KILLINIQ FISHERIES PROJECT

PHASE II

MAKIVIK CORPORATION
RESEARCH DEPARTMENT

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Cover Photo : "Bradley Jeremy" at sea near Killiniq

Photographer : Fritz Axelsen

Major funding and technical support for the Killiniq Fisheries Project, Phase II was provided by the ministère de l'Agriculture, des Pêcheries, et de l'Alimentation du Québec.

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SUMMARY

This report describes the program and presents the results of Phase II of the Killiniq Fisheries Project, undertaken in 1984. The goal of the Project is to investigate the feasibility of re-establishing an inshore marine fishery in northeastern Ungava Bay. Phase I, in 1983, was primarily an exploratory survey for groundfish using static gear. Atlantic cod (Gadus morhua) were taken in potentially commercial concentrations from the waters immediately adjacent to Killiniq Island and several other species observed were deemed to warrant further attention.

Major funding for Phase II was provided by the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec with additional funding from Makivik Corporation. Funding for some specific program components was also received from the Department of Fisheries and Oceans, Employment and Immigration Canada and the Department of Indian Affairs and Northern Development.

The Phase II program was composed of two major components; an experimental commercial fishery based on the Atlantic cod resource located during Phase I; and further exploratory efforts to be directed at species and areas not fully addressed in the Phase I program. A number of secondary components were designed to investigate specific aspects of the fishery including the collection of basic biological data on potentially commercial species, and the sampling and analysis of the feeding habits, stock affinity and degree of parasitism of the Atlantic cod resource. Additionally, specialists from MAPAQ were brought in to study the operational and cost efficency of harvesting methods and to investigate shore processing options and infra-structure requirements.

One 12.2 meter multipurpose longliner and two smaller open trap boats were brought to the site for the Phase II program. As in Phase I, lingering sea-ice delayed the start of the program until after the middle of August. Activities continued at the site until early October.

The concentration of Atlantic cod located in close coastal waters in 1983 did not materialize in 1984, possibly due to lower seawater temperatures. As a result, catches in the experimental commercial fishery were unimpressive. A small amount of salted cod in several product forms was put on both the southern and northern markets to test the response. In both markets quality was judged to be high, however at present, any sizeable market for salted products in the North would seem to be limited to the larger regional centers. Overall, there was a higher interest in unsalted products expressed in the northern communities.

As in the experimental fishery, catches of Atlantic cod in exploratory efforts were patchy and indicative of low concentrations. Some interesting catches of Greenland halibut (Reinhardtius hippoglossoides) were observed in the deeper waters off the northern Labrador coast but this resource may be beyond the effective operational range of inshore vessels based at Killiniq. Iceland scallops (Chlamys islandica) were surveyed opportunistically and, while no commercial concentrations were located, the species seemed widely distributed over the study area.

Other interesting results of the Phase II program included confirmation that Atlantic cod in this area are essentially free of codworm. Two other parasitic nematodes were found prevalent in the livers of cod, however, ruling out further consideration of cod liver as a potential product at Killiniq. Meristic studies in 1984 confirmed that Atlantic cod at Killiniq are aligned with the cod stocks further south along the Labrador coast.

The overall results of Phases I and II indicated the need to undertake another season of developmental study in the Killiniq area. Phase III of the project was completed in the 1985 season. Reports on the biological results of Phases II and III (Allard and Gillis, 1986) and the final Phase III project report (Gillis and Allard, in prep.), incorporating the results of all Phases, are available under separate covers.

A. INTRODUCTION

In 1983, the Killiniq Fisheries Project was established to investigate the feasibility of re-establishing, in the Killiniq area (Figure 1), a commercial inshore marine fishery, to be operated by native people (Makivik Corporation, 1982). The backdrop for the present project, including the current movement toward commercialization of renewable resources and the long history of commercial fishing activity in the Killiniq area in particular, has been described in the report on Phase I (Gillis and Allard, 1984).

Phase I was primarily an exploratory survey of the marine fishery resources, principally groundfish, which might be available within a reasonable operational radius of a fishery based at Killiniq (Figure 2). Atlantic cod (*Gadus morhua*) were known to frequent several specific inshore locations in the area, but the further extent of their availability into Ungava Bay and from the northern Labrador coast had not been rigorously tested. Additionally, it was considered possible that other species, such as Greenland halibut (*Reinhardtius hippoglossoides*), which were known to be available from the offshore areas on both sides of the Torngat peninsula (Makivik Corporation, 1982), might be available on a commercial basis to an inshore fishery in the area. Two multipurpose fishing vessels, 12m and 17m in length, were used in Phase I to begin to address these questions. The opportunity was taken to collect biological information on the resources encountered, and a major training component for Inuit fishermen was incorporated in the program design.

Operationally, the study area proved to be a generally difficult setting for the deployment of static fishing gear, which were primarily bottom gillnets (Gillis and Allard, 1984). Lingering sea ice, strong set and tidal currents in many exposed areas and heavy fouling by seaplants in some protected sites all took their toll on operational efficiency in the early part of the Phase I program. The situation, however, improved markedly with experience as Phase I progressed. Nevertheless, it became clear that

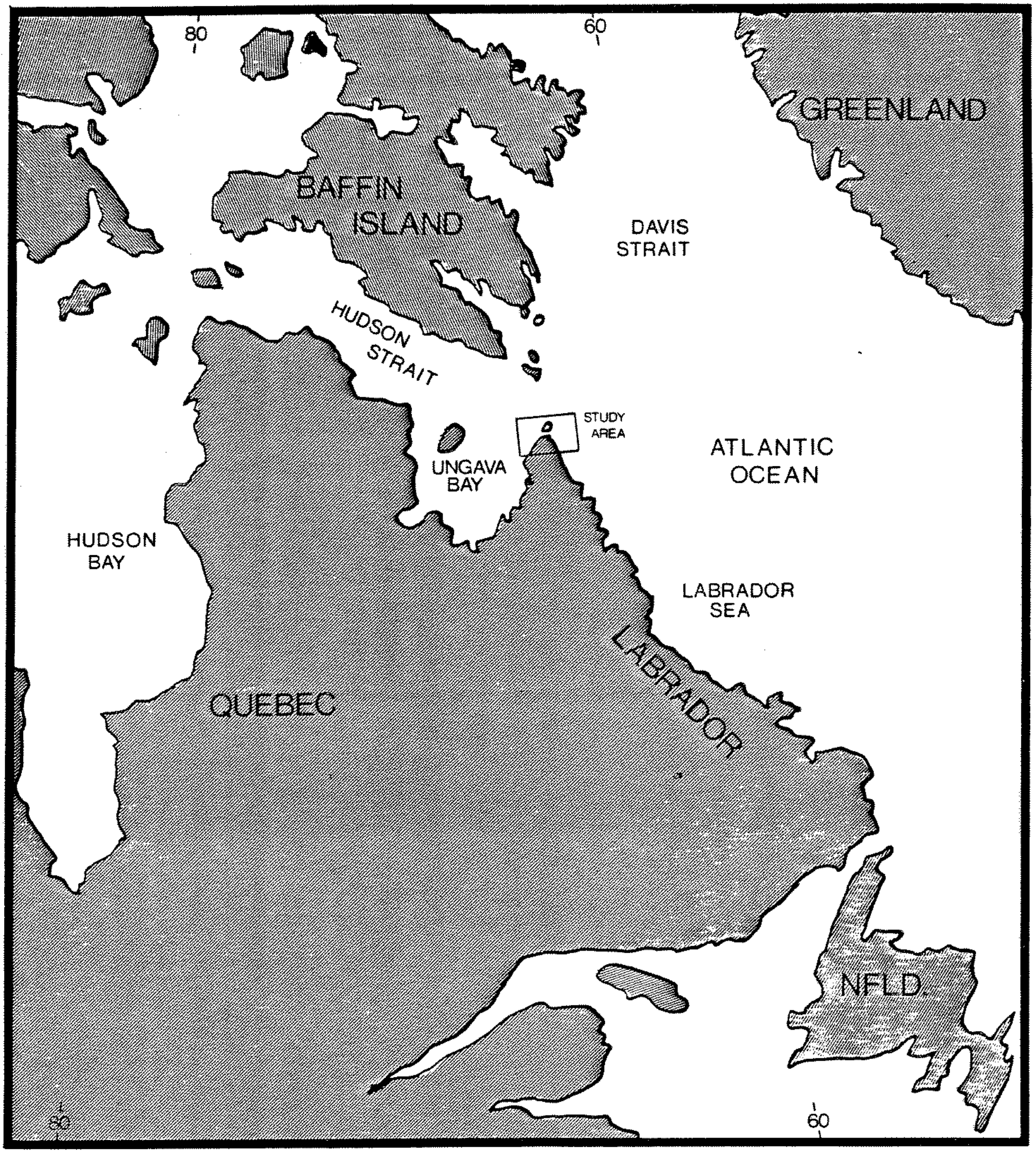

Figure 1. NORTHWEST ATLANTIC AND SOUTHEAST ARCTIC WATERS

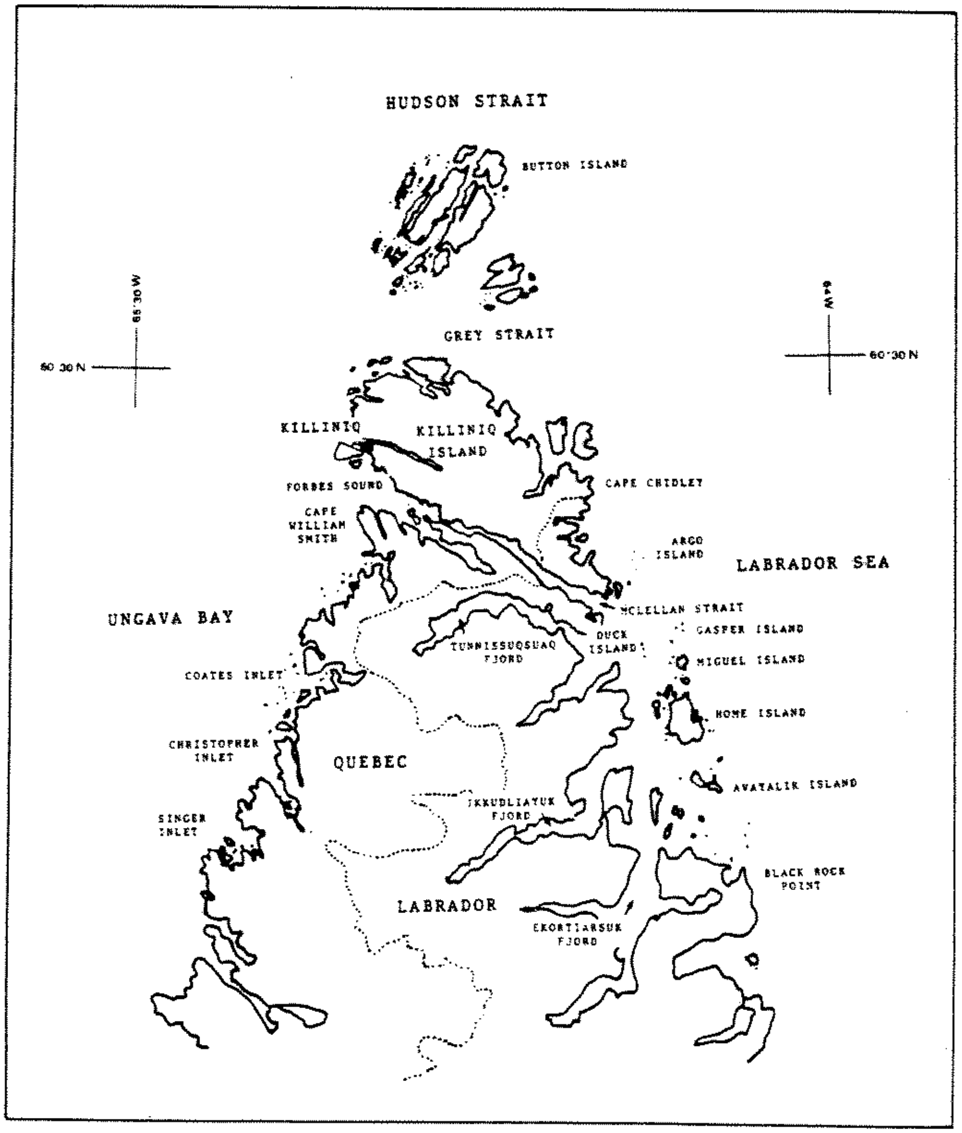

Figure 2. KILLINIQ FISHERIES PROJECT STUDY AREA

adaptation of the gear and its operation would be important in the development of a successful fishery in this area, particularly for static gear.

From a resource standpoint, Atlantic cod in apparently commercial concentrations had been located immediately adjacent to the Killiniq site. Atlantic cod had also been caught south of Killiniq in Ungava Bay but in limited numbers and before the concentration at Killiniq was found. Similarly, efforts that proved unsuccessful on the Labrador coast before the discovery of the resource at Killiniq were not repeated because of time limitations (Gillis and Allard, 1984). In addition, the high incidence of benthic scavengers seriously affected the quality of our catches. Thus, in 1983, some very good fishing was experienced, but questions remained concerning the temporal and spatial extent of the resource.

Biological studies in Phase I showed that significant changes had occurred in the Atlantic cod stock since the only previous biological study in the period 1947 to 1950 (Grainger and Dunbar, unpublished), and the developing stages of the previous fishery in the early to mid 1960's (R. Buffitt, pers. comm). Mean individual rate of growth had apparently increased by approximately 30% with the result that the fish available at Killiniq in 1983 were of a uniformly large size and widely regarded as a superior raw material for a range of products.

No other resources were encountered in Phase I in apparently commercial quantities. Only a few Greenland halibut were recorded, doubtlessly as a result because of the extreme inshore location of most of the fishing effort. A few Iceland scallops (Chlamys islandica) were picked up, both clamped on longline hooks and tangled in gillnet webbings, and it was recommended that this species be the target of some directed survey effort (Gillis and Allard, 1984).

The elements of the Phase II program were selected and designed to address a number of issues arising from the results and experiences of Phase I (Makivik Corporation, 1984a). There were two primary components. The first was an experimental fishery based at Killiniq to test, under conditions approximating a commercial strategy, those Atlantic cod resources identified during Phase I. The second major component was further exploratory fishing focusing on areas outside the radius of the experimental fishery at Killiniq.

Training and familiarization of Inuit fishermen with all aspects of the fishery operation, which had gone very well in Phase I, was to be stepped up in 1984, and Inuit fishermen were heavily involved in both major program components.

Within the framework of these two major components, a number of secondary components were designed to address specific issues. The collection of basic biological measurements was continued (Makivik Corporation, 1984b). In addition, rigorous studies of the feeding, stock affinity and degree of parasitism in Atlantic cod were included in Phase II. Owing to the obvious importance of suitably adapted gear and fishing techniques, a gear specialist from MAPAQ observed all aspects of the operation first-hand with a view to making, and implementing where possible, recommendations to increase the operational and cost efficiency of harvesting. Another MAPAQ specialist in processing and its attendant infrastructure also became involved to make recommendations for the developing fishery.

Most of the funding for Phase II of the Killiniq Fisheries Project was negotiated with the Government of Québec, specifically the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ). Funding for the core program was completed by Makivik Corporation. Additional funds were received from Fisheries and Oceans Canada for biological research and from Employment and Immigration Canada and the Department of Indian Affairs and Northern Development to assist in the training and familiarization of Inuit fishermen.

This document is the complete and only final report on Phase II. Owing to the delay in its completion, several preliminary summaries and reports covering aspects of the program have been issued. Where any discrepancy is found between results given in a preliminary format and those of this report, the information herein should be considered correct.

The organization of this report reflects the compartmentalized structure of the Phase II program. The reports of a number of specialists who dealt with specific components are attached as appendices, and although they are introduced and summarized at the appropriate places in the main text they stand as citable documents in themselves. This report presents the results of the two major components of the program as well as a number of the secondary ones and concludes with a general discussion of all the results.

B. METHODOLOGY

1. General Approach

Phase II of the Killiniq Fisheries Project was composed of two major elements; an experimental fishery for Atlantic cod and an exploratory survey for additional commercializable marine resources.

The experimental inshore fishery was established to operate in the immediate area of Killiniq (Figure 3). Two open trap boats were brought in to work a selection of inshore gear including gillnets, hand jigs and a cod trap. Catches of Atlantic cod were split and heavily salted in the fish plant at Killiniq, following standard commercial techniques, and sold at the completion of the project.

The exploratory survey was conducted within the original study area boundaries established for Phase I (Figure 3). A 12.2 m multi-purpose longliner was chartered from southern Québec for this work. Attention was focused on groundfish, particularly Atlantic cod, in areas not adequately surveyed the previous year. Standard commercial cod gillnets were the primary gear deployed although a considerable amount of hand jigging was done. Catches of Atlantic cod were split and lightly salted on board, and were stored until they could be transferred to the Killiniq plant at the conclusion of each trip. Surplus vessel time, whenever available, was directed at searching for Iceland scallops, using two standard "Digby" type scallop dredges.

The documentation of all fishing activities was complete. In addition, basic biological measurements and samples were obtained from the commercial species. Several special studies were also undertaken during Phase II. A gear specialist from MAPAQ observed all phases of the fishing operation with a view to recommending improvements in the harvesting methodologies. A production specialist from MAPAQ studied the question of processing and processing facilities at Killiniq, mainly to determine what changes would be required in the future to meet the needs of the fishery.

As in Phase I, Inuit fishermen and workers were involved in all aspects of the operation, further preparing them to eventually design and operate their own fishery.

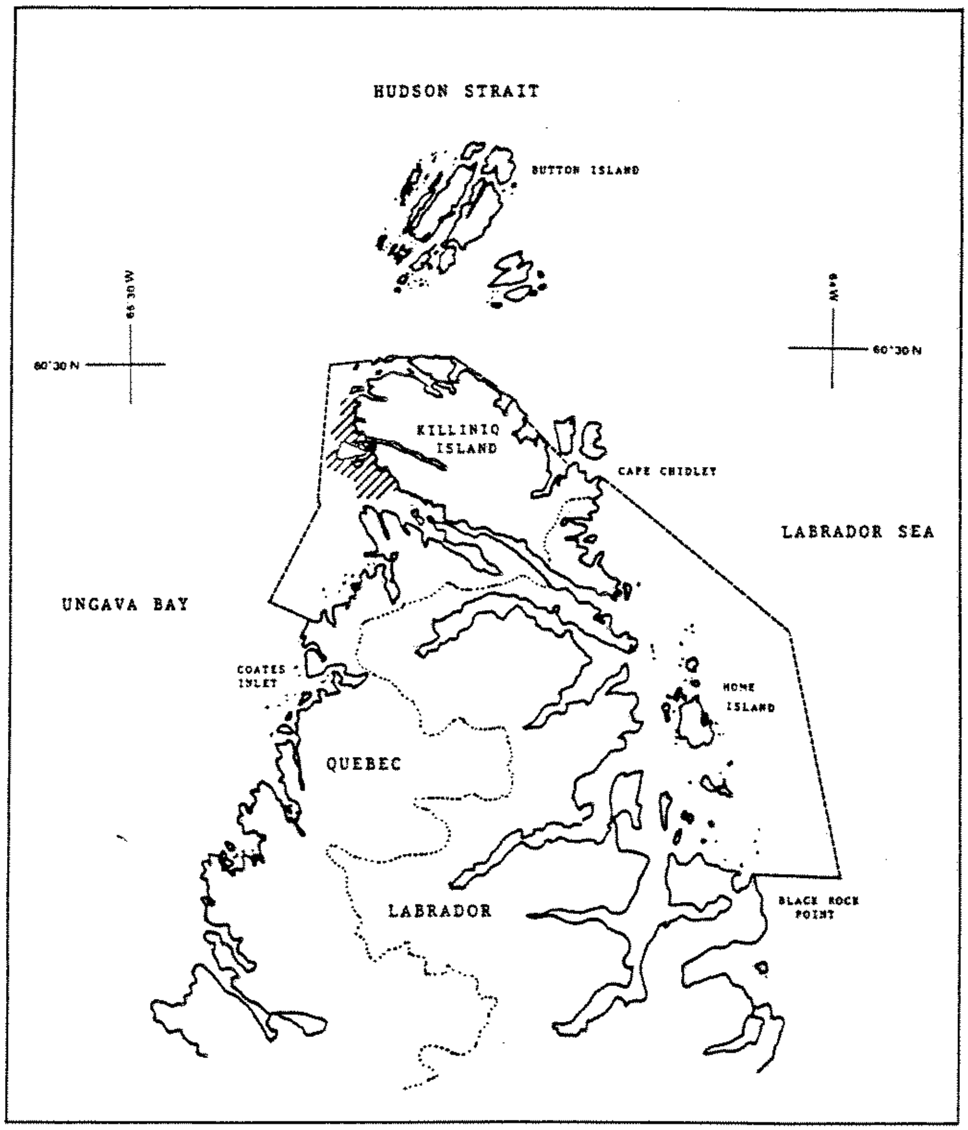

Figure 3. APPROXIMATE OPERATIONAL LIMITS OF EXPERIMENTAL FISHERY (SHADED) AND EXPLORATORY SURVEY (DASHED LINE) COMPONENTS OF KILLINIQ FISHERIES PROJECT, PHASE II

2. Detailed Methods

a) Study Area Description

In Phase II the study area remained basically the same as in Phase I, although additional effort was directed at the north and east coasts of Killiniq Island. The seaward extent of the study area was effectively the safe operational limit for a single 12.2 m vessel in these waters. Thus, most project activities took place within 5 nautical miles of the outermost islands. The land areas in the vicinity (photo 1) are described in the report on Phase I (Gillis and Allard, 1984).

b) Materials and Equipment

(i) Vessels

Three vessels were brought to the site for the Phase II field program. The "Bradley Jeremy" of Chevery, Québec (photo 3) is a multipurpose longliner, 12.2 m in length, which was utilized primarily in exploratory fishing for groundfish and scallops. Features and equipment on this vessel are described in Table 1.

The other two vessels were outboard-powered trap boats, the "Kanayuk", of 9.6 m length, and the "Burwell Pride", of 7.8 m length (photo 4). "Kanayuk" was used primarily in the experimental fishery (photo 5) while "Burwell Pride", was used for many miscellaneous exploratory, technical and scientific tasks in the area of the base at Killiniq. These two trap vessels are described in Table 2.

TABLE 1 - DESCRIPTION OF CHARTERED SURVEY VESSEL
KILLINIQ FISHERY PROJECT - PHASE II

Vessel	FV Bradley Jeremy CFV 8702
Type	Longliner/gillnetter (cabin forward)
Dimensions	12.2 m (40') x 3.9 m (12'8")
Draft	1.5 m (5')
Home Port	Chevery, P.O.
Captain	Willie-Dan Ransom
Crew	Keith Buffitt Steve Strickland Stevenson Shattler
Call Sign	VD 6860
Motor	120 hp John Deere Acadia
Fuel Capacity (litres)	675 litres (150 gallons)
Range (hours)	37 hours
Speed (knots)	10.0 kn.
Hold Capacity (kg)	9,072. Kg (20,000 lb.)
Electronic Equipment	- 1 radar, 24 mile, Decca - 1 depth sounder Furuno FE 600 - 1 Cybernet VHF radio - 1 Cybernet CB radio
Fishing Equipment	- 15" gillnet gurdy, stand and roller - 30 gillnets + staff buoys & net buoys including : - 20 - 140 mm - 10 - 152 mm
Survival Equipment	- life raft, 6 man - aluminum boat + 4.5 hp. Johnson

Project Equipment on Board - FV Bradley Jeremy	
Electronic	- 1 HF radio Hull 922 - 1 satellite navigation system, NAV-STAR 601S - 1 weather facsimile radio, Alden Mark IV - 1 electronic balance MSI Seaweigh
Fishing Equipment	2 scallop drags, "Digby" buckets with teeth
Other	6 survival suits

TABLE 2 - DESCRIPTION OF SMALLER VESSELS USED DURING PHASE II OF KILLINIQ FISHERY PROJECT

	KANAYUK	BURWELL PRIDE
Type	Trap boat	Trap boat
Dimensions	9.6 m x 2.4 m (31.6' x 8')	7.8 m x 1.7 m (25.6' x 5.6')
Draft	.9 m (3')	.7 m (2.3')
Home Port	Lourdes de Blanc Sablon, Qué.	Chevery, Qué.
Owner	Alexandre Dumas	Raymond Buffitt
Motor	55 hp Mariner commercial	55 hp Evinrude Commercial
Misc. Equipment	Honda mini gurdy hauler	
Project Equipment	- FE 400 Furuno depth sounder - SBX 11A HF trail radio	- FE 400 Furuno depth sounder - SBX 11A HF trail radio - Auto jigger
Duties/Tasks	- used mainly in experimental fishery, some scientific work and exploratory jigging with hand lines	-scientific work, auto jigging + handline -checking gear for exploratory program : . trammel nets . experimental nets . cod trap . lobster pots

(ii) Equipment

As in Phase I, a wide range of fishing gear was used during Phase II. The gear and the amount or number of each available are listed in Table 3. While all the gear was deployed at least once, commercial cod gillnets were the prevalent gear used in both exploratory and experimental commercial fishing in Phase II. Further details concerning some of the gear and their operation may be found in the report of Fritz Axelsen and Arthur Mauger of MAPAQ, which forms Appendix G of this report.

In addition to the standard tools and instruments for basic biological and environmental measurements, a bathyothermograph was used to monitor water temperature profiles.

c. Operations

(i) Project itinerary

Planning for Phase II field studies began early in 1984. Procurement of materials and other concrete arrangements commenced on May 23 immediately after the funding structure was ratified. The major events in the course of the project from this point on are listed chronologically in Table 4.

In spite of the fact that only 3 weeks were available to procure the seasons supplies, the sealift was assembled and ready to load at the Ministry of Transport Coast Guard Base Québec by mid-June. At it turned out, not all the material could be loaded on board the CCGS "Des Groseilliers" as intended. Remaining items, including the two trap vessels, were consigned to the CCGS "Pierre Radisson" to depart in late July for the Arctic. The "Des Groseilliers" called at Killiniq on July 4 and offloaded its consignment by helicopter. The "Pierre Radisson" followed on August 3 but was only able to unload some gasoline in barrels. No safe method to unload the heavy trap boats was available because of nearby ice. The "Pierre Radisson" departed Killiniq and on August 6-7 transferred its remaining consignment to the "Des Groseilliers" at sea. On August 15, the "Des Groseilliers" was able to put the trap boats in the water near Killiniq, and they were sailed into the site. The remaining cargo was landed by helicopter at the same time (photo 2).

The chartered survey vessel, "Bradley Jeremy", departed Chevery, Québec, on July 24 and had arrived unimpeded in the vicinity of Home Island, Labrador, by August 2. There, the vessel was delayed by lingering sea ice (photo 2) around Killiniq Island until August 11 and 12 when it was able to sail around the island via Grey Strait (Figure 2). The detailed itineraries of

TABLE 3 - LIST OF FISHING GEAR AND SCIENTIFIC EOUIPMENT
USED DURING PHASE II OF KILLINIO FISHERY PROJECT

	AMOUNTS	TYPE OF GEAR
FISHING GEAR		
	80	Cod Gillnets
	12	Trammel Nets
	17	Experimental Nets
	1	Cod Trap
	6	Handlines and Jigs
	2	Autofisher
	2	Lobster Pots
	2	Scallop Drags
SCIENTIFIC EOUIPMENT		
	1	Bathyothermograph

the vessel on the northbound and southbound trips are given in Tables 5 and 6, respectively. See Figure 4 for the key to location numbers given in these tables.

Inuit project workers and their families arrived at Killiniq on July 15, travelling, as in the previous year, along a strip of open water up the northeastern coast of Ungava Bay, which was maintained by prevailing southerly winds. The first of the southern project team arrived on July 26 and 27, and base preparations went quickly and smoothly. Major site improvements for Phase II included installation of a fresh water supply line and distribution system for the living areas, construction of a fish drying chamber in the main plant building and renovation of the processing side of the main plant (A-1, Figure 5) to meet current standards for saltfish production (photo 9).

TABLE 4 - PROJECT ITINERARY
KILLINIQ FISHERY PROJECT, PHASE II

DATE	ACTIVITIES
1984 :	
May 23 - July 24	- preparation for field studies
June 14-15 July 15 July 4	- load cargo aboard CCGS "DesGroseilliers" - load materials aboard CCGS "Radisson" - CCGS "DesGroseilliers" unloads at Killiniq
July 15	- Inuit arrive at Killiniq
July 24	- chartered vessel "Bradley Jeremy" leaves Chevery
July 26-27	- Makivik personnel Kuujjuaq - Killiniq
August 2	- chartered vessel "Bradley Jeremy" arrives Home Island area
August 3	- CCGS "Radisson" unloads fuel supply only and leaves
August 6	- exploratory fishery starts - CCGS "Radisson" transfers cargo to CCGS "DesGroseilliers" (at sea)
August 12	- chartered vessel "Bradley Jeremy" arrives at Killiniq
August 15	- CCGS "DesGroseilliers" unloads transfered cargo at Killiniq
August 22	- ice leaves Killiniq area
August 23	- experimental fishery starts
August 30	- MAPAQ personnel arrive at Killiniq
September 22	- MAPAQ personnel leave Killiniq aboard "Bradley Jeremy"
September 26-October 2	- snowstorm
October 3	- Inuit leave Killiniq
October 6	- exploratory fishery ends
October 7	- chartered vessel "Bradley Jeremy" leaves Killiniq
October 9	- experimental fishery ends
October 10-19	- base demobilization
October 17	- chartered vessel "Bradley Jeremy" arrives at Chevery
October 19	- Makivik personnel leave Killiniq aboard CCGS "Radisson"
October 25	- CCGS "Radisson" arrives at Québec City
November 3	- saltfish sold in Gaspé
November 15-January 30	- lab analysis
1985 :	
February 1-April 30	- data analysis and draft report preparation

The exploratory fishing program began intermittently on the Labrador coast on August 6 while the "Bradley Jeremy" awaited clear passage to Killiniq. Efforts resumed on August 15, but ice conditions precluded effective exploratory fishing until August 22. The experimental fishery was started the following day.

Project activities continued at a high rate until late September. A contingent from Employment and Immigration Canada visited the project in early September. Personnel from MAPAQ, who had arrived on August 30, departed by longliner to Kangiqsualujjuaq on September 22. Several other project staff departed over the next several days, leaving the Inuit project workers and a reduced southern staff to continue the experimental and exploratory fisheries as far into October as possible. The first major snow storm of the season started on September 26 and abated on October 2. As a result of the weather, the Inuit project members departed by canoe on October 3 to deliver their families back to Kangiqsualujjuaq before further inclement weather set in. Efforts in the exploratory fishery were continued for several more days but in view of the return trip to the Gulf of St. Lawrence and deteriorating local weather conditions, the exploratory program was suspended on October 6, and the experimental fishery several days later.

The "Bradley Jeremy" departed Killiniq on October 7, and proceeded uneventfully to Chevery, arriving October 17 (Table 6, Figure 4). The small remaining project staff continued to monitor several fleets of nets near Killiniq for a few days, however on October 9 the experimental fishery was terminated because of continuing low catches and marginal operating conditions. Over the next 9 days, the remaining project staff demobilized and winterized the base in preparation for departure. On October 19, CCGS "Pierre Radisson" loaded the salted cod produced during Phase II, a small southbound consignment of miscellaneous cargo and the remaining project staff and departed southbound, arriving at Québec City on October 26. Materials and personnel were dispersed immediately.

TABLE 5 - CHARTER VESSEL'S VOYAGE ITINERARY, NORTHBOUND
KILLINIQ FISHERY PROJECT, PHASE II

DEPARTURE			ARRIVAL			STEAMING HOURS
Location	#	Date/time	Location	#	Date/time	
Chevery	1	July 24/6:30	La Tabatière	2	July 24/11:00	4:30
La Tabatière	2	July 24/12:00	St. Paul's River	3	July 24/19:00	7:00
St. Paul's River	3	July 25/5:55	L. de Blanc Sablon	4	July 25/8:30	2:35
L. de Blanc Sablon	4	July 25/10:00	Battle Harbour	5	July 25/19:10	9:10
Battle Harbour	5	July 26/5:00	Domino Harbour	6	July 26/15:15	10:15
Domino Harbour	6	July 27/3:30	Smokey Tickle	8	July 27/16:00	12:30
Smokey Tickle	8	July 28/4:00	Makkovik	11	July 28/15:30	11:30
Makkovik	11	July 29/3:35	Nain	14	July 29/21:30	17:55
Nain	14	July 30/10:00	Okak Bay	15	July 30/21:45	11:45
Okak Bay	15	July 31/3:25	Big Island	17	July 31/12:05	9:40
Big Island	17	Aug 1/3:50	Seven Island Bay	19	Aug 1/14:30	10:40
Seven Island Bay	19	Aug 2/3:45	Ikkudliayuk Fjord	20	Aug 2/14:30	10:45
Ikkudliayuk Fjord	20	Aug 3/10:30	* Home Island (area)	21	Aug 3/21:30	11:00
*Home Island (area)	21	Aug 11/9:30	Bush Island	22	Aug 11/16:45	7:15
Bush Island	22	Aug 12/6:30	Killiniq	23	Aug 12/9:30	3:00

* Aug 3 to 11 ... spent time in Home Island area changing harbours to avoid several large moving ice fields. Unable to navigate around Cape Chidley.

DURATION OF TRIP : 20 DAYS
TOTAL STEAMING TIME : 139:30 HRS

TABLE 6 - CHARTER VESSEL'S VOYAGE ITINERARY, SOUTHBOUND
KILLINIQ FISHERY PROJECT, PHASE II

DEPARTURE			ARRIVAL			STEAMING HOURS
Location	#	Date/time (EDT)	Location	#	Date/time	
Killiniq	23	Oct 7/8:20	Seven Island Bay	19	Oct 7/18:00	9:40
Seven Island Bay	19	Oct 8/15:00	Bigelow Bight	18	Oct 8/18:00	3:00
Bigelow Bight	18	Oct 9/6:30	Mugford Tickle	16	Oct 9/22:15	15:45
Mugford Tickle	16	Oct 10/6:10	Ford Harbour	13	Oct 10/19:10	13:00
Ford Harbour	13	Oct 11/6:15	Hopedale	12	Oct 11//17:45	11:30
Hopedale	12	Oct 12/6:23	Nuinguaq Bight	10	Oct 12/14:05	7:42
Nuinguaq Bight	10	Oct 13/6:25	Sloop Cove (Cape Harrison)	9	Oct 13/11:05	4:40
Sloop Cove (Cape Harrison)	9	Oct 14/8:05	Smokey Tickle	8	Oct 14/13:25	5:20
Smokey Tickle	8	Oct 15/6:10	Black Tickle	7	Oct 15/17:10	11:00
Black Tickle	7	Oct 16/8:00	La Tabatière	2	Oct 17/12:25	28:25
La Tabatière	2	Oct 17/14:00	Chevery	1	Oct 17/18:30	4:30

DURATION OF TRIP : 11 DAYS
TOTAL STEAMING TIME : 114:53 HRS

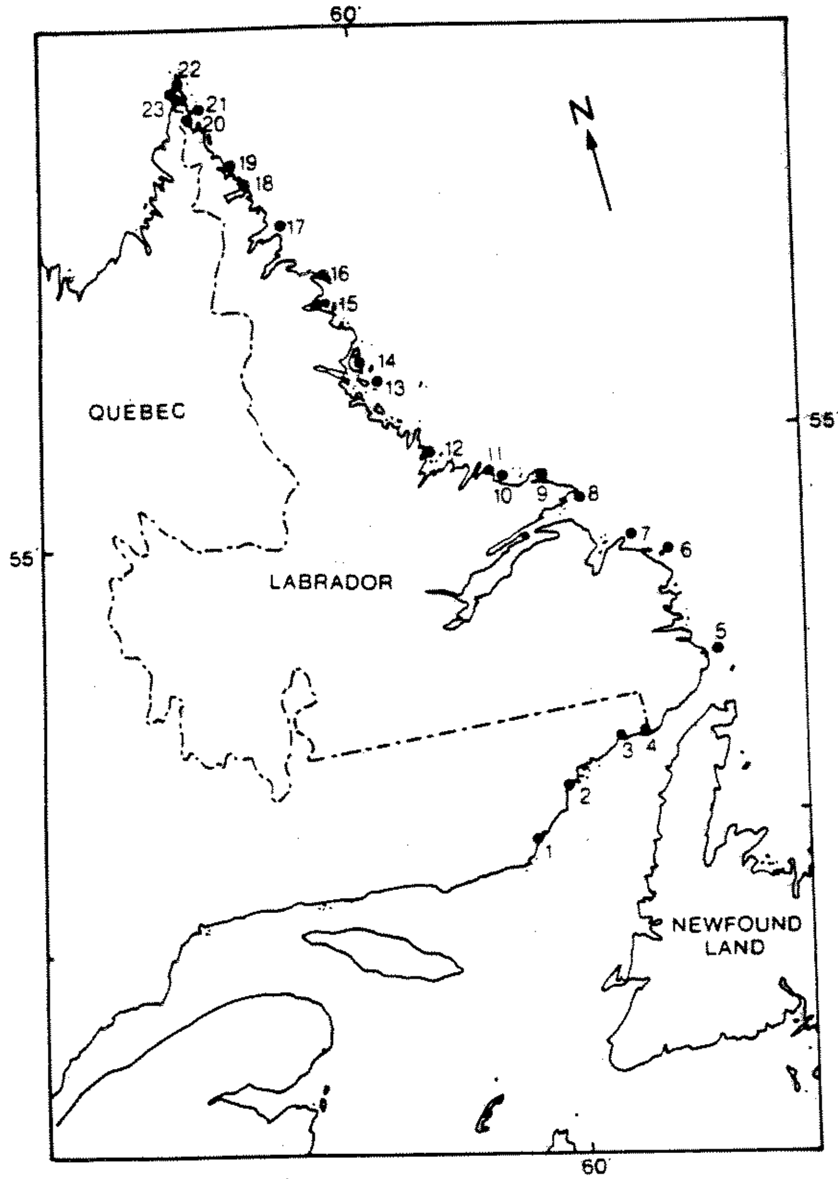

Figure 4. NORTHBOUND AND SOUTHBOUND WAYPOINTS, F.V. BRADLEY JEREMY, KILLINIQ FISHERIES PROJECT, PHASE II

Samples retained from the season's studies were sorted and sent for analysis in November. Proofing of data and preliminary data work-up proceeded, and in the spring of 1985, preparation of the draft report commenced. Completion of the final report was delayed by the start of Phase III.

(ii) Survey and sampling procedures

The primary focus of exploratory efforts during Phase II was groundfish in the inshore and mid-offshore sections of the study area (Figure 3).

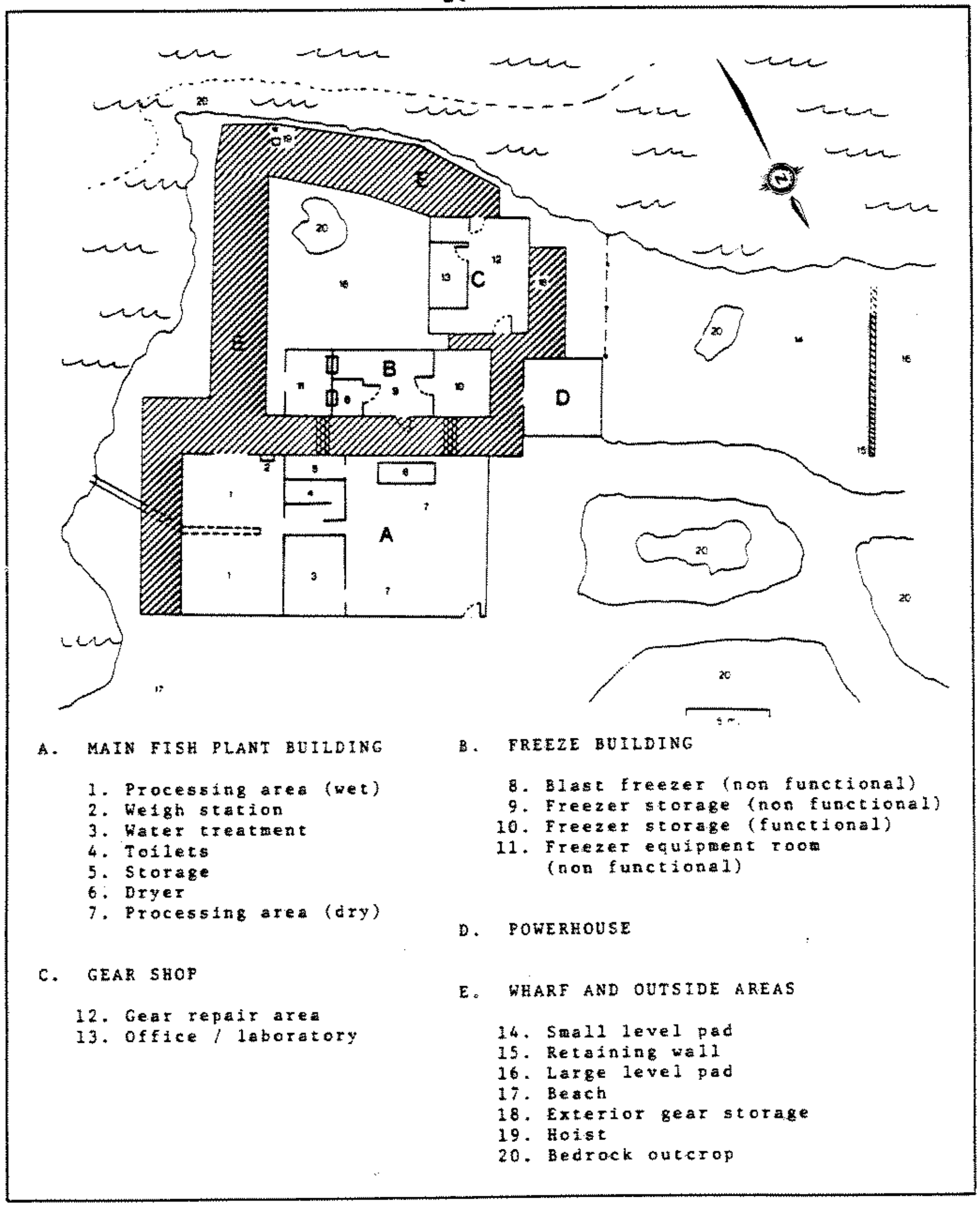

Figure 5. KILLINIQ FISHPLANT SITE, KILLINIQ FISHERIES PROJECT, PHASE II

Standard commercial cod gillnets, ranging from 114 mm to 178 mm (stretched) mesh size, and several types and sizes of hand jigs, with a variety of accessory lures and artificial baits, were the predominant gear utilized. Based on the experience gained during Phase I, fishing sites were not predetermined but rather chosen carefully after assessing the area. Area coverage was achieved by focusing efforts in smaller segments of the study area on a trip-by-trip basis. Trips normally lasted from four to six days. Day trips from the Killiniq base were found to be more convenient than staying out overnight so long as the target area was within 1 to 1½ hours steaming time from the base. Except in unusual circumstances, gillnets were set one day and retrieved and moved the next. A number of day-sets of several hours duration were made in the initial period of the program while the threat of ice persisted. Bad weather sometimes delayed retrieval of gear after only one night. The longest duration recorded was 4 nights, due to persistent high winds.

Hand jigging was found to be a useful method of spot checking for Atlantic cod. Typically, from two to four jigs were used per set, for a minimum of 5 minutes. At this point, if no fish had been landed, the location would usually be abandoned for another. Jigging sessions at any one location were sometimes extended up to an hour, depending on the returns. On several occasions, gillnet set locations were chosen based on jigging results, although in Phase II, it was found that good jigging did not necessarily result in good gillnet catches at the same location.

Time not otherwise occupied with groundfish explorations was usually directed at Iceland scallops. Time often became available toward the end of a survey day or, in some cases, when weather prevented retrieval of nets in exposed locations but did not impede dragging in protected waters. Under such opportunistic conditions, a structured survey program was unfeasible. Tow durations varied from 4 to 47 minutes, although the average was 26.9 minutes of bottom time. The "Bradley Jeremy" was not equipped in Phase II with a winch for scallop dragging. The gear was towed with a 100 fm. length of 5/8" polypropylene rope and retrieved with the gillnet gurdy. Consequently, the maximum depth which could be towed effectively, while maintaining a warp ratio of 3:1, was approximately 30 fathoms (photo 7).

The experimental fishery was established to reflect as closely as possible the results of a commercial fishery. Therefore, decisions about the spatial extent of the operation, the amount of gear utilized and the sites fished at any particular time were, by and large, to be made by the project team assigned to this section of the study based on criteria used by commercial fishermen, i.e effort vs. returns. Since the inshore migration did not materialize, there was a considerable deviation from this principle. A minimum of 3 nets were deployed to monitor the situation at a level of overall cost effectiveness that few commercial operators would have endured on any sustained basis. Nevertheless, other aspects of this operation were treated as if it were a commercial venture, including production (see section iii). Record-keeping was simplified so that only the essential information such as daily catch and daily effort with an approximate indication of gear position, was recorded and biological sampling of these catches was reduced to a non-disruptive level.

For every exploratory effort with any gear, detailed records were kept of the gear amounts, types and sizes, the precise location, times and durations, water depths and gear damage. Each potentially commercial species in the catch was counted and weighed. For commercial species, the frequency of lengths was recorded to the nearest centimeter, for each sex. Random subsampling was performed only where large catches dictated.

Additional basic biological data from commercial species were collected through detailed autopsies of individuals selected to cover the range of observed lengths. Routine autopsies included total length to the nearest millimeter, round fresh weight to the nearest 100 grams, sex, and state of maturity. Otoliths, or scales in the case of Atlantic salmon (Salmo salar), were removed and retained for age determinations. In a reduced number of fish, some additional measurements and/or samples were retained depending on the species. These cases included; livers, stomachs and vertebral counts from Atlantic cod, stomachs from Greenland halibut, gonad weight from salmonids, and edible muscle weight from individual Iceland scallops.

A technique was worked out experimentally to count the vertebrae in Atlantic cod in the field using fresh samples. Several complete vertebral columns were cleaned by removing as much flesh as practical with a sharp knife and then placing the semi-cleaned skeletons into a lobster trap for some days, so that zoobenthic scavengers could finish the cleaning. These vertebral columns became useful reference material.

In initial attempts at counting the vertebrae in fresh samples, it was found that much labour was involved in exposing the first few vertebrae from the dorsal side and it was difficult to determine the first (fused) vertebrae. On the other hand, the first few vertebrae were very easily exposed from the ventral side by cutting away a thin layer of tissue covering the hind brain and the top of the spinal column. From this angle, vertebrae could be easily counted as far as the posterior end of the body cavity. The solution adopted was to combine the best of the two approaches. The sample was prepared by gutting the fish in the standard fashion and removing the gills. The side fillet was then removed, cutting as close to the backbone as possible and extending the cut posteriorily to the base of the caudel fin rays. This cut would expose all but the first few vertebrae. Passing the knife blade lightly along the length of the column at this point ensured that the tops of all the vertebrae were exposed. The first few vertebrae were then exposed from the ventral side as explained earlier. The first (fused) vertebra was clearly visible. After counting ten or so vertebrae from the ventral side, the tip of the knife was inserted along the posterior edge of the last vertebra counted until it was clearly visible from the top, from which angle the count was resumed to completion. Feeling for the protruding lip between each pair of vertebrae with the tip of the knife was found to be a useful aid to the visual count in the last quarter of the column, especially in smaller fish. Every vertebral column was counted independantly by at least two researchers. Where required, counts were repeated until researchers reached an agreement.

To promote the transfer of what was being learned from the project to the Killiniq group and to make the best use of the various experts involved while they were at the site, a series of meetings were held during the field period to discuss issues in the development of a fishery, such as : fishing vessel design and operations; fish processing and products; plant modifications; and training of Inuit workers and fishermen.

(iii) Production

As during Phase I, salted products were the only option available for the production of commercial fish products. Similarily, Atlantic cod was the only groundfish available in Phase II in sufficient quantity for commercial production.

Catches in the experimental fishery were brought intact directly to the plant, usually within 1 to 1½ hours of retrieval. There they were gutted and split for salting by the standard commercial technique. After a thorough cleaning in salt water (photo 9), the split fish were packed in layers alternating with salt, and cured for a total of 21 days. The pile was usually repacked after 10 days. Once cured, some of the product was dried in the drying chamber. The dried saltfish were skinned and deboned to produce dry salted boneless fillets and bags of smaller pieces. All these products were sent out for commercial sale and/or market and public response; most of the salt bulk fish and dried fish was carried south by the CCGS "Pierre Radisson" at the close of the season [section C.4.a.].

Catches from exploratory gillnets and jigging efforts during extended trips away from the base were split and cleaned onboard and packed lightly with salt in the hold of the longliner. This preserved the first days' catch for up to four days before it had to be repacked on a heavy bed of salt. Catches preserved onboard the "Bradley Jeremy" were not mixed with the regular input to the plant from the experimental fishery even though no significant difference in quality was noted.

(iv) Treatment of samples and data

The analysis of the various retained samples collected during Phase II was subcontracted to authorities in each field. Samples of Atlantic cod livers and viscera were studied by Dr. Mark Curtis of the Institute of Parasitology at the MacDonald College Campus of McGill University in Ste-Anne-de-Bellevue, Québec. Stomachs of Atlantic cod and Greenland halibut were sent to Dr. Max Dunbar at McGill University in Montreal, Québec, and a small sample of Iceland scallop shells were sent for age interpretation by Mr. Maurice Gaudet, a biologist at the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec Regional Laboratory at Sept-Iles, Québec. The methods employed by each of these specialists are presented in their respective reports, Appendices H, I, and K.

Otoliths of Atlantic cod and Greenland halibut were, as in Phase I, interpreted by Mr. Gérald Johnson, technician at the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec Regional Laboratory at Québec. For Atlantic cod, the otolith was sectioned transversely with a low speed ISOMET saw to expose the nucleus. The exposed face of one section was placed on a hot plate for a period of 15 to 20 seconds at a temperature in the range of 260°C to 480°C, depending on the size of the otolith. The burnt sections were then placed upright under reflected light and read with a microscope. Otoliths judged difficult to read were set aside and read a second time.

The Greenland halibut otoliths were submerged in a small watch glass containing equal parts of alcohol and glycerine and were read with a microscope using either reflected or transmitted light.

The small sample of Atlantic cod vertebra columns retained to verify the visual field counts were analysed by X-ray photography at the National Museum of Icythyology in Ottawa by Mr. Claude Renaud. Samples had most of the surrounding musculature removed in preparation for visual reading in the field and so required little additional preparation prior to the X-ray. Fish were "posed" as appropriate to make best use of the available 8" x 10" field. Since it usually required two or, or for large fish, three plates to photograph the length of each fish's vertebral column, stainless steel pins were inserted between vertebrae where required to accurately resume the count on sequential plates. The exposed plates were developed and the vertebrae counted (including the first (fused) vertebra and the urostyle) at the Museum by Mr. Renaud.

Salmonid scales and otoliths were interpreted at the Kuujjuaq Research Center. Salmon scales were soaked and cleaned in water before being mounted between two slides for reading under a dissection microscope. Arctic char otoliths were also read under a dissection microscope. Some otoliths required no special preparation while others were ground by hand using very fine (600 grade) waterproof sandpaper and water to make reading easier.

Other than that done by the various analysists for their respective reports, all data synthesis and computations, as well as the preparation of all figures, tables and text was done in the Montréal office of Makivik Corporation.

v) Alterations to proposed study design

The Phase II field program as presented in the funding proposals (Makivik Corporation, 1984 a,b) and the detailed sampling design submitted to MAPAO were generally accomplished. Inevitably, as with most field programs, some elements could not be completed, under the circumstances presented. All such deviations and omissions from the current program are identified below. While the project would have benefited from their successful completion, there were no changes or omissions from the Phase II proposed program which significantly changed the outcome of the year's work or the development process in the longer term.

The backbone of the operation, the experimental fishery at Killiniq, generally went according to plan in an operational sense although the cod resource by and large failed to materialize during the summer of 1984. Almost all fishing was done with gillnets. The cod trap was installed as soon as drift ice cleared the area, only to be severely damaged almost immediately by an iceberg. See section C.2.b (iii) for more details on the use of gears other than gillnets.

In view of the general lack of experience in the area vis-à-vis the operation of gear, and knowledge of the depth strata in the inshore waters, the exploratory fishing program was not designed on any geographically systematic basis. Such an approach was not very successful in Phase I (Gillis and Allard, 1984). In Phase II, the approach adopted was to identify sites and areas which could be fished effectively from an operational standpoint and to monitor these sites/areas accordingly based on catches observed. Given this approach, the exploratory program proceeded as planned, however, poor catches in all areas resulted in a bias of total effort toward the Labrador side on the assumption (later confirmed) that the Atlantic cod resource in Ungava is an extension of the north Labrador stock.

The basic biological sampling program and special biological studies were completed as planned with the exception of the cod tagging program which was cancelled due to the destruction of the cod trap.

The water temperature profiling program was cancelled due to mechanical failure of the bathyothermograph. However, some valuable measurements were provided to the project by Jack Fife, D.F.O., who was involved in an independant sampling program in the vicinity of Killiniq. These data, supplemented the Project's surface temperature measurements, did provide indications of temporal changes in temperature through the season (see section C.1.d).

All the other elements of the program including the gear evaluation, plant/processing assessment and plant upgrading components were completed as planned and are detailed in subsequent sections of this report.

C. RESULTS

1. Operations

(a) Sea ice

As in Phase I, lingering concentrations of sea ice influenced all Phase II activities during the base mobilization period and the early part of the sampling program. The pattern of clearing is shown in Figure 6. While, in 1983, the source of late-clearing ice was the Central Canadian Arctic, lingering ice in 1984 originated predominantly in Eastern Canadian Waters (Environment Canada, 1984). The local (near Killiniq) effects were similar in both years (see Gillis and Allard, 1984). An open corridor along the northeastern shore of Ungava Bay persisted through much of July permitting Inuit fishermen and their families to travel unimpeded to Killiniq at mid-month. Immediately after the first team of southern project staff arrived by floatplane on July 26 and 27, 1984, fields of ice returned to block all local waters until August 12. Clearing proceeded very slowly in the immediate Killiniq area (photo 2). No static gear was left overnight in adjacent waters until August 23. Fishing on the Labrador side (Figure 3) was free from risk of ice by August 20.

b) Weather

Meteorological measurements recorded by Ministry of Transport personnel at Killiniq for the active period of the Phase II field program are listed in Appendix 3 and summarized by month in Table 7. Unfortunately, wind measurements are not available for 1984. The trend in average temperatures, cooling through the period, is similar to that of 1983 (Gillis and Allard, 1984), though July and August 1984 were both slightly warmer than the previous year. After July, more precipitation was recorded during the 1984 field season compared with the previous year.

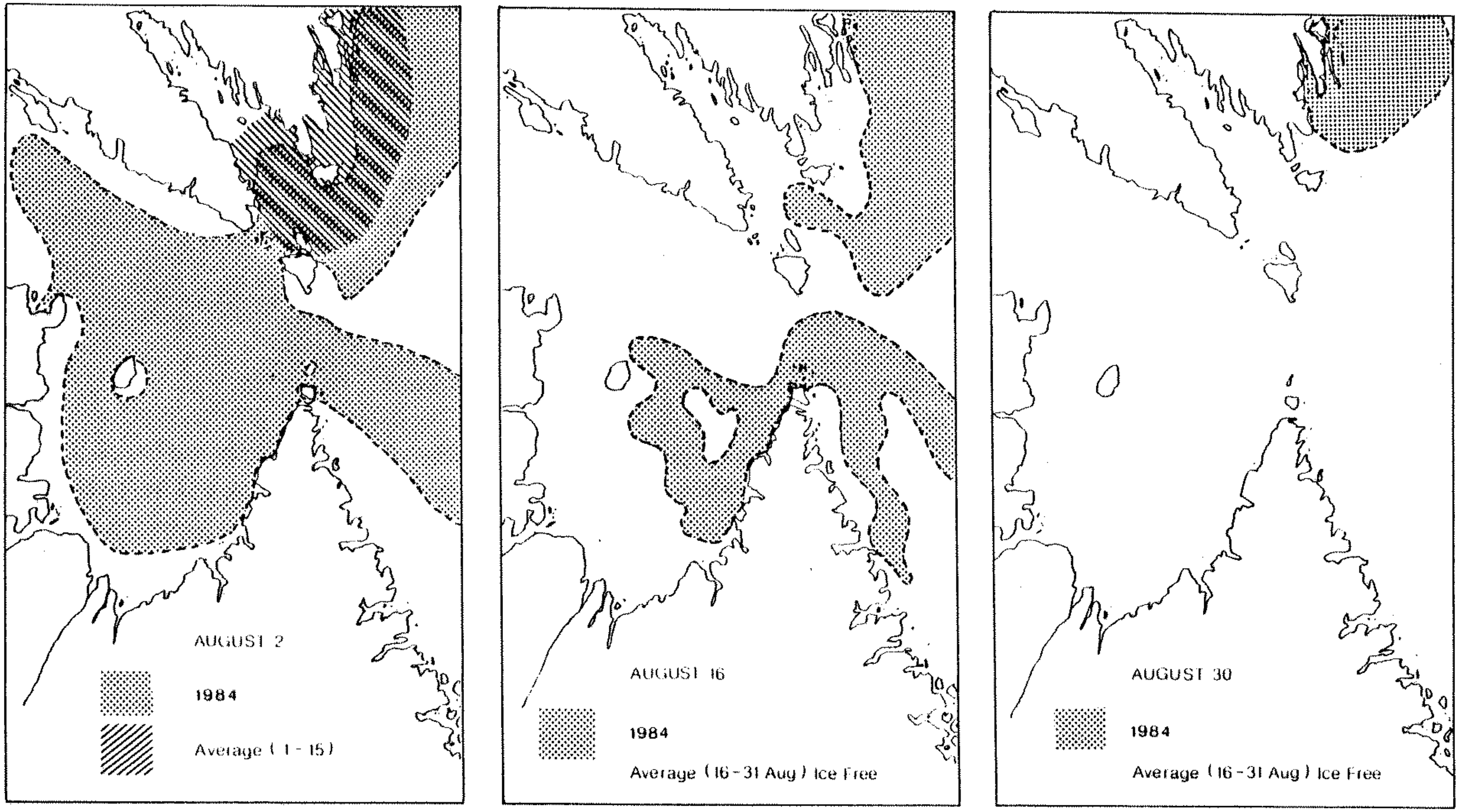

FIGURE 6. EXTENT OF ICE COVER PROHIBITIVE TO THE DEPLOYMENT OF STATIC FISHING GEARS (≤ 10% BY AREA) FOR 1984. ENVIRONMENT CANADA, 1984; FOR THE AVERAGE: UNITED STATES NAVAL OCEANOGRAPHIC OFFICE, 1968.

TABLE 7 - MONTHLY SUMMARY OF KEY METEOROLOGICAL PARAMETERS AT KILLINIQ JULY - OCTOBER, 1984 (Source : Environment Canada, Canadian Climatological Center) - KILLINIQ FISHERY PROJECT, PHASE II

PARAMETERS	JULY	AUG.	SEPT	OCT.*
Temperature : (# of obs. = 8 daily)	184	168	184	56
Mean Daily High (°C)	10.4°	8.9°	4.4°	1.6°
Mean Daily Low (°C)	2.9°	1.5°	0.6°	-1.1°
Overall Mean (°C)	6.7°	5.0°	2.5°	0.3°
Precipitation : (# of obs. = 1 daily)	23	21	23	7
Total (mm)	33.2	77.9	106.8	16.1
Snow (cm)	-	-	48.0	14.1
Days with more than 1 mm precipitation	6	11	13	5
Sea level air pressure (# of obs. = 4 daily)	112	112	112	31
Monthly mean (millibars)	1006.7	1001.4	1006.0	1007.8

* Last observations October 10, 1984

Overall, the weather until late September, during which time only 4 days were lost due solely to weather conditions, was quite favourable for fishing operations. A major storm broke on September 26 and continued for 6 days. The weather thereafter (to October 19) was variable and frequently windy.

(c) Tidal and Set Currents

The general characteristics of the hydrological features in the study area have been discussed in the report of Phase I (Gillis and Allard, 1984). Figure 7 is a representation of the surface set current pattern of the southeastern Canadian Arctic. Figure 8 is the actual tidal cycle (Canadian Hydrographic Service, 1983) at Killiniq during Phase II field studies. The annual peak amplitude of 7.1 meters on September 27 was in considerable contrast to the annual minimum amplitude of 1.8 meters, which had occurred just 7 days previously.

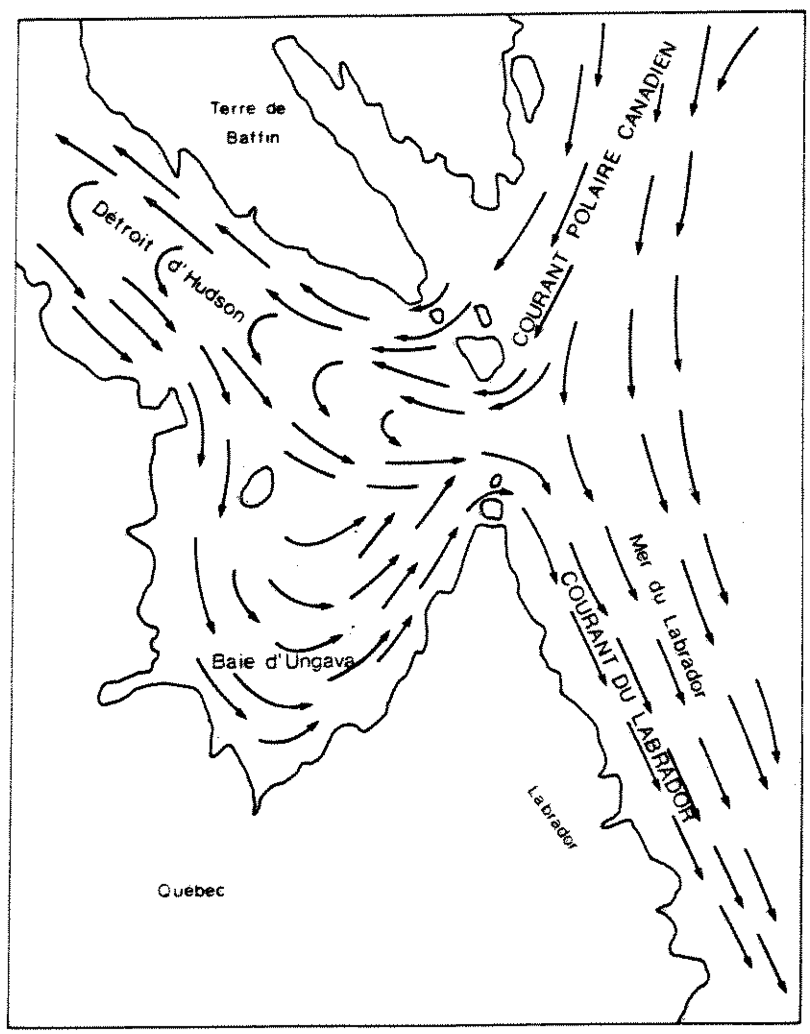

Figure 7. GENERAL SURFACE CURRENT PATTERN, SOUTHEASTERN CANADIAN ARCTIC WATERS (ADAPTED FROM DUNBAR (1951) AND GUSTAJTIS & BUCKLEY (1977))

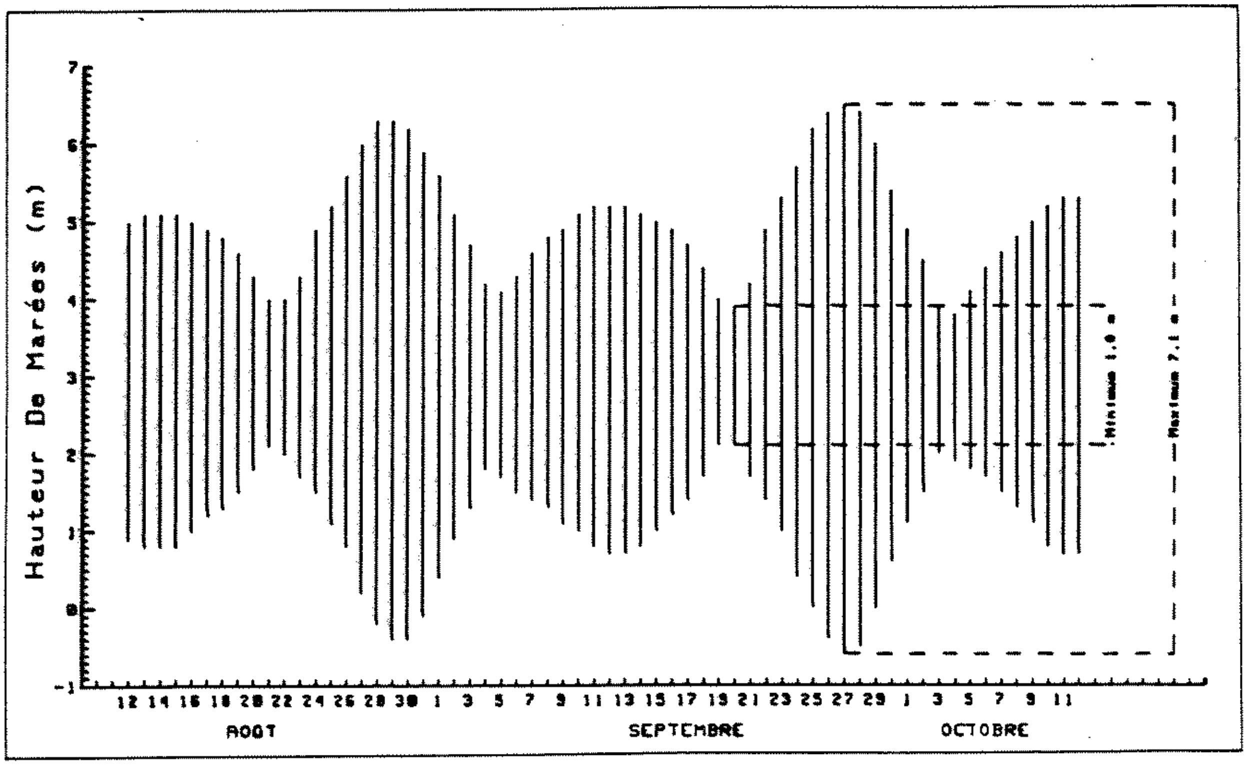

Figure 8. DAILY TIDAL AMPLITUDES AT KILLINIQ, AUGUST 12 - OCTOBER 12, 1984.

(d) Water Temperatures

The bathyothermograph used in Phase II was found to be not recording properly and so those data were not considered. In an independent study, Jack Fife of Fisheries and Oceans Canada observed that water temperatures in the immediate vicinity of Killiniq were quite constant throughout the column (J. Fife, pers. comm.), probably because of the mixing action of the tidal currents. On this basis, surface temperature measurements, near Killiniq at least, should be a good indicator of water temperatures throughout the water column. Four regular stations were established within the area of the experimental fishery to monitor water temperature. Surface measurements from these stations are given in Table 8.

TABLE 8. SURFACE WATER TEMPERATURES (°C) FROM THE IMMEDIATE KILLINIQ AREA, KILLINIQ FISHERIES PROJECT, PHASE II

	Station			
Date	1	2	3	4
August 25		1.8*	2.0*	
September 07	1.0	1.0		
September 13	1.5	1.1	1.2	1.6
September 21	2.2	2.2	2.2	2.2
October 03	1.0		1.0	
October 05	2.0	2.0	2.0	2.0
October 14	- 1.8	- 1.8	- 1.8	- 1.8

Key to stations :
1. Inner Burwell Harbour, 18 fm.
2. Outer Burwell Harbour, 25 fm.
3. Center of Munro Harbour, 30 fm.
4. Center of Fox Harbour, 15 fm.

* data provided by Jack Fife, DFO

The highest surface water temperature of the summer, 3°C, was recorded immediately in front of the fish plant at Killiniq on September 20. A number of surface temperature measurements at other locations in the study area were also recorded over the season but none of these exceeded 1.8°C. Water temperatures in the immediate Killiniq area seemed to be affected by high winds, particularly from the eastern quarter. A rise in water temperatures appeared to follow heavy easterly winds on several occasions both in Phase I and II. The water temperature in the Forbes Sound/Killiniq area is likely the result of a complex interaction of cold Arctic water from offshore Ungava Bay, the coastwise core of warmer fresh water flowing out of the large rivers in the south of Ungava Bay and the water which ebbs and flows from Labrador through the McLellan Strait and around Killiniq Island on each tide, all compounded by the effect of changing tidal amplitudes (Figure 8) and recent weather patterns. A series of surface water temperature readings was taken on August 25 on a transect from the narrowest point of the McLellan Strait (Figure 2), through the center of Forbes Sound to the south coast of Jackson Island when the tide was rising strongly (water was flowing east to west through McLellan Strait). Temperatures at six positions along this transect showed a steady increase from 0.4°C at the narrows to 2.0°C close to Jackson Island, indicating that at least under these circumstances, water pumped by tidal action through McLellan Strait from Labrador had a cooling effect on waters immediately adjacent to Killiniq Island.

While the details of the mechanism controlling water temperatures in this area are unclear, the overall effect in 1984 was quite clear. Water temperatures never reached those recorded in 1983 (4.5 + °C) but remained at 3°C or lower for the entire season.

(e) Operation of Gears and Vessels

M. Arthur Mauger, gear specialist for MAPAO, spent three weeks at the site during Phase II to observe the physical conditions of the area and the operation of the fishing gear and vessels being used, with a view to making recommendations for changes which would result in better adapted gear and increased harvesting and cost efficiency. His report is attached to this report as Appendix G.

2. Resources

(a) Experimental Fishery

The experimental commercial fishery based at Killiniq was operative from August 23 to October 9. Daily activity reports for this fishery are given in Appendix C. A total of 411 net-days of effort was spent in this fishery. The work was carried out almost entirely by the "Kanayuk" (see Table 2 and photo 5) with a total crew of 4, which, in the interests of Inuit training and experience, was a higher number than is usually necessary. Overall, the number of nets set averaged 8.7/day, but varied from 3 to 16 at any one time. Effort fluctuated in relation to expected return. Through the peak of the fishery (see below), a daily average of 11.5 nets (range 8-16) were used.

All potentially commercial catches from the daily reporting sheets are summarized in Table 9. Obviously, of the fish species, only Atlantic cod was taken in any significant quantity. Some records of non-commercial

TABLE 9. TOTAL RECORDED CATCH, EXPERIMENTAL FISHERY AT KILLINIQ, 1984

	Number	Weight
Atlantic Cod :		
Fresh	721	2668.1
Scavenged	53	196.1*
Lost	4	14.8*
Total	778	2879.0*
Other species :		
Greenland cod	4	
Thorny skate	1	
Atlantic salmon	1	
Arctic char	1	
Iceland scallops	3	
Harp seals	20	
Bearded seals	2	
Seal, unspecified	1	

* Weights generated from average of all fresh catch.

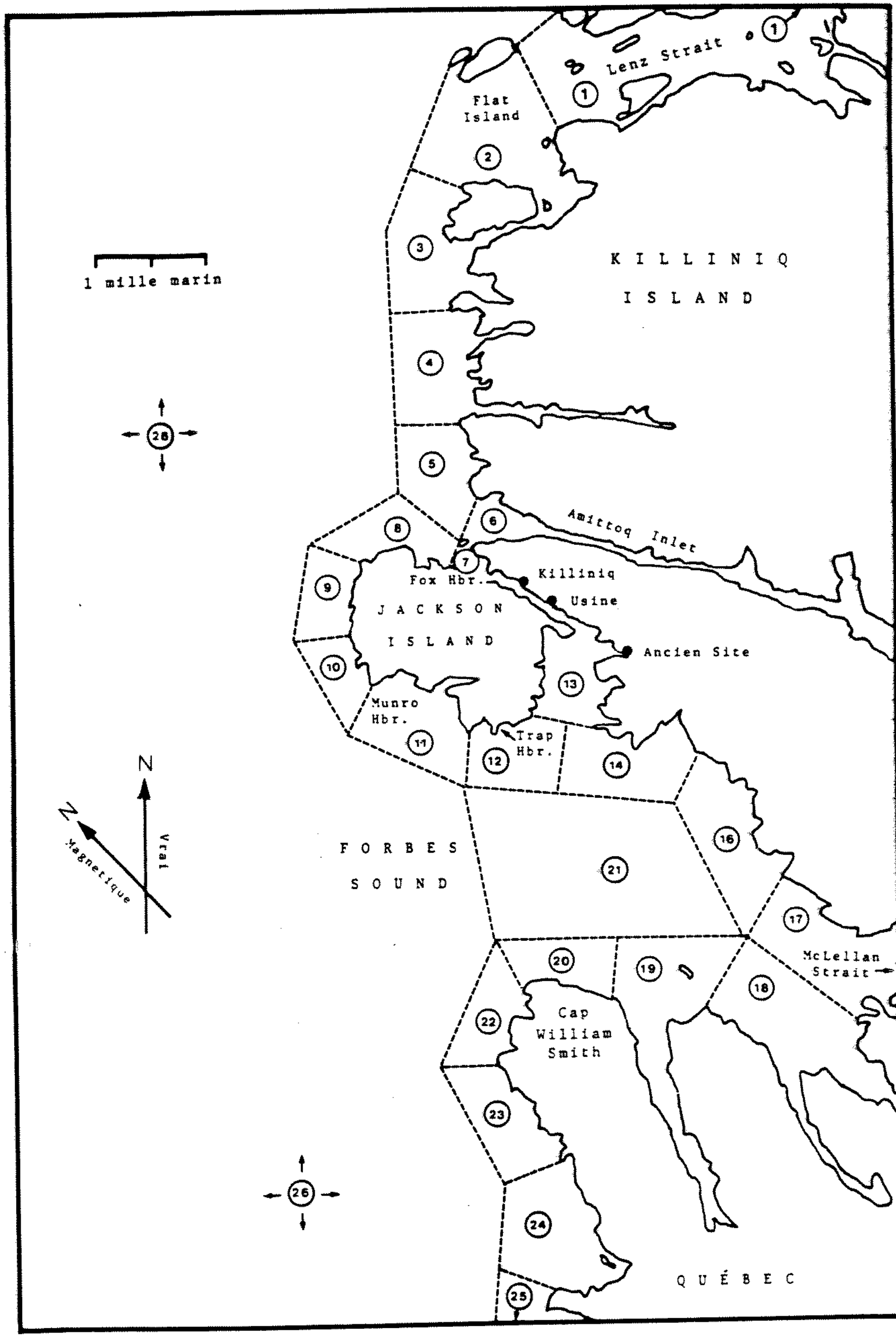

Figure 9. FISHING ZONES, EXPERIMENTAL FISHERY, KILLINIQ FISHERIES PROJECT, PHASE II

species, such as shorthorn sculpin (*Myoxocephalus scorpius*), and Hyas crab (*Hyas coarcticus*), were recorded but not continuously, and so are not included.

In addition to catches, fishermen were required to record their daily effort in terms of numbers of nets set. Both daily catch and effort were recorded in relation to a series of numbered fishing zones pre-established to cover the total anticipated extent of the fishery (Figure 9). With these data, the spatial extent of the fishery from each zone can be studied. Of the 26 zones delineated, efforts were recorded in only nine (Table 10), a semi-continuous stretch from the north-western tip of Killiniq Island, around Jackson Island and into Forbes Sound (Figure 9). Zone nine has no fishable grounds because of strong currents. Table 10 presents the total catch of fresh Atlantic cod, total effort and catch per unit of effort (CPUE) for each zone and the whole area.

TABLE 10. TOTAL EFFORT, CATCHES OF FRESH ATLANTIC COD AND RESULTANT CATCH PER UNIT EFFORT (CPUE), BY FISHING ZONE; EXPERIMENTAL FISHERY AT KILLINIQ, 1984

Zone (see Figure 9)	Catch (kg)	Effort (net-days)	CPUE (kg/net-days)
4	0	3	0.00
5	0	3	0.00
8	7.2	9	0.80
10	190.5	12	15.88
11	1159.2	92	12.60
12	581.1	68	8.55
13	280.2	60	4.67
14	0	3	0.00
21	2.3	6	0.38
Not specified	447.6	155	2.89
Total	2668.1	411	(ave) 6.49

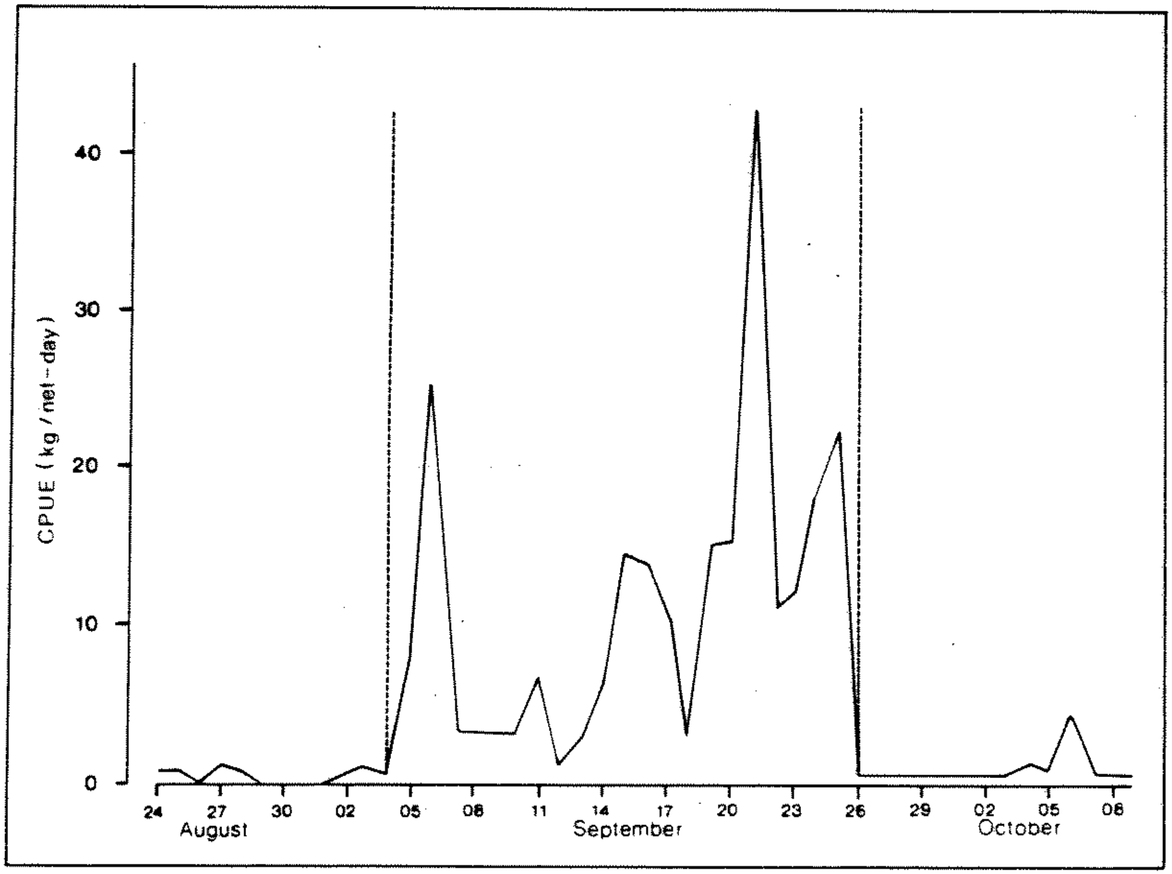

Figure 10. TEMPORAL CATCH OF ATLANTIC COD PER UNIT OF EFFORT IN EXPERIMENTAL FISHERY, KILLINIQ FISHERIES PROJECT, PHASE II

Zones 10 to 13 were the most heavily fished and provided the best returns, reaching a peak of 15.88 kg per net-day in zone 10. Some 37.7% of catches and 16.8% of efforts could not be attributed to any single zone. Including these efforts, the overall catch per unit of effort for the fishery was 6.49 kg/net-day. In comparison with an overall average CPUE of 51.06 kg/net-day from much the same area in 1983 (Gillis and Allard, 1984), the strength of the inshore migration of Atlantic cod to the immediate Killiniq area in 1984 was obviously well below that of the previous year.

The daily CPUE for the experimental fishery, plotted in Figure 10, shows the seasonality of the fishery. If the temporal boundaries of the inshore migration are defined as the first and last significant daily returns (more than 5.0 kg/net-day), a 22-day period between September 4 and 26, is derived during which most fish were caught. Eliminating the largely empty effort exerted outside this period from Table 10 pushes the CPUE for the productive fishery to 10.1 kg/net-day over the 22-day peak period. This figure provides a more valid comparison with the 1983 results but is still well below that level.

b) Exploratory survey

(i) Groundfish

A total of 93 sets of exploratory gillnets were laid between August 6 and September 18. The total catch of commercial species is given in Table 11 (A). A number of other non-commercial species were recorded

TABLE 11. TOTAL COMMERCIAL CATCH, EXPLORATORY GROUNDFISH SURVEY, KILLINIQ FISHERIES PROJECT, PHASE II

Species	Number	Weight (kg)
A. Gillnets		
Atlantic cod		
Fresh	726	2784.8
Scavenged	272	1044.5*
Lost	1	3.8*
Total	999	3833.1
Greenland cod	3	7.4
Greenland halibut	145	240.7
Iceland scallop	30	3.2
B. Hand jigs		
Atlantic cod		
Fresh	390	876.7
Lost	1	2.3*
Total	391	878.9
Sculpin sp.	5	N/A

* Weight generated from average of fresh catch

discontinuously throughout the survey. Summaries of the raw set and catch data are given in Appendix D. Atlantic cod was the only species recorded in significant numbers from exploratory gillnet efforts, however two of the other species listed, Greenland halibut and Iceland scallop, are of interest and will be discussed later.

A total of 432 net-days of exploratory gillnet effort was recorded in the 1984 program, the majority (73.8%) being directed at the Labrador coast (Table 12). In relative terms, catches of Atlantic cod were better on the north Labrador coast by approximately a factor of 3 over Ungava Bay. In real terms, however, none of these catch results was very rewarding. The CPUE for Labrador was quite similar to that for the productive period in the experimental fishery at Killiniq (Figure 10). The Ungava exploratory figures mainly pertain to those areas outside the experimental fishery's primary zones of activity (Table 10).

TABLE 12. EFFORT, TOTAL CATCH AND CATCH PER UNIT EFFORT (CPUE) FOR ATLANTIC COD TAKEN IN EXPLORATORY GILLNET SURVEY, KILLINIQ FISHERIES PROJECT, PHASE II

	Ungava Bay	North Labrador coast	Overall
Effort (net-days)	113	319	432
Total Catch (kg)	439	3366	3805
CPUE (kg/net-day)	3.89	10.55	8.81

Like those of the experimental fishery, catches in the exploratory survey were quite sporadic. Several good individual catches (set numbers 24, 25, 41 and 76; all more than 50 kg/net-day) were recorded, but despite an immediate redistribution of the available gear to attempt to take advantage of these results, they could not be immediately repeated.

Hand jigs were used frequently throughout the exploratory groundfish survey, both as a spot sampling tool and, on occasion, to assist in choosing locations for gillnet sets. Total catches for this gear are found in Table 11(B). Raw set and catch data may be found in Appendix D.

The parameters used to describe the exploratory jigging are presented in Table 13. All successful jigging was done in the north Labrador area. While the efforts at the Button Islands were not extensive, it is interesting that no Atlantic cod were jigged on the Ungava side of the peninsula. Similar efforts in 1983 had also proven unsuccessful (Gillis and Allard, 1984). One out of four attempts on the Labrador side resulted in at least one fish being caught (Table 13). Since few restrictions were placed upon the length or intensity of any jigging attempt, catch per unit

TABLE 13. TOTAL CATCH OF ATLANTIC COD, EFFORT, AND SEVERAL VALUES OF CATCH PER UNIT EFFORT (CPUE) FOR EXPLORATORY HAND JIGGING, KILLINIQ FISHERIES PROJECT, PHASE II

Parameters	Area		
	Ungava Bay	North Labrador	Button Is.
Catch (kg)	0	797.3	0
# Attempts	15	68	1
# Successful attempts	0	17	0
Total jig hours	9.1	58.1	1.3
Successful jig hours	0.0	37.3	0.0
Success ratio (attempts)	0	25%	0
CPUE (kg/jig-hour), all efforts	-	13.7	-
CPUE (kg/jig-hour), successful efforts	-	21.4	-
Average CPUE (kg/jig-hour) per attempt	-	4.6	-
Average CPUE (kg/jig-hour) per successful attempt	-	18.5	-

effort figures have been calculated in several ways. If desired, the following units may be re-expressed as numbers of fish using the observed average weight of 2.25 kg per jigged fish. Including all efforts, returns were at a rate of 13.7 kg per jig-hour, or an average CPUE of 4.6 kg per jig-hour per attempt. Considering successful efforts only, the overall yield becomes 21.4 kg per hour of successful jigging, or an average CPUE of 18.5 kg per jig-hour for successful attempts.

The individual jig results seem to support the evidence from the experimental and exploratory gillnets results, i.e., that cod in 1984 were moving through the area in isolated pockets. The data from the exploratory jigging is quite precise in space and time and therefore should be useful in comparing relative fish densities between sites when the distribution is as patchy as was seemingly encountered in 1984. Table 14 presents each successful jig set, the CPUE in #/jig-hour, and the average depth from which the fish were taken. Also given is the theoretical maximum CPUE in #/jig-hour based on a sink rate for the jig of 2 fm/sec, a sustainable retrieval rate (by hand) of 0.5 fm/sec and a fixed turnaround time on the vessel of 10 seconds. The assumption adopted is that if fish are present, the average time required to attract and jig one, once the jig is at depth, is density dependant. By setting the time required to attract and jig a fish to zero, the resultant figure becomes a theoretical depth-specific maximum rate of return against which to compare the observed values. Ratios of the observed to the theoretical maximum CPUE (A/B in Table 14) can then be used to rank sets by increasing density of fish on the bottom. Figure 11 presents each of the successful 1984 jig sets (points) relative to the depth-specific theoretical maximum (line) as described above. Plotting these ranked jig sets (Figure 12) indicates no clear density pattern beyond the observation that four of the top eight densities were recorded from the slopes around the Argo Islands.

Most of the groundfish exploratory effort in Phase II was directed at near shore areas. The only other potentially commercial fish encountered in any amount was the Greenland halibut. Almost all of these were taken from two fleets set well offshore (18-20 naut. miles) between September 6 and 10.

These nets were not retrieved for four days because poor weather conditions. As a result of the low catch of Atlantic cod (36.1 kg from a total of 15 nets), no further efforts were directed offshore in Phase II. Greenland halibut was the primary catch in these sets, totalling 238.4 kg (144 fish averaging 3.3 kg each, CPUE = 4.26 kg per net-day).

TABLE 14. RANKING OF SUCCESSFUL HAND JIG SETS BY INCREASING DENSITY OF ATLANTIC COD. KILLINIO FISHERIES PROJECT, PHASE II

Set #	A CPUE (#/j-h)	AVE DEPTH (fm.)	B MAX CPUE	A/B	RANK
225	5.6	32.0	40.0	0.14	11
228	10.8	36.5	35.6	0.30	4
231	4.4	32.5	39.5	0.11	14
233	6.0	25.0	49.7	0.12	13
234	6.7	30.0	42.0	0.16	8
236	9.0	38.0	34.3	0.26	6
237	15.6	38.5	33.9	0.46	2
242	3.0	40.0	33.0	0.09	15
246	12.0	45.0	29.4	0.41	3
248	8.2	45.0	29.4	0.28	5
251	4.1	51.5	26.2	0.16	8
254	23.4	30.0	42.0	0.56	1
258	1.0	37.0	35.1	0.03	16
260	0.9	45.0	29.4	0.03	16
271	6.6	50.0	27.0	0.24	7
281	5.0	33.0	38.0	0.13	12
283	4.2	52.0	25.7	0.16	8

(ii) Iceland scallops

A total of 50 tows were completed in search of Iceland scallops in Phase II. Table 15 summarizes the results of those efforts.

Roughly two thirds of the scallop effort was directed at the Labrador side of the study area since the exploratory groundfish survey effort was higher there. No apparent commercial "beds" of Iceland scallops were delineated, even though the species was widely encountered (62.5% of tows) at a low density.

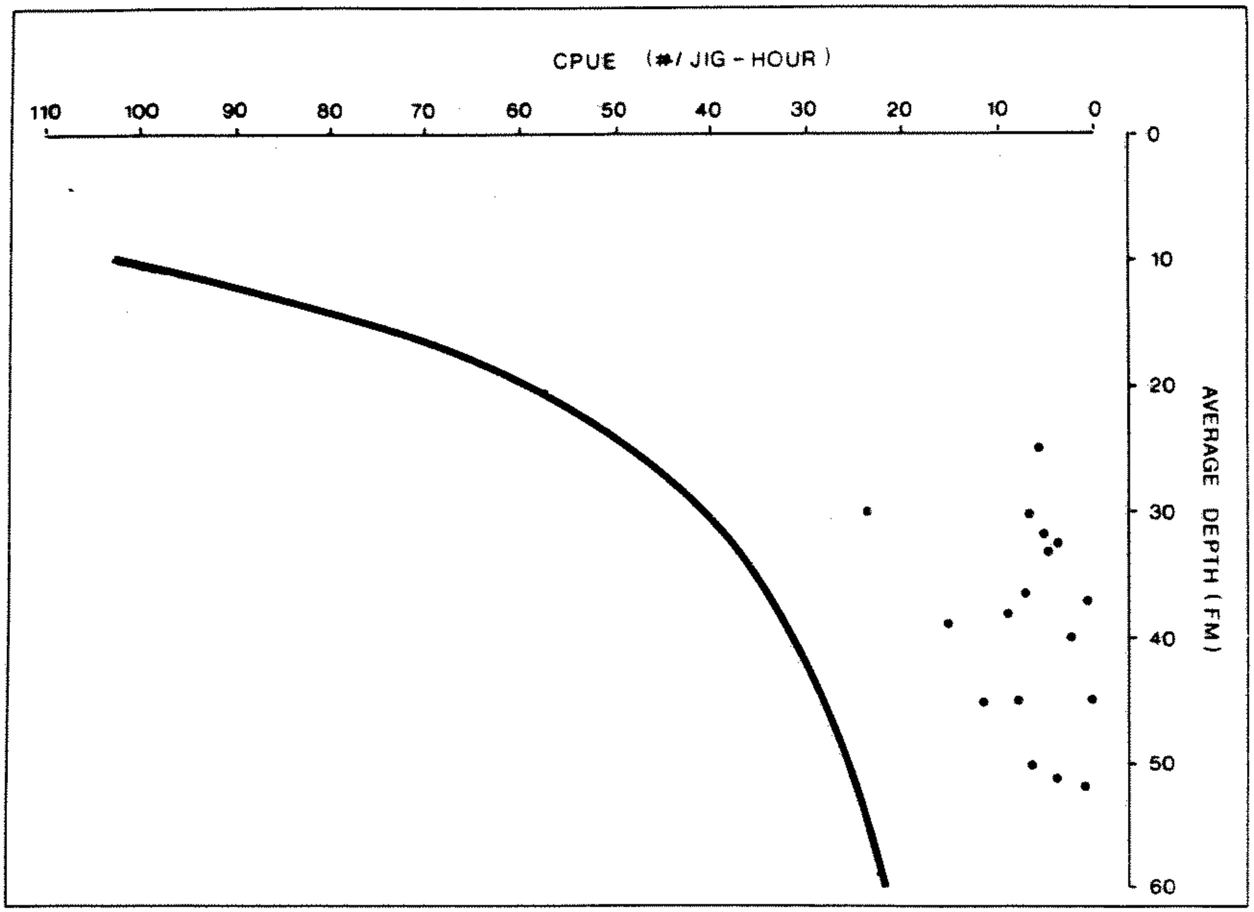

Figure 11. INDIVIDUAL CATCH PER UNIT OF EFFORT (CPUE) FOR HAND JIG SETS PLOTTED AGAINST DEPTH AND IN COMPARISON WITH THE DEPTH SPECIFIC THEORETICAL MAXIMUM CPUE, KILLINIQ FISHERIES PROJECT, PHASE II

Much more rigorous scallop survey results obtained subsequently indicate that the rig used in the initial exploratory work in Phase II was not nearly so efficient as the standard commercial rig used during Phase III (Gillis and Allard, in prep.). For this reason, the actual levels of catch in Phase II will not be used to characterize commercial potential of this species.

(iii) Miscellaneous exploratory efforts

Besides commercial gillnets, scallop drags and hand jigs, other gear was used during Phase II for various periods and with varying degrees of success. The cod trap brought to the site the previous year was re-installed at Trap Cove, immediately to the west of the mouth of Burwell Harbour on the south coast of Jackson Island (Figure 9), on September 6.

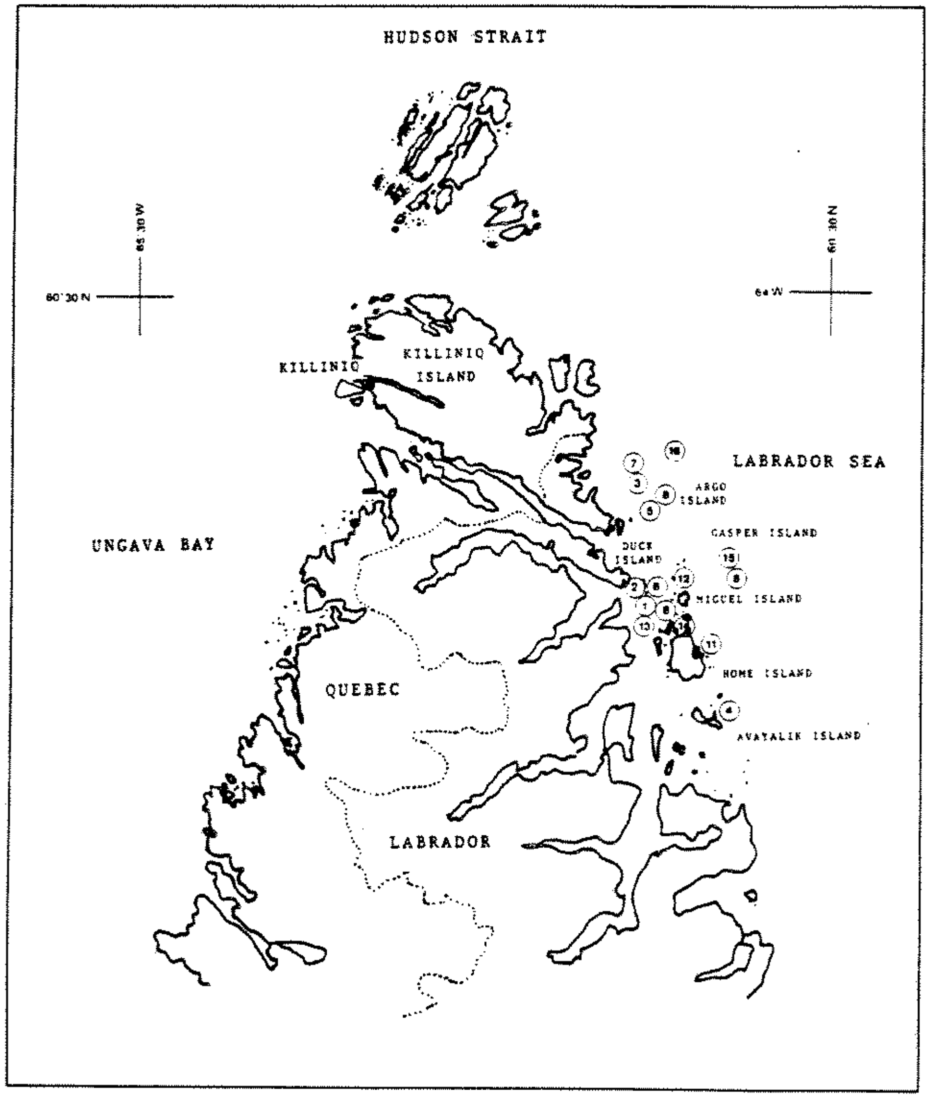

Figure 12. PLOT OF SUCCESSFUL JIG SETS RANKED BY INDICATED ATLANTIC COD DENSITY, KILLINIQ FISHERIES PROJECT, PHASE II

It was checked the following morning and found empty. That evening, major damage was sustained when a bergy bit from a disintegrating grounded iceberg several miles away was propelled by high winds into the moored trap. The bergy bit moved off the remnants of the trap on September 9, after which the trap was lifted and brought to shore. Repairs on the trap proceeded over the next weeks, and were completed just before the end of the field period.

One of two available automatic jigging machines was installed on the "Burwell Pride" and tested in the harbour. Unfortunately, the lack of cod

TABLE 15. CATCH, EFFORT AND CPUE OF ICELAND SCALLOP FOR QUÉBEC AND LABRADOR SECTIONS OF STUDY AREA DURING EXPLORATORY SCALLOP FISHING, KILLINIQ FISHERIES PROJECT, PHASE II

Parameter	Québec	Labrador	Total
EFFORT			
# of tows	18	32	50
success ratio (scallops present)	27.8%	62.5%	50.0%
# of drag-hours	13.43	31.50	44.93
CATCH			
# of scallops	37	236	273
whole weight (kg)	4.2	27.5	31.7
CPUE (kg/drag-hour)			
Average (whole wt)	0.31	0.87	0.71
Highest individual tow (whole wt)	1.43	8.09	8.09

prevented any meaningful testing of this gear, since the few cod in the Killiniq area in Phase II seemingly could not be jigged (Table 13).

Two lobster traps were placed at various sites within Burwell Harbour for a period of 31 days. Depths varied from 2 to 8 fathoms, and locally available baits (eg., cod heads) were used. Catches included numerous _Hyas_ crabs, shorthorn sculpins and several eelpouts, _Lycodes_ sp., but no lobster (_Homarus americanus_).

More interesting results were obtained from short fleets of geometric gangs and trammel nets set out at the surface in Burwell Harbour. A total of 28 Atlantic herring (_Clupea harengus_) were taken from these nets (Table 16). Most of these (24) were taken between September 21 and 25, after which the trammel net could not be checked until October 1, and the geometric gangs until October 3 because of a storm. The trammel net was heavily damaged during the storm, and both sets of gear were removed for the season on October 3.

TABLE 16. SUMMARY OF GEOMETRIC GANG AND TRAMMEL NET CATCHES AND EFFORT, KILLINIQ FISHERIES PROJECT, PHASE II

Gear	Dates	Net-days	Catch
Geometric gangs	Sept. 9, Sept. 13- Oct. 3	61	12 Atlantic herring
Trammel nets	Sept. 10- Oct. 3	23	16 Atlantic herring

One or more surface gillnets were maintained near Killiniq by several of the Inuit fishermen, and some Atlantic salmon (Salmo salar) and several Arctic char char (Salvelinus alpinus) were taken. No accurate records of these efforts were kept, however, biological autopsies were performed on some fish taken from these nets. These results are presented in the following section.

3. Biological Characteristics of the Resources

a) Atlantic Cod

(i) Basic biology

The size run in the catch for Atlantic cod in 1984 was very similar to that of 1983 (Gillis and Allard, 1984). A total of 1125 cod were randomly selected from commercial gillnet catches, sexed, and measured to the nearest centimeter. The length frequency distributions for gillnetted fish are given in Figure 13. As seems typical for this species, males were slightly yet significantly shorter than the females. All three mean values of length (male, female, and combined) are very close to the values of 1983, which were also calculated solely on the basis of gillnet catches. Catches from hand jigging were sufficient in 1984 to produce a random length frequency data base for that gear as well. These distributions are given in Figure 14. The length distribution of jigged fish is clearly bimodal.

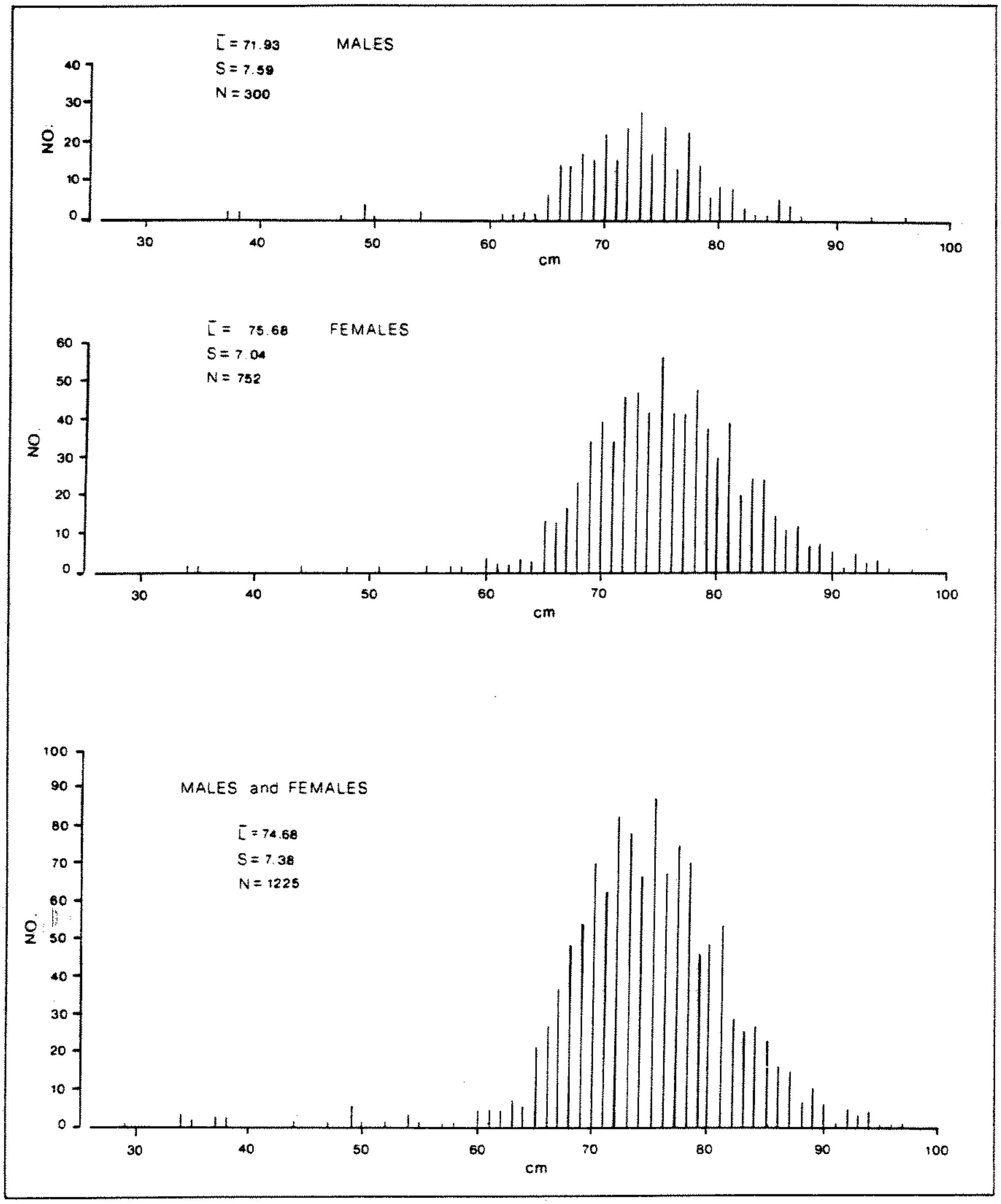

FIGURE 13. LENGTH FREQUENCY OF GILLNETTED ATLANTIC COD (<u>Gadus morhua</u>), KILLINIQ FISHERIES PROJECT, PHASE II.

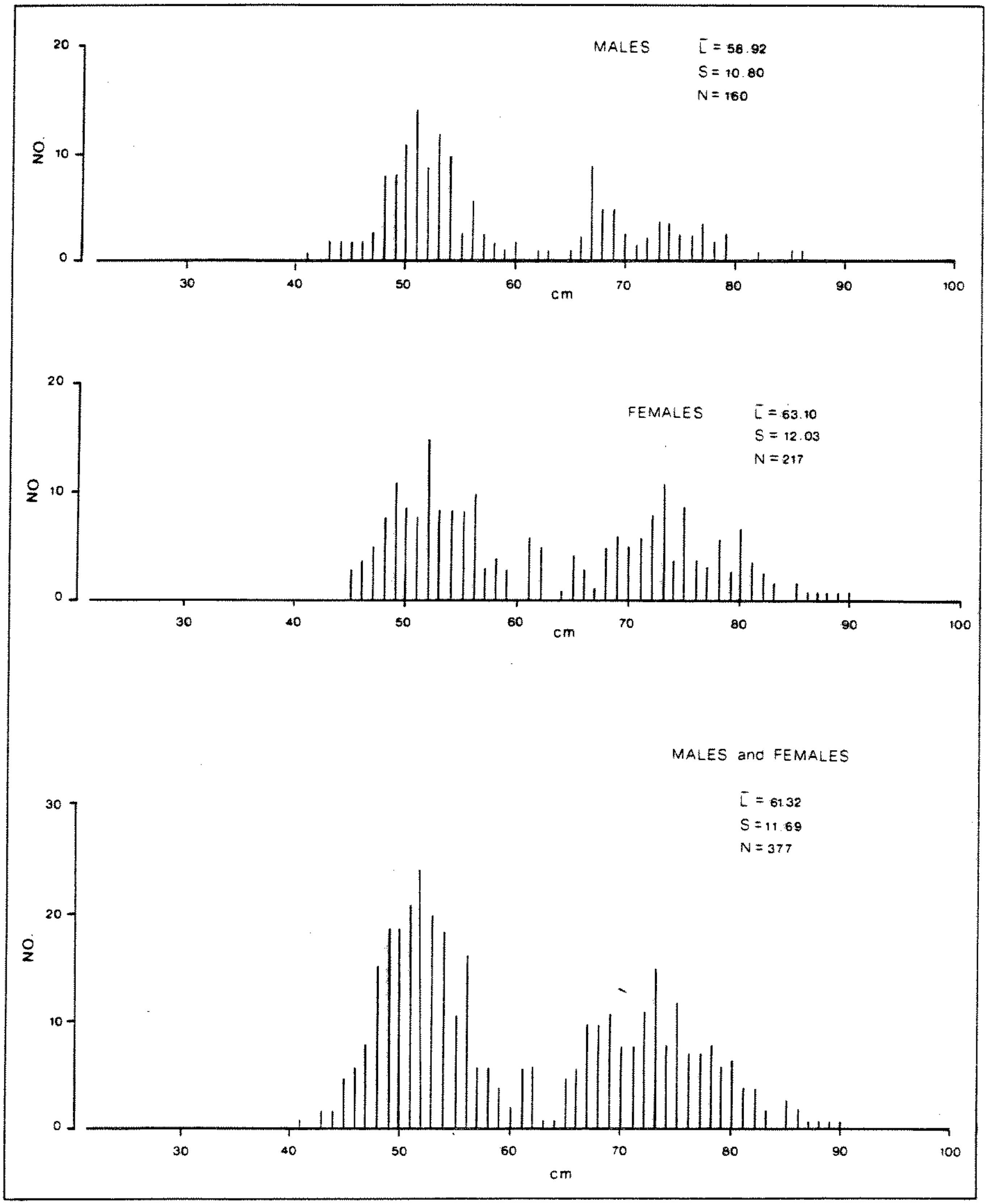

FIGURE 14. LENGTH FREQUENCY OF JIGGED ATLANTIC COD (*Gadus morhua*), KILLINIQ FISHERIES PROJECT, PHASE II.

Subsequent to the original interpretation of the 1984 cod otoliths, several independent re-readings of a subsample of the 1983 cod otoliths have produced interpretations which, when compared with the original readings, fall outside accepted standards for disparities between independent readings of the same sample. At the time of writing, the disparities had not been resolved. The following results therefore may be modified at some future date. Nevertheless, while the magnitude of the changes in the cod stock suggested by the 1983 results may be reduced depending on how the discrepancy in interpretation is resolved, this discrepancy in itself will probably not account for all of the observed changes.

The age distributions of the gillnet and hand-jig catches are given in Figures 15 and 16, respectively. The age distributions were calculated by correcting the age frequency within each 1-cm length grouping from the autopsy file so as to correspond to the actual frequency of that same 1-cm group within the random length frequency data base. This was done independently for each sex and each gear to avoid bias. When completed, the age frequencies for each sex taken by the same gear were added to produce a total age frequency for that gear. The results are quite interesting. In gillnet catches in 1984, eight-year-old fish remained the single strongest year class (1976) although its dominance (0.41) was reduced over that of 1983 (0.48) (Gillis and Allard 1984). At the same time, age nine fish are far more prevalent (.35 vs .18) than in the previous year while the proportion of age seven fish dropped by a corresponding amount. The suggestion is that both the 1975 and 1976 year classes are relatively strong.

The age structure of jigged fish (Figure 16) is also interesting in that the upper mode of the length frequency in the catch corresponds closely to the age distribution of gillnetted fish, presenting the 1975 and 1976 (9 and 8 years old, respectively) year classes as relatively strong. Much of the lower mode of the length frequency is accounted for by age 5 fish, which may signal another strong year class (1979).

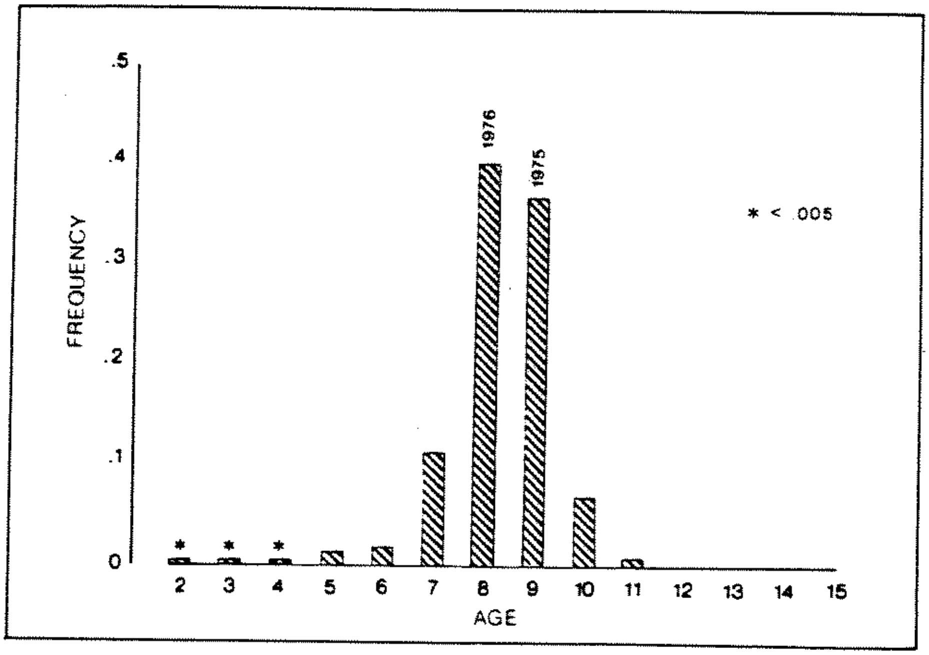

Figure 15. DISTRIBUTION OF AGES, ATLANTIC COD, GILLNET CATCHES, KILLINIQ FISHERIES PROJECT, PHASE II

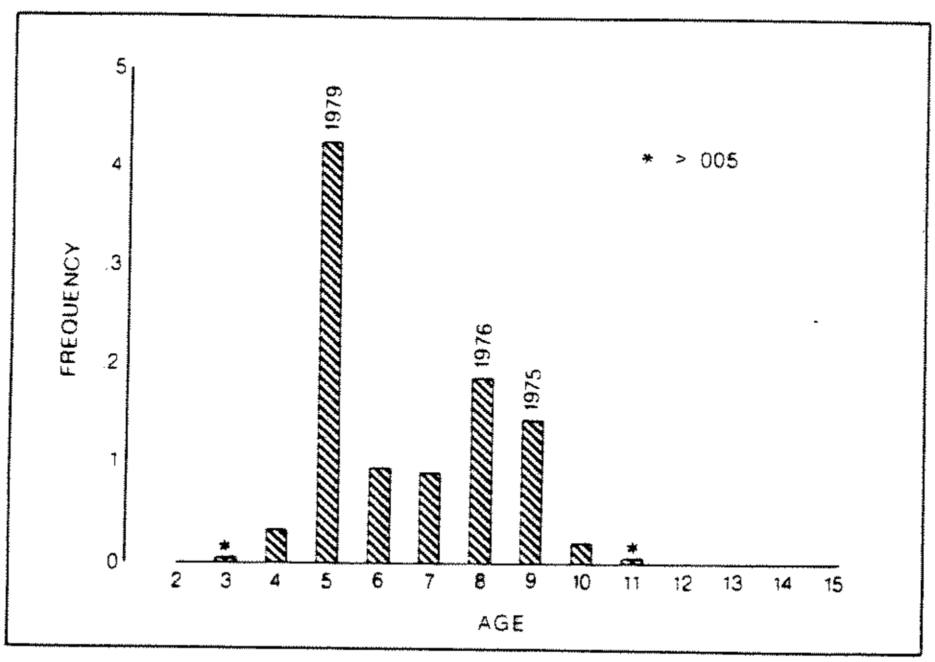

Figure 16. DISTRIBUTION OF AGES, ATLANTIC COD, JIGGED FISH, KILLINIQ FISHERIES PROJECT, PHASE II

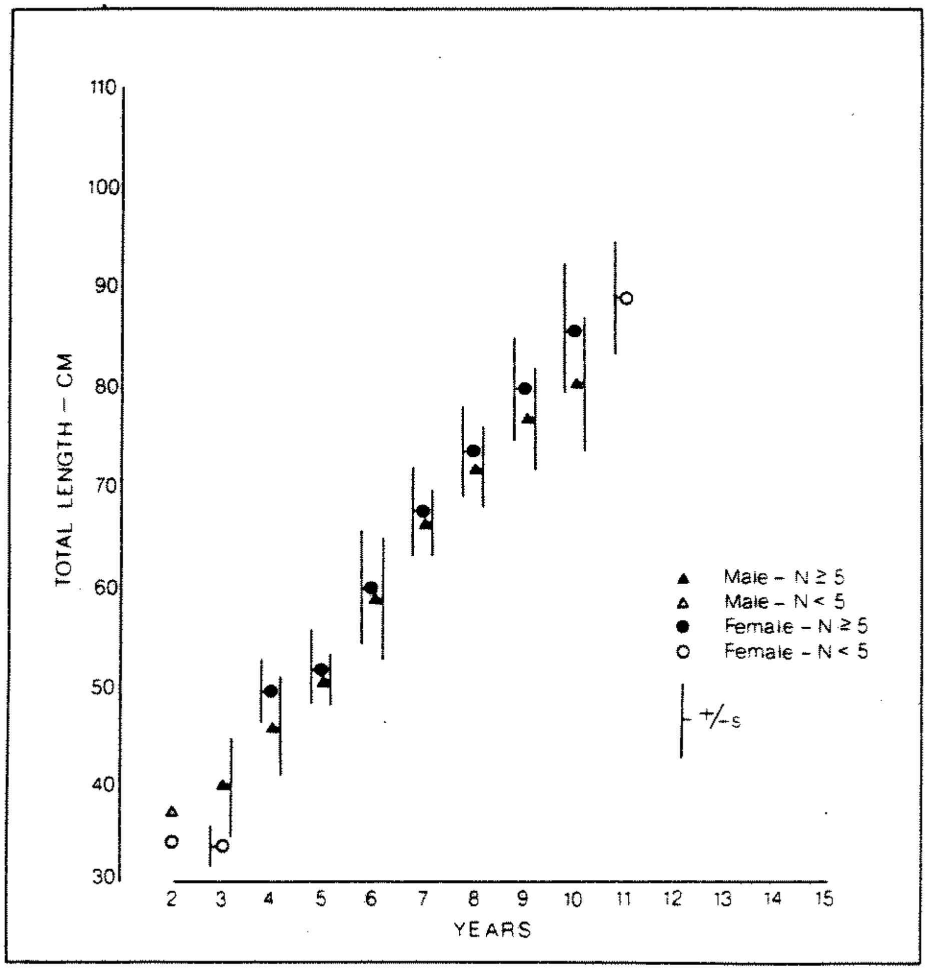

Figure 17. LENGTH AT AGE AND +/-1 STANDARD DEVIATION FOR MALE AND FEMALE ATLANTIC COD (*Gadus morhua*), KILLINIQ FISHERIES PROJECT, PHASE II

The growth rate, indicated by average length at age data, is shown in Figure 17. It is very similar to that of 1983 in all respects: relatively rapid growth; and males growing slightly but consistently slower than females. Mean asymptotic length, L_{∞} was approximately 120 cm for ages 6 to 10. However, rate of growth was not uniform within the sample. Females predominated in the catch at every age for which sufficient numbers existed (Figure 18). The final ratio of the sexes was .32 : .68 (M:F).

(ii) Stomach contents

Though not measured directly in either year, the general impression among field observers was that Atlantic cod in 1984 catches were not feeding as heavily as those of the previous year. One hundred and sixty-six stomachs of Atlantic cod were retained for analysis of contents. The report of Dr. Max Dunbar is attached as Appendix H. A total of 48 food species were identified. Sufficient samples were available (Table 17) to compare the feeding pattern of fish from the Labrador side (N = 60) with those taken from Ungava Bay (N = 106).

Only twenty-five species (52,1%) were recorded from both sides, while thirteen (27.1%) were unique to Ungava and ten (20.8%), to Labrador. However, with the exception of the observation of the cumacean, Diastylis rathkei, in 15.0% of stomachs from Labrador, the rate of occurrence of species unique to one side was invariably less than 4% of stomachs.

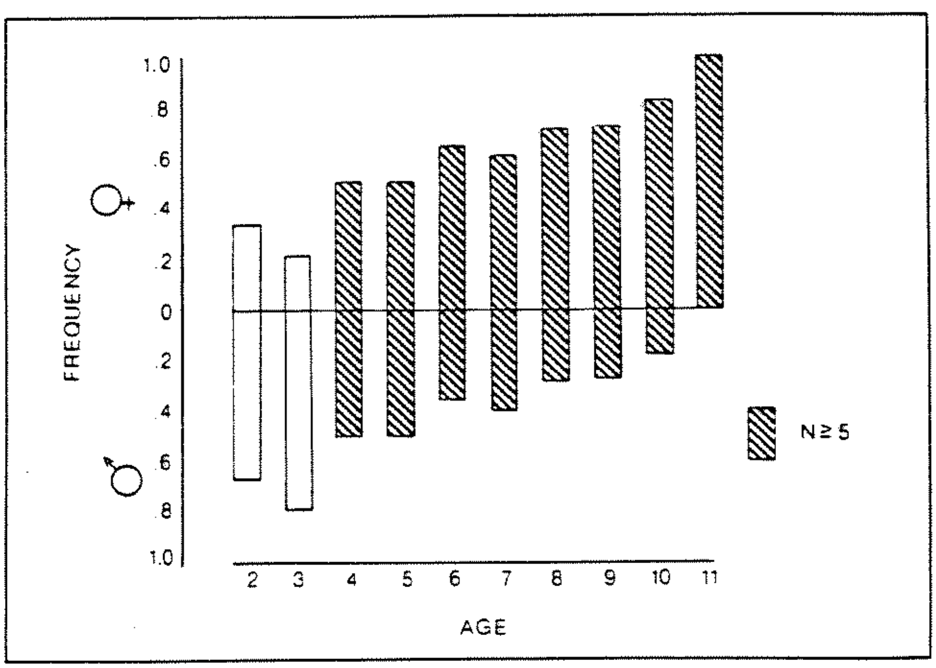

Figure 18. RATIO OF SEXES BY AGE, ATLANTIC COD (Gadus morhua), KILLINIQ FISHERIES PROJECT, PHASE II

TABLE 17. IMPORTANT FOOD SPECIES (≥ 10% OCCURRENCE) OF ATLANTIC COD FROM NORTHERN LABRADOR AND NORTHEASTERN UNGAVA, SEPTEMBER 1984

Species	% Occurrence	
	Ungava (N = 106)	Labrador (N = 60)
Fish		
Myctophum glaciale	51.9	6.7
Myoxocephalus scorpius groenlandicus	10.4	63.3
Decapods		
Lebbeus polaris	7.5	13.3
Lebbeus groenlandicus	38.7	16.7
Eualus fabricii	21.7	16.7
Pandalus montagui	15.1	6.7
Spirontocaris spinus	3.8	15.0
Amphipods		
Ampelisca eschrichti	5.7	23.3
Anonyx nugax	12.3	21.7
Haploops setosa	18.9	6.7
Mysids		
Mysis oculata	13.2	58.3
Polychaetes		
Nereis pelagica	17.9	8.3
Cumaceans		
Diastylis rathkei	0.0	15.0

Of the species recorded from both sides of the peninsula, there were often considerable differences in the relative importance of a species from one side to the other. Table 17 compares those species considered important (≥ 10% occurrence) on one or both sides. Labrador fish fed most often on juveniles of the sculpin, Myoxocephalus scorpius groenlandicus (63.3%) and the mysid, Mysis oculata (58.1%). Dunbar's observation that these two species are usually associated with fresh water influence is interesting since the jigged fish he refers to (Appendix H, p.6) were taken among the outer islands on the Labrador coast, distinctly removed from any significant source of run-off or entrainment of fresh water.

In contrast, Ungava fish fed most frequently on the lantern fish Myctophum glaciale (51.9%) and tended to eat decapod shrimp more frequently, particularly Lebbeus groenlandicus (38.7%). Those items which were important (≥ 10%) to fish from both sides were the exception (5 of 48). For a species known to be highly omnivorous (Leim and Scott, 1966), it is likely that the observed regional differences in diet are more a function of availability of food items rather than preference.

Since inshore migrations, such as into the Killiniq area, are feeding migrations, it could be revealing to compare the important (≥ 10% occurrence) dietary items recorded for Atlantic cod from Ungava Bay between Phases I and II (Table 18). The glacier lantern fish, Myctophum glaciale, seems equally available and/or preferred in both years, however, beyond that there are some differences. Greenland halibut, Reinhardtius hippoglossoides, the amphipod, Haploops setosa, and the shrimp, Lebbeus polaris are clearly reduced in importance in 1984 over 1983. Three species: the shrimp, Eualus fabricii and the two species associated by Dunbar (1985) with fresh water, Myoxocephalus scorpius groenlandicus and Mysis oculata, increased in importance in 1984.

(iii) Parasites

Data on field observations and samples of Atlantic cod livers were analysed by Dr. Mark Curtis. In a very complete report (Appendix I), he presents the results of those analyses and provides a literature review of the biology and commercial implications of anisakine nematodes in Atlantic cod. The following is a brief review of the major results, beyond which inquiries should be directed at the report itself.

Despite candling thin sections of fillets from 177 fish, and observing hundreds of others during the biological autopsy routine and thousands more during commercial splitting procedures, no field observations of the codworm or "sealworm" (Phocanema decipiens) were recorded. In other areas

TABLE 18. IMPORTANT FOOD SPECIES (≥ 10% OF STOMACHS) IN ATLANTIC COD STOMACHS FROM UNGAVA, 1983 AND 1984

Species	% Occurrence 1983 (N = 75)	% Occurrence 1984 (N = 106)
Fish		
Myctophum glaciale	49.3	51.9
Reinhardtius hippoglossoides	32.0	8.5
Myoxocephalus scorpius groenlandicus	0.0	10.4
Amphipods		
Haploops setosa	38.7	18.9
Anonyx nugax	14.7	12.3
Decapods		
Lebbeus groenlandicus	25.3	38.7
Lebbeus polaris	22.7	7.5
Eualus fabricii	2.7	21.7
Pandalus montagui	13.3	15.1
Mysids		
Mysis oculata	0.0	13.2
Polychaetes		
Nereis pelagica	0.0	17.9
Unidentified	8.0	0.0
Molluscs		
Cephalopods	12.0	3.8

devoid of the primary host species, grey seal (Halichoerus grypus), this parasite is maintained by other seals, such as harp seals (Pagophilus groenlandicus), at a level of approximately 1%. Since other seals, especially the harp, are very abundant in the Killiniq area, it seems unlikely that the incidence in Killiniq cod should be much lower than 1%. The worm had been observed in cod fillets processed in the previous fishery, but at a rate not above 1% (R. Buffitt, pers. comm.). The 1984 results, therefore, confirm that codworm incidence in the Killiniq area remains at an extremely low level.

Rigorous data were obtained on the incidence of the two other anisakine nematodes observed in 1983 material, *Anisakis sp.* and *Contracaecum sp.* (Curtis, 1984). Sixty-one percent (N = 149) of livers inspected visually in the field and 74% (N = 164) of those examined by Dr. Curtis in the laboratory harboured one or both species. The mean level of intensity of infection of Killiniq cod by *Anisakis sp.* is near the median for east coast Atlantic cod fisheries (Curtis, Appendix I). While *Anisakis sp.* can be a serious pathogen in man, the incidence of this species in the flesh is usually less than 2% of that recorded in the liver, which would place the expected incidence in Killiniq cod fillets at a very low level. Moreover, the parasite is killed by either freezing the flesh (- 20°C for 24 hrs) or as a result of the normal cooking process.

While anisakine nematodes do not pose any concern for the production of flesh-based Atlantic cod products from Killiniq, their incidence in the liver, combined with an unidentified protozoan cyst observed in 12% of liver samples, precludes further consideration of any form of whole cod livers as a potential fish product. Only 22% of livers examined were devoid of visible parasitic organisms.

Curtis (Appendix I) points out that subsequent intermediate hosts, such as Atlantic cod, may pick up *Anisakis sp.* directly from euphausids, the first intermediate host, if the level of pelagic feeding is high, or indirectly from a pelagic forage fish upon which they may prey. Atlantic herring is a common pelagic forager which acts as an intermediate host to *Anisakis sp.*. At least during the summer feeding migration, Atlantic cod at Killiniq do not prey on euphausids, and while Atlantic herring are present, they have been neither abundant nor an item in the Atlantic cods' diet (Tables 17 and 18). The role of foraging intermediate hosts and the source of *Anisakis sp.* for Atlantic cod in this area could be played by the lantern fish *Myctophum glaciale* (Table 18) although this has not been confirmed.

Curtis' report concludes with several recommendations, including one that the documented "worm-free" status of Atlantic cod products from this area should be reflected favourably in the market place and should be used to the furtherest extent as a marketing tool.

(iv) Stock affinity

Using the method described in Section B.2 c. (ii), a total of 112 vertebral columns of Atlantic cod were prepared and enumerated visually from fresh material. As a check on the accuracy of these counts, 19 vertebral columns which had been read visually in the field were subsequently X-rayed (see section B.2.c(iv)) and enumerated in the laboratory. The means derived from visual and X-ray counts of the same 19 fish were 54.79 and 55.16 respectively, including the first (fused) vertebrae and the urostyle. This difference was tested using a t-test for paired observations and found to be not significant (α = .05).

Thus, the visual counts were accepted. The mean vertebral number of the 112 visual counts was 54.91. The mean of the previous sample from Killiniq, collected in 1948, was virtually the same (54.90, N = 50). Based on that sample, Grainger and Dunbar (unpublished) aligned Killiniq cod with the Labrador stock, as did Vladykov (1933) before them, based on fin ray (D2) counts. Templeman (1981), in reviewing all available northwest Atlantic vertebral counts, found the counts from the Labrador-East Newfoundland stock to be usually over 55 (average sexes combined, 1947-1971, 55.234), but noted a tendency toward lower averages in samples from the inshore areas. Means as low as 54.20 in southern Labrador and 54.68 in the central and northern areas have been reported.

b) Iceland Scallop

Iceland scallop catches seemed to be correlated with water depth. As mentioned, subsequent Iceland scallop survey results (Gillis and Allard, in prep.) have illustrated the inadequacy of the scallop rig used in Phase

II as a quantitative survey gear. Depth capability extended only to approximately 30 fathoms. Tows were grouped into 5 fathom average tow depth classes, and standardized catch rates were determined for each class, setting the highest class CPUE at 1.0. There was a trend (Figure 19) toward higher catches with increased depth to the limit (30 fm.) of the gear used.

A total of 238 scallops were randomly selected and measured to the nearest millimeter. The resultant frequency of lengths in the catch is shown in Figure 20. Eighty-seven to 89 mm individuals formed the mode, but the mean length in the catch was pulled down to 83.42 mm (s = 8.269) by smaller individuals which ranged down to the 54-56 mm class. Length at age data were available from 76 of 104 samples retained for that purpose. The balance (26.9%) were unreadable owing to epiphytic growth. The report of Gaudet (1985, Appendix K) also provided an analysis of growth.

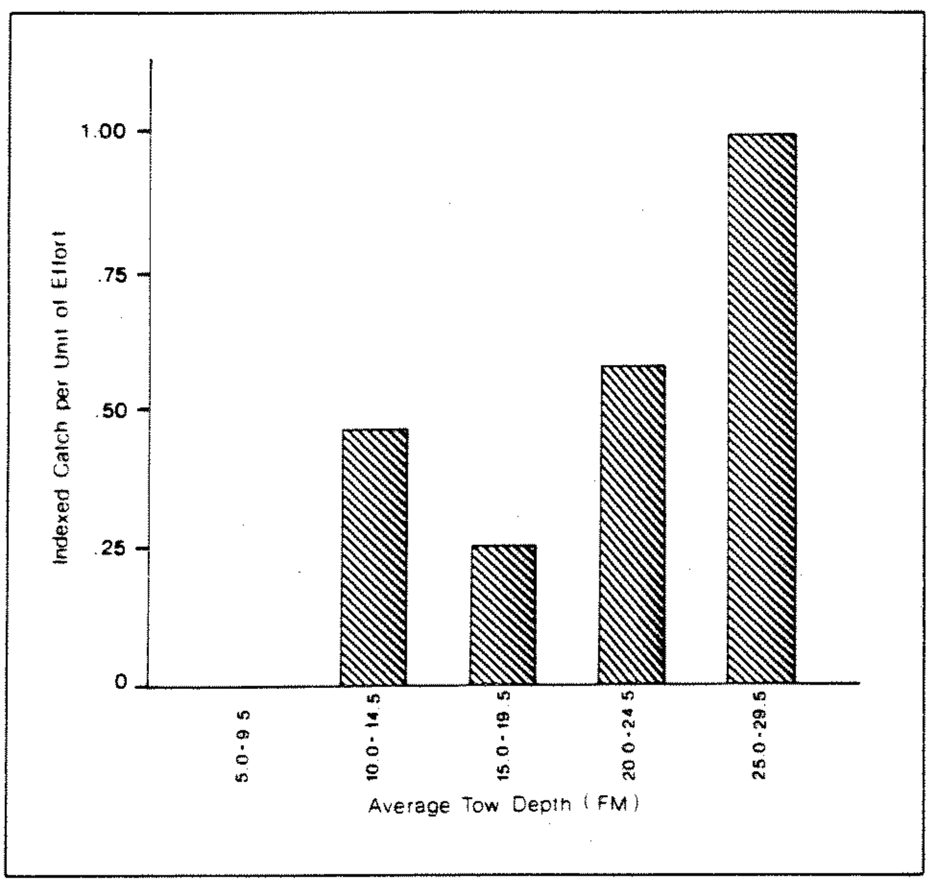

Figure 19. RELATIVE CATCHES OF ICELAND SCALLOP PER UNIT OF EFFORT IN RELATION TO DEPTH, KILLINIQ FISHERIES PROJECT, PHASE II

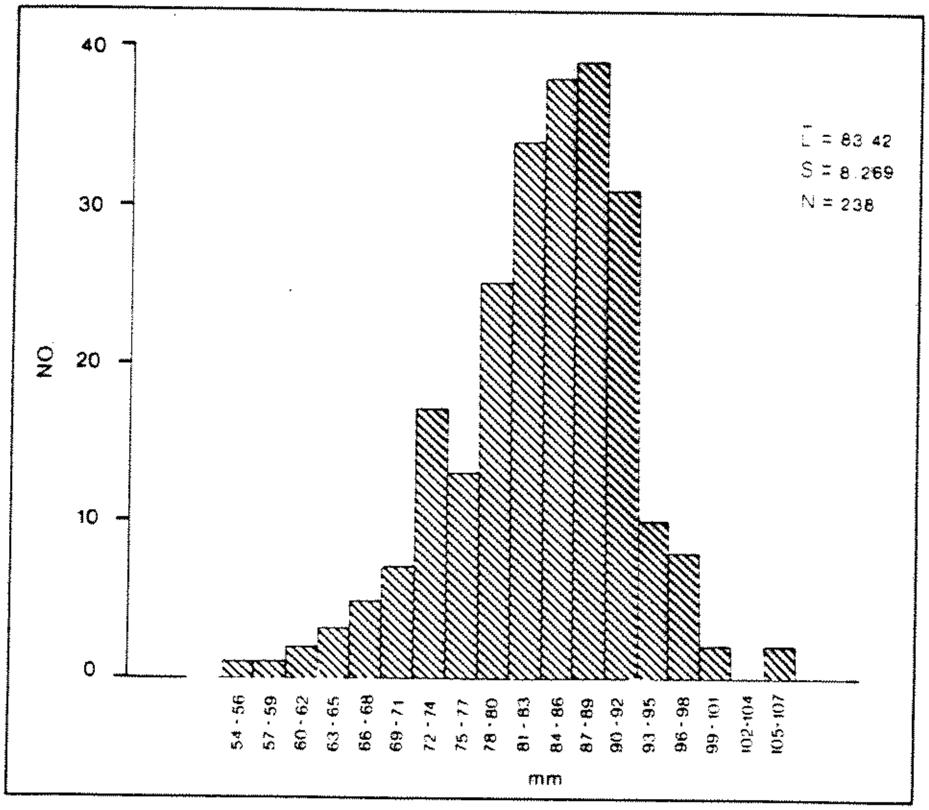

Figure 20 RANDOM FREQUENCY OF LENGTHS IN CATCH, ICELAND SCALLOPS, KILLINIQ FISHERIES PROJECT, PHASE II

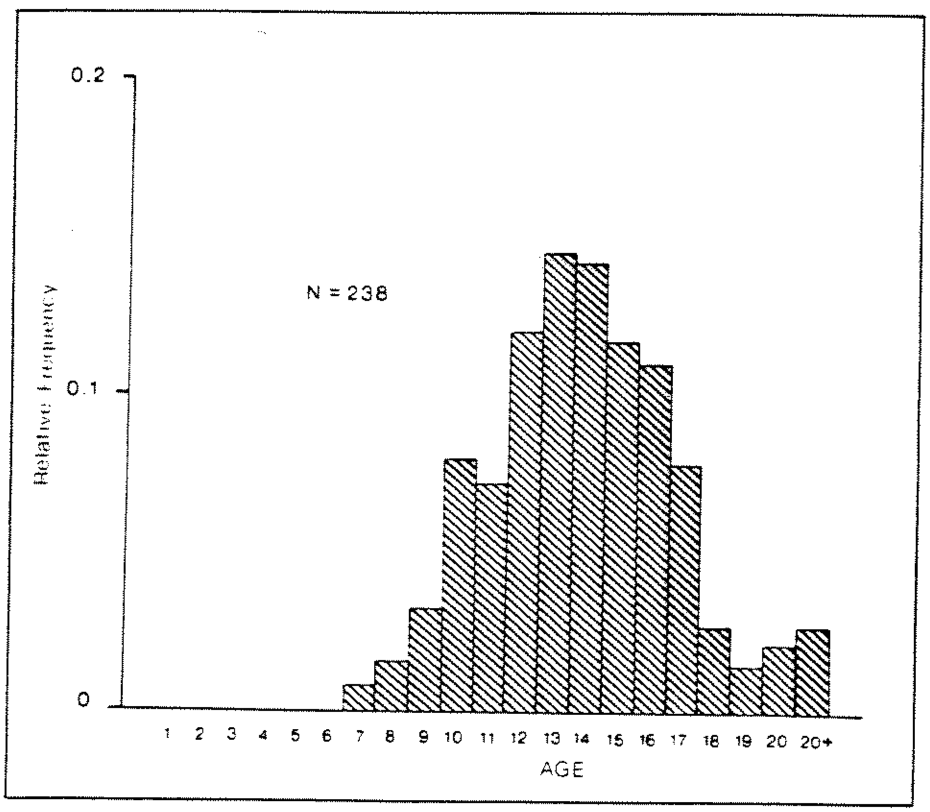

Figure 21. AGE FREQUENCY IN CATCH OF ICELAND SCALLOP (*Chlamys islandica*) CALCULATED FROM VON BERTALNAFFY'S GROWTH EQUATION, KILLINIQ FISHERIES PROJECT, PHASE II

In the majority of cases, terminal age could not be accurately measured. The age structure was therefore determined by applying a key of length range at age, as calculated using the Von Bertalnaffy growth equation (Ricker, 1975), to the random frequency of lengths in the catches. Gaudet (Appendix K) unknowingly calculated the age frequency in this way based on the length frequency of the biased autopsy sample. In 1984, the mean asymptotic length, L_{∞}, was 108.2 mm, K was 0.115 and t_0 was 0.56. The corrected age frequency is shown in Figure 21. Mean age in the 1984 catch was 13.94 years. Growth was also expressed by Gaudet as directly measured lengths at age from the back measurement at each annular ring. These lengths at age are plotted on Figure 22 in relation to some representative rates of growth from the northern Gulf of St. Lawrence area (Poirier, 1976, and Poirier and Bernier, 1981; in Gaudet, 1985, Appendix K). Although the overall sample size (N = 76) for 1984 was rather small, the rate of growth indicated is closely comparable with those of the northern Gulf area.

c. Other Species

(i) Atlantic salmon

A total of 31 Atlantic salmon were autopsied during Phase II. The catch and biological data for these fish is summarized in Appendix F-2. This sample, 12 males and 19 females, was taken from Inuit nets set in the immediate Killiniq area. Of 30 life histories available from scale interpretations, there were 7 grilse (1 + years at sea), 22 maidens (2 + years at sea) and 1 smolt. The smolt and all but one of the grilse were males. Growth was uniform within each life history type, though the maidens were all larger ($\bar{L}$ = 77.28, s = 4.29) than the grilse ($\bar{L}$ = 61.40, s = 3.27). The overall mean K-factor of the sea salmon was quite high at 1.17 (s = 0.104) as would be expected for fish nearing the end of the marine phase of their life cycle. These fish seem typical of those native to the large river systems in southern Ungava Bay; the average age at smoltification is characteristically high at 5.1 years (range 4 to 7) (Power, 1981). The migration route suggested by Power et al (in press) for

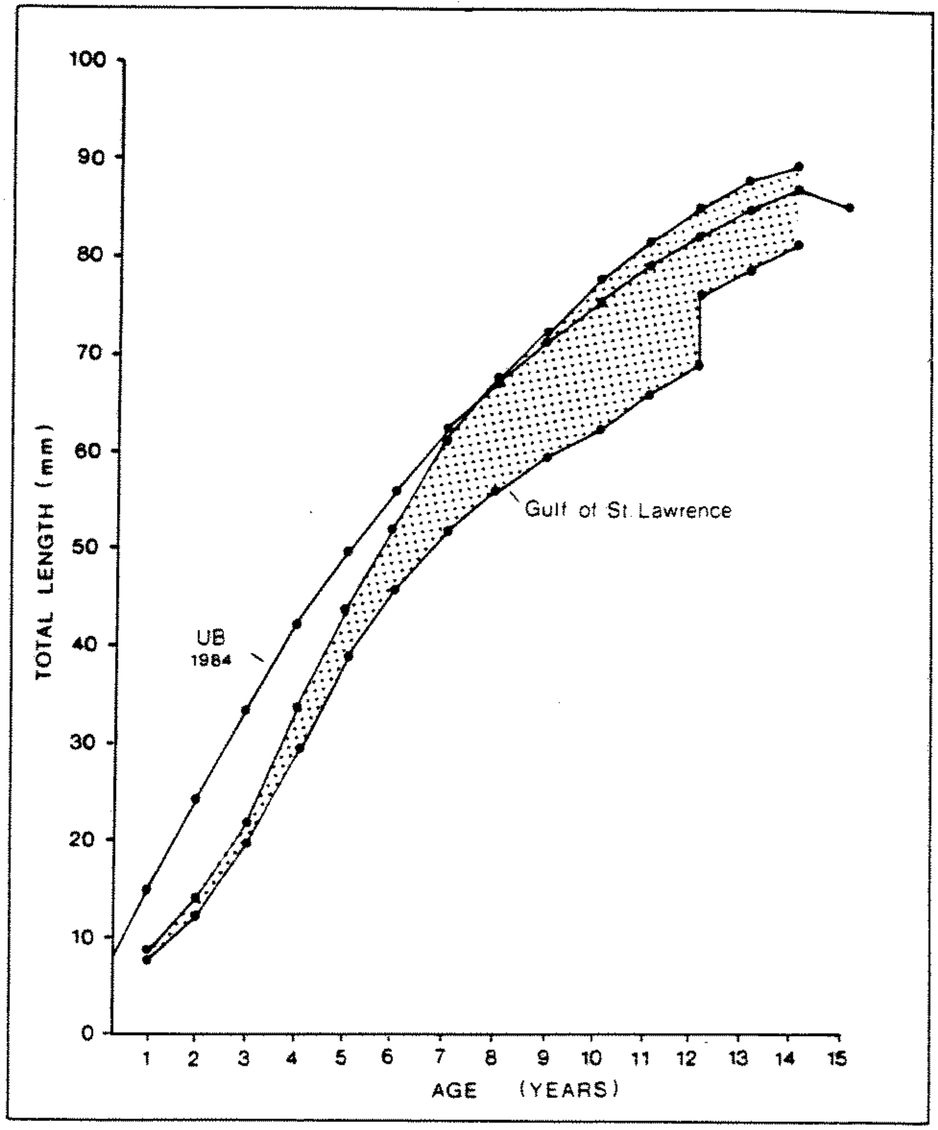

Figure 22. GROWTH RATES OF ICELAND SCALLOPS FROM UNGAVA BAY AND GULF OF ST. LAWRENCE (ADAPTED FROM GAUDET, 1985) (APPENDIX K)

Atlantic salmon leaving Ungava Bay as smolts and returning as sea salmon would bring them through the immediate Killiniq area.

(ii) Arctic char

Two Arctic char, both males, were taken at Killiniq in September (see Appendix F-3). Though almost the same length, one fish was considerably heavier and showed a marked development of the testes in comparison with the other. The closest known char producing system to the Killiniq townsite is some 17 km to the south on the Québec mainland.

(iii) Greenland halibut

Details of 63 autopsied Greenland halibut are presented in Appendix F-4. Size run in the catch (140 mm to 178 mm gillnets) was large, with an average of 582.1 mm (s = 97.78) and a range of 429 mm to 1,000 mm. The sexes were represented nearly equally (.48 : .52, M:F). Ages ranged from 7 to 15 years. Average length at age calculations are presented in Table 19.

TABLE 19. AVERAGE LENGTH AT AGE, GREENLAND HALIBUT, KILLINIQ FISHERIES PROJECT, PHASE II.

Age	N	$\bar{L}$ (mm)	s
7	3	494.0	7.0
8	10	500.5	37.27
9	14	543.9	67.94
10	14	571.3	61.47
11	12	619.8	49.79
12	5	661.0	26.57
13	1	658	-
14	1	787	-
15	2	911.5	125.16

(iv) Atlantic herring

Eighteen of the Atlantic herring taken during Phase II were autopsied, and this information is presented in Appendix F-6. Total lengths ranged from 273 mm to 344 mm (mean 315.1, s = 19.3). Average weight was 241.2 gm. Thirteen (72%) of the fish in the sample were female. This pelagic species would seem to be near the northernmost limit of its range in this area (Liem and Scott, 1966).

4. Production

a) Atlantic Cod

Similar to Phase I, it is estimated that 10% of the fresh Atlantic cod landed in the experimental and exploratory operations were consumed locally or for some other reason were not split and produced as salt bulk cod. Some cured salt bulk fish was dried at the Killiniq plant, and samples of boneless salted fillets were produced. About 135 kilograms of salt bulk cod, size large, were sent out by aircraft to Kuujjuaq for northern market testing. The remainder was boxed into 23-kg units and shipped via the CCGS "Pierre Radisson" to Québec at the end of the season. From there it was trucked to Gaspé where it was sold to Les Pêcheries Sheehan Inc.. What had not already been dried at Killiniq before shipping was dried at the Sheehan plant at Sainte-Thérèse de Gaspé upon arrival. The grade and price breakdown for the product sold is given in Table 20.

TABLE 20. GRADING AND PRICE STRUCTURE FOR SALTED ATLANTIC COD FROM KILLINIQ, KILLINIQ FISHERIES PROJECT, PHASE II

Grade	Size	Amount (kg)	%	Price ($/kg)	Total ($)
Choice	L.	454	38.5	2.43	1100.00
Choice	M.	567	48.1	2.31	1312.50
Standard	XL.	68	5.8	2.31	157.50
Standard	L.	23	1.9	2.20	50.00
Standard	M.	45	3.8	2.09	95.00
Standard	S.	23	1.9	1.76	40.00
		1180	100	ave. 2.34	2755.00

As in the previous year, the quality of the fish was judged excellent; over 86% of the product was graded choice. The percentage of large and extra large fish, however, dropped from over 90% in 1983 to 46.1% this season, largely because of the higher proportion of jigged fish in the 1984 catch.

Prices received in 1984 were considerably higher, at \$1.76/kg to \$2.43/kg, (average \$2.33/kg) than those of 1983 (\$0.60/kg to \$1.43/kg). The market price was stronger in 1984, however, the difference was between that of the Canadian Saltfish Corporation (in 1983) and a private buyer (in 1984).

Samples of large size salt bulk Atlantic cod were sold to six northern food retailers: two in Frobisher Bay, two in Kuujjuaq and one each in Kangiqsualujjuaq and Quaqtaq. The selling price was \$3.30/kg, delivered to the retailer. Retailers were asked to display both the product and instructions on its preparation prominently. Retail price was left to the discretion of the merchant. Soon after, a questionnaire was sent to each retailer to be completed and returned once the product was sold. Despite several followup contacts, only three of the retailers responded to the questionnaires; one from each of Kuujjuaq, Frobisher and Kangiqsualujjuaq. All sold their product at \$4.40/kg: within 2 weeks at Frobisher and Kangiqsualujjuaq and 4 weeks at Kuujjuaq. The level of familiarity with the salt bulk product ranged from high in Frobisher, which has a high Eastern Canadian population, to low at Kangiqsualujjuaq, where the market is primarily native.

Both Québec retailers indicated that natives and non-natives equally bought the product, while in Frobisher the product was purchased primarily by non-Natives. Sales potential for salt bulk cod was judged high in Frobisher but only guardedly positive at both Québec communities responding. Recommendations for wholesale packaging varied from bulk to prepackaged in ventilated plastic.

The opportunity was taken to ask each retailer for the sales potential, in his or her opinion, of a number of other products of Atlantic cod which might be considered at Killiniq. Within the salt product group, there was high interest in boneless salted fillets from Frobisher and some interest in salted scraps from Kuujjuaq. In fresh-frozen forms, there was a unanimously high interest in fillets and, in Frobisher and Kuujjuaq, fresh frozen tongues and cheeks. No market interest was shown for heads fresh, frozen or salted. The two larger centres identified some possible demand for smoked cod fillets.

Although this is by no means a definitive marketing study, it seems clear that the best northern markets for salted cod products at present will be in the larger centers, such as Frobisher, with their higher populations of Eastern Canadians who are already familiar with these products. So far as can be determined, the product did sell in the smaller centers, however, and was purchased by native people. If it were made available on a steady basis, a small market would surely develop even in small communities with primarily native consumers. There is little doubt, however, that the northern market for fresh, frozen cod fillets would be considerably larger.

b) Iceland Scallop

Meats collected during Phase II were all consumed locally, and received critical approval. Yields of meat by weight were determined to be 12.3% of whole (clean shell) weight. In Phase II, meat weights were that of the entire adductor muscle complex, including smooth and striated components. The average weight of individual meats from the catch was 12.1 grams, which would correspond to a meat count of 37.5/pound or 82.5/kilogram.

The degree of epiphytic growth seemed to vary considerably, from shells heavily covered at some locations to others completely clean elsewhere. The most significant epiphytes were the barnacles, *Balanus sp*. The degree of epiphytic growth was studied on a sample of 74 scallops, randomly selected from the catch. By weight, the highest individual load was 43.6% of clean weight. On the other hand, 54.1% of scallops in the sample were considered clean, i.e., nothing could be removed easily with the blade of a knife. The sample size was insufficient to attempt to investigate the effects of heavy epiphytic growth on the individual scallop or look for any pattern which may explain regional differences in epiphytic growth levels.

Overall, epiphytes accounted for 9.37% of the gross weight of the sample, which was taken from a number of sites. Meat yields based on whole catch weights can be expected to vary considerably from area to area solely because of dilution of the yield equation by the weight of epiphytic organisms.

c) Other Species

No other species were available in sufficient amounts for production during Phase II. The Greenland halibut taken on September 10 from sets 74 and 75 were mostly soft fish since four days had elapsed since the fleets had been set.

A small sample of harp seal oil was rendered at Killiniq to investigate possible markets. A small harp taken from a gillnet was sculped, yielding 9.0 kg of clean fat. From this, approximately 7 liters of oil were rendered. The yield varies greatly with season and is reported to peak in late fall when the average harp seal in the catch would produce almost 30 liters of oil (R. Buffitt, pers. comm.).

Two forms of product can be produced: oil rendered directly by the heat and a lighter oil pressed from the remnants. A sample of each type was analysed by Standard Biological Laboratories, Mississauga, Ontario, to determine basic chemical characteristics, as per the American Oil Chemists Society procedures (Table 21).

TABLE 21. CHEMICAL CHARACTERISTICS OF SAMPLES OF HARP SEAL OILS, KILLINIQ FISHERIES PROJECT, PHASE II

Characteristic	Form	
	Pressed	Rendered
Moisture & Volatile Matter, percent	0.02	0.01
Free Fatty Acids (as oleic) percent	0.44	0.50
Insoluble Impurities, percent	0.01	0.01
Iodine Value	188.3	190.6
Cold Test (5½ hours)	Cloudy	Cloudy

A number of inquiries were made to identify current industrial uses for such oil. Industries which may have at one time used natural animal oils in some products and/or processes have replaced their use with synthetic oils which can now be custom designed for specific purposes. They are usually cheaper to produce and pose no "moral" problem for consumers, particularly in the cosmetics and health-care products industries.

5. Shore Facilities

During Phase II, a plant specialist of the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, Mr. Pierre Chantal, examined the potential fishery at Killiniq from the standpoint of shore processing infrastructure and equipment requirements. Mr. Chantal visited the site for 12 days in September. During this time, wide ranging discussions were held with the Killiniq Inuit and the other project team members concerning all aspects of the production side of the operation, and a review of existing facilities and equipment at Killiniq was made. Mr. Chantal's report is attached as Appendix J. This report presents a review of previous fishery operations at Killiniq, those undertaken during the present study and other relevant data, and discusses various product forms and the equipment and infrastructure requirements each entails. Two alternative upgrading scenarios are proposed, and the costs of each are detailed. Both alternatives are designed to accomodate a diversity of species and a variety of product forms, including salted, dried, fresh-frozen, and smoked.

The information contained in the report of Mr. Chantal has been a useful reference for production requirements. In addition it has formed the basis of a renovation project which will be considered once outstanding resource availability issues become clearer.

6. Training

The training of Inuit fishermen and their familiarization with all aspects of the fishery operation was increased in 1984. Nine full-time positions in the project were staffed by Inuit from the Killiniq group. The "Bradley Jeremy's" regular crew was reduced by half, to two, and those positions were filled by the two people designated by the community to eventually become the two primary crewmembers of the community's own vessel (photo 10). These individuals became full crewmembers for the duration of the project's field period, gaining experience in all aspects of the longliner's operation.

Four other Inuit fishermen, with the assistance of one experienced fishing supervisor, were left to run the experimental fishery. In addition to the fishing operation and the treatment of the catch, these men were responsible for assisting with the repair of gear for both the exploratory and experimental efforts.

While representatives from CEIC were at the site, a meeting with the Killinimuit was held to discuss the training requirements for the potential fishery. The value of the training and experience gained to date was recognized, but a clear desire to receive training in other, more targetted, skills was voiced. Positions for which such training was considered essential included the longliner captain and engineer, base/plant maintenance, business management and bookkeeping.

D - DISCUSSION

With respect to marine resources, the predominant dominant result of the 1984 season was the observation that the strong inshore migration of Atlantic cod, documented in 1983, and which had apparently occurred without fail in previous fisheries, did not materialize to any sustained extent. Inshore Atlantic cod fisheries have failed at one time or another in every portion of the Canadian east coast. Water temperature has often been implicated in these cases (Templeman, 1966) acting either directly on the cod or indirectly by affecting the distribution of bait fish. In view of the lower water temperatures recorded in Phase II when compared to Phase I, it does not seem incautious in this case to suggest such a connection. While no marked change in the occurence of major dietary items was noted between the 1983 and 1984 samples (Table 18), field observations clearly suggested that individual Atlantic cod stomachs contained far fewer myctophiids (Myctophum glaciale) that had been observed the previous year.

Having re-confirmed the affinity of Atlantic cod taken in Ungava with northern Labrador fish, the relative scale of a fishery at Killiniq can be brought into perspective. Current practice, in spite of evidence of some mixing with stocks to the south, is to manage the Atlantic cod resources of NAFO Divisions 2G and 2H as a discreet stock. The recent history of exploitation and management of this stock, derived from annual ICNAF Redbooks, Canadian Atlantic quota reports, and Baird and Bishop (1985), is given in Figure 23. Most of the landings have been in fact reported from Division 2H (Ave. 1955-1979 incl., 90.1%). The relative size of the fishery, mostly by foreign vessels, during the years 1965 to 1969 is striking, and therein may lie the cause of increased growth of individuals within the fraction of this stock available at Killiniq. In a virtual population assessment covering the years 1962 to 1971 by Wells (1973), the 1964, 1965 and 1966 year classes were shown to be weak. This, plus the marked depletion of heavily recruited year classes (age 6 and up) directly by the fisheries of 1965 to 1969 inclusive, had combined to reduce the number of fish 3 years and up within this stock by almost 60% by 1970.

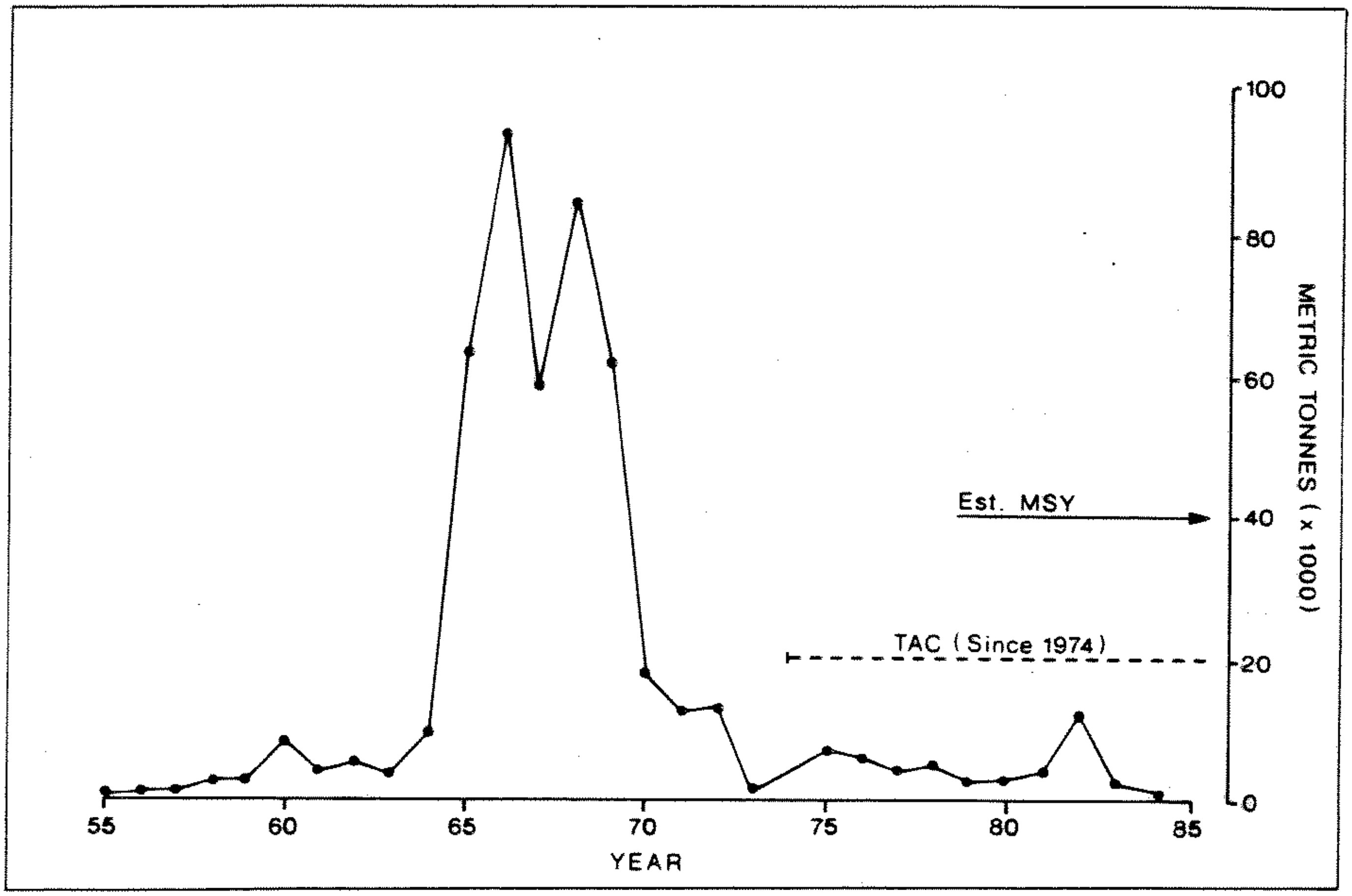

Figure 23. RECENT LANDINGS, CURRENT TOTAL ALLOWABLE CATCH (TAC) AND ESTIMATED MAXIMUM SUSTAINABLE YIELD (MSY) FOR ATLANTIC COD NAFO DIVISION 2GH

Either of the density-related mechanisms (Lilly, 1980 and Wells, 1983) identified in last year's report could explain how fish from all of the year classes now prevalent in the gillnet fishery, 1972 to 1977 (allowing for differences in age interpretation), may have benefitted as individuals (i.e., increased rate of growth) from the effects of the fishery of the late 1960's. Wells (1984) presents this explanation for a similar phenomenon within the cod stock in NAFO Divisions 2J and 3KL, to the south. If so, this would suggest there is a reasonably effective mechanism to link this effect with its cause since the two are physically separated by over 300 nautical miles. North-south migrations of Labrador cod have been documented (Templeman, 1979) in relation to the spawning cycle. The greatest concentration of spawning within the 'northern' cod stock complex (2GHJ, 3KL) takes place in late winter/early spring along the offshore slopes of Division 2G, relatively close to Killiniq (Fitzpatrick and Miller, 1979).

The cold Labrador current, the dominant hydrographic feature of this coast (Figure 7), carries many of these eggs, which develop slowly at these temperatures, well down the coast before they hatch (Templeman, 1981). By this mechanism, the spawning grounds off northernmost Labrador "pump" juvenile Atlantic cod into the much larger fishery off southern Labrador and northeast Newfoundland. The local adult Atlantic cod population in northernmost Labrador could have hatched from eggs which drifted out of the Labrador current and/or could be post-spawning migrants (most fish caught were in a state of recuperation from spawning). In either case, the indication is that, if the events discussed earlier are in fact responsible for increased rate of growth of cod at Killiniq, then a significant north-south movement and/or exchange of Atlantic cod within at least the north and central Labrador area (Divisions 2GH) must occur. More to the point of the current study, the same mechanism could, should present low levels of exploitation in 2GH continue, result in a drop in individual rates of growth within future heavily recruited year classes as stock density increases. This phenomenon is already being observed in more southern areas (Wells, 1984).

Potentially commercial concentrations of no other groundfish have yet been encountered in the Killiniq study area. Greenland halibut have long been known to inhabit the deeper waters off northernmost Labrador, where they have been the target of some fishery effort in the past, primarily by large (30m+) European longliners, and in east Hudson Strait and Ungava Bay, where some sizeable bycatches in shrimp trawls have been recorded (Makivik Corporation, 1982). While several good catches have been taken (see sets 74 and 75, Appendix D-2) in the deeper offshore area of Labrador, generally little effort has yet been directed in areas with sufficient water depth (generally 100+ fathoms; Lear and Pitt, 1971) for this species. To date, fishing efforts in deeper waters have only been accomplished with difficulty. The inclusion of this species as a commercial resource in the Killiniq fishery will therefore likely be as much an operational question as one of resource availability.

While the initial impression cast by the results of scallop fishing in Phase II may not be very positive, it is interesting to compare the preliminary results with those of a recent survey (Barney et al, 1982) of grounds around Nain, where commercial beds have been delineated and a small commercial fishery has started. Further treatment of some of the data provided in the Nain report highlights the extremely patchy distribution of the species. Beds tend to be small but very densely covered with scallops. Within the total water area surveyed, the area covering "beds" amounted to a mere 2%. The assumption that fully 1/2 of the total area will remain unfishable because of rough bottom or other hindrances, raises the fraction of the dragable bottom occupied by beds to only 4%. Once located however, CPUE increases on the average Nain bed by a factor of more than 60 from a background, or "off bed", CPUE of 11.37 scallops per draghour to a return of 723.53 scallops per drag-hour on or near commercial beds. Expressed in similar units, our 1984 CPUE from scallop tows was 6.08 scallops per drag-hour. This rises to 7.49 in considering the Labrador sub-area by itself. In view of the limitations of the Phase II gear, particularly the fact that both the difficulty in towing properly and CPUE, in spite of that difficulty (Figure 19), both increased with depth, the possibility of commercial scallop concentrations in the vicinity of Killiniq cannot be ruled out. If the distribution is similar to those areas around Nain, much more effort, in particular, many more individual tows which could be of much shorter duration, would be required to properly survey the area. The growth rate (similar to the Gulf region), meat yield by weight (approx. 12%), and the observed count per kilogram (82.5) in 1984 all bode well for a scallop fishery in this area if sufficient resource can be shown to be available.

At the completion of two years of resource inventory studies in the Killiniq area, the status of most potential members of the commercial resource pool remains, in one way or another, unclear. After the encouraging results of 1983, the failure of the Atlantic cod in 1984, while not unheard of in other areas, does raise some questions about the annual reliability of the resource were a commercial development to proceed at this point. The initial Iceland scallop results are interesting, however, a structured intensive survey with commercial gear is required to properly assess this resource. While the areas further offshore (approximately 8 nautical miles or more) remain largely unsurveyed, preliminary fishing in the deeper water depths suggests that those areas might yield Greenland halibut in commercial quantities.

Although it was originally projected that major resource questions could be addressed in two years of exploratory and experimental work (Makivik Corporation, 1982), the many outstanding questions after these two years make it impossible to recommend proceeding into the commercial phase of this redevelopment project without at least one more year in which to further delineate the available resource pool.

Although not the object of directed studies to date, several other species must now be considered for commercial development. Several species of seal, especially the harp seal, are very abundant at Killiniq and, in view of the recent suspension of the harp seal harvest, likely to become more abundant. Beyond the traditional product/market structure of previous seal fisheries, other products, such as canned seal meat primarily for northern consumption, should be investigated. Atlantic salmon are a summer migrant known to the Killiniq Inuit and are almost certainly native to the major rivers in southern Ungava (Powers et al., in press). A fishery for Atlantic salmon in the Killiniq area, however, would in fact constitute a high seas fishery, which neither the Inuit fishermen and sports camp operators of south Ungava nor the provincial and federal governments' management groups responsible for this species would view favourably. The Killiniq Inuit themselves recognize this fact and do not consider the Atlantic salmon a commercializable alternative for them.

Arctic char, of course, was the backbone of the previous fishery. Though other Arctic char fisheries started in Ungava collapsed or degenerated under similar pressure (Lejeune, unpublished), the fishery at Killiniq ran for over fifteen years at a quota of initially 20,000 lb. (gut-out) and later 30,000 lb. (gut-out) with no apparent sustained effects on the stocks being reported. Subsistence requirements were taken over and above the quota (R. Buffitt, pers. comm.), but, due to operational constraints, the commercial quota was not taken in all years. It would seem that little if any biological justification was used in setting and regulating the previous quotas. Nevertheless, levels of harvest were sustained and it should be a safe assumption that a similar harvest could be sustained today. Harvest limits should be set initially at a conservative level and resource assessment studies should be undertaken consecutively.

In review of the results of Phases I and II, an additional season of field studies was required to address outstanding questions. The field program of this additional study, Phase III of the Killiniq Fisheries Project, has been completed. Two major components comprised Phase III. The first was further exploratory survey efforts (Makivik Corporation, 1985 a) which focussed on the offshore areas for groundfish and inshore areas for Iceland scallops. Second, a project to design and field-test a prototype Arctic char trap for use in a coastal marine fishery was undertaken (Killiniq Fisheries Inc., 1985). As in other years, a number of additional questions were addressed within the framework of the major components. These included the basic biological characteristics of potentially commercial species (Makivik Corporation, 1985 b), a field inspection of known and suspected anadromous Arctic char producing systems along the Ungava coast of the study area, based on Inuit knowledge, and the monitoring of the inshore migration of Atlantic cod, particularly in the immediate area of Killiniq. A proposed fishplant renovation plan (Killiniq Fisheries Inc., 1985) was presented to and accepted by MAPAQ for discussion. Funds were made available from the Phase III budget to have a team of architects and engineers prepare detailed plans of all the existing buildings and facilities at the fish plant site to facilitate the eventual preparation of detailed renovation plans.

Many of the more important results of Phase III have been summarized in a report presented to the Department of Fisheries and Oceans concerning the biological studies of Phases II and III (Allard and Gillis, 1986). The complete presentation of the program and results of Phase III will be available under separate cover (Gillis and Allard, in prep.).

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1973 Virtual Population Assessment of Cod in ICNAF Divisions 2GH. ICNAF Res. Doc. 73/106, Ser. No. 3069. 6p.

APPENDIX A

PHOTOGRAPHS

The following collection of photographs depict some of the elements of Phase II of the Killiniq Fisheries Project.

PHOTO 1. AERIAL VIEW OF THE KILLINIQ SITE

This view, actually taken in 1985, looks over the Killiniq townsite toward the northwest, with Killiniq Island to the right, Jackson Island on the left and Ungava Bay in the background. The fish plant sits in the foreground facing Plant Harbour which is separated from Fox Harbour in the background by a shallow sill which is covered by water only at high tide. The village faces Fox Harbour and is separated from the fish plant by a hill, upon which sit the oil storage tanks, painted black.

While both harbours are accessible to small vessels, Plant Harbour offers better protection and better access to the shore. In the past, it was possible to move small (up to 14 m) vessels over the sill between the two harbours at high tide after clearing away loose rocks with a bulldozer. At present, it is only possible to move over the sill with canoes.

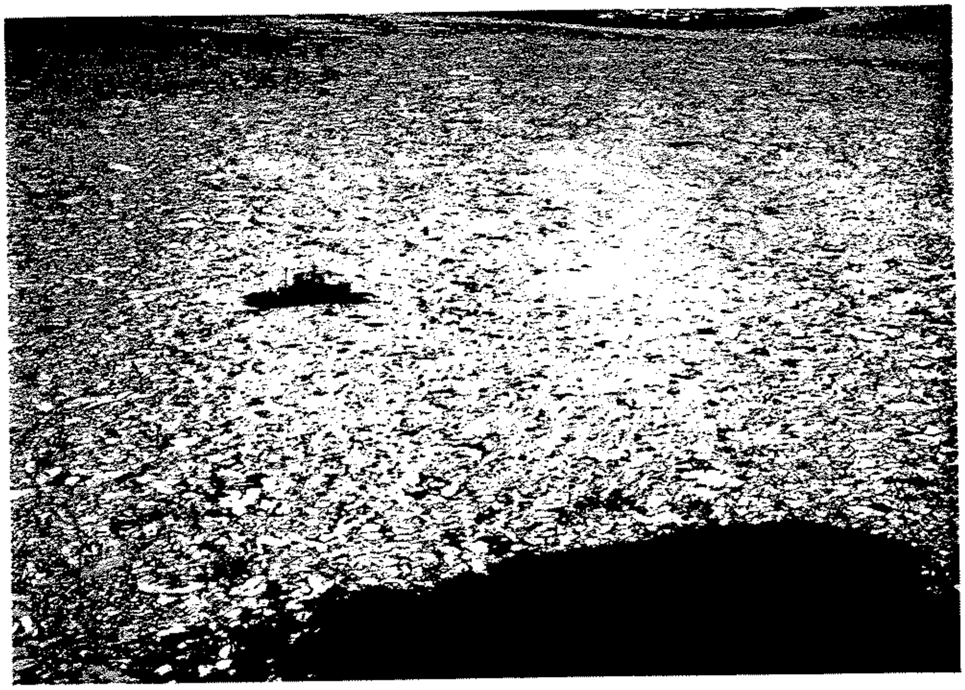

PHOTO 2. CCGS "Des GROSEILLIERS" IN FORBES SOUND

This photograph, taken on August 15^{th}, while freight was being airlifted ashore, illustrates the problems posed by lingering sea ice in the Killiniq area in both 1983 and 1984. Ice like this had periodically filled surrounding bays and harbours for the preceeding month and continued to do so, depending on the local wind and tide, for most of the subsequent two weeks, hampering the deployment of static gears. Initial exploratory fishing efforts were directed at the Labrador section of the study area where the ice was not as prevalent.

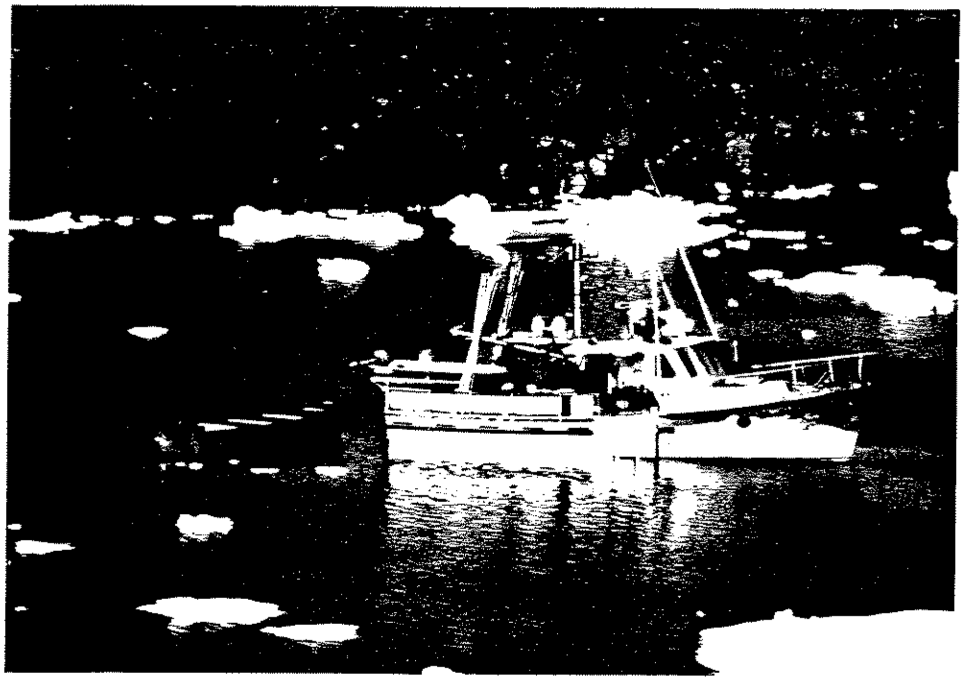

PHOTO 3. CHARTERED FISHING VESSEL IN PLANT HARBOUR

The FV "Bradley Jeremy", out of Chevery, Quebec, was chartered for the Phase II exploratory program. This vessel, a 12.2 meter gillnetter constructed of fibreglass, is described in detail in section B.2.b (i) of this report.

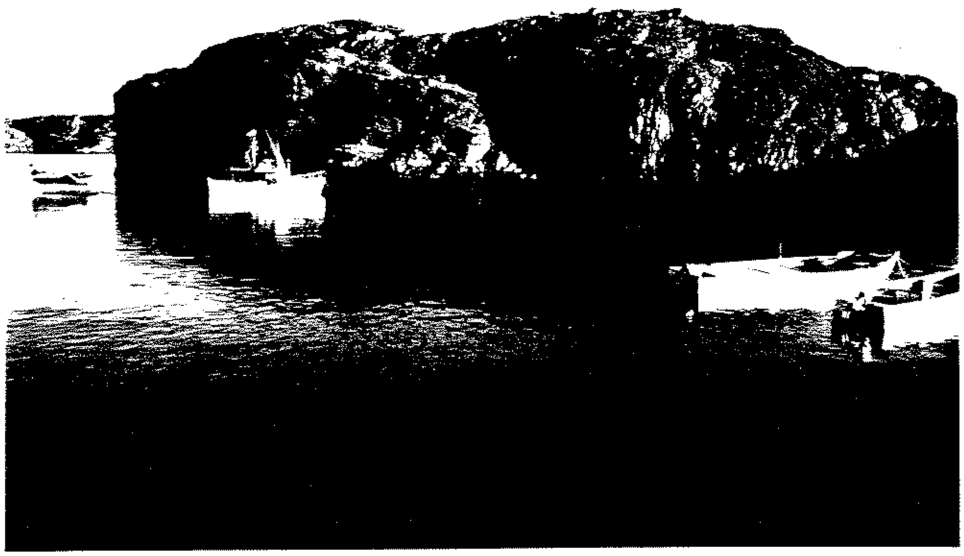

PHOTO 4. PROJECT VESSELS IN PLANT HARBOUR

In the foreground at right sit the two open trap boats brought to Killiniq primarily for the Killiniq-based experimental fishery. Note that the larger (left) of these vessels, the "Kanayuk", is outfitted with a mini-gurdy system visible toward the bow. Details of these vessels are given in section B.2.b (i) of this report.

In the background at left sit the "Bradley Jeremy" and a floatplane typical of those used to move people and supplies to and from the site during the project. Flying time to Kuujjuaq, Québec is approximately two hours.

PHOTO 5. "KANAYUK" HAULING GILLNETS NEAR KILLINIQ

Most fishing in the experimental fishery was undertaken with this vessel. The better fishing sites near Killiniq were within 10 to 15 minutes sailing time from the plant however, subject to sea conditions and visibility, the effective range of such a vessel is significantly greater if so required. Note the twisting of the gillnet being hauled; a frequent result of tidal currents in this area.

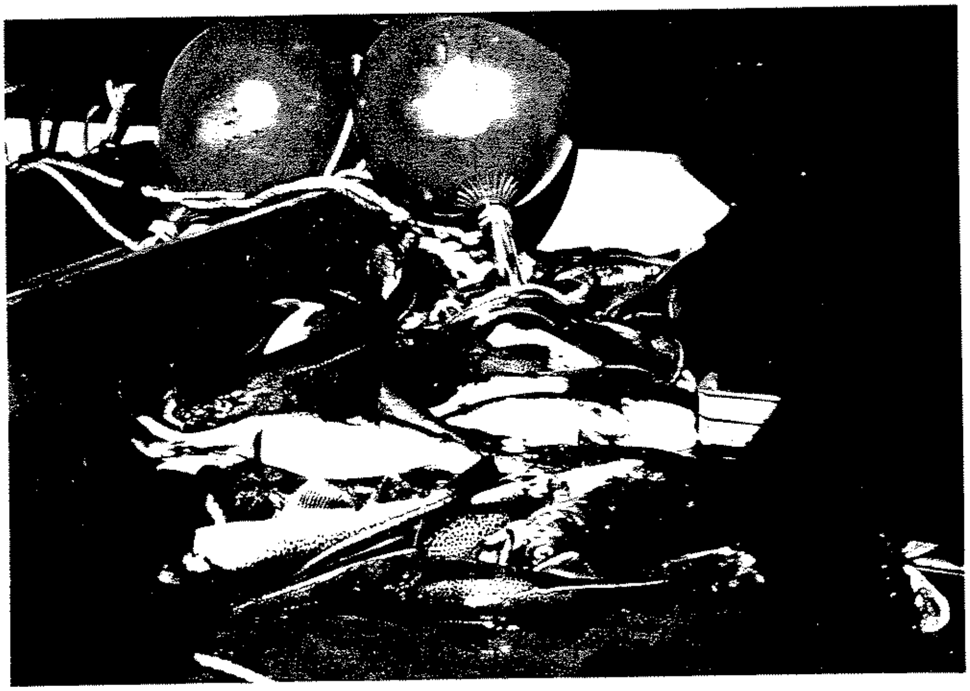

PHOTO 6. FRESHLY LANDED ATLANTIC COD

As discussed in the text of this report (section C.2.b (i)), catches of Atlantic cod were generally small and sporadic in 1984. The large individual size of fish in the catch, evident in this photograph, was characteristic of gillnetted catches both in 1983 and 1984.

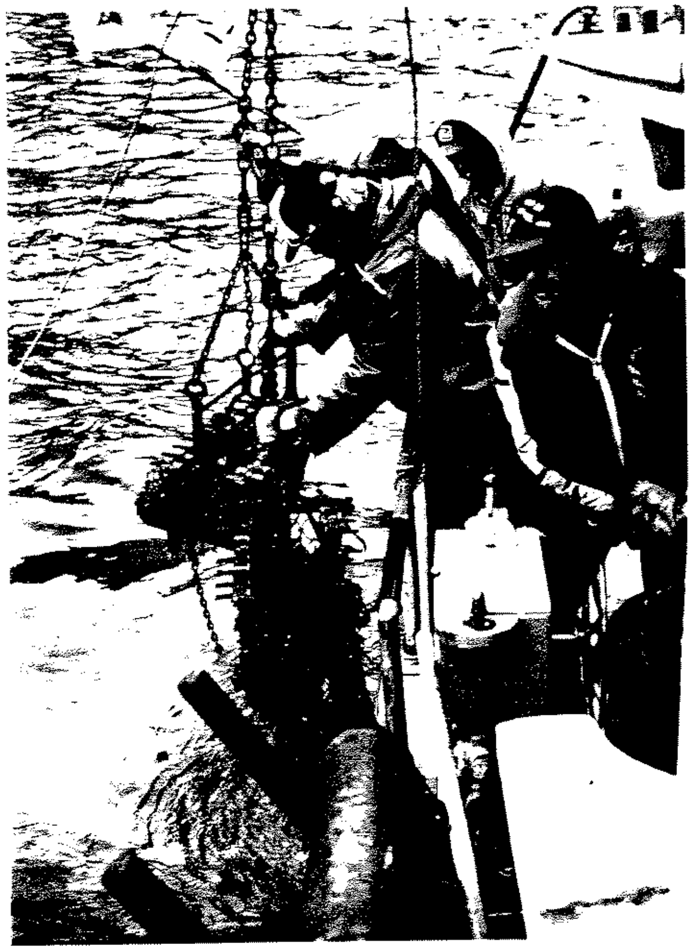

PHOTO 7. RETREIVING SCALLOP GEAR ABOARD "BRADLEY JEREMY"

The "Bradley Jeremy" was outfitted with a "make-shift" scallop rig for the 1984 season and scallop explorations were undertaken opportunistically. Two Digby buckets with teeth were attached to a single bar and towed from the starboard side with a rope. The gillnet gurdy was used in place of a proper winch.

The depth limit of this rig was approximately 30 fathoms. While the use of this gear in 1984 showed that Iceland scallops were widely distributed across the study area, its effectiveness was much lower than the fully commercial rig used in the subsequent season.

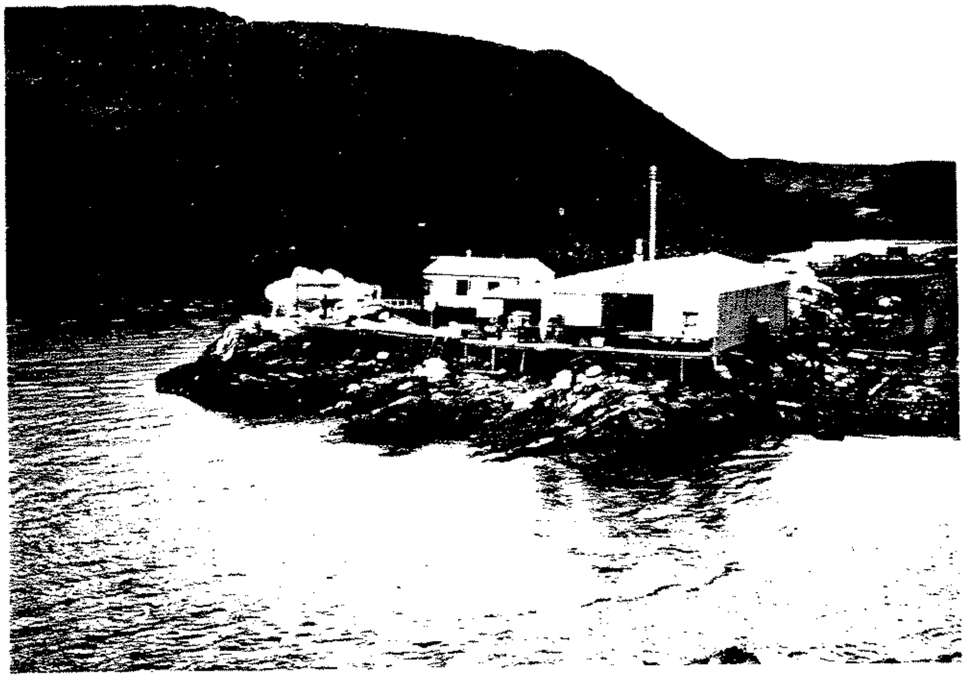

PHOTO 8. THE FISH PLANT AT KILLINIQ

Visible here is the main plant building in the right foreground and the gear shop back to the left. A portion of the freezer building is visible between these two structures. The mast and boom of the fish hoist sits at the edge of the natural wharf at the far left of the site.

Parts of the fish plant complex were retrofitted during Phase II to conform to current regulations for the production of salted products.

PHOTO 9. PROCESSING COD AT THE FISH PLANT

Fish taken near Killiniq were split, washed and salted down in the processing area of the main plant building shown here (see figure 5 in text). Fish taken in exploratory fishing further afield were split onboard "Bradley Jeremy" and lightly salted until it could be repacked at the plant, usually several days after.

PHOTO 10. INUIT FISHERMAN PILOTING "BRADLEY JEREMY"

By 1984, the Inuit of Killiniq had shown considerable interest in acquiring their own fishing vessel. In anticipation of this, two of the future crew members (Kenny Assevik shown here) were assigned as crew on the "Bradley Jeremy" for the entire season. In addition to gaining experience in the operation of the gear, they were introduced to the use of wheelhouse electronics, general seamanship and routine vessel maintenance.

APPENDIX B

DAILY METEOROLOGICAL RECORDS

The following meteorological records were made at Killiniq between July and October 1984 by MOT Personnel from "VAW" Killiniq) (Source : Environment Canada, Canadian Climatological Center)

Key M = missing observation

Precipitation : TR = trace

Pressure Trends : S = steady

V = variable

R = rising

F = falling

APPENDIX - METEOROLOGICAL SUMMARY
KILLINIO FISHERY PROJECT, PHASE II

DATE	TEMPERATURE		PRECIPITATION	SEA LEVEL PRESSURE millibars		
	Min. °C	Max. °C	mm	Low	High	Trend
July 1	2.0	9.5		1008.8	1012.8	R
2	1.0	6.0		1013.1	1017.2	R
3	2.0	7.0		1012.7	1016.9	F
4	3.0	8.0	5.0	1000.2	1009.1	F
5	3.0	6.0	4.0	998.0	1001.9	R
6	3.0	10.0	TR	1003.6	1013.1	R
7	1.5	17.5	3.4	1009.3	1014.8	F
8	0.0	7.0	4.4	1002.9	998.7	R
9	M	M	M	998.1	1000.7	R
10	M	M	M	1004.9	1009.0	F
11	M	M	M	1003.2	1003.7	F
12	3.0	14.0	M	1004.6	1011.2	V
13	5.0	15.5	M	1008.2	1010.7	R
14	M	M	M	1011.3	1012.1	S
15	2.0	9.0	M	1011.1	1013.0	S
16	10.0	23.0	M	1003.2	1009.7	F
17	4.0	12.5	M	1001.0	1001.9	S
18	5.1	10.5	0.4	1000.2	1002.5	R
19	4.0	9.0	7.8	1000.2	1001.3	S
20	4.5	11.0	M	1000.3	1001.6	R
21	3.0	7.5	M	1006.0	1011.1	R
22	1.5	10.5	M	1010.8	1012.1	V

APPENDIX - METEOROLOGICAL SUMMARY
KILLINIQ FISHERY PROJECT, PHASE II

DATE	TEMPERATURE		PRECIPITATION	SEA LEVEL PRESSURE millibars		
	Min. °C	Max. °C	mm	Low	High	Trend
July 23	1.5	15.5	M	1002.5	1009.7	F
24	M	M	M	1002.3	1004.2	R
25	1.0	5.0	M	1003.6	1005.3	R
26	1.0	4.5	M	1004.1	1010.7	R
27	2.5	8.0	M	1011.6	1013.5	V
28	M	M	M	1010.8	1013.4	F
29	M	M	M	1013.2	1014.6	R
30	3.0	12.0	8.2	995.4	1012.3	F
31	M	M	M	992.6	996.1	R
Aug. 1	0.5	4.0	TR	995.6	1012.7	V
2	0.5	7.0	1.8	1001.3	1005.2	V
3	M	M	M	999.6	1004.4	V
4	M	M	M	976.1	991.8	F
5	0.0	2.5	2.8	982.5	995.9	R
6	M	M	M	997.8	1004.8	R
7	M	M	M	1002.9	1003.2	S
8	M	M	M	1003.1	1007.9	R
9	M	M	M	1011.5	1014.1	V
10	0.5	8.0	11.1	995.3	1004.6	V
11	0.5	4.5	M	1008.2	1019.3	R
12	3.0	7.5	7.7	1011.1	1018.7	F

APPENDIX - METEOROLOGICAL SUMMARY
KILLINIO FISHERY PROJECT, PHASE II

DATE	TEMPERATURE		PRECIPITATION	SEA LEVEL PRESSURE millibars		
	Min. °C	Max. °C	mm	Low	High	Trend
Aug. 13	0.0	4.5	1.9	1005.9	1013.5	R
14	0.3	10.8	M	1013.7	1016.9	F
15	0.5	17.0	M	996.4	1009.6	F
16	M	M	M	998.6	1008.5	R
17	0.0	4.5	M	1007.4	1007.9	S
18	3.5	8.0	6.3	1003.5	1004.9	S
19	0.5	9.0	M	1005.7	1010.5	R
20	M	M	M	1009.9	1011.1	F
21	3.0	13.0	14.0	996.5	1011.1	F
22	M	M	M	988.9	1004.9	R
23	M	M	M	1008.4	1010.9	R
24	0.5	4.5	-	1012.1	1015.9	R
25	3.0	12.5	-	1007.6	1013.7	F
26	4.0	10.5	17.4	997.3	1004.7	F
27	1.5	13.0	8.4	989.5	995.7	V
28	1.5	4.5	1.3	998.1	1006.7	R
29	2.5	9.5	-	1009.4	1015.6	R
30	1.8	9.0	-	1005.6	1012.8	F
31	4.5	14.0	5.2	998.7	1003.7	V
Sept. 1	3.0	8.0	5.0	1003.2	1010.0	R
2	2.5	9.0	7.4	1010.4	1015.7	R

APPENDIX - METEOROLOGICAL SUMMARY
KILLINIQ FISHERY PROJECT, PHASE II

DATE	TEMPERATURE		PRECIPITATION	SEA LEVEL PRESSURE millibars		
	Min. °C	Max. °C	mm	Low	High	Trend
Sept. 3	2.0	6.5	1.0	1017.6	1019.4	V
4	M	M	M	1018.4	1018.8	S
5	M	M	M	1014.6	1017.9	F
6	0.5	5.5	2.2	1010.5	1013.2	V
7	0.8	9.0	0.6	1015.3	1018.1	V
8	0.0	9.0	22.8	996.8	1007.1	V
9	-0.5	1.5	-	1008.4	1012.0	R
10	-0.5	3.8	-	1008.3	1009.9	V
11	-0.6	2.0	-	1008.8	1016.6	R
12	-0.8	2.0	-	1017.7	1021.2	R
13	0.0	4.0	0.8	1012.5	1019.8	F
14	0.0	8.0	-	1000.9	1006.6	V
15	-0.5	4.0	0.6	1001.5	1008.4	R
16	0.5	5.5	0.2	1006.7	1008.7	F
17	M	M	M	1004.6	1007.5	V
18	M	M	M	1009.2	1014.2	R
19	0.5	2.0	8.6	999.9	1012.1	F
20	1.0	4.0	8.4 (5.4 + 3.0)	986.9	993.7	V
21	2.5	7.5	1.4	994.8	1007.7	R
22	0.5	4.0	2.4 (2.2 + .2)	1010.5	1015.8	R
23	M	M	M	1007.3	1014.3	F
24	0.0	2.0	2.4 (4 + 2.0)	1002.5	1004.1	V

APPENDIX - METEOROLOGICAL SUMMARY
KILLINIQ FISHERY PROJECT, PHASE II

DATE	TEMPERATURE		PRECIPITATION	SEA LEVEL PRESSURE millibars		
	Min. °C	Max. °C	mm	Low	High	Trend
S. 25	-0.3	2.0	3.2	1004.7	1009.5	R
26	-0.4	1.5	20.0	974.4	1006.8	F
27	-3.5	-0.5	19.8	964.6	977.0	R
28	M	M	M	979.9	988.0	R
29	-1.5	0.5	-	988.4	1000.3	R
30	M	M	M	1004.0	1005.4	R
Oct. 1	M	M	M	M	M	M
2	M	M	M	M*	M*	M*
3	M	M	M	M**	M**	M**
4	1.0	3.0	TR	994.1	996.0	R
5	0.0	3.5	1.0	997.0	1011.1	R
6	-2.0	1.0	2.8	1015.0	1017.9	V
7	-1.0	1.0	4.0	998.5	1009.0	F
8	-1.0	0.2	6.3	1001.3	1014.9	R
9	-2.5	0.0	TR	1016.1	1018.2	F
10	-2.5	2.2	2.0	1014.7	1018.2	F

* 997.7 / one entry only
** 996.7 / one entry only

APPENDIX C

EXPERIMENTAL FISHERY
DAILY SUMMARY OF CATCH AND EFFORT

For zones please reference Figure C-1

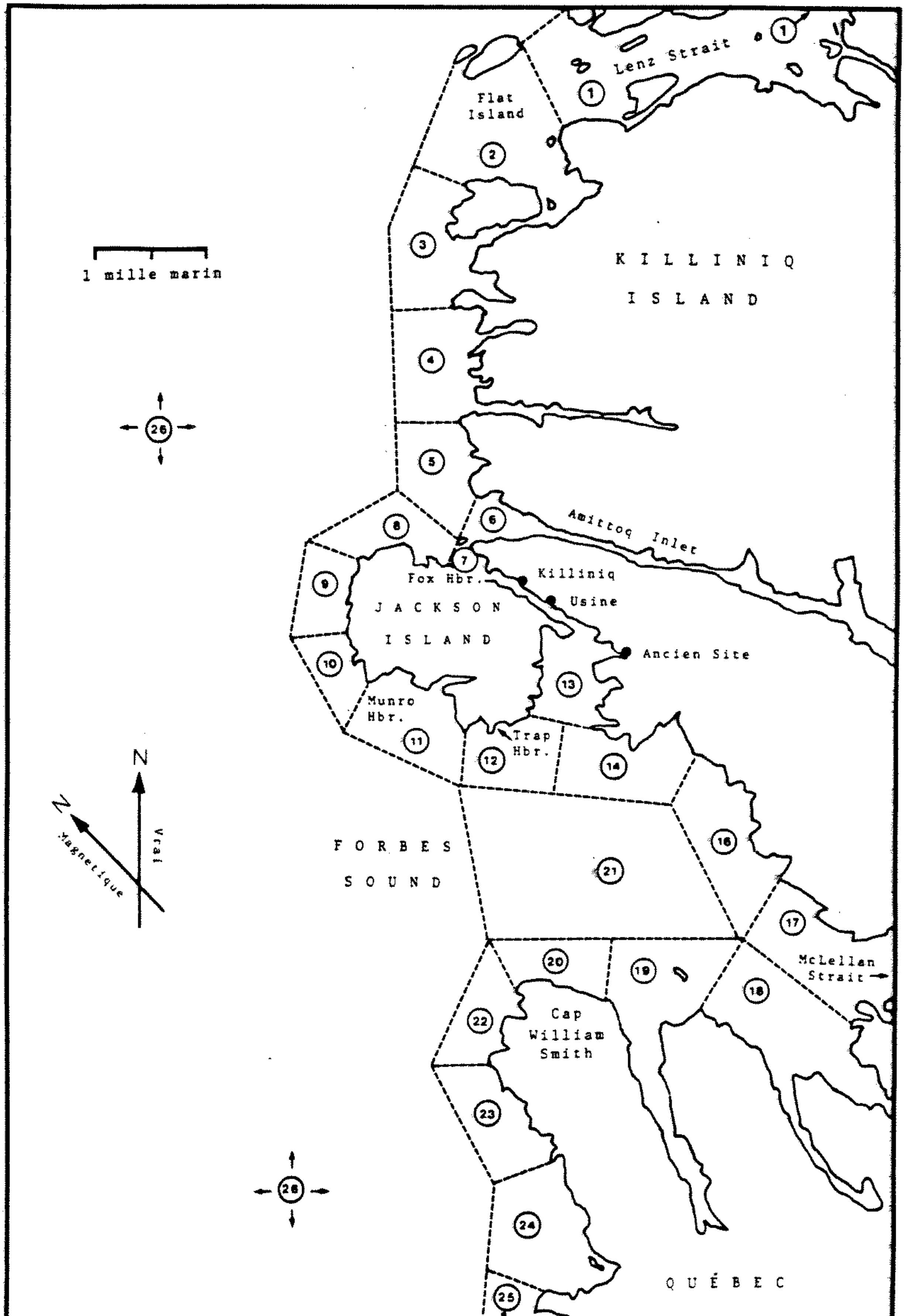

Figure C-1 FISHING ZONES, EXPERIMENTAL FISHERY, KILLINIQ FISHERIES PROJECT, PHASE II

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Aug 23	HAUL DATE : Aug 25	NITES : 2
WEATHER (HAULING)	Wind speed : 20-25 km	Wind direction : NW
Visibility : Good	Precipitation : ---	Seas : 4

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8	3 x 5½"	6	4.5	Lot of seaweed
10				
11				
12				
13				
14				
21				
OTHER				
TOTALS	3	6	4.5	

COMMENTS	

SET DATE : Aug 25	HAUL DATE : Aug 26	NITES : 1
WEATHER (HAULING)	Wind speed : 5-10 km	Wind direction : SSW
Visibility : Good	Precipitation : ---	Seas : 2

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11				
12				
13				
14				
21	3 x 5½"	3	0.0	
OTHER				
TOTALS	3	3	0.0	

COMMENTS	37 crab, 1 sculpin, 1 cod scavenged. Few seaweeds.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Aug 26	HAUL DATE : Aug 27	NITES : 1
WEATHER (HAULING)	Wind speed : 5-10 km	Wind direction : SE
Visibility : 3 mi	Precipitation : Rain	Seas : 2

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	3	3.6	Lot of seaweed
12				
13				
14				
21				
OTHER				
TOTALS	3	3	3.6	

COMMENTS: 4 sculpin, 6 crab. Light damage - 1 net.

SET DATE : Aug 27	HAUL DATE : Aug 28	NITES : 1
WEATHER (HAULING)	Wind speed : 5 km	Wind direction : SSW
Visibility : 2 mi.	Precipitation : Fog	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8	3 x 5½"	3	2.7	
10				
11				
12				
13				
14				
21				
OTHER				
TOTALS	3	3	2.7	

COMMENTS: 7 sculpin, 21 crab, lot of seaweed, 1 starfish (12 pt.). Light damage - 2 nets.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Aug 28	HAUL DATE : Aug 29	NITES : 1
WEATHER (HAULING)	Wind speed : 0	Wind direction : SW
Visibility : Good	Precipitation : ---	Seas : 0

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10	3 x 5½"	3	0.0	1 sculpin
11	3 x 5½"	3	0.0	*See below
12	2 x 5½"	2	0.0	*See below
13				
14				
21				
OTHER				
TOTALS	8	8	0.0	

COMMENTS * Few seaweed, 59 crab, 6 sculpin, 4 starfish, lots of rock.

SET DATE : Aug 29	HAUL DATE : Sept 01	NITES : 3
WEATHER (HAULING)	Wind speed : 0-5 km	Wind direction : W
Visibility : 1 mi.	Precipitation : Fog	Seas : 0

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	9	0.0	3 scavenged cod
12				
13				
14				
21				
OTHER				
TOTALS	3	9	0.0	

COMMENTS Lot of crab, few seaweed, 13 sculpin, few starfish.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Aug 31	HAUL DATE : Sept 01	NITES : 1
WEATHER (HAULING)	Wind speed : 0-5 km	Wind direction : W
Visibility : 1 mi.	Precipitation : Fog	Seas : 0

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5	3 x 6"	3	0.0	*See below
8				
10				
11				
12				
13				
14				
21				
OTHER				
TOTALS	3	3	0.0	

COMMENTS: Lot of seaweed, 4 sculpin, few starfish, few crab.

SET DATE : Sept 01	HAUL DATE : Sept 02	NITES : 1
WEATHER (HAULING)	Wind speed : 0+ km	Wind direction : South
Visibility : 3 mi.	Precipitation : ---	Seas : 0

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4	3 x 6"	3	0.0	Lot of seaweed
5				
8				
10				
11	3 x 5½"	3	2.3	1 Harp seal*
12				
13				
14				
21				
OTHER				
TOTALS	6	6	2.3	

COMMENTS: * Few seaweed, lot of crab.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 02	HAUL DATE : Sept 03	NITES : 1
WEATHER (HAULING)	Wind speed : 0+ km	Wind direction : W
Visibility : Good	Precipitation : ---	Seas : 0

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	3	3.4	4 harpseals*
12				
13				
14				
21				
OTHER				
TOTALS	3	3	3.4	

COMMENTS * Few crab, 3 sculpin, few starfish, 2 scallops.

SET DATE : Sept 03	HAUL DATE : Sept 04	NITES : 1
WEATHER (HAULING)	Wind speed : 0-5 km	Wind direction : South
Visibility : 100 m.	Precipitation : Fog	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	3	5.5	3 cod
12	3 x 5½"	3	0.0	Few crab, few stars
13				
14				
21	3 x 6"	3	2.3	Few crab, 1 cod
OTHER				
TOTALS	9	9	7.8	

COMMENTS

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 04	HAUL DATE : Sept 05	NITES : 1
WEATHER (HAULING)	Wind speed : 0+ km	Wind direction : SW
Visibility : Nil	Precipitation : Fog	Seas : 0

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	3	74.1	17 cod*
12				
13	3 x 5½"	3	3.2	1 cod, 1 seal*
14	3 x 6 "	3	0.0	*
21				
OTHER				
TOTALS	9	9	77.3	

COMMENTS * Few starfish, few seaweeds.

SET DATE : Sept 05	HAUL DATE : Sept 06	NITES : 1
WEATHER (HAULING)	Wind speed : 1 km	Wind direction : SE
Visibility : Good	Precipitation : ---	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10	3 x 6 "	3	172.2	45 cod
11	3 x 5½"	3	23.0	6 cod
12	3 x 5½"	3	34.4	9 cod
13				
14				
21				
OTHER				
TOTALS	9	9	229.6	

COMMENTS

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 06	HAUL DATE : Sept 09	NITES : 3
WEATHER (HAULING)	Wind speed : 20 km	Wind direction : W
Visibility : Good	Precipitation : ---	Seas : 4

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11				
12	3 x 5½"	9	105.7	29 cod, few seaweed*
13				
14				
21				
OTHER				
TOTALS	3	9	105.7	

COMMENTS * 5 cod scavenged, nets slimy.

SET DATE : Sept 06**	HAUL DATE : Sept 10	NITES : 4**
WEATHER (HAULING)	Wind speed : 5 km	Wind direction : SW
Visibility : Good	Precipitation : ---	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10	3 x 6 "	12		Catches from 3 zones
11	9 x 5½"	36	137.3	comb. total 38 cod.*
12	3 x 6 "	3**		
13				
14				
21				
OTHER				
TOTALS	15	51	137.3	

COMMENTS **Nets in zone 12 only hauled on Sept 09.
*Lot of seaweed, lot of crab, lot of starfish.
6 cod scavenged, 1 Lg cod lost, 1 greenland cod.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 10	HAUL DATE : Sept 11	NITES : 1
WEATHER (HAULING)	Wind speed : 15 km	Wind direction : NW
Visibility : Good	Precipitation : ---	Seas : 3

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10	3 x 6 "	3	10.7	
11	3 x 5½"	3	14.3	
12	3 x 5½"	3	28.6	
13	3 x 5½"	3	21.5	
14				
21				
OTHER				
TOTALS	12	12	75.1	

COMMENTS	Total 21 fresh cod, plus 2 scavenged plus 1 lost. A lot of seaplants. Rocks and crab in nets. Many sculpins.

SET DATE : Sept 11	HAUL DATE : Sept 12	NITES : 1
WEATHER (HAULING)	Wind speed : 15-20 km	Wind direction : NW
Visibility : Good	Precipitation : Snow flurries	Seas : 3

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	3 x 6"	3	5.0	
12	3 x 5½"	3	0.0	
13	6 x 5½"	6	10.1	
14				
21				
OTHER				
TOTALS	12	12	15.1	

COMMENTS	6 cod fresh plus 1 scavenged. Othercatch: 1 Greenland cod, 1 salmon, 1 arctic char, few sculpins, 2 harp seals, few seaplants, crabs, rocks.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 12	HAUL DATE : Sept 13	NITES : 1
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : WSW
Visibility : Good	Precipitation : ---	Seas : 2

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 6 "	3	6.2	
12	5 x 5½"	5	21.5	
13	3 x 5½"	3	9.2	
14				
21				
OTHER				
TOTALS	11	11	36.9	

COMMENTS 12 fresh cod, 2 scavenged cod. 1 Greenland cod, 2 harp seals, few sculpins, little debris.

SET DATE : Sept 13	HAUL DATE : Sept 14	NITES : 1
WEATHER (HAULING)	Wind speed : 0+	Wind direction : SW
Visibility : Good	Precipitation : ---	Seas : 0

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	3 x 6"	3	29.1	
12	5 x 5½"	5	40.0	
13	3 x 5½"	3	0.0	
14				
21				
OTHER				
TOTALS	11	11	69.1	

COMMENTS 19 cod fresh, plus 6 scavenged. 1 harp seal, 1 bearded seal. Many crabs few seaplants, rocks, sculpins, starfish.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 14	HAUL DATE : Sept 15	NITES : 1
WEATHER (HAULING)	Wind speed : N.R.	Wind direction : SE
Visibility : Good	Precipitation : Snow and rain	Seas : 2

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10	3 x 6 "	3	7.6	
11	2 x 5½"	2	34.3	
12	5 x 5½"	5	110.5	
13				
14				
21				
OTHER				
TOTALS	10	10	152.4	

COMMENTS: 40 cod fresh plus 6 scavenged, many crab, 1 harp seal, few seaplants, sculpins, rocks, starfish.

SET DATE : Sept 15	HAUL DATE : Sept 16	NITES : 1
WEATHER (HAULING)	Wind speed : N.R.	Wind direction : South
Visibility : Good	Precipitation : ---	Seas : 2

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	2 x 5½", 3 x 6"	5	140.0	Catches not separated.
12	5 x 5½"	5		
13				
14				
21				
OTHER				
TOTALS	12	12	140.0	

COMMENTS: 1 bearded seal; 1 scallop; few sculpins. Many basket stars; few other stars, rocks and seaplants.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 16	HAUL DATE : Sept 17	NITES : 1
WEATHER (HAULING)	Wind speed : N.R.	Wind direction : NW
Visibility : Good	Precipitation : ---	Seas : 4

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 6", 3 x 5½"	6	129.4	Catches not separated.
12	6 x 5½"	6	.	
13				
14				
21				
OTHER				
TOTALS	12	12	129.4	

COMMENTS: 4 scavenged cod, several seallop shells, 1 harp seal, few basket stars, other stars, crabs, sculpin and rocks; many seaplants.

SET DATE : Sept 17	HAUL DATE : Sept 18	NITES : 1
WEATHER (HAULING)	Wind speed : 5-10	Wind direction : SE
Visibility : Good	Precipitation : ---	Seas : 0

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	2 x 6", 2 x 5½"	5	24.2	
12	2 x 5½"	2	0.0	
13	3 x 5½"	3	4.8	
14				
21				
OTHER				
TOTALS	10	10	35	

COMMENTS: 6 cod all fresh. Many basket stars crabs and sculpins.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 18	HAUL DATE : Sept 20	NITES : 2
WEATHER (HAULING)	Wind speed : 0-5 km	Wind direction : SE
Visibility : Good	Precipitation : Rain	Seas : 0

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	5 x 5½"	10	190.4	
12	3 x 5½"	6	59.1	
13				
14				
21				
OTHER				
TOTALS	8	16	249.5	

COMMENTS 67 fresh cod, plus 12 scavenged plus 2 lost. Lot of crabs, few rocks and sculpins.

Note: Nets in zone 13 not hauled today.

SET DATE : Sept 18	HAUL DATE : Sept 21	NITES : 3
WEATHER (HAULING)	Wind speed : 15 km	Wind direction : SE
Visibility : Good	Precipitation : ---	Seas : 3

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11				
12				
13	3 x 5½"	9	53.8	
14				
21				
OTHER				
TOTALS	3	9	53.8	

COMMENTS See next table. These nets were set for 3 nites but hauled at the same time as those on next table.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 20	HAUL DATE : Sept 21	NITES : 1
WEATHER (HAULING)	Wind speed : 15 km	Wind direction : SE
Visibility : Good	Precipitation : ---	Seas : 3

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 5½"	3	215.2	
12	2 x 6 "	2	0.0	
13				
14				
21				
OTHER				
TOTALS	5	5	215.2	

COMMENTS: 1 harp seal; few crab, sculpin, seaplants, stars and rocks.

SET DATE : Sept 21	HAUL DATE : Sept 22	NITES : 1
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : NE
Visibility : Good	Precipitation : Snow flurries	Seas : 2

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	6 x 5½"	6	90.4	
12	3 x 5½", 3 x 6"	6	67.8	
13	4 x 5½"	4	22.6	
14				
21				
OTHER				
TOTALS	16	16	180.8	

COMMENTS: 2 harp seals; many crab and basket stars; few seaplants, sculpins and stars.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 22	HAUL DATE : Sept 23	NITES : 1
WEATHER (HAULING)	Wind speed : 10 km	Wind direction : SE
Visibility : Good	Precipitation : Rain	Seas : 1

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	6 x 5½"	6	130.6	
12	3 x 5½"	3	16.3	
13	4 x 5½", 3 x 6"	7	49.0	
14				
21				
OTHER				
TOTALS	16	16	195.9	

COMMENTS: Many crab, basket stars and seaplants; few sculpin and stars.

SET DATE : Sept 23	HAUL DATE : Sept 24	NITES : 1
WEATHER (HAULING)	Wind speed : 5 km	Wind direction : NE
Visibility : Good	Precipitation : ---	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	6 x 5½"	6	171.1	
12	3 x 5½"	3	24.4	
13	4 x 5½", 3 x 6"	7	97.8	
14				
21				
OTHER				
TOTALS	16	16	293.3	

COMMENTS: Gear hauled @ Longliner today. 2 harp seals; 1 thorny skate; 1 Greenland cod. Many basket stars and crab; few rocks, seaplants and sculpins.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Sept 24	HAUL DATE : Sept 25	NITES : 1
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : NW
Visibility : Good	Precipitation : Snow	Seas : 3

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11	3 x 6", 3 x 5½"	6	136.5	
12	2 x 5½"	2	45.5	
13				
14				
21				
OTHER				
TOTALS	8	8	182.0	

COMMENTS: Few seaplants, sculpins, rocks and basket stars.

SET DATE : Sept 25	HAUL DATE : Oct 03	NITES : 8
WEATHER (HAULING)	Wind speed : 15-25 km	Wind direction : WSW
Visibility : Good	Precipitation : ---	Seas : 4

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	4 x 5½"	32	40.9	
12	3 x 6", 3 x 5½"	48		
13				
14				
21				
OTHER				
TOTALS	10	80	40.9	

COMMENTS: Major storm, no fishing since Sept 25. Most cod scavenged. 1 set (2 x 5½") lost completely incl. bouys; much damage to others.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Oct 03	HAUL DATE : Oct 04	NITES : 1
WEATHER (HAULING)	Wind speed : 15-20 km	Wind direction : SSW
Visibility : Good	Precipitation : ---	Seas : 3

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4 5 8 10 11 12 13 14 21 OTHER	2 x 5½"	2	2.7	Few sculpin, crab
TOTALS	2	2	2.7	

COMMENTS: Sets in zone 11 not hauled due to weather.

SET DATE : Oct 03	HAUL DATE : Oct 05	NITES : 2
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : SE
Visibility : Good	Precipitation : Rain	Seas : 1

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4 5 8 10 11 12 13 14 21 OTHER	2 x 5½"	4	0.0	
TOTALS	2	4	0.0	

COMMENTS: See next table.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Oct 04	HAUL DATE : Oct 05	NITES : 1
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : SE
Visibility : Good	Precipitation : Rain	Seas : 1

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11				
12	2 x 5½"	2	7.3	3 cod
13				
14				
21				
OTHER				
TOTALS		2	7.3	

COMMENTS Few sculpins, stars, crabs and seaplants.

SET DATE : Oct 05	HAUL DATE : Oct 06	NITES : 1
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : SW
Visibility : Good	Precipitation : ---	Seas : 2

CATCH Zone	Nets used	Net days	Catch (kg)	Comments
4				
5				
8				
10				
11	2 x 5½"	2	0.0	
12	2 x 5½"	2	17.3	Many basket star.
13				
14				
21				
OTHER				
TOTALS		4	17.3	

COMMENTS Few seaplants, sculpins and stars; many rocks. 1 harp seal.

EXPERIMENTAL FISHERY SUMMARY SHEET

SET DATE : Oct 06	HAUL DATE : Oct 09	NITES : 3
WEATHER (HAULING)	Wind speed : 10-15 km	Wind direction : NW
Visibility : Good	Precipitation : Snow flurries	Seas : 2

CATCH Zone	Nets used	Net days	Cod Catch (Kg)	Comments
4				
5				
8				
10				
11				
12				
13	4 x 5½"	12	8.2	
14				
21				
OTHER				
TOTALS		12	8.2	

COMMENTS: 2 cod fresh (8.2 kg.), plus 5 scavenged. 2 harp seal; many crab, seaplants and basket stars; few sculpin, stars and rocks.

APPENDIX D

EXPLORATORY SURVEY DATA SUMMARY

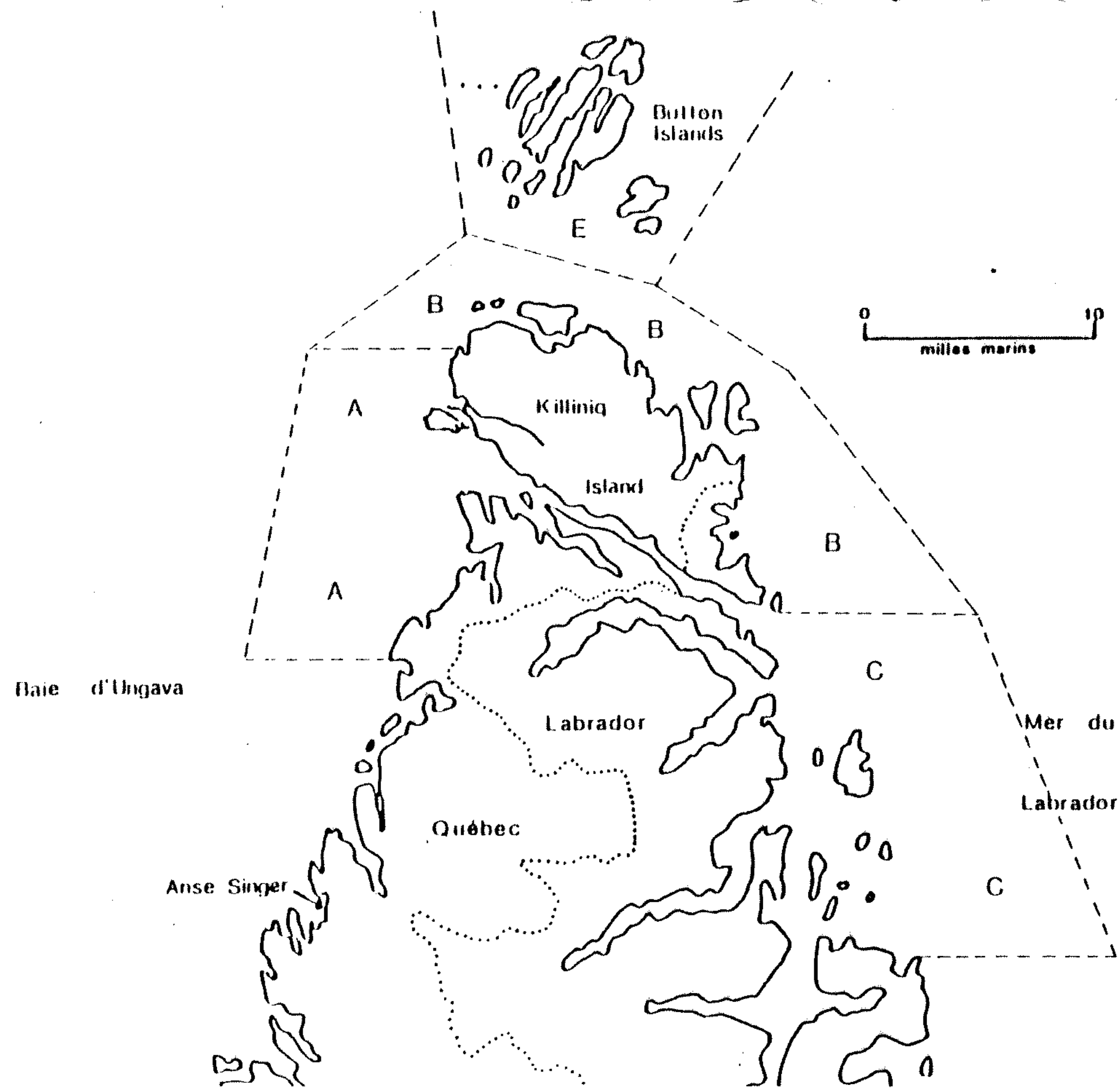

FIGURE D-1. SOUS-ZONES CREEES POUR L'ANALYSE DES RESULTATS DE LA PÊCHE EXPLORATOIRE, PROJECT DES PÊCHERIES DE KILLINIQ, PHASE II.

D

D-1 EXPLORATORY SET RECORD

Key :

Set No. : 1-199 = Bottom Gillnet
200-299 = Hand Jig
300-399 = Cod Trap
500-599 = Geometric Gang Net
600-699 = Trammel net
800-899 = Scallop dredges

Vessel :
B.J. = Bradley Jeremy
B.P. = Burwell Pride

Gear :
3 X 7" (example) = 3 nets of 7" mesh
NFLD = Newfoundland hand jig
NOR = Norwegian hand jig
G.G. x 3 = 3 geometric gang nets
Tram x 1 = 1 Trammel net

General Location :
C.W.S. = Cape William Smith
N/A = non available

Zone : For general orientation of sets, see Figure D-1

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
						DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
1	B.J.	2 x 6", 2 x 5½"	IKKUDLIAYUK FJ.	60°07.0 N 64°23 W	C	Aug 6	19:30	23-26	Aug 7	09:20	23-26	1	
2	B.J.	4 x 5½"	IKKUDLIAYUK FJ.	60°08 N 64°27 W	C	Aug 6	20:00	18-21	Aug 7	10:15	18-21	1	No seaweed
3	B.J.	2 x 6", 2 x 5½"	EKORTIARSUK FJ.	59°57 N 64°24 W	C	Aug 7	18:20	7-10	Aug 9	12:20	7-10	2	
4	B.J.	4 x 5½"	EKORTIARSUK FJ.	59°54 N 64°29 W	C	Aug 7	17:10	18-21	Aug 9	10:45	18-21	2	Invertebrate sample
5	B.J.	2 x 5½", 2 x 6"	EKORTIARSUK FJ.	59°59 N 64°23 W	C	Aug 9	17:50	22-30	Aug 10	11:55	22-30	1	
6	B.J.	4 x 5½"	EKORTIARSUK FJ.	59°55 N 64°33 W	C	Aug 9	11:20	69-70	Aug 10	10:30	69-70	1	
7	B.J.	1 x 4½ surface	EKORTIARSUK FJ.	59°57 N 64°23 W	C	Aug 9	17:10	surface	Aug 9	20:00	surface	(2:50 hrs.)	
8	B.J.	1 x 4½ surface	EKORTIARSUK FJ.	59°57 N 64°23 W	C	Aug 9	20:00	surface	Aug 10	10:00	surface	1	
9	B.J.	4 x 6"	BLANDFORD HBR.	60°29.3N 64°41.3W	B	Aug 19	15:15-15:22	6-25	Aug 19	16:11-16:26	6-25	(0.56 hrs.)	Ice threatened net
10	B.J.	4 x 6"	AMITTOQ MOUTH	60°25.8N 64°51.45W	A	Aug 18	13:34-13:38	28-32	Aug 18	14:55-15:25	25-30	(1:21 hrs.)	Several rips from ice - ice covered net difficult haul
11	B.J.	4 x 6"	LADY JOB HBR.	60°27.4N 64°36.0W	B	Aug 20	10:25-10:28	30-50	Aug 20	16:31-16:45	30-53	(6:06 hrs.)	
12	B.J.	4 x 7"	BURGESS INLET	60°25.7N 64°33.0W	B	Aug 20	10:57-11:00	30-34	Aug 20	15:17-15:41	31-33	(4:20 hrs.)	
13	B.J.	2 x 6"x 2 x 7"	BURGESS INLET	60°25.8N 64°36.2W	B	Aug 20	11:10-11:13	16-29	Aug 20	15:50-16:06	20-24	(4:40 hrs.)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING DATE	SETTING TIME	SETTING DEPTH fm	HAULING DATE	HAULING TIME	HAULING DEPTH fm	DURATION No. of NIGTHS	COMMENTS
14	B.J.	4 x 6"	O'BRIEN HBR	$60^{\circ}24.4N$ $64^{\circ}30.6W$	B	Aug 20	11:41-11:43	17-17	Aug 20	14:39-14:49	17-17	(2:58 hrs.)	
15	B.J.	4 x 6"	Off C.W.S.	$60^{\circ}22.8N$ $64^{\circ}56.3W$	A	Aug 21	10:01-10:05	55-65	Aug 21	12:34-12:59	45-54	(2:33 hrs.)	Rotten webbings in this net
16	B.J.	4 x 6"	Off FORBES Sd.	$60^{\circ}22.7N$ $64^{\circ}58.0W$	A	Aug 21	10:12-10:16	56-58	Aug 21	12:07-12:22	57-58	(1:55 hrs.)	Poor webs
17	B.J.	4 x 6"	Off W. Pt. of NORTH STAR ISLAND	$60^{\circ}22.0N$ $64^{\circ}24.3W$	B	Aug 22	10:21-10:27	51-49	Aug 23	14:32-14:56	49-49	1	2 seals damage net - net drifted N a little (1/4 mile app.) Roll#3,f32 eaten harp seal
18	B.J.	2 x 7", 2 x 6"	E. of ROBINSON Is.	$60^{\circ}20.5N$ $64^{\circ}25$ W	B	Aug 22	10:46-10:49	30-25	Aug 23	14:00-14:19	24-29	1	
19	B.J.	4 x 7"	1½ m N of PARMENTER Is.	$60^{\circ}18.6N$ $64^{\circ}23.0W$	B	Aug 22	11:12-11:16	20-24	Aug 23	13:10-13:38	23-24	1	Nets full of kelp
20	B.J.	4 x 6"	SE of BECH PT.	$60^{\circ}12.7N$ $64^{\circ}21.2W$	C	Aug 22	12:14-12:18	32-38	Aug 23	12:00-12:16	30-36	1	
21	B.J.	4 x 5½"	E of ROWLAND PT. + S tip of NIMBUS Is.	$60^{\circ}10.0N$ $64^{\circ}21.5W$	C	Aug 22	12:42-12:46	21-23	Aug 23	11:25-11:39	20-21	1	Nice clean net - Roll #3, f 18-30 boys @ work
22	B.J.	4 x 5½"	MIDDLE Hbr. of IKKUDLIAYUK	$60^{\circ}05.0N$ $64^{\circ}27.0W$	C	Aug 22	13:55-13:57	22-22	Aug 23	10:42-10:53	22-22	1	Clean and very empty nets
23	B.J.	4 x 10"	Between MERMAID and PARMENTER Is.	$60^{\circ}17.7N$ $64^{\circ}21$ W	B	Aug 23	15:54-15:59	48-50	Aug 24	16:18-16:35	44-45	1	No fish eaten and 6-10 fish very alive
24	B.J.	2 x 6", 2 x 7"	E. of GASPER Is.	$60^{\circ}15.5N$ $64^{\circ}15.3W$	C	Aug 23	16:25-16:29	33-48	Aug 24	14:07	40-60	1	Set over a ledge

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
						DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
25	B.J.	4 x 7"	Between GASPER and MIGUEL ISLANDS	60°15.2N 64°18 W	C	Aug 23	16:42-16:45	26-53	Aug 24	13:27-13:58	51-51	1	Net damaged by rocks - Set over very steep ledge - Net full of rocks, haul from ledge bottom
26	B.J.	4 x 6"	Set NW of KOHLMEISTER towards GRENFELL Sd.	60°14 N 64°17.7 W	C	Aug 23	16:57-17:00	26-30	Aug 24	12:50-13:13	24-26	1	
27	B.J.	4 x 5½"	Between KOHLMEISTER Is. and JOLLIET INLET	60°12.9N 64°18.3W	C	Aug 23	17:09-17:12	15-25	Aug 24	12:26-12:40	18-27	1	2 cod eaten
28	B.J.	4 x 5½"	1 m. E. of Jolliet In.	60°12.5N 64°21.25W	C	Aug 23	17:23-17:26	37-40	Aug 24	11:50-12:13	37-40	1	
29	B.J.	2 x 6", 2 x 7"	E. of GASPER Is.	60°15.4N 64°16 W	C	Aug 24	15:41-15:44	45-50	Aug 25	9:19-9:48	42-48	1	
30	B.J.	4 x 7"	NW of GASPER Is.	60°15.7N 64°18 W	C	Aug 24	15:47-15:49	55	Aug 25	8:26-9:08	52-56	1	Lots of kelp, crabs & unusual amt of sea cucumbers
31	B.J.	4 x 6 "	½m NE THOMAS PT.	60°19.7N 64°24.3W	B	Aug 24	10:40-10:53	16-27	Aug 25	10:40-10:53	17-21	1	Net drifted SW onto shoals
32	B.J.	4 x 6"	E. of ROBINSON Is.	60°20.5W 64°24.6W	B	Aug 24	17:11-17:15	30-40	Aug 25	11:00-11:26	30-42	1	
33	B.J.	4 x 5½"	E. of CROWELL INLET	60°21.25N 64°26 W	B	Aug 24	17:34-17:38	31-50	Aug 25	11:42-12:06	43-43	1	
34	B.J.	4 x 5½"	SW of GOULD PT.	60°23 N 64°26 W	B	Aug 24	17:52-17:55	22-40	Aug 25	12:22-12:56	10-20	1	Net moved SE into shallower water
35	B.J.	4 x 5½"	O'BRIEN Hb.		B	Aug 25	13:19-13:22	21-30	Aug 26	16:40-16:59	21-28	1	Surface water temp. 0°C
36	B.J.	4 x 5½"	BURGESS INLET	60°26 N 64°34 W	B	Aug 25	13:47-13-49	33-35	Aug 26	15:34-16:06	30-33	1	Extensive damage to webbing

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
						DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
37	B.J.	4 x 6"	West side of KILLINIQ IS.	60°28 N 64°52.5W	A	Aug 25	16:00-16:04	25-35	Aug 26	11:27-13:00	36	1	Net ripped in two places
38	B.J.	4 x 6"	North of FRITZ'S ARM	60°27 N 64°54 W	A	Aug 25	16:10-16:13	48-50	Aug 26	11:30-12:12	35-55	1	Net badly damaged
39	B.J.	2 x 6", 2 x 7"	West of FRITZ'S ARM	60°26.7N 64°52.6W	A	Aug 25	16:19-16:22	40-50	Aug 26	10:33-11:20	35-46	1	Nets torn up badly
40	B.J.	4 x 5½"	East of GASPER IS.	60°15.3N 64°16.3W	C	Aug 26	18:51-18:54	30-50	Aug 27	13:05-13:40	50-50	1	Fish on sounder @ 30 f.
41	B.J.	4 x 5½"	SE of GASPER IS.	60°14.8N 64°15.4W	C	Aug 26	18:59-19:02	45-49	Aug 27	12:17	44-	1	
42	B.J.	4 x 6"	SE of MIGUEL ISLAND	60°13.9N 64°14.3W	C	Aug 26	19:07-19:09	28-34	Aug 27	11:24	42-	1	Set over a hump
43	B.J.	4 x 6"	SE of KOHLMEISTER Is.	60°13.3N 64°14.7W	C	Aug 26	19:17-19:21	24-47	Aug 27	14:00-14:22		1	
44	B.J.	2 x 6", 2 x 7"	SE of KOHLMEISTER Is. NE of KMOCK ISLAND	60°12.6N 64°14.6W	C	Aug 26	19:35-19:38	10-15	Aug 27	10:10-10:54	15-18	1	50% webbing missing in setting - 3 nets replaced with 6"
45	B.J.	4 x 7"	North of JOKSUT INLET	60°13.7N 64°23.2W	C	Aug 26	20:08-20:11	49-53	Aug 27	08:59-09:28	10-38	1	Net moved, hauled mostly from 10-17 f.
46	B.J.	4 x 5½"	GASPER ISLAND	60°15 N 64°13 W	C	Aug 29	16:39-16:42	40-50	Aug 31	11:11-11:42	46-50	2	Some damage 1 net
47	B.J.	4 x 5½"	Islands east GASPER Is.	60°14.7N 64°14.3W	C	Aug 29	16:43-16:50	45-32	Sept 1	10:58-11:41	39-34	3	
48	B.J.	4 x 5½"	Between outer Islands & GASPER	60°14.6N 64°14.2W	C	Aug 29	16:54-16:59	50-45	Sept 1	10:00-10:48	47-40	3	Last net torn

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING DATE	SETTING TIME	SETTING DEPTH fm	HAULING DATE	HAULING TIME	HAULING DEPTH fm	DURATION No. of NIGHTS	COMMENTS
49	B.J.	4 x 6"	Between outer Islands & GASPER	60°14.3N 64°24.8W	C	Aug 29	17:01-17:05	40-20	Sept 1	09:22-09:45	28-20	3	Rough bottom, up and down
50	B.J.	4 x 6"	NW GASPER Island	60°15.4N 64°17.7W	C	Aug 29	17:14-17:18	29-49	Aug 31	10:15-10:45	28-42	2	No damage. Strong wind, heavy swell
51	B.J.	4 x 7"	Between GASPER & DUCK Islands	60°14.8N 64°18.8W	C	Aug 29	17:25-17:30	41-48	Aug 30	09:25-10:25	42-42	1	No damage. Strong wind, heavy swell
52	B.J.	4 x 5½"	NW of GASPER Is.	60°15.4N 64°17.7W	C	Aug 31	12:00-12:05	39-50	Sept 1	12:21-12:51	30-36	1	Some damage. Not extensive. Strong winds when setting.
53	B.J.	4 x 6"	West of GASPER Is.	60°15.1N 64°17.5W	C	Aug 31	12:07-12:11	34-50	Sept 1	13:00-13:37	28-37	1	Some damage to webs. Strong winds when setting.
54	B.J.	4 x 7"	½ m. N. of MIGUEL Is.	60°19.0N 64°14.5W	B	Aug 31	12:12-12:15	42-48	Sept 1	13:50-14:21	33-46	1	No damage.
55	B.J.	2 x 7", 2 x 5½"	½ mile W. JACKSON Is.	60°20.8N 64°41.1W	A	Sept 2	14:59-15:02	59-69	Sept 3	08:46-09:02	58-70	1	
56	B.J.	4 x 6"	1½ mile NW JACKSON	60°25.5N 64°55.6W	A	Sept 2	15:14-15:18	54-45	Sept 3	09:14-09:44	38-38	1	
57	B.J.	4 x 5½"	2½ mile NW JACKSON	60°23.0N 64°56.8W	A	Sept 2	15:26-15:30	70-82	Sept 3	09:54-10:19	72-75	1	
58	B.J.	4 x 5½"	2½ mile from JACKSON	60°22.0N 64°56.5W	A	Sept 2	15:35-15:39	64-70	Sept 3	10:31-10:50	64-69	1	Net very clean
59	B.J.	4 x 5½"	3½ mile from JACKSON	60°21.5N 64°57.0W	A	Sept 2	15:48-15:51	54-59	Sept 3	11:00-11:18	52-55	1	Net very clean
60	B.J.	4 x 6"	4½ mile from JACKSON	60°20.4N 64°55.4W	A	Sept 3	15:59-16:03	40-45	Sept 3	11:27-11:55	40-42	1	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING DATE	SETTING TIME	SETTING DEPTH fm	HAULING DATE	HAULING TIME	HAULING DEPTH fm	DURATION No. of NIGHTS	COMMENTS
61	B.J.	4 x 6"	½ m. SW of tip of C.W.S	60°21.3N 64°52.2W	A	Sept 3	14:14-14:17	23-32	Sept 4	12:35-12:57	15-32	1	
62	B.J.	4 x 5½"	½ mile C.W.S 2 mile JACKSON Is.	60°22.5N 64°52.3W	A	Sept 3	14:22-14:24	45-51	Sept 4	12:11-12:27	45-50	1	Net clean
63	B.J.	4 x 5½"	2 mile C.W.S. 1 mile JACKSON Is.	60°23.6N 64°52.8W	A	Sept 3	14:31-14:53	44-48	Sept 4	11:16-11:32	41-46	1	
64	B.J.	4 x 5½"	¼ to ½ mile due west of JACKSON Is.	60°23.3N 64°54.0W	A	Sept 3	15:04-15:07	40-70	Sept 4	10:34-11:00	47-68	1	
65	B.J.	4 x 6"	2½ mile C.W.S. ½ mile JACKSON Is.	60°24.0N 64°53.0W	A	Sept 3	15:21-15:24	42-58	Sept 4	10:02-10:22	48-60	1	
66	B.J.	2 x 7", 2 x 5½"	1 1/8 mile C.W.S. 1 1/8 mile JACKSON Is.	60°23.3N 64°51.4W	A	Sept 3	15:50-15:53	18-50	Sept 4	11:43-11:58	10-48	1	
*67													*missed a set #
68	B.J.	4 x 6"	1½ mile C.W.S. 1½ mile JACKSON Is.	60°22.7N 64°54.0W	A	Sept 4	16:01-16:04	53-50	Sept 5	10:45-11:11	48-48	1	
69	B.J.	4 x 6"	½ mile JACKSON Is. 1½ mile C.W.S.	60°23.3N 64°52.4W	A	Sept 4	16:12-16:14	44-59	Sept 5	11:16-11:32	55-57	1	
70	B.J.	2 x 7", 2 x 5½"	1 mile from C.W.S. + JACKSON Is.	60°23.3N 64°52.0W	A	Sept 4	16:19-16:23	54-60	Sept 5	11:27-12:20	51-53	1	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
						DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
71	B.J.	4 x 5½"	S.W. of East end of MUNROE HARBOUR	60°24.5N 64°53.7W	A	Sept 4	16:35-16:38	18-60	Sept 5	10:18-10:40	20-59	1	
72	B.J.	4 x 5½"	FOX HARBOUR N. of Jackson Is.	60°25.6N 64°53.0W	A	Sept 4	16:34-16:57	18-37	Sept 5	09:45-10:14	36-19	1	Last 2 nets moved.
73	B.J.	4 x 6"	FOX HARBOUR	60°26.1N 64°53.5W	A	Sept 4	17:00-17:03	14-50	Sept 5	09:16-09:42	15-49	1	
74	B.J.	2 x 5½, 4 x 6, 2 x 7"	LABRADOR BANK	60°10.5N 63°34.5W	D	Sept 6	11:46-11:52	106-110	Sept 10	11:30	110	4	
75	B.J.	2 x 5½", 4 x 6"	LABRADOR BANK	60°11.7N 63°36 W	D	Sept 6	12:16	112-112	Sept 10	10:35-11:18	115-117	4	Last net, chain + buoy taken by Iceberg
76	B.J.	2 x 5½", 4 x 6"	OFF ISLAND (18)	60°11.6N 64°02.2W	C	Sept 6	15:42-15:44	47-50	Sept 7	08:33-09:15	46-48	1	
77	B.J.	2 x 5½", 4 x 6"	East side HOME Is.	60°10.6N 64°13.2W	C	Sept 7	10:08-10:10	30-44	Sept 9	08:12-09:30	45-46	2	Webs torn, footline parted
78	B.J.	3 x 6"	MOUTH JOLIET Inlet	60°12.9N 64°21.5W	C	Sept 9	13:45-13:47	40-45	Sept 10	16:53-17:44	41-53	1	Heavy damage by kelp. Very heavy kelp.
79	B.J.	1 x 6", 2 x 5½"	East side DUCK Is.	60°13.6N 64°19.5W	C	Sept 9	13:57-13:59	26-32	Sept 10	15:56-16:35	31-35	1	Webs badly ripped. Maximum kelp.
80	B.J.	4 x 5½"	4½ m. GASPER Is. 3½ m. HOME Is.	60°13.4N 64°10.9W	C	Sept 12	11:47-11:51	52-54	Sept 13	10:34-11.38	55-	1	Haul net 5½m. Gasper - 4m. Home Island.
81	B.J.	4 x 5½"	5½ m. GASPER Is. 1 m. Shoal #18	60°12 N 64°04 W	C	Sept 12	11:58-12:01	52-54	Sept 13	14:06-15:15	20-42	1	Haul ½ m. Shoal #18 - 5½ m. Gasper Is.
82	B.J.	4 x 5½"	6½ GASPER ISLAND 1 m. Shoal #18	60°11.5N 64°02.8	C	Sept 12	12:10-12:13	50-53	Sept 13	15:35-16:04	42-45	1	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
						DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
83	B.J.	4 x 6"	½-1m NW of Shoal #18	60°13N 64°11W	C	Sept 12	12:24-12:28	40-50	Sept 13	11:50-12:36	38-45	1	
84	B.J.	4 x 7"	4 m. HOME Island 1½ m. Shoal #18	60°10.5N 64°05.5W	C	Sept 12	12:30-12:35	54-56	Sept 13	12:45-13:57	46-50	1	
85	B.J.	4 x 6"	3 m. ESE Home Is. toward shoal # 18	60°08.3N 64°10 W	C	Sept 12	12:39-12:41	48-50	Sept 13	09:20-10:17	48-50	1	
86	B.J.	3 x 5½"	Mouth towards Robinson	60°19.8N 64°26.2W	B	Sept 13	19:26-19:29	20-25	Sept 14	08:40-08:51	20-25	1	
87	B.J.	3 x 5½"	JAYMES BAY Is. FOX HARBOUR	60°25.31N 64°49.81W	A	Sept 16	15:12-15:15	35-47	Sept 17	11:49-12:14	47-50	1	
88	B.J.	4 x 5½"	100 ft. off N. side JACKSON ISLAND	60°25.8N 64°52.8W	A	Sept 16	15:16-15:19	10-18	Sept 17	11:27-11:39	7-15	1	Slub & slime in water.
89	B.J.	4 x 7"	Mouth of MUNROE Hr.	60°24.5N 64°48.5W	A	Sept 16	16:45-16:48	10-80	Sept 17	10:49-11:07	12-48	1	Rough but not so much slub as above.
90	B.J.	5 x 6"	½ m. S.W. MUNROE Hr.	60°24.3N 64°48.1W	A	Sept 16	15:50-15:54	45-70	Sept 18	10:30-11:17	40-68	2	Webs torn badly. Slub in water.
91	B.J.	4 x 5½"	1 m. S.S.W. TRAP Hr.	60°23.8N 64°46.4W	A	Sept 16	16:09-16:12	60-65	Sept 17	09:42-10:32	68-69	1	Slub in water.
92	B.J.	4 x 6"	Mouth of TRAP Hr.	60°24.0N 64°46.9W	A	Sept 16	16:18-16.21	23-74	Sept 17	09.14:09:34	54-67	1	
93	B.J.	4 x 6"	N of JOKSUT Inlet	60°14.2N 64°25 W	C	Sept 18	17:01-17:05	30-31	Sept 20	17:26-17:53	29-30	2	Some slub in net. Couldn't haul Sept. 19. Strong S.E. wind. B.T. taken while hauling.

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
					DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
300	B.P.	Cod Trap	Trap HB.	60°24.35N 64°52.30W	Sept 6	12:00						
301	B.P.	Cod Trap	Trap HB.	60°24.35N 64°52.30W	Sept 7						Over nite	
302	B.P.	Cod Trap	Trap HB.	60°24.35N 64°52.30W	Sept 9							small berg ripped apart trap.
												only checked trap once set Sept. 6, 198 checked Sept. 7, 1984 (no catch) later in afternoon, small berg passed thru net and sat on trap till Sept. 9, 1984.

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR GEO. GANG x 1	GENERAL LOCATION	POSITION	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
					DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
500	B.P.	G.G. x 1	Center B.H.		Sept 9		15	Sept 10		15	1	Floating
501	B.P.	G.G. x 3	Burwell Hbr.		Sept 13			Sept 14			1	1 single web, + 1 double web
502	B.P.	G.G. x 3	Burwell Hbr.		Sept 14			Sept 15			1	1 single web, + 1 double web
503	B.P.	G.G. x 3	Burwell Hbr.		Sept 15			Sept 16			1	1 single web, + 1 double web
504	B.P.	G.G. x 3	Burwell Hbr.		Sept 16			Sept 17			1	1 single web, + 1 double web
505	B.P.	G.G. x 3	Burwell Hbr.		Sept 17			Sept 18			1	1 single web, + 1 double web
506	B.P.	G.G. x 3	Burwell Hbr.		Sept 18			Sept 19			1	1 single web, + 1 double web
507	B.P.	G.G. x 3	Burwell Hbr.		Sept 19			Sept 20			1	storm
508	B.P.	G.G. x 3	Burwell Hbr.		Sept 20			Sept 21			1	storm
509	B.P.	G.G. x 3	Burwell Hbr.		Sept 21			Sept 22			1	storm
510	B.P.	G.G. x 3	Burwell Hbr.		Sept 22			Sept 23			1	storm
511	B.P.	G.G. x 3	Burwell Hbr.		Sept 23			Sept 24			1	storm
512	B.P.	G.G. x 3	Burwell Hbr.		Sept 24			Sept 25			1	storm
513	B.P.	G.G. x 3	Burwell Hbr.		Sept 25			Oct 3			8	Nets picked up and ruined.

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR TRAMMELS NETS	GENERAL LOCATION	POSITION	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
					DATE	TIME	DEPTH fm	DATE	TIME	DEPHT fm		
600												
601	B.P.	Tram x 1	Burwell Hbr.		Sept 10			Sept 11			1	Floating
602	B.P.	Tram x 1	Burwell Hbr.		Sept 11			Sept 12			1	Floating
603	B.P.	Tram x 1	Burwell Hbr.		Sept 12			Sept 13			1	Floating
604	B.P.	Tram x 1	Burwell Hbr.		Sept 13			Sept 14			1	Floating
605	B.P.	Tram x 1	Burwell Hbr.		Sept 14			Sept 15			1	Floating
606	B.P.	Tram x 1	Burwell Hbr.		Sept 15			Sept 16			1	Floating
607	B.P.	Tram x 1	Burwell Hbr.		Sept 16			Sept 17			1	Floating
608	B.P.	Tram x 1	Burwell Hbr.		Sept 17			Sept 18			1	Floating
609	B.P.	Tram x 1	Burwell Hbr.		Sept 18			Sept 19			1	Floating
610	B.P.	Tram x 1	Burwell Hbr.		Sept 19			Sept 20			1	Floating
611	B.P.	Tram x 1	Burwell Hbr.		Sept 20			Sept 21			1	Floating
612	B.P.	Tram x 1	Burwell Hbr.		Sept 21			Sept 22			1	Floating
613	B.P.	Tram x 1	Burwell Hbr.		Sept 22			Sept 23			1	Floating

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR TRAMMEL NETS	GENERAL LOCATION	POSITION	SETTING			HAULING			DURATION No. of NIGHTS	COMMENTS
					DATE	TIME	DEPTH fm	DATE	TIME	DEPTH fm		
614	B.P.	Tram. x 1	Burwell Hbr.		Sept 23			Sept 24			1	Storm
615	B.P.	Tram. x 1	Burwell Hbr.		Sept 24			Sept 25			1	Storm
616	B.P.	Tram. x 1	Burwell Hbr.		Sept 25			Sept 30			5	Storm
617	B.P.	Tram. x 1	Burwell Hbr.		Sept 30			Oct 3			3	Storm

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			DURATION No. of MINUTES	COMMENTS
						DATE	TIME	DEPTH fm		
800	B.J.	2 drags	MOUTH, AMITTOQ Inlet	60°25.9N 64°50.7W	A	Aug 18	13:53-14:03	6-20	(0:10)	No damage. Tow speed 2.1--2.5 knots.
801	B.J.	2 drags	AMITTOQ INLET	60°25.9N 64°50.6W	A	Aug 18	14:08-14:39	5-13	(0:31)	No damage. Hooked several times.
802	B.J.	2 drags	FOX HARBOUR	60°25.5N 64°52.0W	A	Aug 18	15:40	6-17	(0:17)	No damage. Easy tow, lots of kelp.
803	B.J.	2 drags	AMITTOQ, outside	60°26 N 64°52 W	A	Aug 19	13:42	12-35	(0:22)	No damage.
804	B.J.	2 drags	BLANDFORD HARBOUR	60°29.2N 64°40.8W	B	Aug 19	15:33	6-14	(0:11)	No damage. Beaucoup kelp.
805	B.J.	2 drags	O'BRIEN HARBOUR	60°23 N 64°31 W	B	Aug 20	11:47	17-16	(0:21)	No damage. Flat bottom.
806	B.J.	2 drags	O'BRIEN HARBOUR	60°24 N 64°31 W	B	Aug 20	12:50	16-22	(0:19)	No damage. Up to 9 fm at end.
807	B.J.	2 drags	IKKUDLIAYUK FJ.	60°04 N 64°28.8W	C	Aug 23	8:55	22-25	(0:25)	No damage.
808	B.J.	2 drags	IKKUDLIAYUK FJ.	60°05.6N 64°26 W	C	Aug 23	9:36	10-33	(0:41)	No damage. Easy tow. Few snags.
809	B.J.	2 drags	IKKUDLIAYUK FJ.	60°07 N 64°25.3W	C	Aug 23	18:17	5-27	(0:40)	No damage. Up and down. Very shallow @ end.
810	B.J.	2 drags	IKKUDLIAYUK FJ.	60°05.5N 64°26.3W	C	Aug 23	19:12	20-29	(0:28)	
811	B.J.	2 drags	IKKUDLIAYUK FJ.	60°05.5N 64°27 W	C	Aug 23	19:51	21-10	(0:21)	
812	B.J.	2 drags	IKKUDLIAYUK FJ.	60°05.7N 64°26.7W	C	Aug 24	8:35	22-24	(0:40)	
813	B.J.	2 drags	IKKUDLIAYUK FJ.	60°04.1N 64°26.5W	C	Aug 24	9:36-10:08	18-10	(0:32)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			DURATION No. of MINUTES	COMMENTS
						DATE	TIME	DEPTH fm		
814	B.J.	2 drags	IKKUDLIAYUK FJ.	60°06.3N 64°28 W	C	Aug 24	10:16-11:01	10-20	(0:45)	
815	B.J.	2 drags	TUNNISSUGJUAK Inlet, North side	60°14.4N 64°25.1W	C	Aug 28	10:41-11:24	12-19	(0:43)	Average tow near 18 f.
816	B.J.	2 drags	TUNNISSUGJUAK Inlet, North side	60°14.5N 64°26.W	C	Aug 28	11:30-11:52	18-19	(0:22)	Very level bottom.
817	B.J.	2 drags	TUNNISSUGJUAK Inlet, North side	60°14.8N 64°27.3W	C	Aug 28	12:00-12:44	17-24	(0:44)	
818	B.J.	2 drags	TUNNISSUGJUAK Inlet, North side	60°14.9N 64°28 W	C	Aug 28	12:52-13:35	20-25	(0:43)	Towing speed 3.0-3.4 knots (Steve).
819	B.J.	2 drags	TUNNISSUGJUAK Inlet, North side	60°14.3N 64°25.4W	C	Aug 28	13:55-14:33	19-24	(0:38)	
820	B.J.	2 drags	TUNNISSUGJUAK Inlet	60°14.8N 64°27 W	C	Aug 29	17:56-18:28	11-20	(0:32)	Towing North.
821	B.J.	2 drags	TUNNISSUGJUAK Inlet	60°15 N 64°28 W	C	Aug 29	18:40-19:10	20-24	(0:30)	Towing South.
822	B.J.	2 drags	SHUNGMIYUK Inlet	60°13 N 64°25.1W	C	Aug 30	11:38-12:10	12-20	(0:32)	Dragging back and forth.
823	B.J.	2 drags	SHUNGMIYUK Inlet	60°12.2N 64°26.9W	C	Aug 30	12:15-12:40	20-25	(0:35)	
824	B.J.	2 drags	SHUNGMIYUK Inlet	60°12.8N 64°27.8W	C	Aug 30	12:55-13:36	20-27	(0:19)	Towing East.
825	B.J.	2 drags	SHUNGMIYUK Inlet	60°11.5N 64°27.5W	C	Aug 30	13:49-14:15	9-25	(0:26)	Towing West.
826	B.J.	2 drags	SHUNGMIYUK Inlet	60°12.7N 64°26.6W	C	Aug 30	14:29-14:35	15-15	(0:06)	Short tow. Mechanical problem.
827	B.J.	2 drags	Inside TUNNISSUGJUAK Inlet	60°15.3N 64°30.2W	C	Aug 31	13:20-13:49	20-27	(0:29)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			DURATION No. of MINUTES	COMMENTS
						DATE	TIME	DEPTH fm		
828	B.J.	2 drags	Inside TUNNISSUGJUAK	60°15.8N 64°32.1W	C	Aug 31	14:21-14:47	19-26	0:26	
829	B.J.	2 drags	JOKSUT INLET	60°14.9N 64°27.8W	C	Aug 31	15:14-15:28	25-	0:14	No damage. Warp broke at 15:28. Retreived at 18:18 in low tide.
830	B.J.	2 drags	JOKSUT INLET	60°14.7N 64°27.2W	C	Aug 31	18:27-18:45	17-20	0:18	
831	B.J.	2 drags	South of CWS	60°19.2N 64°53.0W	A	Sept 3	12:23-12:46	6-14	0:23	
832	B.J.	2 drags	Sout of CWS	60°19.3N 64°53 W	A	Sept 3	12:50-13:20	4-17	0:30	
833	B.J.	2 drags	SW of CWS	60°21.1N 64°52 W	A	Sept 3	13:44-13:48	14-16	0:04	Tow speed 3.5 knots
834	B.J.	2 drags	CENTRE BURWELL Hbr.	60°24.7N 64°50.6W	A	Sept 3	16:08-16:24	7-24	0:16	Tow speed 2.5 knots. Towed to N of Fish Plant.
835	B.J.	2 drags	2 miles SW-CWS	60°19 N 64°53.5W	A	Sept 4	13:21-13:49	10-40	0:28	Rough bottom.
836	B.J.	2 drags	Between CWS and COATES INLET	60°16.9N 64°56.6W	A	Sept 4	14:06-14:28	8-22	0:22	One large rock in drag.
837	B.J.	2 drags	Between CWS and COATES INLET	60°17.3N 64°56.5W	A	Sept 4	14:55-15:19	10-23	0:24	
838	B.J.	2 drags	South side HOME Is.	60°08.1N 64°15.3W	C	Sept 7	13:45-14:26	17-19	0:41	Good level bottom.
839	B.J.	2 drags	AVAYALIK Is.	60°08.4N 64°12.6W	C	Sept 7	14:51-15:09	13-19	0:18	Towed in a circle.

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VES.	GEAR	GENERAL LOCATION	POSITION	ZONE	SETTING			DURATION No. of MINUTES	COMMENTS
						DATE	TIME	DEPTH fm		
840	B.J.	2 drags	Lower West shore MARTIN BAY	60°04.2N 64°24.5W	C	Sept 12	15:12-15:42	12-25	(0:30)	Very muddy bottom.
841	B.J.	2 drags	NW tow across MARTIN BAY	60°04.4N 64°23.8W	C	Sept 12	15:50-16:27	9-25	(0:37)	Very muddy bottom. Lots of old clam shells.
842	B.J.	2 drags	Upper East shore HUTTON PEN.	60°07 N 64°21.8W	C	Sept 12	17:01-17:25	13-18	(0:24)	Tow speed 3 knots.
843	B.J.	2 drags	JOLLIET INLET	60°12 N 64°23.8W	C	Sept 21	10:57-11:22	15-16	(0:25)	Good bottom but no sign at all.
844	B.J.	2 drags	Shoals SW of CWS	60°19 N 64°53 W	A	Oct 6	9:46-9:59	9-15	(0:13)	Zilch.
845	B.J.	2 drags	YOUNG INLET E. side GODDARD Is.	60°21.7N 64°44.7W	A	Oct 6	11:06-11:29	17-24	(0:23)	Very smooth. (Molson Golden Is)
846	B.J.	2 drags	SE shore YOUNG INLET	60°19.8N 64°41.4W	A	Oct 6	11:36-12:09	38-12	(0:33)	Few old clam & scallop shells.
847	B.J.	2 drags	YOUNG INLET SE of Islands near entrance	60°20.4N 64°42.8W	A	Oct 6	12:18-13:05	22-11	(0:47)	Muddy bottom. Lots of old clam and scallop shells.
848	B.J.	2 drags	SE + E of GODDARD Is.	60°21 N 64°44.5 W	A	Oct 6	13:17-13:49	30-6	(0:32)	
849	B.J.	2 drags	YOUNG INLET N of GODDARD ISLANDS	60°22 N 64°45 W	A	Oct 6	14:06-14:23	30-8	(0:17)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
200	Kanayuk	NFLD + NOR (7)	Off Fox & Fritz'Arm	60°26.0N* 64°53.0W	A	Aug 16	20:30/21:30	20-50	(0:30)	*6 locations
201	Kanayuk	NFDL+ NOR (3)	South side, Jackson Is.	60°24.0N* 64°51.7W	A	Aug 17	16:00/17:45	30-50	(0:30)	*3 locations, ice in coves
202	BJ	NFLD + NOR (2)	Mouth, Amittoq Inlet	60°25.9N 64°52.0W	A	Aug 19	14:16/14:19	30	(0:03)	
203	BJ	NFLD + NOR (4)	Perrett Is., East end	60°30.3N 64°47.1W	B	Aug 19	17:14/17:22	21-60	(0:08)	strong tide
204	BJ	NFLD + NOR (3)	Perrett Is., East end, Hettash Is.	60°31.2N 64°47.5W	B	Aug 19	17:28/17:35	25-30	(0:07)	
205	skipped number									
206	BJ	NOR (2)	Forbes Sd.	60°23.0N 64°52.5W	A	Aug 21	09:49/09:51	42-45	(0:02)	
207	BJ	NOR (2)	Off C.W.S.	60°22.3N 64°57.2W	A	Aug 21	10:22/10:26	60-62	(0:04)	
208	BJ	NOR (1)*	Off C.W.S.	60°22.0N 64°55.8W	A	Aug 21	10:31/10:36	66-76	(0:05)	
209	BJ	NOR (1)*	Off C.W.S.	60°22.3N 64°58.2W	A	Aug 21	10:44/11:05	80-84	(0:21)	*2 lines together
210	BJ	NFLD (1) NOR (1)	Off C.W.S.	60°21.3N 64°56.0W	A	Aug 21	11:07/11:15	40-41	(0:08)	
211	BJ	NFLD (1) NOR (1)	Off C.W.S. to south	60°20.5N 64°53.2W	A	Aug 21	11:38/11:50	45-45	(0:12)	
212	Kanayuk	NFLD (1)	West side Munro Hbr.	60°24.4N 64°52.5W	A	Aug 25	15:45/16:00	20-40	(0:15)	*surface water temperature : 2°C
213	Kanayuk	NFLD (1)	N. of outside end of Goddard Is.	60°22.0N 64°45.9W	A	Aug 25	16:34/16:37	20	(0:03)	*surface water temperature : 1.6°C

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
214	BJ	NFLD(1) NOR (1)	E. of GOULD Pt.	60°23.7N 64°25.8W	B	Aug 22	9:48/9:55	47	(0:07)	
215	BJ	NFLD(1) NOR (1)	NW of NORTH STAR Is.	60°22.1N 64°24.7W	B	Aug 22	10:10/10:15	10	(0:05)	
216	BJ	NFLD (1)	SE arm of Burgess In.	60°25.9N 64°33.2W	B	Aug 26	14:35/14:45	10	(0:10)	
217	BJ	NOR (1)	Gasper Is.	68°15N 64°13.3W	C	Aug 29	16:21/16:25	32	(0:04)	
218	BJ	NOR(1) NFLD (1)		60°24.4N 64°55.4W	*	Sept 2	16:10/16:15	50	(0:05)	
219	Burwell Pride		FORBES Sound	60°23.4N 64°50.0W	A	Sept 2	09:30/15:30			2 sculpins. Tried many places all over Forbes Sound.
220	BJ	NFLD (2) NOR (1)	¼ mile C.W.S. 2 1/8 mile Jackson Is.	60°22.1N 64°52.9W	A	Sept 3	14:25/14:33	52	(0:08)	No fish, but something showing on sounder
221	BJ	NFLD (2)	Off Black Rock Pt.	60°06.0N 63°53.0W	C	Sept 6	14:25/14:33	42	(0:08)	Beside Iceberg
222	BJ	NFLD (2)	Off Black Rock Pt.	60°05.8N 63°57.5W	C	Sept 6	14:48/14:52	36-40	(0:04)	Near sharp slope
223	BJ	NOR (1)	Off Island (18)	60°11.6N 64°02.2W	C	Sept 6	15:48/15:50	50	(0:02)	
224	BJ	NOR(1) NFLD (2)	Off Island (18)	60°11.0N 64°02.9W	C	Sept 6	15:56/16:02	20	(0:06)	
225	BJ	NFLD(2)/NFLD(1) + Feathers	East side Home Is.	60°10.2N 64°12.8W	C	Sept 6	16:40/17:12	32-36	(0:32)	Fish at 32 FM
226	BJ	NFLD (3)	East side Home Is.	60°11.0N 64°13.0W	C	Sept 6	17:17/17:20	15	(0:03)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
227	BJ	NFLD (2)	East side Home Is.	60°10.5N 64°15.5W	C	Sept 7	10:25/10:28	10	(0:03)	
228	BJ	5 for 5 min. 6 for 45 min.	Off Avayalik Is.	60°08.0N 64°12.0W	C	Sept 7	15:21/16:11	33-40	(0:50)	Drifted off ½ mi.
229	BJ	NFLD (3)	East side Home Is.	60°10.6 64°13.2W	C	Sept 7	16:21/16:38	22	(0:17)	Lost 1 jig. Hooked
230	BJ	NFLD (2)	East side Home Is.	60°10.6N 64°13.8	C	Sept 7	16:45/16:58	30-37	(0:13)	
231	BJ	NFLD (3)	Between Home and Kmock Is.	60°12.0N 64°15.1W	C	Sept 9	11:36 - 40" 11:45 - 50"	28-37	(0:04) (0:05)	2 passes over slope
232	BJ	NFLD (3)	Between Home and Kmock Is.	60°12.0N 64°17.0W	C	Sept 9	12:03/12:09	33-37	(0:06)	
233	BJ	NFLD(4) NOR (1)	SE corner Duck Is.	60°13.2N 64°20.0W	C	Sept 9	12:28/12:38	19-31	(0:10)	
234	BJ	NFLD(4) NOR (1)	East side Duck Is.	60°13.4N 64°20.0W	C	Sept 9	12:42/13:00	28-32	(0:18)	
235	BJ	NFLD(4) NOR (1)	North of Jollet Inlet	60°13.0N 64°22.7W	C	Sept 9	13:18/13:35	24-33	(0:17)	Drift to SE
236	BJ	NFLD(3) NOR (1)	NE of Duck Is.	60°14.6N 64°20.0W	C	Sept 9	14:05/14:40	20-44	(0:35)	Fish in + 30
237	BJ	NFLD(3) NOR (1)	Tip Cape Labrador	60°15.3N 64°21.8W	C	Sept 9	14:55/15:45	30-47	(0:50)	Good jigging
238	BJ	NFLD(3) NOR (1)	Inside mouth McLellan Strait	60°15.9N 64°23.1W	C	Sept 9	15:55/15:59	25	(0:04)	
239	BJ	NFLD(3) NOR (1)	East side Amity Is.	60°14.6N 64°22.0W	C	Sept 9	16:23/16:30	31-55	(0:07)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
240	BJ	NFLD(2) NOR(1)	SE tip Amity Is.	60°14.3N 64°22.5W	C	Sept 9	16:37/16:46	26-33	(0:09)	
241	BJ	N/A	Outside Duck Islands	60°14.1N 64°20.0W	C	Sept 10	N/A	N/A	N/A	
242	BJ	NFLD 4 JIGS	shoals N of Gasper	60°15.8N 64°19.0W	C	Sept 13	17:55/18:10	40	(0:15)	
244	BJ	NFLD 3 JIGS	shoals N of Thomas Point	60°19.7N 64°25.4W	B	Sept 14	09:02/09:07	27	(0:05)	Surface water temperature 0.5°C
245	BJ	NFLD 4 JIGS	few miles E of Robinson Is.	60°20.3N 64°25.2W	B	Sept 14	09:14/09:21	32	(0:07)	
246	BJ	NFLD 5 JIGS	Argo Islands	60°19.4N 64°19 W	B	Sept 14	09:41/09:52	45	(0:11)	
247	BJ	NFLD 5 JIGS	Argo Islands	60°19.4N 64°19W	B	Sept 14	10:01/10:05	20	(0:04)	
248	BJ	NFLD 4 JIGS	Argo Islands W. side	60°19.4N 64°19W	B	Sept 14	10:08/10:30	40-50	(0:22)	
249	BJ	NFLD 5 JIGS	Argo Islands	60°19.4N 64°19W	B	Sept 14	10:38/10:45	43-60	(0:07)	
250	BJ	NFLD 4 JIGS	NE Argo Islands	60°19.4N 64°19W	B	Sept 14	10:52/11:00	32-55	(0:08)	
251	BJ	NFLD 4 JIGS	Argo Islands E. side	60°19.4N 64°19W	B	Sept 14	11:11/11:22	32-48	(0:11)	
252	BJ	NFLD 3 JIGS	small Island N. of Gaspers	60°15.6N 64°17.7W	C	Sept 14	11:53/11:57	35	(0:05)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
253	BJ	NFLD (2) JIGS	N of Duck Island	60°14.5N 64°21W	C	Sept 14	12:02/12:06	38	(0:04)	
254	BJ	*NFLD (4) JIGS	SE of Duck Island	60°13.3N 64°20W	C	Sept 14	12:35/13:15	30	(0:40)	*6 NFLD JIGS from 12:50-13:15
255	BJ	NFLD (3) JIGS	between Kmock and Home Island	60°11.9N 64°16.4W	C	Sept 14	13:35/13:38	35	(0:03)	
256	BJ	NFLD (3) JIGS	E of 2 small islands on outer side of Home Island	60°09.5N 64°12.7W	C	Sept 14	13:56/14:04	42-43	(0:08)	
257	BJ	NFLD (4) JIGS	N/A	N/A	C	Sept 14	14:20/14:27	38-23	(0:07)	
258	BJ	NFLD (4) JIGS	N/A	N/A	C	Sept 14	14:39/14:53	37	(0:14)	*5 NFLD 14:48/14:53 Surface water temperature 1°C
259	BJ	NFLD (4) JIGS	E. of southern tip Avayalik Is.	60°06N 64°11.5 W	C	Sept 14	15:06/15:12	36-37	(0:06)	
260	BJ	NFLD (4) JIGS	Argo Islands shoals	60°19.4N 64°19W	B	Sept 14	17:00/17:16	45	(0:16)	
261	BJ	NFLD (4) JIGS	Argo Islands shoals	60°19.4N 64°19W	B	Sept 14	17:17/17:27	30	(0:10)	
262	BJ	NFLD (4) JIGS	Argo Islands shoals	60°19.4N 64°19W	B	Sept 14	17:33/17:39	45-50	(0:06)	
263	BJ	NFLD (4) JIGS	S Cabob Is. NW of Gould Pt.	60°23.9N 64°26.9W	B	Sept 14	18:04/18:10	36-50	(0:06)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
264	BJ	NFLD 4 JIGS	Lower W side outer O'BRIEN Hb.	60°24N 64°31W	B	Sept 15	08:28/08:34	27-29	(0:06)	
265	BJ	NFLD 4 JIGS	upper outer O'BRIEN Hbr	60°24.3N 64°31W	B	Sept 15	08:37/08:41	38-40	(0:04)	
266	BJ	NFLD 4 JIGS	O'BRIEN Hbr. W of LECASSE Pt.	60°24.6N 64°29.3W	B	Sept 15	08:45/08:51	45-52	(0:05)	
267	BJ	NFLD 5 JIGS	South CABOT Island NW GOULD Pt. 1 mile	60°23.9N 64°26.9W	B	Sept 15	09:01/09:06	40-41	(0:05)	
268	BJ	NFLD 5 JIGS	½ m. s. of GOULD Pt.	60°23N 64°26W	B	Sept 15	09:21/09:26	33-44	(0:05)	
269	BJ	NFLD 5 JIGS	½m. N of NORTH STAR Is.	60°22.2N 64°24.3W	B	Sept 15	09:37/09:42	38-47	(0:05)	
270	BJ	NFLD 5 JIGS	1 mile north of Island NW of ARGO Islands	60°20.3N 64°20.2W	B	Sept 15	10:04/10:08	47	(0:04)	
271	BJ	NFLD 5 JIGS	½ mile N of ARGO Is.	60°19.6N 64°18.8W	B	Sept 15	10:23/12:25	40-60	(2:02)	
272	BJ	NFLD 3 JIGS	E of AUSTIN Islands	60°15.5N 64°21.8W	B	Sept 15	14:04/14:06		(0:02)	
273	BJ	NFLD 3 JIGS	between SWAINE Pt. and AUSTIN Island	60°15.7N 64°22.3W	C	Sept 15	14:12/14:14	17	(0:02)	
274	BJ	NFLD 3 JIGS	1m. N. of DUCK Is. E of SWAINE Pt. ½ m.	60°15.3N 64°21.8W	C	Sept 15	14:21/14:28	40-46	(0:07)	

KILLINIQ FISHERIES PROJECT, PHASE II
SET RECORDS, EXPLORATORY FISHERY

SET #	VESSEL	GEAR	GENERAL LOCATION	POSITION	ZONE	DATE	TIME	DEPTH fm	DURATION No. of MINUTES	COMMENTS
275	BJ	NFLD (3)	NW side JACKSON Is.	60°25.6N 64°54.3W	A	Sept 16	15:25/15:31	28-30	(0:06)	
276										skipped a set number
277	BURWELL PRIDE	NOR (2)	off SEAL FISHERY Pt.	60°24.6N 64°50.7W	A	Sept 11	09:15/09:30	16-22	(0:15)	
278	BJ	NFLD(3) NOR(1)	DUCK Island	60°14N 64°21.5W	C	Sept 21	08:43/08:47	48	(0:04)	1°C temperature on surface
279	BJ	NFLD(3) NOR(1)	South of DUCK Island	60°13.3N 64°19.3W	C	Sept 21	08:55/09:10	35	(0:15)	1°C surface temp. / B.T. taken at 34 fathoms
280	BJ	NFDL(3) NOR(1)	South of DUCK Island	60°13.2N 64°19.8W	C	Sept 21	09:14/09:20	33-41	(0:06)	1°C surface temp. / B.T. taken
281	BJ	NFDL(3) NOR(1)	3/8 mile N. of MIQUEL Island	60°14.5N 64°18.4W	C	Sept 21	09:35/09:50	33	(0:15)	1°C surface temp. / B.T. taken, 5 fish jig. "small"
282	BJ	NFDL(3) NOR(1)	½ mile from GASPER Is.	60°15N 64°18W	C	Sept 21	09:54/09:59	46-50	(0:05)	1°C surface temp.
283	BJ	NFDL(2) NOR(1)	GASPER Is. area	60°15.2N 64°17.2W	C	Sept 21	10:06/10:25	50-54	(0:19)	1°C surface temp. B.T. taken @ 34 fathoms. 4 fish.
284	BURWELL PRIDE	NOR (4)	LENZ STRAIT	60°29.6N 64°47.5W	B	Sept 14	N/A	5-8	(0:10)	
285	BP	NOR (4)	BUSH Island	60°29.9N 64°47.5W	B	Sept 14	N/A	15-20	(0:10)	
286	BP	NOR (4)	South BUTTON Is.	60°34.3N 64°46W*	E	Sept 14	N/A	8-25	(0:20)	*central pos. of 4 attempts
287	BP	NOR (4)	PORT HARVEY	60°34.3N 64°42.0W	B	Sept 14	N/A	15	(0:20)	
288	BP	NOR (4)	LENZ STRAIT	60°29.2N 64°47.0W	B	Sept 14	N/A	6-10	(0:10)	

D-2 EXPLORATORY CATCH RECORD

Key :

Wt = whole weight in kilograms

Set No. 1-199 = Bottom Gillnet
200-299 = Hand Jig
300-399 = Cod Trap
500-599 = Geometric Gang Net
600-699 = Trammel net
800-899 = Scallop dredges

N/A = non available

Index for other catch :

N = None = no significant catch
F = Few = some present but operation unaffected
M = Many = operation affected, i.e. slowed, by presence
E = Extreme = gear damaged and/or rendered useless by presence

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
1									3	N/A									F	F	M
2									4	N/A								1 American plaice, 1 lumpfish		F	
3											4	N/A				1		2 Atl. salmon, 1 scallop shell	F	M	N
4																		Saltwater grasshoppers (La. Amph) - sampled	N	N	N
5											4	N/A				1			N	N	N
6																		Grasshopers	N	N	N
7											7	N/A						1 Atl. salmon	N	N	N
8											3	N/A						2 Atl. salmon (8.2 kg + 4.5 kg)	N	N	N
9																			F	F	F
10													1	0.1					N	F	F
11															2	1			N	F	F
12															3				N	F	F
13															1				F	F	F
14																			N	F	F

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
15																			E	N	N
16																			N	F	N
17	2	6.15							4	N/A					2			Lots of kelp and seals damage nets	N	F	F
18	1	3.5							2	N/A						1			N	F	F
19	1	3.2											1	0.1		1		1 american plaice	N	F	M
20	10	34.5	11																N	F	M
21																		Perfectly clean net except crab	N	M	N
22																			N	N	F
23	10	43.0																6 fish very alive	N	F	N
24	96	412.8	18															1 American plaice, 1 halibut	N	M	F
25	55	236.5	6															2 American plaice	F	M	F
26	5	16.45	3		1	2.45			6	N/A									N	M	F
27	4	10.65	2						5	N/A									N	F	F
28	7	21.45	2	1					1	N/A			4	0.5					N	M	M

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV. LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
29	20	77.4	6					1	N/A								American plaice = .55 kg, 409mm, female	N	M	F
30	19	97.6	8														American plaice = .75 kg	N	M	M
31	1	3.6						1	N/A								75+ sea cucumbers	F	F	F
32								2	N/A									N	M	E
33								5	N/A									F	M	E
34	2	6.9						9	N/A									N	M	E
35								1	1.2									F	F	E
36								4	N/A									E	M	E
37																	1 Atl. Salmon 5.5 kg, FL 784, TL 834, male	M	F	M
38	2	7.0										1	0.1					M	F	E
39	1	4.8						1	1.1						1*		*Possible ranger seal	F	F	E
40	36	116.9	1															F	F	M
41	60	198.4	4					2	2.5									N/A	N/A	N/A
42	27	94.7	8									1	0.1					F	F	M

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
43	2	10.5			1	2.7													F	F	M
44																			F	N	E
45	4	17.2											1	0.1					F	F	M
46	8	30.3	17		1	2.2												6 of the 17 salted. Sample weights unreliable. Rough weather.	F	M	M
47	4	10.9	39										1	0.1				4 of the 39 salted. Few rocks.	M	M	N
48	8	28.2	43						8	N/A								23 of 43 salted	F	M	M
49	3	9.4							6	N/A									F	F	F
50	62	229.0	6																F	M	M
51			1																F	F	E
52	3	9.1							6	N/A									E	M	M
53	4	13.6	2						12	N/A			1	0.1	1				F	M	F
54	8	37.3							3	N/A						1 baby			F	M	E
55	3	15.0													2			Cod alive	F	N	F

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
56	2	10.7											2	0.2					M	N	F
57			1															Basket star extreme	F	N	F
58																		Net very clean. No catch.	F	N	N
59	1	3.0	1																N	N	N
60			1																N/A	N/A	M
61	2	7.95							4	N/A									F	M	M
62	2	7.2											1	0.1	1				N	N	F
63	4	23.5																	E	F	F
64	5	28.0																	E	F	F
65	12	54.7							1	N/A								Very fresh fish	N	N	F
66	7	39.6													1				F	N	F
* 67																		Skipped a set number			
68	2	7.6							2	N/A			2	0.2					F	F	N
69																			F	F	N

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV. LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
70	3	14.5																F	F	E
71	10	38.9	1					2	N/A									F	M	N
72	3	14.0										1	0.1					F	F	E
73	9	40.1	1									1	0.1					M	F	F
74	1	3.2	3			70	91.3*					6	0.7				*WTOF 53 fresh fish, 17 scavenged/1 plaice 0.3	F	F	N
75	2	6.7	5			74	79.6*	Fourhorn 2	1.4								*WT of 50 fresh fish, 24 scavenged/plaice 1 = 0.6 (+2 eaten), 1 roughhead grenadier = 0.4, 1 broadhead wolffish = 6.5	F	F	N
76	85	307.0	16					10	N/A									N	F	F
77	19	65.7	34															N	F	E
78	2	6.9	3															F	F	E
79	30	95.8	5									1	0.1					N	F	E
80	1	3.92						1	N/A									N	F	E
81	11	32.4	2															N	F	E
82	6	18.85	4															N	F	E

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
83	17	57.9	12																N	F	E
84																		No catch	N	F	E
85	2	8.9	2																N	F	E
86									4	N/A									N	F	F
87	2	7.84							2	N/A			1	0.1					F	F	E
88	2	7.84							2	N/A									N	F	F
89	9	35.28							1	N/A								In - Slub in water	F	F	N
90	2	11.2	3		1	2.3												experimental - Blowing a good breeze	M	F	F
91	3	11.76											2	0.2				fishery - G. hal. caught in 61 fathoms. Many rocks	E	F	N
92	2	7.84	1										2	0.2				- Slub and slime in water	F	F	F
93									1	N/A											

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
200													1	0.1					N	F	F
201																		No catch			
202																		No catch			
203																		No catch			
204																		No catch			
205																		Skipped a set number			
206																		No catch			
207																		No catch			
208																		No catch			
209																		No catch			
210																		No catch			
211																		No catch			
212																		No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
213																		No catch			
214																		No catch			
215																		No catch			
216																			N	N	F
217																			N	N	N
218																		No catch	N	N	N
219									2	N/A								Ray & Arthur tried many places around Forbes Sound	N	N	N
220																			N	N	N
221																		No catch	N	N	N
222																		No catch	N	N	N

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
223																		No catch	N	N	N
224																		No catch fish, 1 sea cucumber	N	N	N
225	9	20.5																	N	N	N
226																		No catch	N	N	N
227																		No catch	N	N	N
228	53	120.4																	N	N	N
229																		No catch	N	N	N
230																		No catch	N	N	N
231	2	1.5																	N	N	N
232																		No catch	N	N	N
233	5	20.5																	N	N	N
234	10	21.3																	N	N	N
235																		No catch	N	N	N
236	21	59.6																	N	N	N

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV. LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
237	21	59.6																N	N	N
238																		N	N	N
239																		N	N	N
240																	No catch	N	N	N
241	49	79.2																		
242	3	6.75																		
243																	Skipped a set number			
244																	No catch			
245																	No catch			
246	11	43.56																		
247								1	N/A											
248	12	47.52						1	N/A											
249																	No catch			
250																	No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
251	3	11.88																			
252																		No catch			
253																		No catch			
254	82	104.14																			
255									1	N/A											
256																		No catch			
257																		No catch			
258	1	1.27																			
259																		No catch			
260	1	1.27																			
261																		No catch			
262																		No catch			
263																		No catch			
264																		No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
265																		No catch			
266																		No catch			
267																		No catch			
268																		0.5°C surface water temperature			
269																		No catch			
270																		No catch			
271	67	213.1																nice size fish (60.0 - 70.0 mm range)			
272																		No catch			
273																		No catch.			
274																		No catch			
275																		No catch			
276																		Skipped a set number			
277																		No catch			
278																		No catch 1°C surface temperature			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
279																		No catch 1°C surface temperature B.T. taken			
280																		No catch 1°C surface temp. B.T. taken at 33 fathoms			
281	5	17.11																1°C surface water temperature B.T. taken at 33 fathoms			
282																		No catch 1°C surface temperature			
283	4	13.69																1°C surface temperature B.T. taken at 34 fathoms			
284																		No catch			
285																		No catch			
286																		No catch			
287																		No catch			
288																		No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH		ATLANTIC COD OTHER (#)		GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
500																					
501																		Atlantic herring = 1			
502																		No catch			
503																		No catch			
504																		No catch			
505																		No catch			
506																		No catch			
507																		Atlantic herring = 1			
508																		Atlantic herring = 1			
509																		Atlantic herring = 9			
510																		No catch			
511																		No catch			
512																		No catch			
513																		No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
601																		No catch			
602																		No catch			
603																		No catch			
604																		No catch			
605																		No catch			
606																		No catch			
607																		No catch			
608																		Atlantic herring = 1			
609																		No catch			
610																		No catch			
611																		No catch			
*612																		No catch			
*613																		No catch			
614																		Atlantic herring = 6			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
615																		Atlantic herring = 3			
616																		Atlantic herring = 6			
617																		No catch			

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
800																			F	F	F
801																			N	F	F
802																		Several shrimp in kelp	N	F	M
803																		1 urchin	F	F	F
804																			N	N	M
805																		Few clams	F	F	F
806																		No catch	N	N	F
807																		No catch	F	N	F
808													9	1.0					F	F	F
809													2	0.2					N	F	N
810													6	0.7					F	F	F
811													4	0.5					M	N	F
812																		No catch	F	N	N
813													12	1.4					M	F	F

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
814													4	0.5					M	F	F
815													15	1.0				Many empty shells (scallops & 2 clams sp.)	F	F	F
816													4	0.5					F	N	N
817													37	4.2					M	F	N
818													22	2.8				Few sea cucumber	F	F	N
819																		Few urchins & sea cucumbers	F	F	F
820													12	1.6				Few rocks	M	F	N
821													39	5.1				Many rocks	F	F	N
822													7	0.9					F	F	N
823													4	0.5				1 shrimp sclerocrangon species	F	F	N
824																		Some rocks	F	F	N

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD				GREENLAND COD		GREENLAND HALIBUT		SHORTHORN SCULPIN		ARCTIC CHAR		ICELAND SCALLOP		HARP SEAL	RINGED SEAL	BEARDED SEAL	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
	FRESH		OTHER (#)																		
	#	WT.	SCAV.	LOST	#	WT.	#	WT.	#	WT.	#	WT.	#	WT.	#	#	#				
825													4	0.4				Rocky bottom	F	F	N
826													4	0.4					F	N	N
827													8	0.6					F	F	N
828																		No catch	F	F	N
829													35	3.8				Warp broken no damage	F	F	N
830													10	1.1					F	F	N
831													9	1.1					N	N	N
832																			N	N	F
833																			N/A	N/A	N/A
834																		Rough bottom	N/A	N/A	N/A
835																			N/A	N/A	N/A
836																			N	F	N
837																			N/A	N/A	N/A

KILLINIQ FISHERIES PROJECT, PHASE II
CATCH RECORDS, EXPLORATORY FISHERY

SET #	ATLANTIC COD FRESH #	ATLANTIC COD FRESH WT.	ATLANTIC COD OTHER (#) SCAV.	ATLANTIC COD OTHER (#) LOST	GREENLAND COD #	GREENLAND COD WT.	GREENLAND HALIBUT #	GREENLAND HALIBUT WT.	SHORTHORN SCULPIN #	SHORTHORN SCULPIN WT.	ARCTIC CHAR #	ARCTIC CHAR WT.	ICELAND SCALLOP #	ICELAND SCALLOP WT.	HARP SEAL #	RINGED SEAL #	BEARDED SEAL #	OTHER CATCH	STAR-FISH	CRAB	SEA-PLANT
838																		No catch	F	F	N
839																		No catch, kelp blocked drag	N	N	E
840													3	0.3				No catch, very muddy bottom	F	F	F
841																		No catch, very muddy bottom, lots of old clams shells	F	F	F
842																		No catch	N	N	F
843																		No catch. Smooth muddy bottom	N	N	N
844																			F	N	F
845													3	0.3					F	F	F
846													6	0.7					N	F	F
847													10	1.1				Rough bottom	F	F	N
848													9	1.0					F	F	F
849																			N	F	F

APPENDIX E

Random Length Frequency Data Base
Atlantic Cod

APPENDIX E

RANDOM LENGTH FREQUENCY DATA BASE
ATLANTIC COD

Key : Set # : 0001-0199 = bottom gillnets
0200-0299 = hand jigs
+ = catches from sets combined
Expm = catches from experimental fishery

Date : Month : Day.

Region : Same as zone, see Figure D-1
m = catch from more than one zone

Gear type :
GN = gillnet
J = hand jig

Gear size :
M = mixed sizes
45.5 = 4 nets of 5½" mesh
87.0 = 8 nets of 7" mesh,
etc.

Sex :
M = male
F = female
U = unknown

Total length : in mm

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0720
023+	0824	M	GN	M	U	0730
023+	0824	M	GN	M	U	0730
023+	0824	M	GN	M	U	0730
023+	0824	M	GN	M	U	0730
023+	0824	M	GN	M	U	0730
023+	0824	M	GN	M	U	0740

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0640
023+	0824	M	GN	M	U	0660
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0670
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0680
023+	0824	M	GN	M	U	0690
023+	0824	M	GN	M	U	0690
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0700
023+	0824	M	GN	M	U	0710
023+	0824	M	GN	M	U	0710

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0740
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0750
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0760
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0770
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0780
023+	0824	M	GN	M	U	0790
023+	0824	M	GN	M	U	0790
023+	0824	M	GN	M	U	0790
023+	0824	M	GN	M	U	0790
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0800
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0810
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0820
023+	0824	M	GN	M	U	0830
023+	0824	M	GN	M	U	0830
023+	0824	M	GN	M	U	0840
023+	0824	M	GN	M	U	0840
023+	0824	M	GN	M	U	0840
023+	0824	M	GN	M	U	0850
023+	0824	M	GN	M	U	0850

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
023+	0824	M	GN	M	U	0850
023+	0824	M	GN	M	U	0850
023+	0824	M	GN	M	U	0850
023+	0824	M	GN	M	U	0860
023+	0824	M	GN	M	U	0860
023+	0824	M	GN	M	U	0870
023+	0824	M	GN	M	U	0870
023+	0824	M	GN	M	U	0890
023+	0824	M	GN	M	U	0890
023+	0824	M	GN	M	U	0900
023+	0824	M	GN	M	U	0940
0026	0824	C	GN	46.0	U	0710
0026	0824	C	GN	46.0	U	0710
0026	0824	C	GN	46.0	U	0750
0026	0824	C	GN	46.0	U	0750
0026	0824	C	GN	46.0	U	0760
0027	0824	C	GN	45.5	M	0650
0027	0824	C	GN	45.5	M	0690
0027	0824	C	GN	45.5	M	0700
0027	0824	C	GN	45.5	F	0720
0028	0824	C	GN	45.5	U	0650
0028	0824	C	GN	45.5	M	0670
0028	0824	C	GN	45.5	M	0670
0028	0824	C	GN	45.5	M	0690
0028	0824	C	GN	45.5	M	0720
0028	0824	C	GN	45.5	F	0660
0028	0824	C	GN	45.5	F	0890
0029	0825	C	GN	M	M	0650
0029	0825	C	GN	M	M	0680
0029	0825	C	GN	M	M	0680

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0029	0825	C	GN	M	M	0700
0029	0825	C	GN	M	M	0750
0029	0825	C	GN	M	F	0680
0029	0825	C	GN	M	F	0700
0029	0825	C	GN	M	F	0700
0029	0825	C	GN	M	F	0730
0029	0825	C	GN	M	F	0730
0029	0825	C	GN	M	F	0740
0029	0825	C	GN	M	F	0750
0029	0825	C	GN	M	F	0760
0029	0825	C	GN	M	F	0770
0029	0825	C	GN	M	F	0780
0029	0825	C	GN	M	F	0780
0029	0825	C	GN	M	F	0790
0029	0825	C	GN	M	F	0810
0029	0825	C	GN	M	F	0820
0029	0825	C	GN	M	F	0870
0030	0825	C	GN	47.0	M	0700
0030	0825	C	GN	47.0	M	0730
0030	0825	C	GN	47.0	M	0730
0030	0825	C	GN	47.0	M	0780
0030	0825	C	GN	47.0	M	0820
0030	0825	C	GN	47.0	F	0670
0030	0825	C	GN	47.0	F	0710
0030	0825	C	GN	47.0	F	0720
0030	0825	C	GN	47.0	F	0730
0030	0825	C	GN	47.0	F	0750
0030	0825	C	GN	47.0	F	0760
0030	0825	C	GN	47.0	F	0760
0030	0825	C	GN	47.0	F	0770

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0030	0825	C	GN	47.0	F	0790
0030	0825	C	GN	47.0	F	0800
0030	0825	C	GN	47.0	F	0800
0030	0825	C	GN	47.0	F	0810
0030	0825	C	GN	47.0	F	0810
0030	0825	C	GN	47.0	F	0840
0030	0825	C	GN	47.0	F	0840
0030	0825	C	GN	47.0	F	0860
0030	0825	C	GN	47.0	F	0890
0031	0825	B	GN	46.0	F	0750
0034	0825	B	GN	45.5	F	0700
0034	0825	B	GN	45.5	F	0780
0038	0826	A	GN	46.0	M	0750
0038	0826	A	GN	46.0	M	0770
0039	0826	A	GN	M	F	0810
040+	0827	C	GN	85.5	M	0610
040+	0827	C	GN	85.5	M	0620
040+	0827	C	GN	85.5	M	0630
040+	0827	C	GN	85.5	M	0640
040+	0827	C	GN	85.5	M	0650
040+	0827	C	GN	85.5	M	0650
040+	0827	C	GN	85.5	M	0650
040+	0827	C	GN	85.5	M	0660
040+	0827	C	GN	85.5	M	0660
040+	0827	C	GN	85.5	M	0660
040+	0827	C	GN	85.5	M	0660
040+	0827	C	GN	85.5	M	0660
040+	0827	C	GN	85.5	M	0670
040+	0827	C	GN	85.5	M	0680
040+	0827	C	GN	85.5	M	0680

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
040+	0827	C	GN	85.5	M	0680
040+	0827	C	GN	85.5	M	0680
040+	0827	C	GN	85.5	M	0690
040+	0827	C	GN	85.5	M	0690
040+	0827	C	GN	85.5	M	0710
040+	0827	C	GN	85.5	M	0710
040+	0827	C	GN	85.5	M	0720
040+	0827	C	GN	85.5	M	0720
040+	0827	C	GN	85.5	M	0730
040+	0827	C	GN	85.5	M	0730
040+	0827	C	GN	85.5	M	0730
040+	0827	C	GN	85.5	M	0740
040+	0827	C	GN	85.5	M	0740
040+	0827	C	GN	85.5	M	0750
040+	0827	C	GN	85.5	M	0760
040+	0827	C	GN	85.5	M	0770
040+	0827	C	GN	85.5	M	0770
040+	0827	C	GN	85.5	M	0780
040+	0827	C	GN	85.5	M	0820
040+	0827	C	GN	85.5	M	0850
040+	0827	C	GN	85.5	F	0600
040+	0827	C	GN	85.5	F	0630
040+	0827	C	GN	85.5	F	0630
040+	0827	C	GN	85.5	F	0650
040+	0827	C	GN	85.5	F	0650
040+	0827	C	GN	85.5	F	0650
040+	0827	C	GN	85.5	F	0660
040+	0827	C	GN	85.5	F	0670
040+	0827	C	GN	85.5	F	0670
040+	0827	C	GN	85.5	F	0670

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
040+	0827	C	GN	85.5	F	0680
040+	0827	C	GN	85.5	F	0680
040+	0827	C	GN	85.5	F	0680
040+	0827	C	GN	85.5	F	0680
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0690
040+	0827	C	GN	85.5	F	0700
040+	0827	C	GN	85.5	F	0700
040+	0827	C	GN	85.5	F	0700
040+	0827	C	GN	85.5	F	0700
040+	0827	C	GN	85.5	F	0710
040+	0827	C	GN	85.5	F	0710
040+	0827	C	GN	85.5	F	0710
040+	0827	C	GN	85.5	F	0710
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0720
040+	0827	C	GN	85.5	F	0730
040+	0827	C	GN	85.5	F	0740
040+	0827	C	GN	85.5	F	0740
040+	0827	C	GN	85.5	F	0740

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
040+	0827	C	GN	85.5	F	0750
040+	0827	C	GN	85.5	F	0750
040+	0827	C	GN	85.5	F	0750
040+	0827	C	GN	85.5	F	0750
040+	0827	C	GN	85.5	F	0750
040+	0827	C	GN	85.5	F	0760
040+	0827	C	GN	85.5	F	0760
040+	0827	C	GN	85.5	F	0760
040+	0827	C	GN	85.5	F	0760
040+	0827	C	GN	85.5	F	0760
040+	0827	C	GN	85.5	F	0770
040+	0827	C	GN	85.5	F	0770
040+	0827	C	GN	85.5	F	0770
040+	0827	C	GN	85.5	F	0780
040+	0827	C	GN	85.5	F	0780
040+	0827	C	GN	85.5	F	0790
040+	0827	C	GN	85.5	F	0790
040+	0827	C	GN	85.5	F	0790
040+	0827	C	GN	85.5	F	0800
040+	0827	C	GN	85.5	F	0810
040+	0827	C	GN	85.5	F	0830
040+	0827	C	GN	85.5	F	0830
040+	0827	C	GN	85.5	F	0840
040+	0827	C	GN	85.5	F	0840
040+	0827	C	GN	85.5	F	0860
040+	0827	C	GN	85.5	F	0860
0042	0827	C	GN	46.0	M	0660
0042	0827	C	GN	46.0	M	0680
0042	0827	C	GN	46.0	M	0690
0042	0827	C	GN	46.0	M	0690

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0042	0827	C	GN	46.0	M	0700
0042	0827	C	GN	46.0	M	0720
0042	0827	C	GN	46.0	M	0730
0042	0827	C	GN	46.0	M	0760
0042	0827	C	GN	46.0	M	0770
0042	0827	C	GN	46.0	M	0770
0042	0827	C	GN	46.0	M	0780
0042	0827	C	GN	46.0	M	0780
0042	0827	C	GN	46.0	M	0840
0042	0827	C	GN	46.0	F	0710
0042	0827	C	GN	46.0	F	0710
0042	0827	C	GN	46.0	F	0710
0042	0827	C	GN	46.0	F	0710
0042	0827	C	GN	46.0	F	0720
0042	0827	C	GN	46.0	F	0730
0042	0827	C	GN	46.0	F	0730
0042	0827	C	GN	46.0	F	0740
0042	0827	C	GN	46.0	F	0760
0042	0827	C	GN	46.0	F	0780
0042	0827	C	GN	46.0	F	0780
0042	0827	C	GN	46.0	F	0790
0042	0827	C	GN	46.0	F	0800
0042	0827	C	GN	46.0	F	0810
0045	0827	C	GN	47.0	M	0860
0045	0827	C	GN	47.0	F	0740
0045	0827	C	GN	47.0	F	0780
0045	0827	C	GN	47.0	F	0790
0046	0831	C	GN	45.5	M	0700
0046	0831	C	GN	45.5	M	0720
0046	0831	C	GN	45.5	M	0770

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0046	0831	C	GN	45.5	M	0790
0046	0831	C	GN	45.5	F	0660
0046	0831	C	GN	45.5	F	0700
0046	0831	C	GN	45.5	F	0730
0046	0831	C	GN	45.5	F	0860
0047	0901	C	GN	45.5	M	0680
0047	0901	C	GN	45.5	M	0760
0047	0901	C	GN	45.5	F	0650
0047	0901	C	GN	45.5	F	0690
0048	0901	C	GN	45.5	M	0670
0048	0901	C	GN	45.5	M	0700
0048	0901	C	GN	45.5	F	0720
0048	0901	C	GN	45.5	F	0750
0048	0901	C	GN	45.5	F	0810
0048	0901	C	GN	45.5	F	0880
0049	0901	C	GN	46.0	M	0770
0049	0901	C	GN	46.0	F	0660
0049	0901	C	GN	46.0	F	0830
0052	0901	C	GN	45.5	M	0730
0052	0901	C	GN	45.5	M	0740
0052	0901	C	GN	45.5	F	0650
0053	0901	C	GN	46.0	M	0730
0053	0901	C	GN	46.0	M	0800
0053	0901	C	GN	46.0	F	0680
0053	0901	C	GN	46.0	F	0760
0054	0901	B	GN	47.0	M	0740
0054	0901	B	GN	47.0	F	0750
0054	0901	B	GN	47.0	F	0790
0054	0901	B	GN	47.0	F	0800
0054	0901	B	GN	47.0	F	0810

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0054	0901	B	GN	47.0	F	0840
0054	0901	B	GN	47.0	F	0840
0054	0901	B	GN	47.0	F	0850
0061	0904	A	GN	46.0	M	0740
0061	0904	A	GN	46.0	F	0790
0062	0904	A	GN	45.5	F	0690
0062	0904	A	GN	45.5	F	0820
0063	0904	A	GN	45.5	M	0680
0063	0904	A	GN	45.5	M	0740
0063	0904	A	GN	45.5	F	0800
0063	0904	A	GN	45.5	F	0830
0064	0904	A	GN	45.5	M	0660
0064	0904	A	GN	45.5	M	0810
0064	0904	A	GN	45.5	F	0760
0064	0904	A	GN	45.5	F	0780
0064	0904	A	GN	45.5	F	0780
0065	0904	A	GN	46.0	M	0610
0065	0904	A	GN	46.0	M	0690
0065	0904	A	GN	46.0	M	0720
0065	0904	A	GN	46.0	M	0720
0065	0904	A	GN	46.0	M	0770
0065	0904	A	GN	46.0	M	0770
0065	0904	A	GN	46.0	F	0750
0065	0904	A	GN	46.0	F	0750
0065	0904	A	GN	46.0	F	0750
0065	0904	A	GN	46.0	F	0840
0065	0904	A	GN	46.0	F	0840
0065	0904	A	GN	46.0	F	0870
0066	0904	A	GN	M	M	0730
0066	0904	A	GN	M	M	0770

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0066	0904	A	GN	M	M	0780
0066	0904	A	GN	M	F	0750
0066	0904	A	GN	M	F	0750
0066	0904	A	GN	M	F	0830
0066	0904	A	GN	M	F	0880
0055	0903	A	GN	M	F	0750
0055	0903	A	GN	M	F	0760
0055	0903	A	GN	M	F	0850
0056	0903	A	GN	46.0	F	0800
0056	0903	A	GN	46.0	F	0810
0059	0903	A	GN	45.5	F	0670
0068	0905	A	GN	46.0	F	0730
0068	0905	A	GN	46.0	F	0750
0070	0905	A	GN	M	M	0730
0070	0905	A	GN	M	F	0780
0070	0905	A	GN	M	F	0860
0071	0905	A	GN	45.5	M	0670
0071	0905	A	GN	45.5	M	0720
0071	0905	A	GN	45.5	M	0720
0071	0905	A	GN	45.5	M	0770
0071	0905	A	GN	45.5	F	0670
0071	0905	A	GN	45.5	F	0680
0071	0905	A	GN	45.5	F	0730
0071	0905	A	GN	45.5	F	0870
0072	0905	A	GN	45.5	M	0730
0072	0905	A	GN	45.5	M	0810
0072	0905	A	GN	45.5	F	0660
0073	0905	A	GN	46.0	M	0700
0073	0905	A	GN	46.0	M	0770
0073	0905	A	GN	46.0	F	0670

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0073	0905	A	GN	46.0	F	0680
0073	0905	A	GN	46.0	F	0740
0073	0905	A	GN	46.0	F	0790
0073	0905	A	GN	46.0	F	0810
EXPM	0906	A	GN	M	M	0620
EXPM	0906	A	GN	M	M	0710
EXPM	0906	A	GN	M	M	0710
EXPM	0906	A	GN	M	M	0710
EXPM	0906	A	GN	M	M	0720
EXPM	0906	A	GN	M	M	0730
EXPM	0906	A	GN	M	M	0750
EXPM	0906	A	GN	M	M	0750
EXPM	0906	A	GN	M	M	0750
EXPM	0906	A	GN	M	M	0760
EXPM	0906	A	GN	M	M	0770
EXPM	0906	A	GN	M	M	0770
EXPM	0906	A	GN	M	M	0780
EXPM	0906	A	GN	M	M	0810
EXPM	0906	A	GN	M	M	0850
EXPM	0906	A	GN	M	F	0650
EXPM	0906	A	GN	M	F	0650
EXPM	0906	A	GN	M	F	0670
EXPM	0906	A	GN	M	F	0670
EXPM	0906	A	GN	M	F	0670
EXPM	0906	A	GN	M	F	0680
EXPM	0906	A	GN	M	F	0690
EXPM	0906	A	GN	M	F	0690
EXPM	0906	A	GN	M	F	0690
EXPM	0906	A	GN	M	F	0690
EXPM	0906	A	GN	M	F	0700

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0906	A	GN	M	F	0700
EXPM	0906	A	GN	M	F	0710
EXPM	0906	A	GN	M	F	0710
EXPM	0906	A	GN	M	F	0720
EXPM	0906	A	GN	M	F	0720
EXPM	0906	A	GN	M	F	0740
EXPM	0906	A	GN	M	F	0740
EXPM	0906	A	GN	M	F	0750
EXPM	0906	A	GN	M	F	0760
EXPM	0906	A	GN	M	F	0760
EXPM	0906	A	GN	M	F	0780
EXPM	0906	A	GN	M	F	0780
EXPM	0906	A	GN	M	F	0780
EXPM	0906	A	GN	M	F	0780
EXPM	0906	A	GN	M	F	0790
EXPM	0906	A	GN	M	F	0790
EXPM	0906	A	GN	M	F	0790
EXPM	0906	A	GN	M	F	0800
EXPM	0906	A	GN	M	F	0800
EXPM	0906	A	GN	M	F	0800
EXPM	0906	A	GN	M	F	0810
EXPM	0906	A	GN	M	F	0810
EXPM	0906	A	GN	M	F	0830
EXPM	0906	A	GN	M	F	0830
EXPM	0906	A	GN	M	F	0840
EXPM	0906	A	GN	M	F	0850
EXPM	0906	A	GN	M	F	0850
EXPM	0906	A	GN	M	F	0850
EXPM	0906	A	GN	M	F	0860
EXPM	0906	A	GN	M	F	0880

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0906	A	GN	M	F	0900
EXPM	0906	A	GN	M	F	0920
EXPM	0906	A	GN	M	F	0940
EXPM	0906	A	GN	M	F	1030
EXPM	0905	A	GN	M	M	0660
EXPM	0905	A	GN	M	M	0700
EXPM	0905	A	GN	M	M	0740
EXPM	0905	A	GN	M	F	0680
EXPM	0905	A	GN	M	F	0720
EXPM	0905	A	GN	M	F	0730
EXPM	0905	A	GN	M	F	0740
EXPM	0905	A	GN	M	F	0740
EXPM	0905	A	GN	M	F	0760
EXPM	0905	A	GN	M	F	0760
EXPM	0905	A	GN	M	F	0770
EXPM	0905	A	GN	M	F	0770
EXPM	0905	A	GN	M	F	0790
EXPM	0905	A	GN	M	F	0820
EXPM	0905	A	GN	M	F	0830
EXPM	0905	A	GN	M	F	0860
EXPM	0905	A	GN	M	F	0870
EXPM	0905	A	GN	M	F	0870
EXPM	0909	A	GN	M	M	0640
EXPM	0909	A	GN	M	M	0680
EXPM	0909	A	GN	M	M	0770
EXPM	0909	A	GN	M	F	0690
EXPM	0909	A	GN	M	F	0690
EXPM	0909	A	GN	M	F	0700
EXPM	0909	A	GN	M	F	0720
EXPM	0909	A	GN	M	F	0730

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0909	A	GN	M	F	0730
EXPM	0909	A	GN	M	F	0740
EXPM	0909	A	GN	M	F	0750
EXPM	0909	A	GN	M	F	0770
EXPM	0909	A	GN	M	F	0770
EXPM	0909	A	GN	M	F	0770
EXPM	0909	A	GN	M	F	0770
EXPM	0909	A	GN	M	F	0780
EXPM	0909	A	GN	M	F	0780
EXPM	0909	A	GN	M	F	0780
EXPM	0909	A	GN	M	F	0780
EXPM	0909	A	GN	M	F	0780
EXPM	0909	A	GN	M	F	0790
EXPM	0909	A	GN	M	F	0790
EXPM	0909	A	GN	M	F	0790
EXPM	0909	A	GN	M	F	0800
EXPM	0909	A	GN	M	F	0810
EXPM	0909	A	GN	M	F	0820
EXPM	0909	A	GN	M	F	0820
EXPM	0909	A	GN	M	F	0880
EXPM	0909	A	GN	M	F	0900
0228	0907	C	J	M	M	0480
0228	0907	C	J	M	M	0490
0228	0907	C	J	M	M	0490
0228	0907	C	J	M	M	0490
0228	0907	C	J	M	M	0500
0228	0907	C	J	M	M	0500
0228	0907	C	J	M	M	0510
0228	0907	C	J	M	M	0520
0228	0907	C	J	M	M	0520

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0228	0907	C	J	M	M	0520
0228	0907	C	J	M	M	0530
0228	0907	C	J	M	M	0670
0228	0907	C	J	M	M	0670
0228	0907	C	J	M	M	0670
0228	0907	C	J	M	M	0680
0228	0907	C	J	M	M	0680
0228	0907	C	J	M	M	0680
0228	0907	C	J	M	M	0690
0228	0907	C	J	M	M	0730
0228	0907	C	J	M	M	0750
0228	0907	C	J	M	M	0770
0228	0907	C	J	M	M	0780
0228	0907	C	J	M	M	0860
0228	0907	C	J	M	F	0470
0228	0907	C	J	M	F	0470
0228	0907	C	J	M	F	0480
0228	0907	C	J	M	F	0500
0228	0907	C	J	M	F	0500
0228	0907	C	J	M	F	0510
0228	0907	C	J	M	F	0510
0228	0907	C	J	M	F	0510
0228	0907	C	J	M	F	0520
0228	0907	C	J	M	F	0520
0228	0907	C	J	M	F	0540
0228	0907	C	J	M	F	0560
0228	0907	C	J	M	F	0560
0228	0907	C	J	M	F	0570
0228	0907	C	J	M	F	0580
0228	0907	C	J	M	F	0610

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0228	0907	C	J	M	F	0610
0228	0907	C	J	M	F	0610
0228	0907	C	J	M	F	0620
0228	0907	C	J	M	F	0690
0228	0907	C	J	M	F	0710
0228	0907	C	J	M	F	0730
0228	0907	C	J	M	F	0730
0228	0907	C	J	M	F	0740
0228	0907	C	J	M	F	0750
0228	0907	C	J	M	F	0750
0228	0907	C	J	M	F	0750
0228	0907	C	J	M	F	0800
0228	0907	C	J	M	F	0800
0228	0907	C	J	M	F	0810
0228	0907	C	J	M	F	0830
231+	0909	C	J	M	M	0410
231+	0909	C	J	M	M	0440
231+	0909	C	J	M	M	0450
231+	0909	C	J	M	M	0460
231+	0909	C	J	M	M	0470
231+	0909	C	J	M	M	0480
231+	0909	C	J	M	M	0480
231+	0909	C	J	M	M	0480
231+	0909	C	J	M	M	0480
231+	0909	C	J	M	M	0490
231+	0909	C	J	M	M	0500
231+	0909	C	J	M	M	0500
231+	0909	C	J	M	M	0500
231+	0909	C	J	M	M	0500
231+	0909	C	J	M	M	0510

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
231+	0909	C	J	M	M	0510
231+	0909	C	J	M	M	0510
231+	0909	C	J	M	M	0510
231+	0909	C	J	M	M	0520
231+	0909	C	J	M	M	0520
231+	0909	C	J	M	M	0530
231+	0909	C	J	M	M	0530
231+	0909	C	J	M	M	0530
231+	0909	C	J	M	M	0530
231+	0909	C	J	M	M	0540
231+	0909	C	J	M	M	0540
231+	0909	C	J	M	M	0550
231+	0909	C	J	M	M	0560
231+	0909	C	J	M	M	0560
231+	0909	C	J	M	M	0560
231+	0909	C	J	M	M	0570
231+	0909	C	J	M	M	0570
231+	0909	C	J	M	M	0580
231+	0909	C	J	M	M	0680
231+	0909	C	J	M	M	0690
231+	0909	C	J	M	M	0690
231+	0909	C	J	M	M	0720
231+	0909	C	J	M	M	0740
231+	0909	C	J	M	M	0750
231+	0909	C	J	M	M	0790
231+	0909	C	J	M	F	0470
231+	0909	C	J	M	F	0470
231+	0909	C	J	M	F	0470
231+	0909	C	J	M	F	0480
231+	0909	C	J	M	F	0480

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
231+	0909	C	J	M	F	0490
231+	0909	C	J	M	F	0490
231+	0909	C	J	M	F	0490
231+	0909	C	J	M	F	0510
231+	0909	C	J	M	F	0510
231+	0909	C	J	M	F	0520
231+	0909	C	J	M	F	0520
231+	0909	C	J	M	F	0520
231+	0909	C	J	M	F	0520
231+	0909	C	J	M	F	0530
231+	0909	C	J	M	F	0530
231+	0909	C	J	M	F	0530
231+	0909	C	J	M	F	0540
231+	0909	C	J	M	F	0540
231+	0909	C	J	M	F	0560
231+	0909	C	J	M	F	0560
231+	0909	C	J	M	F	0560
231+	0909	C	J	M	F	0570
231+	0909	C	J	M	F	0610
231+	0909	C	J	M	F	0610
231+	0909	C	J	M	F	0620
231+	0909	C	J	M	F	0620
231+	0909	C	J	M	F	0640
231+	0909	C	J	M	F	0680
231+	0909	C	J	M	F	0680
231+	0909	C	J	M	F	0690
231+	0909	C	J	M	F	0700
231+	0909	C	J	M	F	0710
231+	0909	C	J	M	F	0720
231+	0909	C	J	M	F	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
231+	0909	C	J	M	F	0720
231+	0909	C	J	M	F	0730
231+	0909	C	J	M	F	0730
231+	0909	C	J	M	F	0740
231+	0909	C	J	M	F	0750
231+	0909	C	J	M	F	0750
231+	0909	C	J	M	F	0760
231+	0909	C	J	M	F	0760
231+	0909	C	J	M	F	0780
231+	0909	C	J	M	F	0790
231+	0909	C	J	M	F	0790
231+	0909	C	J	M	F	0800
231+	0909	C	J	M	F	0820
231+	0909	C	J	M	F	0870
231+	0909	C	J	M	F	0880
0076	0907	C	GN	M	M	0650
0076	0907	C	GN	M	M	0680
0076	0907	C	GN	M	M	0690
0076	0907	C	GN	M	M	0690
0076	0907	C	GN	M	M	0700
0076	0907	C	GN	M	M	0710
0076	0907	C	GN	M	M	0710
0076	0907	C	GN	M	M	0720
0076	0907	C	GN	M	M	0720
0076	0907	C	GN	M	M	0720
0076	0907	C	GN	M	M	0720
0076	0907	C	GN	M	M	0730
0076	0907	C	GN	M	M	0730
0076	0907	C	GN	M	M	0740
0076	0907	C	GN	M	M	0750

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0076	0907	C	GN	M	M	0750
0076	0907	C	GN	M	M	0760
0076	0907	C	GN	M	M	0780
0076	0907	C	GN	M	M	0780
0076	0907	C	GN	M	M	0800
0076	0907	C	GN	M	M	0830
0076	0907	C	GN	M	M	0850
0076	0907	C	GN	M	M	0930
0076	0907	C	GN	M	F	0640
0076	0907	C	GN	M	F	0660
0076	0907	C	GN	M	F	0660
0076	0907	C	GN	M	F	0690
0076	0907	C	GN	M	F	0690
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0700
0076	0907	C	GN	M	F	0710
0076	0907	C	GN	M	F	0710
0076	0907	C	GN	M	F	0710
0076	0907	C	GN	M	F	0710
0076	0907	C	GN	M	F	0710
0076	0907	C	GN	M	F	0720
EXPM	0914	A	GN	M	M	0740
0076	0907	C	GN	M	F	0720
0076	0907	C	GN	M	F	0720
0076	0907	C	GN	M	F	0720
0076	0907	C	GN	M	F	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0076	0907	C	GN	M	F	0720
0076	0907	C	GN	M	F	0720
0076	0907	C	GN	M	F	0730
0076	0907	C	GN	M	F	0730
0076	0907	C	GN	M	F	0730
0076	0907	C	GN	M	F	0730
0076	0907	C	GN	M	F	0730
0076	0907	C	GN	M	F	0740
0076	0907	C	GN	M	F	0740
0076	0907	C	GN	M	F	0750
0076	0907	C	GN	M	F	0750
0076	0907	C	GN	M	F	0750
0076	0907	C	GN	M	F	0760
0076	0907	C	GN	M	F	0760
0076	0907	C	GN	M	F	0760
0076	0907	C	GN	M	F	0760
0076	0907	C	GN	M	F	0770
0076	0907	C	GN	M	F	0770
0076	0907	C	GN	M	F	0770
0076	0907	C	GN	M	F	0770
0076	0907	C	GN	M	F	0770
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0780
0076	0907	C	GN	M	F	0790
0076	0907	C	GN	M	F	0790
0076	0907	C	GN	M	F	0790

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0076	0907	C	GN	M	F	0800
0076	0907	C	GN	M	F	0800
0076	0907	C	GN	M	F	0810
0076	0907	C	GN	M	F	0810
0076	0907	C	GN	M	F	0810
0076	0907	C	GN	M	F	0820
0076	0907	C	GN	M	F	0830
0076	0907	C	GN	M	F	0830
0076	0907	C	GN	M	F	0840
0076	0907	C	GN	M	F	0850
0076	0907	C	GN	M	F	0970
0077	0909	C	GN	M	M	0670
0077	0909	C	GN	M	M	0750
0077	0909	C	GN	M	M	0750
0077	0909	C	GN	M	M	0810
0077	0909	C	GN	M	F	0660
0077	0909	C	GN	M	F	0680
0077	0909	C	GN	M	F	0710
0077	0909	C	GN	M	F	0710
0077	0909	C	GN	M	F	0710
0077	0909	C	GN	M	F	0720
0077	0909	C	GN	M	F	0720
0077	0909	C	GN	M	F	0730
0077	0909	C	GN	M	F	0740
0077	0909	C	GN	M	F	0740
0077	0909	C	GN	M	F	0740
0077	0909	C	GN	M	F	0770
0077	0909	C	GN	M	F	0780
0077	0909	C	GN	M	F	0790
0077	0909	C	GN	M	F	0810

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0241	0910	C	J	M	M	0430
0241	0910	C	J	M	M	0450
0241	0910	C	J	M	M	0460
0241	0910	C	J	M	M	0470
0241	0910	C	J	M	M	0480
0241	0910	C	J	M	M	0500
0241	0910	C	J	M	M	0500
0241	0910	C	J	M	M	0510
0241	0910	C	J	M	M	0510
0241	0910	C	J	M	M	0510
0241	0910	C	J	M	M	0530
0241	0910	C	J	M	M	0530
0241	0910	C	J	M	M	0540
0241	0910	C	J	M	M	0550
0241	0910	C	J	M	M	0580
0241	0910	C	J	M	M	0600
0241	0910	C	J	M	M	0670
0241	0910	C	J	M	M	0680
0241	0910	C	J	M	M	0710
0241	0910	C	J	M	M	0760
0241	0910	C	J	M	F	0450
0241	0910	C	J	M	F	0480
0241	0910	C	J	M	F	0490
0241	0910	C	J	M	F	0490
0241	0910	C	J	M	F	0500
0241	0910	C	J	M	F	0510
0241	0910	C	J	M	F	0510
0241	0910	C	J	M	F	0520
0241	0910	C	J	M	F	0520
0241	0910	C	J	M	F	0520

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0241	0910	C	J	M	F	0520
0241	0910	C	J	M	F	0530
0241	0910	C	J	M	F	0530
0241	0910	C	J	M	F	0530
0241	0910	C	J	M	F	0550
0241	0910	C	J	M	F	0550
0241	0910	C	J	M	F	0550
0241	0910	C	J	M	F	0560
0241	0910	C	J	M	F	0560
0241	0910	C	J	M	F	0590
0241	0910	C	J	M	F	0650
0241	0910	C	J	M	F	0660
0241	0910	C	J	M	F	0670
0241	0910	C	J	M	F	0680
0241	0910	C	J	M	F	0690
0241	0910	C	J	M	F	0740
0241	0910	C	J	M	F	0780
0241	0910	C	J	M	F	0800
0225	0906	C	J	M	M	0560
0225	0906	C	J	M	M	0670
0225	0906	C	J	M	M	0700
0225	0906	C	J	M	M	0710
0225	0906	C	J	M	F	0520
0225	0906	C	J	M	F	0550
0225	0906	C	J	M	F	0740
0225	0906	C	J	M	F	0790
EXPM	0910	A	GN	M	M	0540
EXPM	0910	A	GN	M	M	0670
EXPM	0910	A	GN	M	M	0730
EXPM	0910	A	GN	M	M	0730

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0910	A	GN	M	M	0740
EXPM	0910	A	GN	M	M	0770
EXPM	0910	A	GN	M	F	0490
EXPM	0910	A	GN	M	F	0670
EXPM	0910	A	GN	M	F	0690
EXPM	0910	A	GN	M	F	0700
EXPM	0910	A	GN	M	F	0700
EXPM	0910	A	GN	M	F	0710
EXPM	0910	A	GN	M	F	0710
EXPM	0910	A	GN	M	F	0720
EXPM	0910	A	GN	M	F	0720
EXPM	0910	A	GN	M	F	0740
EXPM	0910	A	GN	M	F	0740
EXPM	0910	A	GN	M	F	0740
EXPM	0910	A	GN	M	F	0750
EXPM	0910	A	GN	M	F	0750
EXPM	0910	A	GN	M	F	0750
EXPM	0910	A	GN	M	F	0760
EXPM	0910	A	GN	M	F	0770
EXPM	0910	A	GN	M	F	0770
EXPM	0910	A	GN	M	F	0780
EXPM	0910	A	GN	M	F	0790
EXPM	0910	A	GN	M	F	0810
EXPM	0910	A	GN	M	F	0810
EXPM	0910	A	GN	M	F	0820
EXPM	0910	A	GN	M	F	0840
EXPM	0910	A	GN	M	F	0840
EXPM	0910	A	GN	M	F	0850
EXPM	0910	A	GN	M	F	0850
EXPM	0910	A	GN	M	F	0860

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0910	A	GN	M	F	0870
EXPM	0910	A	GN	M	F	0880
EXPM	0910	A	GN	M	F	0890
EXPM	0911	A	GN	M	M	0660
EXPM	0911	A	GN	M	M	0720
EXPM	0911	A	GN	M	M	0750
EXPM	0911	A	GN	M	M	0750
EXPM	0911	A	GN	M	F	0650
EXPM	0911	A	GN	M	F	0690
EXPM	0911	A	GN	M	F	0700
EXPM	0911	A	GN	M	F	0750
EXPM	0911	A	GN	M	F	0750
EXPM	0911	A	GN	M	F	0760
EXPM	0911	A	GN	M	F	0760
EXPM	0911	A	GN	M	F	0770
EXPM	0911	A	GN	M	F	0780
EXPM	0911	A	GN	M	F	0780
EXPM	0911	A	GN	M	F	0780
EXPM	0911	A	GN	M	F	0780
EXPM	0911	A	GN	M	F	0790
EXPM	0911	A	GN	M	F	0810
EXPM	0911	A	GN	M	F	0810
EXPM	0911	A	GN	M	F	0810
EXPM	0911	A	GN	M	F	0820
EXPM	0912	A	GN	M	M	0690
EXPM	0912	A	GN	M	M	0700
EXPM	0912	A	GN	M	M	0760
EXPM	0912	A	GN	M	F	0630
EXPM	0912	A	GN	M	F	0650
EXPM	0912	A	GN	M	F	0650

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0912	A	GN	M	U	0670
EXPM	0913	A	GN	M	M	0490
EXPM	0913	A	GN	M	F	0720
EXPM	0913	A	GN	M	F	0730
EXPM	0913	A	GN	M	F	0750
EXPM	0913	A	GN	M	F	0760
EXPM	0913	A	GN	M	F	0780
EXPM	0913	A	GN	M	F	0780
EXPM	0913	A	GN	M	F	0810
EXPM	0913	A	GN	M	F	0930
EXPM	0913	A	GN	M	U	0810
EXPM	0914	A	GN	M	M	0720
EXPM	0914	A	GN	M	M	0730
EXPM	0914	A	GN	M	M	0740
EXPM	0914	A	GN	M	M	0760
EXPM	0914	A	GN	M	F	0650
EXPM	0914	A	GN	M	F	0680
EXPM	0914	A	GN	M	F	0700
EXPM	0914	A	GN	M	F	0710
EXPM	0914	A	GN	M	F	0730
EXPM	0914	A	GN	M	F	0730
EXPM	0914	A	GN	M	F	0750
EXPM	0914	A	GN	M	F	0760
EXPM	0914	A	GN	M	F	0770
EXPM	0914	A	GN	M	F	0780
EXPM	0914	A	GN	M	F	0800
EXPM	0914	A	GN	M	F	0810
EXPM	0914	A	GN	M	F	0830
EXPM	0914	A	GN	M	F	0920
0081	0913	C	GN	45.5	M	0650

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0081	0913	C	GN	45.5	M	0720
0081	0913	C	GN	45.5	M	0780
0081	0913	C	GN	45.5	F	0580
0081	0913	C	GN	45.5	F	0610
0081	0913	C	GN	45.5	F	0640
0081	0913	C	GN	45.5	F	0680
0081	0913	C	GN	45.5	F	0700
0081	0913	C	GN	45.5	F	0750
0081	0913	C	GN	45.5	F	0750
0081	0913	C	GN	45.5	F	0790
0082	0913	C	GN	45.5	M	0540
0082	0913	C	GN	45.5	M	0680
0082	0913	C	GN	45.5	F	0670
0082	0913	C	GN	45.5	F	0720
0082	0913	C	GN	45.5	F	0760
0082	0913	C	GN	45.5	F	0820
0083	0913	C	GN	46.0	M	0490
0083	0913	C	GN	46.0	M	0660
0083	0913	C	GN	46.0	M	0680
0083	0913	C	GN	46.0	M	0700
0083	0913	C	GN	46.0	M	0720
0083	0913	C	GN	46.0	F	0620
0083	0913	C	GN	46.0	F	0670
0083	0913	C	GN	46.0	F	0690
0083	0913	C	GN	46.0	F	0690
0083	0913	C	GN	46.0	F	0710
0083	0913	C	GN	46.0	F	0730
0083	0913	C	GN	46.0	F	0730
0083	0913	C	GN	46.0	F	0760
0083	0913	C	GN	46.0	F	0780

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0083	0913	C	GN	46.0	F	0810
0083	0913	C	GN	46.0	F	0840
0083	0913	C	GN	46.0	F	0870
0085	0913	C	GN	46.0	M	0860
0085	0913	C	GN	46.0	F	0700
246+	0914	B	J	M	M	0560
246+	0914	B	J	M	M	0650
246+	0914	B	J	M	M	0670
246+	0914	B	J	M	M	0700
246+	0914	B	J	M	M	0730
246+	0914	B	J	M	M	0750
246+	0914	B	J	M	M	0770
246+	0914	B	J	M	M	0770
246+	0914	B	J	M	M	0780
246+	0914	B	J	M	M	0850
246+	0914	B	J	M	F	0680
246+	0914	B	J	M	F	0700
246+	0914	B	J	M	F	0710
246+	0914	B	J	M	F	0710
246+	0914	B	J	M	F	0720
246+	0914	B	J	M	F	0720
246+	0914	B	J	M	F	0720
246+	0914	B	J	M	F	0730
246+	0914	B	J	M	F	0770
246+	0914	B	J	M	F	0770
246+	0914	B	J	M	F	0800
246+	0914	B	J	M	F	0810
246+	0914	B	J	M	F	0820
246+	0914	B	J	M	F	0860
246+	0914	B	J	M	F	0890

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
246+	0914	B	J	M	F	0900
0254	0914	C	J	M	M	0440
0254	0914	C	J	M	M	0470
0254	0914	C	J	M	M	0480
0254	0914	C	J	M	M	0480
0254	0914	C	J	M	M	0490
0254	0914	C	J	M	M	0490
0254	0914	C	J	M	M	0490
0254	0914	C	J	M	M	0490
0254	0914	C	J	M	M	0500
0254	0914	C	J	M	M	0500
0254	0914	C	J	M	M	0510
0254	0914	C	J	M	M	0510
0254	0914	C	J	M	M	0510
0254	0914	C	J	M	M	0510
0254	0914	C	J	M	M	0510
0254	0914	C	J	M	M	0520
0254	0914	C	J	M	M	0520
0254	0914	C	J	M	M	0520
0254	0914	C	J	M	M	0520
0254	0914	C	J	M	M	0530
0254	0914	C	J	M	M	0530
0254	0914	C	J	M	M	0530
0254	0914	C	J	M	M	0530
0254	0914	C	J	M	M	0530
0254	0914	C	J	M	M	0540
0254	0914	C	J	M	M	0540
0254	0914	C	J	M	M	0540
0254	0914	C	J	M	M	0540
0254	0914	C	J	M	M	0540

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0254	0914	C	J	M	M	0540
0254	0914	C	J	M	M	0550
0254	0914	C	J	M	M	0560
0254	0914	C	J	M	F	0450
0254	0914	C	J	M	F	0450
0254	0914	C	J	M	F	0460
0254	0914	C	J	M	F	0460
0254	0914	C	J	M	F	0460
0254	0914	C	J	M	F	0460
0254	0914	C	J	M	F	0480
0254	0914	C	J	M	F	0480
0254	0914	C	J	M	F	0490
0254	0914	C	J	M	F	0490
0254	0914	C	J	M	F	0490
0254	0914	C	J	M	F	0490
0254	0914	C	J	M	F	0490
0254	0914	C	J	M	F	0500
0254	0914	C	J	M	F	0500
0254	0914	C	J	M	F	0500
0254	0914	C	J	M	F	0500
0254	0914	C	J	M	F	0500
0254	0914	C	J	M	F	0520
0254	0914	C	J	M	F	0520
0254	0914	C	J	M	F	0520
0254	0914	C	J	M	F	0520
0254	0914	C	J	M	F	0530
0254	0914	C	J	M	F	0540
0254	0914	C	J	M	F	0540
0254	0914	C	J	M	F	0540
0254	0914	C	J	M	F	0540

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0254	0914	C	J	M	F	0540
0254	0914	C	J	M	F	0550
0254	0914	C	J	M	F	0550
0254	0914	C	J	M	F	0550
0254	0914	C	J	M	F	0550
0254	0914	C	J	M	F	0560
0254	0914	C	J	M	F	0560
0254	0914	C	J	M	F	0560
0254	0914	C	J	M	F	0570
0254	0914	C	J	M	F	0580
0254	0914	C	J	M	F	0580
0254	0914	C	J	M	F	0590
0254	0914	C	J	M	F	0590
0254	0914	C	J	M	F	0650
0254	0914	C	J	M	F	0660
0254	0914	C	J	M	F	0680
0254	0914	C	J	M	F	0730
0254	0914	C	J	M	F	0800
0254	0914	C	J	M	F	0820
0271	0915	B	J	M	M	0500
0271	0915	B	J	M	M	0570
0271	0915	B	J	M	M	0590
0271	0915	B	J	M	M	0600
0271	0915	B	J	M	M	0620
0271	0915	B	J	M	M	0630
0271	0915	B	J	M	M	0660
0271	0915	B	J	M	M	0660
0271	0915	B	J	M	M	0660
0271	0915	B	J	M	M	0670
0271	0915	B	J	M	M	0670

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0271	0915	B	J	M	M	0670
0271	0915	B	J	M	M	0690
0271	0915	B	J	M	M	0690
0271	0915	B	J	M	M	0700
0271	0915	B	J	M	M	0720
0271	0915	B	J	M	M	0720
0271	0915	B	J	M	M	0730
0271	0915	B	J	M	M	0730
0271	0915	B	J	M	M	0740
0271	0915	B	J	M	M	0740
0271	0915	B	J	M	M	0740
0271	0915	B	J	M	M	0760
0271	0915	B	J	M	M	0760
0271	0915	B	J	M	M	0770
0271	0915	B	J	M	M	0790
0271	0915	B	J	M	M	0790
0271	0915	B	J	M	M	0820
0271	0915	B	J	M	F	0580
0271	0915	B	J	M	F	0620
0271	0915	B	J	M	F	0620
0271	0915	B	J	M	F	0650
0271	0915	B	J	M	F	0650
0271	0915	B	J	M	F	0660
0271	0915	B	J	M	F	0690
0271	0915	B	J	M	F	0690
0271	0915	B	J	M	F	0700
0271	0915	B	J	M	F	0700
0271	0915	B	J	M	F	0700
0271	0915	B	J	M	F	0710
0271	0915	B	J	M	F	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
0271	0915	B	J	M	F	0720
0271	0915	B	J	M	F	0730
0271	0915	B	J	M	F	0730
0271	0915	B	J	M	F	0730
0271	0915	B	J	M	F	0730
0271	0915	B	J	M	F	0730
0271	0915	B	J	M	F	0750
0271	0915	B	J	M	F	0750
0271	0915	B	J	M	F	0750
0271	0915	B	J	M	F	0750
0271	0915	B	J	M	F	0760
0271	0915	B	J	M	F	0760
0271	0915	B	J	M	F	0770
0271	0915	B	J	M	F	0780
0271	0915	B	J	M	F	0780
0271	0915	B	J	M	F	0780
0271	0915	B	J	M	F	0780
0271	0915	B	J	M	F	0800
0271	0915	B	J	M	F	0810
0271	0915	B	J	M	F	0810
0271	0915	B	J	M	F	0830
0271	0915	B	J	M	F	0850
0271	0915	B	J	M	F	0850
EXPM	0920	A	GN	M	M	0380
EXPM	0920	A	GN	M	M	0660
EXPM	0920	A	GN	M	M	0700
EXPM	0920	A	GN	M	M	0710
EXPM	0920	A	GN	M	M	0720
EXPM	0920	A	GN	M	M	0730
EXPM	0920	A	GN	M	M	0760

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0920	A	GN	M	M	0760
EXPM	0920	A	GN	M	M	0770
EXPM	0920	A	GN	M	M	0770
EXPM	0920	A	GN	M	M	0770
EXPM	0920	A	GN	M	M	0770
EXPM	0920	A	GN	M	M	0790
EXPM	0920	A	GN	M	M	0790
EXPM	0920	A	GN	M	M	0800
EXPM	0920	A	GN	M	M	0870
EXPM	0920	A	GN	M	M	0960
EXPM	0920	A	GN	M	F	0340
EXPM	0920	A	GN	M	F	0660
EXPM	0920	A	GN	M	F	0660
EXPM	0920	A	GN	M	F	0670
EXPM	0920	A	GN	M	F	0670
EXPM	0920	A	GN	M	F	0680
EXPM	0920	A	GN	M	F	0690
EXPM	0920	A	GN	M	F	0690
EXPM	0920	A	GN	M	F	0690
EXPM	0920	A	GN	M	F	0690
EXPM	0920	A	GN	M	F	0700
EXPM	0920	A	GN	M	F	0700
EXPM	0920	A	GN	M	F	0700
EXPM	0920	A	GN	M	F	0720
EXPM	0920	A	GN	M	F	0720
EXPM	0920	A	GN	M	F	0720
EXPM	0920	A	GN	M	F	0720
EXPM	0920	A	GN	M	F	0730
EXPM	0920	A	GN	M	F	0740
EXPM	0920	A	GN	M	F	0740

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0920	A	GN	M	F	0740
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0750
EXPM	0920	A	GN	M	F	0760
EXPM	0920	A	GN	M	F	0760
EXPM	0920	A	GN	M	F	0770
EXPM	0920	A	GN	M	F	0770
EXPM	0920	A	GN	M	F	0770
EXPM	0920	A	GN	M	F	0780
EXPM	0920	A	GN	M	F	0780
EXPM	0920	A	GN	M	F	0790
EXPM	0920	A	GN	M	F	0790
EXPM	0920	A	GN	M	F	0800
EXPM	0920	A	GN	M	F	0800
EXPM	0920	A	GN	M	F	0810
EXPM	0920	A	GN	M	F	0810
EXPM	0920	A	GN	M	F	0810
EXPM	0920	A	GN	M	F	0820
EXPM	0920	A	GN	M	F	0830
EXPM	0920	A	GN	M	F	0830
EXPM	0920	A	GN	M	F	0850
EXPM	0920	A	GN	M	F	0850
EXPM	0920	A	GN	M	F	0850
EXPM	0920	A	GN	M	F	0870
EXPM	0920	A	GN	M	F	0940
EXPM	0918	A	GN	M	M	0750

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0918	A	GN	M	M	0760
EXPM	0918	A	GN	M	F	0730
EXPM	0918	A	GN	M	F	0760
EXPM	0918	A	GN	M	F	0840
EXPM	0918	A	GN	M	F	0890
EXPM	0918	A	GN	M	F	0940
EXPM	0916	A	GN	M	M	0670
EXPM	0916	A	GN	M	M	0680
EXPM	0916	A	GN	M	M	0700
EXPM	0916	A	GN	M	M	0710
EXPM	0916	A	GN	M	M	0740
EXPM	0916	A	GN	M	M	0750
EXPM	0916	A	GN	M	M	0750
EXPM	0916	A	GN	M	M	0750
EXPM	0916	A	GN	M	M	0780
EXPM	0916	A	GN	M	M	0780
EXPM	0916	A	GN	M	M	0810
EXPM	0916	A	GN	M	M	0850
EXPM	0916	A	GN	M	F	0650
EXPM	0916	A	GN	M	F	0660
EXPM	0916	A	GN	M	F	0670
EXPM	0916	A	GN	M	F	0690
EXPM	0916	A	GN	M	F	0700
EXPM	0916	A	GN	M	F	0700
EXPM	0916	A	GN	M	F	0700
EXPM	0916	A	GN	M	F	0710
EXPM	0916	A	GN	M	F	0710
EXPM	0916	A	GN	M	F	0720
EXPM	0916	A	GN	M	F	0730
EXPM	0916	A	GN	M	F	0740

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0916	A	GN	M	F	0740
EXPM	0916	A	GN	M	F	0740
EXPM	0916	A	GN	M	F	0750
EXPM	0916	A	GN	M	F	0750
EXPM	0916	A	GN	M	F	0750
EXPM	0916	A	GN	M	F	0760
EXPM	0916	A	GN	M	F	0770
EXPM	0916	A	GN	M	F	0780
EXPM	0916	A	GN	M	F	0790
EXPM	0916	A	GN	M	F	0790
EXPM	0916	A	GN	M	F	0790
EXPM	0916	A	GN	M	F	0800
EXPM	0916	A	GN	M	F	0810
EXPM	0916	A	GN	M	F	0820
EXPM	0916	A	GN	M	F	0830
EXPM	0916	A	GN	M	F	0830
EXPM	0916	A	GN	M	F	0900
EXPM	0921	A	GN	M	M	0370
EXPM	0921	A	GN	M	M	0380
EXPM	0921	A	GN	M	M	0630
EXPM	0921	A	GN	M	M	0670
EXPM	0921	A	GN	M	M	0670
EXPM	0921	A	GN	M	M	0680
EXPM	0921	A	GN	M	M	0690
EXPM	0921	A	GN	M	M	0690
EXPM	0921	A	GN	M	M	0700
EXPM	0921	A	GN	M	M	0700
EXPM	0921	A	GN	M	M	0710
EXPM	0921	A	GN	M	M	0710
EXPM	0921	A	GN	M	M	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0921	A	GN	M	M	0730
EXPM	0921	A	GN	M	M	0730
EXPM	0921	A	GN	M	M	0730
EXPM	0921	A	GN	M	M	0730
EXPM	0921	A	GN	M	M	0750
EXPM	0921	A	GN	M	M	0750
EXPM	0921	A	GN	M	M	0750
EXPM	0921	A	GN	M	M	0760
EXPM	0921	A	GN	M	M	0780
EXPM	0921	A	GN	M	M	0800
EXPM	0921	A	GN	M	F	0350
EXPM	0921	A	GN	M	F	0440
EXPM	0921	A	GN	M	F	0570
EXPM	0921	A	GN	M	F	0600
EXPM	0921	A	GN	M	F	0680
EXPM	0921	A	GN	M	F	0680
EXPM	0921	A	GN	M	F	0680
EXPM	0921	A	GN	M	F	0690
EXPM	0921	A	GN	M	F	0690
EXPM	0921	A	GN	M	F	0690
EXPM	0921	A	GN	M	F	0700
EXPM	0921	A	GN	M	F	0700
EXPM	0921	A	GN	M	F	0700
EXPM	0921	A	GN	M	F	0720
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0730
EXPM	0921	A	GN	M	F	0740
EXPM	0921	A	GN	M	F	0740
EXPM	0921	A	GN	M	F	0750
EXPM	0921	A	GN	M	F	0750
EXPM	0921	A	GN	M	F	0750
EXPM	0921	A	GN	M	F	0760
EXPM	0921	A	GN	M	F	0760
EXPM	0921	A	GN	M	F	0760
EXPM	0921	A	GN	M	F	0760
EXPM	0921	A	GN	M	F	0770
EXPM	0921	A	GN	M	F	0770
EXPM	0921	A	GN	M	F	0770
EXPM	0921	A	GN	M	F	0770
EXPM	0921	A	GN	M	F	0780
EXPM	0921	A	GN	M	F	0790
EXPM	0921	A	GN	M	F	0790
EXPM	0921	A	GN	M	F	0790
EXPM	0921	A	GN	M	F	0790
EXPM	0921	A	GN	M	F	0800
EXPM	0921	A	GN	M	F	0800
EXPM	0921	A	GN	M	F	0800
EXPM	0921	A	GN	M	F	0800
EXPM	0921	A	GN	M	F	0820
EXPM	0921	A	GN	M	F	0820
EXPM	0921	A	GN	M	F	0830
EXPM	0921	A	GN	M	F	0830
EXPM	0921	A	GN	M	F	0840
EXPM	0921	A	GN	M	F	0840

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0921	A	GN	M	F	0850
EXPM	0921	A	GN	M	F	0880
EXPM	0921	A	GN	M	F	0910
EXPM	0921	A	GN	M	F	0920
EXPM	0921	A	GN	M	F	0920
EXPM	0922	A	GN	M	M	0370
EXPM	0922	A	GN	M	M	0490
EXPM	0922	A	GN	M	M	0630
EXPM	0922	A	GN	M	M	0670
EXPM	0922	A	GN	M	M	0670
EXPM	0922	A	GN	M	M	0690
EXPM	0922	A	GN	M	M	0700
EXPM	0922	A	GN	M	M	0710
EXPM	0922	A	GN	M	M	0710
EXPM	0922	A	GN	M	M	0710
EXPM	0922	A	GN	M	M	0730
EXPM	0922	A	GN	M	M	0740
EXPM	0922	A	GN	M	M	0740
EXPM	0922	A	GN	M	M	0790
EXPM	0922	A	GN	M	M	0800
EXPM	0922	A	GN	M	M	0850
EXPM	0922	A	GN	M	F	0520
EXPM	0922	A	GN	M	F	0600
EXPM	0922	A	GN	M	F	0680
EXPM	0922	A	GN	M	F	0690
EXPM	0922	A	GN	M	F	0700
EXPM	0922	A	GN	M	F	0700
EXPM	0922	A	GN	M	F	0700
EXPM	0922	A	GN	M	F	0710
EXPM	0922	A	GN	M	F	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0922	A	GN	M	F	0720
EXPM	0922	A	GN	M	F	0730
EXPM	0922	A	GN	M	F	0740
EXPM	0922	A	GN	M	F	0740
EXPM	0922	A	GN	M	F	0740
EXPM	0922	A	GN	M	F	0750
EXPM	0922	A	GN	M	F	0760
EXPM	0922	A	GN	M	F	0760
EXPM	0922	A	GN	M	F	0770
EXPM	0922	A	GN	M	F	0770
EXPM	0922	A	GN	M	F	0770
EXPM	0922	A	GN	M	F	0780
EXPM	0922	A	GN	M	F	0780
EXPM	0922	A	GN	M	F	0780
EXPM	0922	A	GN	M	F	0790
EXPM	0922	A	GN	M	F	0790
EXPM	0922	A	GN	M	F	0800
EXPM	0922	A	GN	M	F	0800
EXPM	0922	A	GN	M	F	0840
EXPM	0922	A	GN	M	F	0840
EXPM	0922	A	GN	M	F	0840
EXPM	0922	A	GN	M	F	0890
EXPM	0922	A	GN	M	F	0900
281+	0921	C	J	M	M	0430
281+	0921	C	J	M	M	0510
281+	0921	C	J	M	M	0540
281+	0921	C	J	M	F	0480
281+	0921	C	J	M	F	0490
281+	0921	C	J	M	F	0530
281+	0921	C	J	M	F	0610

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0925	A	GN	M	F	0690
EXPM	0925	A	GN	M	F	0700
EXPM	0925	A	GN	M	F	0700
EXPM	0925	A	GN	M	F	0710
EXPM	0925	A	GN	M	F	0710
EXPM	0925	A	GN	M	F	0710
EXPM	0925	A	GN	M	F	0720
EXPM	0925	A	GN	M	F	0720
EXPM	0925	A	GN	M	F	0730
EXPM	0925	A	GN	M	F	0730
EXPM	0925	A	GN	M	F	0730
EXPM	0925	A	GN	M	F	0740
EXPM	0925	A	GN	M	F	0740
EXPM	0925	A	GN	M	F	0740
EXPM	0925	A	GN	M	F	0740
EXPM	0925	A	GN	M	F	0750
EXPM	0925	A	GN	M	F	0760
EXPM	0925	A	GN	M	F	0760
EXPM	0925	A	GN	M	F	0770
EXPM	0925	A	GN	M	F	0770
EXPM	0925	A	GN	M	F	0780
EXPM	0925	A	GN	M	F	0790
EXPM	0925	A	GN	M	F	0800
EXPM	0925	A	GN	M	F	0810
EXPM	0925	A	GN	M	F	0820
EXPM	0925	A	GN	M	F	0820
EXPM	0925	A	GN	M	F	0840
EXPM	0925	A	GN	M	F	0870
EXPM	0925	A	GN	M	F	0890
EXPM	0925	A	GN	M	F	0900

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0924	A	GN	M	F	0820
EXPM	0924	A	GN	M	F	0820
EXPM	0924	A	GN	M	F	0830
EXPM	0924	A	GN	M	F	0830
EXPM	0924	A	GN	M	F	0840
EXPM	0924	A	GN	M	F	0850
EXPM	0924	A	GN	M	F	0850
EXPM	0924	A	GN	M	F	0860
EXPM	0924	A	GN	M	F	0860
EXPM	0924	A	GN	M	F	0860
EXPM	0924	A	GN	M	F	0870
EXPM	0924	A	GN	M	F	0870
EXPM	0924	A	GN	M	F	0890
EXPM	0924	A	GN	M	U	0290
EXPM	0924	A	GN	M	U	0690
EXPM	0924	A	GN	M	U	0690
EXPM	0925	A	GN	M	M	0660
EXPM	0925	A	GN	M	M	0670
EXPM	0925	A	GN	M	M	0680
EXPM	0925	A	GN	M	M	0750
EXPM	0925	A	GN	M	M	0750
EXPM	0925	A	GN	M	M	0760
EXPM	0925	A	GN	M	M	0780
EXPM	0925	A	GN	M	M	0790
EXPM	0925	A	GN	M	M	0800
EXPM	0925	A	GN	M	F	0600
EXPM	0925	A	GN	M	F	0620
EXPM	0925	A	GN	M	F	0660
EXPM	0925	A	GN	M	F	0660
EXPM	0925	A	GN	M	F	0680

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0730
EXPM	0924	A	GN	M	F	0740
EXPM	0924	A	GN	M	F	0740
EXPM	0924	A	GN	M	F	0740
EXPM	0924	A	GN	M	F	0740
EXPM	0924	A	GN	M	F	0750
EXPM	0924	A	GN	M	F	0750
EXPM	0924	A	GN	M	F	0750
EXPM	0924	A	GN	M	F	0760
EXPM	0924	A	GN	M	F	0770
EXPM	0924	A	GN	M	F	0770
EXPM	0924	A	GN	M	F	0780
EXPM	0924	A	GN	M	F	0780
EXPM	0924	A	GN	M	F	0780
EXPM	0924	A	GN	M	F	0790
EXPM	0924	A	GN	M	F	0800
EXPM	0924	A	GN	M	F	0800
EXPM	0924	A	GN	M	F	0800
EXPM	0924	A	GN	M	F	0800
EXPM	0924	A	GN	M	F	0800
EXPM	0924	A	GN	M	F	0810
EXPM	0924	A	GN	M	F	0810
EXPM	0924	A	GN	M	F	0810
EXPM	0924	A	GN	M	F	0810
EXPM	0924	A	GN	M	F	0810

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0924	A	GN	M	M	0690
EXPM	0924	A	GN	M	M	0700
EXPM	0924	A	GN	M	M	0700
EXPM	0924	A	GN	M	M	0700
EXPM	0924	A	GN	M	M	0710
EXPM	0924	A	GN	M	M	0720
EXPM	0924	A	GN	M	M	0730
EXPM	0924	A	GN	M	M	0740
EXPM	0924	A	GN	M	M	0740
EXPM	0924	A	GN	M	M	0750
EXPM	0924	A	GN	M	M	0770
EXPM	0924	A	GN	M	M	0800
EXPM	0924	A	GN	M	M	0800
EXPM	0924	A	GN	M	M	0810
EXPM	0924	A	GN	M	M	0810
EXPM	0924	A	GN	M	F	0650
EXPM	0924	A	GN	M	F	0670
EXPM	0924	A	GN	M	F	0680
EXPM	0924	A	GN	M	F	0680
EXPM	0924	A	GN	M	F	0690
EXPM	0924	A	GN	M	F	0690
EXPM	0924	A	GN	M	F	0690
EXPM	0924	A	GN	M	F	0700
EXPM	0924	A	GN	M	F	0710
EXPM	0924	A	GN	M	F	0710
EXPM	0924	A	GN	M	F	0710
EXPM	0924	A	GN	M	F	0710
EXPM	0924	A	GN	M	F	0720
EXPM	0924	A	GN	M	F	0720
EXPM	0924	A	GN	M	F	0720

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0760
EXPM	0923	A	GN	M	F	0770
EXPM	0923	A	GN	M	F	0770
EXPM	0923	A	GN	M	F	0770
EXPM	0923	A	GN	M	F	0780
EXPM	0923	A	GN	M	F	0790
EXPM	0923	A	GN	M	F	0800
EXPM	0923	A	GN	M	F	0810
EXPM	0923	A	GN	M	F	0810
EXPM	0923	A	GN	M	F	0810
EXPM	0923	A	GN	M	F	0810
EXPM	0923	A	GN	M	F	0820
EXPM	0923	A	GN	M	F	0820
EXPM	0923	A	GN	M	F	0820
EXPM	0923	A	GN	M	F	0830
EXPM	0923	A	GN	M	F	0830
EXPM	0923	A	GN	M	F	0840
EXPM	0923	A	GN	M	F	0870
EXPM	0923	A	GN	M	F	0920
EXPM	0923	A	GN	M	F	0930
EXPM	0923	A	GN	M	U	0340
EXPM	0924	A	GN	M	M	0470
EXPM	0924	A	GN	M	M	0500
EXPM	0924	A	GN	M	M	0660
EXPM	0924	A	GN	M	M	0680
EXPM	0924	A	GN	M	M	0690

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
281+	0921	C	J	M	F	0690
281+	0921	C	J	M	F	0710
EXPM	0923	A	GN	M	M	0490
EXPM	0923	A	GN	M	M	0690
EXPM	0923	A	GN	M	M	0710
EXPM	0923	A	GN	M	M	0720
EXPM	0923	A	GN	M	M	0720
EXPM	0923	A	GN	M	M	0730
EXPM	0923	A	GN	M	M	0730
EXPM	0923	A	GN	M	M	0730
EXPM	0923	A	GN	M	M	0730
EXPM	0923	A	GN	M	M	0740
EXPM	0923	A	GN	M	M	0750
EXPM	0923	A	GN	M	M	0800
EXPM	0923	A	GN	M	M	0810
EXPM	0923	A	GN	M	M	0860
EXPM	0923	A	GN	M	F	0550
EXPM	0923	A	GN	M	F	0630
EXPM	0923	A	GN	M	F	0680
EXPM	0923	A	GN	M	F	0700
EXPM	0923	A	GN	M	F	0720
EXPM	0923	A	GN	M	F	0720
EXPM	0923	A	GN	M	F	0720
EXPM	0923	A	GN	M	F	0730
EXPM	0923	A	GN	M	F	0730
EXPM	0923	A	GN	M	F	0740
EXPM	0923	A	GN	M	F	0740
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0750
EXPM	0923	A	GN	M	F	0750

KILLINIQ FISHERY PROJECT - 1984 LENGTH FREQUENCY DATA

SET NUMBER	DATE	REGION	GEAR TYPE	GEAR SIZE	SEX	TOTAL LENGTH
EXPM	0925	A	GN	M	F	0950
EXPM	1004	A	GN	M	M	0650
EXPM	1005	A	GN	M	M	0720
EXPM	1005	A	GN	M	F	0610
EXPM	1005	A	GN	M	F	0830
EXPM	1006	A	GN	M	M	0700
EXPM	1006	A	GN	M	M	0700
EXPM	1006	A	GN	M	F	0680
EXPM	1006	A	GN	M	F	0770
EXPM	1006	A	GN	M	F	0840
EXPM	1009	A	GN	M	F	0770
EXPM	1009	A	GN	M	F	0830

APPENDIX F

AUTOPSY DATA

F-1 Atlantic cod
F-2 Atlantic salmon
F-3 Arctic char
F-4 Greenland halibut
F-5 Greenland cod
F-6 Atlantic herring
F-7 Iceland scallop

F-1 ATLANTIC COD AUTOPSY DATA

Key :

Date : month : day

Set : 1-199 = exploratory bottom gillnet
200-299 = hand jig
+ = catches combined
expm = catch from experimental fishery

Region : Same as zone, see Figure D-1
m = mixed zones

Length : in millimeters, total

Weight : in kilograms

Sex : M = male
F = female
U = unknown

Maturity : 1 = immature
6 = mature, recuperation

Age : in years

Vertebral numbers :
Visual counts, <u>excluding</u> first (fused) vertebrae and urostyle

Parasites : T = tight coils*
L = Loose coils*
T + L = tight and loose coils*
= sample number for retained livers

*see main text, section C.3.a.(iii) and Appendix I

Stomach contents :
F = fish
S = shrimp
C = crab
P = polychaetes
Mt = empty
# = sample number for retained stomachs

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0823	17	B	763	3.30	F	6	8			FS
0823	17	B	708	2.85	F	6	8			F
0823	18	B	751	3.50	M	6	9			FS
0823	19	B	732	3.20	F	6	9			MT
0823	20	C	780	3.80	F	6	9			MT
0823	20	C	650	2.50	M	6	7			FSC
0823	20	C	795	4.30	F	6	8			SP
0823	20	C	750	3.80	M	6	9			MT
0823	20	C	723	3.50	F	6	8			S
0823	20	C	742	3.35	F	6	8			FS
0823	20	C	738	3.40	F	6	8			FSQ
0823	20	C	690	3.30	F	6	8			
0823	20	C	761	3.65	M	6	8			FSA
0823	20	C	720	2.90	F	6	8			MT
0824	27	C	690	2.60	M	6	8			MT
0824	27	C	705	2.90	M	6	8			MT
0824	27	C	646	2.05	M	6	7			MT
0824	27	C	725	3.10	F	6	8			F
0824	28	C	888	6.15	F	6	9			FQ
0824	28	C	672	2.50	M	6	8			S
0824	28	C	695	2.40	M	6	7			S
0824	28	C	671	2.40	M	6	7			MT
0824	28	C	663	2.45	F	6	8			MT
0824	28	C	721	3.10	M	6	8			FS
0824	23+	M	741	3.50	F	6	8			S
0824	23+	M	827	5.10	F	6	8			FC
0824	23+	M	715	3.20	F	6	8			FC
0824	23+	M	772	3.95	F	6	8			S
0824	23+	M	680	2.80	M	6	7			S
0824	23+	M	862	6.80	F	6	8			S

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0824	23+	M	697	3.30	M	6	8			F
0824	23+	M	800	4.60	F	6	9			S
0824	23+	M	768	4.25	F	6	8			FS
0824	23+	M	856	5.30	F	6	9			MT
0824	23+	M	751	4.10	M	6	9			FS
0824	23+	M	777	3.65	F	6	8			F
0824	23+	M	715	2.80	M	6	7			S
0824	23+	M	702	3.40	M	6	9			S
0824	23+	M	732	3.00	M	6	9			S
0824	23+	M	712	2.80	M	6	8			F
0824	23+	M	765	4.00	F	6	8			F
0824	23+	M	740	3.20	F	6	7			S
0824	23+	M	782	4.45	M	6	8			FS
0824	23+	M	816	4.55	F	6	9			F
0824	23+	M	820	4.90	F	6	9			MT
0824	23+	M	759	3.70	F	6	9			F
0824	23+	M	823	4.75	F	6	8			SP
0824	23+	M	839	4.80	F	6	9			FS
0824	23+	M	716	2.85	F	6	7			C
0824	23+	M	727	2.85	M	6	9			MT
0824	23+	M	710	3.40	F	6	8			C
0824	23+	M	770	3.95	F	6	9			FS
0824	23+	M	769	4.00	F	6	8			FS
0824	23+	M	806	4.75	F	6	9			F
0824	23+	M	808	4.30	F	6	9			F
0824	23+	M	770	3.50	M	6	8			F
0824	23+	M	749	3.10	F	6	9			FS
0824	23+	M	825	4.95	F	6	9			FS
0824	23+	M	673	2.90	F	6	8			C
0824	23+	M	640	2.10	F	6	7			F

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0824	23+	M	698	3.00	F	6	7			S
0824	23+	M	791	3.90	F	6	8			S
0824	23+	M	714	2.80	F	6	8			MT
0824	23+	M	766	3.70	F	6	8			MT
0824	23+	M	691	2.45	M	6	8			F
0824	23+	M	681	2.90	F	6	8			S
0824	23+	M	712	3.20	M	6	8			MT
0824	23+	M	713	3.60	F	6	8			FP
0824	23+	M	677	2.55	M	6	7			F
0824	23+	M	805	4.50	F	6	9			F
0824	23+	M	783	3.60	F	6	8			S
0824	23+	M	774	4.00	F	6	9			MT
0824	23+	M	756	3.50	F	6	8			FS
0824	23+	M	776	3.75	F	6	9			S
0824	23+	M	751	3.20	F	6	9			F
0824	23+	M	766	3.80	F	6	9			F
0824	23+	M	721	3.35	F	6	8			F
0824	23+	M	890	4.30	F	6	9			S
0824	23+	M	714	3.15	M	6	8			F
0824	23+	M	755	3.65	F	6	8			S
0824	23+	M	677	2.50	F	6	8			MT
0824	23+	M	751	3.70	F	6	9			F
0824	23+	M	732	3.45	F	6	8			F
0824	23+	M	756	3.60	M	6	8			F
0824	23+	M	685	2.25	F	6	6			MT
0824	23+	M	785	4.20	M	6	9			F
0824	23+	M	872	6.20	M	6	9			FS
0824	23+	M	855	00000	M	6	9			F
0826	38	A	748	3.70	M	6	8			
0826	38	A	767	3.30	M	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0826	39	A	812	4.80	F	6	9			
0827	40+	C	864	5.60	F	6	8			
0827	40+	C	666	2.40	M	6	8			
0827	40+	C	716	3.15	F	6	8			
0827	40+	C	711	2.85	F	6	8			
0827	40+	C	716	3.35	M	6	8			
0827	40+	C	796	3.70	F	6	9			
0827	40+	C	732	3.35	M	6	8			
0827	40+	C	718	2.90	F	6	6			
0827	40+	C	646	2.10	F	6	7			
0827	40+	C	645	2.30	M	6	7			
0827	40+	C	685	2.40	M	6	8			
0827	40+	C	722	3.30	F	6	8			
0827	40+	C	760	4.00	F	6	9			
0827	40+	C	694	2.80	F	6	8			
0827	40+	C	750	3.60	F	6	8			
0827	40+	C	675	2.60	F	6	8			
0827	40+	C	751	3.70	F	6	8			
0827	40+	C	858	5.00	F	6	10			
0827	40+	C	695	2.80	F	6	8			
0827	40+	C	735	3.40	F	6	8			
0827	40+	C	721	3.10	F	6	7			
0827	40+	C	757	4.00	F	6	8			
0827	40+	C	667	2.25	F	6	8			
0827	40+	C	842	5.85	F	6	9			
0827	40+	C	766	3.70	F	6	9			
0827	40+	C	827	4.60	F	6	9			
0827	40+	C	784	3.70	M	6	9			
0827	40+	C	825	4.50	F	6	9			
0827	40+	C	688	2.65	F	6	8			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0827	40+	C	851	5.60	M	6	9			
0827	40+	C	736	3.60	F	6	8			
0827	40+	C	684	3.00	F	6	8			
0827	40+	C	773	4.15	M	6	9			
0827	40+	C	770	3.70	F	6	8			
0827	40+	C	784	3.30	F	6	8			
0827	40+	C	621	2.40	M	6	7			
0827	40+	C	663	2.50	M	6	8			
0827	40+	C	654	2.50	M	6	7			
0827	40+	C	705	3.30	M	6	8			
0827	40+	C	728	2.70	F	6	8			
0827	40+	C	729	3.60	M	6	8			
0827	40+	C	625	2.30	F	6	7			
0827	40+	C	842	5.50	F	6	9			
0827	40+	C	649	2.40	F	6	6			
0827	40+	C	684	3.50	F	6	8			
0827	40+	C	721	3.70	M	6	9			
0827	40+	C	625	2.25	F	6	U			
0827	40+	C	625	2.10	M	6	7			
0827	40+	C	694	3.00	F	6	8			
0827	40+	C	716	3.00	F	6	8			
0827	40+	C	742	3.60	M	6	8			
0827	40+	C	746	3.50	M	6	9			
0827	40+	C	759	3.75	F	6	9			
0827	40+	C	612	2.20	M	6	7			
0827	40+	C	683	2.90	M	6	8			
0827	40+	C	662	2.50	M	6	7			
0827	40+	C	678	2.60	F	6	7			
0827	40+	C	741	4.00	M	6	8			
0827	40+	C	815	4.00	M	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0827	40+	C	702	2.65	F	6	7			
0827	40+	C	767	3.80	M	6	8			
0827	40+	C	677	2.50	M	6	U			
0827	40+	C	600	2.60	F	6	6			
0827	40+	C	750	3.20	F	6	9			
0827	40+	C	670	2.30	F	6	7			
0827	40+	C	656	2.25	M	6	7			
0827	40+	C	774	4.30	F	6	8			
0827	40+	C	733	3.00	M	6	8			
0827	40+	C	813	5.40	F	6	9			
0827	40+	C	785	3.70	F	6	8			
0827	40+	C	737	3.40	F	6	7			
0827	40+	C	790	4.90	F	6	8			
0827	40+	C	654	2.80	M	6	8			
0827	40+	C	670	2.35	F	6	8			
0827	40+	C	663	2.80	M	6	7			
0827	40+	C	687	2.80	F	6	8			
0827	40+	C	675	2.50	M	6	7			
0827	40+	C	724	3.30	F	6	8			
0827	40+	C	661	2.60	F	6	7			
0827	40+	C	640	2.35	M	6	7			
0827	40+	C	776	3.95	F	6	9			
0827	40+	C	651	2.30	F	6	7			
0827	40+	C	692	2.65	F	6	7			
0827	40+	C	704	2.95	F	6	8			
0827	40+	C	675	2.55	M	6	8			
0827	40+	C	713	3.00	F	6	8			
0827	40+	C	720	2.75	F	6	8			
0827	40+	C	655	2.50	M	6	7			
0827	40+	C	788	4.60	F	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0827	40+	C	705	3.00	F	6	8			
0827	40+	C	747	3.60	F	6	9			
0827	40+	C	755	2.95	M	6	9			
0827	40+	C	754	3.80	F	6	9			
0827	40+	C	697	2.55	F	6	8			
0827	40+	C	706	3.40	M	6	8			
0827	40+	C	764	3.75	F	6	8			
0827	40+	C	707	2.80	F	6	7			
0827	43	C	716	3.80	F	6	9			
0827	43	C	906	6.90	F	6	11			
0827	45	C	782	4.20	F	6	9			
0827	45	C	786	4.20	F	6	9			
0827	45	C	860	5.40	M	6	9			
0827	45	C	741	3.60	F	6	8			
0831	46	C	704	3.20	F	6	7			
0831	46	C	726	3.60	F	6	9			
0831	46	C	861	6.60	F	6	10			
0831	46	C	660	2.20	F	6	7			
0831	46	C	669	2.50	M	6	7			
0831	46	C	767	4.30	M	6	9			
0831	46	C	716	3.70	M	6	8			
0831	46	C	793	4.00	M	6	9			
0901	47	C	755	3.20	M	6	9			
0901	47	C	654	2.20	F	6	8			
0901	47	C	678	2.70	M	6	8			
0901	47	C	691	2.80	F	6	8			
0901	48	C	702	3.00	M	6	7			
0901	48	C	868	5.50	F	6	9			
0901	48	C	809	5.00	F	6	9			
0901	48	C	665	2.70	M	6	7			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0901	48	C	699	2.90	M	6	8			
0901	48	C	701	2.60	M	6	8			
0901	48	C	751	3.60	F	6	9			
0901	48	C	723	2.90	F	6	7			
0901	49	C	827	4.10	F	6	U			
0901	49	C	770	2.60	M	6	8			
0901	49	C	655	2.70	F	6	7			
0901	52	C	727	3.20	M	6	8			
0901	52	C	645	2.60	F	6	7			
0901	52	C	740	3.30	M	6	8			
0901	53	C	759	3.30	F	6	8			
0901	53	C	725	3.30	M	6	7			
0901	53	C	802	4.10	M	6	9			
0901	53	C	675	2.90	F	6	7			
0901	54	B	791	4.50	F	6	9			
0901	54	B	843	5.50	F	6	9			
0901	54	B	805	4.30	F	6	9			
0901	54	B	746	4.10	F	6	8			
0901	54	B	842	5.30	F	6	10			
0901	54	B	797	4.60	F	6	9			
0901	54	B	851	5.10	F	6	9			
0901	54	B	740	3.90	M	6	9			
0903	55	A	765	4.50	F	6	9			
0903	55	A	746	4.20	F	6	8			
0903	56	A	801	5.80	F	6	10			
0903	56	A	816	4.90	F	6	9			
0903	56	A	855	6.30	F	6	9			
0903	59	A	668	3.00	F	6	8			
0904	61+	A	817	4.80	M	6	9			
0904	61+	A	777	3.85	M	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0904	61+	A	875	6.10	F	6	10			
0904	61+	A	842	5.20	F	6	9			
0904	61+	A	785	4.70	F	6	9			
0904	61+	A	684	3.65	M	6	9			
0904	61+	A	805	4.90	F	6	9			
0904	61+	A	728	3.65	M	6	8			
0904	61+	A	827	4.80	F	6	9			
0904	61+	A	835	5.10	F	6	9			
0904	61+	A	660	2.30	M	6	8			
0904	61+	A	739	3.50	F	6	8			
0904	61+	A	755	3.50	F	6	8			
0904	61+	A	755	3.75	F	6	7			
0904	61+	A	720	3.20	M	6	8			
0904	61+	A	609	1.80	M	6	7			
0904	61+	A	685	3.40	M	6	8			
0904	61+	A	726	3.10	F	6	8			
0904	61+	A	752	4.30	F	6	9			
0904	61+	A	740	3.70	F	6	7			
0905	68	A	735	4.10	F	6	8			
0905	68	A	746	3.50	F	6	9			
0905	70	A	784	4.40	F	6	10			
0905	70	A	860	6.10	F	6	9			
0905	70	A	731	4.00	M	6	8			
0905	71	A	720	3.25	M	6	9			#11
0905	71	A	914	8.00	U	6	11			#14
0905	71	A	723	3.30	M	6	9			#17
0905	71	A	670	2.60	M	6	9			#18
0905	71	A	767	4.40	M	6	10			#16
0905	71	A	871	6.40	F	6	10			#10
0905	71	A	666	3.10	F	6	8			#13

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0905	71	A	684	2.50	F	6	9			#15
0905	71	A	735	3.90	F	6	9			#12
0905	72	A	732	3.40	M	6	10			
0905	72	A	808	4.70	M	6	10			
0905	72	A	661	2.50	F	6	8			
0905	73	A	767	3.80	M	6	9			#7
0905	73	A	681	3.40	F	6	8			#9
0905	73	A	792	4.95	F	6	8			#3
0905	73	A	884	6.85	U	6	10			#8
0905	73	A	696	3.10	M	6	8			#6
0905	73	A	672	3.00	F	6	6			#5
0905	73	A	745	3.50	F	6	8			#4
0905	73	A	752	4.40	F	6	8			#1
0905	73	A	809	3.90	F	6	9			#2
0905	EXPM	A	934	00000	U	6	12			#19
0906	EXPM	A	707	2.70	F	6	8			
0906	EXPM	A	688	2.50	F	6	7			
0906	EXPM	A	718	3.00	F	6	8			
0906	EXPM	A	917	6.20	F	6	10			
0906	EXPM	A	806	4.30	M	6	10			
0906	EXPM	A	944	7.30	F	6	10			
0906	EXPM	A	743	3.40	F	6	8			
0906	EXPM	A	706	3.40	M	6	8			
0906	EXPM	A	692	3.00	F	6	8			
0906	EXPM	A	780	3.10	F	6	9			
0906	EXPM	A	753	3.90	M	6	8			
0906	EXPM	A	769	3.70	M	6	9			
0906	EXPM	A	1035	8.60	F	6	10			
0906	EXPM	A	881	5.00	F	6	9			
0906	EXPM	A	790	4.60	F	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0906	EXPM	A	680	3.20	F	6	8			
0906	EXPM	A	860	4.90	F	6	9			
0906	EXPM	A	778	3.50	F	6	8			
0906	EXPM	A	846	4.90	F	6	9			
0906	EXPM	A	725	3.10	F	6	8			
0906	EXPM	A	845	4.40	F	6	9			
0906	EXPM	A	624	2.90	M	6	9			
0906	EXPM	A	651	2.20	F	6	6			
0906	EXPM	A	779	3.80	F	6	9			
0906	EXPM	A	702	2.70	F	6	8			
0906	EXPM	A	714	3.00	M	6	8			
0906	EXPM	A	692	2.70	F	6	8			
0906	EXPM	A	708	3.00	F	6	8			
0906	EXPM	A	670	2.30	F	6	7			
0909	EXPM	A	720	2.80	F	6	8			#47
0909	EXPM	A	755	3.20	F	6	8			#48
0909	EXPM	A	780	3.90	F	6	8			#43
0909	EXPM	A	790	4.00	F	6	9			#46
0909	EXPM	A	819	4.20	F	6	9			#45
0909	EXPM	A	779	3.90	F	6	8			#49
0909	EXPM	A	902	7.00	F	6	10			#44
0909	EXPM	A	770	3.30	F	6	9			#42
0909	EXPM	A	772	4.00	F	6	10			#41
0909	EXPM	A	744	3.30	F	6	8			#40
0909	EXPM	A	775	4.00	M	6	8			#39
0909	EXPM	A	885	5.60	F	6	10			#38
0909	EXPM	A	783	3.60	F	6	9			#37
0909	EXPM	A	776	3.40	F	6	8			#36
0909	EXPM	A	800	4.00	F	6	9			#35
0909	EXPM	A	689	2.80	F	6	9			#34

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0909	EXPM	A	791	3.90	F	6	8			#33
0909	EXPM	A	692	2.50	F	6	8			#32
0909	EXPM	A	728	3.10	F	6	9			#31
0909	EXPM	A	726	3.10	F	6	8			#30
0909	EXPM	A	774	3.80	F	6	9			#26
0909	EXPM	A	702	3.00	F	6	8			#29
0909	EXPM	A	816	4.90	F	6	9			#28
0909	EXPM	A	793	4.40	F	6	8			#27
0909	EXPM	A	677	2.90	M	6	8			#25
0909	EXPM	A	779	4.00	F	6	10			#24
0909	EXPM	A	770	5.00	F	6	9			#22
0909	EXPM	A	643	2.10	M	6	6			#21
0909	EXPM	A	815	00000	F	6	9			#23
0910	241	C	518	1.10	F	6	5			#50
0910	241	C	549	1.50	F	6	5			#51
0910	241	C	554	1.50	M	6	5			#52
0910	241	C	675	2.70	F	6	8			#53
0910	241	C	683	2.60	M	6	7			#54
0910	241	C	497	1.00	M	6	5			#55
0910	241	C	661	2.40	F	6	8			#56
0910	241	C	529	1.20	F	6	5			#57
0910	241	C	551	1.60	F	6	5			#58
0910	241	C	784	4.10	F	6	9			#59
0910	241	C	528	1.20	F	6	5			#60
0910	241	C	502	1.10	F	6	5			#61
0910	241	C	496	1.10	U	6	5			#62
0910	241	C	483	0.80	M	6	5			#63
0910	241	C	689	2.60	F	6	9			#64
0910	241	C	506	1.10	M	6	5			#65
0910	241	C	575	1.60	M	6	6			#66

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0910	241	C	521	1.20	F	6	5			#67
0910	241	C	593	1.50	F	6	6			#68
0910	241	C	543	1.20	M	6	4			#69
0910	241	C	756	3.30	M	6	7			#70
0910	241	C	714	3.00	M	6	8			#71
0910	241	C	490	1.10	F	6	5			#72
0910	241	C	795	4.30	F	6	9			#73
0910	241	C	448	0.70	M	6	3			#74
0910	241	C	470	0.80	M	6	5			#75
0910	241	C	476	0.80	F	6	5			#76
0910	241	C	556	1.40	F	6	6			#77
0910	241	C	489	1.10	F	6	6			#78
0910	241	C	452	0.70	F	6	5			#79
0910	241	C	674	2.50	F	6	8			#80
0910	241	C	739	3.90	F	6	9			#81
0910	241	C	645	2.00	F	6	7			#82
0910	241	C	512	1.20	F	6	5			#83
0910	241	C	514	1.10	M	6	5			#84
0910	241	C	597	1.90	M	6	6			#85
0910	241	C	502	1.00	M	6	5			#86
0910	241	C	671	2.50	M	6	7			#87
0910	241	C	512	1.20	M	6	5			#88
0910	241	C	550	1.30	F	6	5			#89
0910	241	C	511	1.10	F	6	5			#90
0910	241	C	529	1.30	F	6	6			#91
0910	241	C	516	1.30	F	6	5			#92
0910	241	C	432	0.70	M	6	4			#93
0910	241	C	532	1.30	M	6	5			#94
0910	241	C	561	1.50	F	6	5			#95
0910	241	C	455	0.90	M	6	5			#96

<u>KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA</u>

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0910	241	C	521	1.10	F	6	5			#97
0910	241	C	531	1.10	M	6	5			#98
0901	EXPM	A	770	3.85	F	6	7			
0904	EXPM	A	862	7.75	M	6	9			
0904	EXPM	A	743	3.40	M	6	9			
0904	EXPM	A	701	2.90	F	6	7			
0906	225	C	548	1.20	F	1	5			
0906	225	C	520	1.20	F	1	4			
0906	225	C	744	3.50	F	6	9			
0906	225	C	786	4.10	F	6	9			
0906	225	C	695	3.00	M	6	8			
0906	225	C	712	3.10	M	6	7			
0906	225	C	556	1.40	M	6	5			
0906	225	C	666	2.50	M	6	7			
0907	228	C	610	1.60	F	6	6			
0907	228	C	516	0.90	F	6	U			
0907	228	C	610	1.60	F	6	5			
0907	228	C	535	1.20	F	6	4			
0907	228	C	500	0.80	M	6	5			
0907	228	C	565	1.50	F	6	5			
0907	228	C	502	1.05	F	6	5			
0907	228	C	622	1.70	F	6	6			
0907	228	C	582	1.40	F	6	5			
0907	228	C	523	1.15	M	6	5			
0907	228	C	494	0.95	M	6	5			
0907	228	C	523	1.00	M	6	5			
0907	228	C	507	1.10	F	6	5			
0907	228	C	482	0.85	F	6	5			
0907	228	C	499	1.10	F	6	5			
0907	228	C	486	1.00	M	6	4			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0907	228	C	511	1.05	F	6	5			
0907	228	C	560	1.30	F	6	7			
0907	228	C	612	1.65	F	6	7			
0907	228	C	562	1.45	F	6	6			
0907	228	C	510	1.10	M	6	5			
0907	228	C	529	1.05	M	6	5			
0907	228	C	515	1.00	M	6	5			
0907	228	C	467	0.75	F	6	5			
0907	228	C	669	2.10	M	1	6			
0907	228	C	514	1.00	F	6	5			
0907	228	C	499	0.90	M	6	5			
0907	228	C	491	0.85	M	6	5			
0907	228	C	480	0.75	M	6	5			
0907	228	C	522	1.10	F	6	5			
0907	228	C	456	0.85	F	6	5			
0907	228	C	863	4.80	M	6	9			
0909	231+	C	869	5.85	F	6	10			#1
0909	231+	C	880	5.90	F	6	10			#2
0909	231+	C	487	0.90	F	6	5			#3
0909	231+	C	477	0.95	M	6	5			#4
0909	231+	C	480	0.95	F	6	5			#5
0909	231+	C	486	0.95	F	6	5			#6
0909	231+	C	468	0.80	F	6	4			#7
0909	231+	C	469	0.90	F	6	5			#8
0909	231+	C	456	0.85	M	6	6			#9
0909	231+	C	495	1.10	M	6	5			#10
0909	231+	C	492	1.00	F	6	5			#11
0909	231+	C	435	0.60	M	6	4			#12
0909	231+	C	497	1.05	M	6	5			#13
0909	231+	C	468	0.85	F	6	4			#14

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0909	231+	C	508	1.10	F	6	5			#15
0909	231+	C	481	0.90	M	6	5			#16
0909	231+	C	484	0.95	M	6	5			#17
0909	231+	C	473	0.90	M	6	5			#18
0909	231+	C	447	0.75	M	6	4			#19
0909	231+	C	497	1.00	M	6	5			#20
0909	231+	C	482	1.00	M	6	5			#21
0909	231+	C	479	0.95	F	6	6			#22
0909	231+	C	406	0.55	M	6	4			#23
0909	231+	C	490	0.85	M	6	5			#24
0907	76	C	652	2.15	M	6	8			
0907	76	C	966	9.10	F	6	10			
0907	76	C	781	4.10	F	6	9			
0907	76	C	852	5.25	F	6	10			
0907	76	C	800	3.80	M	6	9			
0907	76	C	800	4.00	F	6	9			
0907	76	C	643	2.00	F	6	6			
0907	76	C	819	4.40	F	6	9			
0907	76	C	811	4.50	F	6	9			
0907	76	C	825	5.20	F	6	10			
0907	76	C	660	2.25	F	6	8			
0907	76	C	848	5.50	M	6	U			
0907	76	C	840	5.25	F	6	8			
0907	76	C	814	4.95	F	6	9			
0907	76	C	825	4.90	M	6	9			
0907	76	C	785	4.90	F	6	9			
0907	76	C	833	4.75	F	6	9			
0907	76	C	814	4.50	F	6	9			
0907	76	C	664	2.45	F	6	7			
0907	76	C	930	6.55	M	6	10			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0912	EXPM	A	645	2.10	F	6	8		T+L	
0912	EXPM	A	0000	00000	U	6	7		T+L	
0912	EXPM	A	702	2.80	M	6	8		L	
0912	EXPM	A	761	3.60	M	6	8		T+L	
0912	EXPM	A	645	1.90	F	6	7		T	
0912	EXPM	A	688	2.65	M	6	8		T	
0912	EXPM	A	630	2.00	F	6	7		T	
0913	EXPM	A	928	7.15	F	6	10		#1	
0913	EXPM	A	780	3.40	F	6	8		#2	
0913	EXPM	A	784	3.75	F	6	9		#3	
0913	EXPM	A	719	2.90	F	6	8		#4	
0913	EXPM	A	758	4.30	F	6	9		#5	
0913	EXPM	A	745	3.30	F	6	9		#6	
0913	EXPM	A	0000	4.20	F	6	9		#7	
0913	EXPM	A	0000	3.85	U	6	9		#8	
0913	EXPM	A	728	3.20	F	6	9		#9	
0913	EXPM	A	493	0.80	M	6	5		#10	
0914	EXPM	A	0000	4.00	F	6	9		#1	
0914	EXPM	A	760	3.10	F	6	9		#2	
0914	EXPM	A	724	2.90	M	6	9		#3	
0914	EXPM	A	797	4.10	F	6	9		#4	
0914	EXPM	A	683	3.20	F	6	8		#5	
0914	EXPM	A	773	3.70	F	6	8		#6	
0914	EXPM	A	712	2.60	F	6	8		#7	
0914	EXPM	A	0000	2.90	M	6	8		#8	
0914	EXPM	A	826	5.30	F	6	9		#9	
0914	EXPM	A	759	4.00	M	6	9		#10	
0914	EXPM	A	923	7.40	F	6	10		#11	
0914	EXPM	A	744	3.30	M	6	9		#12	
0914	EXPM	A	748	3.50	F	6	7		#13	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0914	EXPM	A	652	2.70	F	6	7		#14	
0914	EXPM	A	703	3.00	F	6	8		#15	
0914	EXPM	A	744	3.55	M	6	9		#16	
0914	EXPM	A	729	2.50	F	6	8		#17	
0914	EXPM	A	775	4.30	F	6	9		#18	
0914	EXPM	A	733	3.00	F	6	7			
0913	81	C	681	2.90	F	6	7			
0913	81	C	750	3.30	F	6	9			
0913	81	C	787	4.90	F	6	9			
0913	81	C	745	3.30	F	6	10			
0913	81	C	717	2.60	M	6	9			
0913	81	C	609	2.10	F	6	6			
0913	81	C	781	3.80	M	6	9			
0913	81	C	654	2.30	M	6	9			
0913	81	C	640	2.70	F	6	8			
0913	81	C	701	2.70	F	6	9			
0913	81	C	582	1.80	F	6	7			
0913	82	C	540	1.40	M	6	5			
0913	82	C	755	4.20	F	6	8			
0913	82	C	822	4.50	F	6	8			
0913	82	C	722	3.30	F	6	8			
0913	82	C	674	2.75	F	6	8			
0913	82	C	683	2.70	M	6	6			
0913	85	C	704	2.90	F	6	8			
0913	85	C	856	6.00	M	6	9			
0913	85	C	773	00000	U	6	8			
0913	85	C	802	00000	U	6	8			
0913	83	C	780	3.70	F	6	8			
0913	83	C	667	3.00	F	6	8			
0913	83	C	838	6.10	F	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0913	83	C	621	2.40	F	6	7			
0913	83	C	695	3.10	M	6	8			
0913	83	C	729	3.10	F	6	8			
0913	83	C	712	3.30	F	6	8			
0913	83	C	725	3.30	F	6	8			
0913	83	C	675	2.90	M	6	7			
0913	83	C	756	4.00	F	6	8			
0913	83	C	691	3.00	F	6	8			
0913	83	C	694	2.70	F	6	7			
0913	83	C	657	2.75	M	6	6			
0913	83	C	872	6.00	F	6	8			
0913	83	C	486	0.75	M	6	5			
0913	83	C	806	4.60	F	6	8			
0913	83	C	716	3.20	M	6	9			
0914	246+	B	725	3.00	F	6	9			
0914	246+	B	700	2.95	F	6	9			
0914	246+	B	765	4.30	F	6	9			
0914	246+	B	651	2.70	M	6	7			
0914	246+	B	765	3.65	M	6	9			
0914	246+	B	717	3.50	F	6	9			
0914	246+	B	903	8.25	F	6	11			
0914	246+	B	564	1.45	M	6	6			
0914	246+	B	845	5.00	M	6	10			
0914	246+	B	752	3.95	M	6	9			
0914	246+	B	767	3.65	M	6	9			
0914	246+	B	805	5.40	F	6	11			
0914	246+	B	732	3.45	M	6	10			
0914	246+	B	855	6.70	F	6	10			
0914	246+	B	894	6.70	F	6	10			
0914	246+	B	710	2.45	F	6	9			

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0914	246+	B	767	4.80	F	6	9			
0914	246+	B	715	3.25	F	6	9			
0914	246+	B	714	3.20	F	6	9			
0914	246+	B	816	5.50	F	6	10			
0914	246+	B	798	4.65	F	6	10			
0914	246+	B	719	2.90	F	6	8			
0914	246+	B	684	2.50	F	6	U			
0914	246+	B	667	2.40	M	6	7			
0914	246+	B	702	2.90	M	6	7			
0914	246+	B	784	3.65	M	6	9			
0914	254	C	543	1.35	F	6	5		T	
0914	254	C	503	1.15	F	6	5		O	
0914	254	C	552	1.50	F	6	6		T	
0914	254	C	662	2.80	F	6	7		L	
0914	254	C	733	3.80	F	6	8		T+L	
0914	254	C	572	1.55	M	6	5		O	
0914	254	C	575	1.60	F	6	6		L	
0914	254	C	522	1.30	U	6	5		O	
0914	254	C	495	1.20	F	6	5		O	
0914	254	C	529	1.25	F	6	5		O	
0914	254	C	539	1.30	F	6	5		O	
0914	254	C	488	1.00	F	6	5		O	
0914	254	C	498	1.00	M	6	5		O	
0914	254	C	516	00000	M	6	5			
0914	254	C	800	5.70	F	6	10		T+L	
0914	254	C	454	0.95	F	6	5		O	
0914	254	C	441	0.80	M	6	5		L	
0914	254	C	545	1.45	F	6	6		O	
0914	254	C	528	1.20	M	6	5		O	
0914	254	C	460	0.85	F	6	5		O	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0914	254	C	555	1.50	F	6	5		O	
0914	254	C	588	1.65	F	6	6		L	
0914	254	C	484	1.05	F	6	5		O	
0914	254	C	469	1.00	M	6	5		L	
0914	254	C	791	4.70	M	6	10		T	
0914	254	C	494	1.05	M	6	5		O	
0914	254	C	648	2.35	F	6	6		T	
0914	254	C	542	1.25	M	6	5		O	
0914	254	C	456	0.90	F	6	5		O	
0914	254	C	531	1.30	F	6	5		O	
0914	254	C	553	1.50	F	6	5		O	
0914	254	C	610	1.70	M	6	U		O	
0914	254	C	573	1.40	F	6	6		T+L	
0914	254	C	577	1.70	F	6	U		O	
0914	254	C	519	1.25	F	6	5		O	
0914	254	C	498	1.10	F	6	5		L	
0914	254	C	513	1.40	M	6	5		O	
0914	254	C	523	1.20	F	6	5		L	
0914	254	C	486	1.00	F	6	5		L	
0914	254	C	492	1.00	F	6	5			
0914	254	C	528	1.25	M	6	5		O	
0914	254	C	492	1.00	F	6	5		O	
0914	254	C	538	1.45	M	6	5		O	
0914	254	C	677	2.45	F	6	7		O	
0914	254	C	538	1.35	F	6	5		O	
0914	254	C	505	1.15	M	6	5		O	
0914	254	C	506	1.30	M	6	5		O	
0914	254	C	511	1.10	F	6	5		O	
0914	254	C	549	1.50	F	6	5		O	
0914	254	C	463	0.95	F	6	5		O	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0914	254	C	485	1.10	M	6	5		O	
0914	254	C	490	0.95	F	6	5		O	
0914	254	C	520	1.20	M	6	5		O	
0914	254	C	486	1.00	M	6	5		O	
0914	254	C	510	1.05	M	6	5		O	
0914	254	C	536	1.45	F	6	5		O	
0914	254	C	542	1.40	M	6	5		O	
0914	254	C	475	0.90	F	6	4		O	
0914	254	C	522	1.30	F	6	5		O	
0914	254	C	505	1.20	M	6	5		O	
0914	254	C	523	1.35	M	6	5		O	
0914	254	C	477	0.85	M	6	5		L	
0914	254	C	575	1.45	M	6	6		O	
0914	254	C	669	2.80	M	6	8		T+L	
0914	254	C	822	4.00	M	6	8		T	
0914	254	C	605	1.65	M	6	6		O	
0914	254	C	525	1.15	M	6	5		O	
0914	254	C	497	0.95	M	6	5		O	
0914	254	C	567	1.45	M	6	6		O	
0914	254	C	562	1.70	F	6	5		T+L	
0914	254	C	501	1.00	F	6	5		O	
0914	254	C	542	1.40	M	6	6		O	
0915	271	B	659	2.70	F	6	9		#1	
0915	271	B	821	4.70	M	6	8		#2	
0915	271	B	852	5.20	F	6	10		#3	
0915	271	B	733	3.10	F	6	8		#4	
0915	271	B	738	2.90	M	6	8		#5	
0915	271	B	780	3.50	F	6	9		#6	
0915	271	B	617	2.00	F	6	7		#7	
0915	271	B	570	1.70	M	6	5		#8	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0915	271	B	813	4.70	F	6	9		#9	
0915	271	B	671	2.80	M	6	7		#10	
0915	271	B	710	2.90	F	6	8		#11	
0915	271	B	692	2.30	F	6	8		#12	
0915	271	B	767	3.50	F	6	9		#13	
0915	271	B	761	4.00	F	6	10		#14	
0915	271	B	784	4.40	F	6	10		#15	
0915	271	B	655	2.40	M	6	8		#16	
0915	271	B	771	2.50	M	6	9		#17	
0915	271	B	792	3.80	M	6	8		#18	
0915	271	B	733	3.50	F	6	9		#19	
0915	271	B	734	3.50	F	6	8		#20	
0915	271	B	692	2.80	F	6	8		#21	
0915	271	B	775	3.90	F	6	8		#22	
0915	271	B	763	3.50	F	6	8		#23	
0915	271	B	803	4.50	U	6	10		#24	
0915	271	B	810	4.10	F	6	9		#25	
0915	271	B	830	5.70	F	6	9		#26	
0915	271	B	752	3.80	F	6	9		#27	
0915	271	B	686	2.70	M	6	8		#28	
0915	271	B	631	2.10	M	6	7		#29	
0915	271	B	756	3.50	M	6	8		#30	
0915	271	B	660	2.80	M	6	8		#31	
0915	271	B	702	2.90	F	6	8		#32	
0915	271	B	654	2.20	F	6	7		#33	
0915	271	B	595	1.90	M	6	7		#34	
0915	271	B	657	2.20	M	6	7		#35	
0915	271	B	577	1.70	F	6	6		#36	
0915	271	B	702	2.70	F	6	8		#37	
0915	271	B	722	3.10	M	6	8		#38	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0915	271	B	780	4.30	F	6	9		#39	
0915	271	B	734	3.40	M	6	8		#40	
0915	271	B	847	5.50	F	6	10		#41	
0915	271	B	754	3.50	F	6	8		#42	
0915	271	B	727	3.80	F	6	9		#43	
0915	271	B	750	3.80	F	6	9		#44	
0915	271	B	743	3.60	M	6	8		#45	
0915	271	B	788	3.90	M	6	U		#46	
0915	271	B	657	2.30	U	6	7		#47	
0915	271	B	727	3.60	M	6	9		#48	
0915	271	B	802	4.70	F	6	9		#49	
0915	271	B	760	3.40	M	6	9		#50	
0915	271	B	735	3.40	M	6	9		#51	
0915	271	B	587	1.80	M	6	7		#52	
0915	271	B	670	2.70	M	6	8		#53	
0915	271	B	754	3.20	F	6	8		#54	
0915	271	B	580	1.50	U	6	U		#55	
0915	271	B	721	3.00	F	6	8		#56	
0915	271	B	621	1.80	F	6	8		#57	
0915	271	B	719	3.90	F	6	10		#58	
0915	271	B	619	2.60	M	6	6		#59	
0915	271	B	700	3.20	F	6	8		#60	
0915	271	B	693	2.80	M	6	9		#61	
0915	271	B	720	3.60	M	6	9		#62	
0915	271	B	725	3.00	F	6	9		#63	
0915	271	B	704	3.20	M	6	9		#64	
0915	271	B	665	2.30	M	6	7		#65	
0915	271	B	648	2.10	F	6	7		#66	
0915	271	B	495	1.00	M	6	5		#67	
0915	EXPM	A	751	3.50	F	6	8		T+L	

<u>KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA</u>

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0915	EXPM	A	740	3.20	M	6	8		T+L	
0915	EXPM	A	709	3.70	M	6	8		T+L	
0915	EXPM	A	724	2.80	M	6	8		T	
0915	EXPM	A	827	5.00	F	6	9		T	
0915	EXPM	A	760	4.40	M	6	9		T	
0915	EXPM	A	728	3.00	M	6	8		T	
0915	EXPM	A	0000	2.90	M	6	9		L	
0915	EXPM	A	793	4.70	F	6	9		L	
0915	EXPM	A	0000	2.95	F	6	8		T	
0915	EXPM	A	0000	3.20	F	6	9		T	
0915	EXPM	A	758	3.85	F	6	8		T+L	
0915	EXPM	A	0000	2.40	M	6	9		T	
0915	EXPM	A	775	4.60	M	6	9		T+L	
0915	EXPM	A	827	4.10	F	6	9		T+L	
0915	EXPM	A	693	2.90	M	6	9		T	
0915	EXPM	A	794	4.35	F	6	9		T	
0915	EXPM	A	739	3.70	M	6	9		T+L	
0915	EXPM	A	793	3.15	M	6	9		L	
0915	EXPM	A	782	3.60	M	6	9		T+L	
0915	EXPM	A	769	3.95	F	6	8		O	
0916	EXPM	A	324	0.264	F	1	3		#68	D
0916	EXPM	A	319	0.253	M	1	3		#69	A
0917	EXPM	A	754	4.00	F	6	U		T+L	
0917	EXPM	A	790	5.30	F	6	9		T+L	
0917	EXPM	A	844	5.50	F	6	9		T+L	
0918	608	A	456	0.70	M	6	3		O	
0918	EXPM	A	937	7.20	F		11			
0918	EXPM	A	893	5.50	F		9			
0918	EXPM	A	841	5.50	F		9			
0920	EXPM	A	881	5.80	M	6	9		#1	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0920	EXPM	A	934	7.50	F	6	9		#2	
0920	EXPM	A	342	0.30	F	1	2		#3	
0920	EXPM	A	0000	2.20	F	6	8		#4	
0920	EXPM	A	881	4.90	F	6	9		#4	
0920	EXPM	A	658	2.30	M	6	7		#6	
0920	EXPM	A	0000	2.80	F	6	8		#7	
0920	EXPM	A	382	0.40	M	6	3		#8	
0920	EXPM	A	0000	7.10	M	6	U		#9	
0920	EXPM	A	690	2.60	F	6	8		#10	
0921	EXPM	A	878	5.70	F	6	10		T	
0921	EXPM	A	846	5.10	F	6	10		T	
0921	EXPM	A	574	1.50	F	6	6		T	
0921	EXPM	A	444	0.70	F	6	5		O	
0921	EXPM	A	0000	0.80	F	6	5		T	
0921	EXPM	A	351	0.33	F	6	3		O	
0921	EXPM	A	0000	00000	F	6	3			
0921	EXPM	A	0000	0.34	M	6	3		O	
0921	EXPM	A	377	0.38	M	1	3		O	
0921	281+	C	612	2.20	F	6	7		#1	#99
0921	281+	C	526	1.25	F	6	5		#2	100
0921	281+	C	493	0.95	F	6	5		#3	101
0921	281+	C	541	1.20	M	6	6		#4	102
0921	281+	C	430	0.70	M	6	5		#5	103
0921	281+	C	483	1.00	F	6	5		#6	104
0921	281+	C	507	1.10	M	6	6		#7	105
0922	EXPM	A	690	3.00	M	6	9		#1	
0922	EXPM	A	849	5.40	U	U	10		#2	
0922	EXPM	A	854	5.30	U	U	9		#3	
0922	EXPM	A	634	2.70	M	6	8		#4	
0922	EXPM	A	485	1.10	M	6	5		#5	

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0922	EXPM	A	790	4.50	M	6	9		#6	
0922	EXPM	A	669	2.40	M	6	8		#7	
0922	EXPM	A	897	5.30	F	6	10		#8	
0922	EXPM	A	848	5.50	M	6	9		#9	
0922	EXPM	A	801	6.35	M	6	9		#10	
0922	EXPM	A	892	6.70	F	6	10		#11	
0922	EXPM	A	599	2.00	F	6	5		#12	
0922	EXPM	A	688	2.85	F	6	8		#13	
0922	EXPM	A	0000	00000	F	6	4		#14	
0922	EXPM	A	372	0.40	M	6	2		#15	
0923	EXPM	A	918	7.50	F	6	10		#1	#1
0923	EXPM	A	857	4.55	M	6	9		#2	#2
0923	EXPM	A	747	3.75	F	6	8		#3	#3
0923	EXPM	A	685	2.90	M	6	7		#4	#4
0923	EXPM	A	547	1.20	F	6	5		#5	#5
0923	EXPM	A	0000	0.95	M	6	4		#6	#6
0923	EXPM	A	631	2.10	F	6	7		#7	#7
0923	EXPM	A	874	5.80	F	6	9		#8	#8
0923	EXPM	A	811	4.75	M	6	9		#9	#9
0923	EXPM	A	0000	4.50	M	6	9		#10	#10
0923	EXPM	A	748	3.30	M	6	8		#11	#11
0923	EXPM	A	934	7.70	F	6	9		#12	#12
0924	EXPM	A	798	6.10	M	6	9		#1	#1
0924	EXPM	A	470	1.10	M	6	5		#2	#2
0924	EXPM	A	856	5.60	F	6	9		#3	#3
0924	EXPM	A	874	6.40	F	4	9		#4	#4
0924	EXPM	A	810	4.90	U	6	9		#5	#5
0924	EXPM	A	650	2.60	F	6	7		#6	#6
0924	EXPM	A	800	4.35	M	6	9		#7	#7
0924	EXPM	A	641	2.95	M	6	8		#8	#8

KILLINIQ FISHERIES PROJECT - 1984 ATLANTIC COD AUTOPSY DATA

DATE	SET	REGION	LENGTH	WEIGHT	SEX	MATURITY	AGE	VERT#	PARASITES	STOMACH CONTENTS
0924	EXPM	A	692	3.20	U	6	8		#9	#9
0924	EXPM	A	807	5.00	M	6	8		#10	#10
0924	EXPM	A	887	6.80	F	6	9		#11	#11
0924	EXPM	A	693	2.75	M	6	8		#12	#12
0924	EXPM	A	851	5.85	F	6	8		#13	#13
0924	EXPM	A	853	6.00	F	6	10		#14	#14
0924	EXPM	A	752	4.45	M	6	8		#15	#15
0924	EXPM	A	289	0.25	U	1	3		#16	#16
0925	EXPM	A	759	3.80	M	6	9		#1	#1
0925	EXPM	A	893	6.50	F	6	9		#2	#2
0925	EXPM	A	897	6.35	F	6	9		#3	#3
0925	EXPM	A	598	1.95	F	6	5		#4	#4
0925	EXPM	A	614	2.30	F	6	6		#5	#5
0925	EXPM	A	750	4.00	M	6	9		#6	#6
0925	EXPM	A	793	4.30	M	6	9		#7	#7
0925	EXPM	A	392	0.60	M	6	3		#8	#8
0925	EXPM	A	947	7.60	F	6	9		#9	#9
0925	EXPM	A	884	6.00	F	6	9		#10	#10
0925	EXPM	A	867	00000	F	6	9		#11	#11
1004	EXPM	A	651	2.00	M	6	7	53	T+L	
1005	EXPM	A	722	3.15	M	6	8	54	L	
1005	EXPM	A	831	5.40	F	6	9	52	T+L	
1005	EXPM	A	610	2.00	F	6	5	53	O	
1006	EXPM	A	699	3.25	M	6	9	54		
1006	EXPM	A	0000	3.20	M	6	U			
1006	EXPM	A	844	6.85	F	6	9	54		
1006	EXPM	A	0000	00000	F	6	8			
1006	EXPM	A	0000	00000	F	6	9			
1009	EXPM	A	833	7.50	F	6	9	53	T+L	
1009	EXPM	A	770	3.90	F	6	8	54	T+L	

F-2 Atlantic Salmon Autopsy Data

Key :

Date : month : day

Scale Interpretation :

1^{st} number = number years in fresh water

1^{st} symbol(s) : + = freshwater growth in same year fish smoltified

. = migrated directly to sea

t = transition (growth faster than in freshwater but slower than at sea)

2^{nd} number = number years in salt water

\+ = growth of current year

Type :

I = maiden, 2 years at sea

G = grilse, 1 year at sea

S = smolt, 1^{st} time migrant from fresh water

KILLINIQ FISHERIES PROJECT
1984 AUTOPSY DATA
ATLANTIC SALMON

Fish No.	Date	Fork Length (mm)	Total weight (kg)	K	Sex	Gonad weight (gms)	Scale Interpretation	Age	Type
1	0830	818	6.95	1.27	M	17.9	6t2+	8	I
2	0830	809	6.65	1.26	F	408.6	6.2+	8	I
3	0830	826	7.10	1.26	F	386.8	6t2+	8	I
4	0831	654	3.50	1.25	M	10.2	6t1+	7	G
5	0901	632	3.15	1.25	F	32.8	4.1+	5	G
6	0904	713	4.40	1.21	F	70.4	5.2+	7	I
7	0904	618	2.80	1.19	M	6.1	4±1+	5	G
8	0904	700	3.90	1.14	M	15.1	4t2+	6	I
9	0904	793	6.60	1.32	F	256.0	no scales collected		
10	0904	730	4.80	1.23	F	76.0	5.2+	7	I
11	0904	588	2.40	1.18	M	7.3	6.1+	7	G
12	0905	780	6.00	1.26	M	19.6	4t2+	6	I

KILLINIQ FISHERIES PROJECT
1984 AUTOPSY DATA
ATLANTIC SALMON

Fish No.	Date	Fork Length (mm)	Total weight (kg)	K	Sex	Gonad weight (gms)	Scale Interpretation	Age	Type
13	0905	726	4.95	1.29	F	110.3	4t2+	6	I
14	0905	749	4.80	1.14	F	138.9	5t2+	7	I
15	0905	760	5.00	1.14	F	206.9	6t2+	8	I
16	0905	825	6.90	1.29	F	625.2	7t2+	9	I
17	0905	721	3.40	0.91	M	3.8	6t2+	8	I
18	0905	645	2.90	1.08	M	7.5	5t1+	6	G
19	0905	799	5.60	1.10	F	244.7	5±2+	7	I
20	0907	790	6.35	1.29	F	260.0	4t2+	6	I
21	0907	785	5.90	1.22	F	223.6	6±2+	8	I
22	0912	598	2.10	0.98	M	5.8	4.1+	5	G
23	0912	773	4.70	1.02	F	174.3	5t2+	7	I
24	0912	760	5.00	1.14	F	89.1	5.2+	7	I

KILLINIQ FISHERIES PROJECT
1984 AUTOPSY DATA
ATLANTIC SALMON

Fish No.	Date	Fork Length (mm)	Total weight (kg)	K	Sex	Gonad weight (gms)	Scale Interpretation	Age	Type
25	0911	774	4.90	1.06	F	29.8	5t2+	7	I
26	0914	874	7.10	1.06	M	32.0	6t2+	8	I
27	0915	563	2.17*	1.22	M	4.5	6.1+	7	G
28	0916	773	5.40	1.17	F	187.7	4t2+	6	I
29	N/A	784	5.50	1.14	F	N/A	5t2+	7	I
30	N/A	732	4.60	1.17	F	N/A	4t2+	6	I
31	1003	287	0.20	0.85	M	N/A	5+	5	S

* calculated from gut-out weight at ratio of 1.21 (Powers, G., 1981)

F-3 Arctic Char Autopsy Data

KILLINIQ FISHERIES PROJECT
1984 AUTOPSY DATA
ARCTIC CHAR

Fish No.	Date	Fork Length (mm)	Total weight (kg)	K	Sex	Gonad weight (gms)	Age
1	0904	691	4.85	1.47	M	129.6	13+*
2	0916	678	3.40	1.09	M	2.80	10+

* difficult to read; could be 14+

F-4 Greenland Halibut Autopsy Data

Key :

Stomach contents : E = empty
Sh = shrimp
S = sample retained

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Gr. Halibut	11/09	581	X	1.7		x	1	9	empty	
Gr. Halibut	11/9	678	X	2.5		x	1	10	shrimp	
Gr. Halibut	11/09	484		0.7		x	1-1MM	8	/	
Gr. Halibut	11/09	486		0.7	x		1-1MM	7	empty	
Gr. Halibut	11/09	624		2.0		x	1 recup	12	/	
Gr. Halibut	11/09	499		0.9	x		1MM	7	empty	
Gr. Halibut	11/09	490		1.2	x		1-2 rec	8	empty	
Gr. Halibut	11/09	619		1.8		x	1 recup	11	empty	
Gr. Halibut	11/09	503		1.0		x	1-1MM	9	empty	
Gr. Halibut	11/09	515		1.0		x	1-1MM	8	empty	
Gr. Halibut	11/09	556		1.5	x		1-1MM	11	empty	
Gr. Halibut	11/09	545		1.2		x	1-1MM	9	/	
Gr. Halibut	11/09	456		0.7		x	1MM	9	empty	
Gr. Halibut	11/09	1000		8.3		x	2 recup	15	empty	
Gr. Halibut	11/09	666		2.6	x		2	11	/	

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Gr. Halibut	11/09	531		1.2	x		1	8	empty	
Gr. Halibut	11/09	561		1.4	x		recup.	9	/	
Gr. Halibut	11/09	602		1.5		x	2-3	9	empty	
Gr. Halibut	11/09	562		1.3		x	1-1MM	8	empty	
Gr. Halibut	11/09	497		0.8	x		1MM	7	empty	
Gr. Halibut	11/09	488		0.8		x	1-1MM	8	/	
Gr. Halibut	11/09	429		0.7		x	1-1MM	8	/	
Gr. Halibut	11/09	471		0.9		x	1-1MM	8	empty	
Gr. Halibut	11/09	614		1.7		x	1 recup	9	/	
Gr. Halibut	11/09	578		1.3	x		1 recup	10	empty	
Gr. Halibut	11/09	625		1.8		x	1 recup	11	empty	
Gr. Halibut	11/09	455		0.8	x		1-1MM	9	empty	
Gr. Halibut	11/09	596		1.6	x		27	10	empty	

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Gr. Halibut	11/09	460		0.7	x		1-1MM	9	/	
Gr. Halibut	11/09	543		1.2	x		1-1MM	9	/	
Gr. Halibut	11/09	610		1.6	x		1-2	10	empty	
Gr. Halibut	11/09	521		1.1		x	1-1MM	10	empty	
Gr. Halibut	11/09	521		1.0		x	1-1MM	10	empty	
Gr. Halibut	11/09	532		1.2		x	1-1MM	11	empty	
Gr. Halibut	11/09	787		3.6		x	N/A	14	/	
Gr. Halibut	11/09	681		2.8		x	2	11	empty	
Gr. Halibut	11/09	641		2.2	x		1-2	11	/	
Gr. Halibut	11/09	695		3.0		x	N/A	12	/	
Gr. Halibut	11/09	656		2.3	x		2	9	empty	
Gr. Halibut	11/09	666		2.6	x		2	11	empty	
Gr. Halibut	11/09	620		1.7	x		2	11	empty	

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Gr. Halibut	11/09	567		1.6	x		2	9	/	
Gr. Halibut	11/09	502		1.0		x	1-1MM	8	empty	
Gr. Halibut	11/09	457		0.7		x	1-1MM	9	/	
Gr. Halibut	11/09	533		1.2		x	1 recup	8	empty	
Gr. Halibut	11/09	658		2.3		x	1 recup	13	/	
Gr. Halibut	11/09	495		1.0	x		1-1MM 9 M	10	empty	
Gr. Halibut	11/09	823		4.9		x	2-3	15	/	
Gr. Halibut	11/09	552		1.3	x		1-1MM	11	empty	
Gr. Halibut	11/09	534		1.2		x	1-1MM	10	empty	
Gr. Halibut	11/09	543		1.3	x		1-1MM	10	/	
Gr. Halibut	11/09	473		0.7	x		1MM	10	empty	
Gr. Halibut	11/09	560		1.6		x	1 recup	10	empty	
Gr. Halibut	11/09	635		1.7	x		1 recup	10	empty	

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Gr. Halibut	11/09	560		1.4		x	1 recup	N/A	empty	
Gr. Halibut	11/09	615		2.0		x	white gonad	9	empty	
Gr. Halibut	11/09	670		2.3	x		2?	12	empty	
Gr. Halibut	11/09	592		1.9		x	2?	10	empty	
Gr. Halibut	11/09	668		2.5	x		2?	11	empty	
Gr. Halibut	11/09	668		2.2	x		N/A	12	empty	
Gr. Halibut	11/09	648		1.8	x		2?	12	empty	
Gr. Halibut	11/09	611		1.7	x		2?	11	empty	
Gr. Halibut	18/09	662		2.6	x			10		

F-5 Greenland Cod Autopsy Data

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Greenland Cod	10/09	632		2.9	x			N/A		
Greenland Cod	12/09	557		N/A	x			9		
Greenland Cod	13/09	371		0.4		x		5		
Greenland Cod	13/09	570		2.2		x		9		
Greenland Cod	15/09	est (58) cm.		2.2		x		10		L = 0
Greenland Cod	18/09	625		2.5	x			10		L = L + T
Greenland Cod	24/09	557		2.1			6	10		

F-6 Atlantic Herring Autopsy Data

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Atl. Herring	22/09	314	283	0.2362		x				
Atl. Herring	22/09	341	308	0.3337		x				
Atl. Herring	22/09	298	270	0.2373		x				
Atl. Herring	22/09	314	288	0.2476	x					
Atl. Herring	22/09	314	281	0.2377		x				
Atl. Herring	22/09	336	304	0.3030	x					
Atl. Herring	22/09	328	295	0.2945		x				
Atl. Herring	22/09	320	288	0.2597		x				
Atl. Herring	22/09	336	294	0.2996		x				
Atl. Herring	25/09	299	261	0.1858	x					
Atl. Herring	25/09	301	272	0.2156		x				
Atl. Herring	25/09	328	287	0.2768	x					
Atl. Herring	30/09	300	273	0.2230		x				

SPECIES	DATE	TOTAL LENGTH	FORK LENGTH	WEIGHT	SEX		GONAD WEIGHT	AGE	STOMACHS	COMMENTS
					M	F				
Atl. Herring	30/09	273	248	0,1390	x					
Atl. Herring	30/09	323	294	0,2450		x				
Atl. Herring	30/09	344	309	0,3160		x				
Atl. Herring	30/09	315	283	0,2600		x				
Atl. Herring	30/09	287	259	0,2210		x				

F-7 Iceland Scallop Autopsy Data

Key :

Set No. : + = several sets combined

Date : month/day

Iceland Scallop Autopsy Data - Phase II

Set No.	Date	Sample No.	Max. Length (mm)	Whole Weight (gms) With Epiphytes	Whole Weight (gms) Without Epiphytes	(gms) Meat Weight
812+	08/26	15	73.5	54.2	54.2	7.1
"	"	16	84.1	N/A	84.8	16.1
"	"	17	89.9	162.6	118.1	18.4
815	08/28	1	89.6	120.9	120.9	16.0
"	"	2	88.8	106.7	106.7	20.3
"	"	3	79.1	73.5	73.5	13.4
"	"	4	91.1	98.3	98.3	16.8
"	"	5	72.3	61.0	61.0	11.6
"	"	6	85.7	98.3	98.3	13.0
"	"	7	72.8	49.3	49.3	9.1
"	"	8	87.9	N/A	N/A	11.3
"	"	9	71.9	59.0	59.0	7.3
"	"	10	86.7	107.9	107.9	16.6
"	"	11	74.7	66.5	66.5	9.2
"	"	12	90.0	131.8	131.8	16.9
"	"	13	90.6	102.1	102.1	14.8
"	"	14	66.5	50.6	50.6	6.5
816	08/28	18	97.0	137.5	137.5	20.1
"	"	19	97.5	126.9	126.9	11.5
"	"	20	84.7	117.8	117.8	15.1
"	"	21	89.2	100.3	100.3	13.4
817	08/28	44	81.4	N/A	N/A	8.0
"	"	45	82.8	101.6	101.6	16.0
"	"	46	85.4	111.1	111.1	N/A
"	"	47	86.0	108.3	108.3	11.2
"	"	48	94.2	114.9	114.9	16.6
"	"	49	82.1	98.7	98.7	10.9
"	"	50	89.1	122.1	106.9	10.4
"	"	51	82.5	88.8	85.5	10.0
"	"	52	84.4	105.3	95.4	16.1
"	"	53	82.2	N/A	N/A	2.0
"	"	54	91.4	117.4	115.8	15.2
"	"	55	75.0	72.5	72.5	1.9
"	"	56	90.2	116.4	116.4	6.5
"	"	57	71.8	60.8	58.5	6.5
"	"	58	79.9	96.7	85.3	9.5
"	"	59	75.7	92.8	79.8	7.3
"	"	60	77.4	83.1	77.6	8.2
"	"	61	84.4	102.9	102.9	9.3
"	"	62	92.3	136.3	94.9	10.7
"	"	63	92.3	130.9	130.9	16.1
"	"	64	73.8	73.8	56.0	7.2

Iceland Scallop Autopsy Data - Phase II

Set No.	Date	Sample No.	Max. Length (mm)	Whole Weight (gms) With Epiphytes	Whole Weight (gms) Without Epiphytes	(gms) Meat Weight
817	08/28	65	89.3	114.2	111.0	12.1
"	"	66	76.2	94.7	77.4	7.2
"	"	67	81.9	97.0	97.0	11.5
"	"	68	82.2	104.5	104.5	9.4
"	"	69	85.3	113.3	113.3	11.0
"	"	70	96.8	155.2	147.3	14.7
"	"	71	90.5	138.1	133.2	9.6
"	"	72	81.9	98.4	94.7	10.4
"	"	73	97.1	187.0	162.7	22.0
"	"	74	88.3	N/A	N/A	15.1
"	"	75	99.2	166.5	166.5	17.8
"	"	76	90.0	129.1	129.1	12.7
"	"	77	88.7	128.7	114.7	8.2
"	"	78	81.0	89.6	78.7	11.6
818	08/28	22	90.3	119.8	119.8	10.6
"	"	23	85.6	96.0	88.5	6.0
"	"	24	83.2	121.0	119.0	9.3
"	"	25	82.5	103.8	80.4	8.1
"	"	26	87.1	143.2	125.3	7.4
"	"	27	64.6	50.0	50.0	5.1
"	"	28	82.8	112.7	82.6	12.0
"	"	29	88.6	148.3	121.1	14.2
"	"	30	60.3	52.7	52.7	3.6
"	"	31	87.2	124.9	124.9	11.7
"	"	32	81.5	92.3	84.5	10.9
"	"	33	83.9	121.8	104.5	8.8
"	"	34	92.0	135.7	130.0	15.3
"	"	35	95.7	135.1	135.1	8.9
"	"	36	85.6	115.3	96.3	10.0
"	"	37	96.7	165.1	160.6	16.9
"	"	38	85.3	134.4	109.0	14.5
"	"	39	82.3	126.1	126.1	7.4
"	"	40	89.0	108.7	108.7	12.6
"	"	41	87.3	114.6	102.6	14.3
"	"	42	82.7	106.0	87.4	8.5
"	"	43	80.8	89.2	86.2	9.8
845	10/08	100	104.5	N/A	104.5	11.4
"	"	101	81.5	N/A	80.1	12.0
"	"	102	84.0	N/A	74.9	12.6
"	"	103	89.4	N/A	107.5	14.3
"	"	104	105.7	N/A	92.2	9.2
"	"	105	95.4	N/A	138.4	12.7
"	"	106	91.0	N/A	120.5	18.4

Iceland Scallop Autopsy Data - Phase II

Set No.	Date	Sample No.	Max. Length (mm)	Whole Weight (gms) With Epiphytes	Whole Weight (gms) Without Epiphytes	(gms) Meat Weight
845	10/08	107	93.2	N/A	103.5	15.4
"	"	108	89.0	N/A	98.8	11.4
"	"	109	85.2	N/A	97.4	18.1
"	"	110	77.9	N/A	72.0	7.6
"	"	111	88.8	N/A	100.8	15.8
"	"	112	92.3	N/A	95.7	16.4
"	"	113	94.5	N/A	92.5	19.5
"	"	114	88.5	N/A	119.3	17.5
"	"	115	99.2	N/A	133.2	18.3
"	"	116	92.0	N/A	109.8	14.2
"	"	117	85.7	N/A	97.4	13.0
"	"	118	83.5	N/A	90.5	9.7
"	"	119	88.1	N/A	96.7	12.0
"	"	120	81.9	N/A	86.9	13.2
"	"	121	89.1	N/A	115.8	15.0
"	"	122	89.5	N/A	107.9	11.4
"	"	123	87.8	N/A	78.8	10.3
"	"	124	84.1	N/A	79.3	12.3
"	"	125	91.7	N/A	118.3	15.0
"	"	126	84.3	N/A	87.9	17.0
"	"	127	60.2	N/A	30.0	4.9

APPENDIX G

Axelsen, F. and A. Mauger
1987 Assessment of and Recommendations concerning the operation of fishing gears in the Killiniq Fishery. Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec.

Note :

The report on gears is unavailable for inclusion in this report at the time of printing. This document will be forwarded for insertion as soon as it is available.

Au moment de mettre sous presse, nous ne disposons pas du rapport sur les engins, lequel vous sera transmis dès que possible.

APPENDIX H

Dunbar, M.J.
1985 Report on Contents of Fish Stomachs. (Atlantic cod, Greenland halibut). Makivik Experimental Fishery, Ungava Bay and Northern Labrador. September 1984. Department of Oceanography, McGill University, Montreal, Québec.

REPORT ON CONTENTS OF FISH STOMACHS

(Atlantic cod, Greenland halibut)

MAKIVIK Experimental fishery, Ungava Bay
and northern Labrador, September 1984.

M.J. Dunbar
January 1985

Cod, Ungava Bay side: 106 stomachs
Cod, Labrador: 60 stomachs
Greenland halibut, Labrador: 22 stomachs

UNGAVA BAY: (Cod)

	Species	found in x stomachs	Total number
Fish:	*Myctophum glaciale*	55	very many; not all counted
	Rheinhardtius hippoglossoides	9	12
	Myoxocephalus quadricornis	1	1
	Triglops pingeli	5	6
	Paralepis sp.	1	1
	Lampanyctus crocodilus	1	1
	Gymnocanthus tricuspis	5	5
	Icelus spatula	1	1
	Myoxocephalus scorpius groenlandicus, juvenile, 9-14 mm	11	79
	Liparis koefoedi	1	1
	Lumpenus sp.	3	4
	Lumpenus ?fabricii	1	1
	Gymnelis ?viridis	1	1

(Ungava Bay cod stomachs, 1984 - cont.)

Species	found in x stomachs	Total number
Stomias boa ferox (see notes)	1	1
Decapod Crustacea:		
Lebbeus groenlandicus	41	139
Lebbeus polaris	8	19
Eualus fabricii	23	49
Eualus macilenta	2	3
Pandalus montagui	16	44
Argis dentata	10	18
Spirontocaris spinus	4	4
Pasiphaea multidentata	1	1
Pandalus ?borealis	1	2
Sabinea septemcarinata	2	5
Amphipods		
Parathemisto libellula	6	30
Hyperia galba	1	1
Haploops setosa	20	60
Ampelisca eschrichti	6	7
Anonyx nugax	13	27
Eusirus cuspidatus	1	1
Sclerocrangon sp.	1	1

(Ungava Bay cod stomachs, 1984 - cont.)

Species	found in x stomachs	Total number
Isopods		
Mesidotea entomon	1	1
Euphausiids		
Thysanoessa raschii	1	1
Mysids		
Boreomysis nobilis	1	1
Mysis oculata	14	37
Crabs		
Hyas coarctatus	1	1
Copepods		
Calanus hyperboreus	1	1
Polychaetes		
Nereis pelagica	19	many
Cephalopods		
Unidentifiable sp.	4	4

NOTES:

As in 1983, by far the commonest organism was the lantern fish Myctophum glaciale. Not all were counted individually, and several stomachs contained a digested mass of this species. The identification of the Myoxocephalus scorpius groenlandicus juveniles is fairly certain. These young fish were found in large numbers in southern Baffin Island inshore waters in 1939 and 1940, described in Dunbar (1947). The lantern fish Lampanyctus crocodilus was taken in cod stomachs at Burwell in 1947, 1948 and 1949 (Dunbar and Hildebrand 1952) and were sent for confirmation at that time to S.F. Hildebrand. See Leim and Scott (1966), page 143). In addition to the specimen found in the cod stomach, another much larger specimen was unlabelled with no sample number. The Boa Dragonfish, Stomias boa ferox, was apparently identified in the field. It is recorded by Leim and Scott (1966) as being found "between the southeastern slope of the Newfoundland Banks and the Bahama Channel. This is therefore an unusual extension of distribition. Pasiphaea multidentata is also north of its hitherto known distribution. It was taken in sample number 39, September 9. The identification seems to be correct. It has not hitherto been reported north of the Strait of Belle Isle, so far as I am aware.

NORTHERN LABRADOR COAST (cod).

Species	found in x stomachs	Total number
Fish:		
Myctophum glaciale	4	9
Rheinhardtius hippoglossoides	1	4
Gymnocanthus tricuspis	3	3
Artediellus uncinatus	1	1
Triglops sp.	1	2
Myoxocephalus sc. groenlandicus, juv.	38	505 counted, plus more.
Lumpenus sp.	2	11
Liparis koefoedi?	1	1

(Northern Labrador cod stomachs -- cont.)

Species	found in x stomachs	Total number
Liparis koefoedi juv.	5	8
Lycodes sp., juv.	1	1
Decapod Crustacea:		
Lebbeus groenlandicus	10	20
Lebbeus polaris	8	10
Eualus fabricii	10	17
Spirontocaris spinus	9	44
Argis dentata	4	7
Pandalus montagui	4	5
Sabinea septemcarinata	2	3
Sclerocrangon boreas	1	1
Sabinea sarsi	2	2
Sabinea sp. (juv.)	1	1
Eualus gaimardi	1	1
Amphipods:		
Anonyx nugax	13	22
Ampelisca eschrichti	14	34
Haploops setosa	4	5
Eusirus cuspidatus	2	2
Gammarus wilkitzkii	1	1
Westwoodilla megalops	2	2
Byblis gaimardi	1	1

(Northern Labrador cod stomachs -- cont.)

Species	found in x stomachs	Total number
Ceradocus torelli	1	1
Parathemisto libellula	2	2
Hyperia galba	2	2

Others:

Mysis oculata	35	203 plus
Thysanoessa inermis	1	1
Nereis pelagica	5	several, not all counted
Diastylis rathkei (Cumacean)	9	15
Calanus sp.	1	1
Crab remains, unidentifiable	4	fragments

NOTES:

The most remarkable difference between the stomach contents from the two sides of the northern Labrador peninsular is the comparative scarcity of Myctophum glaciale on the Labrador side; next is the much greater numbers of Myoxocephalus juveniles and Mysis oculata, again on the Labrador side. The latter two were particularly abundant in the series labelled "J-lab". These are both planktonic and often are found near influxes of fresh water into the sea. Artediellus uncinatus is described by Leim and Scott (1966) as being found "from Nain southward". The giant amphipod Ceradocus torelli is not often recorded in Canadian waters. There have been some six records, including the Beaufort Sea and the Gulf of St. Lawrence. It is known from west Greenland and was first recorded in the Murmansk area. The present specimen is in good condition, taken in sample no. 105.

Comparing the 1984 material with that from 1983 does not produce very much of interest. Lycodes reticulatus was better represented in 1983. Ampelisca eschrichti did not appear at all in the 1983 list, but I suspect some of the "Haploops setosa" of 1983 may in fact have been A. eschrichti. They are in the same family, and similar; Mysis oculata and the Myoxocephalus juveniles are much more abundant in the 1984 collection, but as noted above this is probably because they were found predominantly on the Labrador side in 1984, a region not sampled in 1983.

The GREENLAND HALIBUT material from 1984

The 22 stomachs from Home Island were mostly small, contained little, and what there was was in an advanced stage of digestion.

Species	found in x stomachs	Total number
Liparis sp ?koefoedi	1	1
Liparis koefoedi	1	1
Triglops nybelini	1	2
Triglops murrayi	4	7
Lumpenus sp?	1	1
Lycodes reticulata	1	1
Argis dentata	3	4
Sabinea sp.	1	1
Sabinea septemcarinata	1	1

One sample, with no label and no stomach, contained two Lumpenus medius, one Myctophum glaciale, and one Lampanyctus crocodilus.

References: Dunbar, M.J., 1947. Bull. Fish. Res. Canada, No. 73.
Dunbar, M.J., and H.H. Hildebrand, 1952. J. Fish. Res. Bd. Canada, 9 (2): 83-128.
Leim, A.H., and W.B. Scott, 1966. Fishes of

the Atlantic Coast of Canada. Bull. no. 155, Fish. Res. Bd. Canada.

The material from the stomachs, with the exception of digested and useless detritus, and with the exception also of specimens so abundant as to be overwhelming, has been preserved in jars together with the original labels, and is stored temporarily at the Institute of Oceanography, Eaton Building, McGill University.

GENERAL CONSIDERATIONS

It is not possible, from the apparent northward extensions of the range of three species, to draw conclusions regarding environmental change in the region of study. Much more faunistic and physical oceanographic work will be needed. But it is worth while to place the Killiniq study in the wider context of the Greenland-Eastern region, where interesting climatic events are occurring.

The last three winters in west Greenland have been extremely cold, and the Atlantic salmon catch in Davis Strait has dropped drastically. The salmon scholars, for instance the Federal Fisheries Laboratory people at St. John's, are now talking of a "southward movement of the salmon resource". I have no immediate details of the cod fishery in West Greenland, but it is not improbable that the warming of the West Greenland Current which began about 1920 and peaked in the 1930's (with a minor second peak in 1960) is now over, and that we may look for a return to the colder conditions of the mid-19th century. What this might mean for the Labrador coast-Ungava Bay side of the picture is not clear. It has been suggested that a decline in the intensity of the Atlantic-Arctic circulation would involve a lesser velocity and transport in the West Greenland Current, and that this would in turn decrease the pressure of the water against the West Greenland coast under the influence of the Coriolis effect. This should allow more of the mixed Atlantic-Arctic water of that current to peel off to the west towards Hudson Strait and Ungava Bay, thus increasing rather than decreasing the total Atlantic influence in that region. It has been suggested that this mechanism caused the appearance of Capelin (a Subarctic, not an Arctic fish) at the head of Ungava Bay in 1884 when L.M. Turner reported their being taken by the thousand in hand nets at the mouth of the Koksaok River. At that time the West Greenland water appears also to have been cooling, as now.

All this is useful food for thought when considering the longer term development of a fishery in the Killiniq area, and might with profit be discussed in the Makivik report to Quebec. It could be used, for instance, to press for further and more expanded work, to include plankton sampling and physical oceanographical measurements.

APPENDIX I

Curtis, M.A.
1985 A Report on the Results of a Parasite Survey on Cod (*Gadus morhua*) from the Killiniq Experimental Fishery. 1984. Institute of Parasitology, MacDonald College, McGill University, Montreal, Quebec. Report to Makivik Corporation Research Department.

A REPORT ON THE RESULTS OF A PARASITE SURVEY ON COD (*GADUS MORHUA*) FROM THE KILLINIQ EXPERIMENTAL FISHERY 1984

Mark A. Curtis
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Macdonald College
McGill University

Table of Contents

Preface

The purpose of this report is to document the results of parasite analyses on samples obtained from the Killiniq experimental cod fishery in 1984, and to discuss the findings in the light of similar data for other cod stocks in eastern Canada. The first section of the report deals with existing literature on cod parasites of significance to commercial fisheries, and covers current knowledge on the biological, economic and human health issues involved. A second section describes the findings of work done on the Killiniq samples and relates these to data for other areas where cod have been systematically examined for parasites. The report concludes with a brief summary, and recommendations based on the information gathered.

Review of Literature on Anisakine Nematodes in Commercial Cod.

Introduction

A number of species of Anisakine nematode infect the cod taken by commercial fisheries in all parts of the North Atlantic. These parasites are of importance primarily because their presence makes otherwise marketable fish products unacceptable to retail suppliers and consumers. There is also the potential for these parasitic nematodes to cause medical problems of significance in cases where human infections occur. One particular parasite, commonly designated as "codworm" or "sealworm"[1], currently is making an immense economic impact on the Canadian cod fishery. While codworm presently constitutes the most prominent parasite problem of the east coast fishery, other nematodes are also of importance, particularly *Anisakis* species and members of the *Contracaecum* complex. *Anisakis*, found in the viscera and flesh of cod, is considered a greater risk to human health than codworm, for if living worms are ingested they may penetrate the stomach or intestinal mucosa causing acute abdominal symptoms. *Anisakis* and *Contracaecum* species also frequently occur in cod livers, where they reduce liver oil content and render the livers unfit for consumption.

In the following pages relevant background information on presented on technical and practical aspects of dealing with the parasitic

[1] A recent Canadian usage has been "sealworm" in an effort to bring about more public awareness of the true final host of the parasite.

nematodes commonly encountered in commercial cod stocks. For more detailed information, one should refer to published review papers which cover various aspects of the field (Jackson, 1975; Myers, 1975; Cheng, 1976; Margolis, 1977; Odense, 1978; Smith and Wooten, 1978).

Taxonomy and Life Cycle Characteristics

The nematodes which cause problems to the cod fishery are grouped within the Family Anisakidae, subfamily Anisakinae. This includes the genera *Phocanema* (codworm), *Anisakis* (herring worm), and members of the *Contracaecum* complex. Lists of nematode species found in published records on cod from Canadian waters are presented by Margolis and Arthur (1979) and Appy and Burt (1982). Taxonomic criteria to separate the genera and species of Anisakine nematodes are based largely on internal structures of the worms, which must first be suitably fixed and cleared for diagnostic examination. Useful keys for separation of genera are those of Hartwich (1974) and Myers (1975), who use the anterior digestive tract formation and position of the excretory pore as a basis for discriminating between groups. Detailed species descriptions are mainly found scattered in the literature, and difficulties arise in interpretation of some earlier designations for nematode species.

The life cycles of most common anisakid worms in cod involve a bird or mammal as final host, and thus nematodes in the fish are usually immature larval forms lacking adult characteristics. This means that the identification of most individuals recovered from fish cannot be established to species with any degree of certainty. Techniques have been developed for in vitro cultivation of the larval worms from fish in order to bring them to identifiable adult stages (Bier, 1976). In most general surveys, however, such techniques are not applied, and definitive confirmation of nematode species present is not possible. Generic designations are usually feasible, and this level of identification is considered adequate by most field workers.

The life cycles for anisakine nematodes of cod are only incompletely known due to the complexity of the marine ecosystems in which they occur, and the possibility of many different transmission pathways. Phocanema decipiens (codworm) is an adult in seals, the grey seal being its most suitable host, and the host responsible for the bulk of egg transmission McClelland, 1980). Phocanema also occurs in other seals, but the degree of transmission that occurs outside the region of grey seal distribution is considered low. Intermediate hosts for codworm are believed to be benthic invertebrates, most probabably small crustaceans. Harpacticoid copepods are now known as suitable hosts in experimental infections McClelland, 1982), but none have been found naturally infected in the sea. Phocanema transmission presumably occurs between the benthic crustacean intermediates and small forage fish, then larger fish such as cod acquire the parasite either by directly consuming the crustacean intermediate host, or indirectly by feeding upon infected forage fish. The location of the codworm in the body of its fish host is of special importance, for the parasite most frequently infects the flesh of the fish rather than the viscera, as is the case for the other common nematodes of cod. Phocanema is concentrated particularly in the flaps of the gutted fish (hypaxial musculature), adjacent to the body cavity (Platt, 1975;McClelland, 1983a 1983b). In Britain it has been suggested that flaps and fillets be processed separately in order to reduce codworm incidence in market products (Platt, 1975).

Codworm has been designated within a number of different genera, and even a present the nomenclature concerning this parasite is in a state of uncertainty. Terranova, Porrocaecum, and Phocanema have all been applied to the codworm by various taxonomists at different times, and in the most recent controversy the genus Pseudoterranova has been evoked as it comprises a genus exclusively reserved for forms occurring in mammalian hosts (Gibson, 1983). In the present report, the codworm is referred to as Phocanema decipiens quite simply as that designation is most familiar to fisheries biologists in eastern Canada at this time.

Anisakis simplex, or Anisakis sp. is a parasite of cod found predominantly in the viscera of the fish and more infrequently in the fillets or flaps. Anisakis is a smaller worm on average (length = 10-30 mm) than Phocanema (25-50mm), and is less readily detectable in fillets because its creamy coloration is not so clearly deliniated from that of fish flesh. A. simplex occurs as an adult in various cetacea and seals, but the latter play only a very minor role in the life cycle; possibly, the larvae only mature to adulthood in cetaceans (Smith and Wootton, 1978). The first intermediate hosts are considered euphausid crustacea (krill). The presence of Anisakis larvae in euphausids means that they are transmitted to fish acting as pelagic feeders, and herring are regarded as a principal host fish. Thus, the name "herring worm" has become a part of common usage. The extent to which cod become infected is related at least in part to their level of pelagic feeding. However, as is the case for other anisakid nematodes, herring worm is probably transmitted from forage fish to perdatory fish and in this way also cod acquire the parasites.

Studies of the distribution of Anisakis in cod tissues indicate that the viscera, particularly the liver and pyloric caecae, are the preferred sites of infection. A smaller percentage of worms are found throughout the viscera and in the flesh where, in common with Phocanema, they tend to be more abundant in the flaps than in the fillets (Pälsson, 1979; McClelland, 1983a, 1983b). When located in the liver, Anisakis is generally found tightly coiled just below the connective tissue capsule (McClelland, 1983a). Thus, the parasites are not often found embedded deeply in liver parenchyma, but tend to be very close to the surface and are highly visible to the casual observer.

The Contracaecum complex consists of several genera having in common the characteristics of both a ventricular appendix and an intestinal caecum, which separates the group from all other anisakines. It is only possible to delineate certain of the genera further on the basis of features only present in the adult worms, and so if only larval stages are recovered from fish, they often cannot be assigned to a specific genus or species. Contracaecum (sensu lato) encompasses the related genera Phocascaris, Thynnascaris and Hysterothylacium. Phocascaris larvae are morphologically inseparable from those of Contracaecum, and can only be differentiated if experimentally raised in mammalian hosts or by using in vitro methods. These genera mature either in seals (Phocascaris) or in piscivorous birds (Contracaecum), and their first intermediate hosts are believed to be copepods (Davey, 1969). Hysterothylacium is the current designation for the common species previously referred to as Contracaecum aduncum or Thynnascaris aduncum(Gibson, 1983). H. aduncum utilizes marine fish as both intermediate and definitive hosts, thus adults with suitable features for identification may occur in cod. A wide variety of invertebrates are apparently utilized as intermediate hosts including coelenterates, molluscs, annelids, crustaceans, echinoderms and chaetognaths (Norris and Overstreet, 1976). Phocascaris, Contracaecum and Thynnascaris all occur primarily in the viscera of host fish, particularly among the pyloric caecae and in the liver. As fairly large (20-35 mm) darkly colored worms, their unsightly appearance is a barrier to marketing infected livers.

Studies on the pathogenic effects of H. aduncum on cod livers indicate a considerable reduction in oil yield with increased infection such that heavily parasitized livers may yield only 14% oil (by weight) as compared with 57% for uninfected livers (Margolis, 1977). Fish condition factors are also reported as diminished by heavy infections, and blood haematocrit readings significantly decreased. It is not clear whether mechanical damage by the wandering nematodes is the chief source of damage, or whether metabolic byproducts of worm metabolism are implicated (Margolis, 1977). Presumably, any anisakine nematodes present in the liver in large numbers would have similar pathogenic effects, depending upon their size, mechanical activity rates, metabolic characteristics, and the abilities of the fish host to encapsulate and inactivate them.

Anisakiasis as a Human Health Issue.

Cheng (1976) used the term anisakiasis to refer to infections occurring in man and other organisms due to nematode worms of the anisakid type, including not only *Anisakis* but other related forms within the Anisakidae. The first reported cases of human anisakiasis in recent times occurred in Holland during the 1950's as a result of the consumption of pickled "green herring" that contained living *Anisakis* (Jackson, 1975; Margolis, 1977). A great many number of cases of anisakiasis have since been recorded in the literature, including reports from Japan and North America as well as Europe. The incidents are reported to involve primarily *Anisakis* and *Phocanema*, although other anisakine nematodes are probably implicated as well. General reviews of scientific literature on anisakiasis as a human heath problem in connection with fish consumption describe cases for North America (Jackson, 1975; Margolis, 1977) and Japan (Koyama et al., 1982]. Of the two nematode types most frequently identified in cases of anisakiasis in man (Anisakis and Phocanema), Anisakis appears the more serious pathogen, causing an acute abdominal syndrome with significant clinical symptoms manifested as severe epigastric pain accompanied by nausea or other abdominal discomfort. The pain typically begins 2-10 hours after consumption of fish infected by the worms. Symptoms arising from anisakiasis are similar to those from a number of other gastrointestinal ailments, and it is likely that in the past most instances were not recognized as being of parasitic disease origin. Today, most suspected cases are confirmed by use of gastrofiberscopic biopsy forceps, which may be used also to remove the worms directly from the stomach wall. As Jackson (1975) observes, it is remarkable that while most pathogenic human parasites were well known to the medical world by 1900, only in the 1950's did some physicians become generally aware of the clinical symptoms resulting from the consumption of infected fish that had remained raw, or been undercooked or pickled.

In comparison with infections by Anisakis, Phocanema infections are generally less common and not so severe in terms of symptomology. Phocanema in man is most often confined to the upper gastrointestinal tract (osophagus and stomach), and frequently the worm is coughed up and expelled. Unlike Anisakis, there are no specific records of intestinal invasion by Phocanema, which in its normal host, the grey seal, is also typically found in the stomach rather than the intestine.

Removal of Phocanema is thus practicable by use of the gastrofiberscopic forceps, whereas this is not always possible for Anisakis, which may be located in the intestine. The tissue penetrating abilities of Phocanema must not, however, be underestimated, as one specimen was recovered from the abdominal cavity of a man from Massachusetts, having exited from the gastrointestinal tract (Margolis, 1977).

In Japan, out of 1424 recorded cases of anisakiasis between 1960 and 1981, only 11% were determined to be from Phocanema (Koyama et al., 1982). However, the occurrence of anisakiasis in the Alaskan and Canadian arctic is likely to be much higher than indicated by existing reports for these regions due to a lack of publicity accorded the problem. For example, although there are no reports of anisakiasis for Canadian Inuit communities, Hitchcock (1950) had reported the presence of anisakine larvae in 10% of the stools of a sampled population of 100 persons from northern Alaska, and Lichtenfels and Brancato (1976) have presented details of a case of Phocanema expulsion from the throat of a native of the Alaskan coast. As a matter of interest, possibly the first documentated case of anisakiasis was for a worm vomited by a child from Jacobshavn in West Greenland (Jackson, 1975), in 1867.

Because the source of human infections by anisakid larvae is the consumption of raw, insufficiently cooked or marinated fish, the avoidance of such foods is itself an adequate measure to ensure infection does not occur. However, cultural habits of food consumption make it unlikely that certain modes of fish preparation will be changed and if anything, the current level of experimentation in North American eating habits make it likely that anisakiasis will become more prevalent than in the past. Freezing at -20°C for 24 hours is adequate to kill anisakine larvae, as is cooking the fish for the appropriate period (7 min at 70°C or 10 min at 60°C). Herring are now routinely frozen prior to marinating in commercial fish plants in both Europe and North America. Northern fisheries which freeze or otherwise process fish in a manner to ensure worm mortality are unlikely to be implicated in problems of public health significance regarding the anisakine nematodes in local cod stocks.

Anisakiasis as an Economic problem for the Fishing Industry.

While there appear to be no published figures on the present cost to the east coast Canadian fishery related to anisakine nematodes (principally codworm), estimates from informed sources in Halifax are in the order of 30 to 50 million dollars Canadian annually. These amounts include both the direct cost of worm removal and wastage of heavily infected fillets, as well as the indirect cost of lost markets (mainly in the U.S.) where fish are rejected on the basis of contamination by worms. There is little question that the magnitude of the codworm problem in Atlantic Canada has recently grown, and that cod stocks in the southern Gulf region and Scotian Shelf are more heavily infected today than in the 1950's and 1960's when past surveys took place McClelland, 1983a, 1983b). The increase in codworm abundance is considered directly related to the growth of the grey seal population in the Canadian Atlantic region, the herd there consisting of a single population with intermingling between the Gulf and Atlantic components. Estimated numbers of 1^+ animals in the herd were 50-75,000 in 1984 (CAFSAC, 1984), a figure more than 10 times that for the grey seal population in the mid 1960's (Mansfield and Beck, 1977; Zwanenberg et al., 1981).

The present technique for removing codworms from commercial fillets involves slicing the fillets to approximately 1/2" (1.3 cm) in thickness and passing them over a candling table with subsurface lighting for visual detection of the worms. Phocanema are removed manually with forceps and heavily infected fillets are rejected (Odense, 1978). The candling process is costly and relatively inefficient, as it still leaves a variable percentage of worms undetected in the fillets (on average 10-20%). During peak periods of processing cod as many people are employed on line candling as are occupied in all other phases of fish plant activity. Clearly this influences selection of cod stocks for low codworm abundance, but processers in affected areas are still obligated to deal with the problem. Possible procedures to mechanize the worm detection and removal procedures have been studied for a number of years, and are under investigation today at Nova Scotia Technical College, but these are as yet remote from on-line application McClelland, 1983a). Because of the many problems of dealing with codworm, stocks relatively uninfected by this parasite are considered of the highest quality (eg. Labrador coast, Grand Banks), and have an advantage particularly for foreign markets.

Regulations Regarding Codworm and Other Parasites in Processed Fish

Present standards of tolerance for codworm are one worm for three pounds of fillet in Canada and one worm per two pounds in the United States. These acceptance levels are inadequate to guard against consumers regularly finding codworm in purchased fish and there is pressure, particularly from the Boston markets to lower tolerance limits. As McClelland (1983a) observes, it is the marketplace that truly decides the value of the fish, and only products free of worms are able to capture the most lucrative side of the business.

With regard to anisakine nematodes other than codworm, general regulations are set out in the Canada Fish Inspection Act[2], which are enforced by local fishery inspection officers. The part of the act relevant to processing of fish products (eg. fillets or livers) which may have nematodes is part 1, section 6.(1) which reads:

> "6.(1) No person shall import, export or process for export or attempt to import, export or process for export[3]
> (a) any fish that is tainted, decomposed or unwholesome or otherwise fails to meet the requirements of these Regulations."

where " 'unwholesome' with respect to fish, means fish that is rancid or has upon it bacteria of public health significance or substances toxic or aesthetically offensive to man."

The presence of parasitic worms falls under the category of "substances . . . aesthetically offensive to man . . ." and as such products containing nematodes are normally excluded from sale commercially. It is to be noted that the codworm problem is to be taken as a special case with "tolerance limits" only accepted as an interim measure.

[2]Chapter 802, Consolidated Regulations of Canada. Vol. VII. p. 4966-4967. Information supplied by Dr. M. Gilgen, Fish Inspection Service, Halifax.

[3]"export" refers to the shipment of fish across provincial or international boundaries.

Report on the Occurrence of Anisakine Nematodes From Killiniq Cod Sampled in 1984

Introduction

During the experimental cod fishery near Killiniq in 1984, a survey of parasites was conducted in order to establish the status of the fish in terms of parasite burden. In particular, it was regarded as useful to ascertain whether or not codworm (Phocanema decipiens) would pose a problem for the efficient operation of the fishery. Existing knowledge about the distribution of grey seals, the major definitive host for codworm, would indicate that the parasite would be rare in cod from the Killiniq region, but it was considered important to confirm this on a quantitative basis. Also, as some interest was expressed in utilizing liver from Killiniq as a commercial product, a study of the prevalence and intensity of parasites in cod livers from the region was deemed necessary. The results of this work constitute a basis for comparing the level of parasitism in Killiniq cod with similar information for cod stocks from other areas of eastern Canada where they are commercially fished.

Data utilized in this report have been obtained in three ways. First, the results of visual inspection of cod fillets and livers for the occurrence of codworm and other parasites was conducted on site at Killiniq by Makivik personnel. Second, a sample of cod livers was obtained from fish taken in the 1984 experimental fishery, and these were analysed at the Institute of Parasitology to yield data on the numbers and types of parasites present. Third, a collection of parasites taken from the Killiniq cod during the 1983 fishery and enumerated at the Institute was available as a reference set of samples. In addition, standard quantitative data on the cod sampled for parasites (lenght, weight, age, etc.) was made available by Makivik in order that quantitative relationships between parasite occurrence and host characteristics could be analysed.

Materials and Methods

The details of sampling cod during the Killiniq experimental fishery are given in the general project report for 1984 and so are not further referenced here. Subsamples of cod were selected for parasite analyses, including routine candling treatment and examination of livers for parasitic worms. Basic data on the cod subsampled for parasite study are included in Appendix 1.

On site candling of fillets was carried out at Killiniq using standard fish processing procedures, the fillets having a thickness of no more than 3/4" (1.9cm) and being examined on an illuminated candling table. Fillets from a total of 177 cod were examined by candling. Livers from 149[1] eviscerated cod were also examined on site for parasites, which were categorized on the basis of their size, coloration, and degree of coiling as follows: "Tight coils" (Relatively small, lightly colored nematodes lying in a tight coil on the liver surface immediately below the capsule membrane; probably = Anisakis sp.) and "loose coils" (larger,

[1]These specimens were included among the 177 cod processed on the candling table

darkly colored nematodes, loosely coiled near the liver surface or partly or entirely embedded in liver tissue; probably = Contracaecum (Phocascaris) sp.).

Results

No specimens of Phocanema (codworm) were detected in any of the material examined by Makivik in the field or in liver samples analysed at the Institute of Parasitology. However, two other types of anisakine nematode were present in the samples: Anisakis sp. and Contracaecum (Phocascaris sp.). Because the nematodes occur only as larval forms in the fish it is not possible to identify them as to species, for diagnostic features are only present in adult stages of these anisakine genera. A consideration of the most likely forms present, on the basis of zoogeographic information and host distributions, is included in the discussion section of this report. The occurrence of each of these two nematode taxa in the samples examined is recorded in Appendix 1.

Summary data for the prevalence and intensity of infection in cod liver for each of the nematodes is presented in Table 1. Prevalence (percentage of host livers infected) for Anisakis was 54% and for Contracaecum 52%. Mean intensity (No. of worms per liver) was 1.62 for Anisakis and 1.05 for Contracaecum, however as the worms were not randomly distributed among the infected fish, the frequency distributions given in Table 2 more clearly indicate the levels of infection in the

Table 1

Prevalence (% infected) and mean intensity (total number of parasites/number of samples) for cod livers collected in the Killiniq region during the 1984 fishery. No. of samples examined was 149 on site by Makivik and 164 at the Institute of Parasitology.

Parasite	Prevalence	Intensity	Range
Anisakis (IP)	54.3%	1.62	0-20
Contracaecum (Phocascaris) (IP)	52.4%	1.05	0-9
Protozoan cyst masses (IP)	11.6%	-	-
Anisakis (M)	33.9%	-	-
Contracaecum (Phocascaris) (M)	31.2%	-	-
All nematodes (IP)	73.8%	-	-
All nematodes (M)	65,1%	-	-

Key: IP = Institute of Parasitology
M = Makivik

Table 2

Frequency distributions of *Anisakis* sp. and *Contracaecum* (*Phocascaris*) sp. occurrences in cod livers collected near Killiniq in 1984. No. of samples = 164.

Anisakis sp.			*Contracaecum* (*Phocascaris*) sp.		
No. of worms	Frequency	Percent Frequency	No. of worms	Frequency	Percent Frequency
0	75	45.7%	0	78	47.6%
1	41	25.0%	1	50	30.5%
2	11	6.7%	2	15	9.1%
3	12	7.3%	3	12	7.3%
4	6	3.7%	4	1	0.6%
5	4	2.4%	5	3	1.8%
6	5	3.0%	6	2	1.2%
7	5	3.0%	7	0	0.0%
8	2	1.2%	8	2	1.2%
9	1	0.6%	9	1	0.6%
10	0	0.0%			
11	0	0.0%			
12	0	0.0%			
13	1	0.6%			
14	0	0.0%			
15	0	0.0%			
16	0	0.0%			
17	0	0.0%			
18	0	0.0%			
19	0	0.0%			
20	1	0.6%			

sample population. Of the 164 livers examined at the Institute of Parasitology, 74% were infected by either or both anisakine nematode types. Cysts of presumed protozoan origin were found in 12% of the livers. Either cysts or nematodes or both were present in 78% of the livers, and thus only 22% of those examined were found not to harbour any parasitic organisms at all.

Although there was generally a trend towards the livers of larger cod being more heavily infected (Table 3), this was not statistically significant, possibly because so many of the fish examined were of similar size and relatively few specimens represented the extremes of the size range. In general it is to be expected that the larger fish are the most heavily infected and contain the majority of the worm population. Sex of the cod was not significantly related to intensity of infection for any of the parasite types. The protozoan cyst masses were more often found in fish uninfected by nematodes than expected, but this was not statistically significant.

Of the 149 livers examined in Killiniq during fish processing by Makivik, 61% were recognized as harbouring nematodes. On the basis of the criteria used (tight coil/loose coil), 38% were recognized as being infected by Anisakis sp. and 36% seen as infected by Contracaecum. Protozoan cyst masses were not recorded for the livers examined in Killiniq.

There did not appear to be any regularity to the spatial positioning of anisakine nematodes of either type in any particular site

Table 3

Mean intensity and range of abundance for anisakine nematodes collected from cod livers for fish of various size classes near Killiniq.

Length of Host Fish	n	Anisakis sp.		Contracaecum (Phocanema) sp.	
		Intensity	Range	Intensity	Range
≤30 cm	3	0.00	0-0	0.57	0-1
31-40 cm	6	0.00	0-0	0.00	0-0
41-50 cm	8	0.50	0-1	0.75	0-3
51-60 cm	10	0.10	0-1	0.50	0-3
61-70 cm	38	1.26	0-9	0.79	0-3
71-80 cm	57	1.77	0-13	1.14	0-8
81-90+ cm	28	3.10	0-20	0.79	0-3

in the livers examined, beyond the observation that most Anisakis were located on the distal surfaces of the liver mass (i.e. the surfaces lying closes to the hypaxial musculature). The Contracaecum were also found on the distal surfaces, but a greater proportion than Anisakis were collected on surfaces adjacent to the stomach and pyloric caecae. Contracaecum was sometimes deeply embedded within the liver parenchyma, with only a small portion of the body exposed to view. There was a tendency for the protozoan cyst masses to be found near the extremities of the liver lobes. These masses of fibrous tissue were sometimes quite large, up to 6 cm measured along the longest axis. The cysts, often partly calcified, presented an appearance at least as aesthetically objectionable as that of the nematode worms.

Histological examination of the presumed protozoan cyst masses revealed no structures of diagnostic value in determining their origin (eg. spores or reproductive stages). It would appear that the cellular immune system of the host fish had overwhelmed the invasive organisms, and the cyst masses themselves consisted largely of recognizable host tissue such as macrophages in the lumens, with layers of fibroblasts forming the cyst walls. There was evidence of calcification within the larger cyst masses.

Discussion

The criteria for identification of anisakine nematode genera are based at least partly on characteristics possed only by the adult worms, and thus it is not always possible to distinguish the larval forms occurring in fish. In the case of the nematodes found in cod from the Killiniq region, the type identified as *Anisakis* sp. is reasonably simple to confirm as belonging to the genus on the basis of its straight anterior digestive tract without an intestinal caecum or ventricular appendix. The species may be *Anisakis simplex*, but development of species-specific diagnostic characteristics does not take place until the adult phase of the life cycle in cetaceans. The presence of *Anisakis* in cod of the Killiniq area is significant, especially because one must acknowledge that some proportion of the worms could be located in fish flesh where they could act as a source of human infection. Due to their relatively small size and indistinct coloration, *Anisakis* larvae are not readily detected by routine candling of fillets, as only digestion of the fillets in a pepsin/HCl solution at elevated temperatures at about 35'C is an adequate procedure for worm detection. In cod from the southern Gulf of St. Lawrence and Breton Shelf (McLelland 1983a) about 60% of the *Anisakis* collected were found to be located in the liver and only 1% in the flesh, the remainder occurring in other parts of the viscera, principally among the pyloric caecae. If the same degree of site selection holds for *Anisakis* in the Killiniq cod, there would occasionally be some individuals found in fillets. However, at the intensities recorded here the probability of finding infected fillets is very low. The mean intensity of infection recorded for whole cod by McClelland (1983a) in areas of eastern Canada studied so far ranges between 0.69 (Canso Bank Hole) and 3.45 (Sable Island Bank West) and the value for Killiniq (1.62) would be regarded as near the median for areas in eastern Canada. In the light of this information, it would seem that the presence of Anisakis in the Killiniq cod presents no novel problems for the fishery.

The Contracaecum (Phocascaris) larvae present in livers sampled from the Killiniq cod were determined on the basis of gut structure (intestinal caecum and ventricular appendix present) and location of the excretory pore (Myers, 1975). Separation of the two genera is only feasible on the basis of adult characters, and so it is not possible to absolutely determine which genus is present, or if both occur. In a single sample of complete viscera (Makivik fish reference no. 488) a large number of Contracaecum sp. occurred with Anisakis sp. among the pyloric caecae; these most nearly resembled C. osculatum, on the criteria of size and general morphology. The other Contracaecum type larvae characteristically found in the livers may be Phocascaris sp., a form frequently infecting cod in the northernmost extensions of their range. In the Killiniq region, Phocascaris would be predominantly carried by harp seals. Given known host distributions, it seems likely that Phocascaris could be a species infecting cod livers in the Killiniq region.

The apparent absence of Phocanema (codworm) specimens in the parasite samples is worthy of comment. It is possible that some of the Phocanema may not have been detected due to the preservation state of the 1984 samples, since freezing the worms makes the preservation and clearing processes less satisfactory. It is notable also, however, that no Phocanema were found among the 40 nematode samples collected from Killiniq cod by Makivik in 1983 and immediately preserved in glycerine alcohol. Furthermore, no codworm were detected in candling fillet samples from the 1984 fishery. It would seem then that codworm is at least extremely rare in the cod of the Killiniq district. This conclusion may be considered acceptable also on the basis of information on grey seal distributions on the Labrador coast; the northernmost extension of the grey seal range is generally considered to be Hamilton Inlet, and only a single grey seal capture has been reported for farther north at Port Burwell (Killiniq region), caught in a seal trap in 1963 (Mansfield and Beck, 1977) Codworm transmission in the Killiniq area would be primarily dependent upon maintenence of the cycle in harp seals and other pinnipeds, and as such should be very low. In West Greenland, Phocanema has a prevalence of only about 1% in cod fillets (Platt, 1975), and the Killiniq region would be unlikely to much exceed this.

With regard to the anisakine nematode infections of cod livers from Killiniq, the information that the majority of livers from market sized cod are infected by at least one parasite would make the livers unsuitable for commercial canning on the basis of the Fish Inspection Act. Removal of the nematodes would be impractical, as the remaining tissue bears obvious imprints of the detached worms. One option might be to explore the possibility of extracting oil from the livers of cod at Killiniq. Before proceeding in this direction, however, it would be necessary to assess the economic feasibility of such a project, and also to determine that PCB levels are within Fisheries Inspection Branch tolerances. This can be pursued by submitting liver samples for analysis at the St. John's laboratory.

Overall, the prospects for operating a fishery for high quality cod on a commercial basis should be considered very good on the basis of the parasite analyses conducted thus far. This is particularly encouraging in perspective of the difficulties presently experienced in exploiting some other Canadian stocks where the codworm problem has greatly increased over the past decade. Consequently, processed fillets from regions where codworm is largely absent are now even more sought after than ever and should yield a high price in domestic and foreign markets.

In the next few years some continued monitoring for parasites should continue at Killiniq, especially because a proportion of more heavily infected fish may be taken in the initial phase of the fishery, when the largest and oldest individuals in the stock may be harvested. Also, it should be established that the cod taken are members of a relatively uninfected stock or mixture of such stocks and that there is no appreciable likelyhood that migratory fish from other areas could become harvested by the Killiniq operation. In this context, some effort should also be directed towards obtaining collections from the Labrador Sea sectors of the proposed fishery, since few samples as yet have been analysed from that region. Digestion of some fillets from all regions should be carried out as well to confirm the anticipated low densities of Anisakis and other nematodes.

Summary

There is at present a reasonably extensive literature dealing with the parasites of cod which are of importance to commercial fisheries, and several reviews exist on various aspects of problems caused by these parasites. The "codworm" or "sealworm" (*Phocanema decipiens*) currently is responsible for great financial losses to the fishing industry in Atlantic Canada, especially in the southern Gulf of St. Lawrence and off the Nova Scotia coast. Moreover, both codworm and *Anisakis*, another nematode parasite found in cod, constitute a potential medical hazard if accidentally ingested alive. Clinical aspects of the diagnosis and treatment of "anisakiasis", the disease caused by these parasitic worms, are now reasonably documented. The distributions of these and other nematode parasites of cod are related to the availability of suitable hosts for the completion of their life cycles. While *Anisakis* may be occasionally found in the flesh of a small percentage of cod wherever harvested in eastern Canada, codworm is normally a problem only in areas where its primary host, the grey seal, occurs in abundance. A 10-fold increase in the grey seal population of maritime Canada over the past two decades has apparently resulted in a great surge in the abundance of codworm in several important fish stocks. Hence, fisheries with access to lightly infected or uninfected cod are now in an advantageous position for marketing quality fish fillets.

During the experimental cod fishery based at Killiniq in 1984, a survey of fish parasites was carried out aimed at establishing whether or

not codworm would pose any problems for the fishery. Furthermore, cod livers were examined to determine their possible acceptability as a marketable item. The cod fillets examined by Makivik personnel in Killiniq were apparently uninfected by codworm, and the parasite was not detected in any of the livers later subjected to detailed analysis in the laboratory. The evident rarity of codworm near Killiniq is probably related to the absence of grey seals from the region. Anisakis and Contracaecum (Phocascaris) were detected in the livers, together occasionally with a protozoan cyst mass of unknown origin. In all, 78% of the livers examined in detail were found to contain parasites of some description. Cod livers from the Killiniq region are thus not to be regarded as suitable for canning, but there is some possibility for liver oil extraction if this is economically feasible and PCB levels are within acceptable limits.

The results of the survey on cod parasites near Killiniq indicate that the fishery is well situated to exploit cod which are not normally infected by codworm. In comparison with other sectors of the Canadian fishing industry which must presently must deal with the problem of codworm, the Killiniq fishery is in a more favourable position to supply foreign and domestic markets.

Recommendations

1. Evidence that codworm is very rare in the Killiniq region should be considered a highly favourable feature characterizing the local stock to be exploited. In view of the difficulties currently encountered because of codworm in some other Canadian cod stocks, those responsible for wholesaling the Killiniq fillets should emphasize the lack of parasites as an important characteristic of their product, and one which strongly promotes its acceptance into quality domestic and foreign markets.

2. The presence of parasitic organisms in a high percentage of sampled cod livers indicates that the processing of these as a canned commercial product is not advisable. However, the prospect remains to extract oil from the livers. This possibility should be considered on the basis of its economic feasibility, provided that PCB levels are within Canadian limits.

3. Some monitoring for parasite occurrence should continue, particularly as the older and larger fish in the initial phases of the fishery are likely to be the most heavily infected. An effort should also be made to obtain more collections from the Labrador Sea sector of the fishery as this region has not as yet been extensively sampled.

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Note: An extensive bibliography containing copies of these and other citations on anisakine nematodes in cod is on file at the Institute of Parasitology.

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Gary McClelland at the Halifax Fisheries Research Laboratory supplied valuable information on the taxonomy of the anisakine nematodes of cod, and aided in identifications.

Appendix A

Data set for liver samples analysed for parasites at the Institute of Parasitology.

Key: Region = Station site as per Makivik charts.

Date = Month/day (1984)

Length = Length of fish host in mm.

Weight = Weight of fish host in kg.

Sex = Male (M), Female (F).

Liverwt = Weight of cod liver in g.

Anisakis = No. of *Anisakis* sp. in cod liver.

Contra = No. of *Contracaecum*(*Phocascaris*) sp. in cod liver.

Protozoa = Protozoan cyst masses present (1) or absent (0).

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
A	913	780	3.400	F	236	0	0	1
A	913	745	3.300	F	167	6	0	0
A	913	493	0.800	M	50	0	3	0
A	913	784	3.750	F	165	1	1	1
A	913	758	4.300	F	291	3	1	0
A	913	719	2.900	F	175	1	2	0
A	913	728	3.200	F	174	0	0	1
A	913	.	4.200	F	239	2	5	0
A	913	.	3.850		161	0	6	0
A	913	928	7.150	F	392	3	4	0
A	914	773	3.700	F	161	3	0	0
A	914	683	3.200	F	188	2	0	0
A	914	760	3.100	F	169	1	1	0
A	914	797	4.100	F	253	4	2	0
A	914	826	5.300	F	315	1	1	0
A	914	712	2.600	F	136	0	0	1
A	914	759	4.000	M	280	3	1	0
A	914	724	2.900	M	127	0	2	1
A	914	.	2.900	M	171	1	1	0
A	914	923	7.400	F	360	0	6	0
A	914	744	3.550	M	174	3	2	0
A	914	703	3.000	F	148	1	3	0
A	914	652	2.700	F	141	0	3	0
A	916	324	0.264	F	18	0	0	0
A	916	319	0.253	M	13	0	0	0
A	920	881	5.800	M	378	0	1	0
A	920	342	0.300	F	15	0	0	0
A	920	.	7.100	M	413	1	0	0

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
A	920	690	2.60	F	139	0	1	0
A	920	382	0.40	M	19	0	0	0
A	920	.	2.80	F	178	2	5	0
A	920	.	2.20	F	157	0	1	1
A	920	881	4.90	F	336	6	2	1
A	920	658	2.30	M	119	0	0	0
A	920	934	7.50	F	464	3	9	0
A	922	688	2.85	F	283	4	2	0
A	922	849	5.40		288	0	0	0
A	922	485	1.10	M	52	1	0	0
A	922	801	6.35	M	296	0	0	0
A	922	848	5.50	M	316	0	0	0
A	922	897	5.30	F	298	1	0	0
A	922	372	0.40	M	17	0	0	0
A	922	.	.	F	60	0	0	0
A	922	669	2.40	M	119	0	0	0
A	922	599	2.00	F	105	0	0	0
A	922	690	3.00	M	176	0	1	0
A	922	854	5.30		358	7	1	0
A	922	790	4.50	M	311	6	0	0
A	922	892	6.70	F	410	0	0	0
A	923	.	0.95	M	53	0	1	0
A	923	631	2.10	F	107	1	0	0
A	923	547	1.20	F	38	0	0	0
A	923	685	2.90	M	.	1	1	0
A	923	811	4.75	M	317	6	0	0
A	923	.	4.50	M	319	4	2	1
A	923	934	7.70	F	417	0	3	0

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
A	925	884	6.00	F	363	2	0	0
A	925	893	6.50	F	392	7	0	0
A	925	614	2.30	F	152	1	1	0
A	925	867	.	F	347	2	1	0
A	1006	.	3.20	M	458	0	0	1
A	1006	844	6.85	F	194	0	0	0
B	915	665	2.30	M	139	3	0	0
B	915	693	2.80	M	115	0	1	0
B	915	725	3.00	F	170	1	1	0
B	915	692	2.80	F	161	1	0	0
B	915	743	3.60	M	137	0	1	0
B	915	710	2.90	F	206	1	1	0
B	915	722	3.10	M	171	0	0	0
B	915	686	2.70	M	140	0	1	0
B	915	595	1.90	M	83	0	0	0
B	915	750	3.80	F	247	0	0	0
B	915	700	3.20	F	228	2	1	1
B	915	752	3.80	F	246	2	0	0
B	915	780	4.30	F	248	7	1	1
B	915	659	2.70	F	156	1	0	0
B	915	780	3.50	F	142	1	1	0
B	915	803	4.50		318	0	0	0
B	915	660	2.80	M	138	1	1	0
B	915	775	3.90	F	262	1	0	0
B	915	810	4.10	F	275	0	0	0
B	915	792	3.80	M	299	0	0	1
B	915	734	3.50	F	240	1	0	0
B	915	733	3.50	F	157	1	2	0

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
A	923	918	7.50	F	518	5	0	0
A	923	857	4.55	M	312	1	3	0
A	923	747	3.75	F	222	1	5	1
A	923	874	5.80	F	418	5	0	0
A	923	748	3.30	M	130	4	2	0
A	924	289	0.25		17	0	0	0
A	924	693	2.75	M	152	8	1	0
A	924	807	5.00	M	276	1	1	1
A	924	856	5.60	F	382	0	1	0
A	924	853	6.00	F	340	3	1	0
A	924	887	6.80	F	369	3	1	0
A	924	470	1.10	M	61	1	0	0
A	924	874	6.40	F	412	20	2	0
A	924	800	4.35	M	245	7	1	0
A	924	810	4.90		339	1	0	0
A	924	798	6.10	M	271	0	1	0
A	924	692	3.20		203	1	1	0
A	924	650	2.60	F	170	0	0	0
A	924	851	5.85	F	335	5	1	0
A	924	752	4.45	M	297	0	0	0
A	924	641	2.95	M	179	9	0	0
A	925	392	0.60	M	30	0	0	0
A	925	598	1.95	F	95	0	0	0
A	925	759	3.80	M	261	3	2	0
A	925	750	4.00	M	302	8	0	0
A	925	947	7.60	F	437	4	1	0
A	925	897	6.35	F	353	3	1	0
A	[illegible]	79[illegible]	[illegible].30	[illegible]	232	2	0	0

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
B	915	727	3.80	F	292	1	0	0
B	915	655	2.40	M	145	0	0	0
B	915	763	3.50	F	221	4	0	0
B	915	754	3.50	F	187	1	0	1
B	915	733	3.10	F	227	0	0	1
B	915	631	2.10	M	173	0	0	0
B	915	580	1.50		65	0	0	0
B	915	577	1.70	F	58	1	0	0
B	915	617	2.00	F	93	0	2	0
B	915	570	1.70	M	144	0	3	0
B	915	760	3.40	M	159	0	3	0
B	915	692	2.30	F	85	0	0	0
B	915	654	2.20	F	84	0	1	0
B	915	621	1.80	F	87	0	0	0
B	915	657	2.20	M	119	1	1	0
B	915	771	2.50	M	154	1	1	0
B	915	727	3.60	M	260	1	0	0
B	915	852	5.20	F	173	0	3	0
B	915	784	4.40	F	300	0	8	0
B	915	719	3.90	F	278	13	1	0
B	915	720	3.60	M	241	1	1	1
B	915	767	3.50	F	268	0	1	1
B	915	648	2.10	F	107	0	0	0
B	915	670	2.70	M	135	0	1	0
B	915	735	3.40	M	141	0	8	0
B	915	802	4.70	F	339	1	3	0
B	915	619	2.60	M	114	2	1	0
B	915	821	4.70	M	219	0	1	0

REGION	DATE	LENGTH	WEIGHT	SEX	LIVERWT	ANISAKIS	CONTRA	PROTOZOA
B	915	738	2.90	M	168	1	0	0
B	915	813	4.70	F	407	7	0	0
B	915	721	3.00	F	174	1	1	0
B	915	657	2.30		129	1	3	0
B	915	704	3.20	M	171	0	2	0
B	915	587	1.80	M	111	0	2	0
B	915	702	2.70	F	169	0	0	1
B	915	754	3.20	F	172	0	0	0
B	915	495	1.00	M	56	0	0	0
B	915	761	4.00	F	248	2	1	0
B	915	671	2.80	M	162	5	0	0
B	915	702	2.90	F	200	3	0	0
B	915	847	5.50	F	180	1	1	0
B	915	734	3.40	M	160	0	3	0
B	915	788	3.90	M	165	2	2	0
B	915	830	5.70	F	.	6	1	0
B	915	756	3.50	M	179	0	1	0
C	921	507	1.10	M	55	1	3	0
C	921	541	1.20	M	52	0	0	0
C	921	493	0.95	F	58	0	0	0
C	921	612	2.20	F	137	0	1	0
C	921	526	1.25	F	77	0	0	0
C	921	483	1.00	F	48	0	0	0
C	921	430	0.70	M	44	1	0	0

APPENDIX J

Chantal, P.
1986 Report on Plant Infrastructure Requirements, Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec.

*Note : Correction Table 1, page 12, bottom line :
1967-1975 = 30,000 lbs. quota.

INTRODUCTION

Dans le cadre de la phase II du projet des pêcheries de Killiniq, le service technique de la Direction du développement industriel a été mandaté pour réaliser le programme spécialisé concernant la transformation des produits marins.

Parallèlement aux travaux de recherche sur la ressource marine disponible dans la région, ce programme vise à évaluer les avenues possibles quant aux procédés et les infrastructures industrielles à mettre en oeuvre à Killiniq pour tirer profit de la ressource disponible.

Les travaux sur le site ont eu lieu entre le 30 août et le 11 septembre. Ce rapport présente les données techniques et logistiques recueillies et des suggestions d'orientation pour le développement industriel des ressources connues.

TABLE DES MATIERES

SECTION I: RELEVES SUR LE SITE

Le site des recherches est localisé au village de Killiniq, sur l'Ile de Killiniq, à la pointe est de la base d'Ungava. Le village est accessible par un étroit chenal entre l'Ile de Killiniq et l'Ile Jackson. Les bateaux à haut tonnage doivent mouiller à approximativement deux milles marins du village.

Les habitations longent la rive nord du chenal sur une longueur approximative de 3 000 pieds. Les montagnes de roc deviennent très abruptes à 500 pieds de la rive. Le complexe industriel est distant d'environ 1 500 pieds à l'ouest du village.

1. Les infrastructures urbaines

Le village de Killiniq, dont la juridiction relève des Territoires du Nord-Ouest, est désaffecté depuis 1978, les services publics n'y étant plus assurés. La population fut relocalisée dans les villages ceinturant la baie d'Ungava, notamment à "George River" et à "Fort Chimo". Les infrastructures urbaines sont très rudimentaires, voir inexistantes. Le ministère fédéral des Transports opère à Killiniq une base de communication radio, dotant ainsi le village de quelques infrastructures urbaines. Les données recueillies se résument ainsi:

Population: Environ 150 habitants avant 1978.

Habitation:

- On dénombre une trentaine de maisons rudimentaires en bois, en voie de dégradation avancée.
- Le ministère des Transports a construit deux habitations pour l'hébergement du personnel, une station de radio côtière et un entrepôt (structure métallique préfabriquée) pour les réparations, les pièces et la remise des véhicules. Tous ces bâtiments semblent en bon état.

<u>Réseau routier</u>: Les voies circulables sont en terre compactée et adaptées principalement à des véhicules tout terrain. Le réseau couvre approximativement deux milles.

<u>Approvisionnement en eau douce</u>: Le village est approvisionné en eau douce par un réseau hors terre en tubulure de plastique, en provenance d'un lac distant d'environ un mille. D'après les informations verbales recueillies, ce lac suffisait à la demande du village et de l'usine de transformation avant 1978. On affirme également qu'en période d'utilisation maximale, le niveau d'eau du lac demeurait stable, ce qui ouvre l'hypothèse d'un approvisionnement de fond.

Le débit d'eau s'obtient par gravité et on maintient une circulation en continu pour éviter le gel. L'eau serait accessible durant une période d'environ trois mois, soit du mois d'août au mois de novembre.

<u>Eaux usées sanitaires</u>: Aucun réseau élaboré. On utilise soit les cabinets à sacs ou les cabinets à combustion des déchets solides. On dispose des déchets dans un dépotoir à ciel ouvert.

<u>Electricité</u>: Par génératrice au diésel. Le village est parcouru par un réseau de fils conducteurs sur poteaux en bois.

<u>Carburant</u>: Le carburant pour le chauffage, les véhicules et les génératrices est entreposé dans deux réservoirs en acier de 50 000 gallons chacun. La circulation est par gravité.

Véhicules: Le ministère des Transports possède une niveleuse, deux camions à chenilles et un camion à benne.

Globalement, les éléments positifs relevés, en regard d'une implantation industrielle, se résument ainsi:

1. Accessibilité à une réserve d'eau douce.

2. Présence de deux réservoirs d'approvisionnement de bonne capacité.

3. Un réseau de base pour la distribution électrique.

4. Un réseau routier rudimentaire mais carossable.

2. Les infrastructures industrielles

Le ministère fédéral des Travaux publics, via le service des Affaires indiennes, construisit, en 1960, un bâtiment pour la congélation du poisson et s'ensuivit, en 1967, la construction d'une usine pour la transformation des produits marins et un bâtiment pour les services aux pêcheurs.

Ces bâtiments ainsi que l'aire des débarquements occupent une superficie de bois sur pilotis se prolongeant jusqu'à la rive (très escarpée), d'où les bateaux sont déchargés par un treuil motorisé. Ce même complexe industriel est distant d'environ 1 500 pieds du village et une voie carossable les relie. Une des caractéristiques intéressantes du site est la protection naturelle du chenal contre les intempéries. On retrouve en annexe 1 le relevé sur croquis des installations. Les données recueillies sont:

2.1 L'usine de transformation

Généralités: Le bâtiment est une charpente en acier préfabriqué. La superficie au sol est de 2 079 pi.car. et les dimensions du bâtiment sont de 63' x 33' x 12' de hauteur aux murs.

Généralités:
(suite)

L'aire intérieure est exempte de colonnes de support et les divisions intérieures non portantes en structure de bois peuvent être détruites pour permettre un nouvel aménagement.

Une particularité de ce bâtiment réside dans le fait qu'à sa conception d'origine, on avait prévu deux sections distinctes, soit une section humide de 600 pi.car., dont les finis et les services sont adéquats pour l'utilisation et l'évacuation de l'eau et une section sèche de 840 pi.car. pour la manipulation de matériaux secs. L'utilisation de l'eau dans cette section est restreinte par l'absence de drain. Les pentes sont également irrégulières.

Etat de la structure:

A l'observation visuelle, la structure métallique est en bon état, ainsi que les diverses composantes telles les boiseries, l'isolation et les revêtements intérieurs. De l'extérieur, une section d'environ 50 pi.car. de panneaux métalliques a été perforée par un véhicule et il faut prévoir des réparations à ce niveau.

La fondation ainsi que les planchers de béton sont en bon état quoique les pentes sont inadéquates dans la section sèche de l'usine.

A l'examen visuel, la corrosion n'est pas à un niveau avancé.

Locaux et aménagement: L'usine est divisée en cinq locaux suivants: le local pour les opérations sèches (séchage, entreposage, atelier, confection des filets), le local d'entreposage du sel, les toilettes, le local de conditionnement pour l'eau douce (chlorination, chauffe-eau).

L'aménagement actuel des locaux, les contraintes de drainage des planchers et la distribution de l'eau pour les procédés limitent grandement une utilisation optimale de la superficie disponible pour des opérations de transformation. Une surface de 600 pi.car. peut être exploitée pour des opérations impliquant l'utilisation de l'eau, soit dans la section "humide" du bâtiment comportant un caniveau, rejetant l'eau et les déchets sur la rive.

Services:

Approvisionnement en eau potable: L'usine s'approvisionne en eau douce du lac en montagne, mentionné précédemment. Le réseau est constitué d'une ligne hors terre en plastique, opérant par gravité. La pression obtenue à l'entrée de l'usine est d'environ 50 lb/po.car. L'usine est munie d'un bassin de rétention, d'où elle est chlorinée et acheminée au réseau d'eau froide et chaude. J'évalue que seul le bassin de rétention est réutilisable. Les équipements de chlorination et de chauffage de l'eau sont hors d'usage. Lors de ma visite, le réseau d'eau douce n'était pas en fonction et on utilisait l'eau salée (pompe sur le quai).

Evacuation des eaux sanitaires: Le local des toilettes utilise des cabinets munis de sacs en plastique dont on dispose au dépotoir municipal. Les eaux usées du procédé sont évacuées directement à la mer par un caniveau et une chute métallique.

Electricité: Une génératrice assure l'approvisionnement électrique, pour des tensions de 110 et 220 volts. Les besoins énergétiques actuels sont évalués à 20 kw. L'éclairage est satisfaisant et comprend des néons et des ampoules suspendus.

Chauffage: Le chauffage des locaux est assuré par une fournaise à l'huile avec une distribution d'air chaud par conduites au plafond. Le système de combustion (brûleur) de la fournaise est à refaire à neuf.

Ventilation: Le renouvellement de l'air s'effectue par l'infiltration naturelle, par les portes et par la prise d'air frais de la fournaise.

Equipements: A l'annexe IV,on trouve une liste des principaux équipements de l'usine. Lors de ma visite, les opérations de tranchage de la morue furent effectuées sur une table en bois peint.

Les principaux équipements sont une table de dépeçage pour le loup marin, une balance électronique de précision pour la réception des prises, plusieurs bacs de manutention en plastique et un séchoir à l'air chaud pour la morue salée. L'efficacité du séchoir peut être grandement améliorée, surtout au niveau de la vitesse et de la distribution de l'air.

En résumé, on constate que les équipements observés ne permettent que des opérations élémentaires telles le tranchage manuel, le salage en arime, la congélation par air froid, l'entreposage frigorifique et le séchage par air chaud de la morue salée.

Réglementation: L'aménagement actuel de l'usine ne répond pas aux normes provinciales et fédérales à cet effet. Les principales remarques concernant l'aménagement sont: on exige un local de réception, séparé physiquement du local de transformation; un local pour la maturation du poisson en arime (saline) est requis; on exige également un local pour l'entreposage du sel, un local pour les emballages, un local pour les services électriques, compresseurs, etc.; la réglementation exige des locaux pour les services aux employés tels les toilettes, un vestiaire et un local de repos. Une description complète est disponible sur demande.

2.2 L'unité de congélation et d'entreposage frigorifique

L'unité est un bâtiment préfabriqué en panneaux isolés, ayant les dimensions de 42' x 14' x 10' de hauteur (8' intérieur). L'unité fut construite en 1959 par le ministère fédéral des Travaux publics. L'intégrité structurale semble bonne, bien que les joints d'étanchéité sont à refaire. On retrouve dans l'unité une chambre de 10' x 12' pour la congélation rapide, une chambre de 5' x 5' pour l'entreposage frigorifique, trois congélateurs domestiques de 8' x 2' et, comme équipements non installés, deux évaporateurs neufs de marque "Keeprite".

La réfrigération pour les chambres froides est assurée par un petit compresseur hermétique d'environ 5 H.P., installé dans un bâtiment connexe. Le congélateur rapide à l'air est muni d'un évaporateur suspendu au plafond, tandis que la réfrigération de la chambre froide est assurée par le transfert par conduite d'air froid provenant du congélateur rapide. A l'origine, le ministère des Travaux publics avait conçu et installé deux unités monoblocs pour, d'une part, permettre une congélation rapide dans l'actuelle chambre d'entreposage de 5' x 6' et refroidir l'air restante de l'unité. Ces systèmes furent inadéquats et sont non récupérables.

Le design intérieur du congélateur et l'évaporateur ne permettent pas d'assurer une congélation rapide de produits à congeler individuellement (filets) sur des pannes en chariot roulant. On recommande l'installation d'un entretoit et des déflecteurs pour obtenir une bonne distribution de l'air et une circulation continue, à sens unique, d'un air froid (- 35 °C) propulsée à 500 pi./min. au minimum.

La technique de réfrigération de la petite chambre froide, impliquant un transfert du froid par un tube, est à rejeter. On ne peut pas, de cette façon, contrôler les écarts de température et l'humidité du local.

Les congélateurs domestiques sont en bon état mais ne devraient être utilisés que pour l'entreposage des produits déjà congelés. La raison en est que la congélation dans ces unités est lente, donc permettant une qualité moindre pour les produits que dans le cas d'une congélation rapide.

Ce bâtiment est réutilisable mais son aménagement intérieur doit être refait pour le doter d'un local d'entreposage frigorifique avec un évaporateur et un local bien conçu pour la congélation rapide.

2.3 Autres bâtiments

Ces bâtiments sont représentés en annexe 1.

On retrouve deux bâtiments de services: l'un est utilisé pour l'entreposage des pièces mécaniques, les génératrices et le compresseur pour la réfrigération, l'autre bâtiment est utilisé pour les services aux pêcheurs (agrès, vêtements) et comprend un local pour les travaux de recherche du projet. Ces bâtiments sont des structures conventionnelles en bois et, en première analyse, ils sont en bon état. Comme les planchers en bois des deux bâtiments reposent sur le sol, avec des appuis en bois, ils peuvent être facilement déplacés.

2.4 Services au quai

Le quai est une structure en panneaux de bois, supportée par des pilotis en bois appuyés sur le roc. La surface de travail est en bon état mais sa capacité portante est limitée à des charges faibles si on en juge par l'observation du réseau de pilotis qui montre des risques de déflexion. Il y aura lieu de consolider le quai actuel si on prévoit l'utilisation d'équipements lourds tels un chariot-élévateur.

Comme équipements mécaniques, on retrouve un treuil et une pompe d'eau salée. Le treuil est en bon état mécanique mais la vitesse de remontée est très lente. Le mouvement horizontal du bras de déchargement s'effectue au moyen d'une corde, ce qui ralentit d'autant plus les opérations de déchargement. La pompe d'eau salée est en bon état mécanique.

2.5 Site d'exploitation

L'environnement immédiat de l'usine de transformation est un terrain très accidenté, dont la couche externe du sol est rocailleuse, atteignant sous quelques pouces un sous-sol de roc solide en "Pergelisol". Examinons maintenant les possibilités d'expansion du site en prenant comme hypothèse que l'on désire restreindre au minimum les coûts de terrassement.

2.5.1 Expansion en périphérie de l'usine

Par la face sud de l'usine, donnant directement sur le quai, la superficie de terrain disponible pour une construction neuve est d'environ 3 000 pi.car. En pratique, le terrain permet de construire un bâtiment ayant les mêmes dimensions que l'usine existante (33' x 63'). Les travaux ne semblent pas impliquer du dynamitage, un remplissage rocheux (dont on en trouve abondamment sur le site) et le bétonnage.

Par la face nord, donnant sur le terrain utilisé comme rampe d'acier, l'expansion est possible sur une superficie approximative de 1 800 pi.car. soit 30' en largeur par 60' en longueur, tout en laissant un corridor d'accès de 30' pour les bateaux. Comme le niveau du sol est relativement plus bas que le niveau du plancher de l'usine, on peut envisager une construction nouvelle sur pilotis (béton ou bois) avec un plancher en béton ou en bois, selon la vocation des locaux envisagés, ou une fondation similaire à l'usine actuelle (empilement rocheux avec béton).

L'expansion par les faces ouest et est implique des travaux d'envergure pour accroître de façon valable l'usine en longueur. Par la face est, un remplissage en mer s'avérerait nécessaire et, par la face ouest, il faut dynamiter une épaisse couche de roc solide.

2.5.2 Autres zones d'expansions

A une distance de 80 pieds à l'ouest de l'usine de transformation, on retrouve un terrain d'une superficie approximative de 4 000 pi.car. (32' x 124') dont la surface relativement plane du sol permettrait la construction d'un bâtiment, sans travaux majeurs de terrassement. Le terrain figure à l'annexe 1 (on y observe des barils entreposés sur le sol).

2.5.3 Résumé

Le terrain disponible pour la construction ou l'expansion d'une usine dans la zone immédiate du complexe industriel est limité. Les avenues possibles en périphérie de l'usine sont une superficie de 3 000 pi.car. vers le sud et de 1 800 pi.car. vers le nord. Un terrain d'environ 4 000 pi.car., à l'ouest de l'usine, offre des possibilités intéressantes. Le choix dépend principalement du réaménagement des locaux de l'usine actuelle et des caractéristiques des locaux (nombre, vocation, superficie) que l'on veut y adjoindre.

SECTION II: OPERATIONS DE PECHE ET DE TRANSFORMATION A KILLINIQ

La région de Killiniq se situe au centre d'une zone dont la ressource semble la plus prometteuse de la baie d'Ungava. Historiquement, on relève des activités concernant la pêche à la morue depuis la fin du siècle dernier. En 1898, Job Brothers, de St-Jean, Terre-Neuve, y avait installé une station. En 1951-1952, Northern Affairs organisait un projet de pêche expérimentale à Port Burwell, mais nous ne possédons pas les données recueillies.

En 1960, on construisit une unité de congélation et d'entreposage frigorifique (capacité d'entreposage de 20 000 lb).

1. Opérations de pêche et de transformation - 1960-1978

Nous n'avons pas retrouvé de données écrites concernant la production durant cette période. Les informations sont d'origine verbale, de personnes-ressources ayant coordonné les activités de transformation.

1.1 Flotte de pêche

Les pêcheurs inuits utilisaient deux bateaux côtiers en bois (40 et 46 pieds) actuellement hors d'usage et un bateau collecteur pour la pêche de l'ombre chevalier au Labrador et dans la zone nord-est de la baie d'Ungava.

1.2 Procédés de transformation

Les procédés de transformation se limitaient à la congélation de filets ou à l'état "rond" (éviscéré seulement) de la morue et principalement de l'ombre chevalier. La préparation des produits, soit l'éviscération, le lavage et le filetage, s'effectuait dans un local de l'usine ayant une superficie de 600 pieds carrés. La congélation et l'entreposage avait lieu dans l'unité extérieure à l'usine.

Le tableau 1 ci-dessous présente les données disponibles sur la transformation des espèces.

Tableau 1: Procédés et volume de transformation à Killiniq
1960-1978

Années	Espèces	Procédés de transformation	Volume de production (1) lb/saison
1960-1963	Omble chevalier	Eviscération, lavage, congélation à l'état étêté - éviscéré.	20 000
1963-1966	Omble chevalier	Eviscération, lavage, congélation à l'état étêté - éviscéré.	20 000
	Morue	Filets congelés	3 200
1968	Morue	Eviscération, lavage, congélation à l'état étêté - éviscéré.	60 000
1976-1977	Omble chevalier	Eviscération, lavage, congélation à l'état étêté - éviscéré.	60 000

(1) Moyenne annuelle approximative. Provenance verbale.

1.3 Personnel

Le secteur transformation nécessitait environ douze employés dont quatre femmes pour l'omble chevalier, six femmes et deux hommes pour la morue. Le secteur pêche employait seize personnes, ce qui inclut les travaux de débarquement. La coordination des opérations relevait du "service" fédéral des Affaires indiennes, dont M. Ray Buffit agissait à titre de responsable du projet.

1.4 Ventes

Les produits finis étaient vendus en partie dans les coopératives locales de la baie d'Ungava et à quelques entreprises privées suivantes: Growly, McCroker (Frobisher Bay), la Cie La Baie d'Hudson (Fort Chimo) et l'hôpital Camsoll (Montréal).

2. Opérations de pêche et de transformation - 1978-1984

Les opérations industrielles furent interrompues en 1978, année de la fermeture du village, pour ne reprendre qu'en 1983 dans le cadre du projet des pêcheries de Killiniq.

2.1 Flotte de pêche

La description des composantes de la flotte est relatée en détail dans une autre section du rapport global. Mentionnons toutefois que l'équipe de recherche et les inuits disposaient de deux bateaux de quarante pieds, à cale fermée, et de quatre bateaux côtiers de trente pieds.

2.2 Procédés de transformation

Le projet à Killiniq, bien que s'appliquant à une pêche non commerciale, a permis de capturer 40 000 livres de morue en 1983 et 5 900 livres en 1984. Les travaux de recherche sur les ressources halieutiques des phases I et II du projet permirent d'identifier plusieurs espèces potentielles pour la transformation, notamment le flétan du Groenland, l'omble chevalier, les pétoncles, le phoque et la morue. A date, par contre, compte tenu de travaux de recherche à approfondir, la transformation en 1983 et 1984 porta principalement sur la morue fortement salée en arime et une faible quantité de morue fortement salée et séchée mécaniquement. Comme les travaux n'étaient pas orientés vers la congélation industrielle des produits marins, les captures incidentes (saumon, omble chevalier, crabes) furent congelées dans des congélateurs domestiques installés dans l'unité principale de congélation. Nous discuterons ci-dessous des procédés et équipements utilisés dans le cadre du projet.

2.3 Morue fortement salée: procédé en usage

Au débarquement, la morue est mise dans des plats de plastique pour être acheminée au local de réception. La morue à bord des bateaux n'est pas "saignée" ni éviscérée. Les opérations de réception, de préparation et de salage s'effectuent dans le même local.

Préalablement, les lots de morue sont pesés sur une balance électronique digitale. Les plats de poisson sont, par la suite, dirigés à une table de tranchage en bois où s'effectuent l'éviscération, l'étêtage et le tranchage. La morue tranchée est déposée dans des bacs en plastique, remplis d'eau pour nettoyer la chair des traces de sang et autres déchets. L'eau est partiellement renouvelée par un boyau d'arrosage.

La morue tranchée est alors empilée en couches intercalées avec du gros sel à raison de 60 à 80 lb par 100 lb de poisson. La hauteur de la pile atteint approximativement de 4 à 5 pieds (maximum). Le produit ainsi apprêté se conservera jusqu'à la période d'expédition, soit en octobre.

L'usine est dotée d'un séchoir à l'air chaud pouvant contenir approximativement 400 à 500 livres de produits non séchés. On dépose la morue fortement salée après vingt et un jours sur des vigneaux qui seront insérés dans le séchoir. L'air est réchauffé à une température d'environ 80 ^{o}F par un serpentin électrique et circulé horizontalement entre les vigneaux superposés. Le produit séché est mis en boîtes de carton et entreposé dans la section sèche de l'usine. La durée d'un cycle de séchage est d'environ 20 heures et il faut prévoir au moins deux cycles de séchage, avec une période de 24 à 48 heures d'empilage en hauteur (généralement de 4 à 5 pieds avec transpilage successif) pour favoriser la migration de l'eau, réduite par la formation d'une surface croûtée par l'action asséchante de l'air.

L'expédition des produits finis s'effectue à la fin de la saison de recherche par bateau collecteur. Le poisson salé est débarrassé de l'excès de sel avant son chargement.

2.4 <u>Commentaires</u>

Des 1 432 kg de morue salée expédiée à Québec, 1 182 kg furent vendus aux "Pêcheries Sheehan", de Gaspé. Le produit salé vert sera séché par ce producteur et vendu aux marchés d'exportation. M. Sheehan a classé le niveau de qualité du produit, données que l'on retrouve au tableau 2.

Tableau 2: Evaluation de la morue salée vendue

Qualité	Dimensions (1) Classification officielle	Poids kg	Prix $/kg	Revenus $
De choix	Large	454	2,42	1 100
De choix	Moyenne	568	2,31	1 312
Normale	Extra large	68	2,31	157
Normale	Large	23	2,20	50
Normale	Moyenne	46	2,09	95
Normale	Petite	23	1,76	40
		1 182		

(1) Extra large: 63,5 cm et plus
Large: 53,5 à 63,5 cm
Moyenne: 42,0 à 53,5 cm
Petite: 29,0 à 42,0 cm

Du tableau 2, il ressort que 44% du lot se compose de morue classifiée "large" et "extra large", ce qui correspond, pour la classification en dimensions, à un prix de vente supérieur. Au niveau de la qualité, 86% du lot est de première qualité, ce qui correspond, au niveau de la qualité, à un prix de vente supérieur. La classification de 13% du lot, en qualité "normale" est attribuée à une technique imparfaite de tranchage, ce qui peut occasionner des défauts comme: arête centrale non libérée, surface rugueuse, chair endommagée, etc. A ce niveau, le personnel inuit doit acquérir de l'expérience provenant de personnes-ressources et porter une attention particulière à l'effritage et à la qualité des couteaux. De l'observation des méthodes et des procédés, il en ressort les remarques suivantes:

1. Le personnel inuit devrait être plus encadré pour l'apprentissage de la technique de coupe.

2. La morue devrait être saignée dès sa capture pour réduire l'accumulation et la coagulation du sang dans certaines parties de la chair, ce qui cause des taches et des défauts de saveur.

3. La technique de lavage est à améliorer pour éliminer les déchets. On recommande un bon lavage à l'eau courante ou en changeant fréquemment l'eau des bassins si elle est stagnante. On doit prendre soin d'enlever les traces de sang adhérant à la chair et le limon de la peau.

4. La quantité de sel répartie sur les couches est non contrôlée. Une quantité de 40 livres par 100 livres est suffisante et j'ai observé l'emploi allant de 60 à 80 livres de sel. Le sel doit, en outre, être déposé en plus grande quantité sur les parties épaisses de chair que sur les parties minces. On recommande, au niveau de la pile de morue tranchée, une hauteur maximale de quatre pieds.

5. Au niveau du séchoir, les conditions de circulation de l'air ne sont à améliorer. En première analyse, la vitesse de l'air est trop faible et n'est pas adéquatement dirigée uniformément au-dessus de la surface des produits, entre les vigneaux superposés. On recommande une vitesse d'air approximative variant entre 400 et 600 pieds à la minute et dirigée efficacement par des déflecteurs pour obtenir une distribution égale.

L'humidité relative de l'air ambiant à Killiniq est, en général, élevée et il faut prendre en considération qu'à des niveaux dépassant 65%, le séchage est quasi impossible. Dans une région très humide, pour une saison de séchage très courte, il est impératif que le séchoir soit muni d'un appareil de déshumidification de l'air et de contrôle de la température.

L'usine de Killiniq ne possède pas, à mon avis, les installations (locaux et services) pour produire un produit séché dont la qualité soit contrôlée.

Techniquement, même si la méthode est mise au point, les principaux facteurs limitant sont:

- Manque de superficie de plancher drainable pour l'empilage et l'égouttement entre les cycles de séchage. En pratique courante, l'empilage s'effectue dans un local réfrigéré à 50 °F.

- Une chambre d'entreposage à basse humidité et maintenue à 50 °F (pour réduire le risque de développer de la bactérie du rouge, qui déclasse au rejet les produits atteints). Si l'humidité relative de l'air est trop élevée, le produit séché réabsorbe l'eau de l'air.

Toutefois, ces remarques concernent l'orientation du produit vers les marchés extérieurs qui exigent fréquemment des spécifications précises au niveau de diverses caractéristiques du produit, notamment son humidité. Les exigences du marché local peuvent être très différentes. En annexe , figurent des données concernant le tranchage, le salage et le séchage de la morue fortement salée.

SECTION III: DEVELOPPEMENT INDUSTRIEL A KILLINIQ

1. Base

L'implantation d'une usine nouvelle ou la modernisation d'une usine existante repose sur quelques données fondamentales qui doivent être clairement énoncées. L'industriel doit connaître les informations suivantes:

1- Il faut connaître les possibilités d'approvisionnement actuelles et futures. La quantité moyenne annuelle des captures doit être établie.

2- Quels sont les produits qu'il désire transformer?

3- Quels seront les clients qui achèteront les produits finis? Quels peuvent être les concurrents actuels et futurs sur ce marché?

Cet ensemble de données permet d'estimer l'ampleur et la rentabilité du projet. Il faut ensuite établir les quantités journalières des captures et connaître le nombre de semaines d'opération de l'usine.

2. Possibilités d'approvisionnement

Dans les régions nordiques, les viandes de mammifères marins se consomment crûes, crûes gelées, cuites ou séchées. Certains produits comme le phoque, le saumon et l'omble chevalier connaissent un marché stable n'ayant toutefois pas fait l'objet d'une étude quantitative de consommation. La demande pour l'omble chevalier représente, selon une estimation, un marché potentiel de 60 000 livres par année et, en 1980, la consommation fut de 21 040 livres.

L'état actuel des recherches sur la ressource marine met en évidence la région de Killiniq comme étant une zone dont la ressource est prometteuse, comme en témoigne l'importance de la morue et du flétan du Groenland à l'est de l'île de Killiniq et de la découverte d'un banc abondant de crevettes à l'ouest de l'île de la résolution (60 milles marins environ au nord de Killiniq) et d'un autre plus petit à l'ouest de l'île de Killiniq, tous deux contingentés.

Dans la région immédiate de Killiniq, la recherche sur les ressources marines est récente. Les études préliminaires pour une pêche côtière mettent en évidence la présence de morue, d'omble chevalier, de flétan du Groenland, des pétoncles et du phoque. On ne peut toutefois, à date, envisager un développement de la pêche côtière sans approfondir davantage la recherche sur ces ressources et son niveau d'exploitation.

Dans le cadre d'un développement industriel à court terme à Killiniq, nous croyons que la transformation devrait porter sur les ressources présentant le moins d'incertitude d'approvisionnement, soit la morue, l'omble chevalier et le loup marin. Les conditions pour l'émission des permis de pêche de ces espèces seront toutefois à définir.

2.1 Périodes de capture

Les périodes de capture et de transformation sont grandement influencées par le mouvement des glaces. Nos informations permettent toutefois d'établir approximativement les périodes suivantes:

Loup marin:	Probablement de la mi-juillet à la fin août.
Omble chevalier:	Probablement de la première semaine d'août. L'omble chevalier peut être pêché le long de la côte, jusqu'à la fin d'août.
Morue:	Début de septembre à la dernière semaine d'octobre.

2.2 Captures annuelles estimées

Il est difficile d'établir des volumes de débarquements sur la seule base des travaux de recherche entrepris. Par les opérations passées, on peut préliminairement établir les valeurs suivantes:

Omble chevalier:	60 000 livres rond (1) par saison ou 2 000 livres par jour.
Morue:	40 000 livres rond par saison ou 890 livres par jour.

On pourrait tenter, avec ces données, d'établir la capacité de congélation et d'entreposage frigorifique.

3. Produits finis

Sur la base des données précédentes, nous pouvons envisager une grande variété de produits finis:

Morue:

1- Morue légèrement salée séchée
2- Morue fortement salée (ou séchée)
3- Morue entière congelée
4- Filets de morue congelés
5- Langues, queues
6- Huile de foie de morue

Omble chevalier:

1- Congelée entière
2- Filets congelés
3- Darnes
4- Produits fumés, filets, entier
5- Conserve

Phoque:

1- Conserve
2- Huile
3- Peau

(1) Rond: poisson entier au débarquement.

Toutefois, le choix de produire l'un ou l'autre de ces produits dépend du marché de chacun et la production industrielle impliquant les techniques de conserverie, de séchage et de fumage requiert plusieurs locaux et équipements à vocation spécifique, donc des investissements importants en infrastructures. Compte tenu des études de commercialisation peu élaborées, voire inexistantes, nous recommandons un développement à court terme à Killiniq, impliquant les deux options suivantes:

1- Selon le marché, produire des produits congelés à technologie simple, soit la morue et l'omble chevalier congelés, en filets ou entiers. Conserver l'aire nécessaire pour une production de produits fortement salés en arime et se doter d'une aire pour effectuer à l'échelle expérimentale des produits en conserve. Le fumage à l'échelle expérimentale pourrait s'effectuer dans un local muni d'une hotte.

2- La même situation qu'à l'item 2, sauf que les travaux d'expérimentation pourraient s'effectuer dans un laboratoire-pilote, tel celui du MAPA à Gaspé. Les produits bruts pourraient y être expédiés congelés et les travaux s'effectuer conjointement avec des travailleurs inuits.

En résume, à court terme, on axerait la production industrielle sur les produits suivants:

1- Morue entière, ronde ou en filets (individuels ou en blocs) congelés.

2- Omble chevalier rond ou en filets (individuels ou en blocs) congelés.

3- Produits séchés: A étudier attentivement. Il faut prévoir que si la saison débute au début de septembre, il faut 21 jours avant d'obtenir un produit fini fortement salé et que la saison prend fin à la mi-octobre. Il faut prévoir un séchoir d'environ 700 livres par jour pour sécher en 20 jours la production totale. Il sera préférable, à notre avis, de tester le marché local avec des produits séchés du sud, avant d'investir dans une telle fabrication.

4- Conserverie et fumage: Ces productions ne devraient s'effectuer qu'à l'échelle expérimentale. La transformation du loup marin exige en outre un local séparé pour le dépeçage.

4. Les infrastructures industrielles à développer

Dans cette section, nous suggérons des alternatives de développement en termes de superficie en construction, d'aménagement de locaux et de sélection préliminaire d'équipements. Le choix final de ces paramètres dépend de l'orientation des propriétaires pour les produits à transformer (quantité et produits finis).

Le choix final du site et des travaux à réaliser devra être évalué par une firme d'ingénieurs et d'architectes spécialisés dans les constructions nordiques.

Les installations devront être conformes aux diverses normes gouvernementales, notamment au niveau des produits marins. L'application de ces normes en regard des particularités du site pourrait être discutée avec les représentants des ministères concernés.

4.1 Alternatives de développement

En tenant compte d'informations très préliminaires sur la ressource et les produits à transformer et de l'incertitude d'un retour à Killiniq d'une population stable, nous croyons que l'ampleur des opérations doit être minimale et à une échelle pilote. Plusieurs alternatives d'implantation sont probables mais, dans le cadre de cette étude, nous suggérons pour fin de discussion, deux alternatives, dont les schémas sont présentés aux annexes 2 et 3. Les caractéristiques de ces alternatives sont:

4.1.1 Alternative 1

Esquisse: Annexe 2.

Bâtiment neuf	L'alternative implique une construction neuve de 1 536 pieds carrés, dont la vocation est pour les services au personnel et des opérations de type sec. Le type de construction demeure à déterminer, selon les coûts impliqués, la permanence des installations et les contraintes du site. On peut envisager une construction conventionnelle en bois ou préfabriquée avec soit un plancher en bois sur pilotis ou une structure avec plancher en béton. Une évaluation plus spécialisée est requise.
Bâtiment existant	Les travaux impliquent l'aménagement de locaux et la modernisation des services. Le plancher non drainé doit être modifié au niveau des pentes et muni d'un caniveau avec grille. Les finis des murs doivent être refaits avec un matériel lavable, imperméable et imputrescible. Le plafond doit être fini selon une technique "faux plafond" ou "plafond suspendu". Le matériel doit être imperméable et facilement nettoyable.
Unité de congélation	On suggère que l'unité de congélation soit réaménagé entièrement en local d'entreposage frigorifique à - 25 °C. Le congélateur rapide serait localisé dans l'usine pour permettre des opérations fonctionnelles de congélation, en fonction de la technique de fumage et de la congélation individuelle. De plus, on désire utiliser au maximum l'unité extérieure pour l'entreposage frigorifique.

Services:

Principe

Dans l'optique de polyvalence, on recommande de distribuer les services d'eau et d'électricité de telle sorte qu'ils soient disponibles facilement sans modification des réseaux.

Eau

Réseau au plafond, isolé, à tuyau maître central avec embranchements latéraux. Plusieurs prises seront prévues. La pression recommandée est 60 p.s.i. La température de l'eau chaude pour le lavage sera de 60 ^{o}C avec une réserve suggérée de 100 gallons.

Electricité

Les besoins globaux sont à déterminer en fonction des équipements choisis et le design final. L'intensité lumineuse doit être de 50 décalux dans les aires de transformation et de 20 décalux pour les autres locaux. Les prises de courant seront à l'épreuve de l'eau. Les néons seront de type à l'épreuve des casses et, de préférence, encastrés dans le faux plafond.

Ventilation

Selon les normes. De plus, on suggère au-dessus des éléments de cuisson et de fumage une hotte d'évacuation des buées. On doit prévoir des entrées d'air avec filtre, en fonction des évacuations.

Chauffage

L'unité existante est à réparer au niveau du brûleur. On suggère une distribution des conduites dans le faux plafond.

Eaux usées sanitaires

Nous suggérons l'installation d'une fosse septique de type "chimique", sans champ d'épuration.

Eaux usées industrielles	Si les déchets solides ne représentent pas une masse importante, ils pourront être déposés dans des contenants hermétiques et transportés quotidiennement au dépotoir. Pour l'évacuation des liquides, le caniveau devra être muni d'un grillage de 25 mailles au pouce. L'évacuation serait faite à la mer, à une distance suffisante pour être entraînée par la marée, importante à Killiniq. Ces dispositions devraient être certifiées par le ministère de l'Environnement.
Alimentation en eau du lac	Pour retarder au maximum les dangers de gel de la ligne, on doit assurer une circulation continue. Si on prévoit des opérations au-delà du 15 octobre, il serait préférable d'envisager des techniques d'isolation et de chauffage de la conduite d'alimentation.
Glace	Nous recommandons l'installation d'une machine à glace d'une capacité de 1 1/2 tonne métrique par 24 heures et un réseau de 3 tonnes. Les dimensions approximatives de la réserve sont de 6' x 6' x 6' de hauteur ou l'équivalent. Cette réserve, si non réfrigérée, doit être isolée avec trois pouces de polyuréthane ou l'équivalent si on désire une conservation de deux à trois jours.
Treuil	A déterminer si on opte pour l'achat d'un système plus rapide.
Eau salée	Si l'eau salée est utilisée pour les procédés, il faudra en analyser la qualité et la chloriner au besoin.

Réfrigération

Au niveau des compresseurs, ces derniers devront être de type industriel et on recommande les compresseurs "OPEN TYPE", dont le moteur est remplaçable sans ouvrir le compresseur.

Si on transforme le poisson salé et séché, le local d'entreposage Q devrait être maintenu à 45 °F, en spécifiant un taux d'humidité n'excédant pas 60%.

Treuil

Si on envisage la transformation du loup marin, on suggère de prévoir dans le local de dépeçage un système de treuil pour la manipulation des carcasses en fonction des quantités envisagées.

4.1.2 Alternative 2

Les exigences normatives et le principe de polyvalence sont les mêmes que pour l'alternative 1. Par contre, nous disposons d'une plus grande superficie de travail et un agencement plus fonctionnel des opérations.

Esquisse

Annexe 3.

Bâtiment neuf

Implique une construction neuve de 2 600 pieds carrés. Les travaux impliqueront un site rocheux, dont le niveau varie de 2 à 4 pieds sous le niveau du plancher de l'usine actuelle. La construction serait probablement de type métallique préfabriquée, avec fondation et plancher en béton. Une évaluation plus spécialisée est requise.

Bâtiment actuel

La charpente métallique demeure mais les divisions, les finis, le drainage et les services sont à refaire. L'isolation est incluse.

Contrairement à l'alternative 1, l'entreposage frigorifique est inclus au bâtiment.

<u>Autres bâtiments</u> Il y a lieu d'examiner la construction sur un autre site d'un bâtiment pour l'entreposage des agrès, des marchandises et les services aux pêcheurs.

<u>Services au quai</u> Un chemin devra être aménagé pour avoir accès au quai. L'achat d'un nouveau treuil est à prévoir ainsi qu'un système d'éclairage extérieur.

4.2 Equipements de transformation

Nous retrouvons en annexe 5 une liste des principaux équipements suggérés pour fin de discussion pour les transformations polyvalentes envisagées. Les paramètres de production (produits finis et quantités) ne sont pas établis par les propriétaires. Nous considérons préliminairement des besoins similaires en équipements pour les alternatives 1 et 2.

Ci-dessous, nous suggérons quelques critères de sélection pour les équipements suivants:

<u>Congélateur</u> Les spécifications seront basées sur le produit requérant le plus de volume journalier. Nous considérons l'hypothèse suivante:

<u>Omble chevalier</u>: 60 000 lb/30 jrs - 2 000 lb/jour (10 hres)
Requiert un congélateur d'une capacité de 1 000 lb à congeler en 6 heures.
4 chariots de congélation.

Spécifications	Air:	-35 °C
	Vitesse d'air:	600 pi/min.
	T° d'entrée:	10 °C
	T° de sortie:	- 25 °C
	Produits:	250 lb/heure
	Compresseur:	type ouvert

Prévoir — Un bassin de glaçage par immersion dans l'eau glacée maintenue à 35 °F.

Entrepôt frigorifique — Température: - 25 °C
Entrées quotidiennes: Environ 2 000 lb à - 25 °C

Fumoir

Capacité — A l'échelle expérimentale, nous recommandons un petit fumoir avec brûleur intégré d'une capacité de 100 livres par charge de produits.

Fumée — Probablement de type froide, soit en dessous de 30 °C. Si le client désire un produit à chair cuite, il faut spécifier l'option "à fumée chaude".

Séchoir — Si le séchoir est expérimental, on peut envisager un modèle avec insertion de vigneaux. La capacité pourrait être d'environ 500 livres de produits verts. Si l'humidité moyenne excède 65%, il y a lieu d'envisager un système de déshumidification. La température ne doit pas excéder 80 °F et doit pouvoir se contrôler. La vitesse d'air recommandée est de 400 pi/min. au-dessus de la surface du poisson.

Conserverie

La sélection de l'équipement est difficile car nous ne connaissons pas les volumes impliqués. A notre avis, les installations prévues à court terme ne sont pas adaptées pour une production en continu, ce qui impliquerait un système de treuil à crochets, les facilités pour l'élimination du sang et des viscères et des installations de type industriel pour la stérilisation. Les équipements devraient être prévus pour la mise en conserve pour fin d'étude du marché.

Général

Les équipements en contact avec les produits alimentaires devront être en matériel inoxydable, lisse et facilement nettoyables. Le bois est à exclure.

4.3 Coûts de réalisation

L'évaluation des coûts pour les alternatives suggérées est basée sur les hypothèses suivantes:

1. L'achat du terrain est exclu.

2. Les contraintes reliées au sol ne sont pas établies.

3. Les plans et devis sont réalisés par une firme d'ingénieurs et d'architectes et répondent aux diverses normes et codes. La construction est réalisée selon ces plans et devis.

4. Les coûts sont d'ordre budgétaire. Les travaux d'amélioration de l'approvisionnement en eau ne sont pas inclus.

5. L'utilisation de la main-d'oeuvre locale n'est pas prévue. Il faut organiser la logistique de l'hébergement du personnel, à Killiniq.

4.3.1 Alternative 1

CONSTRUCTION

Bâtiment neuf			
Construction et services	1 536 pi.car x 195 $/pi.car.		300 000 $
Rénovation du bâtiment existant selon les normes et codes	2 016 pi.car. x 125 $/pi.car.		252 000 $
Réfrigération:	Blast	25 000 $	
Congélateur rapide dans	Transport & inst.	25 000 $	
l'usine et entrepôt fri-	Entrepôt	5 000 $	
gorifique à l'extérieur	Transport & inst.	5 000 $	
	Chambre froide avec entretoit	5 000 $	65 000 $
Bâtiment de services (entrepôt)	On présume l'utilisation d'un bâtiment existant à Killiniq		
Sous-total:			617 000 $
Imprévus: 15%			92 550 $
			709 550 $
Plans et devis: 10%			70 955 $
Total bâtiments			780 505 $
EQUIPEMENTS			88 675 $
Total bâtiment et équipements			869 180 $

4.3.2 Alternative 2

CONSTRUCTION

Bâtiment neuf	2 600 pi.car. à 192 $/pi.car.	500 000 $
Main-d'oeuvre locale utilisée mais construction plus spécialisée et répondant aux normes		
Rénovation du bâtiment existant selon les normes et codes	2 016 pi.car. x 125 $/pi.car.	252 000 $
Réfrigération:		
Congélateur rapide et entrepôt frigorifique dans l'usine		75 000 $
Aménagement du terrain		10 000 $
Services au quai		10 000 $
Sous-total:		847 000 $
Imprévus: 15%		127 050 $
Plans et devis: 10%		97 405 $
Total bâtiment:		974 050 $
EQUIPEMENTS		125 000 $
Total:		1 099 050 $

SECTION IV: RECOMMANDATIONS ET CONCLUSION

1. Produits à transformer

Les recherches sur la ressource disponible sont très récentes et, à date, nous pouvons difficilement établir le potentiel réel des espèces commercialisables. En tenant compte des relevés antérieurs de production, des espèces telles la morue et l'omble chevalier pourraient faire l'objet d'une transformation industrielle. Je recommande à court terme des opérations primaires de congélation en filets ou sous forme entière (étêtés, éviscérés) de l'omble chevalier et de la morue.

Le salage, le fumage et la mise en conserve de loup marin ne devraient s'effectuer qu'à l'échelle expérimentale, en petites quantités, pour une étude de marché. La mise au point technique demeure toutefois à réaliser soit à l'usine ou dans un laboratoire pilote.

2. Infrastructure industrielle

Compte tenu du nombre restreint de données sur les matières premières qui seront transformées, les produits finis et leur marché et les recherches incomplètes sur la ressource, je recommande la réalisation d'un projet à une échelle pilote. Ce projet correspond à l'alternative 1 décrite à la page 22 du rapport. L'estimé des investissements est de 869 180 $ et comprend une somme de 88 675 $ pour les équipements décrits à l'annexe V. L'estimé des coûts de construction est basé selon une méthode au pied carré qui demeure approximative pour un site tel Killiniq. La précision est évaluée à ± 25%.

L'usine devrait se conformer aux normes provinciales et fédérales sur la qualité des produits marins, en tenant compte toutefois des contraintes particulières du site. A titre d'exemple, comme on veut utiliser le plus judicieusement la superficie de l'usine pour des opérations de transformation, l'entreposage pour une saison entière, des emballages, du sel, des agrès, etc., elle pourrait être divisée en deux, soit des petites réserves à l'usine et un entrepôt principal, sur un site adjacent à l'usine.

Les techniques de traitement et de disposition des eaux usées sanitaires et des déchets industriels devraient être établies avec le ministère de l'Environnement concerné.

Je recommande que les travaux soient réalisés à partir de plans et devis approuvés par un ingénieur compétent dans le domaine de la construction nordique. Les travaux devraient être gérés et supervisés sur le site par une personne compétente dans l'interprétation des plans et devis et possédant une bonne expérience de la construction en région isolée.

3. Equipements

La sélection des équipements de transformation dépend en grande partie des volumes quotidiens des produits à transformer, en fonction des périodes de capture et des périodes de pointe. Par conséquent, l'industriel doit établir le plus précisément ces données pour en informer le manufacturier.

L'opération de fumage de l'omble chevalier devrait être à petite échelle afin de permettre l'apprentissage et la mise au point technique avec le personnel. Le fumoir sera localisé dans un local spécifique, muni d'un ventilateur d'évacuation pour la fumée.

La mise en conserve de la viande de loup marin devrait être également à petite échelle. Ce procédé implique toutefois un risque élevé pour l'intoxication au botulisme et devra être minutieusement planifié et contrôlé. La première étape est d'établir la composition du mélange à stériliser et la deuxième, de faire établir par un organisme ou une firme compétente le barême de stérilisation à respecter. Les paramètres tels le temps d'évacuation de l'air du cuiseur, le temps de cuisson et de refroidissement, la pression de vapeur devront être mesurés et enregistrés.

La congélation des produits implique des investissements importants lorsqu'un produit de qualité est recherché. L'industriel doit établir le plus précisément des spécifications aux fournisseurs s'il désire s'assurer de l'équipement adéquat. Les plus importantes sont:

- l'identification des produits: espèce, dimensions, emballage;

- le volume par période de temps qui sera introduit dans le congélateur;

- la température au centre d'entrée et de sortie (- 21 °C) des produits;

- la température d'opération de l'air devra être au minimum de - 30 °C, une température de - 35 à - 40 °C étant de pratique industrielle fréquente;

- la vitesse de l'air au-dessus de la surface des produits ne devra pas être inférieure à 500 pi/min.

Le fournisseur doit pouvoir concevoir un "design" selon les pratiques industrielles reconnues pour la congélation à l'air pulsé. Je recommande un équipement frigorifique (compresseur-moteur) de type "ouvert", dont les moteurs sont extérieurs aux compresseurs. De cette façon, ils peuvent facilement être remplacés.

Comme Killiniq est un site très isolé au niveau du transport, l'aspect des pièces de rechange revêt une importance capitale. On pensera aux moteurs, compresseurs, génératrices, pièces d'entretien et tout autre élément qui pourrait mettre en péril la production si un double n'est pas disponible.

4. Planification du projet

La planification doit être entreprise plusieurs mois avant les travaux. Elle implique l'élaboration de plans et devis, la logistique des opérations, la sélection des équipements, etc. Si l'ensemble des travaux est entrepris en 1985, il faut prévoir qu'aucune transformation ne sera possible. Certaines activités sont, à mon avis, partie intégrante à un projet de développement.

Recherche

Comme le projet implique des processus de fumage et de mise en conserve, il y aurait lieu d'en planifier la mise au point. Une avenue possible serait de collaborer avec un centre de recherche au niveau de la documentation disponible et de la possibilité d'effectuer des essais.

Formation

Le personnel autochtone devrait bénéficier d'un programme de formation spécialisé au niveau de la gestion, de la transformation, de l'entretien mécanique-électrique et du contrôle de la qualité.

Finance

Le projet devrait être étudié au niveau de sa rentabilité et du marché. L'analyse de marché permettrait d'orienter l'entreprise vers les produits à commercialiser les plus prometteurs et d'estimer le volume de transformation. Ces informations sont les paramètres de base pour établir la rentabilité du projet ou, du moins, en connaître le seuil de rentabilité.

CONCLUSION

Le village de Killiniq possède les infrastructures minimales pour un développement industriel axé sur les produits marins. L'état des recherches sur la ressource disponible ne permet pas, à date, d'évaluer le potentiel réel des débarquements dont dépend directement la planification d'une usine. Dans ce contexte, il est conseillé de demeurer conservateur et, à court terme, les travaux devraient porter à rendre fonctionnelle l'usine existante. Un projet impliquant un investissement de 869 180 $ est recommandé. Cette somme pourrait être diminuée en fonction de la main-d'oeuvre locale impliquée.

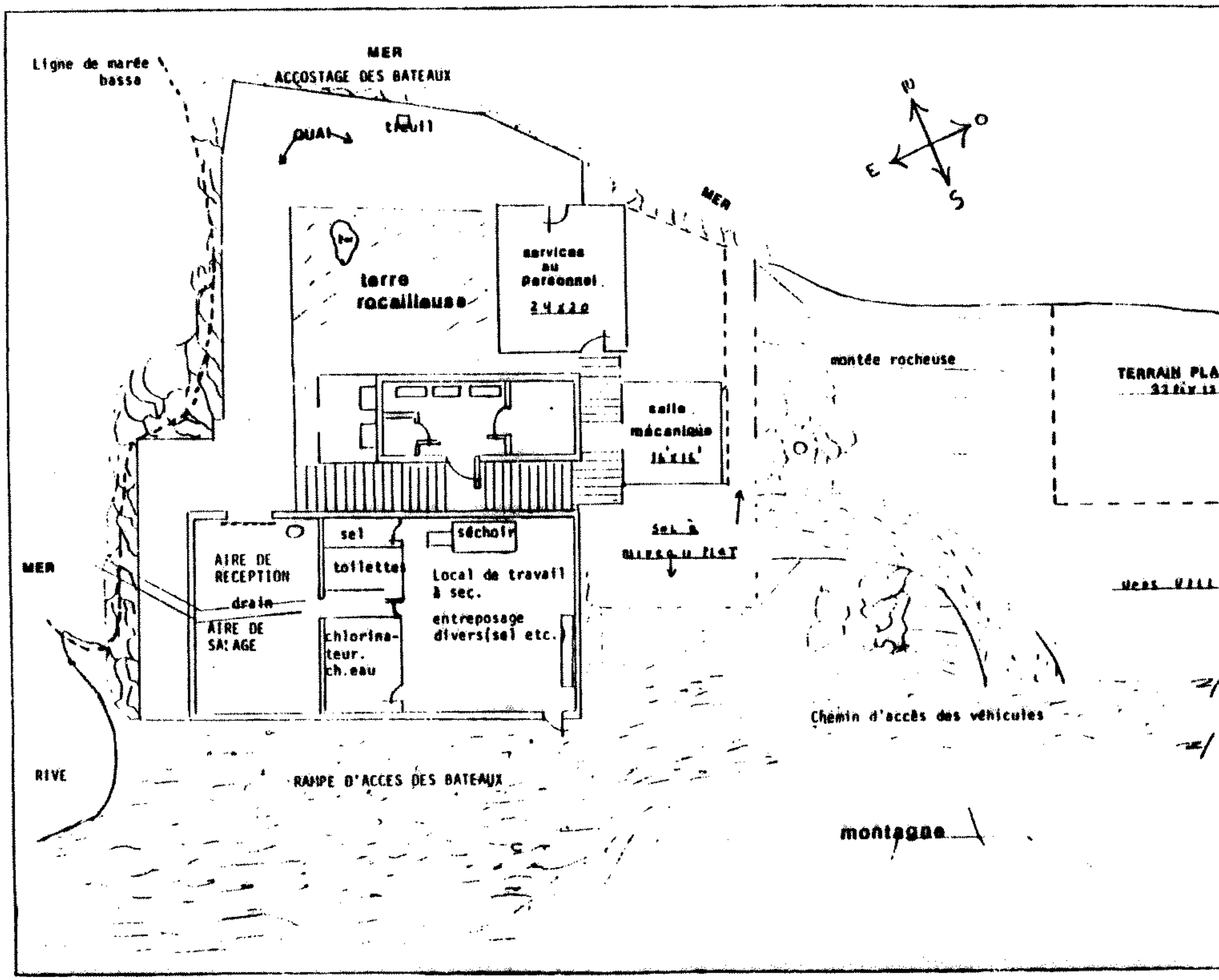
Le rapport recommande d'orienter la transformation vers des opérations primaires, impliquant le filetage et la congélation, tout en conservant un niveau expérimental pour le fumage et la mise en conserve. La recherche sur la ressource et les données antécédentes de production nous indiquent un potentiel de transformation de la morue, de l'omble chevalier et possiblement le loup marin. Néanmoins, une étude de marché devrait être entreprise pour évaluer le potentiel des ventes des produits finis projetés, ce qui serait le paramètre de base pour une étude de rentabilité.

Il est conseillé pour l'expérimentation sur les produits fumés et en conserve d'obtenir de l'aide technique auprès d'un centre de recherche spécialisé en transformation des produits marins, soit pour obtenir des méthodes d'opération qu'éventuellement faire des essais de mise au point.

La formation du personnel autochtone sur divers aspects inhérents à l'opération d'une usine d'avérerait utile à moyen terme pour atteindre l'autonomie locale. Cette formation serait autant au niveau technique qu'au niveau gestion.

ANNEXE I

PLAN DE LOCALISATION



PROJET DES PÊCHERIES DE KILLINIQ

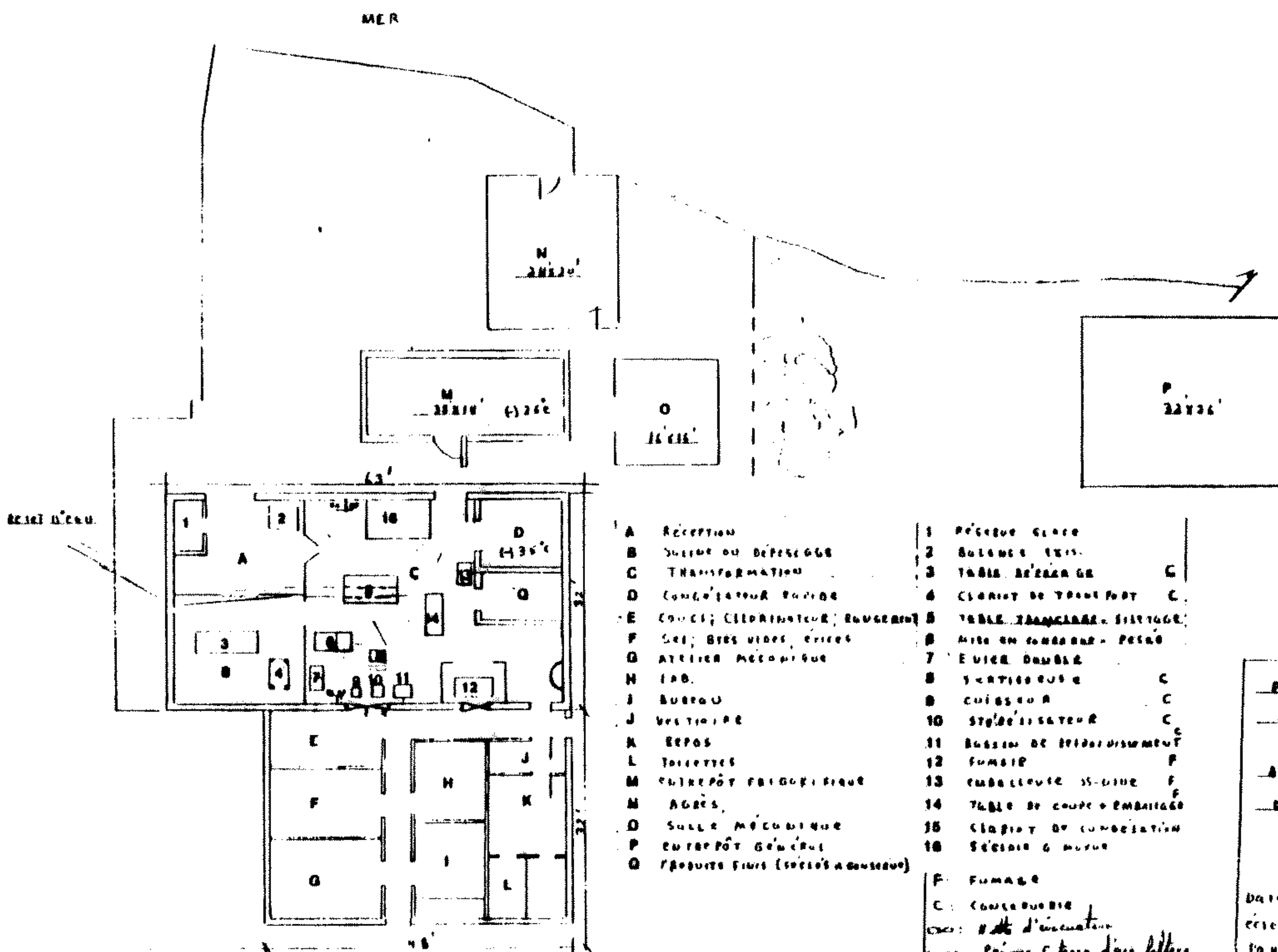
SITE INDUSTRIEL

PLAN DE LOCALISATION

DATE : 25/03/85
ECHELLE : 1/8" = 1' (Réd. 60%)
PAR :

ANNEXE II

ALTERNATIVE 1



A	RÉCEPTION
B	SALLE DE DÉPEÇAGE
C	TRANSFORMATION
D	CONGÉLATEUR RAPIDE
E	COUCI; CLEORINATEUR; ROUGEAUX
F	SEL; BTES VIDES, CRIBES
G	ATELIER MÉCANIQUE
H	LAB.
I	BUREAU
J	VESTIAIRE
K	REPOS
L	TOILETTES
M	ENTREPÔT FRIGORIFIQUE
N	AGRÈS
O	SALLE MÉCANIQUE
P	ENTREPÔT GÉNÉRAL
Q	PRODUITS FINIS (SÉCHÉS & CONSERVE)

1	RÉSERVE GLACE	
2	BALANCE TRIS.	
3	TABLE DÉCHARGE	C
4	CHARIOT DE TRANSPORT	C
5	TABLE TRANCHAGE, FILETAGE	
6	MISE EN CONSERVE - PESÉE	
7	ÉVIER DOUBLE	
8	SERTISSEUSE	C
9	CUISSEUR	C
10	STÉRILISATEUR	C
11	BASSIN DE REFROIDISSEMENT	C F
12	FUMOIR	F
13	TRANCHEUSE SS-VIDE	F
14	TABLE DE COUPE & EMBALLAGE	F
15	CHARIOT DE CONGÉLATION	
16	SÉCHOIR À MORUE	

F : FUMAGE
C : CONSERVERIE
C.R.: Coût d'exécution
Note: Première Entrée d'une [illegible]

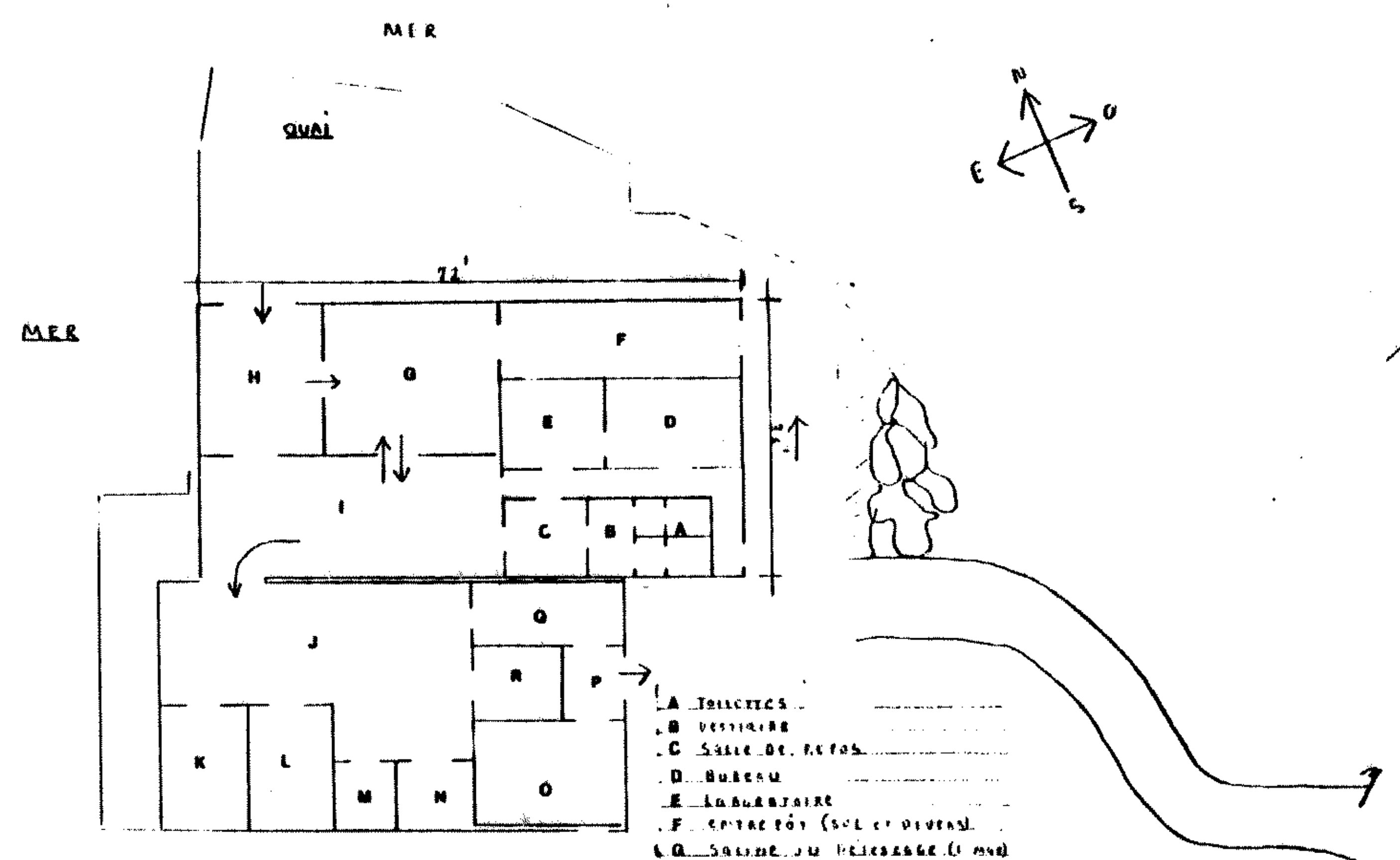
PROJET PÊCHERIES
DE KILLINIQ

ALTERNATIVE 1
DE DÉVELOPPEMENT

DATE 25/01/85
ÉCHELLE 1/32" [illegible]
PAR [illegible]

ANNEXE III

ALTERNATIVE 2



A Toilettes
B Vestiaire
C Salle de repos
D Bureau
E Laboratoire
F Entrepôt (sel et divers)
G Salle du pesage (1 mod)
H Réception
I Transformation
J Transformation
K Atelier mécanique
L Local sel, épices, boîtes.
M Chaudière, chauffe eau
N Génératrices - compresseurs.
O Entrepôt frigorifique
P Anti-chambre
Q Produits finis (séchés - congelés)
R Congélateur rapide

PROJET DES PÊCHERIES DE KILLINIQ

ALTERNATIVE 2 DE DEVELOPPEMENT

DATE 23/2/75
ÉCHELLE 1/16" = 1' Réd. 64%
PAR

ANNEXE IV

LISTE DES PRINCIPAUX EQUIPEMENTS ACTUELS

IDENTIFICATION	QUANTITE	ETAT
- Table d'éviscération en s.s. (17' x 4')	1	Bon
- Bacs de manutention 66 l en plastique	40	Bon
- Basson de chlorination en s.s. (4' x 12' x 4' h)	1	Bon
- Pompe surpression, chlorination, chauffe-eau	1 chaque	Hors d'usage
- Fournaise à l'huile (8' x 3' x 3' h)	1	Brûleur à changer
- Congélateur à plaque de marque Freeze-Cel	1	Système de réfrigération hors d'usage
- Evaporateur Keeprite, mod. KUC 1020-ED série 22401, 17515	1	Neuf
- Evaporateur Keeprite, mod. KLU 90 EU série VEU 46397	1	Neuf
- Congélateur horizontal domestique (8' x 2')	3	Neuf
- Séchoir à poisson en bois	1	Peu efficace en circulation d'air
- Pompe d'eau salée	1	Bon état
- Treuil de débarquement	1	Bon état mais opérations lentes
- Balance digitale de réception	1	Bon état
- Compresseur de réfrigération	1	A déterminer mais non adapté à des opérations industrielles

ANNEXE V

EQUIPEMENTS DE TRANSFORMATION REQUIS

(Liste préliminaire)

LISTE DES EQUIPEMENTS DE TRANSFORMATION

Les quantités et les prix indiqués à certains items sont approximatifs et pour fin budgétaire. Seul le coût par secteur de transformation est présenté.

CONSERVERIE

QUANTITE	DESCRIPTION	COUT
1	Table de dépeçage en s.s. avec section centrale pour incorporer un large récipient pour les viscères Approx.: 4' x 12' x 3' h	
1	Table de coupe en s.s. pour la viande avec évier incorporé à la table Approx.: 4' x 8' x 3' h	
1	Balance "Poids exact" 0-2 lb	
1	Balance digitale 0-20 lb	
5	récipients en plastique avec couvercle pour déchets, 2 3/4' h, approx.: 2'	
20	petits plats en plastique (10 1/2" x 12" x 4") pour les morceaux de viande	
1	Sertisseuse manuelle de marque "Hivesway" pouvant sertir des conserves de type 307 x 200,5 (1/2 lb) et 404 x 206,5 (1 lb)	
1	Cuiseur de type "Presto" avec mamomètre de pression et de température	
1	Enregistreur de temps à alarme pour enregistrer la durée de cuisson	
1	Cuiseur genre marmite ouverte de 3 gal.	
1	banc support de 2 1/2' h. pour l'autoclave	
1	Banc support de 2 1/2' h pour la marmite	
2	Brûleurs au gaz propane	
1	Hotte en tôle galvanisée avec ventilateur pour la marmite et l'autoclave (36" x 96" approx.)	

QUANTITE	DESCRIPTION	COUT
1	Machine 6 codes (manuelle)	
6	Couteaux	
1	Bassin de refroidissement (2' x 2' x 2')	
Divers	Tables, casques, savon, etc.	
Sous-total:		18 000 $

FUMAGE

1	Fumoir de 100 lb en capacité avec brûleur intégré	
1	Table en s.s. pour l'éviscération, l'étêtage, avec trappe centrale pour les déchets; une section pour le lavage 4' x 10' x 3 1/2'	
2	Bassins en plastique avec drain 3' x 3' x 3'	
1	Table en s.s. pour les coupes des produits finis, la pesée et l'emballage 30" x 8', avec étagère à mi-hauteur pour le matériel d'emballage	
1	Trancheuse à saumon manuelle	
1	Etagère conçue pour suspendre les produits avant tranchage	
1	Machine à emballer sous vide	
1	Balance digitale 0-50 lb	
1	Marqueur d'étiquette	
1	Chariot sur roues pour la congélation, avec pannes métalliques	
Divers	Plats, tabliers, imprévus	
Sous-total:		25 000 $

TRANCHAGE ET FILETAGE

QUANTITE	DESCRIPTION	COUT
1	Table de tranchage et de filetage en s.s. (Utiliser celle pour l'omble chevalier)	
1	Epiauteuse à insertion manuelle des filets	
1	Table de mirage	
Sous-total:		1 500 $

EQUIPEMENTS DE CONGELATION

3	(1) Chariots roulant pour la congélation des poissons entiers (Dim. approx.: 5' x 5' x 5')	
1	Bassin de glaçage (Dim. approx.: 2' x 2' x 1 1/2') en plastique	
Sous-total:		2 200 $

(1) La sélection des dimensions des chariots est étroitement liée au design du congélateur rapide.

DIVERS

3	Bacs isothermiques de marque Wedco (Approx.: 4' x 4' x 4' h)	1 500 $
15	Palettes en plastique de 4' x 4' pour la saline	1 875 $
1	Pompe de lavage sur roues avec système de détergent	2 000 $
1	Serre-palette manuelle	600 $
	Equipements pour les bureaux, laboratoire et les services au personnel	6 000 $
Sous-total:		11 975 $

TOTAL:	EQUIPEMENTS	58 675 $
	TRANSPORT (50%)	35 850 $
GRAND TOTAL:		88 675 $

NOTE: L'item "Transport" est à vérifier en fonction du volume ou du poids des équipements.

ANNEXE VI

DONNEES SUR LE TRANCHAGE

ET LE SECHAGE DE LA MORUE SALEE

CHAPITRE II

LE TRANCHAGE

Les diverses opérations de la préparation du poisson n'ont pratiquement pas changé depuis la publication du Bulletin IX il y a une trentaine d'années et les instructions qu'on y trouve sont d'une telle clarté et d'une telle précision que nous les reproduisons ici:

"*Saigner*

"Il ne devrait jamais y avoir de sang dans le poisson qui a été traité et cela pour deux raisons vitales. 1°. Le sang noircit le poisson aux parties où il n'a pas été enlevé et empêche ainsi d'obtenir la chair blanche tant désirée. 2°. Le sang se décompose également plus rapidement que la chair et peut ainsi communiquer une odeur désagréable aux parties du poisson qui autrement seraient tout à fait savoureuses.

"*Pour saigner le poisson, il faut lui couper la gorge aussitôt qu'on le sort de l'eau, avant qu'il raidisse et que le sang ait cessé de circuler.* On devrait prendre l'habitude de jeter de l'eau sur le poisson dès qu'il est débarqué et avant de l'ouvrir. L'eau enlèvera une bonne partie du sang et du limon qui s'amoncellent sur le poisson qui gît dans le bateau.

"*Trancher la gorge et éventrer*

"*Il faut tenir les mâchoires du poisson fermées. De la main gauche et en lui renversant la tête pour l'appuyer sur le bord de la cuve ou de la table,* lui ouvrir les branchies pour exposer la gorge. *A l'aide d'un couteau très coupant, pratiquer une incision transversale jusqu'en arrière des branchies et continuer l'incision pour décoller les branchies du corps. Insérer le couteau sous les os et éventrer tout droit jusqu'à l'anus, mais pas plus loin.*

"Si l'on éventre au delà de l'anus, on est porté à finir l'opération en donnant une incision sur le côté du poisson. C'est ce qui produit ce qu'on est convenu d'appeler "l'entaille" (sliver) de sorte qu'au moment de la mise en filet, une partie de la chair adhère le long de la nageoire au lieu de s'enlever avec le côté dont elle fait partie. Il s'ensuit une perte de chair que l'on devrait éviter.

"*Vider-éviscérer*

"*D'une main, ouvrir le ventre et de l'autre, enlever le foie et le déposer dans un baquet. Puis, détacher les entrailles et les arracher.*

"*Étêter et découper*

"*Pratiquer une incision juste en arrière des branchies de chaque côté en remontant jusqu'au dos. En exerçant une pression sur l'arrière de la tête au bord du baquet ou de la table, détacher la tête du corps du poisson. Ou, ce qui est préférable, renverser le poisson sur le dos et lui trancher la tête à l'aide d'un lourd couteau ou d'un fendoir.*

"*Trancher le poisson*

"Pour cette opération, on devrait utiliser le couteau à trancher ordinaire qu'on peut se procurer chez les marchands, ou encore le couteau français à trancher. Le couteau français a deux courbes et se prête tout particulièrement au tranchage du gros poisson. On devrait voir à ce que le couteau à tranchage reste toujours bien coupant, car autrement la chair du poisson pourrait prendre une apparence d'effiloche."

(Voir fig. 1 du présent bulletin)

"Déposez le poisson sur la table ou sur la planche de tranchage en lui collant le dos à la tringle fixée à la planche en ayant soin d'avoir la queue à sa droite.

"De la main gauche, prenez le poisson par le haut de la nuque lorsqu'il a le ventre tourné vers vous. Comme il n'a été fendu que jusqu'à l'anus, pratiquez la première incision depuis l'anus le long du côté gauche de la nageoire anale en continuant un peu plus bas que la cavité du ventre.

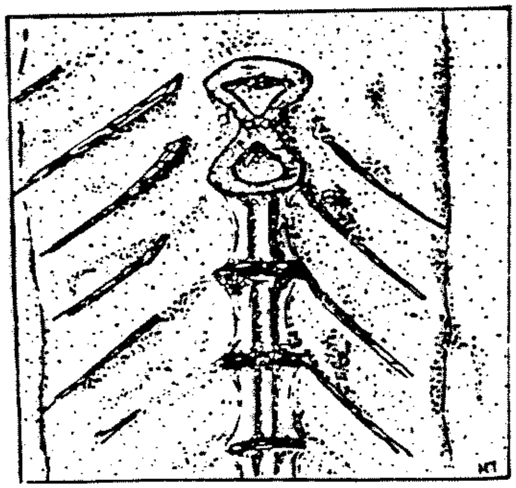


FIG. 1.—Vue de l'arête centrale lorsqu'elle est proprement coupée.

"Insérez le couteau dans le cou du poisson du côté supérieur de l'arête centrale et pratiquez une incision nette jusqu'à la queue en gardant le couteau près de l'arête centrale afin de pouvoir détacher nettement de l'arête centrale et jusqu'à la queue la chair du côté gauche. Toutefois, l'incision ne devrait pas pénétrer les chairs jusqu'au dos afin de ne pas trop amincir le poisson lorsque plus tard on l'étend.

"Coupez l'arête centrale à trois jointures en arrière de l'anus en vous aidant d'un mouvement descendant vers vous-même pour arriver à donner aux trois jointures coupées l'apparence du chiffre '8'. L'endroit où l'on coupe l'arête centrale devrait être assez bas pour ne pas laisser de tache de sang.

"De la main gauche, saisir l'extrémité coupée de l'arête et la dépouiller entièrement à l'aide du couteau de la chair du côté droit. Si l'opération est effectuée proprement, l'arête centrale se dégage sans dommage et intacte dans toute la longueur de l'incision. Si on a eu le malheur de pratiquer une incision trop profonde et d'attaquer l'arête centrale, les articulations au-dessus de l'arête peuvent avoir été touchées de sorte que le poisson pourrait bien se briser à cet endroit. On devrait pratiquer une incision dans la partie de l'arête centrale qui se prolonge dans la queue afin d'en enlever tout sang.

Lorsqu'on a de fortes quantités de poissons à trancher, on peut employer des machines qui étêtent et tranchent le poisson; toutefois, les expériences tentées à date au Canada avec ces machines n'ont pas encore été assez étendues pour pouvoir assurer l'efficacité et l'économie de telles machines.

"Le lavage au tranchage

" 'Le lavage au sortir du couteau' se fait immédiatement après le tranchage.

"Laver le poisson parfaitement dans de l'eau propre, en prenant soin d'enlever le sang qui adhère à la chair durant le tranchage et en apportant un soin particulier au cou et à l'extrémité coupée de l'arête centrale. Enlever le limon qui colle à la peau en nettoyant la peau le long des nageoires de derrière.

"Il est préférable de disposer d'un bon volume d'eau courante, mais à défaut d'eau courante, on devrait changer l'eau très souvent, sinon l'eau salie empêchera de nettoyer le poisson convenablement."

Au cours des ans, nous avons reçu de nombreuses demandes de renseignements pour savoir si l'eau douce est préférable à l'eau salée pour nettoyer le poisson. Nous devons répondre que les deux sortes d'eau ont été utilisées avec succès et ce qui importe avant tout c'est que l'eau soit bien propre et bien froide. L'été, particulièrement dans le golfe Saint-Laurent, l'eau des quais peut être très chaude et contaminée. D'autre part, les puits de cette région fournissent une eau de 50°F. durant les jours chauds de l'été et on devrait alors employer l'eau qui est la plus fraiche. Cette eau ne devrait pas cesser de couler durant le lavage du poisson afin qu'elle reste fraiche et propre.

"*Blanchir les oreilles (enlever la peau noirâtre)*

"L'intérieur du ventre du poisson est doublé d'une légère peau mince noirâtre qui ne part pas à l'opération de l'éviscération et du tranchage; on peut la voir de chaque côté du poisson tranché à la partie qu'on appelle "les oreilles" du poisson. Si on enlève cette petite peau noirâtre, le poisson tranché aura une meilleure apparence du fait qu'il sera plus blanc.

"*Pour blanchir les oreilles du poisson, le dépouiller de cette petite peau noirâtre qui recouvre l'intérieur de l'oreille de chaque côté du poisson tranché.*

(Voir fig. 2 du présent bulletin)

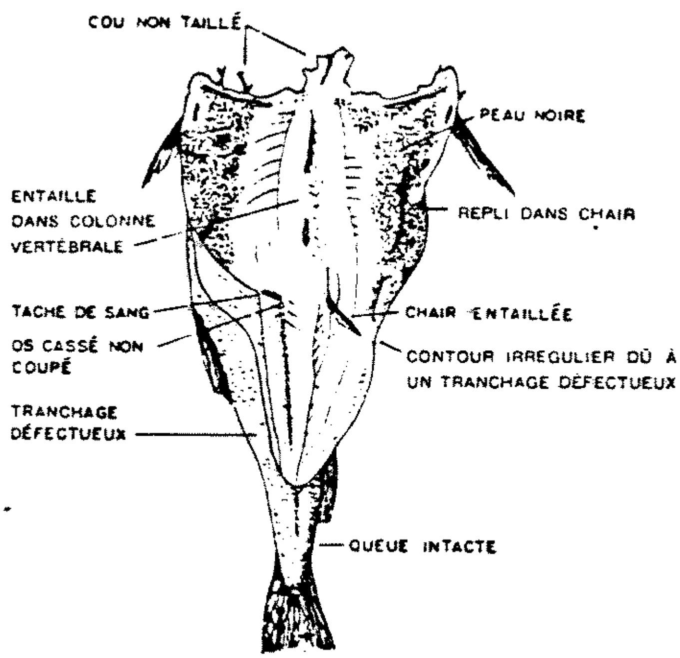


FIG. 2.—Les erreurs à éviter en préparant le poisson séché.

température, l'air perd un peu de son humidité en se condensant sur les surfaces froides, tout comme l'air qu'on exhale contre le carreau d'une fenêtre laissera sa marque sur le verre froid.

C'est le phénomène de la "déshydratation" que l'on provoque en faisant passer un courant d'air au travers d'une boite de glace ou au travers d'un serpentin métallique refroidi par réfrigération mécanique. On peut aussi au moyen de diverses réactions chimiques réduire la teneur en humidité de l'air et quelques-unes de ces réactions peuvent s'appliquer aux sécheurs.

Dans ce texte, nous avons également employé l'expression "humidité relative" suivie d'une valeur exprimée en pourcentage. Cette valeur représente le rapport qui existe entre la vapeur d'eau que contient un certain volume d'air et la quantité maximum de vapeur d'eau exprimée en pourcentage que contiendrait ce même volume d'air à la même température.

Il existe différentes méthodes de sécher le poisson salé à l'intérieur selon le traitement qu'il a reçu.

Ainsi, le poisson fortement salé peut se sécher pour le commerce en deux périodes de séchage ou plus selon la taille du poisson et les frais de manutention, de force motrice et de vapeur. Puisque la formation de cette croûte blanche du sel à la surface du produit ouvré n'est pas censée lui nuire, on attache moins d'importance à la durée exacte du séchage et de l'empilage que dans le cas des poissons salés légèrement. Normalement, pour le séchage mécanique du poisson fortement salé, les conditions atmosphériques doivent être telles que la température soit entre 78 et 80°F., d'une humidité relative de 45 à 50 p. cent et que l'air soit soufflé à une vitesse de 350 à 450 pieds à la minute. On doit voir à ce que ces conditions ne varient pas et que l'air qu'on laisse entrer dans le sécheur soit suffisant pour emporter les vapeurs d'eau qui proviennent du poisson. La vitesse d'évaporation de l'eau contenue dans le poisson fortement salé est d'environ 0.5 p. cent du poids du poisson à l'heure. Dans le poisson de petite taille, sa teneur en humidité peut être réduite à 43 p. cent au cours d'un seul cycle de séchage de 30 heures, tandis que le poisson de taille moyenne aura besoin d'au moins deux cycles de séchage de 20 heures chacun avec empilage sous pression dans l'intervalle. Quant au poisson de grosse taille, il lui faudra trois cycles de 20 heures et deux empilages sous pression.

Il importe de savoir qu'aucun séchage ne peut avoir lieu si l'humidité relative dépasse 73 p. cent. Au delà de ce pourcentage, le poisson séché ou semi-séché absorbera l'humidité de l'air.

Le poisson séché le plus légèrement salé est sans doute le "Gaspé cure" et si sa préparation est plus difficile que celle du poisson fortement salé, c'est qu'à la dernière phase de sa préparation, le séchage lutte de vitesse avec la décomposition.

Le séchage mécanique du "Gaspé cure" doit s'effectuer par étapes et chaque cycle doit alterner avec l'empilage sous pression; on obtient les meilleurs résultats quand la température de l'air est de 80°F. et l'air est soufflé sur le poisson à

CHAPITRE VI

MÉTHODES DE SALAGE

Le salage se pratique selon deux méthodes: en arrime et en saumure. Les deux méthodes s'appliquent à tous les genres de poisson salé, salé fort ou autrement.

SALAGE EN ARRIME

Le salage en arrime se pratique de la façon suivante. On répand le sel sur le plancher ou sur toute autre surface qui recevra le poisson. L'épaisseur de cette couche de sel dépend du genre de traitement qu'on donnera au poisson. On dépose le poisson frais tranché, le côté de la peau en dessous, l'on répand du sel sur la surface tranchée. Pour un traitement légèrement salé, on ne distribue le sel que sur les parties épaisses du poisson et l'on n'en dépose pratiquement pas sur les parties minces des oreilles et sur la queue. Pour un traitement fortement salé, on distribue le sel à la grandeur du poisson en prenant soin d'en épandre davantage sur les parties épaisses du poisson. Quand on dépose les poissons les uns par-dessus les autres pour faire une pile, il faut veiller à ce que les queues soient vers l'extérieur de la pile afin de lui donner une inclinaison à partir du centre de la pile. Cette disposition favorise l'écoulement de la saumure. L'arrimage à inclinaison intérieure se fait en disposant les queues des poissons vers l'intérieur de la pile pour retenir la saumure dans la pile.

La pression qu'exercent toutes ces couches de poissons superposés se traduit par un produit salé qui en sort bien pressé et compact.

Le salage en arrime offre certains avantages à bord des goélettes et dans les hangars de petites dimensions où l'espace manque; toutefois, cette méthode ne se recommande guère à cause du danger qu'elle comporte de ne pas distribuer le sel également. Voilà pourquoi la méthode de salage en arrime ne peut se recommander durant les mois de chaleur de l'été tout particulièrement quand il s'agit de poisson légèrement salé.

LE SALAGE EN SAUMURE

Le salage en saumure se pratique de la même manière que le salage en arrime, sauf qu'on utilise des réservoirs ou des baquets. Au contact du poisson, le sel fait sa propre saumure et cette dernière reste continuellement en contact avec le poisson.

Cette méthode de salage donne un produit plus épais parce que le poisson flotte dans la saumure au lieu de subir la pression des couches de poissons superposés comme dans le salage en arrime. On utilise cette méthode pour le poisson fortement salé qui doit être transformé en languettes désossées ou en quelque autre produit. A cette méthode, on peut produire du poisson légèrement salé avec la certitude que le sel sera mieux distribué.

LE POISSON FORTEMENT SALÉ

Par la méthode en arrime

Le poisson fortement salé est un produit qui a absorbé le sel jusqu'à saturation. La saumure à l'intérieur des tissus est saturée de sel avant le séchage. D'habitude, on ajoute de 35 à 40 liv. de sel par 100 liv. de poisson tranché en prenant soin de recouvrir de beaucoup de sel le dernier rang du dessus. Le sel devrait normalement avoir opéré sa pénétration au bout de 10 à 20 jours selon la grosseur du poisson et aussi selon la température. Si la température est basse, comme elle l'est tard l'automne, l'opération sera plus lente.

Au bout de 10 à 20 jours, on lave le poisson et on l'empile pour laisser s'écouler l'excédent de saumure. Non seulement l'empilage favorise l'écoulement de la saumure, mais il amincit le poisson en le pressant. Il se peut que cette pression produise un poisson plus mince moins recherché, mais le séchage en est accéléré d'une manière appréciable.

Par la méthode en saumure

La production en grand exige des réservoirs de saumure faits de béton armé. Un réservoir de dimensions appropriées aurait 14 pieds de longueur, 4 pieds de largeur et 4 pieds de hauteur et contiendrait 10,000 liv. de poisson.

Le sel déposé sur le poisson tranché commence à se dissoudre dans l'eau à la surface du poisson pour former ainsi une saumure. Le sel commence alors à se répandre dans le 80 p. cent d'eau que contiennent les protéines du poisson. Au fur et à mesure que le sel pénètre la surface du poisson, la quantité de sel, environ 10 p. cent, devient suffisante pour entreprendre la coagulation des protéines. Dès que ce phénomène se produit, les protéines libèrent une quantité d'eau qu'elles contiennent et c'est ainsi que se forme la saumure. Peu à peu, le sel pénètre jusqu'au centre du poisson et la quantité de saumure ainsi formée augmente.

En fin de compte, au bout de 14 jours, l'eau que contient encore le poisson est maintenant saturée de sel et il s'est formé une quantité considérable de saumure.

A ce stage, la chair du poisson fortement salé contient environ 18 p. cent de sel et la teneur en humidité s'est réduite de 80 à 58 p. cent.

En ce qui concerne le "Gaspé cure" (page 19), il se peut que la concentration de sel ne soit pas suffisante pour dénaturer les protéines de la surface; le poisson perd donc moins d'eau et la chair reste transparente.

A la fig. 4, on peut voir comment le sel pénètre les muscles du poisson; on peut également y observer l'effet prononcé qu'exerce l'épaisseur du poisson sur

APPENDIX K

Gaudet, M.
1985 Analyse d'un èchantillon de Pétoncle d'Islande provenant de la Baie d'Ungava. MAPAQ. Laboratoire régional, Sept-Iles, Québec. Report to Makivik Corporation Research Department.

Gouvernement du Québec
Ministère de l'Agriculture,
des Pêcheries et de l'Alimentation
Direction Générale des Pêches Maritimes
Direction de la Recherche Scientifique &
Technique,
Laboratoire Régional,
818, boul. Laure,
Sept-Iles QC
G4R 1Y8

Sept-Iles, le 29 janvier 1985

Société MAKIVIK
4898, Maisonneuve ouest
Westmont QC
H3Z IM8
Att: M. Dave Gillis

<u>Analyse d'un échantillon de Pétoncle d'Islande provenant de la Baie d'Ungava</u>

Le Pétoncle d'Islande, Chlamys islandica (O.F. Müller) se retrouve principalement dans la zone de transition sub-artique (Wallace, 1982). La Baie d'Ungava est donc située dans la partie centrale de l'aire de distribution de l'espèce.

La taille modale de l'échantillon analysé (N=104) se situe entre 70 mm et 100 mm. Cette valeur est très comparable aux résultats obtenus pour le détroit de Jacques Cartier, dans le golfe St-Laurent par Poirier (1976) et par Bernier et Poirier (1981).

La croissance fut déterminée en considérant la distance de la base à chaque anneau de croissance. La méthode de lecture de l'âge à partir du ligament de la charnière (Johannessen, 1973), n'a pas été utilisée en raison de l'absence de petits individus.

Les paramètres de la courbe de croissance de Von Betalanffy ont été calculés à partir des longueurs moyennes pour des âges de 1 à 14 ans. La croissance réelle du Pétoncle d'Islande de la Baie d'Ungava, se situe parmi les plus rapides retrouvés dans le détroit de Jacques Cartier (Op. cit). Cependant, ces résultats doivent être interprétés avec prudence à cause du petit nombre de spécimens étudié.

Les 4 spécimens de mollusques provenant de la station 815 sont des Coques d'Islande (Clinocardium ciliatum Fabricius) et des Coques du Groenland (Serripes groenlandicus Brugière). Ces deux espèces n'ont aucun intérêt commercial.

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Johannessen, O.H., 1973. Age détermination in Chlamys islandica (O.F. Müller). Astarte, 6:15-20.

Poirier, L., 1976. Les stocks de Pétoncle d'Islande, Chlamys islandica Müller, du détroit de Jacques Cartier (Golfe du Saint-Laurent). Min. Ind. Comm. Que., Dir. gen. Pêche mar., Dir. de la Rech., Cah. Inf. No. 71: 1-23.

Wallace, J.C., 1982. The culture of the iceland scallop, (Chlamy islandica O.F. Müller), I-Spat collection and growth during the first year. Aquaculture, 26: 311-320.

Maurice Gaudet

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Station de recherche
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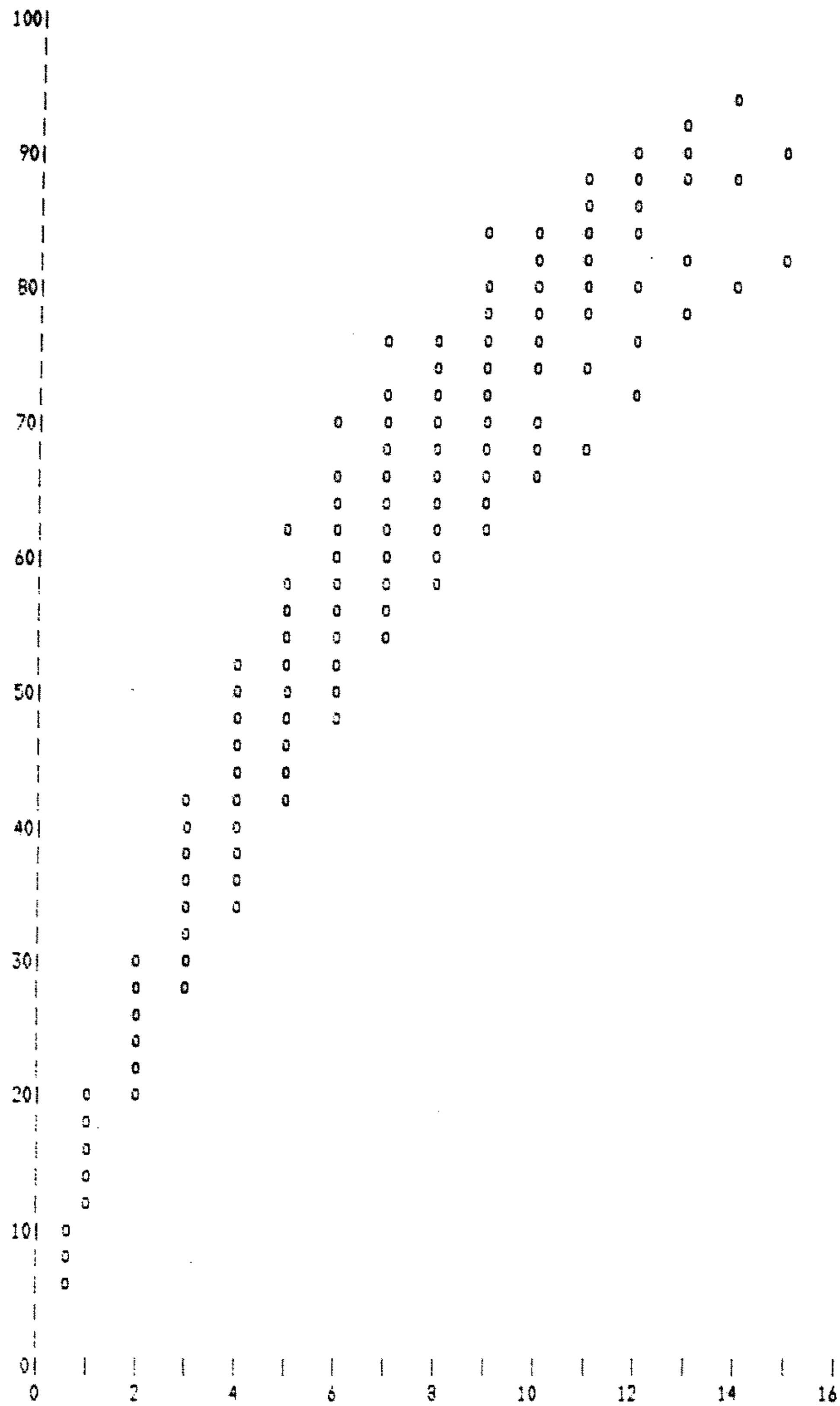
(418) 962-5521

MG/hp

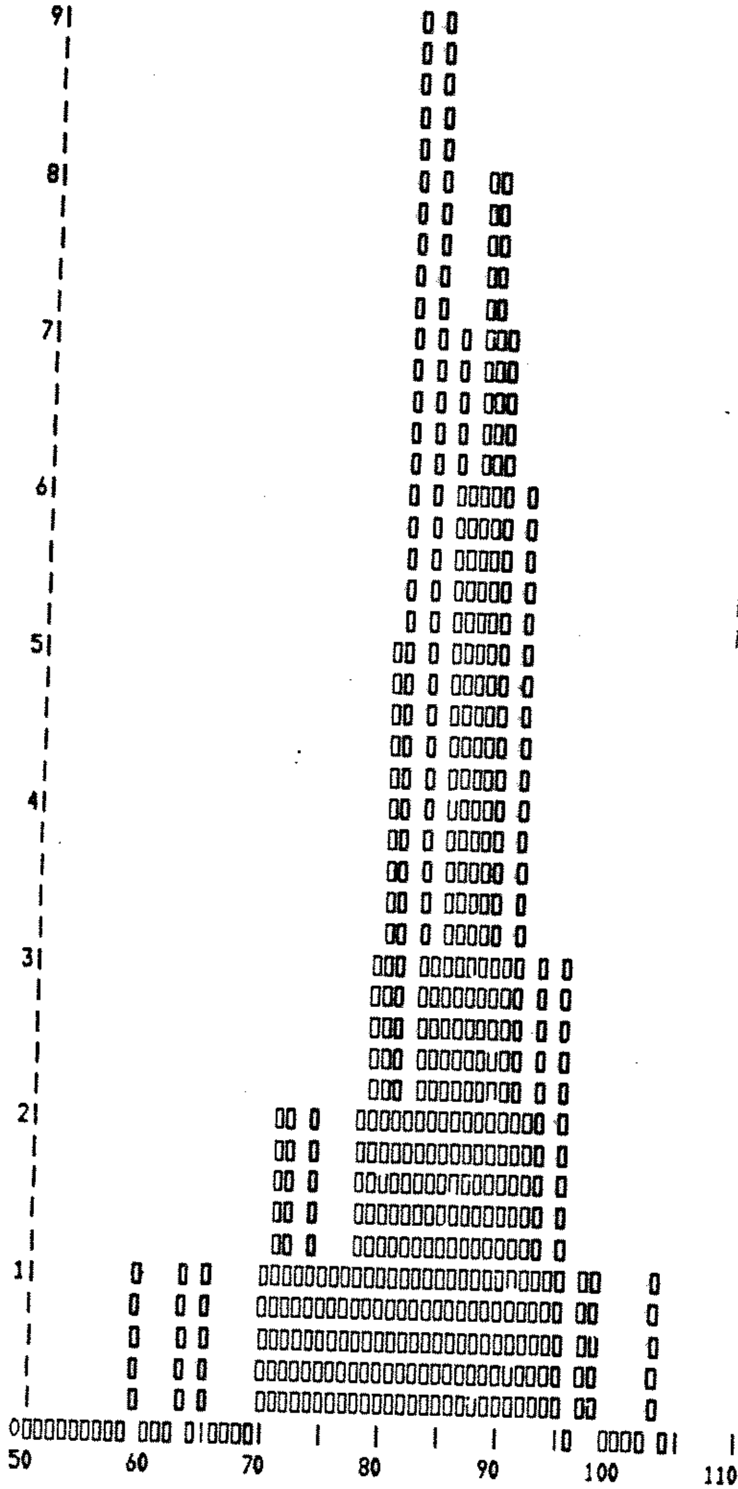
c.c. Michel Pageau

PETONCLES BAIE D'UNGAVA

RELATION AGE VS HAUTEUR



50 100 PLOT MAT



DSTAT LONG

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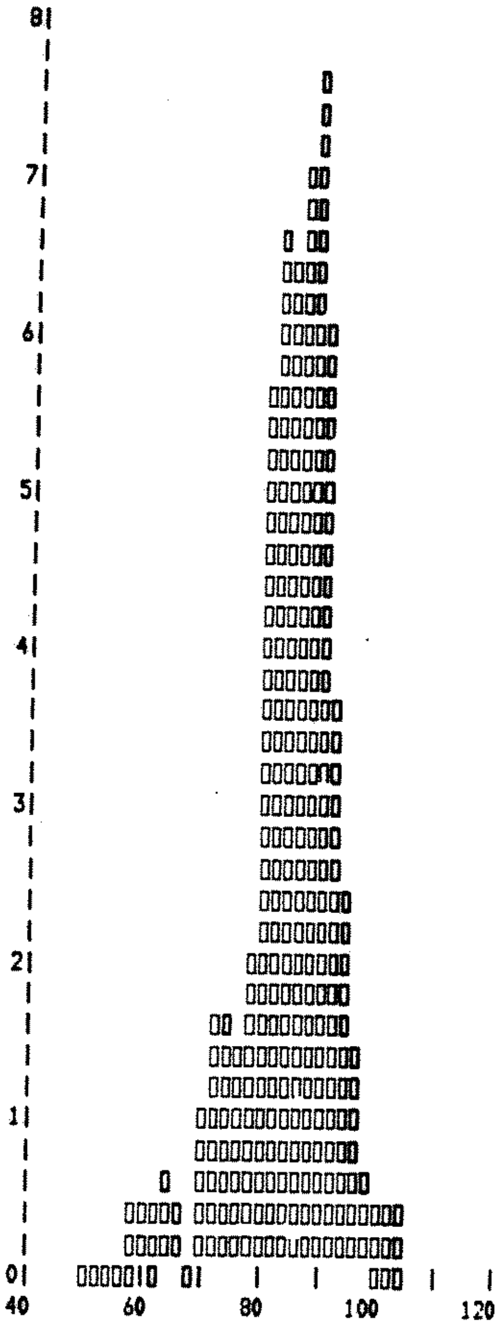
MINIMUM	60
RANGE	44
MEAN	85.29807692
VARIANCE	52.89087005
STANDARD DEVIATION	7.272610952
MEAN DEVIATION	5.480954142
MEDIAN	86
MODE	82 84

50 100 PLOT 50 PLOT FMAT

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      DSTAT LONG
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MAXIMUM             104
MINIMUM             60
RANGE               44
MEAN                85.29807692
VARIANCE            52.89087005
STANDARD DEVIATION  7.272610952
MEAN DEVIATION      5.480954142
MEDIAN              86
MODE                82 84
      ⎕HC 0
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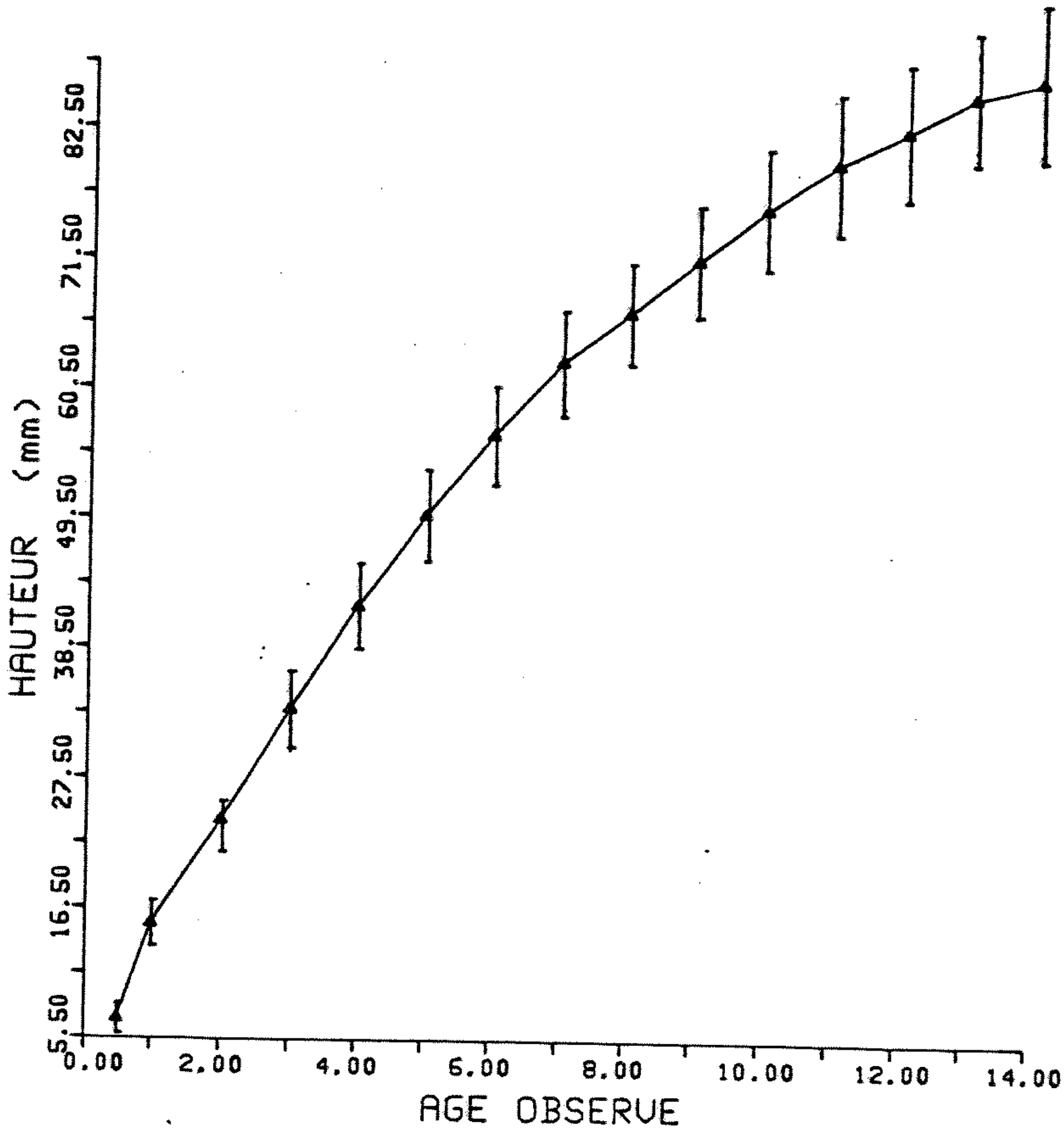
CROISSANCE DU Chlamys islandica

DE LA BAIE D'UNGAVA



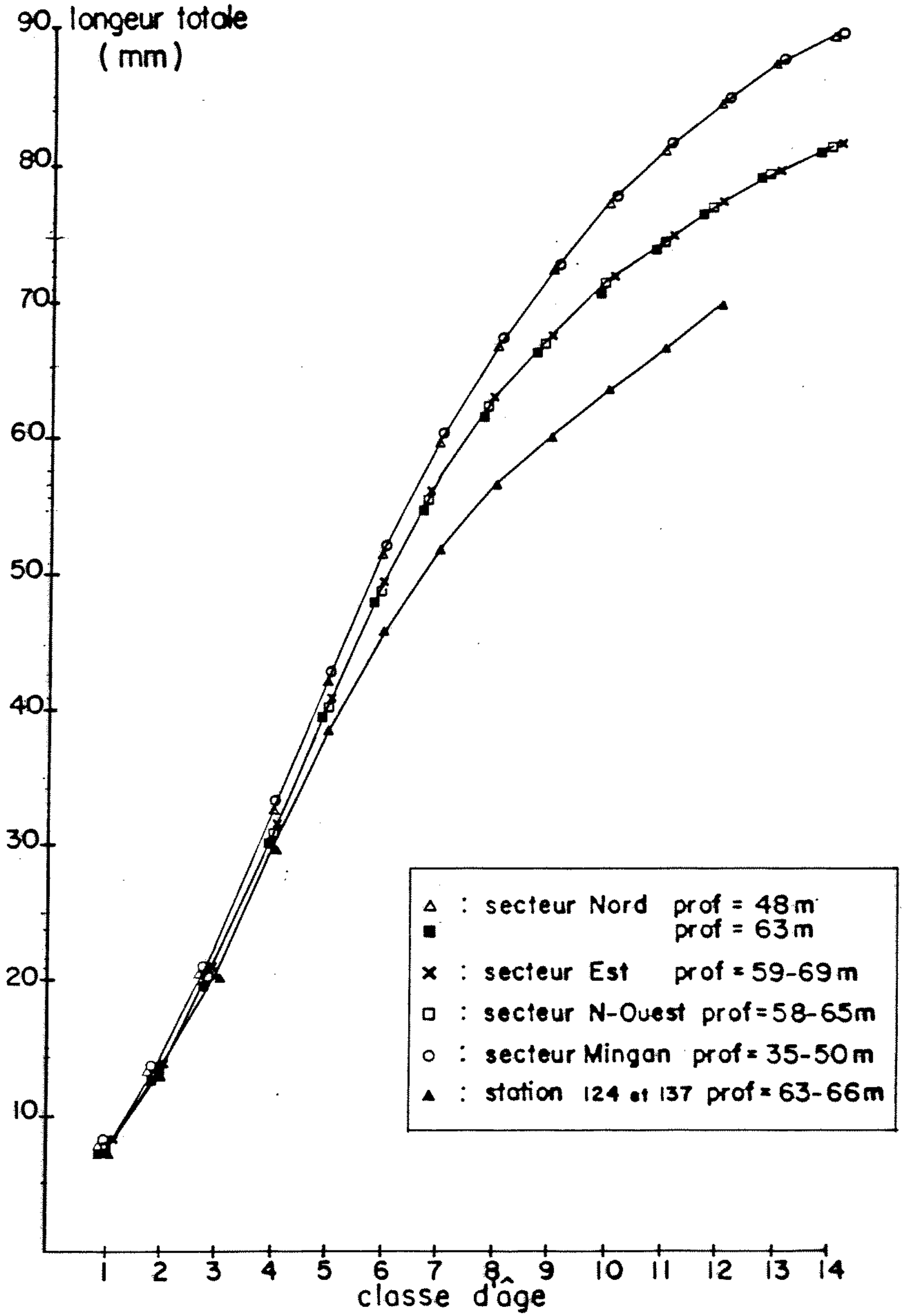
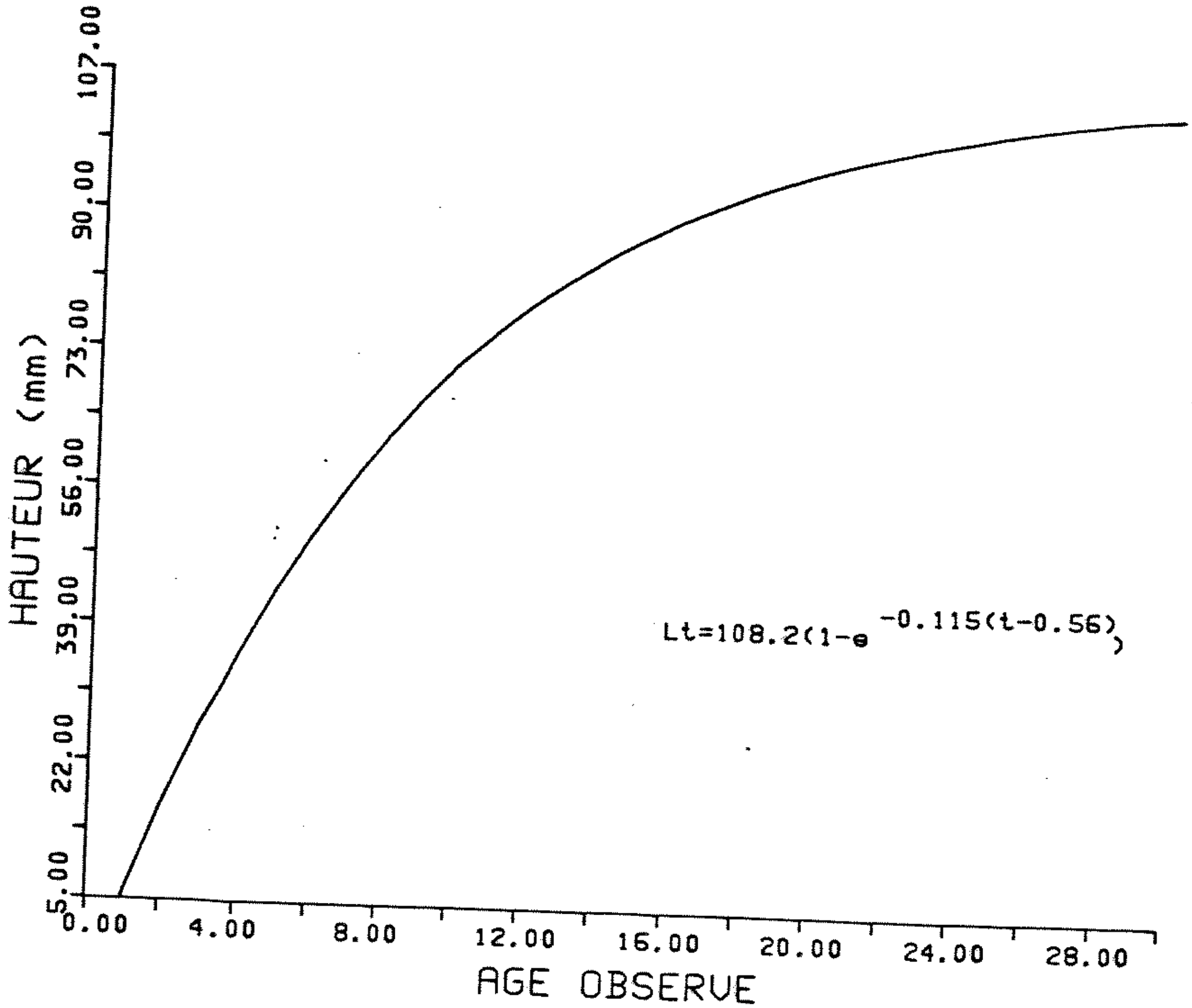


Fig. 5 Croissance des C. islandica du détroit de Jacques-Cartier.



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73.00
56.00
39.00
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5.00
HAUTEUR (mm)
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4.00
8.00
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16.00
20.00
24.00
28.00
AGE OBSERVE
Lt=108.2(1-e -0.115(t-0.56))

LONG. INFINIE : 108.2
K : 0.115
T0 : 0.56

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......T =13 ......LT = 82.32230589
......T =14 ......LT = 85.13349959
......T =15 ......LT = 87.63930247
......T =16 ......LT = 89.87289033
......T =17 ......LT = 91.86383492
......T =18 ......LT = 93.63849553
......T =19 ......LT = 95.22036791
......T =20 ......LT = 96.6303954
......T =21 ......LT = 97.88724616
......T =22 ......LT = 99.00756037
......T =23 ......LT = 100.0061705
......T =24 ......LT = 100.8962978
......T =25 ......LT = 101.6897272
......T =26 ......LT = 102.3969632
......T =27 ......LT = 103.0273695
......T =28 ......LT = 103.5892923
......T =29 ......LT = 104.0901712
......T =30 ......LT = 104.5366378

FICHIER 10000 , ELFMENT NO. 3 AGE : 0.5

GRANDEUR ECHANTILLON	75
MAXIMUM	10
MINIMUM	5
ETENDUE	5
MOYENNE ----------	7.12
VARIANCE	1.539459459
ECART-TYPE	1.240749555
ECART MOYEN	1.000533333

FICHIER 10000 , ELEMENT NO. 4 AGE : 1

GRANDEUR ECHANTILLON	76
MAXIMUM	19
MINIMUM	12
ETENDUE	7
MOYENNE ----------	15.23684211
VARIANCE	3.569824561
ECART-TYPE	1.889397936
ECART MOYEN	1.57132964

FICHIER 10000 , ELEMENT NO. 5 AGE : 2

GRANDEUR ECHANTILLON	76
MAXIMUM	30
MINIMUM	19
ETENDUE	11
MOYENNE ----------	23.98684211
VARIANCE	7.239824561
ECART-TYPE	2.690692209

FICHIER 10000 , ELEMENT NO. 6 AGE : 3

GRANDEUR ECHANTILLON	76
MAXIMUM	42
MINIMUM	27
ETENDUE	15
MOYENNE ----------	33.35526316
VARIANCE	10.65877193
ECART-TYPE	3.26477747
ECART MOYEN	2.603185596

FICHIER 10000 , ELEMENT NO. 7 AGE : 4

GRANDEUR ECHANTILLON	74
MAXIMUM	51
MINIMUM	34
ETENDUE	17
MOYENNE ----------	42.12162162
VARIANCE	12.82062199
ECART-TYPE	3.580589615
ECART MOYEN	2.786705625

FICHIER 10000 , ELEMENT NO. 8 AGE : 5

GRANDEUR ECHANTILLON	72
MAXIMUM	61
MINIMUM	41
ETENDUE	20
MOYENNE ----------	49.77777778
VARIANCE	15.30203443
ECART-TYPE	3.91178149

FICHIER 10000 , ELEMENT NO. 9 AGE : 6

GRANDEUR ECHANTILLON	71
MAXIMUM	69
MINIMUM	47
ETENDUE	22
MOYENNE ----------	56.57746479
VARIANCE	17.44748491
ECART-TYPE	4.177018663
ECART MOYEN	3.237849633

FICHIER 10000 , ELEMENT NO. 10 AGE : 7

GRANDEUR ECHANTILLON	62
MAXIMUM	75
MINIMUM	53
ETENDUE	22
MOYENNE ----------	62.79032258
VARIANCE	20.03728186
ECART-TYPE	4.476302253
ECART MOYEN	3.539021852

FICHIER 10000 , ELEMENT NO. 11 AGE : 8

GRANDEUR ECHANTILLON	50
MAXIMUM	76
MINIMUM	57
ETENDUE	19
MOYENNE ----------	67.02
VARIANCE	18.14244898
ECART-TYPE	4.259395377

FICHIER 10000 , ELEMENT NO. 12 AGE : 9

GRANDEUR ECHANTILLON	40
MAXIMUM	83
MINIMUM	61
ETENDUE	22
MOYENNE ----------	71.525
VARIANCE	22.05064103
ECART-TYPE	4.695811008
ECART MOYEN	3.64875

FICHIER 10000 , ELEMENT NO. 13 AGE : 10

GRANDEUR ECHANTILLON	27
MAXIMUM	84
MINIMUM	65
ETENDUE	19
MOYENNE ----------	75.92592593
VARIANCE	25.37891738
ECART-TYPE	5.037749237
ECART MOYEN	3.865569273

FICHIER 10000 , ELEMENT NO. 14 AGE : 11

GRANDEUR ECHANTILLON	15
MAXIMUM	87
MINIMUM	68
ETENDUE	19
MOYENNE ----------	79.8
VARIANCE	35.17142857
ECART-TYPE	5.930550444

FICHIER 10000 , ELEMENT NO. 15 AGE : 12

GRANDEUR ECHANTILLON	10
MAXIMUM	89
MINIMUM	72
ETENDUE	17
MOYENNE -----------	82.6
VARIANCE	32.48888889
ECART-TYPE	5.699902533
ECART MOYEN	4.68

FICHIER 10000 , ELEMENT NO. 16 AGE : 13

GRANDEUR ECHANTILLON	5
MAXIMUM	91
MINIMUM	78
ETENDUE	13
MOYENNE -----------	85.6
VARIANCE	30.3
ECART-TYPE	5.504543578
ECART MOYEN	4.48

FICHIER 10000 , ELEMENT NO. 17 AGE : 14

GRANDEUR ECHANTILLON	3
MAXIMUM	93
MINIMUM	80
ETENDUE	13
MOYENNE -----------	87
VARIANCE	43
ECART-TYPE	6.557438524

FICHIER 10000 , ELEMENT NO. 18 AGE : 15

GRANDEUR ECHANTILLON	2
MAXIMUM	90
MINIMUM	82
ETENDUE	8
MOYENNE	86
VARIANCE	32
ECART-TYPE	5.656854249
ECART MOYEN	4