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Update of biomass estimates from Canadian research vessel surveys
in NAFO Divisions 4TVWX to 1981

by

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Abstract

CAFSAC Res. Doc. 81/46 is updated to 1981. Research vessel biomass estimates on the Scotian Shelf and in the southern Gulf of St. Lawrence from 1970-81 are calculated, summarized and presented as in previous documents.

Résumé

Le Document de recherche du CSCPCA 81/46 est mis à jour pour 1981. Les estimations de biomasse par navires de recherche sur le plateau Scotian et dans le sud du golfe du Saint-Laurent de 1970 à 1981 ont été calculées. Nous les résumons et présentons ici dans la forme des documents précédents.

Introduction

Research vessel biomass trends from 1970 to 1980 in NAFO Divisions 4TVWX were presented by Koeller (1981). This report incorporates the 1981 estimates from the July *A.T. Cameron* cruise (A321/A322) on the Scotian Shelf and September *E.E. Prince* cruise (P260) in the southern Gulf of St. Lawrence. Estimates for two species (pollock and angler) which contribute significantly to the total biomass are presented for the first time.

Methods

Methods used during these surveys and in calculating biomass estimates are given in Halliday and Kohler (1971), and Koeller (1980). Figure 1 gives biomass per unit area (m tons/km²), i.e., total biomass estimated by the areal expansion method divided by the total area surveyed by each cruise in square km. All other figures and the two tables give total estimated biomass.

Results and Discussion

The most notable change in 1981 was the large increase of the cod estimate in the Gulf. Catches were uniformly high throughout the area and the increase appears to be real. Significantly, cod also increased in the adjacent subdivision 4V, but decreased or remained unchanged in other areas. Haddock estimates were down in both subareas in which they are most abundant, but still above the 12-year mean. White hake increased in all areas, continuing the trend of parallel changes in the subareas within the surveyed area (also seen in other species, particularly silver hake, angler and squid) which suggests large-scale environmental influences on abundance or availability. Flatfish generally show increases or stabilization. In the Gulf the threefold increase of plaice during the first half of the seventies appears to have leveled off at about 125,000 m tons, while winter flounder and yellowtail continued their recent increases. Similarly, Scotian Shelf plaice increases since 1977 appear to have stabilized while other flatfish species increased.

Pelagic species estimates in both areas continued well below the mean. The 1981 fishable biomass estimate on the Scotian Shelf equalled the 12-year mean, while the Gulf estimate was considerably higher, primarily due to the cod increase.

References

- Halliday, R.G., and A.C. Kohler. 1971. Groundfish survey programmes of the St. Andrews Biological Station, Fisheries Research Board of Canada - objectives and characteristics. ICNAF Res. Doc. 71/35.
- Koeller, P.A. 1980. Biomass estimates from Canadian research vessel surveys on the Scotian Shelf and in the Gulf of St. Lawrence from 1970 to 1979. CAFSAC Res. Doc. 80/18.
- . 1981. Update of biomass estimates from Canadian research vessel surveys in NAFO Divisions 4TVWX to 1980. CAFSAC Res. Doc. 81/46.

Table 1. Minimum biomass estimates from Canadian research vessel surveys - Div. 4VWX (mt x 10⁻³).

<u>Species</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	\bar{X} (1970-81)
Cod	113.0	142.4	113.2	249.3	80.2	81.7	96.0	133.7	164.3	142.2	161.0	217.6	141.2
Haddock	63.2	65.9	33.4	38.5	83.6	59.1	54.0	206.5	115.7	147.3	199.2	135.5	100.2
White hake	67.7	12.5	20.8	42.3	35.6	48.8	22.3	35.5	31.8	20.2	17.6	39.5	32.9
Silver hake	23.5	7.9	15.3	38.2	36.1	7.5	18.6	8.2	11.0	36.3	10.1	39.2	21.0
Redfish	172.3	186.3	229.3	196.5	89.6	245.4	83.5	171.6	276.0	73.3	40.4	58.8	151.9
Flatfish	81.0	80.8	79.2	81.7	133.2	101.6	116.6	112.3	70.7	104.4	107.8	107.7	98.1
Skates	48.2	34.3	47.8	77.8	52.2	87.6	41.9	50.3	43.3	40.9	34.4	45.9	50.4
Dogfish	43.6	141.9	26.0	35.9	51.7	7.2	8.6	163.1	2.5	24.7	82.5	19.7	50.6
Angler	15.7	4.7	6.4	20.1	16.9	20.3	13.1	22.4	10.9	6.8	6.3	7.9	12.6
Pollock	29.8	9.5	28.1	28.8	36.5	20.1	51.6	96.6	44.7	46.8	111.8	41.7	45.5
Pelagics	8.3	8.0	4.9	10.3	1.3	5.4	1.8	4.4	2.3	5.5	1.1	1.6	4.6
Other finfish	43.5	30.6	41.9	37.1	32.0	43.8	27.7	44.3	61.0	37.1	27.4	38.9	38.8
Squid	1.9	14.7	3.2	8.9	9.5	24.8	203.7	46.6	11.2	70.3	10.8	27.4	36.1
Total	711.7	739.5	649.5	865.4	658.4	753.3	739.4	1095.5	845.4	755.8	810.4	781.4	783.8
Div. 4V (Strata 40-52)	187.1	250.9	198.0	169.6	173.4	169.3	231.3	221.6	163.4	201.1	229.3	289.8	207.1
Div. 4W (Strata 53-66)	244.7	149.6	120.3	337.6	191.2	330.2	173.5	282.8	461.5	263.1	277.7	213.8	253.8
Div. 4X (Strata 70-95)	279.9	339.0	331.2	358.2	293.8	254.7	334.6	591.1	220.5	291.6	303.4	277.9	323.0

Table 2. Minimum biomass estimates from Canadian research vessel surveys - Div. 4T (mt x 10⁻³).

<u>Species</u>	<u>1970*</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	\bar{X} <u>(1971-81)</u>
Cod	104.0	79.8	77.3	85.6	72.1	54.8	70.5	88.6	146.3	217.5	230.4	410.4	139.4
Plaice	36.1	58.8	61.8	75.7	116.7	120.5	192.4	173.2	118.6	187.6	112.7	115.5	121.2
Other flatfish	5.4	10.7	13.2	12.1	31.5	15.2	42.4	17.4	23.9	19.9	23.9	28.0	21.7
Redfish	-	34.0	43.2	44.1	43.9	19.5	14.0	30.0	32.4	16.1	37.3	60.1	34.1
White hake	1.7	4.3	6.0	15.8	26.3	10.8	8.6	6.6	20.9	19.4	19.7	39.4	16.2
Skates	2.3	8.5	5.8	9.8	8.3	5.7	3.8	6.6	4.1	7.0	5.4	4.3	6.3
Pelagics	21.5	56.3	22.1	20.8	19.7	29.5	9.0	8.9	35.6	5.0	6.5	1.0	19.5
Other finfish	4.3	7.2	5.8	2.8	8.5	5.8	10.4	7.8	6.7	8.3	6.9	6.8	7.0
Squid	-	0.4	0.02	0.04	-	1.0	16.9	15.3	30.8	15.1	6.7	3.0	8.1
Total	175.3	260.0	235.2	266.7	327.0	262.8	368.0	354.4	419.3	495.9	449.5	668.5	373.4

*Strata 15, 25, 29 and 31-39 inclusive were not surveyed in 1970.

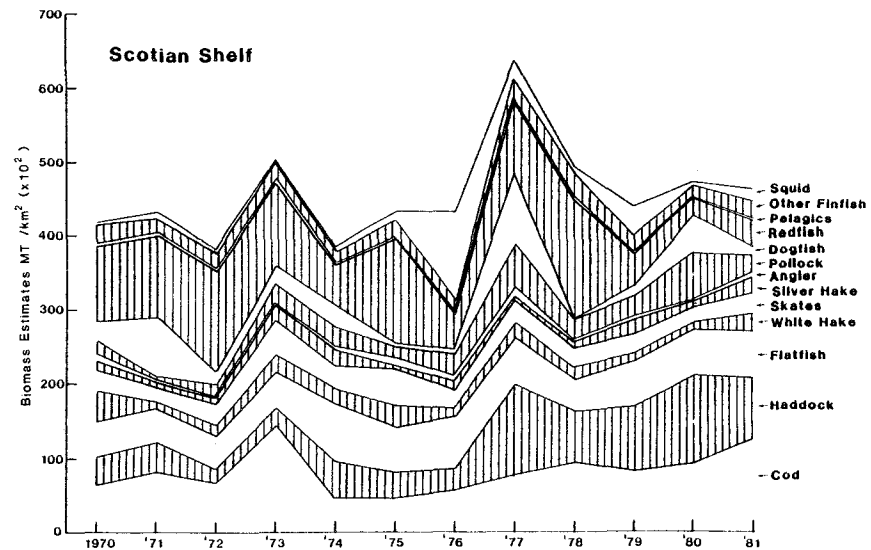
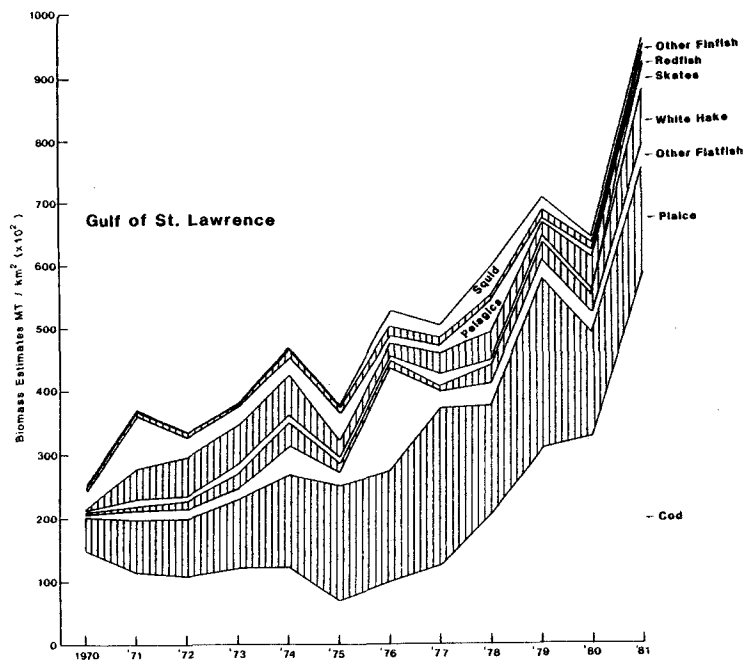


Figure 1. Density estimates of finfish and squid (*Illex*) from Canadian stratified random groundtrawl surveys in NAFO Divisions 4TVWX.

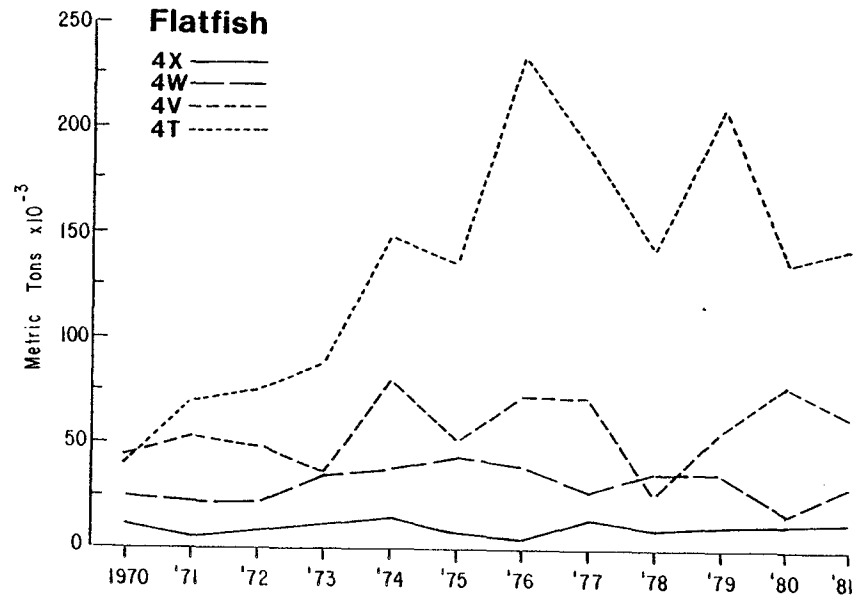
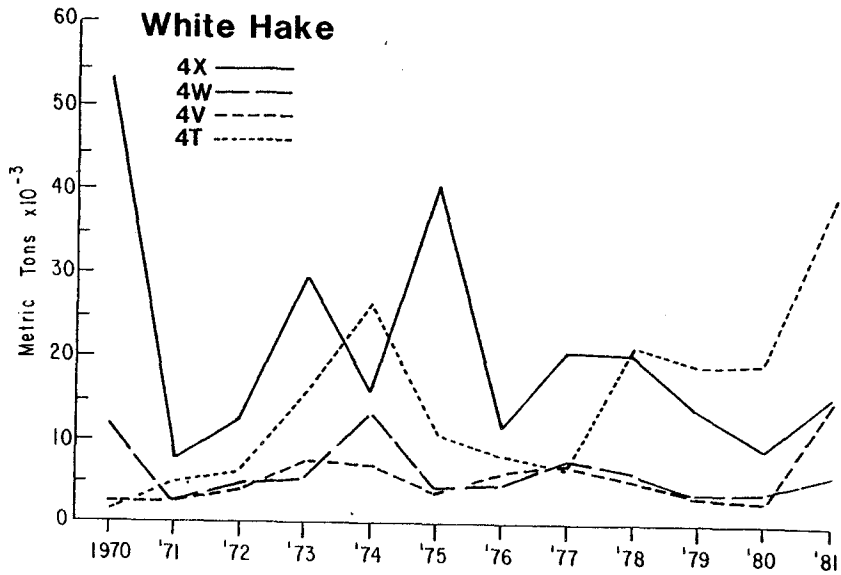
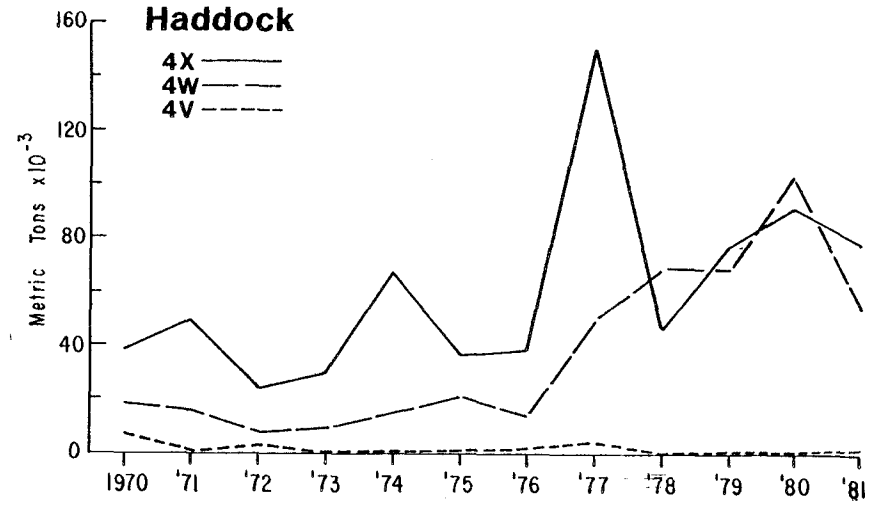
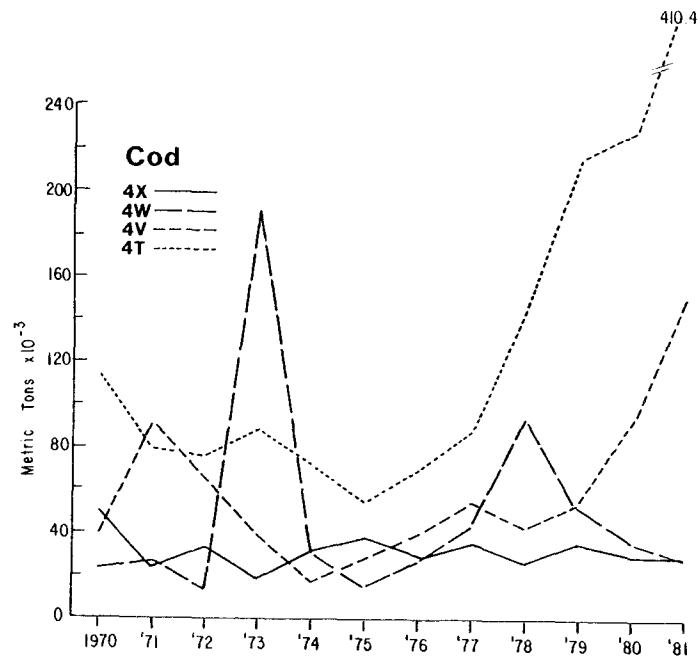


Figure 2. Trawlable biomass estimates of finfish and squid from Canadian stratified random groundtrawl surveys in NAFO Divisions 4TVWX.

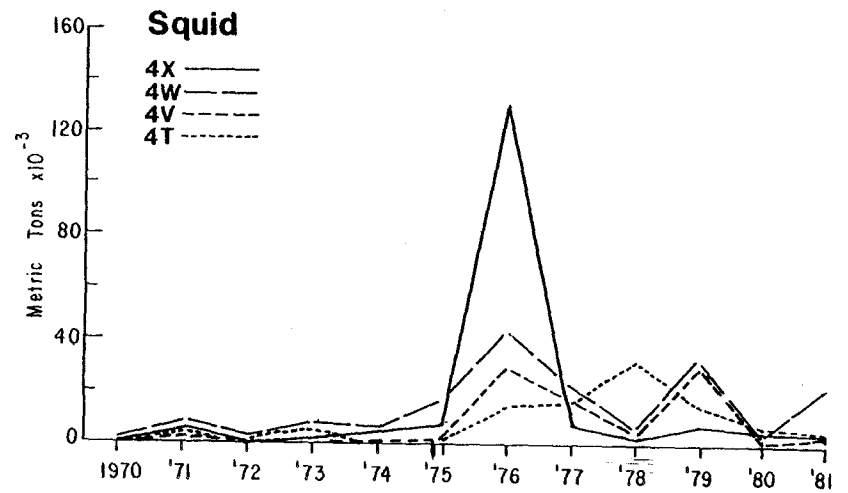
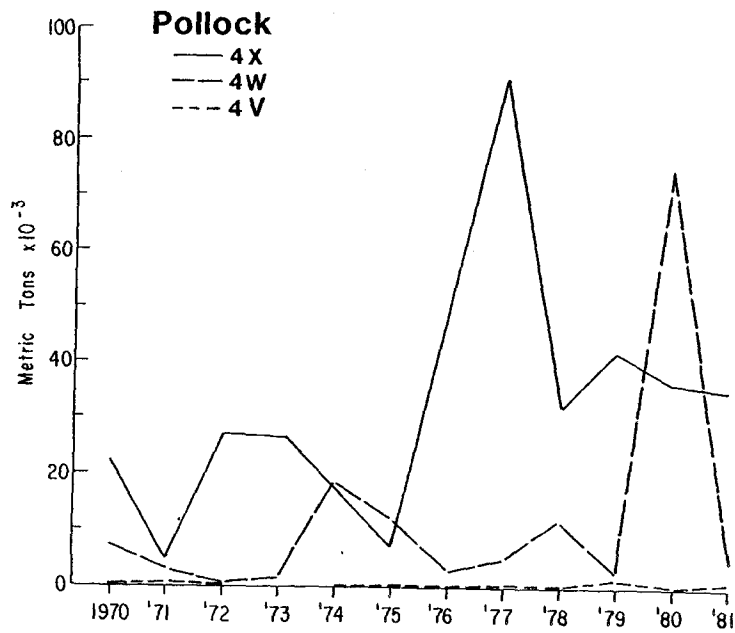
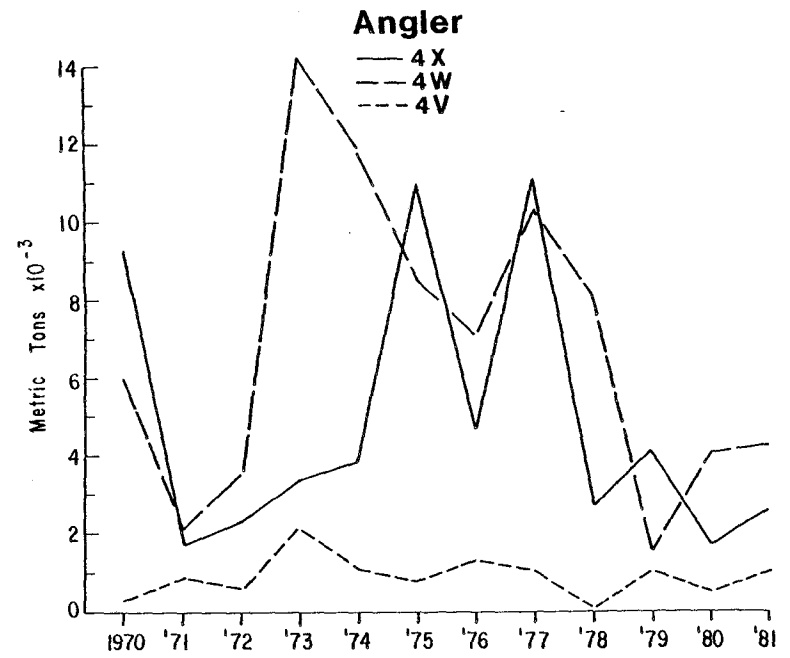
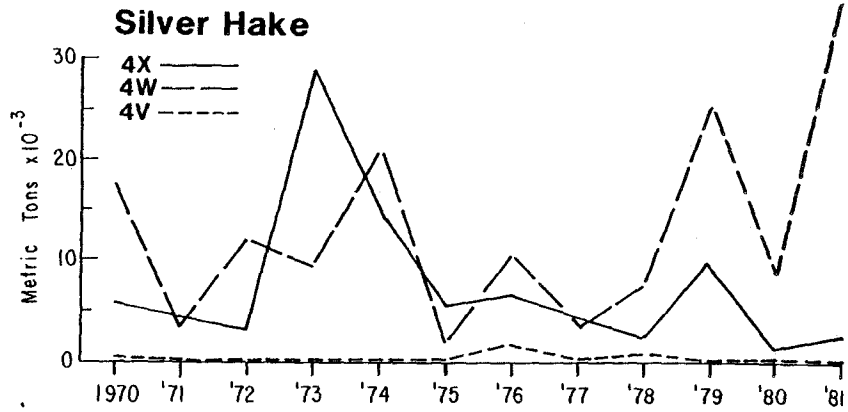


Figure 2. continued

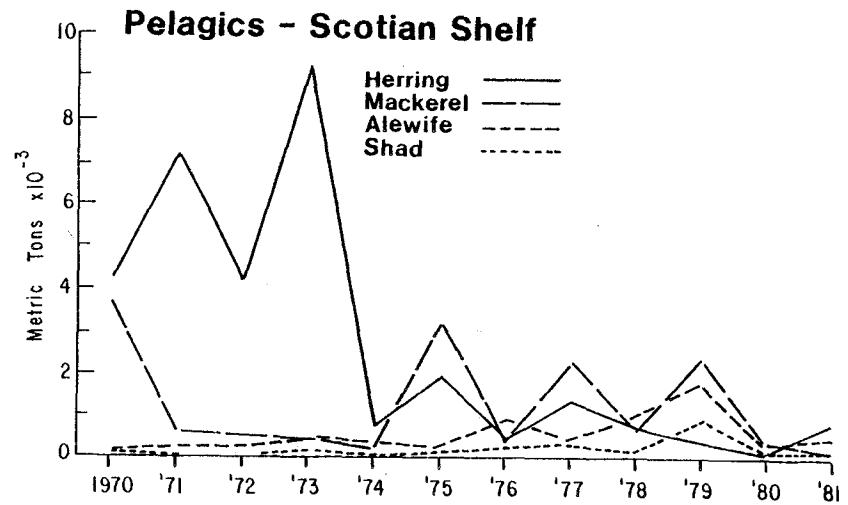
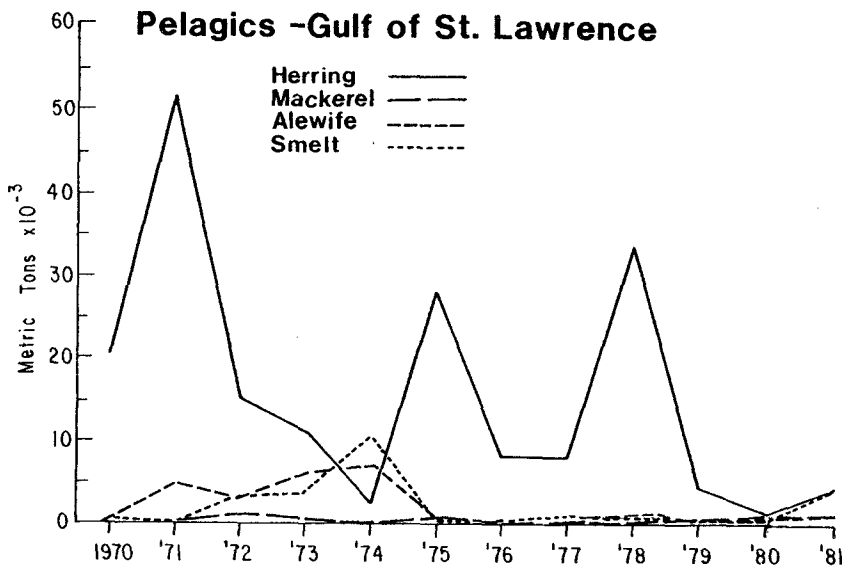
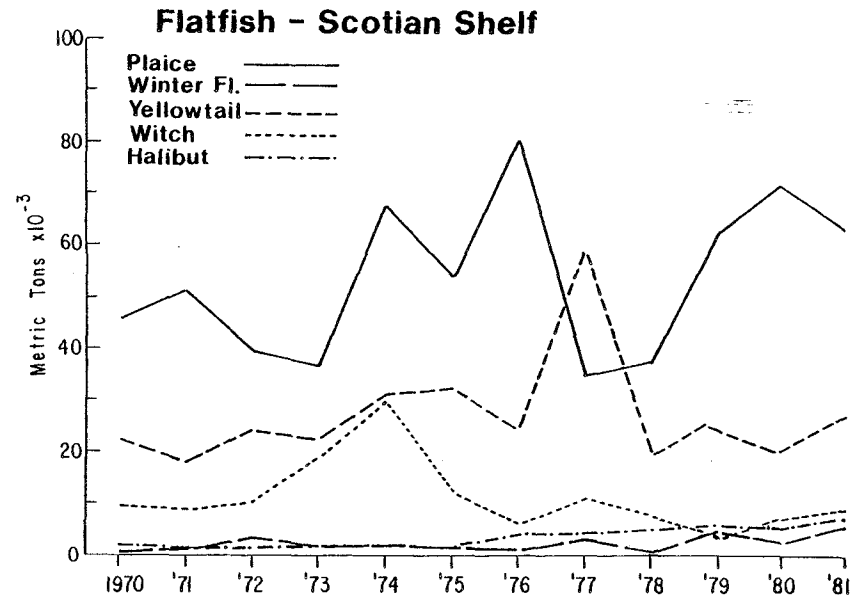
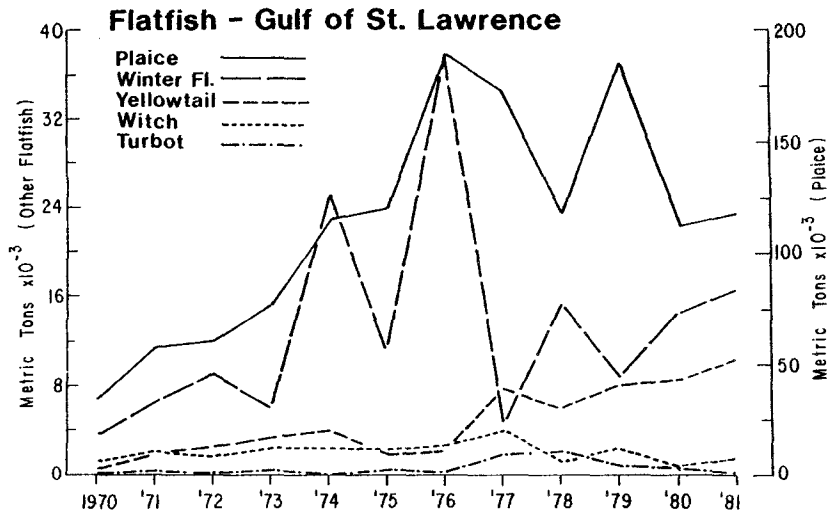


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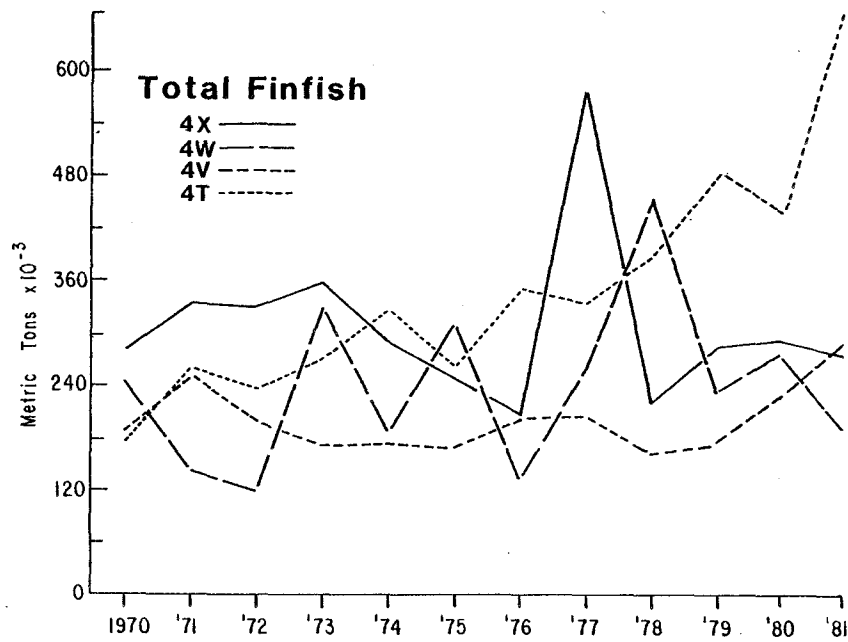
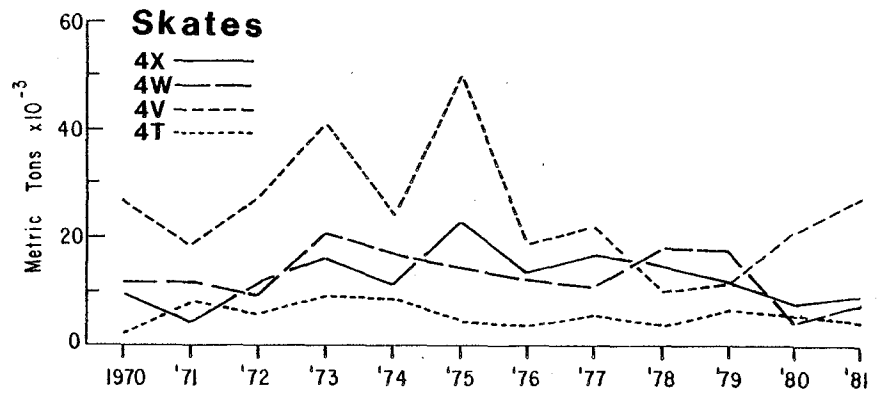
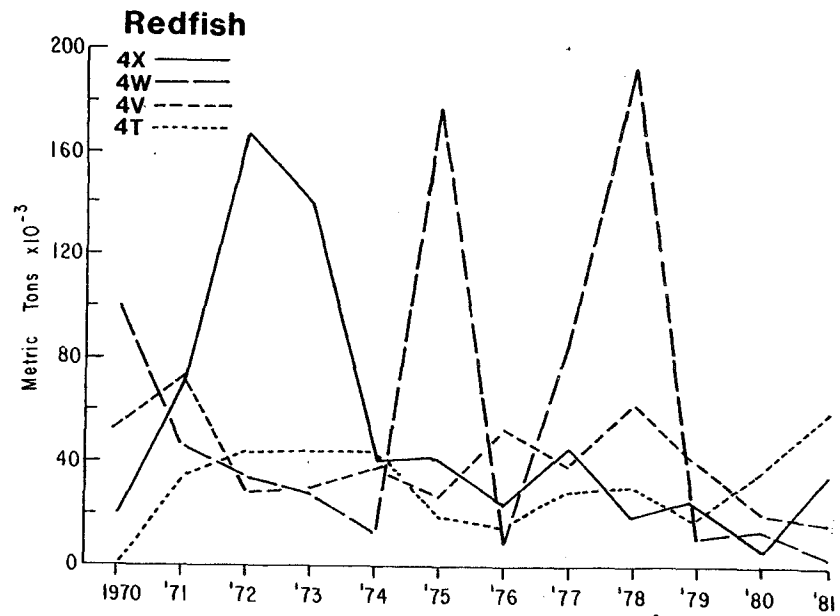


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