Northwest Atlantic Fisheries Organization

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Information relevant to the Fisheries Commission request to the Scientific Council with respect to the redfish stock in Division 3O

by

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Introduction

This paper contains information to address a request by the Fisheries Commission to the Scientific Council (SCS Doc. 06/01) with respect to the redfish stock in Division 3O. That specific request is as follows:

Whether the following measures on Redfish in Division 3O, if applied in the NAFO Regulatory Area, are effective, in particular, in regard to addressing bycatch of species such as American plaice and Cod as conservation and management measure:

• 90 mm mesh size

• Limiting the maximum permissible harvest of 15% (by number) of redfish 22cm or smaller, imposing 5% limit on the bycatch of any other groundfish species in the fishery

• Closure of fishing for a minimum of 10 days after reaching or exceeding of either the small fish or bycatch levels

• Re-opening of fishery through use of test fisheries

Materials and Methods

Observer Data from the Canadian Department of Fisheries and Oceans over the period 1980 to 2006 were used to provide information on bycatch in the redfish directed fishery in Division 3O. Sampling exists for Canada (N), Cuba, Japan and Russia.

Results and Discussion

a) Information on bycatch by mesh size

Information on bycatch species in the directed redfish fishery for Div. 3O is summarized by gear and mesh size for observed sets only from 1980-2006 for the Canada (N) fleets (Table 1). Approximately 25% of the redfish directed catch over the time period was recorded as observed. The data suggest that bycatch of other species, as a percentage of the total catch, is more prevalent with bottom trawling (ranging from 2% to 41%) than with midwater trawling (<1%). The mesh sizes with the highest bycatch of all other species were those in the 90mm-94mm range, accounting for a 41% bycatch, with cod, American plaice and witch flounder accounting for about 5-6% each. For non-Canadian fleets, total bycatch rates ranged were less than 17%, with cod, American plaice and witch flounder

accounting for less than 2% or less. The mesh sizes responsible for the highest bycatch was the 90mm-94mm category (13%).

b) Information on comparison of redfish size distributions by mesh size

A comparison of within year length distributions of the Canada (N) fleets from 1999-2006 by mesh size reveals that generally the smaller mesh sizes (<100mm) are retaining more smaller fish (Fig. 1-6). However, there are a few exceptions to this observation (eg. see 2003 and 2004 in Fig. 1). It is also apparent that of the non-Canadian fleets, size distributions from the Russian catch show a larger proportion of smaller fish that do other fleets.

c) Information on redfish distribution in relation to species under moratoria

With regard to distribution of the redfish stock in 3O in relation to groundfish resources, redfish reside on the slopes of the shelf primarily from 100-750 m in an area that encompasses about 6 400 square nautical miles of the 20 000 square nautical miles of the total bank and shelf area of Div. 3O to 1 500 m. Power and Orr (MS 2002) made a comparison of the relative distribution of redfish with other species currently under moratorium (Div. 3NO Atlantic cod, Div. 3LNO American plaice and Div. 3NO witch flounder. For cod and American plaice, the greatest overlap occurs in depths between 100 m to 200 m. For witch flounder, redfish overlap with its distribution with the exception of the area >750 m. There are also differences in the amount of overlap for all species between spring and autumn with greater overlap generally occurring in the spring with Atlantic cod and witch flounder and in the autumn with American plaice.

REFERENCES

Power, D and D. Orr (MS 2002). Information relevant to the Canadian request to the Scientific Council with respect to the redfish stock in Division 3O. NAFO SCR Doc. 02/79, Ser. No. N4693, 22pp.

Table 1. Summarized Observer data by mesh size and species for Canada (Newfoundland) Fleets directing for redfish in fishing in Div. 3O in various years from 1980-2006. Observed sets represents about 25% of the total redfish catch over the time period.

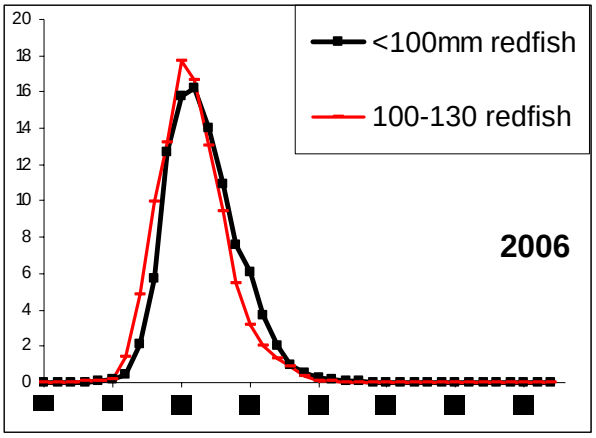
	Codend Mesh Size - Bottom Trawl							Codend Mesh Size - Midwater Trawl				
Common Name	90-94	95-99	100-104	105-109	110-114	120-126	130+	90	105	115	120	130+
REDFISH (NS) SEB.SP.	143069	1767555	1384993	4216644	771114	11460	644488	719000	28299	70995	4500	15665
COD,ATLANTIC	15008	8949	22508	14195	4170	1060	386	240	25	10		
AMERICAN PLAICE	11148	5000	35032	11802	952	240	144					5
WITCH FLOUNDER	13279	3765	41230	11460	1155	1415	1849	5		5		
DOGFISH,SPINY		261	23	282	0	0	15					
DOGFISH,BLACK	6	14	244	1213	0	0	31					
SKATES (NS)	0	0	0	0	0	0	50					
SKATES (NS) RAJA SP.	2366	2934	2311	3656	579	0	1006					
SKATE,THORNY	3455	5059	3090	3382	258	65	1344				2	
SKATE,SMOOTH	30	8	70	5533	0	0	437					
SKATE,SPINYTAIL	5279	1853	2185	1124	202	780	123					
ARGENTINES (NS)	128	165	3088	25	0	0	0					
ARGENTINE,ATLANTIC	2815	1837	1336	3729	2048	5	134					
EELS (NS)	0	7	0	0	0	0	0					
TAPIRFISH,LARGE SCALE	4	41	75	859	3	0	67					
HAKE,BLUE	0	0	4	9	0	0	0					
HADDOCK	6346	2153	7606	2185	1023	160	25					
POLLOCK	141	6885	214	280	63	30	0					
HAKE,LONGFIN	253	393	1231	309	0	1	30					
HAKE,RED (SQUIRREL)	0	7	0	0	0	0	0					
HAKE,WHITE (COMMON)	29022	42809	26136	10581	13847	200	561	5				
HAKE,SILVER	477	265	28	206	10	0	25					
CUSK	319	65	42	457	0	40	67					
GRENADIERS(NS)Macrourida	322	109	156	485	0	0	70					
GRENADIER,ROUGHHEAD	133	201	689	1800	129	0	302					
GRENADIER,COMMON (MARLIN	83	320	75	680	5	1	76					
GRENADIER,ROUNDNOSE	80	113	32	262	85	0	35					
GRENADIER,ROUGHNOSE	11	2	5	48	0	0	9					
WOLFFISH,BROADHEAD	198	665	638	6628	133	65	1054					
WOLFFISH,STRIPED	840	775	317	495	433	13	8					
WOLFFISH,SPOTTED	75	169	45	303	53	0	55					
EELPOUTS (NS)	58	34	27	73	0	0	0					
YELLOWTAIL FLOUNDER	455	10	0	0	3	5	0					
GREENLAND HALIBUT	137	1083	3998	6344	436	5	598					
HALIBUT (ATLANTIC)	3035	5348	9380	9437	1599	600	1414					
ANGLER,COMMON(MONKFISH)	2414	4164	2035	1640	359	57	46					
SQUID TEUTH.	672	88	281	224	102	15	141		5			
SQUID ILLEX SP.	15	79	173	144	0	0	55					
SQUID, SHORT-FIN	954	351	82	738	104	2	99					
SPINY CRAB LITH.MAJ.	87	182	148	176	1	0	20					
SPINY CRAB, NEOL.GRI.	47	35	2	38	0	0	0					
CRAB, SNOW OR QUEEN	39	46	89	108	0	0	0					
Total	242800	1863799	1549618	4317554	798866	16219	654764	719250	28329	71010	4502	15670
Percentage by Key Species												
REDFISH (NS) SEB.SP.	59	95	89	98	97	71	98	100	100	100	100	100
COD,ATLANTIC	6	0	1	0	1	7	0	0	0	0	0	0
AMERICAN PLAICE	5	0	2	0	0	1	0	0	0	0	0	0
WITCH FLOUNDER	5	0	3	0	0	9	0	0	0	0	0	0
All other Species	25	4	4	1	3	13	1	0	0	0	0	0
	100	100	100	100	100	100	100	100	100	100	100	100

Table 2. Summarized Canadian Observer data by mesh size and species for various non-Canadian fleets directing for redfish in fishing in Div. 3O from 1980-2006.

Country	Years Summarized	Species	Mesh Size 90-94	95-99	100-104	120-124	130+
Cuba	1987-1988	REDFISH (NS) SEB.SP.				666200	
	12 % of Dir. Spp represented	COD,ATLANTIC				15	
		AMERICAN PLAICE				60	
		WITCH FLOUNDER				25	
		All other Species				2045	
		Total	0	0	0	668345	0
		Percentage by Key Species					
		REDFISH (NS) SEB.SP.				100	
		COD,ATLANTIC				0	
		AMERICAN PLAICE				0	
		WITCH FLOUNDER				0	
		All other Species				0	
						100	

Country	Years Summarized	Species	Mesh Size 90-94	95-99	100-104	120-124	130+
Japan	1985-1992, 1994-1998	REDFISH (NS) SEB.SP.	507885	1219625	40450	70650	2204092
	43 % of Dir. Spp represented	COD,ATLANTIC	12120	21			4240
		AMERICAN PLAICE		0	12		719
		WITCH FLOUNDER	10222	492	40	235	14098
		All other Species	81957	27126	1027	5635	90095
		Total	612184	1247264	41529	76520	2313244
		Percentage by Key Species					
		REDFISH (NS) SEB.SP.	83	98	97	92	95
		COD,ATLANTIC	2	0	0	0	0
		AMERICAN PLAICE	0	0	0	0	0
		WITCH FLOUNDER	2	0	0	0	1
		All other Species	13	2	2	7	4
			100	100	100	100	100

Country	Years Summarized	Species	Mesh Size 90-94	95-99	100-104	120-124	130+
Russia	1980, 1987, 1989, 1993	REDFISH (NS) SEB.SP.	88200			9205	7000
	0.3 % of Catch represented	COD,ATLANTIC	1810			175	
		AMERICAN PLAICE	35			35	
		WITCH FLOUNDER	29			20	
		All other Species	2679			364	90
		Total	92753	0	0	9799	7090
		Percentage by Key Species					
		REDFISH (NS) SEB.SP.	95			94	99
		COD,ATLANTIC	2			2	0
		AMERICAN PLAICE	0			0	0
		WITCH FLOUNDER	0			0	0
		All other Species	3			4	1
			100			100	100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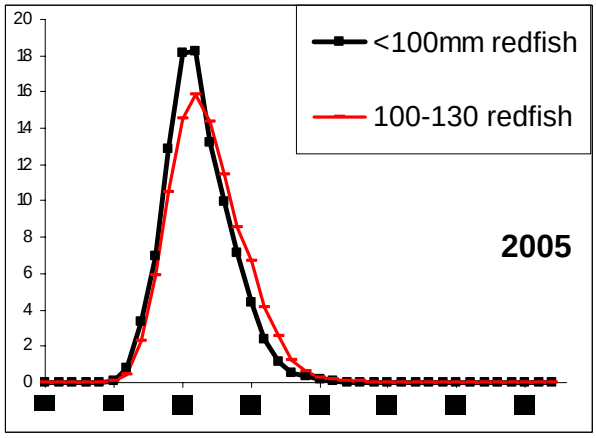
100-130 redfish
2006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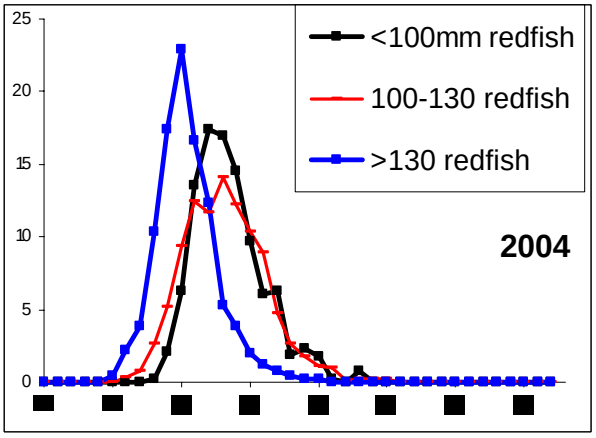
2005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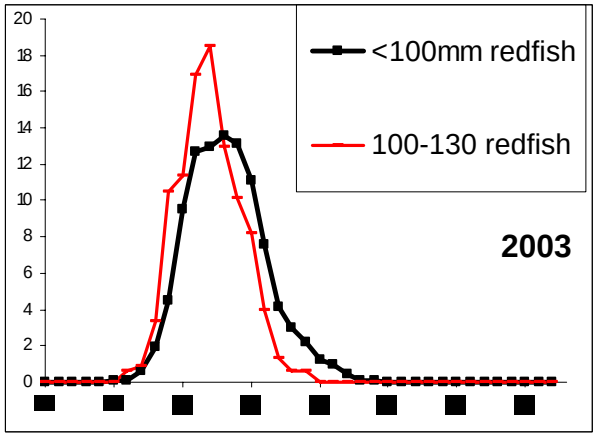
100-130 redfish
>130 redfish
2004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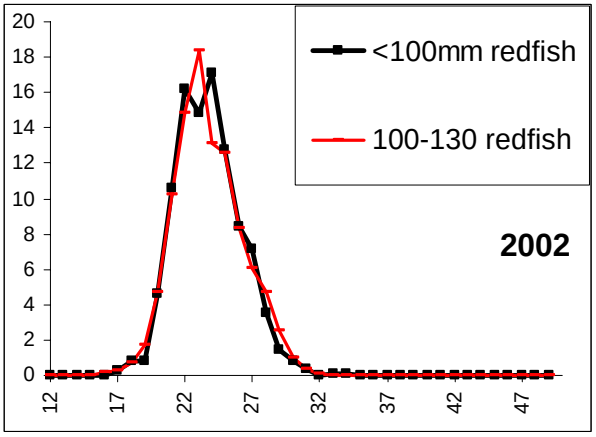
2003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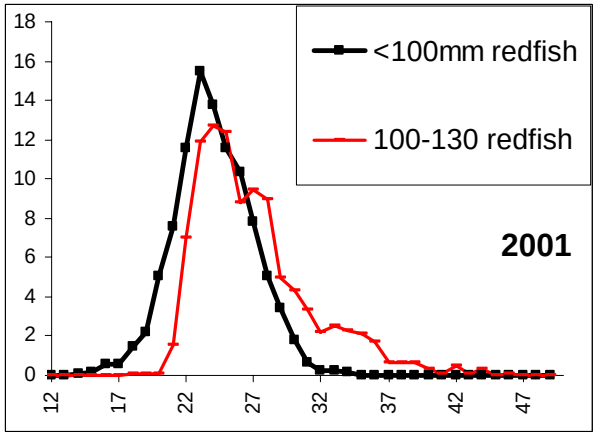
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100-130 redfish
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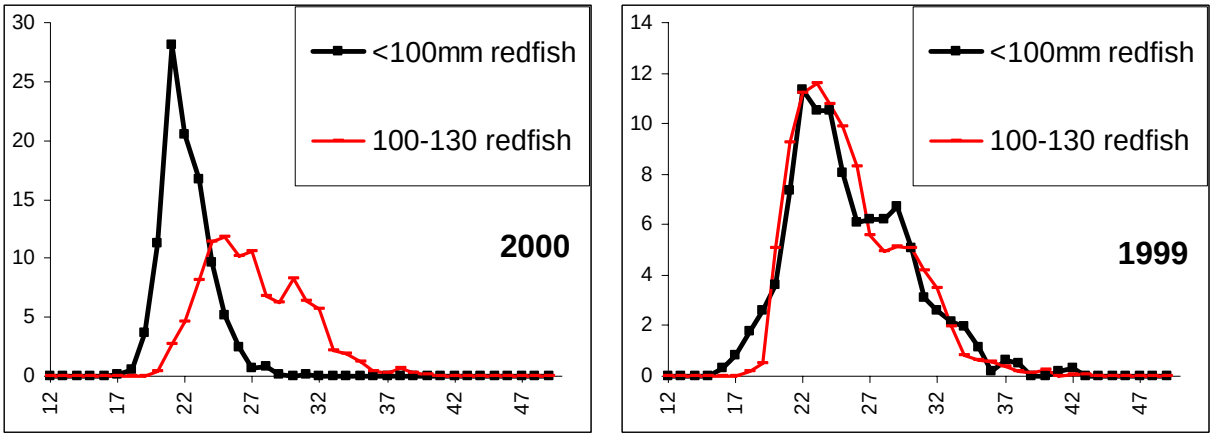


Fig. 1. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Can(N) fleets from 1999-2006.

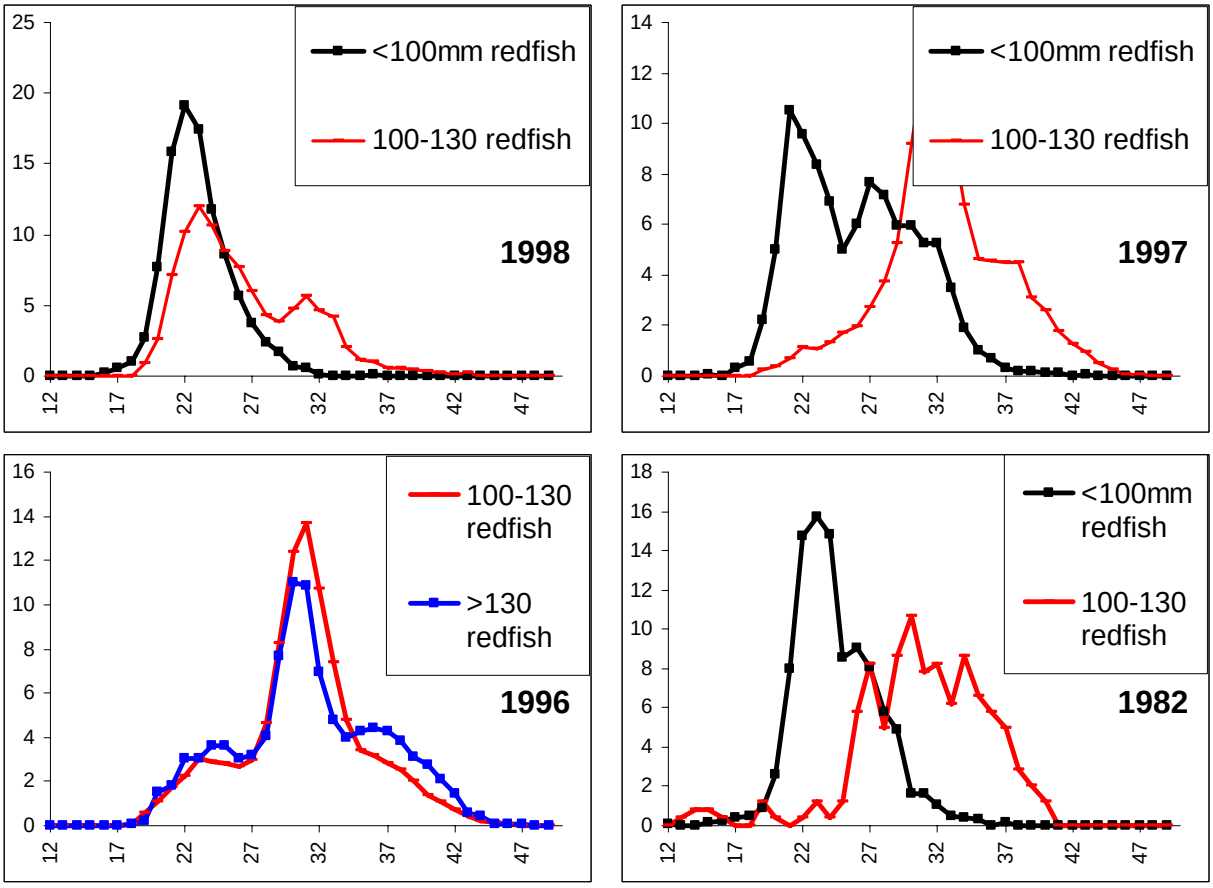


Fig. 2. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Can(N) fleets in 1982 and 1996-1998.

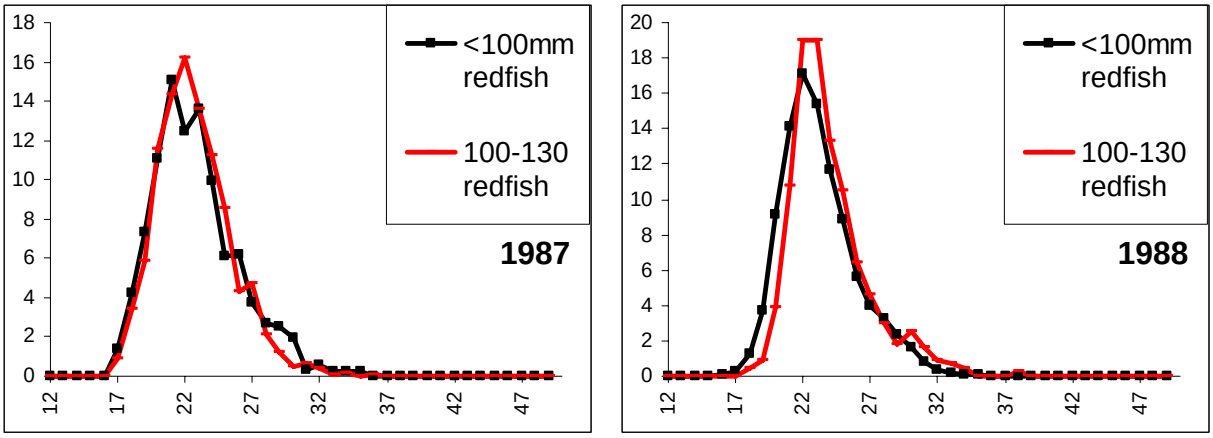
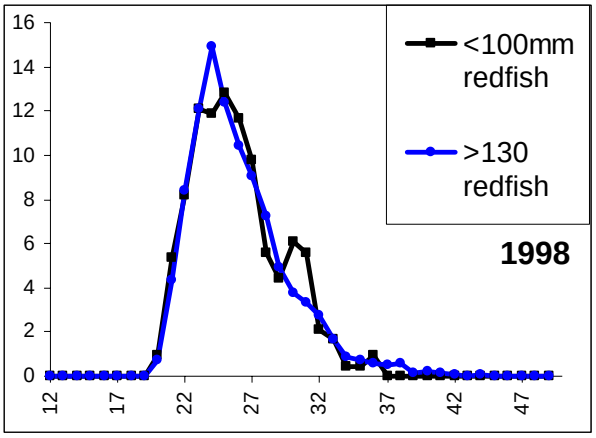
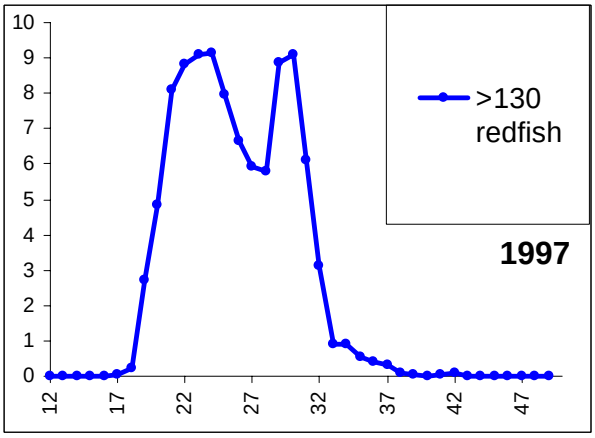


Fig. 3. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Cuba fleets in 1987-1988.


<100mm redfish
>130 redfish
1998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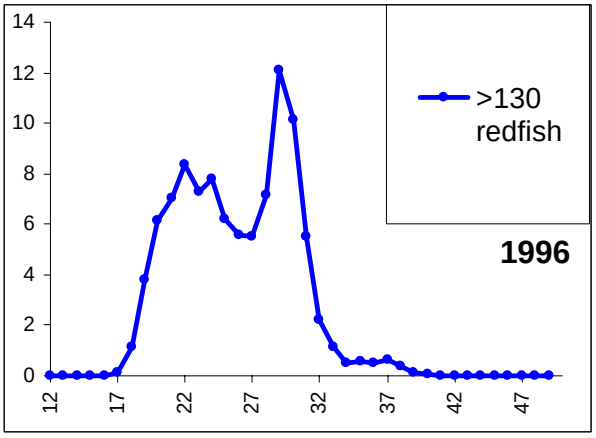
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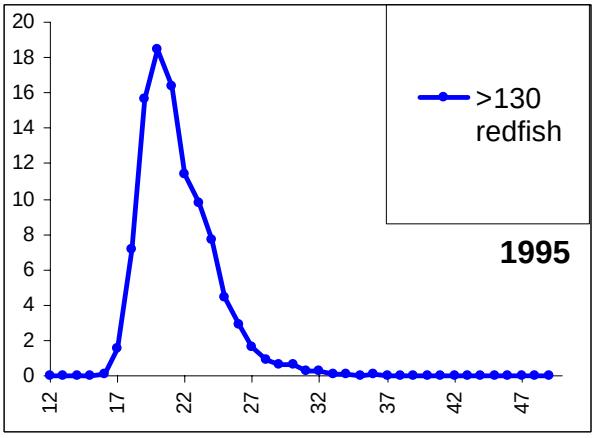
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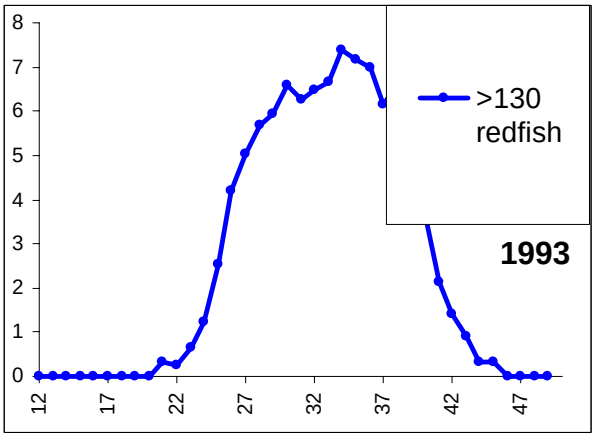
1995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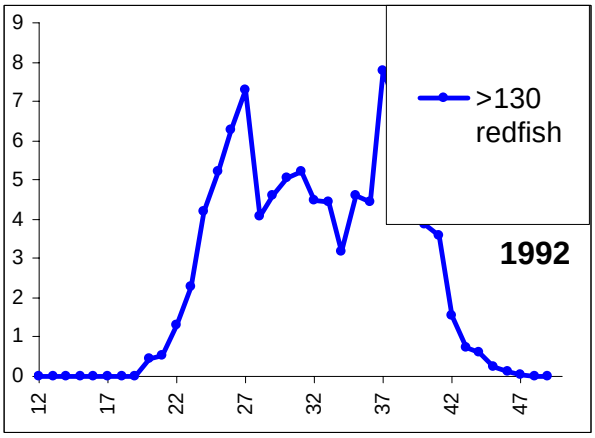
1993


>130 redfish
1992

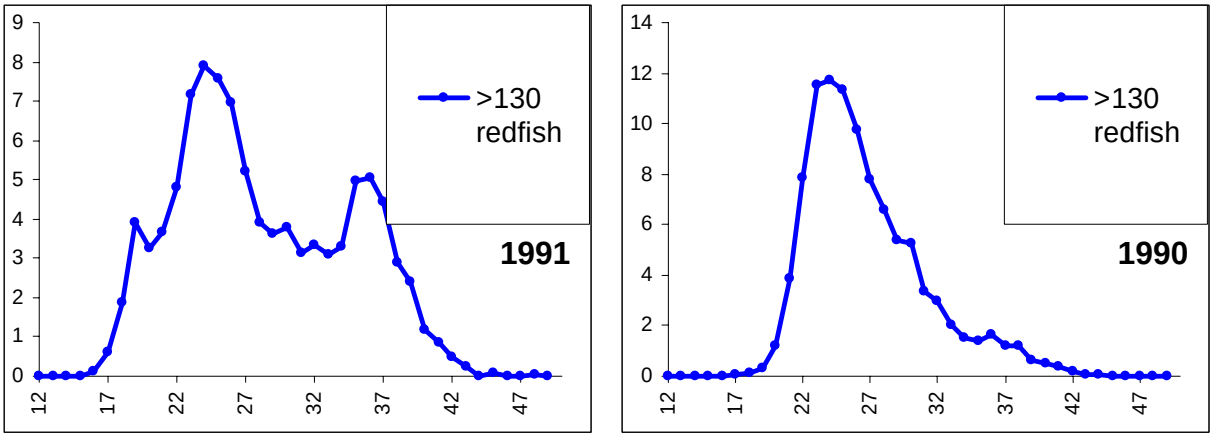
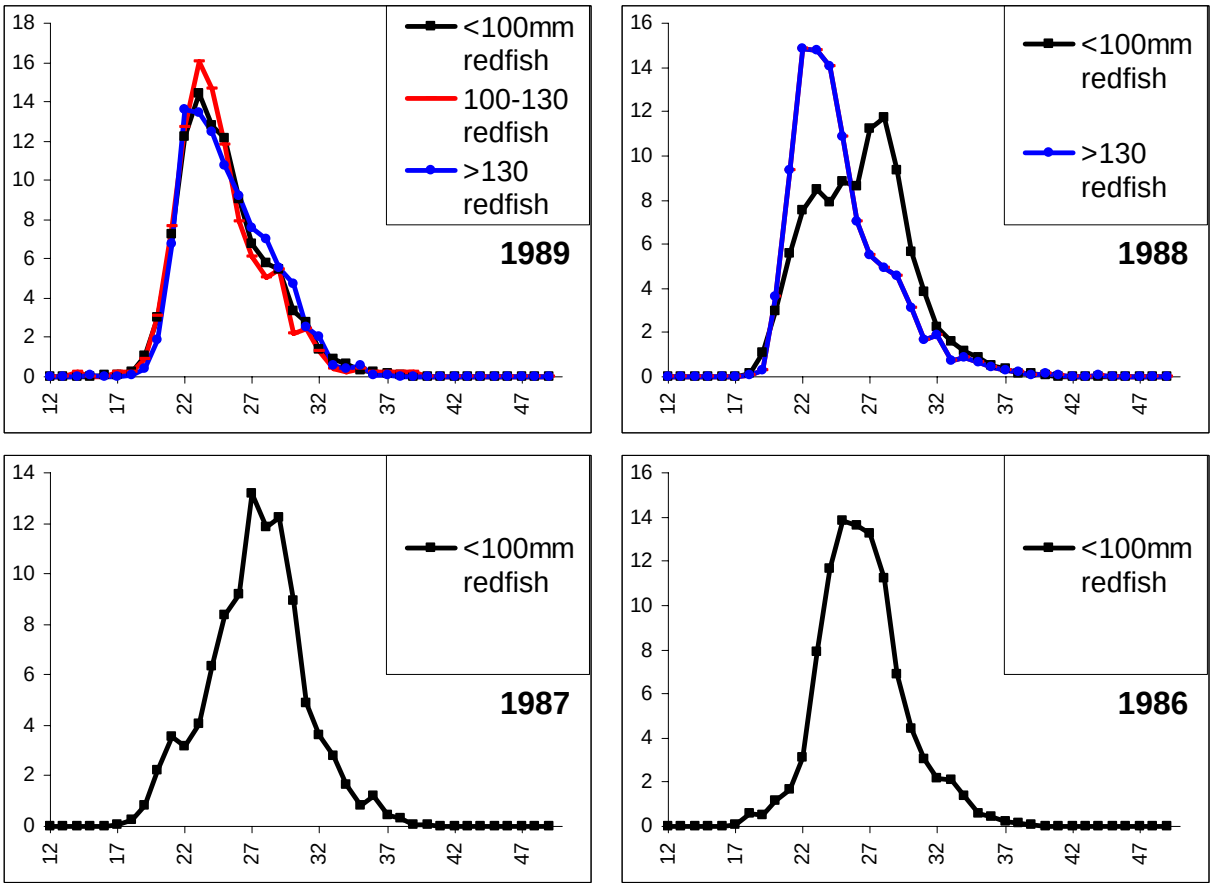


Fig. 4. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Japan fleets in 1990-1998.



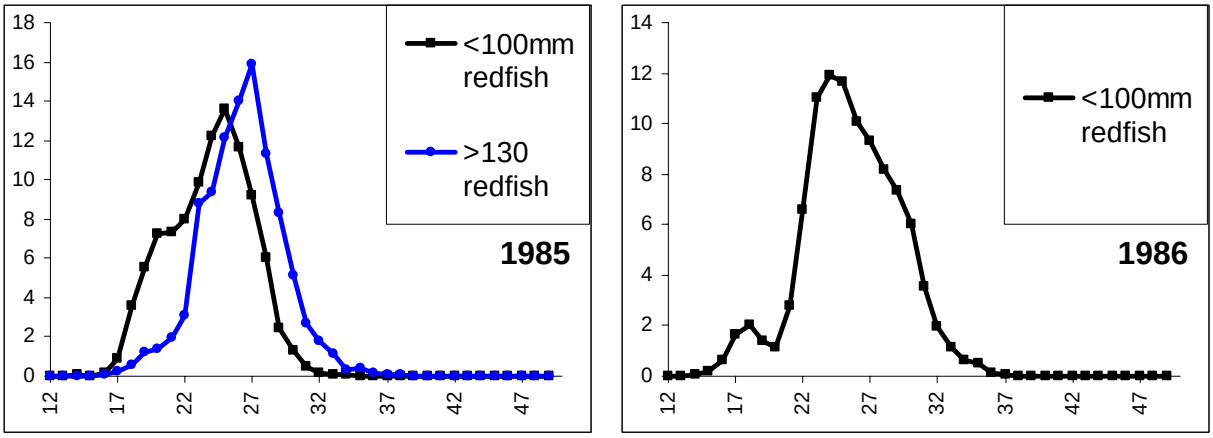
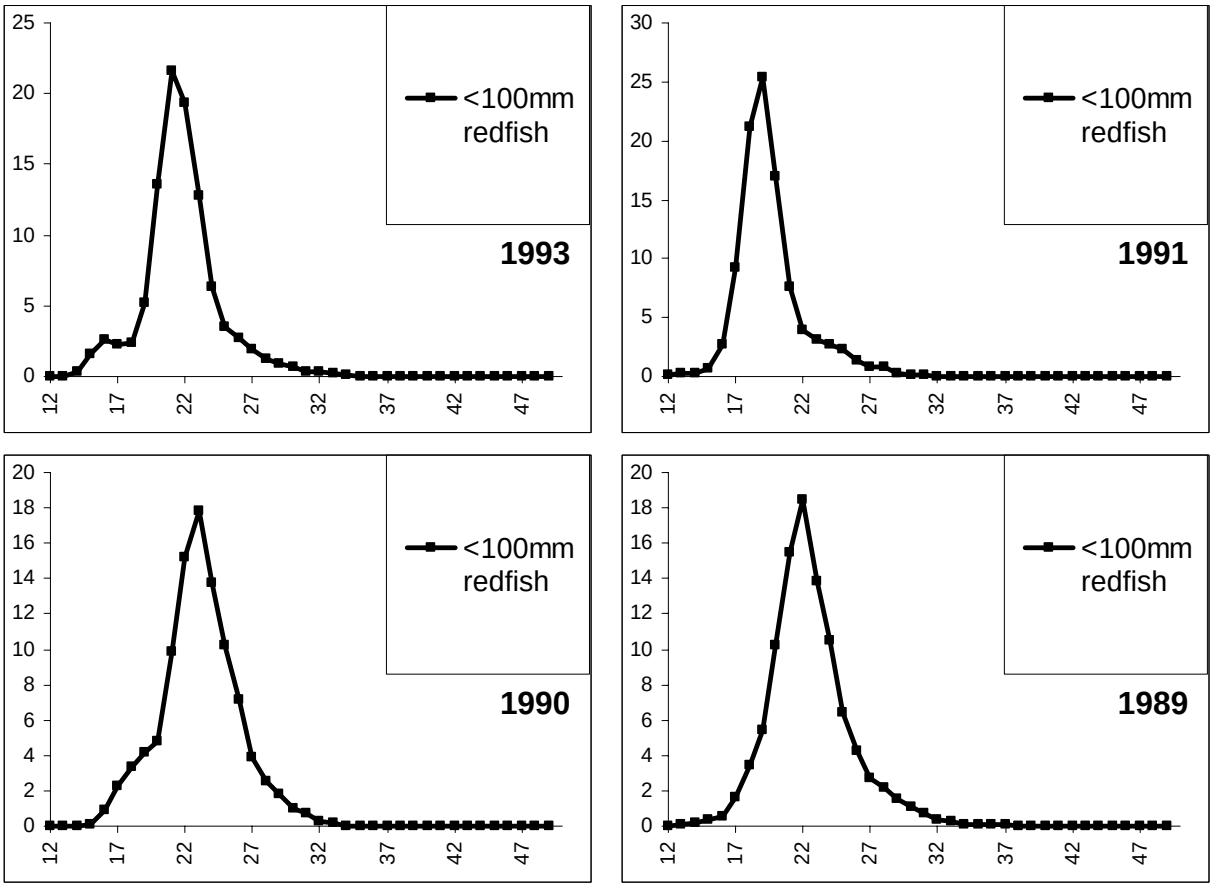


Fig. 5. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Japan fleets in 1985-1989.



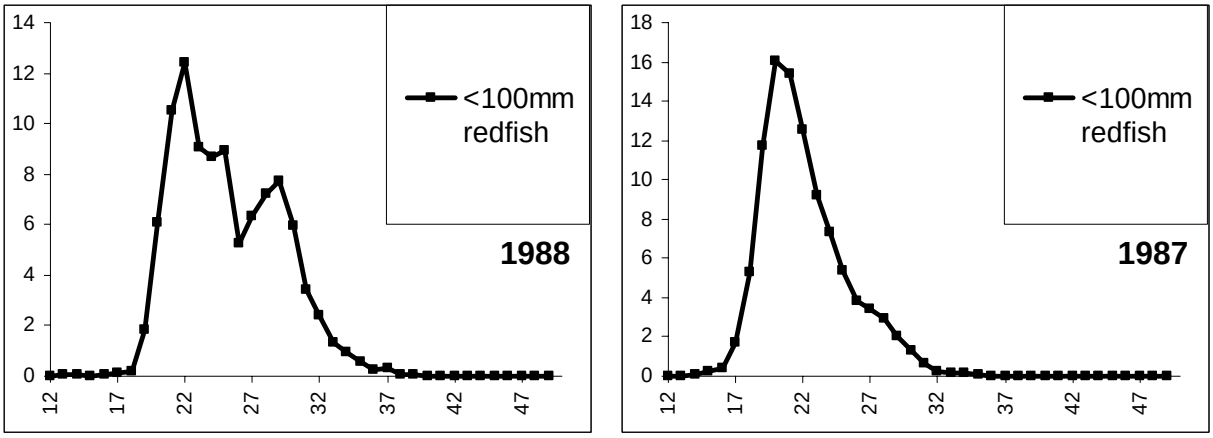


Fig. 6. Redfish Catch frequencies (per mille) by mesh size from Canadian Observer sampling in Div. 3O for Russian fleets in 1987-1991 and 1993.