

PRELIMINARY ANALYSIS OF THE CANADIAN ATLANTIC BLUEFIN TUNA FISHERY DURING 1983*T. R. Hurlbut, J. J. Maguire*

SUMMARY

Preliminary catch composition and effort information from the 1983 Canadian bluefin tuna fishery are presented. Continuation of the trend of increasing mean weight since 1974 is noted and disproportion of the sex ratio is recorded.

RESUME

Le présent document fait état des données préliminaires sur la composition des captures et l'effort sur la pêche canadienne de thon rouge en 1983. La poursuite de la tendance à la hausse du poids moyen depuis 1974 est observée, et le manque de proportion du taux par sexe est enregistré.

RESUMEN

Se presentan datos preliminares de composición de la captura e información del esfuerzo de la pesquería canadiense de atún rojo en 1983. Se observa que continúa aumentando el peso medio desde 1974 y se registra una desproporción del sex ratio.

At the 1982 ICCAT meeting, concern was expressed that the catch levels last year were insufficient to adequately monitor bluefin tuna stock abundance. Consequently a modest increase in the Total Allowable Catch of western North Atlantic bluefin was recommended. This recommendation was approved and the Canadian quota for 1983 was increased from 250 to 573 metric tons.

This quota was then sub-allocated on a numbers of fish basis (estimated from average fish weights in the past) amongst the six Canadian bluefin tuna fishery areas (Table 1 and Figure 1).

The catch monitoring system used for quota management employed a tag system whereby numbered metal tags were attached to each fish immediately upon landing. This system permitted gathering of individual weights for 100% of the catch.

Participation in the fishery was controlled through a licensing system and no new licenses were issued in 1983. Logbooks were also issued to every licensed fishermen and they were collected on a weekly basis.

An intensive biological sampling program was conducted on Prince Edward Island with a coverage of approximately 50% of the fish landed. The routine information collected included various morphometric measurements, weight (round and dressed), sex and stomach contents as well as the sampling of hardparts (otoliths and vertebrae) for aging.

Some of the preliminary findings are presented here and will be updated as the material is analyzed.

1. Catch

The most notable difference in the Canadian fisheries for bluefin tuna in 1983 was the near complete failure of the trap fishery in St. Margaret's Bay, Nova Scotia.

Only twenty-two (22) tuna were landed out of a total quota of four hundred and one (401) bluefin for this fishery (Table 2).

The fishery in Prince Edward Island is still operating at this time and the Nova Scotia (St. Georges Bay) fishery is now underway. The quota for Prince Edward Island was exceeded in early October and this fishery is continuing because part of the unfilled quota for St. Margaret's Bay was reallocated to this fishery.

Although the quotas for Quebec and New Brunswick were not met, reports from fishermen indicate that bluefin were abundant in these areas. There were also reports of smaller bluefin in several areas but these reports have not been substantiated.

2. Effort

Although no ^{new} licenses were issued in 1983, participation in the handgear fisheries (rod and reel and 'tended line') appeared to be high. Of these two gear types, the 'tended line' or 'keg gear' was again predominant (probably greater than 80%).

Logbook coverage and the quality of the information recorded in bluefin tuna logrecords improved in 1983; however no analysis of 1982 or 1983 effort data has been attempted.

There was no Canadian purse seine fishery for bluefin tuna in 1983.

3. Catch Composition in 1983

3.1 Size Composition

A length frequency was constructed from the samples from Prince Edward Island. (Fig. 2).

The fork lengths of male bluefin tuna ranged from 236 to 305 cm with a mean value of 277 cm. The fork lengths of female tuna in the sample ranged from 236 cm. to 285 cm. with a mean value of 266 cm. (Table 4).

3.2 Weight Composition

The mean weight (round) of bluefin tuna caught off Prince Edward Island in 1983 was 424.4 kg. (Table 3). This represents an increase over the 1982 mean weight and a continuation of the trend of increasing mean weight since 1974.

Weight frequency was calculated for both sexes separately from detailed samples from Prince Edward Island. The mean weight of female bluefin tuna was 393.1 kg. and that of males 436.2 kg.

3.3 Age Composition

Otoliths were sampled from approximately three hundred and seventy-five (375) giant bluefin tuna caught off Prince Edward Island. These samples have not been aged yet because of concern about the validity of this aging method.

Caudal vertebrae were collected from a stratified sample of fifty bluefin tuna for evaluation as aging structures.

The age composition from these samples will be reported at a later date.

3.4 Sex Ratio

The sex of three hundred and eighty-six (386) giant bluefin caught off Prince Edward Island was determined. Male fish outnumbered females by a ratio of 2.64:1.

This ratio is considerably different from the ratio of 1.74 male to female giant bluefin tuna calculated by Baglin (1982) for the western Atlantic using data from 1975-79.

Conclusions

The bluefin tuna fishery in Canadian waters in 1983 was regulated by strict quota control. The trap fishery in St. Margaret's Bay, Nova Scotia was nearly a complete failure. The temporal and spatial pattern of landings in the Gulf of St. Lawrence in 1983 seem to reflect abundance of fish available to the fisheries.

In the handgear fisheries, 'tended line' gear was much more prevalent than rod and reel gear.

The sex ratio of bluefin tuna landed in Prince Edward Island in 1983 was 2.64 males to females. Males were larger than females. The mean weight of bluefin tuna sampled on Prince Edward Island in 1983 is higher than in 1982 and in accordance with the observed trend of increasing proportion of large fish entering the fishery.

References

Baglin, R.E. Jr. 1982. Reproductive biology of western Atlantic bluefin tuna. Fish. Bull. 80: 121-134.

Table 1.

Sub-area quotas for Bluefin Tuna fisheries in Canada in 1983

Area	Gear	Quota (Number of fish)
Prince Edward Island	Handgear	660
Newfoundland	"	50
New Brunswick	"	157
Quebec	"	83
Nova Scotia (St. Georges Bay)	"	166
Nova Scotia (St. Margaret's Bay)	Trap	401
		<u>1517</u>

Table 2.

Total numbers of Bluefin Tuna caught in Canadian Atlantic (1970-1983)

Gear	Province	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Trap	Nova Scotia					865	452	474	948	530	72	129	93	157	22
	Prince Edward Island	99	173	482	650	1048	343	650	448	437	317	389	515	392	775
	New Brunswick				3	93	148	180	196	35	55	118	26	53	126
	Quebec					6	6	26	95	11	20	90	29	43	54
	Nova Scotia	15	9	12	16										
	Newfoundland	418	76	104	37	30	33	6	13	17	111	50	81	61	15
								5	2	1	1	1	3	7	3
Total		532	258	98	706	2042	982	1336	1705	1032	576	777	747	713	995

1. Total to date (Oct. 24, 1983), Nova Scotia and Prince Edward Island fisheries continuing.

Table 3

Size composition of large Bluefin Tuna sampled on Prince Edward Island during August and September of the 1983 season (number of fish and ~~total weight~~ ^{round weight} per mille by 10-cm intervals).

Size Class (Kg.)	August				September			
	N	Males PPT	N	Females PPT	N	Males PPT	N	Females PPT
270-279			2	53	1	5		
280-289			0	0	1	5		
290-299			0	0	0	0	1	15
300-309			1	26	1	5	0	0
310-319			1	26	2	10	0	30
320-329	0	0	0	0	2	10	2	30
330-339	0	0	5	132	4	21	4	59
340-349	1	12	0	0	0	0	2	30
350-359	2	24	1	26	4	36	6	90
360-369	1	12	7	184	3	15	7	104
370-379	4	47	4	105	12	62	7	45
380-389	5	59	4	105	9	46	4	59
390-399	4	47	0	26	9	46	4	59
400-409	4	47	0	0	9	73	5	75
410-419	9	106	2	53	14	93	8	119
420-429	13	153	5	132	18	67	6	90
430-439	7	81	1	26	22	73	2	30
440-449	6	71	0	0	13	73	5	75
450-459	7	81	2	53	14	67	3	45
460-469	5	59	2	53	13	52	1	15
470-479	6	71		53	10	62	2	30
480-489	3	35			12	31		
490-499	2	24			6	31		
500-509	1	12			6	21		
510-519	3	35			4	26		
520-529	1	12			5	10		
530-539	0	0			2	5		
540-549	1	12			1	0		
550-559					0	5		
560-569					1	10		
570-579					2			
TOTAL	85	1000	38	1000	194	1000	67	1000

1. PPT figures are rounded off

Preliminary data

Mean Round Weight (August and September Combined):
 - Males + Females = 424.4 Kg n= 384
 - Males only = 436.2 Kg n= 279
 - Females only = 393.1 Kg n= 105

Table 4.

Length composition of large Bluefin Tuna sampled on Prince Edward Island during August and September of the 1983 season (number of fish and fork length per mille by 10 cm. intervals).

Size Class (Cm.)	August				September			
	Males		Females		Males		Females	
	N	PPT	N	PPT	N	PPT	N	PPT
236-240			1	29	2	13	1	19
241-245			1	29	0	0	1	19
246-250			0	0	1	6	2	38
251-255			1	29	1	6	3	58
256-260	4	53	7	200	4	25	5	96
261-265	1	13	12	343	13	83	6	115
266-270	8	105	6	171	16	102	11	212
271-275	13	171	3	85	30	191	14	270
276-280	19	250	3	85	38	243	6	115
281-285	16	211	1	29	29	185	3	58
286-290	12	158			13	83		
291-295	2	26			5	32		
296-300					4	25		
301-305	1	13			1	6		
306-310								
TOTAL	76	1000	35	1000	157	1000	52	1000

1. PPT figures are rounded off

* Preliminary data

Mean Fork Length (August and September Combined):
 - Males and Females = 273.9 cm n= 320
 - Males only = 277.0 cm n= 233
 - Females only = 265.9 cm n= 87

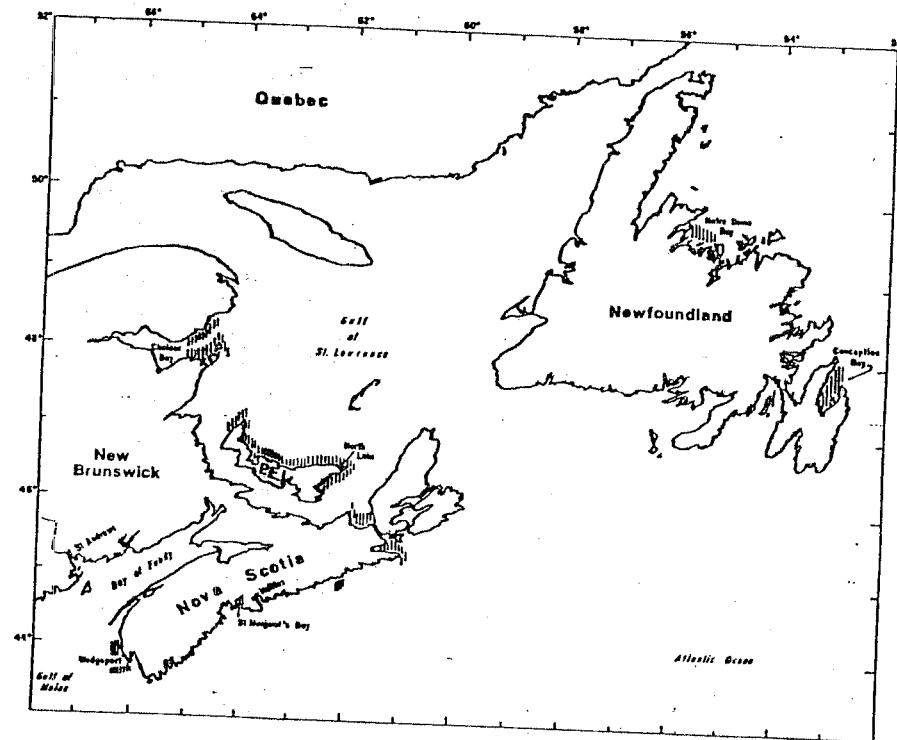


Figure 1: Fishing Locations of the Canadian Fisheries for Bluefin Tuna

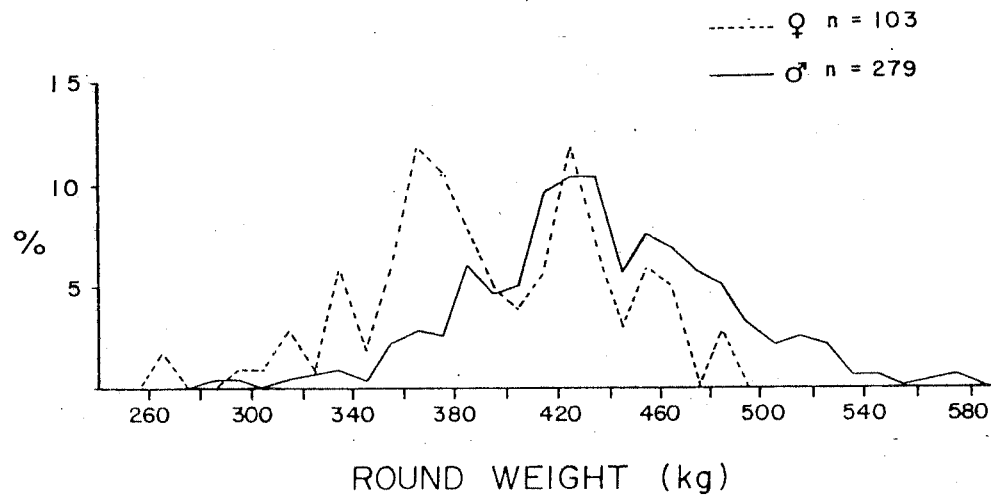
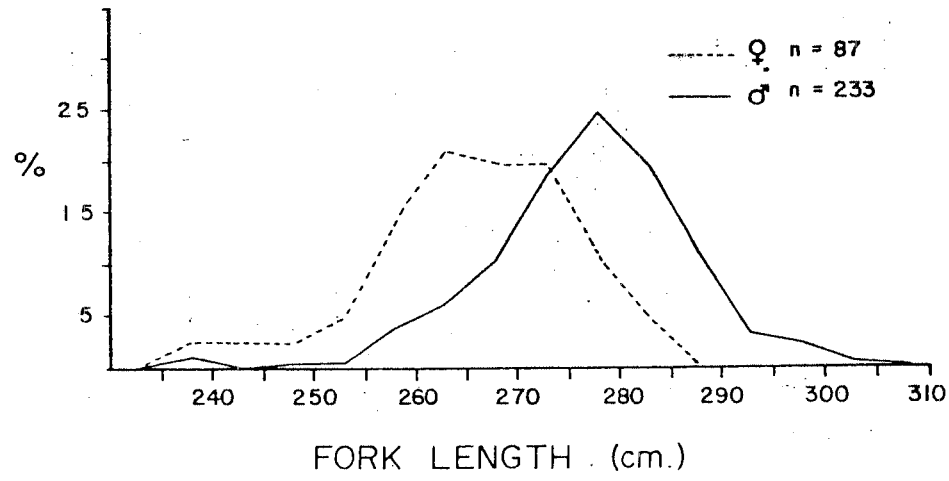


Figure 2: Weight and length frequencies of male and female bluefin tuna landed in P.E.I. during 1983 (Aug. - Oct.)