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Summary of a Logbook Survey of the 1981 Inshore Capelin Fishery in Divisions 3KL

by

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Introduction

Prior to 1970, capelin caught on the east coast of Newfoundland (Div. 3KL) were used for bait, fertilizer, and locally-consumed food products. A commercial offshore fishery directed at capelin commenced in 1972 and dominated landings in Div. 3KL until the fishery in Div. 3L was closed in 1979 and in Div. 3K in 1980. Capelin landed by the inshore fishery in the 1970's were used for fish meal and food. Inshore catches approached 10,000 mt in 1976 and have increased dramatically between 1978 to 1981 reaching 28,000 mt (Table 1). The main impetus for the increase from 1978 to 1981 has been the Japanese roe market for frozen female capelin.

The inshore capelin fishery in Newfoundland is prosecuted by fixed gear (trap, beach seines, cast nets) and mobile gear (purse seine) fishermen. The majority of landings are from Div. 3L and more specifically from Trinity and Conception Bays (Table 1). The closure of the offshore fishery and the rise in catches by the inshore fishery have necessitated a closer examination of the activities of the inshore fishery.

A logbook survey of the 1981 capelin fishery was conducted to address several needs. The first was to collect catch/effort data which may be employed in lieu of catch/effort data from the offshore fishery. Information from logbooks may also provide minimum estimates of the rate of discarding and of the amount of by-catch. Further logbooks may present insights into capelin distribution in the inshore areas during spawning season. Finally logbook surveys permit direct contact with fishermen and should facilitate obtaining their cooperation in the future for other requirements such as collecting biological samples.

Materials and Methods

In 1980 the capelin fishery was designated a limited entry fishery requiring all full-time capelin fishermen to obtain capelin licenses. In the spring of 1981 using the list of licensed capelin fishermen in 1980, a telephone and/or mail survey was conducted to contact purse seine fishermen in Div. 3KL and fixed gear fishermen residing in Bonavista Bay-section 12, Trinity Bay-section 18, Conception Bay-section 21, and the Southern Shore-sections 24, 25 and 26 (Fig. 1). In this study all licensed fixed gear fishermen in the above statistical sections were asked to participate in the survey. The decision to fully cover one part of each bay as opposed to randomly choosing fishermen throughout Div. 3L was taken to reduce the time and effort required to contact fishermen.

Fishermen were interviewed by telephone or else responded to a questionnaire. Logbooks were mailed to each fisherman to record their activities. Each fisherman or a member of the family was personally contacted in the fall of 1981 to assess the response to the logbook survey and to collect completed log records. All records were completed on a voluntary basis.

Purchase slips provided by Economics Branch were scrutinized to compile landings for fishermen who participated in the survey. Using landings in 1979 and 1980 from purchase slips, additional fixed gear fishermen were chosen to include in the 1982 survey.

Results

The initial response to the survey by fishermen has been encouraging. Of 97 mobile gear fishermen and 119 fixed gear fishermen who received logbooks, and fished in 1981, the return rates are 63% and 70% respectively. These results were calculated employing the formula

$$\text{return rate} = \frac{\text{no. logbooks returned}}{\text{no. contacted - no. did not fish capelin}} \times 100$$

using data given in Tables 2 and 3. Included in the 'Logbooks Returned' column were fishermen who did not catch any capelin or an insignificant amount (<1 mt). Two of the four purse-seiners who did not catch any capelin were from the Southern Shore and the remaining two were from Notre Dame Bay and Bonavista Bay. Of 25 fixed-gear fishermen who failed to land any capelin, 11 were from Bonavista Bay, 4 from Trinity Bay, 2 from Conception Bay, and 8 from the Southern Shore.

Entries from purse-seine logbooks have been divided into four categories according to the quality of the information which they contain (Table 4). There were 26 logbooks with sufficient documentation to assess the amount of discards in proportion to landings. Discards in this sense are defined as quantities of capelin either released alive over the headrope or dumped dead after the haul was completed. Five purse-seiners noted that discarding occurred but either no amounts were given or the information was incomplete. Six seiners used separators aboard their vessels to selectively choose females. It was not possible to estimate how much capelin was discarded from these vessels. Eight fishermen either used purchase slips to fill out their logbooks or failed to indicate if any capelin had been discarded. In general landings estimated by fishermen are higher than were recorded on purchase slips. This difference is partially due to variation in estimation aboard vessels and to discrepancies in landings by some fishermen compared to what was recorded by Economics Branch.

Fixed-gear landings were divided by gear type (trap or seine) and by area. Fishermen who recorded days fished and the number of times traps were checked per day were used in this analysis. Due to incomplete records 3 trap fishermen in Trinity Bay and 1 trap fisherman in Conception Bay were excluded from this analysis. The number of beach seine fishermen who completed logbooks was quite small. Therefore no breakdown of their activities was presented here.

Discarding

Discards were estimated for purse seine and capelin trap fisheries utilizing entries in the logbooks. Discards expressed as a % of landings was 37% (1,604,336/4,363,491 x 100) for 26 seiners in Table 4 and 33% (417,692/1,280,954 x 100) for 35 trap fishermen in Table 5. It was impractical to differentiate between discarding of live capelin and dumping of dead capelin with any degree of reliability. From the comments in the 'Remarks' section of the logbooks, the vast majority of discards was released alive from purse seines and traps.

The seiners included in this analysis had good logbooks which appeared complete and contained information on the amount of capelin discarded. It was more difficult to choose the trap fishermen. Those indicated in Table 5 had logbooks with reasonable data and most indicated how much capelin was discarded. Because of the difficulty in finding criteria to include fishermen in the analysis, the estimate for discarding was considered a minimum value.

Several reasons were reported for discarding capelin. Of the many given in the logbooks, the most frequently reported for both purse seine and trap fisheries were 1) low percentage of females, 2) incidence of redfeed, and 3) females of a small size (Table 6).

Catch/effort

Logbook records were analyzed to estimate catch/effort for mobile and fixed gear summarized in Table 7. In considering the 26 purse seiners who reported discards (Table 4), 23 logbooks had entries with the number of searching days and sets made per day. Some records had daily entries from the opening to the closure of the season. The majority were complete from the first day a set was made until the fishery closed. Therefore catch/effort based upon days searched is a maximum estimate, whereas effort defined as number of sets is reasonably sound. The 23 purse seiners included in this analysis spent 16.4 days on average searching for capelin and made 30.7 sets per vessel. To compile the catch/effort data for fixed-gear fishermen, all fishermen who reported the number of days fished and number of times the traps were checked were included in the analysis. It was very difficult to breakdown the records according to information quality as was done for the purse seine logbooks. Thus for this initial survey all fixed-gear fishermen were assessed. It is anticipated that the quality of information will improve now that these fishermen have participated in the 1981 survey. Further improvements to the logbook design and to the list of instructions should simplify keeping records. Using Tables 5 and 7, Trinity Bay traps were fished for 9.4 days and checked 10.9 times; traps located in Conception Bay were fished for 19.3 days and checked 19.6 times; and traps along the Southern Shore were fished 15.0 days and were checked 8.8 times. These were probably underestimates since the majority of fishermen did not make any entries in the logbooks until capelin were caught. Despite the shortcomings in the data, the catch/effort of traps in Conception and Trinity Bays were generally similar while those on the Southern Shore were lower. The higher catch/effort in the former two areas corresponded to where landings were highest (Table 1).

Other information

The level of by-catch of cod in traps as reported in the logbooks was negligible (Table 5). Other species in the by-catch were flounder, squid, and salmon which were rarely caught.

The logbooks may provide insights into the distribution of capelin within the bays during the spawning season. Currently distribution maps are being prepared based upon the search information and landings. Such distribution maps could be used as field evidence to support aerial surveys of capelin distribution and to depict the inshore movements of capelin.

Conclusions

Information from logbooks may be used to determine the behaviour and trends of the inshore fishery and spawning capelin at a time when it would be very difficult to monitor with existing research capabilities. More specifically this first analysis of the inshore capelin fishery in Div. 3KL demonstrates that estimates of catch/effort, rate of discarding, landing trends, and capelin distribution can be obtained from this type of data collecting system. Catch/effort indices from the inshore fishery are required for SCAM models (Carscadden and Miller 1979) to offset the gap which has occurred with the closure of the offshore capelin fishery. It is anticipated that some form of standardization will be required to continue the time series between the offshore and inshore fisheries. The amount of discarding was a serious problem with the 1981 capelin fishery (Anon. 1982) and may continue to be in the future. Thus a logbook survey with some method to verify observations would serve to monitor discarding.

There are several assumptions involved in using this data. The two major assumptions are that fishermen will continue to maintain logbooks and that entries are reasonably accurate. The validity of logbook entries can be verified to some extent by comparing landings from logbooks to those recorded on the purchase slips. In this instance landings from purse seine logbooks were 20% higher than those from purchase slips (Table 4). Similarly landings recorded by trap fishermen from Trinity and Conception Bays were 13% higher than indicated on purchase slips (Table 5). Considering rounding errors and obvious problems in missing purchase slips for some fishermen, the fishermen's estimates are reasonably good. Logbooks may be validated in the field by having observers aboard some of the commercial purse seiners and by periodic checks of some fixed-gear fishermen.

Other problems associated with incomplete records due to misinterpretation of instructions, format of the logbook sheets, and inadequate baseline information from fishermen concerning their fishing methods will be rectified for 1982. Logbook sheets have been modified somewhat to facilitate recording information. Instructions will be more detailed and fishermen who were involved in the 1981 survey will have had experience with this type of record keeping. Information concerning fishermen who shared landings, the plants where capelin were landed, and the dates when fishing began and ended regardless of catches will be obtained to enable us to locate purchase slips and to better estimate search and/or fishing time. It is obvious that some of the catch/effort data in Table 7 is very rough, especially those pertaining to traps. Since traps are the dominant fixed-gear employed in the fishery, special attention will be directed towards improving these records.

In 1982, the program will be expanded to include statistical sections 15, 16, and 17 in Trinity Bay and statistical section 22 in Conception Bay (Fig. 1). The current statistical sections covered in Bonavista Bay and the Southern Shore will be maintained. All purse seiners will be receiving logbooks prior to the 1982 fishery. In the areas that were covered in 1981, only fixed-gear fishermen who responded positively to the survey last year will be involved in the 1982 survey. Fixed-gear fishermen in the additional statistical sections have been contacted to solicit their cooperation in 1982. They were chosen on the basis of being full-time fishermen who had fished capelin since 1979 and whose landings were reasonably good. A maximum of three fishermen were chosen from each community in these four statistical sections.

It is anticipated that the information from the logbook survey will be important in future assessments of the Div. 3L capelin stock. Considering the area that has to be covered in a 3-week period when the spawning populations are inshore, logbooks provide a practical, inexpensive means of monitoring the fishery.

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Table 1. Capelin landings (mt) by area, 1974-81, as reported by Economic Services Branch (1982). The 1981 landings have been updated.

Year	Div. 3L					Div. 3L Total	Div. 3K Total
	Bonavista Bay	Trinity Bay	Conception Bay	Southern Shore	Trepassey and St. Mary's Bays		
1974	1,287.5	2,286.5	310.1	790.5	185.6	4,860.2	1,030.9
1975	149.8	960.4	463.3	645.7	12.6	2,186.8	750.5
1976	97.9	4,954.0	2,061.7	644.8	54.2	7,812.6	1,676.0
1977	126.5	4,817.6	3,744.4	7.2	9.8	8,705.5	2,135.9
1978	351.3	3,386.6	3,573.5	116.7	10.1	7,438.2	2,422.0
1979	761.5	3,300.3	8,070.2	117.6	31.5	12,341.1	671.3
1980	1,711.4	5,029.0	7,089.6	323.5	360.5	14,514.3	1,354.0
1981	3,567.0	9,314.0	10,723.0	66.0	847.0	24,517.0	1,803.0*

* preliminary

Table 2. Logbook survey of the purse-seine fishermen who fished in Div. 3KL and had 1980 licences.

Area of Residence	No. Contacted	Logbooks Returned	No Logbooks Filled out	Did Not Fish Capelin	No Response*
West Coast	2			2	0
Northern Peninsula	2			1	1
White Bay	7	3	1	2	1
Notre Dame Bay	16	9		3	4
Bonavista Bay	12	9		3	0
Trinity Bay	37	17	3	6	11
Conception Bay	19	9		2	8
Southern Shore	2	2	0	0	0

* have not sent in their completed logbooks

Table 3. Logbook survey of the fixed-gear fishermen who fished in Div. 3L and had 1980 licences.

Area of Residence	No. Contacted	Logbooks Returned	No Logbooks Filled out	Did Not Fish Capelin	No Response*
Bonavista Bay	25	17	2	3	3
Trinity Bay	40	24	2	5	9
Conception Bay	35	22	4	3	6
Southern Shore	19	11		2	6

* have not sent in their completed logbooks

Table 4. Total purse-seine landings in 1981 from logbooks and from purchase slips for four levels of information based on the quality of the logbook records. Details are explained in the text.

	Landings per Logbook (kg)	Discards per Logbook (kg)	Landings per Purchase Slip (kg)	No. of Fishermen
Complete Records	4,363,491	1,604,336	3,398,540	26
Incomplete Records	843,457	36,286+	577,300	5
No. Discards Reported	1,634,585		1,420,929	8
Onboard Separators	1,596,142		1,618,353	6

Table 5. Total capelin trap landings in 1981 estimated from logbook and purchase slip records.

Area	Landings Logbook (kg)	Discards Logbook (kg)	Landings Purchase slips (kg)	Cod Bycatch (kg)	No. of Fishermen	No. of traps
Trinity Bay	332,874	120,145	264,555[1]	495	14	15
Conception Bay	926,592	256,534	849,979[2]	4,925	17	21
Southern Shore	21,488	41,013	not available	354	4	5

[1] no purchase slips for 4 fishermen

[2] unable to separate trap and beach seine landings for 1 fisherman

Table 6. The % contribution by weight for reasons given for discarding capelin in 1981.

	% Contribution by weight					
Locality	Redfeed	Small ♀'s	Plants Blocked No Sale	Low % of ♀'s	♀'s Picked Out	Not Given
Traps						
Trinity Bay	43	25	12	2		18
Conception Bay			36	50	12	2
Southern Shore		42		54	3	
Purse-seines						
Notre Dame and White Bay	10			83		7
Bonavista Bay	71			29		
Trinity Bay	29	23	4	40		3
Conception Bay	18	4		33		45

Table 7. Catch/effort data for purse-seine and trap fishermen estimated from the 1981 logbook survey.

Locality	Gear type	No. days fished	No. sets made	No. times trap checked	Landings logbook (kg)	Landings + Discards logbook (kg)
3KL	purse-seine	376	707		10,901/day 5,797/set	14,784/day 7,862/set
Trinity Bay	trap	141		163	2,361/day 2,043/check	3,213/day 2,779/check
Conception Bay	trap	405		411	2,288/day 2,254/check	2,921/day 2,879/check
Southern Shore	trap	75		44	287/day 488/check	833/day 1,420/check

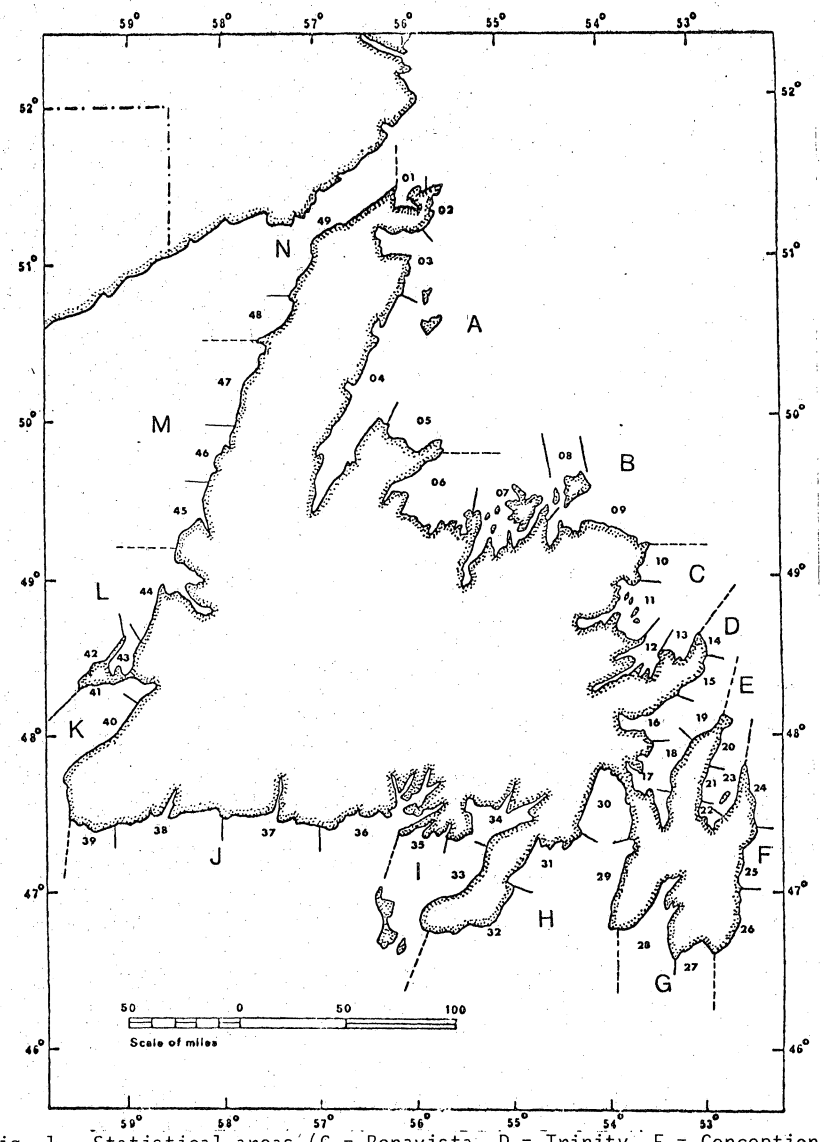

Fig. 1. Statistical areas (C = Bonavista, D = Trinity, E = Conception, F = Southern Shore) and sections (numeric) in the Newfoundland Region.