	178	7	208.0
Subtotal	1498	508	339.1
Corrected Σ	2445	829	
		March	
Greenland	3139	1146	223.0
Faroe Islands	-	(193)	-
Norway	2747	629	229.0
France	132	42	316.0
Subtotal	8018	1817	226.6
Corrected Σ	8870	2010	
		April	
Greenland	-	(191)	-
Faroe Islands	-	(163)	-
Norway	3609	664	184.0
France	723	352	487.0
Subtotal	4332	1016	234.5
Corrected Σ	5842	1370	
		May	
Greenland	-	(90)	-
Norway	4956	798	161.0
France	349	106	304.0
Subtotal	5305	904	170.4
Corrected Σ	5833	994	

Iceland corrected (no other nation fishing)

	Tr. hrs	Catch tons	Kg/hr
June	53	2	42.2
July	655	45	69.3
August	116	8	69.6
September	1546	153	98.8
October	1887	291	154.2
	November		
Faroe Islands		(43)	
Iceland	2391	176	73.5
Corrected Σ	2980	219	73.5
	December		

Table 3. The pooling of effort and catch in every month whereby the yearly overall effort and CPUE can be calculated for 1984.

	Tr hrs	Catch tons	Kg/hr
January	1056	637	603.0
February	2456	830	338.0
March	8870	2010	226.6
April	5842	1370	234.5
May	5833	994	170.4
June	53	2	42.2
July	655	45	69.3
August	116	8	69.6
September	1546	153	98.8
October	1887	291	154.2
November	2980	219	73.5
December	987	116	117.5
Total	32281	6675	206.8