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Acoustic Survey Results for Capelin (Mallotus villosus) in Divisions 2J3K and 3LNO, 1980

by

D. S. Miller, and J. E. Carscadden
Fisheries and Oceans
Research and Resource Serivces
Newfoundland Region
St. John's, Newfoundland
A1C 5X1

Acoustic surveys of capelin stocks in Div. 2J3K and 3LNO were conducted from the research vessel Gadus Atlantica during the periods June 12-July 7, and Oct. 24-Nov. 18, 1980 respectively. Overall biomass estimates for the 3L and 3NO stocks were made. There were insufficient quantities of capelin in Div. 2J3K to provide an acoustic biomass estimate from this 1980 survey.

INTRODUCTION

These surveys are a continuation of an annual acoustic survey program to provide biomass estimates for Div. 2J3K, 3L and 3NO capelin stocks. Biomass estimates for the 2J3K stock have been provided since 1977 (Miller, Carscadden and Bennett, 1978; Miller and Carscadden, 1979; Carscadden and Miller, 1980). The first biomass estimate from the Canadian acoustic survey for 3L and 3NO stocks was made in 1979 (Miller and Carscadden, 1980). This paper describes biological characteristics for capelin sampled during 2J3K, 3L and 3NO surveys. Capelin distribution in Div. 3L and 3NO are described, and relative estimates of biomass for the areas are provided.

METHODS

Acoustic data were collected using the same instrumentation as in earlier cruises (1977-1979). Acoustic data were accumulated for 6 min. intervals and mean density estimates for each interval were calculated. Mean density estimates were calculated for each of the areas sampled and the aerial expansion method was used to calculate total population numbers. Mean weights were calculated from samples collected in each area and these were used to calculate the biomass estimates. Midwater trawl sets were made at regular intervals to provide samples of acoustic targets, both for species composition and capelin size distribution.

2J3K SURVEY

An initial large scale survey covering areas in Div. 2J and 3K was made. Additional areas in both 2J and 3K were examined after completion of the initial survey.

3LNO SURVEY

The area covered was subdivided into 4 subareas based on the size distribution of capelin sampled. Target strengths were calculated corresponding to capelin size distributions using weight-target strength regressions (Buerkle, pers. comm.). An initial large scale survey covering a major portion of Div. 3LNO was made. Four additional surveys covering a small area in Div. 3N where mature capelin were found were also made.

RESULTS

Division 2J-3K

Summaries of sampling data from midwater trawl sets made during the survey are shown in Fig. 1 and 2. The 1977 and 1978 year-classes were predominant in the capelin catch. The survey track and locations of midwater trawl sets are shown in Fig. 5a and 5b. Acoustic data collected during the survey indicated very low fish abundance throughout the entire area covered. This combined with the fact that capelin represented a very small proportion of the total pelagic biomass sampled with midwater trawl sets precluded providing an acoustic estimate of capelin in Div. 2J-3K in 1980. Abundance of other species, such as Arctic cod which were a significant part of the total pelagic biomass in previous years, was also very low in 1980. A summary of previous biomass estimates for Div. 2J-3k standardized to correct for errors in the original Honeywell algorithm is given in Table 1.

Division 3L and 3NO

Summaries of sampling data from midwater trawl sets made in these areas are shown in Fig. 1, 3 and 4. The 1979 year-class was predominant in Div. 3L and northern 3NO. The 1977 year-class was predominant in the spawning concentrations found on the S.E. Shoal of the Grand Bank in Div. 3N. An initial large scale survey covering a major portion of Div. 3LNO was first made (Fig. 6). Mature capelin were found in northern 3L and southern 3NO while large concentrations of juvenile capelin were found in the Virgin Rocks area in southern 3L and northern 3NO. Four additional small surveys were made in southern 3N in an area where mature spawning capelin were detected (Fig. 7a, b, c and d). Biomass estimates from the large scale survey (Fig. 6) are shown in Table 1. Biomass estimates for the small spawning concentrations found in Div. 3N for the surveys shown in Fig. 7a, b, c and d were 550, 150, 130 and 200 tons respectively.

The 1980 survey results show a further decline in the capelin biomass in 3LNO. The major component of this stock during the survey was the 1979 yearclass. The survey did not cover inshore areas in Div. 3L where mature capelin were congregating prior to beach spawning. The acoustic estimate should therefore be considered a minimum estimate for the stock.

REFERENCES

Carscadden, J. E., and D. S. Miller. 1980. Analytical and acoustic assessments of the capelin stock in Subarea 2 and Div. 3K, 1979. NAFO SCR Doc. 80/II/13, Ser. No. N045.

Miller, D. S., and J. E. Carscadden. 1979. An acoustic estimate of capelin biomass in ICNAF Divisions 2J and 3K, Oct. 1978. ICNAF Res. Doc. 79/34, Ser. No. 5360.

1980. An acoustic survey of capelin (Mallotus villosus) in Divisions 3LNO, 1979. NAFO SCR Doc. 80/II/14, Ser. No. N046.

Miller, D. S., J. E. Carscadden, and B. Bennett. 1978. An acoustic estimate of capelin (Mallotus villosus) biomass, ICNAF Divisions 2J and 3K, October and November, 1979. ICNAF Res. Doc. 78/43, Ser. No. 5205.

Table 1. Standardized acoustic biomass estimates for Division 2J3K, 3L and 3NO capelin stocks.

Stock	2J-3K	3L	3NO	3LNO
1977	41,500	-	-	-
1978	14,000	-	-	-
1979	10,400	37,400	4,600	42,000
1980	-	16,700	9,900	26,600
		(2,600)*	(1,300)*	(3,900)*

* Adult portion of stock in 1980.

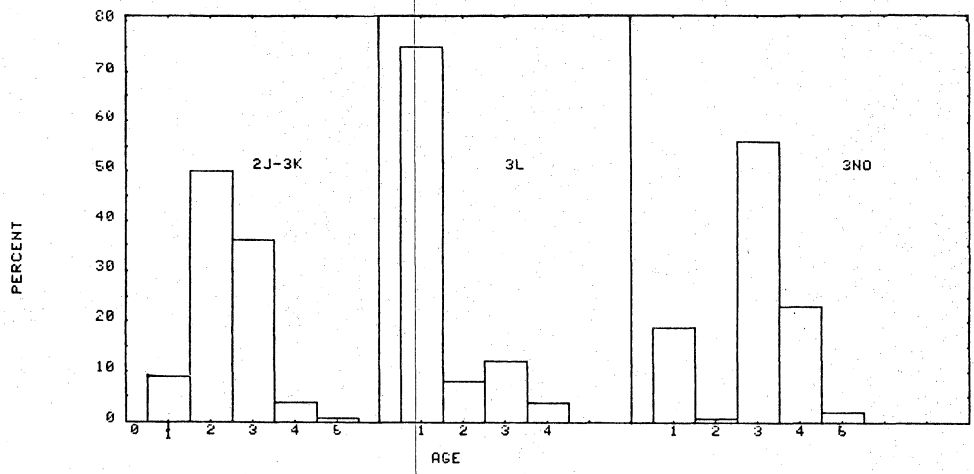
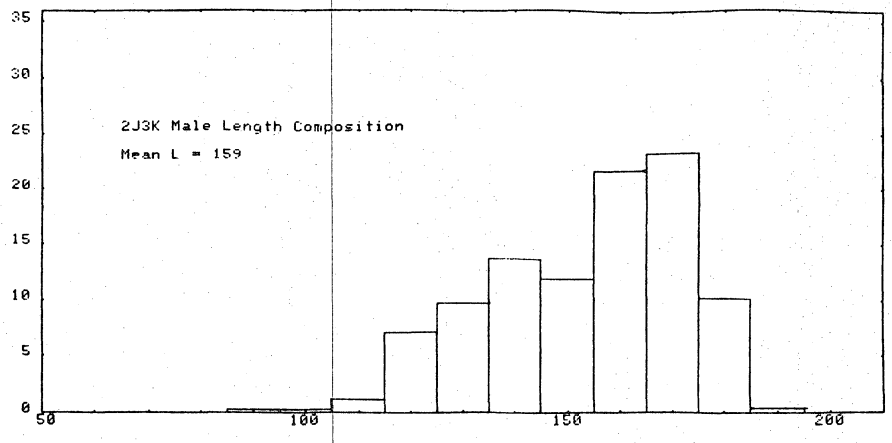


Fig. 1. Age compositions of capelin sampled during acoustic surveys, 1980.



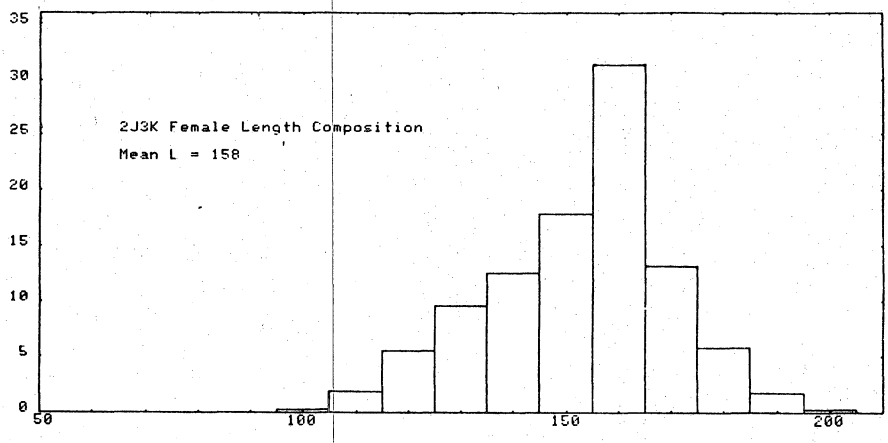
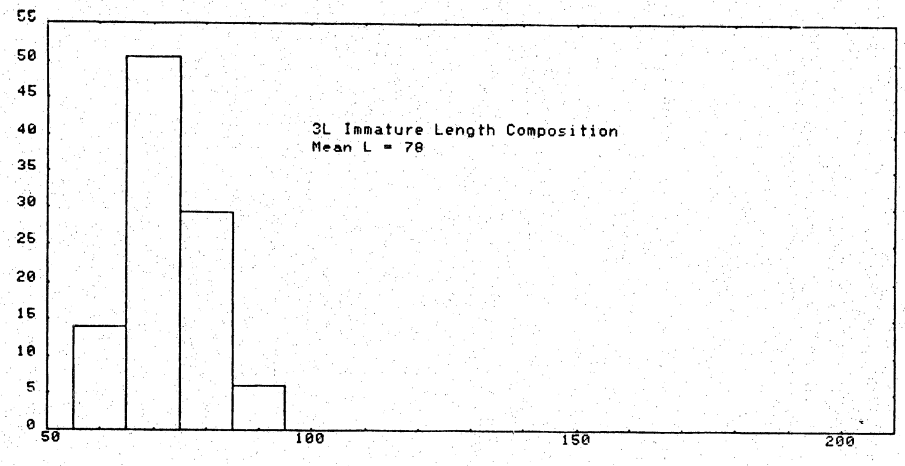
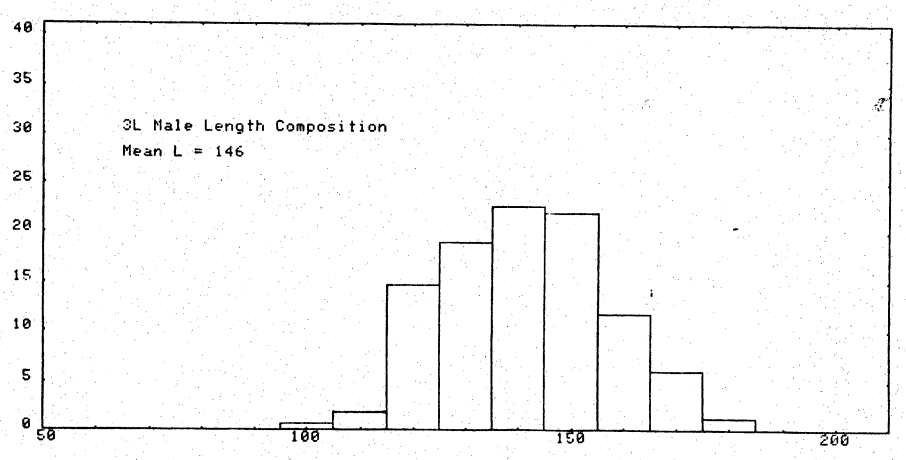


Fig. 2. 2J3K Capelin length composition - Acoustic Survey - October-November, 1980.





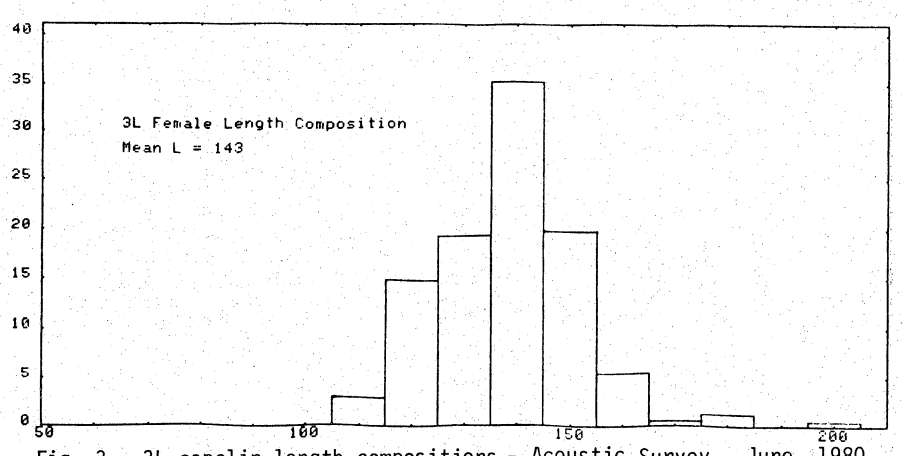
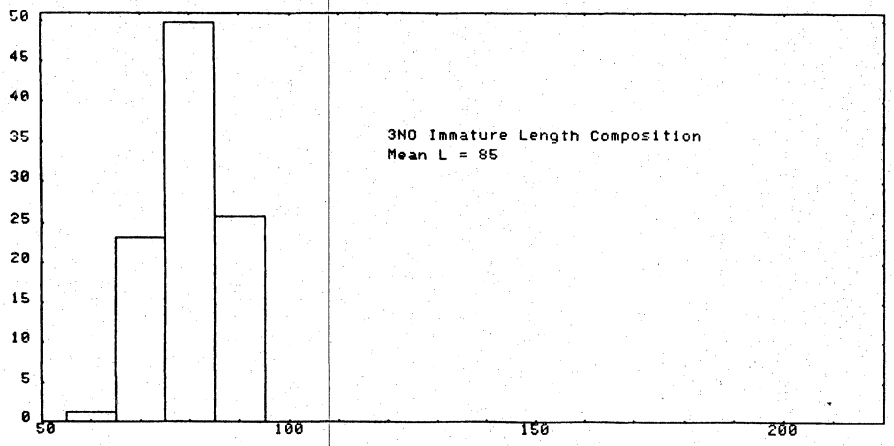
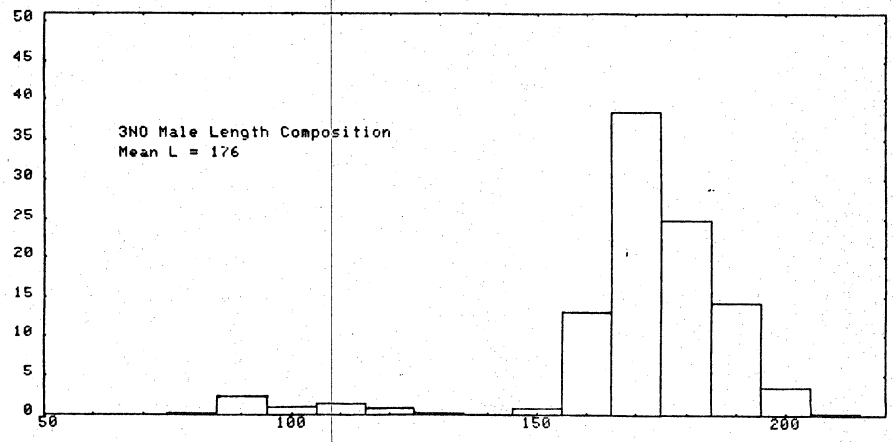


Fig. 3. 3L capelin length compositions - Acoustic Survey - June, 1980.





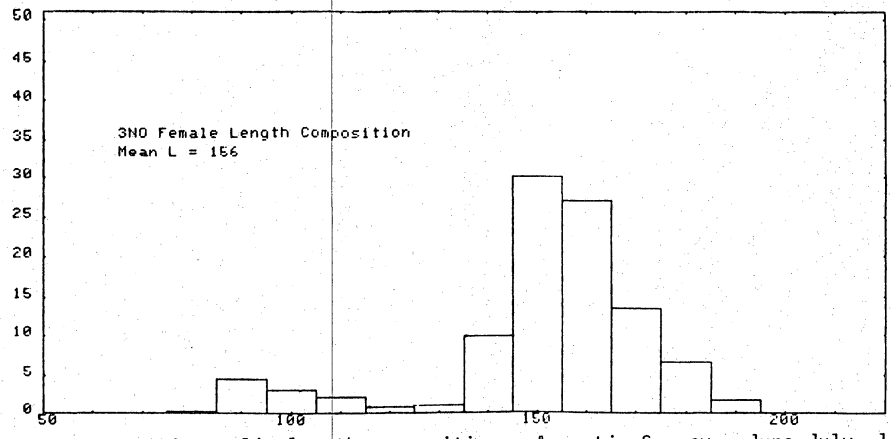


Fig. 4. 3NO capelin length composition - Acoustic Survey - June-July, 1980.

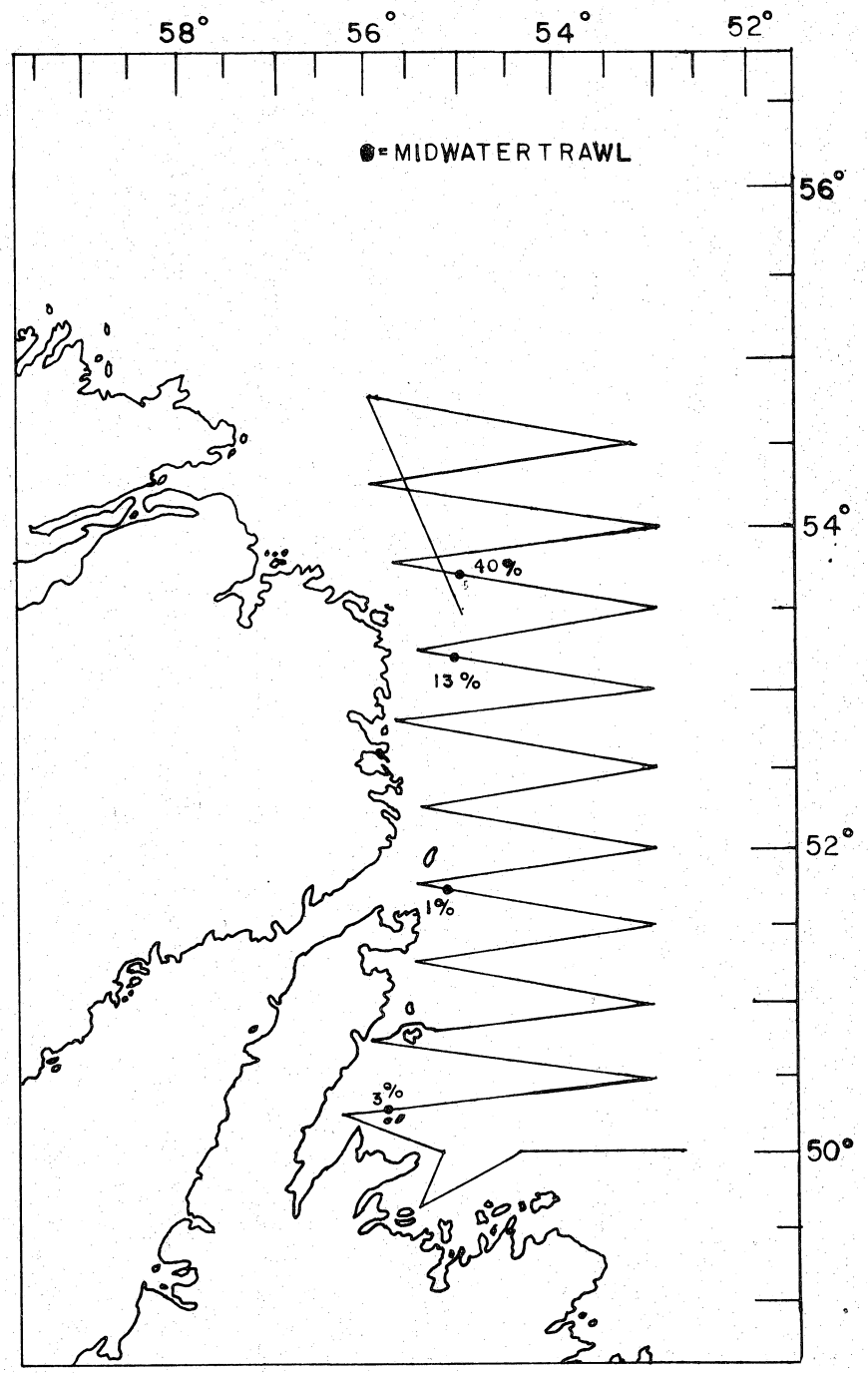


Fig. 5a. Acoustic survey track for Div. 2J3K - Part 1.

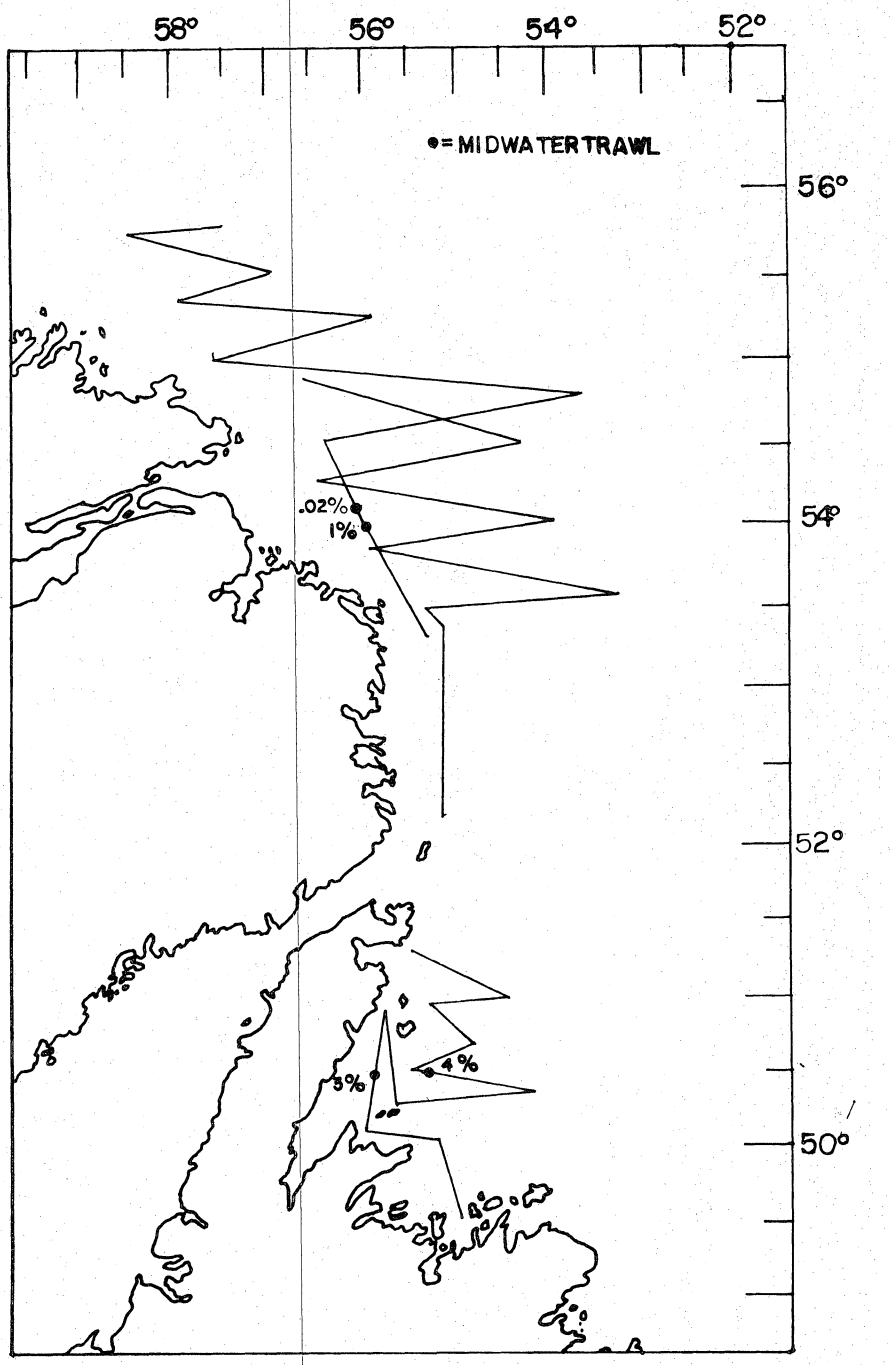


Fig. 5b. Acoustic survey track for Div. 2J3K - Part 2.

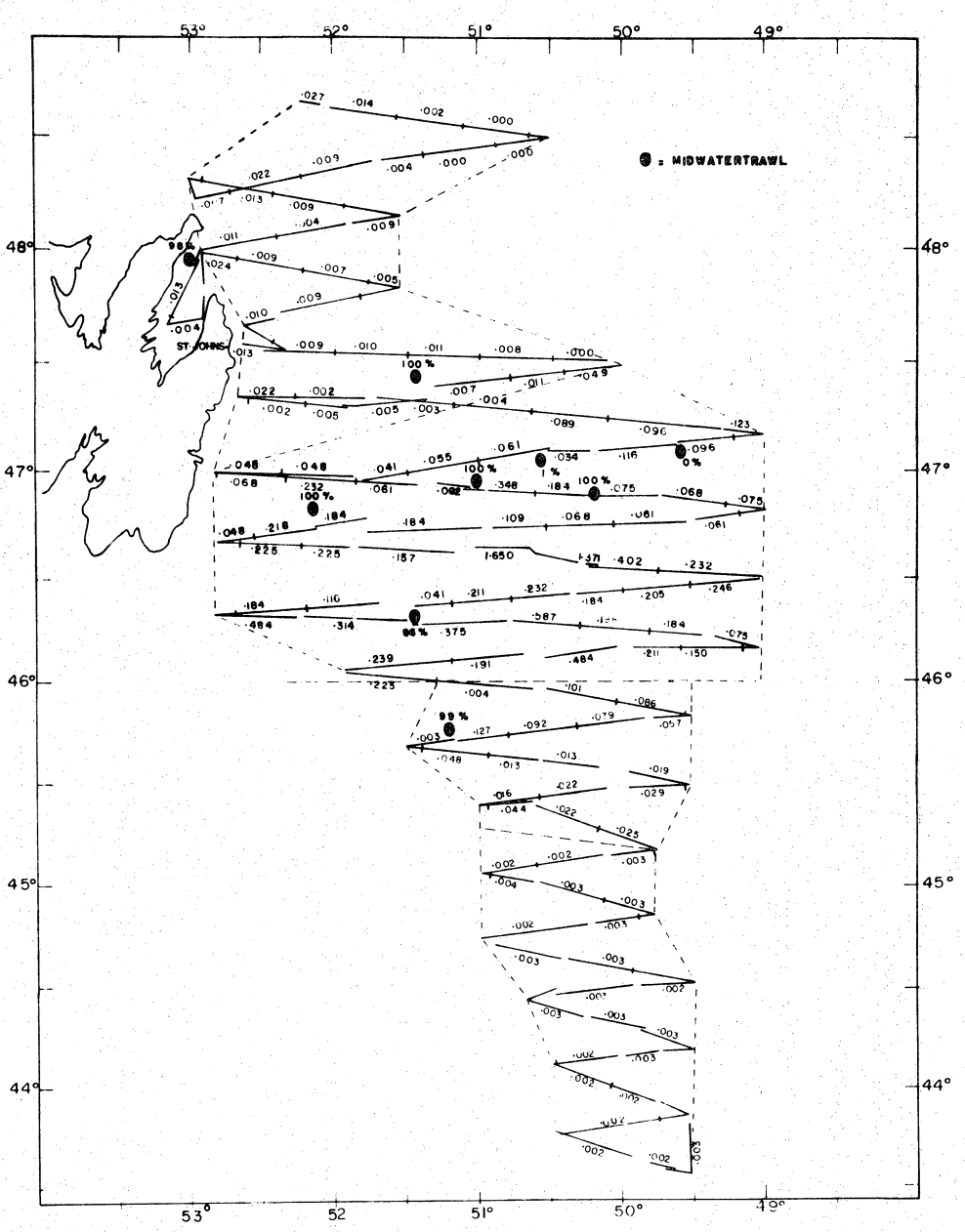


Fig. 6. Acoustic survey track for Div. 3LNO.

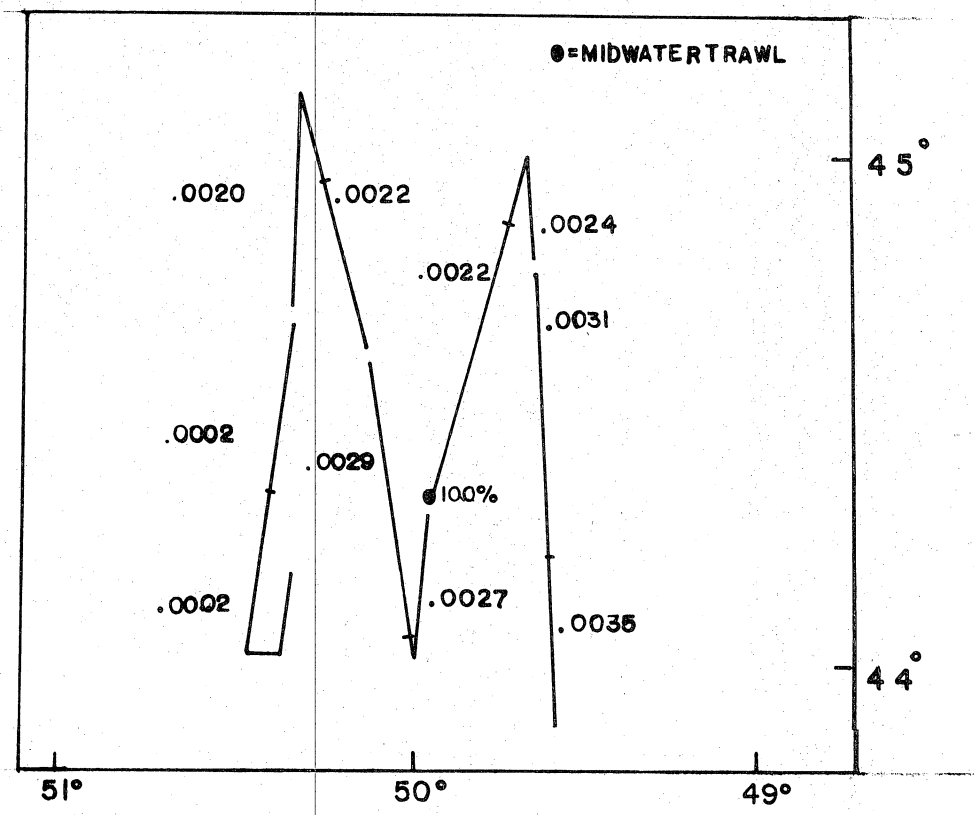


Fig. 7a. Acoustic survey track - Div. 3N.

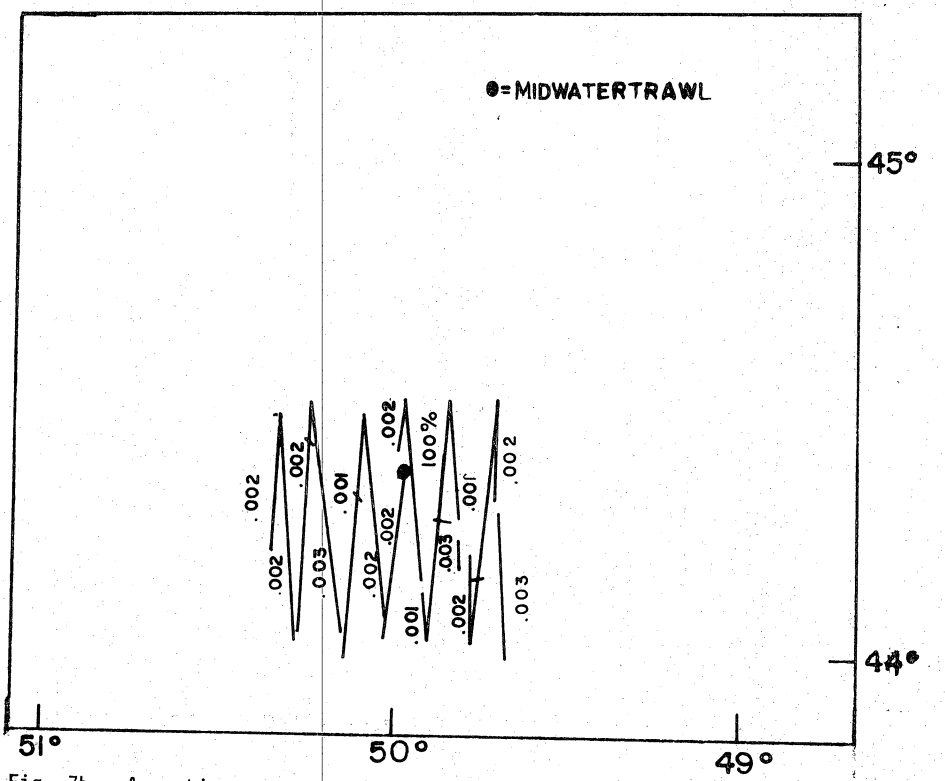


Fig. 7b. Acoustic survey track - Div. 3N.

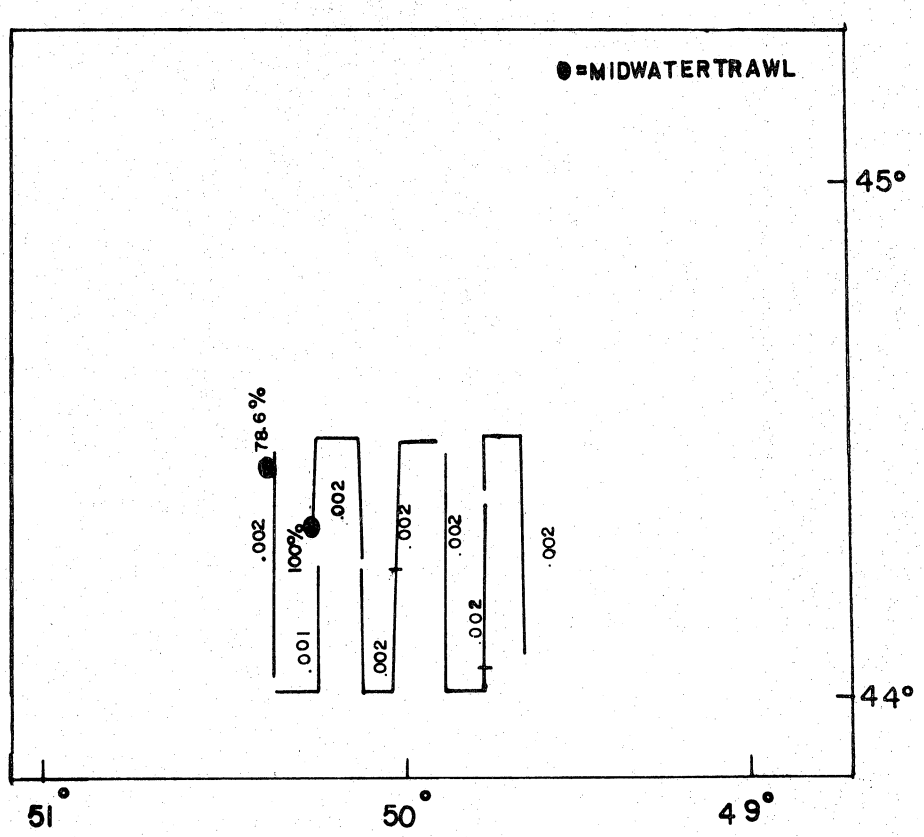


Fig. 7c. Acoustic survey track - Div. 3N.

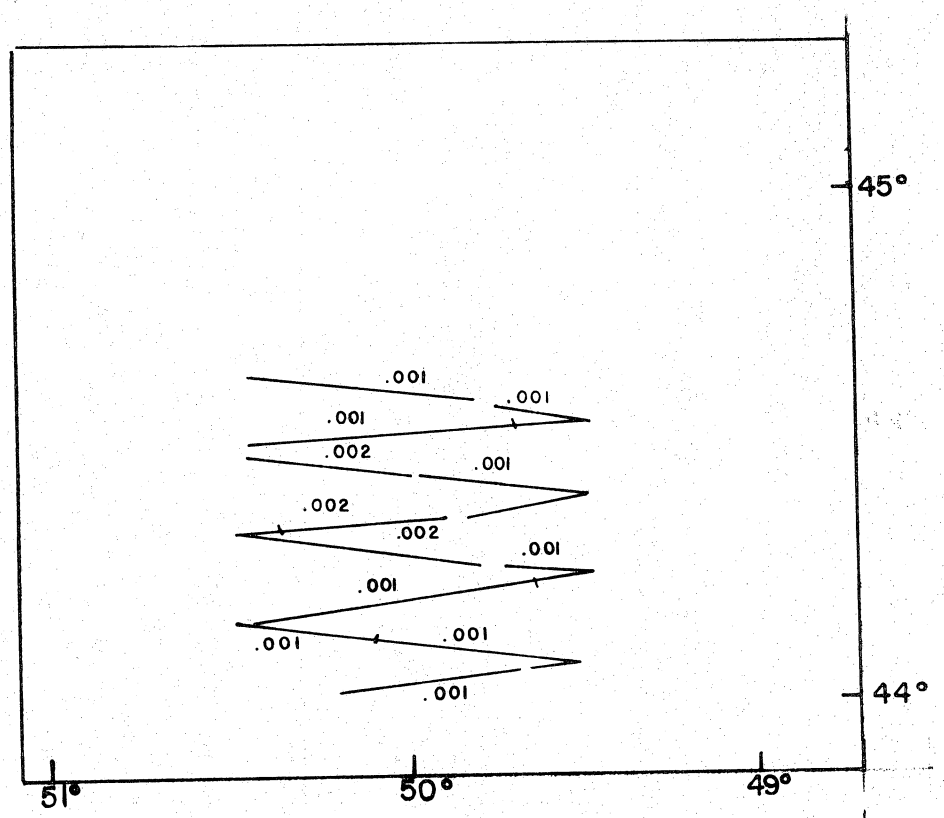


Fig. 7d. Acoustic survey track - Div. 3N.