

1979 Review of Inshore Cod Stock  
in Subdivision 4Vn (May-Dec.)

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INTRODUCTION

It is hard to divide the catch of cod in 4Vn (May-Dec.) between inshore and offshore stocks, and the usual split by gear has been assumed (Halliday, 1974). The inshore catch is taken to be all the Canadian catch other than by otter trawls. The total catch in 4Vn (M-D) dropped to a low of 4,000 tonnes in 1975 under a TAC of 10,000 tonnes. In 1976, the catch rose again to 6.5 thousand tonnes. After reviewing the situation, fearing that most of this catch was from the then depleted 4TVn (J-A) stock, the TAC was set at 3,500 tonnes in 1977 and 1978. Catches in these years were 8,000 and 5.5 thousand tonnes respectively. The inshore catch was also low in 1975 but dropped again in 1976, supporting the view that the higher offshore catches that year were from other stocks. The inshore catch rose to 3.3 and 3.9 thousand tonnes in 1977 and 1978. These catches reflect changes in catch per unit efforts.

CATCHES

Table 1 gives the catches by country for all of 4Vn (M-D) with a summary shown in Figure 1. Table 2 gives the breakdown of the "inshore" catch by gear, while Table 3 shows the monthly breakdown of all catch for the last three years. The concentration of catch by otter trawlers in the months of May, November, and December is evident and may indicate catches are from part of the 4TVn (J-A) stock. The catches by longliners are much more dispersed.

## CATCH PER UNIT EFFORT

Catch per unit effort (when available) for otter trawls and longliners is summarized in Table 4. This is directed catch over directed effort for the months indicated. Figure 2 shows the longline CPUEs. Two series are given for tonnage class 2 that give credence to the belief that they fish the same stock throughout the period. Figures 3a and 3b show the OTB series. Again, two series are shown for tonnage class 4. These show more divergence than the two series for longline tonnage class 2, again supporting the belief that OTB catches early and late in the season are not from local stocks. Though most series show increases in recent years, there is little other agreement between the otter trawl and longline series.

Table 5 and Figure 5 show research population estimates. Table 5 gives the detailed estimates and derivation of the three-year moving average series for 4+, 5+, and 6+ numbers. These latter are plotted in Figure 5. These show similar trends to the CPUE series for longlines.

## CATCH COMPOSITION

Figure 4 shows the proportional breakdown of inshore catch between longlines, handlines, gillnets and other gears. Seiners only took more than 10% of the catch in 1977.

Table 6 shows what age length keys and length and age distributions are available from catch sampling. In Tables 7 and 9, age compositions are given for sampled catches. This gives an idea of trends in the longline catch and the differences between age compositions of longlines, gillnets, and Danish seiners. It is felt that there are not adequate data to construct a complete catch at age table. Hence, no cohort analyses were run.

Tables 8 and 9 give weight at age by gear when available.

SUMMARY

Indications from inshore catch, commercial CPUE and re-search population estimates point to an improvement in recruitment to this stock. Since 4VSW cod and 4TVn (winter) cod show similar improvements, this is not unlikely. However, due to stock mixing, it is possible that the data are just showing the improvement of the other two stocks.

REFERENCE

Halliday, R. G., 1974. The cod stocks of the southern Gulf of St. Lawrence and Sydney Bight (ICNAF Div. 4T - 4Vn). ICNAF Res. Doc. 74/24.



Table 3a: Nominal catches (t) for cod fishery in 4VN (May - Dec) by months and gear. 1976.

Catch	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	
Traps	-	-	-	-	-	-	-	-	-	
Drift Nets	-	-	-	-	-	-	-	-	-	
Fixed Gill Nets	9	19	48	118	57	53	10	-	314	
Handlines	12	25	97	66	51	37	22	-	310	
Misc.	-	1	131	90	17	8	-	-	247	
Unspec.	-	-	-	-	-	-	-	-	-	
Shrimp Tr	-	-	-	-	-	-	-	-	-	
Side OT	197	110	2	1	49	63	414	945	1781	
Stern OT	83	8	-	-	14	17	15	1893	2030	
Longlines	78	36	76	97	118	107	79	29	620	
Purse Seine	-	-	-	-	-	-	-	-	-	
Danish Seine	39	6	6	-	2	-	12	18	83	
Scottish Seine	-	-	-	-	-	-	-	-	-	
Midwater	45	-	-	-	-	7	82	198	332	
Pair Seine	-	-	-	-	-	-	-	-	-	
OTB	-	21	-	-	-	-	-	-	21	
uncovered pound nets	-	-	4	4	-	-	-	-	8	
Total Can.	463	226	364	376	308	292	634	3083	5746	
				<u>FOREIGN FISHERY</u>						
France	-	-	-	-	-	-	-	211	211	
Denmark	-	-	-	-	-	-	-	-	636 <sup>1</sup>	
TOTAL	463	226	364	376	308	292	634	3294	6593	

<sup>1</sup> month unknown

Table 3b: Nominal catches (t) for Cod fishery in 4VN (May - Dec) by month-gear 1977

Catch	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Traps	-	-	-	-	-	-	-	-	-
Drift Nets	-	-	-	-	-	-	-	-	-
Fixed Gill Nets	-	21	33	118	25	2	-	-	199
Handlines	-	4	90	172	80	64	185	-	595
Misc	4	13	16	33	19	17	31	22	155
Unspec.	-	-	-	-	-	-	-	-	-
Shrimp Tr	-	-	-	-	-	-	-	-	-
Side OT	261	26	17	23	16	31	389	694	1457
Stern OT	198	16	-	257	4	23	290	2124	2912
Longlines	141	76	140	170	364	429	325	160	1805
Purse Seine	-	-	-	-	-	-	-	-	-
Danish Seine	166	54	21	5	1	1	54	157	459
Scottish Seine	-	29	35	31	-	-	-	-	95
Midwater	-	-	-	-	1	4	-	101	106
Pair Seine	-	-	-	-	-	-	-	-	-
OTB	-	1	-	1	1	-	-	-	3
TOTAL CAN	770	240	352	810	511	571	1274	3258	7786
				<u>FOREIGN FISHERY</u>					
FRANCE	2	-	-	-	-	-	-	133	135
TOTAL	772	240	352	810	511	571	1274	3391	7921



Table 4: 4Vn (M-D) Cod: Catch per unit effort for Canadian (M & Q) Otter trawls (t/hr) and longlines (t/line).

YEAR	OTTER TRAWL				LONGLINE		
	OTB3 May + Dec	OTB4 May + Dec	OTB4 Aug. + Sept.	OTB5 May + Dec.	LL2 Nov. + Dec.	LL2 Aug+Sept+Oct.	LL3 Nov. + Dec.
1967	0.3205	0.4581	0.8847	0.6833	0.6233	0.5978	0.6602
1968	0.2915	0.6054	-	0.4787	-	-	-
1969	0.2063	0.5720	0.7333	0.6296	0.7432	0.5586	-
1970	0.8602	0.4356	0.4400	0.4790	0.6245	0.5649	-
1971	0.2974	0.368	0.3906	0.4874	0.6146	0.4242	-
1972	0.2110	0.5364	0.7679	0.9533	0.5419	0.3266	-
1973	0.2026	0.4121	0.5000	0.3587	0.3802	0.2918	0.3832
1974	0.2286	0.3477	0.1600	0.4564	0.1414	0.3197	0.2513
1975	0.3242	0.2821	-	0.5118	0.1938	0.2128	0.2167
1976	0.2065	0.5079	0.1500	0.6734	0.3786	0.2683	-
1977	0.4506	0.7538	0.1739	1.0111	-	-	-
1978	0.5932	0.9043	-	0.7875	-	0.4818	0.7759

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Table 5. Div. 4Vn (M-D) Cod: Research vessel survey estimates of population numbers at age x 10<sup>-3</sup> (Strata 40-42)

AGE	1970	1971	1972	1973	1974	1975	1976	1977	1978
1	-	-	-	-	-	-	-	-	-
2	2120	391	174	-	-	204	2164	43	222
3	591	14,146	95	970	203	2142	751	2377	3048
4	1595	3,368	784	1529	455	2863	494	1400	6442
5	3637	8,846	100	7073	931	1550	643	968	1850
6	3490	5,390	538	870	1071	271	517	685	1462
7	1502	3,554	491	995	133	334	243	279	509
8	864	1,198	130	1028	168	192	597	64	392
9	280	657	89	154	87	71	549	93	147
10	-	180	85	49	74	109	469	48	145
11	96	-	62	-	36	-	81	64	-
12	46	-	-	-	-	38	78	85	-
13+	43	187	125	-	-	-	156	73	37
UK	70	135	125	72	-	55	-	23	42
TOTAL	14,318	37,980	2,789	12,740	3,159	7,829	6,742	6,200	14,294
4+	11,553	23,380	2,404	11,698	2,955	5,428	3,827	3,759	10,984
5+	9,958	20,012	1,620	10,169	2,500	2,565	3,333	2,359	4,542
6+	6,321	11,166	1,520	3,096	1,569	1,015	2,690	1,391	2,692
4+ Three year		12,446	12,494	5,686	6,694	4,070	4,338	6,190	7,372 <sup>1</sup>
5+ running		10,530	10,600	4,763	5,078	2,799	2,752	3,411	3,451 <sup>1</sup>
6+ average		6,336	5,261	2,062	1,893	1,758	1,699	2,258	2,042 <sup>1</sup>

1: 2 year average

Table 6. 4Vn (May-Dec.) cod inshore:  
Available age length keys

YEAR	LONGLINE	GILLNET	SEINE
1967	X		
1968	X		
1969	X		
1970	X		
1971	X		
1972	X		
1973	X		
1974	X		
1975	X		
1976	X	X	
1977			X
1978	X		

Table 7. 4Vn (May-Dec.) inshore cod:  
Catch-at-age by longlines (thousands of fish)

AGES	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
1	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	1	-	-	-
3	5	5	2	3	10	-	7	15	44	-	-	35
4	122	96	42	62	43	676	133	179	177	-	-	285
5	336	393	240	322	236	39	437	181	127	5	-	273
6	266	382	346	314	492	604	87	184	73	10	-	206
7	67	102	370	181	600	444	193	54	36	25	-	128
8	112	122	184	208	63	209	230	66	17	27	-	82
9	24	68	41	56	152	2	51	82	13	17	-	54
10	23	10	55	40	48	21	17	26	11	15	-	59
11	33	12	24	82	14	50	9	-	4	10	-	22
12	11	10	24	21	7	2	5	4	-	10	-	20
13	4	10	17	17	28	1	6	1	-	-	-	14
14	3	2	8	11	1	-	1	1	1	-	-	4
15	1	1	2	1	7	1	-	1	-	-	-	8
16	2	-	1	-	5	1	2	1	-	10	-	5

Table 8. 4Vn (May-Dec.) inshore cod:  
Mean weight-at-age for longline catch (kg)

AGES	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
1	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	0.28	-	-	-
3	0.44	0.54	0.46	0.60	0.48	-	0.40	0.49	0.53	-	-	0.56
4	0.96	0.87	0.94	0.79	0.77	0.82	0.72	0.81	0.84	-	-	0.99
5	1.49	1.38	1.26	1.09	1.04	0.91	1.17	1.28	1.29	1.82	-	1.40
6	2.03	2.00	1.86	1.67	1.45	1.72	1.75	1.72	1.79	2.46	-	2.14
7	2.45	2.87	2.38	2.14	2.01	1.66	1.78	2.65	2.29	3.08	-	3.27
8	2.93	2.38	3.14	3.11	4.33	2.10	2.14	2.40	2.00	4.18	-	4.14
9	4.51	3.29	4.44	4.38	3.60	9.29	2.79	2.50	3.18	4.23	-	4.97
10	4.07	4.97	4.19	4.39	5.24	6.91	5.33	3.14	3.50	6.19	-	5.27
11	4.10	6.70	4.67	5.15	6.29	3.46	5.98	7.72	4.41	6.07	-	6.27
12	5.13	5.97	4.63	8.07	8.55	9.29	5.68	4.15	7.72	7.50	-	6.45
13	7.44	4.58	6.96	8.79	4.84	15.23	7.24	11.06	11.06	-	-	7.98
14	7.04	7.55	8.01	9.49	13.45	-	10.15	10.26	8.79	-	-	8.93
15	13.42	11.06	9.39	12.02	12.03	11.06	13.03	11.37	-	-	-	9.16
16	8.55	-	9.37	-	10.71	15.23	7.01	6.08	8.48	9.39	-	14.09

Table 9: 4Vn (May - Dec) Inshore Cod: Available catch at age and weights at age from non longline catch.

Ages	1976 Gill nets		1977 Danish Seine	
	Thousands	Weights (kg)	Thousands	Weights (kg)
1	0	-	0	-
2	0	-	0	-
3	0	-	33	0.53
4	0	-	195	0.78
5	0	-	114	1.17
6	2	-	29	2.10
7	9	3.47	25	3.14
8	20	4.14	10	3.76
9	11	3.91	9	4.40
10	10	5.37	4	4.48
11	8	5.45	1	2.12
12	7	5.85	0	6.34
13	1	-	1	9.29
14	0*	11.06	0	-
15	0	-	1	9.29
16	0	-	0	-

Figure 1: 4Vn (May-Dec) Cod Nominal Catch

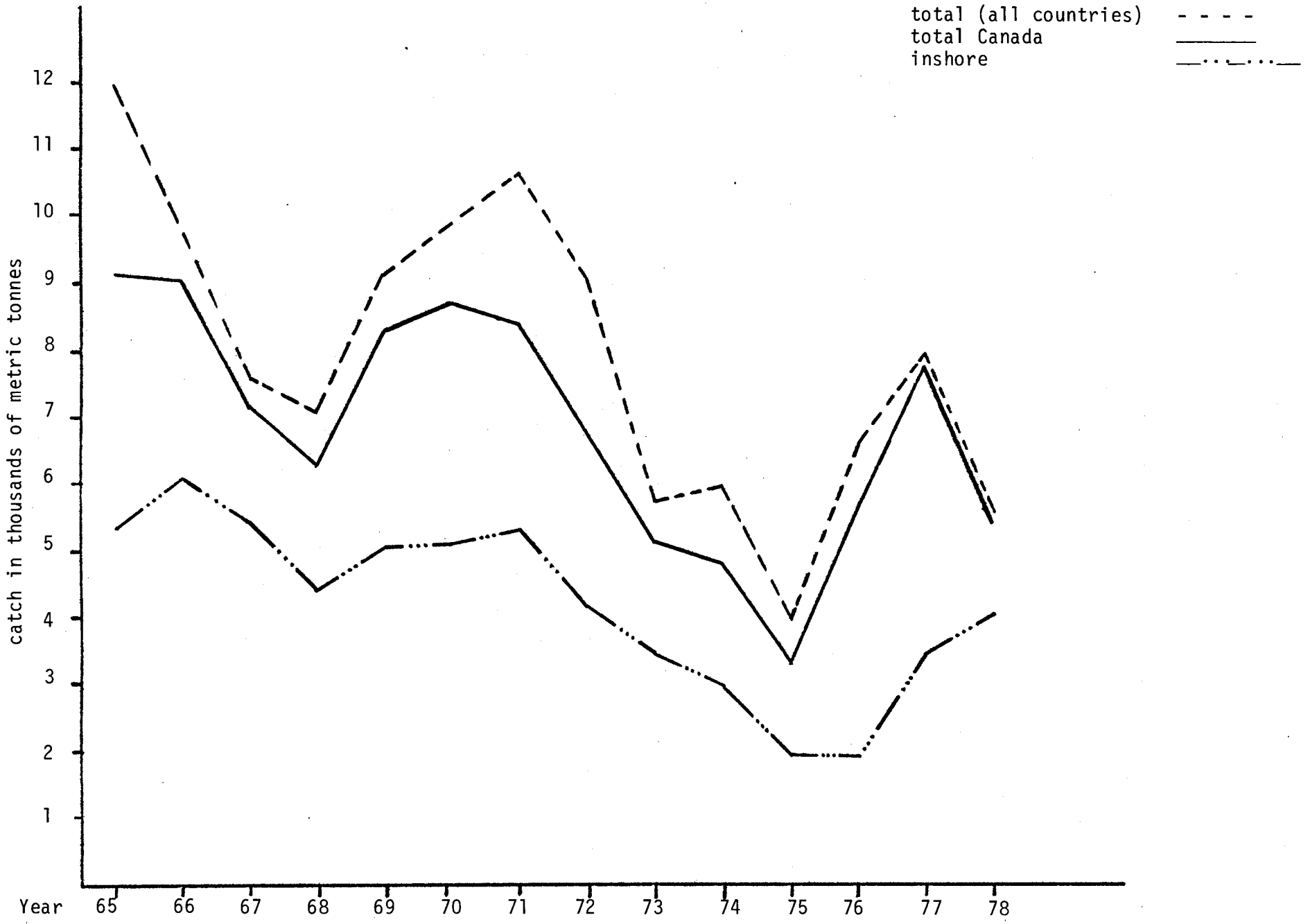


Figure 2: 4Vn (May-Dec) Cod CPUE to Longlines

TC2 Nov + Dec ———  
TC2 Aug + Sept + Oct ·····  
TC3 Nov + Dec —·—·—  
Extrapolations denoted by - - - -

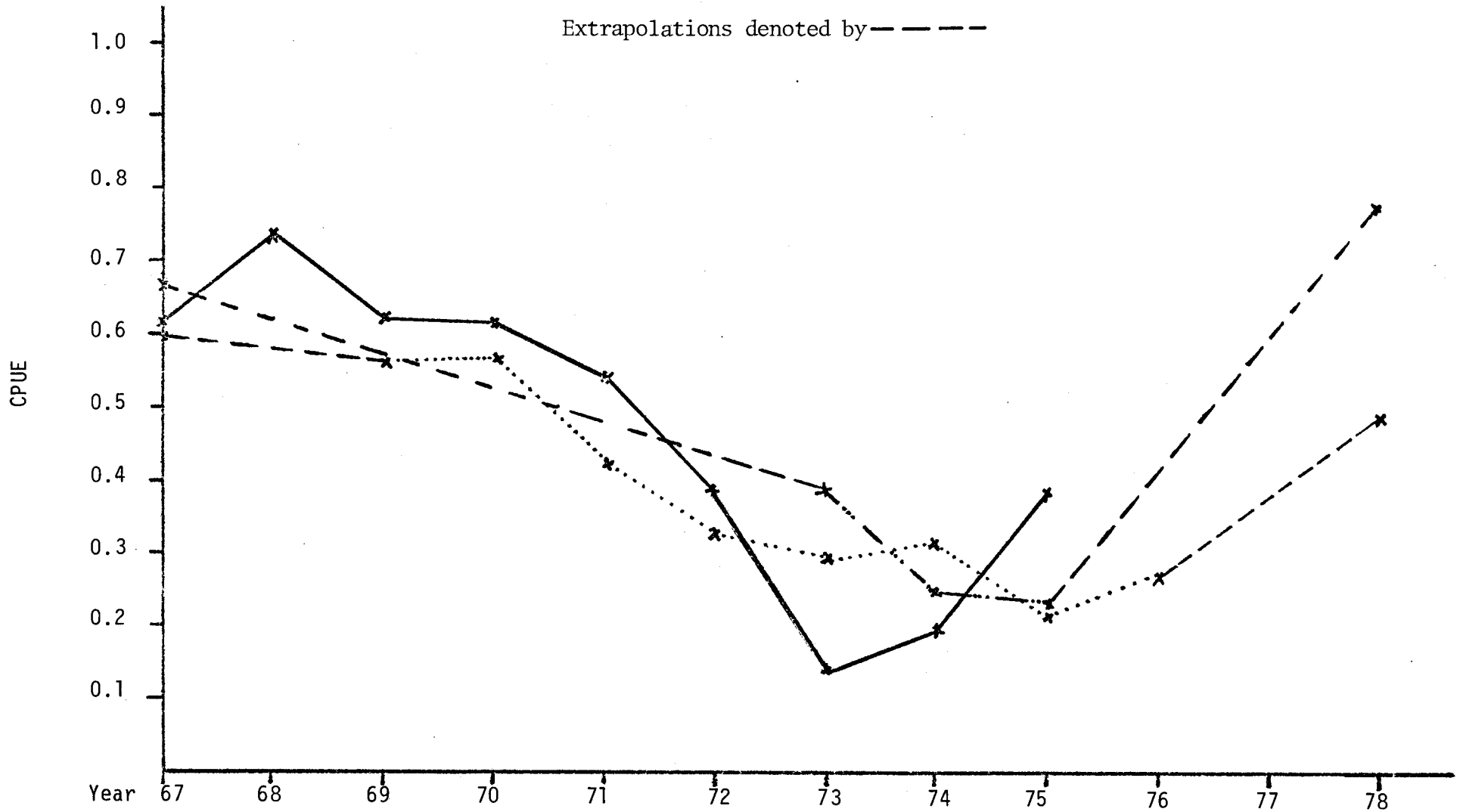


Figure 3a: 4Vn (May-Dec) Cod CPUE to OTB

TC3 (May + Dec) —————

TC5 (May + Dec) - . . . - . . . - . . .

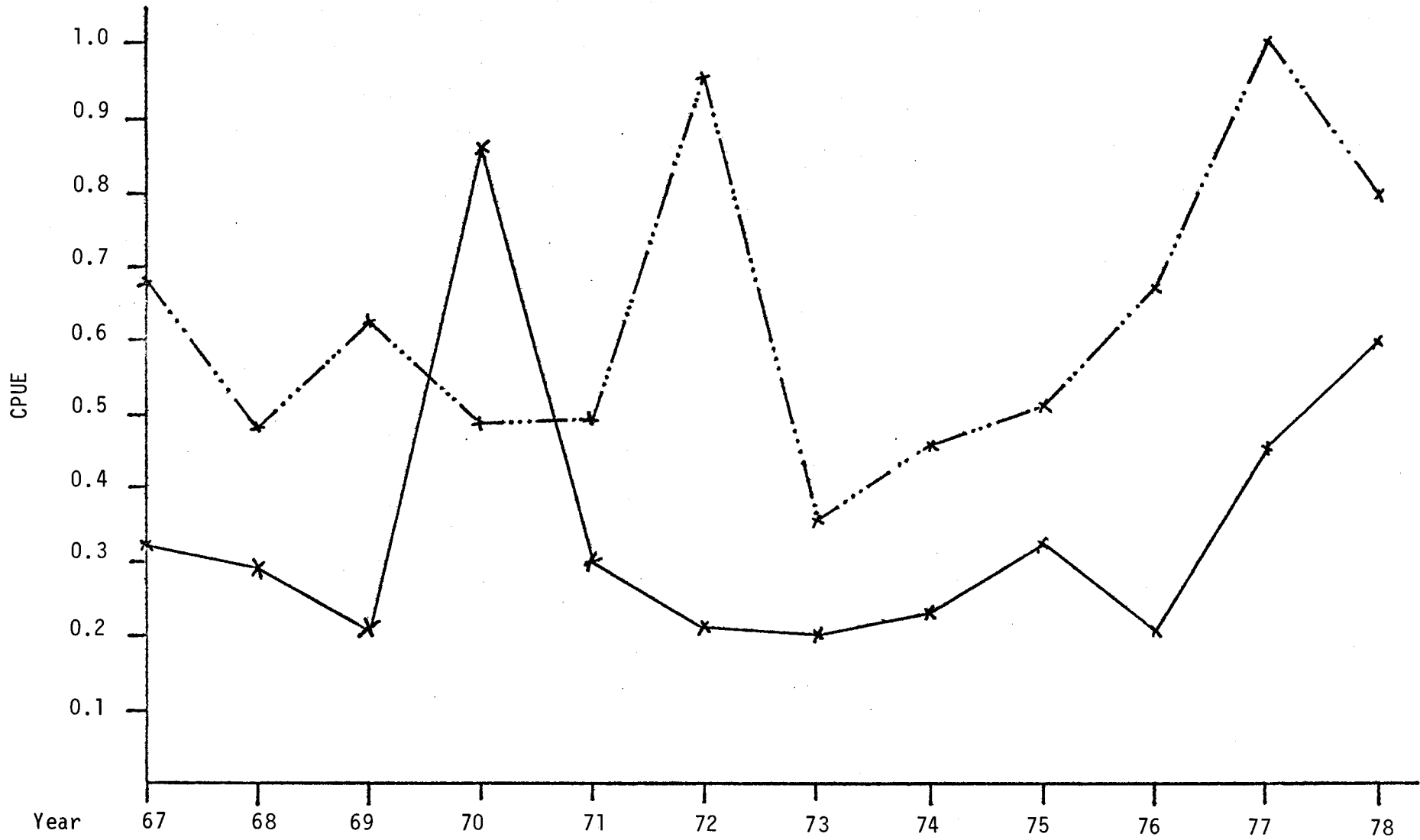




Figure 3b: 4Vn (May-Dec) Cod CPUE to OTB

TC4 (May + Dec) — · · · — · · ·  
TC5 (Aug + Sept) —————

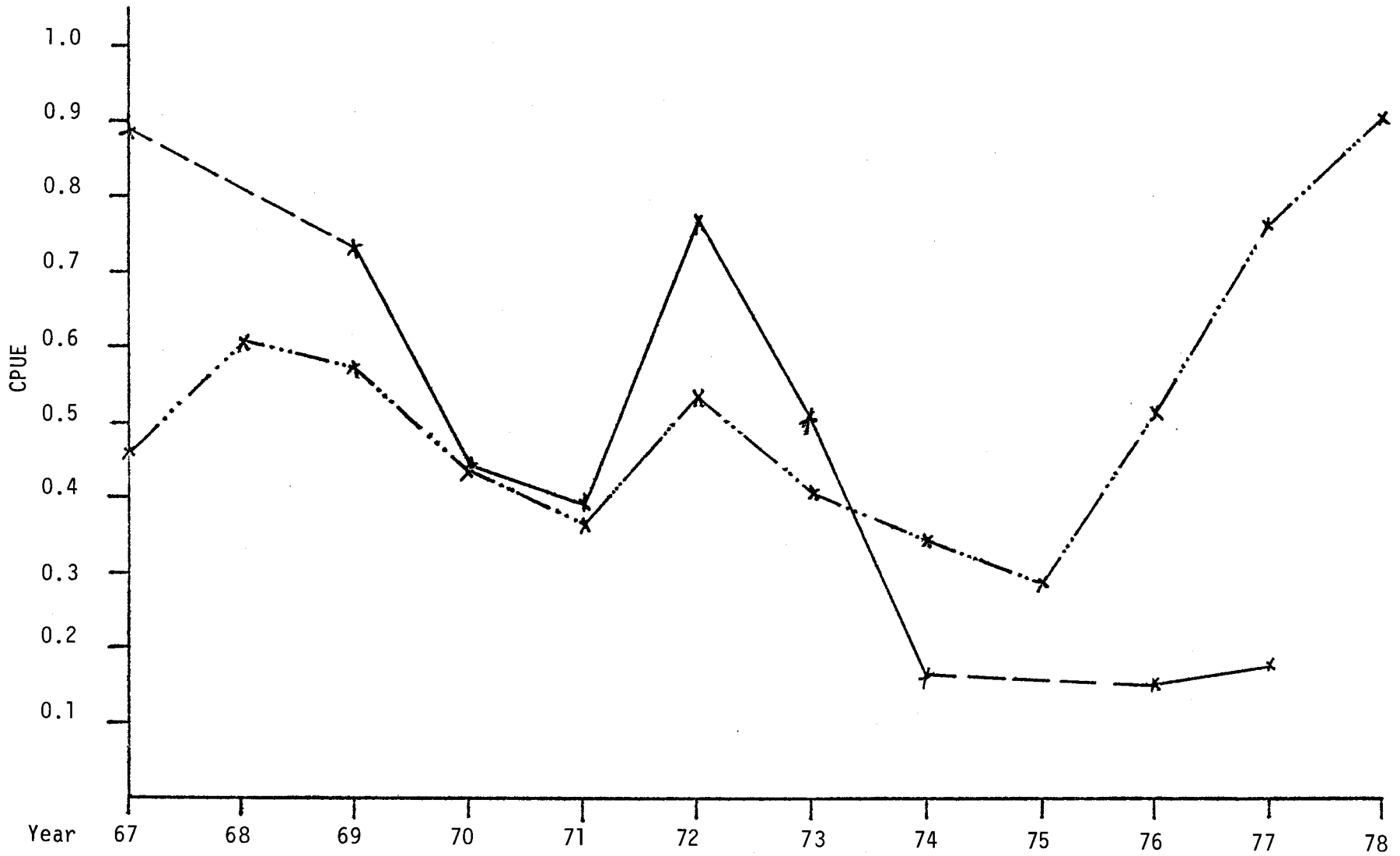


Figure 4: 4Vn (May-Dec) Inshore Cod  
Proportion of catch taken by longlines, handlines and gill nets

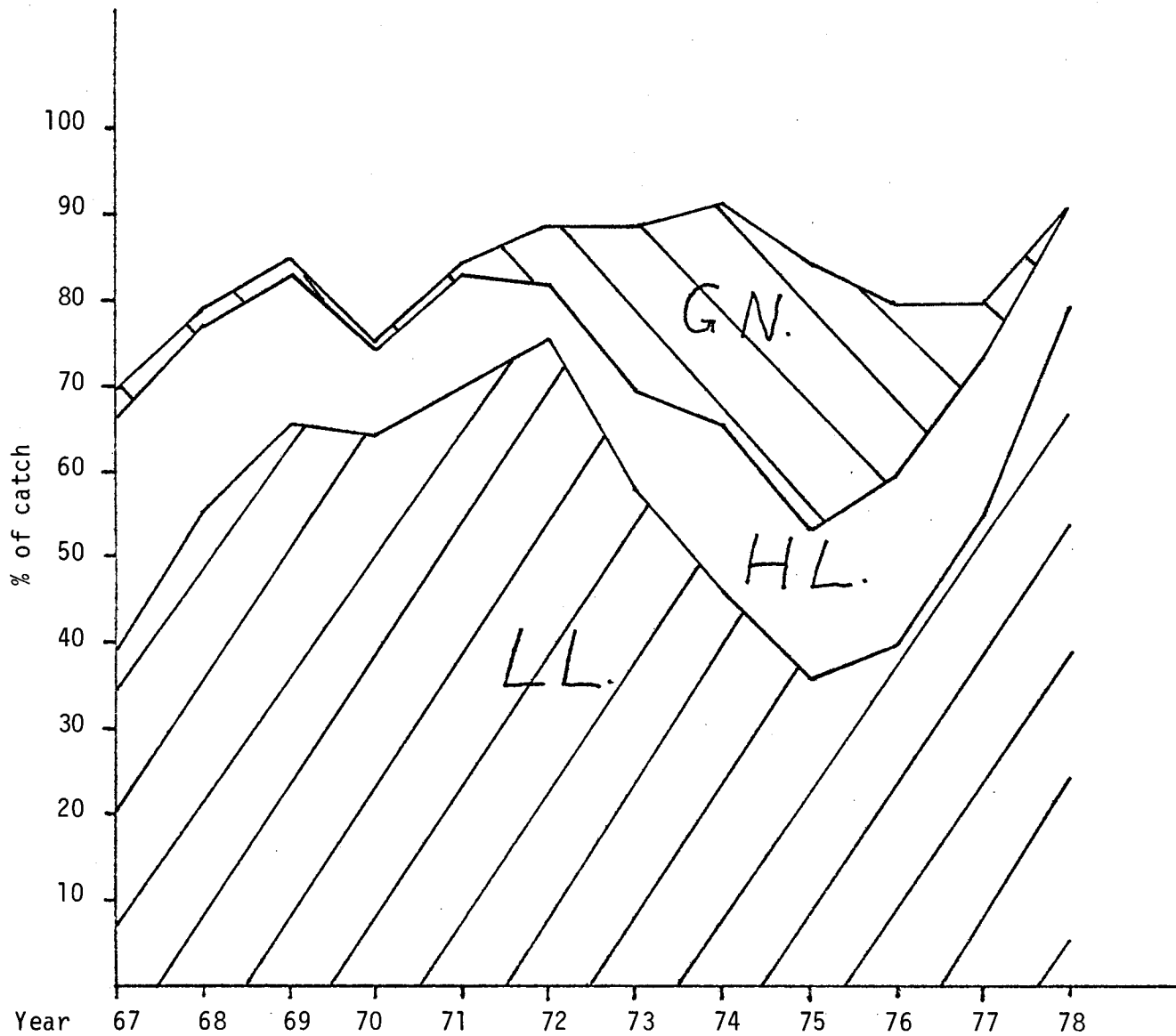


Figure 5: 4Vn (May-Dec) Cod  
Research survey population estimates (3 year running average)

