

International Commission for



the Northwest Atlantic Fisheries

Serial No. 3483
(D. c. 9)

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Corrigendum

ANNUAL MEETING - JUNE 1975

Possible effects of non-reported discards of flatfish on TAC of plaice and
yellowtail in ICNAF Divisions 3LNO

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Page 8, Fig. 4: Caption should read: "Estimated stock size of yellowtail by the two methods described in text, ICNAF Divisions 3LN."

Page 9, Fig. 5: Caption should read: "Estimated stock sizes of plaice by two methods described in text, ICNAF Divisions 3LNO."

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Introduction

Present total allowable catches of flatfish (American plaice, yellowtail and witch) were calculated without taking into account possible discards by countries fishing and salting cod and not reporting flatfish catches either as discards or in their statistics of nominal catch.

Spain, Portugal and France (Metropolitan) almost exclusively report only cod catches on the Grand Bank, although apparently a major proportion of their directed fishery occurs at the same depth and location as the plaice, yellowtail and witch fishery by Canadian trawlers. This being so, it would appear likely that flatfish are taken as by-catches of the otter and pair trawler fishery. These quantities were not used in the calculation of total removals in previous assessments of Divisions 3LNO plaice and yellowtail.

Lopez-Veiga and Vasquez (1974) reported on by-catches of Spanish pair trawlers on the west coast of Greenland (Divisions 1C and 1D), St. Pierre Bank (Subdivision 3Ps), Banquereau (Subdivision 4Vs) and on Georges Bank (Subdivision 5Ze) and indicated frequent commercial catches of species such as wolffish, redfish and American plaice. The latter species was reported as abundant in catches on Georges Bank, and Banquereau, and very abundant off West Greenland.

The reality of this discard problem was further emphasized by an experiment conducted by a Newfoundland fishing company with two Spanish pair trawlers and although the effort was directed to cod, considerable quantities of flatfish were caught.

While definite information on past flatfish discards by non-reporting countries is still not available, and likely will never be available, an attempt was made here to assess the effects of the addition of different levels of discards to the known landings on previously estimated stock sizes and total allowable catches.

Materials and Methods

The only real information available from the non-reporting countries was catch and effort for cod from pair and regular otter trawlers. Based on this information, assumptions were made to give estimates of discards.

Method 1 used the cod catches of Spain, Portugal and France (M) by otter or pair trawler and assumes that the total catches from these gears were made up of a certain proportion of flatfish with the total catch of cod and flatfish estimated from the amount of cod reported. In this way, possible discards were estimated and added to the reported nominal catch to give total plaice and yellowtail catches. Since proportion of flatfish in the total catch (cod and flatfish) was probably not the same for all ICNAF Divisions and in order to be as realistic as possible, discards for each Division were estimated separately. Thus in Figure 1, 30% 50%, 50% refer to percentage of plaice of total catch in Divisions 3L,

3N and 3Ø, respectively. Yellowtail and plaice were separated on the basis of the proportion of these recorded in reported nominal catch.

Method 2 used effort data by the same countries and gears with Spanish otter trawler hour as a standard unit of effort, i.e. catch per hour of Spanish otter trawlers was divided into total catch of Spain, Portugal and France (M) to determine total standard hours for each year. This effort was converted into American plaice catches using Canada (N) catch per hour and assuming these countries caught plaice (a) at the same rate as the Canadian trawlers (100%), (b) at 50% and (c) at 10%. These estimated catches were added to known nominal catches. Yellowtail discards were estimated using the ratio of plaice to yellowtail in the total reported landings (Fig. 2 and 3).

New estimates of numbers caught at age (C^1) were estimated by multiplying the calculated numbers used in previous assessments of these stocks (Pitt 1973, 1974) by the ratio of the new catch estimates to the previously recorded landings, i.e.

$$n^1 C^1_t = n^0 C^0_t \left(\frac{W_2}{W_1} \right)$$

Where $n^1 C^1_t$ = new estimates of number caught at age t in year n, C^0_t the previous estimates of this value, W_1 the reported nominal catch for year n, and W_2 the estimated catch by methods 1 or 2.

This method was considered valid since length frequencies from Spanish pair trawlers in the previously-mentioned commercial experiment in 1974 were similar to those from the Canadian trawler fishery for the same period (Unpub. report by the St. John's Biological Station).

The various estimates of catch at age were applied to Pope's (1972) cohort model and population sizes for the various simulations calculated and from these, TAC's were estimated in the usual way. As in previous assessments, only data for Divisions 3L and 3N were used for plaice and from Divisions 3LN and Ø for yellowtail.

Results and Discussion

The recalculation of TAC's (Table 1) by the two methods described are merely illustrative and are meant to show the possible effects of underestimating removals. However, while these TAC's may not necessarily show the true conditions, they do indicate the possible magnitude of the problem since it emphasizes the possibility of considerable quantities of this resource being discarded at sea.

There is some direct evidence of removals of flatfish and other commercial species as by-catch in the Spanish pair trawler cod fishery. Thus, in addition to the information given by Lopez-Veiga and Vasquez (1974), information gathered from Spanish pair trawlers chartered by a Newfoundland fishing company (Unpub. report at the St. John's Biological Station) (Table 2) clearly indicates the reality of the by-catch problem.

This experiment was directed at the cod fishery with the trawlers apparently operating as in a normal commercial fishery. The net used by pair trawlers has a greater spread and is much higher (foot-rope to headline) than that used by Canadian otter trawlers. Nevertheless, in Division 3L 32% of the catch was American plaice (Table 2) and in Division 3Ø 46% was yellowtail. The Division 3N data had too few hours to be meaningful. Obviously, Canadian trawlers were more efficient at catching flatfish, these being the species sought (plaice and yellowtail). It should be pointed out, however, that catch and effort data for June-August 1973 for Spanish pair trawlers (ICNAF Statis. Bull. Vol. 23) gave catch per hour (tons) for cod at 0.962, 1.098 and 0.895 for Divisions 3L, 3N and 3Ø respectively. One can only speculate if the more efficient catch rate for cod would also imply a higher rate for flatfish also than in the recent commercial experiment. No information is available on possible flatfish discards by the regular otter trawlers operated by Spain, Portugal and France (M).

The non-inclusion of substantial numbers of discards at all size ranges would cause an under-estimation of stock size of plaice and yellowtail (Fig. 4 and 5). Thus, in the case of plaice, at least, this large stock has sustained the fishery in spite of the high removal level. It means, however, that a substantial proportion of the stock is not being managed, but is being removed at a level dependent on the effort expended by the countries that have substantial cod quotas. The yellowtail situation is less clear and the decline in abundance in recent years may have been, in part at least, attributable to these unreported removals in that the total may have exceeded the MSY for this stock.

The probable adverse effect of this by-catch problem on the plaice and yellowtail stocks cannot be too strongly emphasized since if cod becomes less abundant on the Grand Bank, there could be an increase in fishing effort to take the allocated quotas and thus possibly increase the by-catch of flatfish. It is obvious that a fishery cannot be properly managed when a possible substantial proportion of the annual removals is unknown.

References

- Lopez-Veiga and A. Vasquez. 1974. Some observations onboard two Spanish pair trawlers. Intern. Comm. Northw. Atlant. Fish. Res. Doc. 74/88, Serial No. 3324.
- Pitt, T. K. 1973. Assessment of American plaice stocks on the Grand Bank. Intern. Comm. Northw. Atlant. Fish. Res. Bull. No. 10, 63-77.
1973. Status of yellowtail fishery in ICNAF Divisions 3LN. Intern. Comm. Northw. Atlant. Fish. Res. Doc. 73/5, Serial No. 2905.
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- Pope, J. G. 1972. An investigation of the accuracy of virtual population analysis using cohort analysis. Intern. Comm. Northw. Atlant. Fish. Res. Bull. No. 9, 65-74 pp.

Table 1. Estimated 1974 TAC's for plaice and yellowtail in Divisions 3LNO using the two methods described in the text. (Calculated at $F_{0.1}$ for fully recruited ages).

A. - Method 1

	Percent Flatfish in Total Catch (cod and flatfish)								
	3L 30%	3N 50%	3Ø 50%	3L 20%	3N 20%	3Ø 20%	3L 10%	3N 20%	3Ø 20%
	(tons)			(tons)			(tons)		
PLAICE	110,000			80,500			71,000		
YELLOWTAIL	68,800			45,500			39,000		

B. - Method 2

	Percent of Canada (N) catch/hour plaice		
	100%	50%	20%
	(tons)	(tons)	(tons)
PLAICE	112,000	88,000	70,000
YELLOWTAIL	55,000	44,000	38,000

TAC's using reported nominal catches up to and including 1973 at $F_{0.1}$

PLAICE = 58,000 Tons.

YELLOWTAIL = 35,000 Tons

Table 2. Summary of catch composition and catch per hour (tons) by Spanish pair trawlers operated by Newfoundland fishing company and data from Canadian trawlers operating during a comparable period (June - Mid-Aug.).

Division	Hrs.	SPANISH PAIR TRAWLERS						CANADIAN TRAWLERS						
		COD		PLAICE		YELLOWTAIL		COD		PLAICE		YELLOWTAIL		
		T/hr.	%	T/hr.	%	T/hr.	%	T/hr.	%	T/hr.	%	T/hr.	%	
3L	335	0.162	68	0.075	32	--	0	2794	0.040	10	0.245	65	0.097	25
3N	27	0.011	6	--	0	0.186	94	2557	0.007	1	0.240	47	0.259	52
3Ø	700	0.128	48	0.016	6	0.123	46	1130	0.035	8	0.174	39	0.237	53

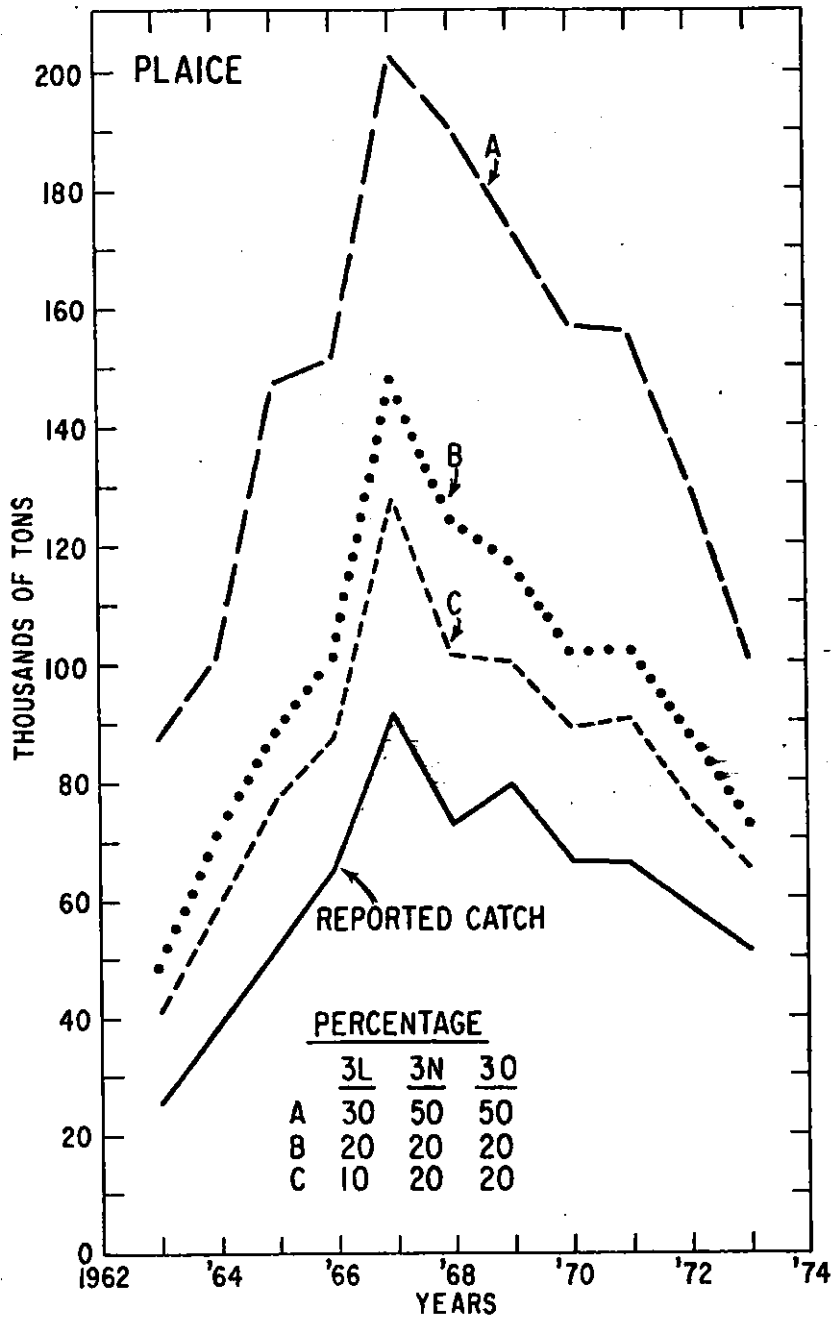


Fig. 1. Estimated plaice catches using method 1.

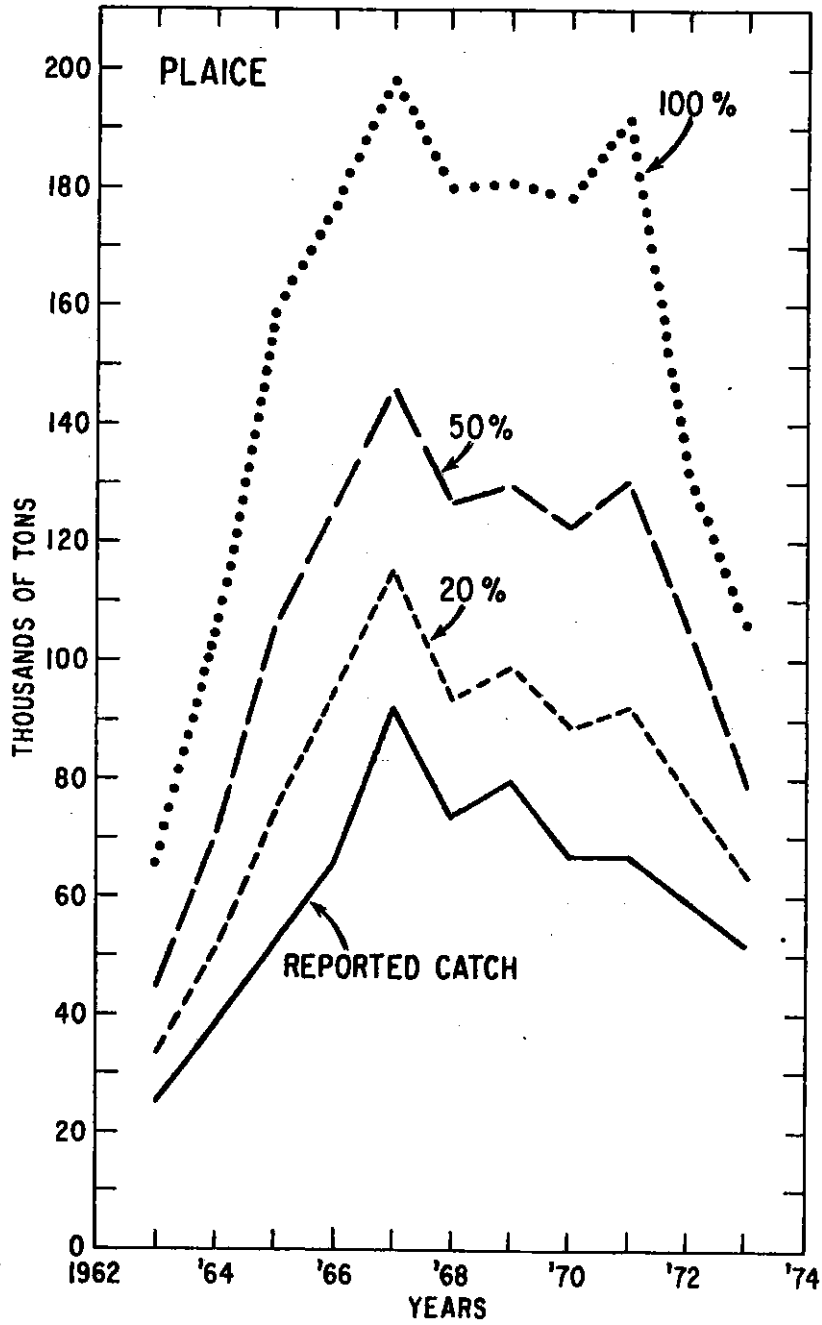


Fig. 2. Estimated plaice catches using method 2.

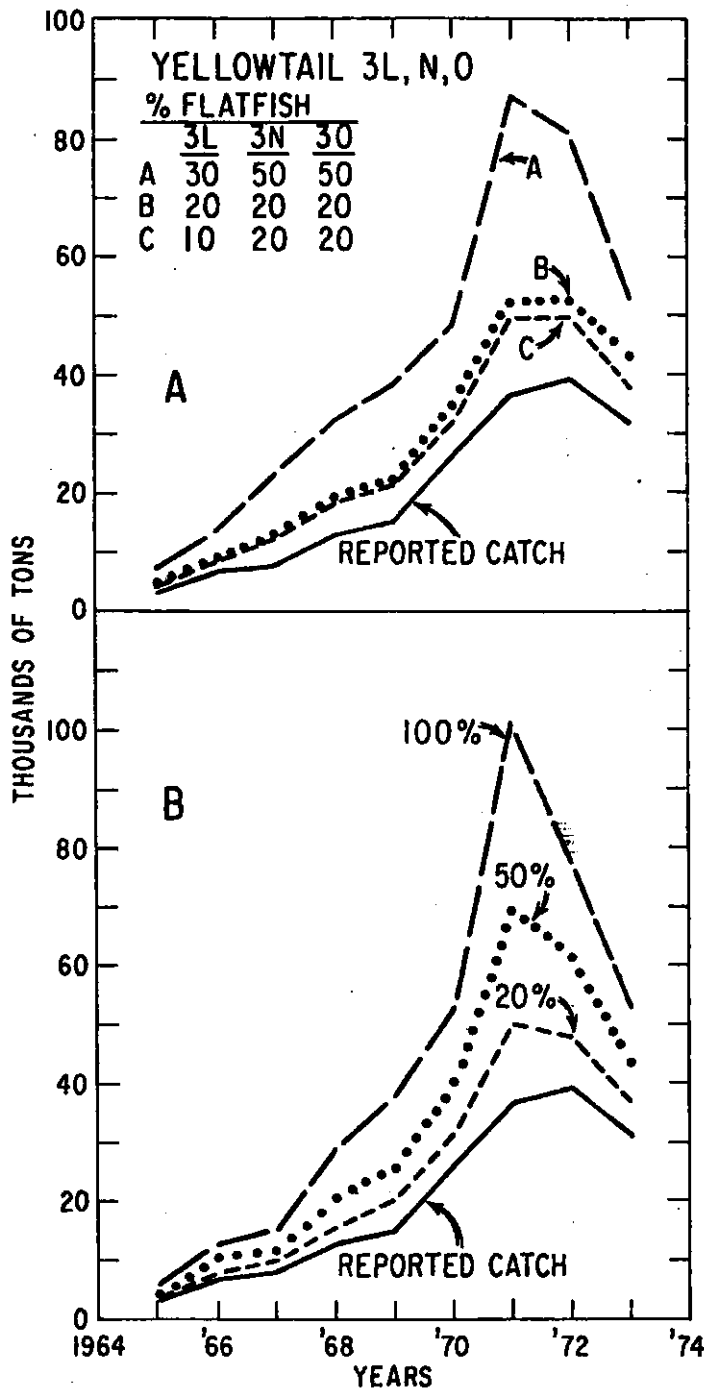


Fig. 3. Estimated catches of yellowtail using (A) Method 1 and (B) Method 2.

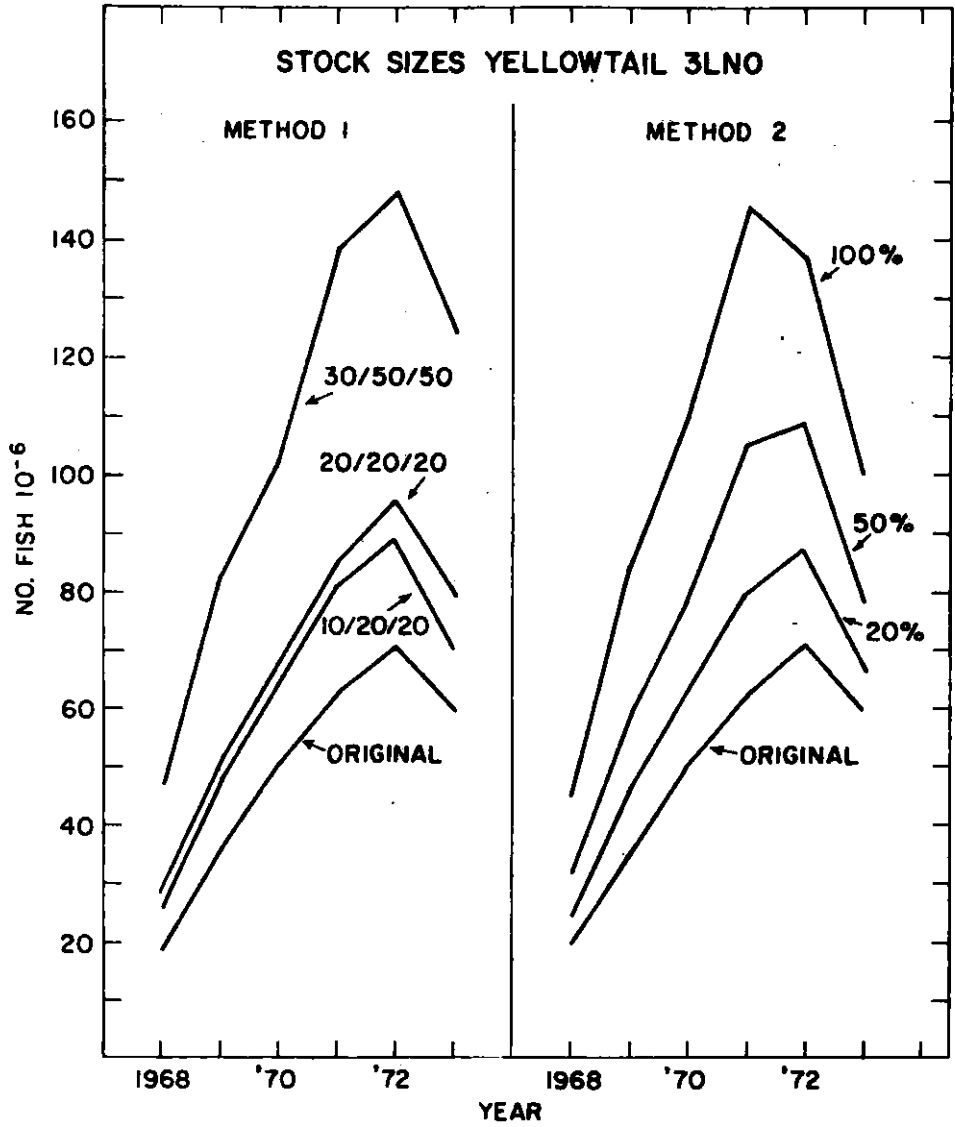


Fig. 4. Estimated stock size plaice by the two methods described in text, ICNAF Divisions 3LN.

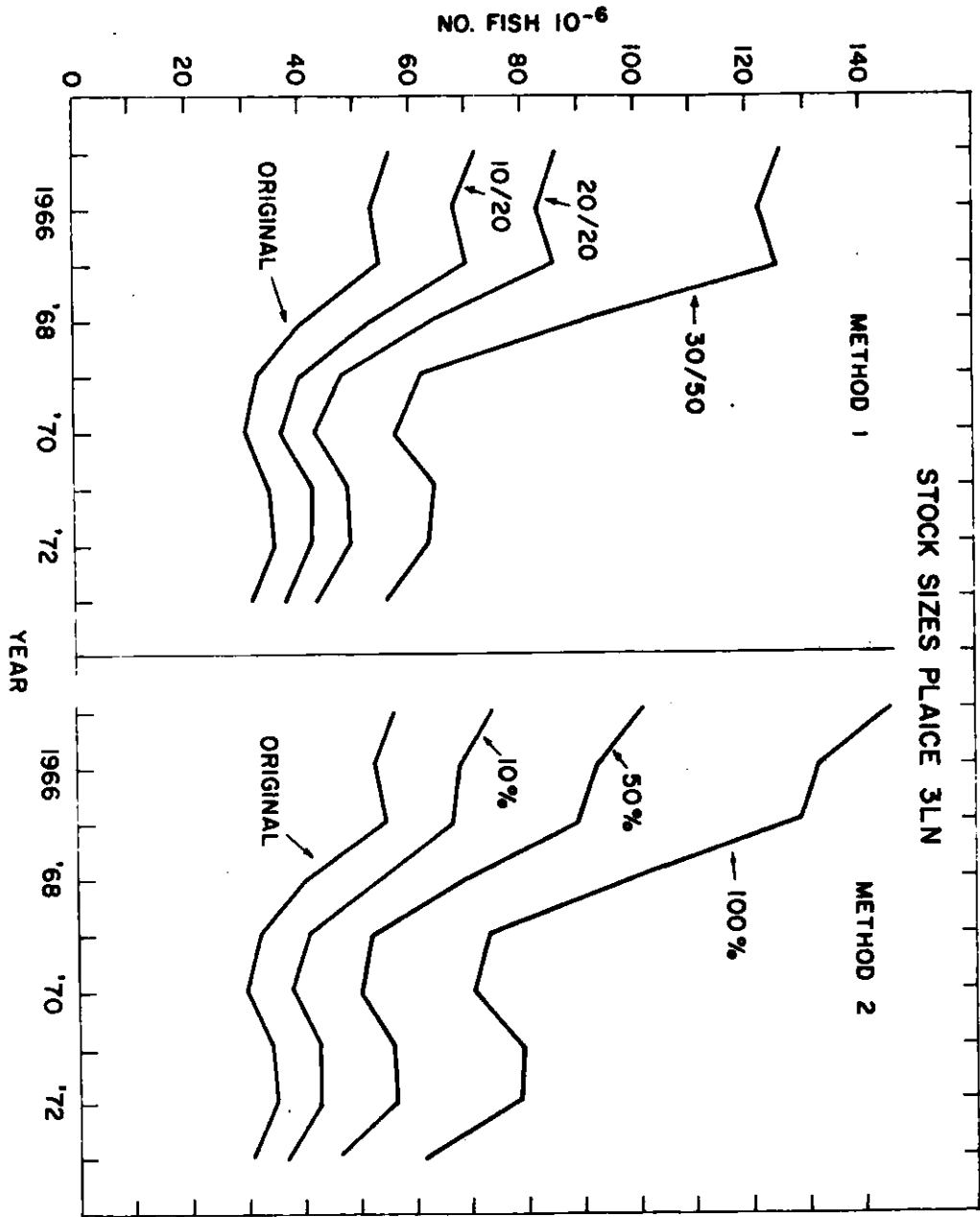


Fig. 5. Estimated stock sizes of yellowtail by two methods described in text, ICNAF Divisions 3LN0.

