

**BEAUFORT SEA BELUGA MANAGEMENT STRATEGY**

**PREPARED FOR  
FISHERIES JOINT MANAGEMENT COMMITTEE**

**BY**

**BEAUFORT SEA BELUGA TECHNICAL WORKING GROUP**

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**JUNE 1987**

**FJMC 87-005**



TO  
A

G. YAREMCHUK, (CHAIR)  
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FROM  
DE

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SECURITY - CLASSIFICATION - DE SÉCURITÉ

OUR FILE/NOTRE RÉFÉRENCE

YOUR FILE/VOTRE RÉFÉRENCE

DATE

23 JUNE 1987

SUBJECT  
OBJET

BEAUFORT SEA BELUGA MANAGEMENT STRATEGY

Attached please find the report entitled "Beaufort Sea Beluga Management Strategy" which I prepared on behalf of the Beaufort Sea Beluga Technical Working Group.

Since I received little response to my letter of 06 January 1987, I assume that the Working Group agrees with the contents of the document. The document attached is polished and has undergone a minor rewrite since I sent it to the committee, but I do not feel that the intent or tone has been altered.

I have been advised informally that you may request me to travel to the three communities involved in a final effort to solicit input from the committee members and any other interested individuals. In my opinion, that action would serve little purpose. I am of the opinion that I would still be required to lead the discussions and complete the task of writing and the document would therefore change little from its present form. I am also of the opinion that the proposed trip and meetings would only serve to reinforce what appears to be an attitude prevalent among many individuals, that their responsibility for participation begins and ends with their paid participation in meetings. Since all Working Group members and the FJMC were advised that a nil response would be taken as agreement with the paper, I would prefer to proceed on that assumption.

I have not forwarded copies of the document to members of the Working Group, but will do so upon your advice. I have provided a copy of the document to my superiors as per our previous agreement.

The submission of this document fulfills my current obligation as chair of the Working Group and I consider my task completed. Should you wish my further participation in discussions regarding this Management Strategy or any matter pertaining to Marine Mammals in the Beaufort Sea, I would be pleased to assist. Arrangements for my participation should be requested through my supervisor R.W. Moshenko.

J.T. STRONG

JTS/cc

Att.

cc: F.J.O. Josephson  
R.W. Moshenko

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## DEFINITIONS

|       |   |
|-------|---|
| CCG   | - Canadian Coast Guard                                  |
| COGLA | - Canadian Oil and Gas Lands Administration             |
| DFO   | - Department of Fisheries and Oceans                    |
| DIAND | - Department of Indian Affairs and Northern Development |
| DOE   | - Department of the Environment                         |
| FJMC  | - Fisheries Joint Management Committee                  |
| HTC   | - Hunters and Trappers Committee                        |
| IGC   | - Inuvialuit Game Council                               |
| ILA   | - Inuvialuit Lands Administration                       |
| MOT   | - Ministry of Transport                                 |
| MSY   | - Maximum Sustainable Yield                             |
| NEB   | - National Energy Board                                 |
| OSY   | - Optimum Sustainable Yield                             |
| TAC   | - Total Allowable Catch                                 |

## INTRODUCTION

The habitat of beluga in the Canadian Beaufort Sea may be affected by hydrocarbon exploration, production and transportation as well as by hydroelectric power development within the upper Mackenzie River Basin. The Inuvialuit of the Mackenzie River Delta and the area immediately adjoining it have hunted beluga in the shallow coastal waters of the Canadian Beaufort Sea for many hundreds of years.

The possibility that infringement on beluga habitat by hydrocarbon based industry, reduction of the beluga's food resources by industrial activity or marine fisheries and harvest levels at or above the sustainable yield might result in the demise of or a reduction in beluga numbers have made management planning necessary.

To date, management of belugas in the Canadian Beaufort Sea has been conducted as required through various federal acts and regulations, most specifically The Fisheries Act, the Beluga Protection Regulations, the Effluent Regulations and the Northwest Territories Fishery Regulations. There have also been many informal arrangements directed towards providing data required for management and to mitigate potential conflicts between the hydrocarbon industry, beluga hunters and beluga.

The Inuvialuit harvest has been self-limited to the number of animals required to cover the basic needs of residents in Aklavik, Inuvik and Tuktoyaktuk, with very little inter-settlement trade. This action has limited the overall harvest in Canadian waters. Inuvialuit hunters have also cooperated and participated in the collection of harvest data and biological material directed towards monitoring the harvest as well as various physical and physiological aspects of the beluga population.

Industry has participated in the collection of harvest statistics, hunt monitoring, population estimates and has had a program of active liaison with beluga hunters to avoid conflict. Industry has also agreed to many mitigative measures directed towards reducing conflict with hunters and stress on the whale population.

The Department of Fisheries and Oceans (DFO) has collected harvest statistics and biological data, conducted aerial photographic census surveys, investigated several aspects of the physical characteristics of beluga habitat and maintained a staff in the Kugmallit Bay hunting area throughout several whaling seasons.

This document is intended to provide structured guidance for the long term management of the beluga of the Canadian Beaufort Sea.

## GOAL

To maintain a thriving population of beluga in the Beaufort Sea and provide for optimal harvest by Inuvialuit.

## OBJECTIVES

### PROTECTION

- To protect those areas of the Canadian Beaufort Sea that are critical for the well-being of the beluga.
- To protect the beluga from displacement, undue harassment, over-harvest and wasteful or inhumane harvesting techniques.

### HARVEST

- To provide for a beluga harvest by Inuvialuit in the Canadian Beaufort Sea.
- To provide for an optimal harvest on the basis of sustained yield.
- To ensure an economical harvest and low loss rates.

### INDUSTRIAL/COMMERCIAL ACTIVITY

- To provide guidelines to those industries or commercial enterprises whose activities may impinge upon the well-being of the beluga resource or upon the beluga harvest. Activities we have identified as requiring guidelines are:
  - Hydrocarbon - exploration, development and production.
  - Shipping and Transportation, including Port Development and Upgrading.
  - Mining - development and production.
  - Tourism - whale watching and general boating or flying.
  - Marine or Coastal Commercial Fisheries.
  - Sale of beluga products to non-Inuvialuit.
  - Scientific research (on all flora and fauna).

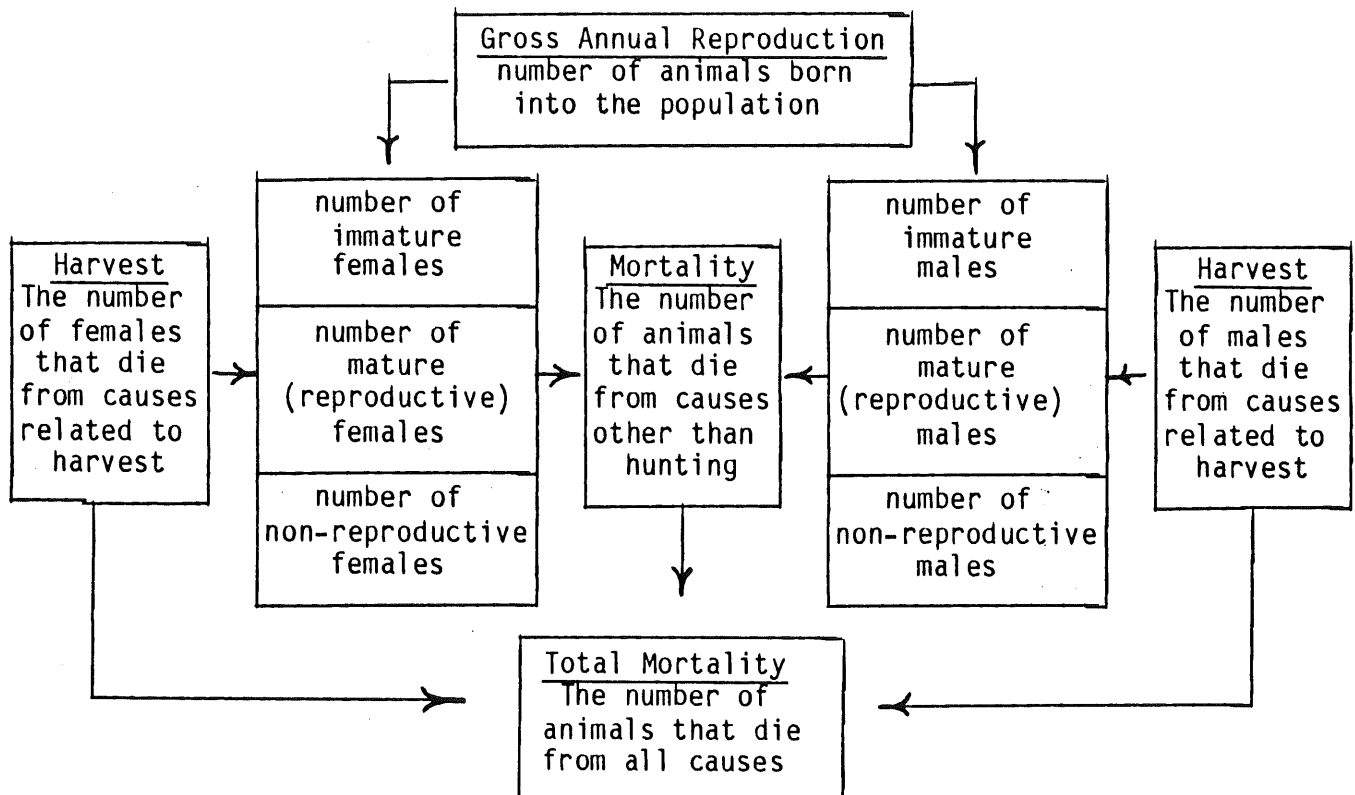
### POTENTIAL IMPACTS AND PROBLEMS

1. Beluga harvest: Harvesting beluga is a traditional activity of the Inuvialuit and is expected to continue. The increasing Inuvialuit population may result in a desire to increase harvest.
2. Hydrocarbon exploration and production: The hydrocarbon industry is well developed in the Canadian Beaufort Sea, and future removal of both oil and gas reserves is simply a matter of economics. Exploration for and production of hydrocarbons may infringe upon the long term well-being of the beluga resource, or on the beluga harvest.
3. Mineral exploration and production: Mining, except for gravel, is not a major issue in the Canadian Beaufort Sea or on the adjoining mainland or islands at this time. Such activities are potential limiting factors for both the beluga resource and the beluga harvest.
4. Deep water port facilities development: The development of a deep water port within the boundaries of the Inuvialuit Land Claim Settlement area is an ongoing issue and current ports will require upgrading. Port developments or upgrading and the attendant increase in shipping may infringe upon the long term well-being of the beluga resource, or on the beluga harvest.
5. Scientific research requirements: There are many gaps in the knowledge base that exists with regard to the Beaufort Sea beluga. Scientific studies to supply this much needed information are required.
6. Public information and education: The success of any management scheme is dependant on the cooperation of both the corporate and the public sectors. Current educational programs are uncoordinated and inadequate.
7. Use of marine and estuarine fauna: It is feasible that commercial development of marine or estuarine fisheries for various species will be contemplated as an economical use of a presently unused resource. The target species of these commercial fishermen may be critical species in the beluga food chain.
8. International cooperation: The beluga of the Beaufort Sea are shared with the United States, and they are harvested along the Alaskan North Slope. It is important that management initiatives be agreed upon by both countries.
9. Tourism: Tourism will likely become a more important source of income to the Inuvialuit in future. The opportunity to view beluga, to observe a beluga hunt and to observe or participate in some aspects of resource processing and camp life will likely be given consideration as business opportunities become available to individuals or groups. It is also unclear, at this time, whether non-Inuvialuit can operate whale watching tours without obtaining permission from the FJMC or some other Agency.
10. Sale of beluga products to non-Inuvialuit: The practice of selling beluga products to non-Inuvialuit constitutes commercial use of the resource, and commercial use is currently illegal.

## POPULATION MODEL

In order to manage the beluga, and to be able to predict the results of changes in the population, it is necessary to use a model. A model that will serve our present needs is:

### Basic Population Model for an Exploited Beluga Population



In order to use the population model, it is necessary to have an estimate of the number of animals in each box.

## TOTAL ALLOWABLE CATCH

The Total Allowable Catch (TAC), for the purpose of this plan, is defined as the number of beluga that can be struck by Inuvialuit hunters during any single hunting season without reducing the numbers of beluga in the overall population.

DFO policy requires that TAC be set at the optimum sustainable yield (OSY) for any given stock, and that the stock be maintained at or above the maximum sustained yield level (MSYL). OSY is the level of harvest from the population that generates the greatest net benefit. MSYL is the size of the stock that provides for the largest sustainable harvest. This strategy should provide adequate management in the Beaufort Sea, but the concept of net benefit is difficult to apply to current arctic marine mammal fisheries.

MSYL and the corresponding MSY are not known for the Beaufort Sea beluga stock. Therefore, to ensure conservation of the stock, we must use conservative estimates of population size and potential yield to set TAC. It is also necessary that harvest losses are not underestimated. The accuracy of the TAC is directly related to the accuracy of the information used to calculate it, and a TAC which is inadvertently set too high will result in a continuing decrease in the number of beluga in the Beaufort Sea stock.

Management of the Beaufort Sea beluga stock will be most efficient when all parties concerned provide the best possible estimates of stock size, landed harvest and loss rates. The responsibility for providing accurate estimates of stock size rests with DFO; that of providing accurate harvest and loss rates with the Inuvialuit.

## CALCULATION OF AVERAGE ANNUAL REMOVAL OF BELUGA

|  |     |
|--|-----|
| Average landed catch by Inuvialuit                                   | 131 |
| Average loss by hunters (20% of landed)                              | 26  |
| Average loss due to termination of pregnancy<br>or abandoned neonate | 13  |
| Average Inupiat (Alaskan) removal (including 60% estimated loss)     | 119 |
| Average Total Removal  | 289 |

## CALCULATION OF SUSTAINABLE YIELD

DFO has suggested that 5% might be an upper limit for sustainable harvest of monodontid whales, although it should be used with care since beluga reproduce at 6+ years of age, every 3 years. The 5% sustainable harvest level provides for a total removal of 350 beluga from a Beaufort Sea population of 7,000 animals. We recommend that 7,000 be used as the total population for management planning until more definitive information is available for the following reasons:

- It is not known whether or not the stock contains an inshore and an offshore component that may be differentially exposed to harvesting, and 7,000 is the "best estimate" of beluga present in the inshore area by researchers familiar with beluga survey data.

- It is not known if the 5% sustainable harvest level is valid. If harvest is carried out at a level that is above the sustainable yield, the beluga population will decline and future harvest levels will be reduced.
- There are no confidence limits associated with any existing population estimates.
- There are still several unknowns regarding beluga behavior, habitat and population dynamics.
- The current Inuvialuit harvest is biased toward males.

### CALCULATION OF TOTAL ALLOWABLE CATCH (TAC)

We recommend that total removal of beluga (all sources) should not exceed 350, i.e. 5% of the 7,000 population estimate. We further recommend that the investigations required to provide the data needed to determine optimum sustainable yield and maximum sustainable yield be given high priority by both managers and users.

The Inuvialuit should therefore limit their annual catch to 197 beluga struck or 158 landed, whichever occurs first. This is derived in the following manner:

|   |            |
|---|------------|
| Estimated total annual removal            | 289 beluga |
| Average annual landed catch by Inuvialuit | 131 beluga |
| Average loss rate by Inuvialuit           | 20%        |

The Inuvialuit landed catch is 131/289 or 45% of the estimated total annual removal. 45% of the 350 animals suggested as a safe removal figure for a population of 7,000 is 158 beluga. Thus the Inuvialuit harvest should currently be limited to 158 beluga landed. Since the current loss rate in the Inuvialuit harvest is 20% (following the example of the International Whaling Commission this figure is struck - landed/struck), the number of strikes allowable for the harvest is 197 beluga.

We recommend the Inuvialuit landed harvest should consist of no more than 158 beluga annually, with no more than 197 total strikes, if the loss rate remains at 20%. The important figure here is the total allowable catch of 197 beluga which is 56% of the 350 animals which constitute the allowable total annual removal from the population. The combination of landed and lost which is TAC must not exceed 56% of the allowable total annual removal and the loss rate is therefore the factor which determines the total landed catch.

Current numbers of beluga in the Beaufort Sea population and whether differential distribution/harvesting occurs must be determined as soon as possible. The TAC can then be based on actual knowledge.

## CONTROL AND REGULATION OF DISTURBANCE

### BELUGA MANAGEMENT ZONES

We recommend the Beaufort Sea be divided into management zones to reflect and facilitate the intensity of management required. For this purpose, it is assumed that all waters on the landward side of the limit of pack-ice, is potential beluga habitat.

Although the beluga occur over many thousands of square kilometers throughout the year, they also concentrate in specific locales for a short time. This ecological phenomenon must be reflected in any management plan.

We have divided the range of the western Arctic belugas into five (5) management zones, each requiring a different level of management.

- Zone 1A Traditional concentration and hunting zone
- Zone 1B Traditional hunting zone
- Zone 2 Mackenzie estuary zone
- Zone 3 Offshore Canadian Beaufort zone
- Zone 4 Foreign waters zone

These zones represent areas which require different amounts of care and attention by the Inuvialuit and Government of Canada. They are intended to assist the debate and decisions about special regulations, codes of conduct or international agreements needed to guarantee that the whales are conserved, the harvest is ensured, and other compatible uses of the animals and habitat are allowed.

Map 1 depicts these five zones. The boundaries of each zone were drawn from existing knowledge of beluga abundance and distribution, traditional whale hunting sites, and exploration areas.

#### Zone 1A - Traditional Concentration and Hunting Zone

This zone includes a few hundred square kilometres of shallow waters at the mouth of the Mackenzie River and encompasses the only known, traditional summer concentration areas of this beluga population. These concentration areas (Shallow Bay, Beluga Bay and Kugmallit Bay) are situated close to the shore of Richards Island, where the waters are shallow (less than two metres deep), warm and brackish - due to the powerful influence of the Mackenzie River discharge. Although groups of whales may move back and forth between these concentration areas and utilize travel corridors, it is the concentration areas that the whales return to year-after-year, and which thus warrant careful protection and management.

On some days in July and early August, up to 60% of the estimated 11,500 whale population may congregate in these areas. The timing and location of these concentrations have been known and exploited by Inuvialuit for many centuries, and have been well-documented by government and industry biologists over the past two decades. Biologists, however, remain uncertain about why the whales use this area in such large numbers, although some evidence and much speculation suggests that feeding, group socializing, skin molting and, maybe, calving might all occur.

Not surprisingly, the harvest comes largely from these concentration areas. Eight of 10 hunting camps are situated on the beaches in Zone 1 - near Kugmallit Bay, on Kendal Island and along the Yukon coast between Tent Island and King Point (Map 2).

For more than a decade, oil and gas exploration leases have blanketed most of Zone 1. Recently, such leases have been removed from Shallow Bay, Kugmallit Bay and on the west side of Richards Island, as part of COGLA's Exploratory lease Re-negotiations. DFO and the GNWT argued successfully that these lands and waters should be relinquished or excluded from the industry's search for oil, due to their unique value to beluga. In the Holman and Paulatuk situations, restrictions will be dependant on the value of the area to harvesting rather than value as an area with unique value for beluga.

Relatively little oil and gas activity (less than 10%) has occurred in Zone 1A waters, none in Zone 1B. Geophysical seismic surveys have been conducted here, but usually from the winter sea ice and only three exploratory wells on dredged artificial islands have been drilled.

In future, the development of oil and gas discoveries at Adgo or Ellice Island, and the proposed pipeline terminal at North Point on Richards Island) will stimulate activity and may result in permanent facilities in the vicinity of Zone 1A. Since this might adversely affect the whale concentration areas, industrial siting and scheduling must give first priority to the needs of the whales and whale hunters.

The majority (over 75%) of boat and barge traffic down the east and west channels of the Mackenzie River passes through or close to the Zone 1A areas in Kugmallit Bay and Shallow Bay. Since this traffic can disrupt the whales and hunters, scheduling and timing of vessel passages will be necessary. A major shorebase on the Yukon coast or pipeline terminal on Richards Island would substantially increase the boat traffic through Zone 1A.

Although the documentation is weak, tourism and recreation such as nature photography and whale watching are becoming common in Zone 1A. Visitors from Canada, United States and other countries travel to the Mackenzie estuary to see the whales in natural surroundings, to observe the whale hunt from boats and to watch processing in the camps. In future, such tourism may become even more popular; it is therefore recommended that guidelines to prevent harassment of both beluga and hunters be developed for Zone 1 waters.

For many years, Zone 1 has been the focus of beluga field research. At least 20 datasets collected from 1977 to 1985, involving aerial surveys and shore watches, centred on the whale concentrations. Map 5 clearly shows this special attention in the survey coverage given to Zones 1 and 2.

#### Zone 1B - Traditional Hunting Zone

The Zone 1B designations in the vicinity of Paulatuk (Map 3) and Holman (Map 4) are not based on known occurrences of traditional whale concentrations, but rather, these are marine waters where beluga are occasionally harvested. These areas will have different management requirements than Zone 1A designations. It is not clear whether strategies specifically designed for management of beluga are defensible in Zone 1B waters, particularly in the vicinity of Holman where beluga occur sporadically.

## Zone 2 - Mackenzie Estuary Zone

This zone includes all the Mackenzie Shelf waters shallower than 20 metres (65 feet), and extends from Baillie Islands (Cape Bathurst) west to Kay Point on the Yukon Coast. The 20-metre isobath was chosen as the offshore limit of Zone 2 because it includes the common travel routes of the whales into/out of and within the estuary. Up to 60% of the western Arctic beluga population may be found in these nearshore waters on some days from mid June to mid August.

To a large degree, the Mackenzie River dominates the oceanographic regime of this zone. In the summer open-water, the whales' habitat is estuarine (layers of fresh, warm, muddy river water are mixed with salty, cold, clear ocean water). Information regarding the importance of these waters to whales is scarce, although feeding and calving are suspected.

The oil and gas industry has focussed considerable levels of exploratory activity in the zone. From 1973 to 1985, approximately 40% of the 63 wells were drilled from drillships and artificial islands in depths 20 metres or shallower. Seismic surveys, dredging, support vessel and aircraft traffic, and disposal of waste material were common activities in Zone 2. Map 8 shows a high frequency of flights and passages over a 10-day period in July 1985. From 1979 to 1982, approximately 75% of all seabottom dredging for sand and gravel (used in artificial island construction) occurred in Zone 2 (Map 8).

The future of Beaufort petroleum development remains uncertain. Major oil reserves (several of which are in water depths of 20 metres or less) have been discovered and proven. It is likely that most of future petroleum exploration, production and transportation will be concentrated in Zone 2, particularly if a large diameter pipeline is the industry's chosen mode of oil transport.

Zone 2 is of little importance to tourists at this time although the potential for whale watching from vessels or aircraft exists.

Zone 2 has been the focus of considerable whale research by government and industry. Map 9 shows the aerial survey lines flown by biologists during the past 10 years. It is interesting to note that these were surveys in which biologists flew where they expected to find beluga.

There is little or no whale hunting by Inuit in Zone 2 as the water is too deep and whales escape by diving, or the hunters risk high losses after shooting. The Minister of Fisheries should use the Beluga Protection Regulations to declare Zone 2 a no hunting zone.

## Zone 3 - Offshore Canadian Beaufort Zone

This zone is relatively large (tens of thousands of square kilometres) and covers the remaining geographical range of the beluga in the Canadian Beaufort Sea (20 metres or deeper). Beluga are found as far offshore as the permanent pack ice permits; the north border is therefore flexible, depending on the ice. The beluga seldom travel farther east than 118° longitude in Amundsen Gulf and the Victoria Island area, although the eastern boundary is the limit of the relevant land claim area and therefore political rather than

biological. The west boundary is also a political one - the offshore Canada/United States border - and, as such, has nothing to do with the whales' ecology.

Up to 100% of the western Arctic population may be found in these waters, sometime between early May and mid October. The whales use Zone 3 for migration and, we assume, summer feeding. Calving is also suspected here since aerial surveys have noted the presence of neonates.

Since 1973, the oil industry has drilled about 60% of their wells in water greater than 20 metres on the Mackenzie Shelf. Although the leases extend offshore to water depths over 500-metres (Map 6), the petroleum reserves discovered to date are situated in depths less than 60 metres. A similar proportion (60%) of dredging load and dump operations were carried out in these deeper waters from 1959 to 1983 (Map 7). Not surprisingly, this same pattern is reflected in the location and frequency of other activities such as aircraft and vessel movements associated with drilling (Map 8).

It is thought that, in this zone, whale watching and photography would account for less than 1% of the regional tourism business and is therefore not significant.

Many scientific studies of bowheads and, coincidentally beluga, have been carried out in this zone.

No whale hunting occurs in Zone 3 for the same reasons as outlined for Zone 2, and since it is far offshore, future beluga hunting is very unlikely. Zone 3 should also be designated a no-hunting zone.

#### Zone 4 - Foreign Waters Zone

This zone encompasses the belugas' range after the animals migrate west past the Canada/USA border into the American Beaufort, Chukchi and Bering seas. It is expected that 100% of the western Arctic population would be found somewhere within this zone during the winter period (mid October to late April). The value of these waters for the belugas is not yet known, but is assumed to be critical to their health and growth.

Although the whales are outside of Canadian jurisdiction and control for over six months of each year, they cannot and must not be considered as out-of-sight and out-of-mind by the Inuvialuit and Government of Canada. The risks of over-harvesting, unwise hunting practices, industrial disruption and marine pollution occur throughout their natural range. We recommend that the foreign waters zone be covered by an international agreement on management of beluga. Canada cannot manage the Beaufort Sea beluga without cooperation from the United States.

#### **BELUGA HARVESTING**

The beluga harvest must be conducted in a manner that will improve performance and efficiency of hunters, develop efficient and humane hunting techniques, and minimize the number of lost whales. The beluga harvest must also provide the basic information required for monitoring.

The total number of beluga harvested annually must be within the sustainable yield of the population and harvest must include all beluga landed, lost, sunk, captured, or taken for any purpose or by any means.

DFO is responsible for enforcement of the Fisheries Act and the Beluga Protection Regulations. The current level of enforcement is not adequate. We recommend that DFO increase the number of Fishery Officers available during the period beluga are in the Canadian Beaufort Sea or investigate the feasibility of a "beluga warden" or "beluga guardian" system that would provide training for Inuvialuit and enable them to become directly involved in enforcing hunting regulations.

The Inuvialuit Game Council, (through the Hunters and Trappers Committees), should be encouraged to draft hunting bylaws that are more stringent than the Regulations. The content of these bylaws, enforcement and penalty should be determined by the IGC, although DFO should provide advice regarding the legal aspects of any proposals. The "beluga warden/guardian" system might provide a vehicle for enforcement of both Federal Regulations and Community bylaws.

We recommend the following changes to the Beluga Protection Regulations.

1. DFO should rewrite the current body of regulation; it does not provide adequate protection for the beluga resource, and does not reflect the land claim agreement.
2. The following hunting rules should be incorporated in the Beluga Protection Regulations.
  - i) No person shall hunt in those areas that have been designated as No Hunting Areas.
  - ii) No person shall hunt during the period beginning one hour before sunset and ending one hour after sunrise.
  - iii) The following list of equipment is mandatory:
    - A rifle of .30 calibre or more with a cartridge case at least 1 3/4" (33 mm) long.
    - Two harpoons equipped with line and float, or one such harpoon and a "seal" hook.
    - One grapple hook attached to sufficient length of line to reach the ocean bottom in the area being hunted.
    - One float marker with enough line to reach the ocean bottom in the area being hunted, and equipped with an anchor.
    - A towing line.

We recommend that the IGC consider implementing specific hunting rules beyond those provided in the Beluga Protection Regulations.

1. No person shall, at any time, take more whales on a hunt than can be adequately taken care of considering the limitation of the boat, the weather, the towing distance and the number of people in the camp available for processing.

2. No person shall hunt alone, and each hunting boat must carry at least 1 (one) experienced hunter. The designation of an experienced hunter shall be made by the appropriate Hunter's and Trapper's Committee.
3. No hunting boat shall carry excess passengers of a number that may interfere with proper hunting technique.
4. Hunters must follow the directions of the elected/appointed hunting leader in each camp or area. The election or appointment of the appropriate hunting leader will be the responsibility of the appropriate Hunters and Trappers Committee.
5. Beluga hunters must provide a collection agency designated by the FJMC with harvest information that may be requested in order that management decisions may be made with correct, up to date data.
6. Each hunting party shall have:
  - A boat of adequate size and state of repair.
  - A sufficient quantity of ammunition.
7. These rules may from time to time be changed by the IGC.

## INDUSTRIAL AND COMMERCIAL ACTIVITIES

### Oil and Gas Industry

There are currently many acts and regulations in place which regulate the oil and gas industry in the Canadian Beaufort Sea. Federal government departments or agencies with Arctic responsibilities and the statutes they administer are provided in Table 1. The following is a list of activities and corresponding regulators:

| <u>Activity</u>       | <u>Regulator</u>                |
|-----------------------|---------------------------------|
| Seismic               | COGLA<br>DFO (explosives)       |
| Island Construction   | DIAND<br>DOE<br>DFO             |
| Pipeline Construction | DIAND<br>DOE<br>NEB<br>DFO      |
| Drilling              | COGLA<br>DIAND (waste disposal) |
| Production Facilities | COGLA<br>DIAND (waste disposal) |

|                    |                                 |
|--------------------|---------------------------------|
| Pipeline Operation | COGLA<br>NEB                    |
| Marine Traffic     | MOT (CCG)<br>DFO (harassment)   |
| Air Traffic        | MOT<br>DFO (harassment)         |
| Shorebase          | MOT (terminals)<br>DIAND<br>ILA |

The oil and gas industry has also encouraged their personnel to avoid interference with beluga hunters or beluga. In addition, the various permitting systems in existence require that settlements be contacted regarding any activities in their sphere of influence, and the statement of the Inuvialuit Land Claim has ensured that all long-term or major development projects must be assessed by the Inuvialuit Screening Committee and the Inuvialuit Review Board as well as the other review processes in existence.

There are several major licencing advisory committees for the NWT which involve DFO:

Arctic Waters Advisory Committee (DIAND)

- reviews application for non-shipping undertakings in Arctic marine waters (Arctic Waters Pollution Prevention Act)
- provides advice on environmental operating conditions for drilling authorities (Oil and Gas Production and Conservation Act)
- provides information to MOT (Navigable Waters Protection Act)

Regional Ocean Dumping Advisory Committee (DOE)

- Provides advice on applications for disposal of dredge spoils (Ocean Dumping Control Act)

Water Board Technical Advisory Committee (Water Board/DIAND)

- provides advice on applications to use water and to discharge wastes (Northern Inland Waters Act)

Lands Advisory Committee (DIAND)

- provides advice on leases to dredge and construct ice or artificial islands (Territorial Lands Act, Public Lands Grant Act)

Land Use Advisory Committee (DIAND)

- provides advice on short term administration of surface lands (Territorial Lands Act)

It is not the purpose of this management plan to create needless regulatory process, nor to duplicate those already extant regardless of the agency

responsible. The information provided above shows that regulation of the hydrocarbon industry is the responsibility of various federal departments and agencies. It is therefore the responsibility of the federal government to ensure coordination and cooperation between and within those departments and agencies in order that all aims and objectives are duly considered. It is also the responsibility of the federal government to determine the weight that will be given to the specific requirements of beluga and beluga harvesters in the decision making process, but the Department of Fisheries and Oceans must put forward a strong case on behalf of the beluga and the beluga harvesters. The initiative for creating a decision-making climate that gives equitable concentration to the beluga and the harvest is solely the responsibility of DFO.

It is the opinion of most members of this working group that the oil and gas industry should not be permitted to explore for resources or to develop any type of facility within Zone 1 waters. It is recognized in some instances that this may result in industry being forced to choose a site or routing that is not optimal for their purposes. The small amount of Zone 1 waters, and their locations should however make any inconvenience to industry minor in nature.

It is recommended that the FJMC be part of any review process.

#### Mining Industry

There are acts and regulations extant that cover mining activity in the NWT and the Yukon Territory. At the present time, there is little likelihood that any mining activity, other than gravel removal, will occur in or adjacent to waters of the Canadian Beaufort Sea. Permits for gravel removal, whether from the sea bed or from land adjacent to the Beaufort Sea, must consider the welfare of the beluga in their planning. We recommend that no mining activities be permitted within Zone 1 waters, and no activities should be allowed that will have deleterious effects on Zone 1 waters even though they are not located in an area designated Zone 1.

Review agencies and permitting agencies must consider the specific requirements of the beluga and the beluga harvest when making their recommendations.

#### Shipping and Port Development

The Working Group recognizes the existence and the need for shipping corridors, as well as the constraints that shipping faces when operating in shallow water. Nonetheless, we recommend that all shipping traffic should be confined to designated routes and should avoid passing through or close to waters designated Zone 1, even if the shortest route is through Zone 1 waters. DFO should investigate the possibility of restricting ship traffic within Zone 1 waters through the use of the Beluga Protection Regulations or the Fisheries Act. Current controls on shipping and ships by other agencies such as MOT are judged adequate.

Development of port facilities, must take the specific needs of the beluga and the beluga harvest into consideration. We recommend that no port development should be allowed within or on the shore of any waters designated

Zone 1. We recommend that any impact assessment review process consider the effect of the proposal on Zone 1 waters. The current review process that would assess any port development project is judged adequate; the responsibility for ensuring the objectives of this plan are considered in any review process, lies with DFO and the various Inuvialuit agencies as well as with the Fisheries Joint Management Committee. It is recommended that the FJMC be part of the review process.

### Tourism

Development of the tourism potential of the Canadian Beaufort Sea Coast is in its infancy. The opportunity to view beluga and beluga hunting/processing is however already being advertized by local entrepreneurs. Uncontrolled tourism for the purpose of viewing whales and whale hunting or visiting whaling camps may harass beluga or annoy hunters. The advantages of tourism must be recognized however and refusing tourists access to the beluga resource should be considered as an option.

To develop the tourist potential of the Canadian Beaufort Sea coast in a manner compatible with the goal of this management strategy, we recommend that the general prohibition of disturbance contained in the Beluga Protection Regulations should be applied using the following guidelines:

- Never chase, disperse or attempt to herd whales.
- Avoid sudden changes in speed or direction when whales are nearby.
- Always approach whales at an angle, never from behind, and always travel parallel to their direction of travel.
- When observing beluga, keep your motor in low gear and remain at least 100 m (300 ft) away. Never separate females from their young.

Ideally control of tourism within Zone 1 designated areas by means of a permitting system, would avoid interference with harvesting and keep disturbance of beluga in the concentration areas at the lowest possible level. This option does not appear feasible however as there is no apparent act or regulation under which public access to Zone 1 can be restricted. In fact, the Navigable Waters Act permits access and it is doubtful if DFO has any recourse other than restrictions on harassment when dealing with public boating.

### Commercial Use of Beluga

Commercial use of beluga is currently not permitted in Canada and there are no regulations extant. We recommend that regulations to control commercial use of beluga be in place before any such use is permitted and the FJMC should request DFO to draw some now, even if no commercial use is contemplated in the near future. Lack of regulatory process is not a valid reason for rejecting commercial use. We recommend that commercial use not be allowed until it is covered by an international agreement and division of TAC between Canada and the USA is agreed upon.

We recommend that although user groups should not draft the regulations they should be consulted during the process. We recommend that under no

circumstances should commercial use be permitted under the guise of excess domestic catch, as it would in all likelihood be an uncontrollable situation and lead to national and international criticism. Beluga taken for commercial purposes must be identified as a unique portion of the TAC, with specific regulations, a finite quota and preferably some form of limited entry.

We recommend that commercial sale of beluga products should be an option for use available to communities and controlled through a section in the Beluga Protection Regulations.

The current practice of occasionally allowing beluga products to be sold through a commercial food outlet in Inuvik particularly to non-Inuvialuit should be forbidden until such time as commercial use of beluga is permitted. The situation as it presently occurs has definite commercial overtones. Commercial sale of beluga products must be either legal or illegal. If it is to be legal it should have a quota under the TAC and if illegal it should be disallowed. A Management Plan that contains tacit agreement will, in the long term, have detrimental effects on the beluga population and on the national and international image of the agencies involved in management.

The capture of whales for exhibit or for scientific study is presently controlled by means of a DFO permit system. We recommend that the DFO permit system continue, but DFO should not make unilateral decisions regarding disposition of beluga. Whales captured under permit must be from the TAC, and each permit must make specific regulations regarding the capture and disposition of the captured animals.

We recommend that the decision to allow commercial use of beluga remain with the Minister of Fisheries and Oceans and the Government of Canada.

### Commercial Fishing

There are no commercial fisheries in the Canadian Beaufort Sea at this time, although an extensive domestic fishery exists for many anadromous species. Commercial fishing may be of future interest and thus compete with beluga. We recommend that commercial fishing in the Canadian Beaufort Sea be regulated with regard to beluga food species and the FJMC in managing such fisheries show regard for beluga stocks.

The present base of scientific knowledge of species interaction in the Beaufort Sea is not sufficient for proper assessment of the effect of medium or large scale commercial fisheries. We recommend that the FJMC and DFO increase the research effort on ecological relationships, beluga food habits and beluga energetics.

### **RESEARCH**

Non DFO research on beluga whales in the Canadian Beaufort Sea is controlled through a DFO permit system, which can place specific restrictions on any project or researcher and requires a report on activities authorized by the permit. We recommend that permittees must provide the FJMC with a copy of their report to DFO from any research permits issued.

We recommend that DFO beluga research in the Beaufort Sea be directed toward the goal and objectives of this Management Strategy. Available monies and personnel should provide the information required to implement and enhance the management strategy.

Resource users also have research responsibilities. Access to whales is an important requirement of research programs. Resource users must provide, or allow the collection of, specific biological material and scientific data if management is to succeed. It may be necessary at times to allocate a portion of the TAC for research. Examples of possible requirements are whales taken during winter to complete knowledge of the reproductive cycle, and to assess winter food species.

## ALLOCATION OF TAC

The IGC and appropriate HTC's must derive an equitable distribution of TAC. The current annual total removal, based on the best information available is less than the calculated TAC and allocation is not an issue at this time; however a system of allocations should be agreed to before it is required. We recommend that allocation to whatever agencies the IGC and HTC's judge appropriate be done by percentage of TAC rather than by number of beluga; this will allow allocation to be self-adjusting if the TAC changes.

We recommend that if commercial use of beluga is legalized, the decision on the portion of the TAC that will be designated as a commercial quota and its distribution be the responsibility of the IGC and the appropriate HTC's. All consumptive uses must be part of the TAC.

The current annual harvest, including loss rates, based on the best information available is less than the calculated figure of total allowable catch. Allocation of the TAC between settlements, or among hunters is therefore not now an issue, but it will be if the harvest approaches the total allowable catch.

A system of allocation should be developed before it is required. We recommend that shares of the harvest be agreed to by Inuvialuit and Inupiat hunters as soon as possible. We recommend that the IGC and the appropriate HTC's derive an equitable division of total allowable catch either among the settlements using the resource or among the hunters using the resource.

Where alternative consumptive uses of the beluga resource, such as live capture for sale, sports hunting or scientific research are considered, animals removed from the population must come from the TAC.

The decision to allow or forbid any alternative consumptive use, with the exception of scientific research, should be made by the IGC and the HTC's. From a management viewpoint, there is no reason to arbitrarily forbid any of the proposed alternatives to domestic harvest. The decision to allow any or all alternate uses of the beluga resource will, however, require some form of resource allocation. The decision to allow a portion of the TAC to be used for scientific research should be the responsibility of the FJMC.

We recommend that no consumptive use of the beluga resource in addition to the domestic harvest be allowed until a workable system of allocation of TAC is in place and a management agreement has been reached with the United States, and that all consumptive uses are considered part of the TAC.

## MONITORING

It is necessary to monitor the annual beluga harvest and various aspects of the population to gather the information necessary to assess the soundness of management strategies, to identify trends in size or sex ratio and to make informed decisions on management matters.

### HARVEST MONITORING

A system for collecting information from hunters must be in place during each hunting season and has been provided for in the Land Claims Settlement under the general heading of Harvest Study. We recommend that the current practice of having harvest information collected by a monitor resident in each traditional whale hunting area continue as the basis for future data collection. Individual hunters must also cooperate and report and their catch accurately to the monitor. The FJMC or their designate will assemble the information for analysis by DFO. DFO will report back to the FJMC before the next whaling season.

The following harvest data should be collected:

- Number of animals struck with an assessment of lethal and non-lethal wounding.
- Number of animals landed.
- Sex and approximate age of each animal landed.
- Number of animals struck but not landed.
- Number of pregnant or nursing females landed.
- Number of pregnant or nursing females struck but not landed.
- Body measurements from each landed whale.
- The date and time each whale was killed.
- Ageing material (jaw).
- Other information may be required from time to time.

The current harvest monitoring program required \$30,000 in 1986. We recommend that adequate funding for harvest monitoring be provided annually as part of the overall harvest study.

### POPULATION MONITORING

Information on various aspects of the beluga population must be collected regularly to monitor its status. Aerial surveys using various techniques, designs and flying heights can provide estimates of: total numbers, gross age and sex structure, gross annual reproductive rate, distribution of beluga at

different times of the year, and perhaps neonate mortality. This information need not be collected annually; we recommend that DFO should design and conduct aerial census surveys every three years beginning in 1989. The 1986 aerial survey program cost \$150,000 including data analysis.

Beluga physiology must be monitored periodically to assess the general health of the population, in particular condition indices, contaminant levels, and age structure. We recommend that a biological sampling program should be conducted every three years beginning in 1990, and should alternate with the aerial survey program. This program should be a joint effort, with the IGC collecting material and DFO processing and analyzing it. DFO should assist the IGC in training individuals in proper collection techniques.

The cost of a biological sampling program is estimated at \$15,000 in 1986 dollars, including participation of one DFO staff person but excluding analysis. The biological sampling would be part of harvest monitoring where it is required. We recommend that DFO plan for biological sampling every three years beginning in 1990, and ensure that money for analysis is available.

## PUBLIC EDUCATION

The other management activities in this strategy must be supported by an education program. Hunting skills have recently been deteriorating and a program to teach good hunting skills is required to reverse this trend. In addition, the need for and the principles of beluga management must be explained to hunters and others.

We recommend that the FJMC contact the Government of the NWT Department of Education, DFO and the IGC to investigate the public education requirement and to plan for programs that will provide the necessary training.

It may be necessary to test hunter skill and licence only the proficient. An educational program will assist prospective hunters in acquiring skills and provide a mechanism that allows for licencing.

We recommend education in the schools and whaling camp participation as integral parts of any proposed education program.

## EDUCATION IN THE SCHOOLS

The opportunity to participate in the formal educational process, should not be wasted. Programs aimed at both Grade School and High School levels should be developed by a joint committee of beluga hunters, wildlife managers and educators. It would be preferable to have this programming form part of the regular science curriculum, but guest lectures could provide the proper information package.

Classroom programming must include:

- The history of beluga harvesting in the Canadian Beaufort Sea with emphasis on the specific area in question.
- The relationship between beluga harvesting and the Inuvialuit culture.
- The biology of the beluga whale.
- The philosophy of hunting and Wildlife Management.
- The mechanics of harvesting and processing beluga.

The above themes could be accomplished through a mix of talks, video presentations and equipment demonstrations aimed at a particular age group.

## WHALING CAMP PARTICIPATION

Lectures and films supplement, but do not replace practical experience. Consideration should, therefore, be given to the establishment of a camp, similar to the language camp, where older students could observe all aspects of beluga harvesting in situ and learn through participation. Safety and survival skills would be added to the practical aspect of the classroom materials.

Establishment of an educational whaling camp that rotated through the established whaling camps would also serve to provide information to individuals who are not participants in the school system. Some individuals who are presently hunting did not have the opportunity to learn all the necessary hunting skills, access to an education camp would disseminate information within this group.

### SUMMARY OF RECOMMENDATIONS

1. We recommend that 7,000 be used as the total population for management planning until more definitive information is available.
2. We recommend that at this time, total removal of beluga from all sources should not exceed 350 (5% of the 7,000 population estimate). We further recommend that managers and users give high priority to collecting the data needed to determine optimum sustainable yield and maximum sustainable yield.
3. The Inuvialuit landed harvest should consist of no more than 158 beluga annually, with no more than 197 total strikes (based on a loss rate of 20%) until such time as information available allows the TAC to be calculated more precisely.
4. Shares of the TAC should be agreed to by Inuvialuit and Inupiat hunters by January 1989. ←
5. The Beaufort Sea should be divided into management zones to reflect and facilitate the intensity of management required.
6. Guidelines to prevent harassment of both beluga and hunters should be developed for Zone 1 waters.
7. The Minister of Fisheries should use the Beluga Protection Regulations to declare Zones 2 and 3 as no hunting zones.
8. Zone 4 (foreign waters) should be covered by an international agreement on beluga management.
9. It is the opinion of most members of this working group that the oil and gas industry should not be permitted to explore for resources or to develop any type of facility within Zone 1 waters.
10. It is recommended that the FJMC be part of any review process that effects beluga management.
11. We recommend that no mining activities be permitted within Zone 1 waters, and no activities be allowed that will have deleterious effects on Zone 1 waters even though they may not be located in an area designated Zone 1.
12. All shipping traffic should be confined to designated routes and should avoid passing through or close to waters designated Zone 1, even if the shortest route is through Zone 1 waters.
13. No port development should be allowed within or on the shore of any waters designated Zone 1.
14. Impact assessment reviews should consider the effects of the proposal on Zone 1 waters.

15. We recommend that DFO either increase the number of Fishery Officers available during the period when beluga are in the Canadian Beaufort Sea or investigate the feasibility of a "beluga warden" or "beluga guardian" system that would provide training for Inuvialuit and enable them to become directly involved in enforcing hunting regulations.
16. We recommend the Beluga Protection Regulations be rewritten to ensure better protection for beluga and to reflect the Inuvialuit Land Claim IFA Settlement.
17. The IGC should consider implementing specific hunting rules beyond those provided in the Beluga Protection Regulations.
18. The general prohibition of disturbance contained in the Beluga Protection Regulations should be applied using the following guidelines:
  - Never chase, disperse or attempt to herd whales.
  - Avoid sudden changes in speed or direction when whales are nearby.
  - Always approach whales at an angle, never from behind, and always travel parallel to their direction of travel.
  - When observing beluga, keep your motor in low gear and remain at least 100 m (300 ft) away. Never separate females from their young.
19. We recommend that Regulations to control commercial use of beluga must be in place before any such use is permitted. The FJMC should request DFO to prepare these regulations, even if no commercial use is contemplated in the near future.
20. Commercial use should not be allowed until it is covered by an international agreement, and division of TAC between Canada and the USA is agreed upon.
21. We recommend that user groups not draft regulations although they should be consulted during the process.
22. Under no circumstances should commercial use be permitted under the guise of excess domestic catch.
23. Commercial sale of beluga products should be an available option to communities and should be controlled through a section in the Beluga Protection Regulations.
24. The DFO scientific permitting system should continue, but DFO should not make unilateral decisions regarding disposition of beluga. Whales captured under permit must be from the TAC, and each permit must make specific regulations regarding the capture and disposition of the captured animals.
25. We recommend that permittees must provide the FJMC with a copy of their report to DFO from any research permits issued.
26. The decision to allow commercial use of beluga should remain with the Minister of Fisheries and Oceans and the Government of Canada.

27. Commercial fishing in the Canadian Beaufort Sea should be regulated with regard to beluga food species and the FJMC in managing such fisheries must consider the food requirements of beluga.
28. DFO and the FJMC should increase the research effort on ecological relationships, beluga food habits and beluga energetics.
30. DFO beluga research in the Beaufort Sea should be directed toward the goal and objectives of this Management Strategy.
31. If commercial use of beluga is legalized, the decision on the portion of the TAC that will be designated as a commercial quota and its distribution be the responsibility of the IGC and the appropriate HTC's. All consumptive uses must be part of the TAC.
32. The IGC and the appropriate HTA's should derive an equitable division of total allowable catch either among the settlements using the resource or among the hunters using the resource by January 1, 1988.
33. Allocation to whatever level the IGC and HTC's judge appropriate should be done by percentage of TAC rather than by number of beluga; this will allow allocation to be self-adjusting if the TAC changes.
34. No consumptive use of the beluga resource in excess of the domestic harvest should be allowed until a workable system of allocation of TAC is in place and a management agreement has been reached with the United States, and all consumptive uses are considered part of the TAC.
35. The current practice of having harvest information collected by a monitor resident in each traditional whale hunting area should continue as the basis for future data collection.
36. Adequate funding for harvest monitoring should be provided annually as part of the overall harvest study.
37. DFO should design and conduct aerial census surveys every three years beginning in 1989.
38. A biological sampling program should be conducted every three years beginning in 1990. This program should alternate with the aerial survey program.
39. DFO should plan for biological sampling every three years beginning in 1990, and ensure that money for analysis is available.
40. The FJMC should contact the Government of the NWT Department of Education, DFO and the IGC to investigate the public education requirement and to plan for programs that will provide the necessary training.
41. We recommend that education in the schools and whaling camp participation be included as integral parts of any proposed education program.

## REQUIRED RESEARCH

There are, at present, many gaps in the data base available on the beluga of the Beaufort Sea. Sound, long term management will require that these information gaps be rectified as soon as possible, and that cooperative research programs with Alaska be initiated. In order to obtain scientifically useful data to answer some of these questions, it will be necessary to sample from all age and sex classes at various times throughout the year.

The following studies are recommended.

### High Priority

1. Determine the relationship between the beluga summering in the Canadian Beaufort Sea and the beluga summering in the American Beaufort Sea and other Alaskan waters. This study will require major funding and should be a joint program between Canada and the USA (Alaska). \$100,000 is suggested for initial year funding.
2. Determine the total number (landed and lost) harvested each season by Inupiat from the Beaufort Sea beluga population. The USA, State of Alaska, should be urged by DFO provide this information annually as a contribution to management.
3. Plan for a detailed examination of struck/lost rates, to include wounded/killed and efficiency of various hunting techniques and strategies. This study should be funded by DFO. Estimated annual O&M costs in 1986 dollars is \$30,000.
4. Determine the reasons why beluga use the Mackenzie River Estuary and the significance of their interactions with temperature/salinity and other ocean gradients. This study should be funded by DFO. Estimated annual O&M cost in 1986 dollars is \$25,000. This study is a continuation of work already begun.

### Medium Priority

5. Determine the behavior, feeding and movements of beluga during July and August using observation towers, helicopters, radio and/or streamer tags and a widely deployed Sonobuoy array. This study must be structured to provide the data required to manage the Beaufort Sea beluga. Both migration and seasonal movement patterns must be included in the study. This study could be part of study #9, but it is of greater value than the larger study. DFO should plan to fund this study, the annual costs of which are estimated at \$60,000 O&M.
6. Determine the short term ~~and short term~~ and long term effects of barge and other vessel traffic on the beluga. Annual cost of this study is estimated at \$15-20,000 O&M. The study is the responsibility of DFO; and is a continuation of work that has been initiated.

Low Priority

7. Investigate beluga vocalization and communication in the various areas of the Canadian Beaufort Sea. DFO would be responsible for a study of this nature which has an estimated annual cost in 1986 dollars of \$50,000. Some initial work on this problem has been done.
8. Determine the effect of stationary structures on beluga. This study should be part of the DFO aerial survey (monitoring) program. Annual cost above existing survey program based on 1986 dollars is estimated at \$50-60,000.
9. Determine the general food habits and feeding behavior of the beluga, focussing on seasonal and age variations. This study should be funded as part of a joint agreement with the USA (Alaska). DFO should lead the Canadian input and coordinate Canadian funding. Cost cannot be estimated at this time.
10. DFO should initiate a study to determine the propensity of beluga to concentrate pollutants.
11. Studies must be directed towards some general information of beluga such as the mating system including the place and time of mating and of parturition.
12. The rates and causes of natural mortality in beluga should be investigated.

## RECOMMENDED INITIATIVES

Several initiatives, both short and long term, are required for this Management Strategy to be successful. The cooperation of the Inuvialuit, DFO and other government departments and various industries, the most obvious being the petroleum industry, must underpin any Beluga Management Strategy.

The success of this Beluga Management Strategy will also depend on cooperation between Canada and the United States since the Beaufort Sea beluga migrate across the Yukon/Alaska border and are harvested in both countries. The Government of Canada should negotiate a formal Beaufort Sea Beluga Management Agreement similar to the agreement for the Porcupine Creek herd with the United States of America at the earliest possible opportunity and strive for an immediate informal agreement to ensure total annual removal of beluga does not exceed the sustainable yield.

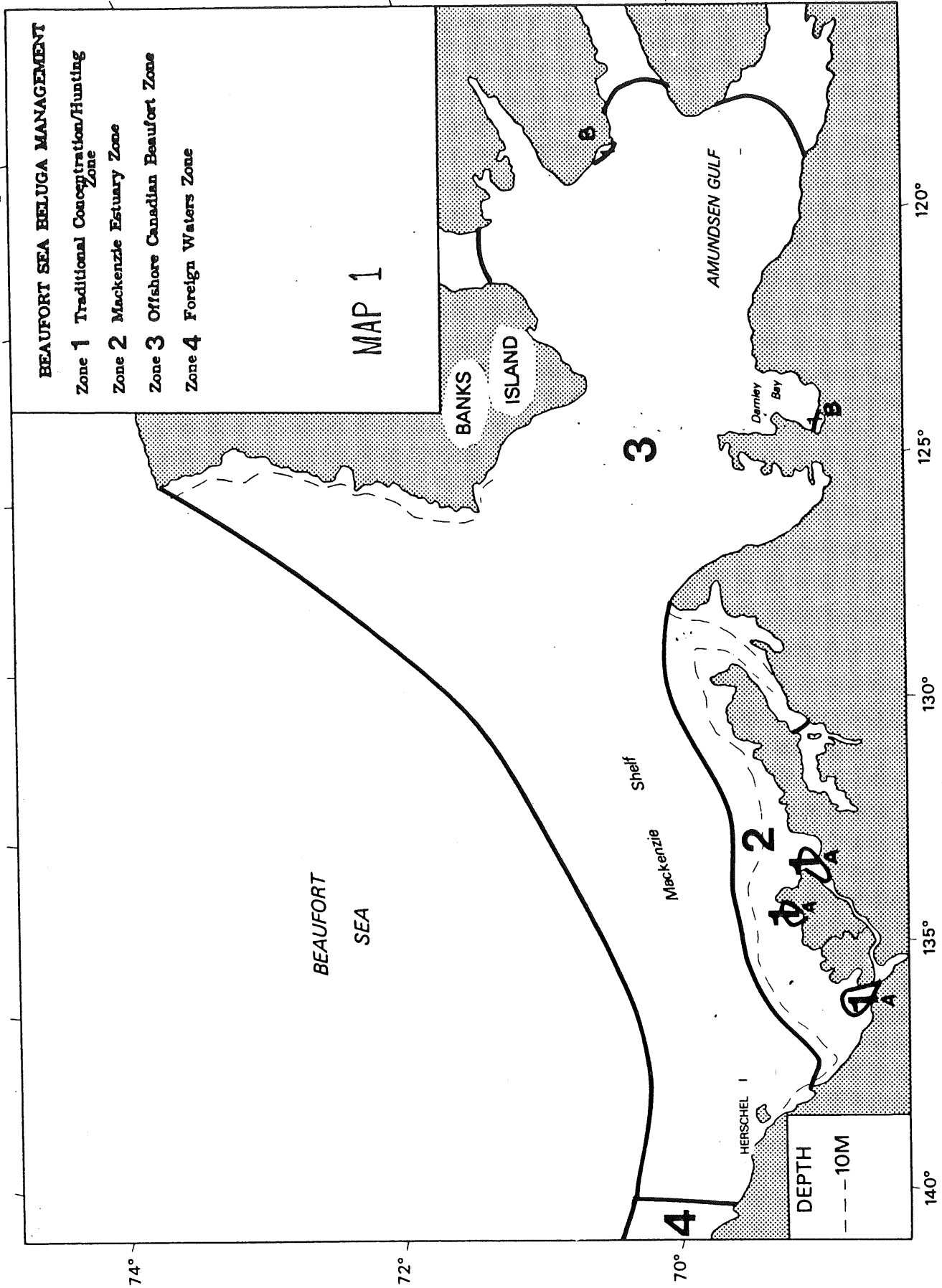
This Beluga Management Strategy should be an integral part of an overall land use plan for the Canadian Beaufort Sea.

The following items are judged to be top priority:

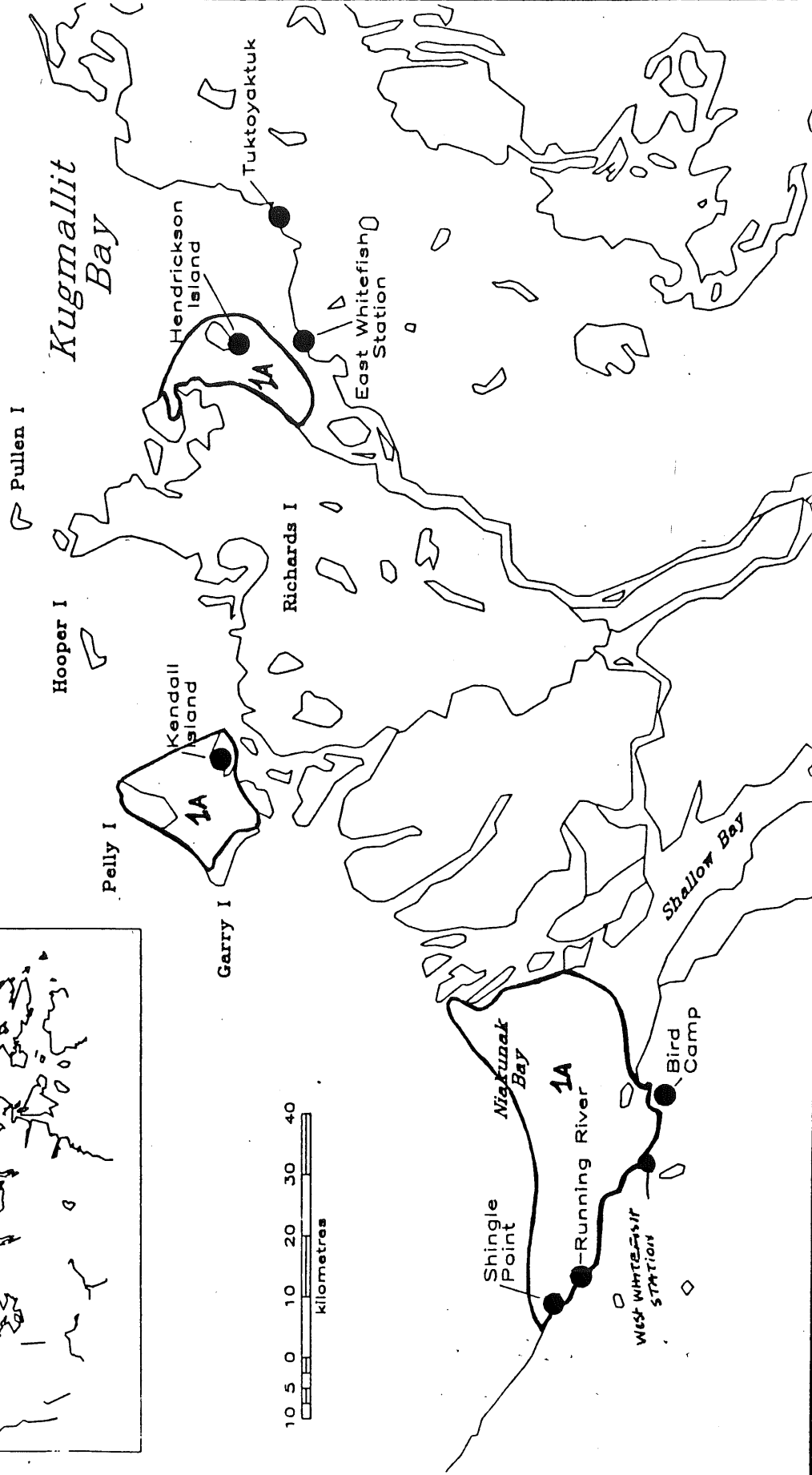
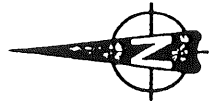
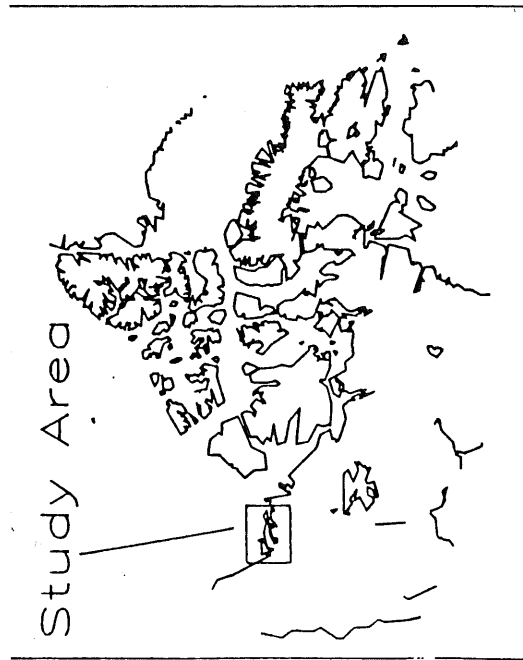
1. A realistic TAC figure, based upon "best available" information, for the Inuvialuit harvest in the Canadian Beaufort Sea should be agreed upon for 1988 by the Inuvialuit and DFO and updated annually. Derivation of TAC is the responsibility of DFO.
2. Allocation of the TAC between the HTC's involved and considering domestic and commercial use (if desired) should be agreed upon. Allocation of TAC is the responsibility of IGC.
3. The suggested beluga management zones should be created by amending the Beluga Protection Regulations or through some other existing body of regulations.
4. The Beluga Protection Regulations should be rewritten to include changes recommended on pages of this document.
5. All government agencies and departments involved in regulating industry or commerce that might impinge on the well-being of beluga or their habitat should be informed of the salient points of this Management Strategy to enable them to make decisions based on all available information. The FJMC should request committees such as ARCOD, AWAC and EACAMT to table the Beluga Management Strategy.
6. The FJMC should initiate the development of a training and instruction program to provide for the direct involvement of Inuvialuit in harvest monitoring, specimen collection and basic analysis. Trainees should be available by 1990.
7. The IGC should plan for beluga harvest monitoring on an annual basis beginning immediately in 1987.
8. DFO should identify dollars and PYs to cover biological monitoring every 3 years beginning in 1990.

9. DFO should identify dollars and PY's to cover aerial surveys every 3 years beginning in 1989. The design and timing of aerial surveys should be re-examined to ensure the best possible efficiency.
10. The FJMC should initiate planning to provide a comprehensive public education program.

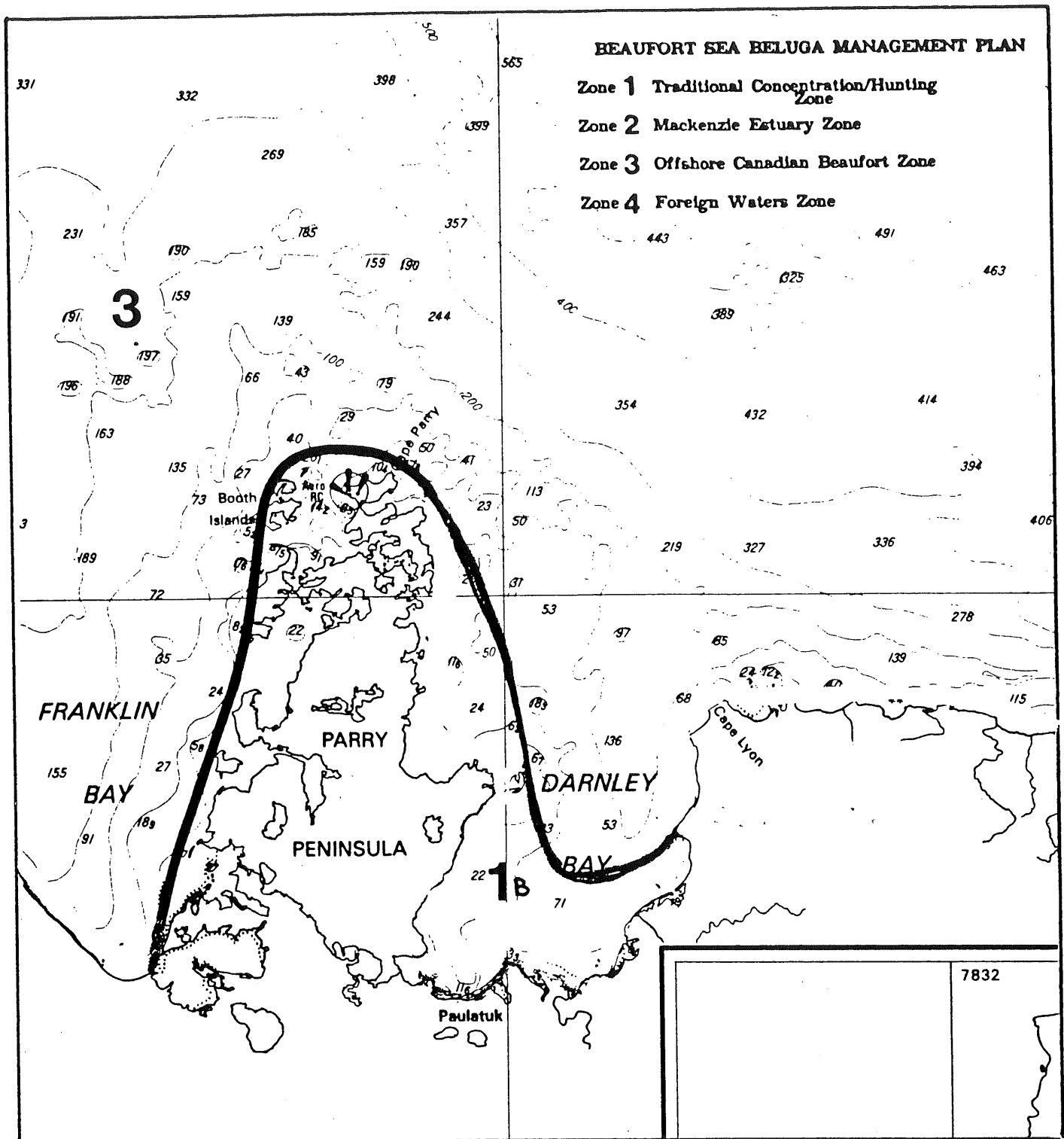
DFO should also begin to allot dollars and PY's to address the information requirements listed as required research. Program proposals or planning should include a synthesis of existing information on the particular question, and be structured to the situation as it exists in the Beaufort Sea. The research planned should take advantage of the best available technology and techniques and also utilize the expertise available within DFO, the private sector and the Inuvialuit.



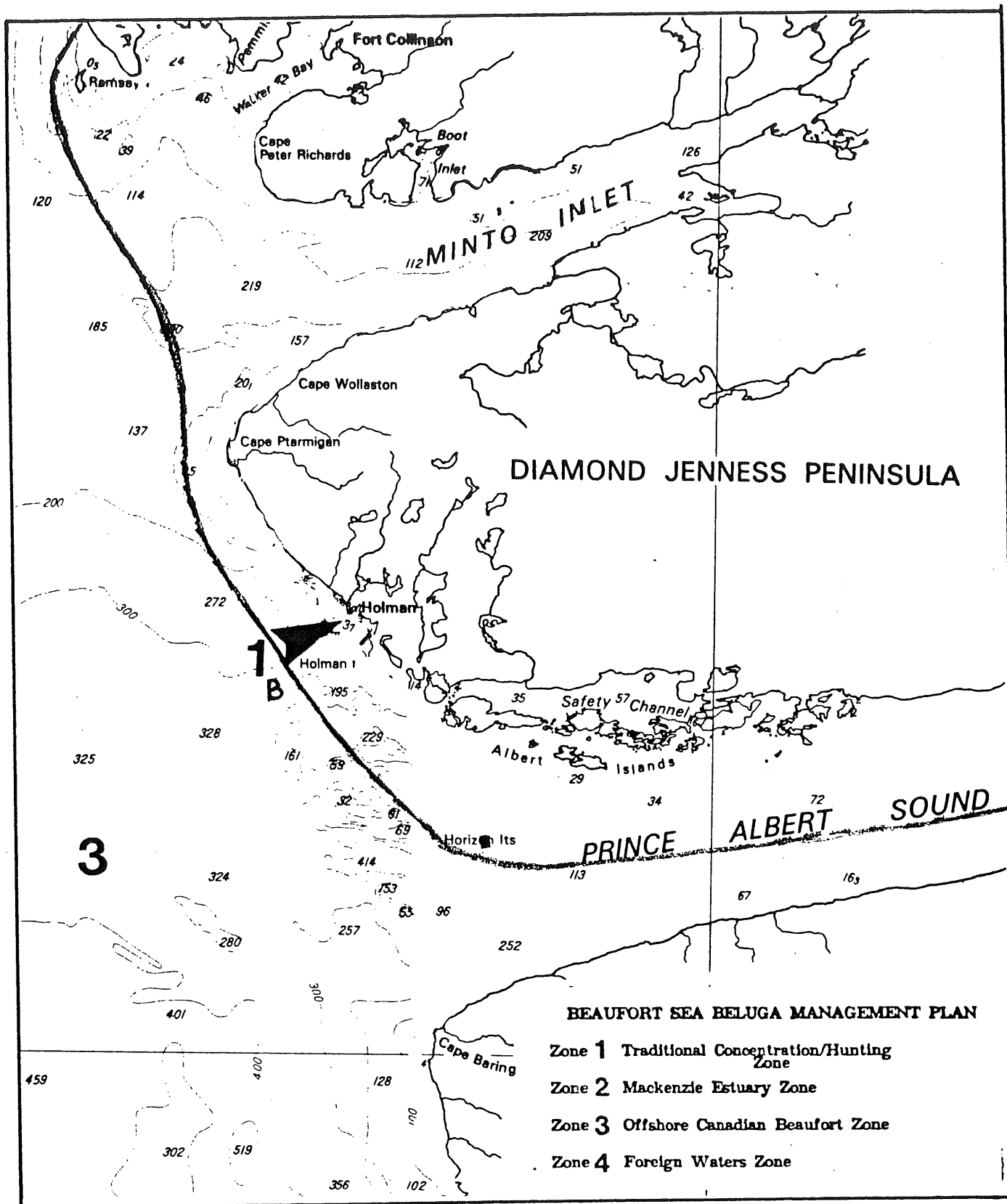
# BEAUFORT SEA



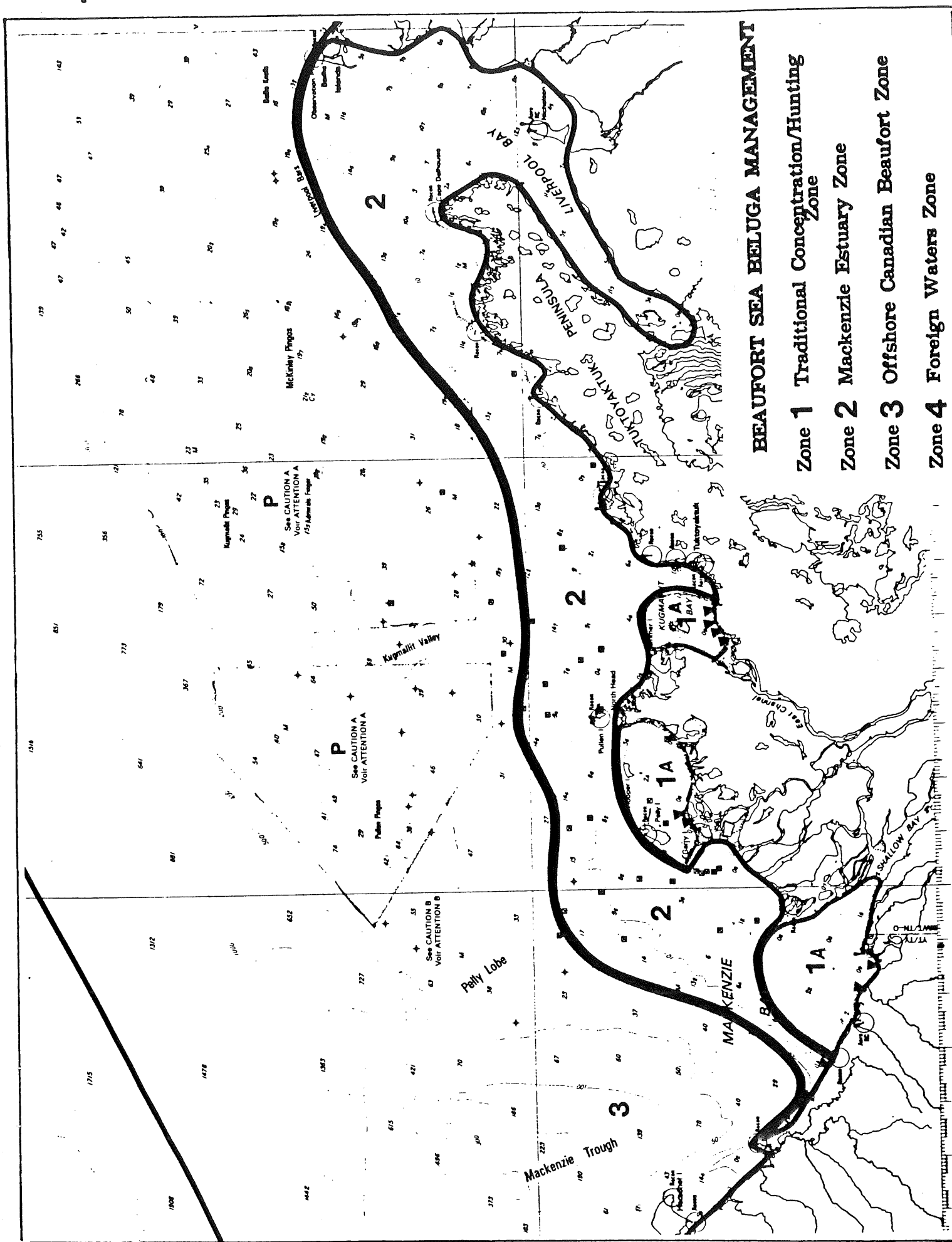
MAP.2 Approximate boundaries of Zone 1A traditional Concentration Hunting areas in Shallow Bay Beluga Bay and Kugmallit Bay.



Map. 3 . Approximate boundaries of Zone 1 Hunting area  
 in the vicinity of the hamlet of Paulatuk

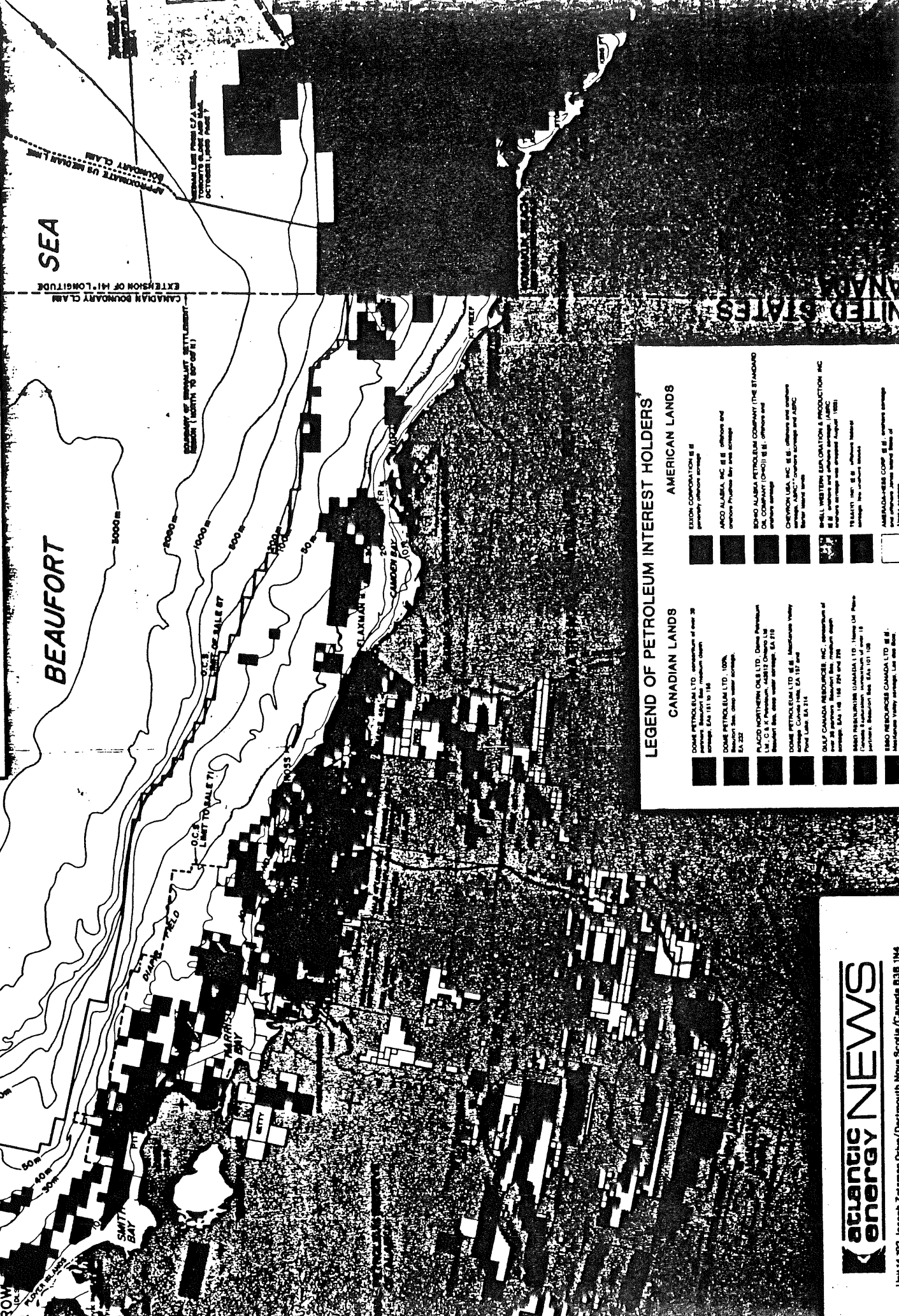


Map 4. Approximate boundaries of Zone 1 Hunting area  
in the vicinity of the hamlet of Holman



Map 6. Map of Petroleum Interests in Beaufort Sea      Canada/USA  
1985

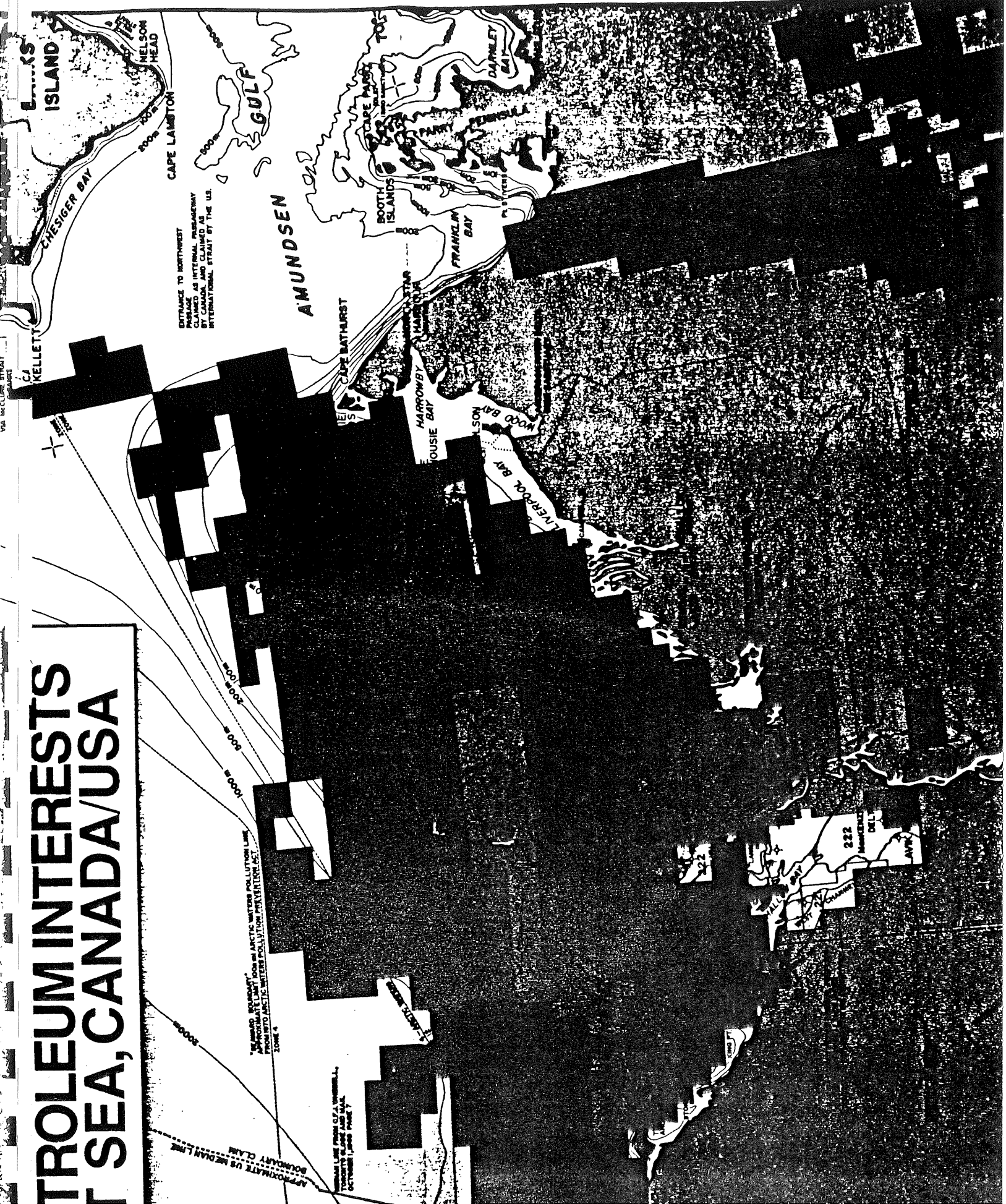
# 1985 MAP OF PETROLEUM BEAUFORT SEA, C.



## LEGEND OF PETROLEUM INTEREST HOLDERS

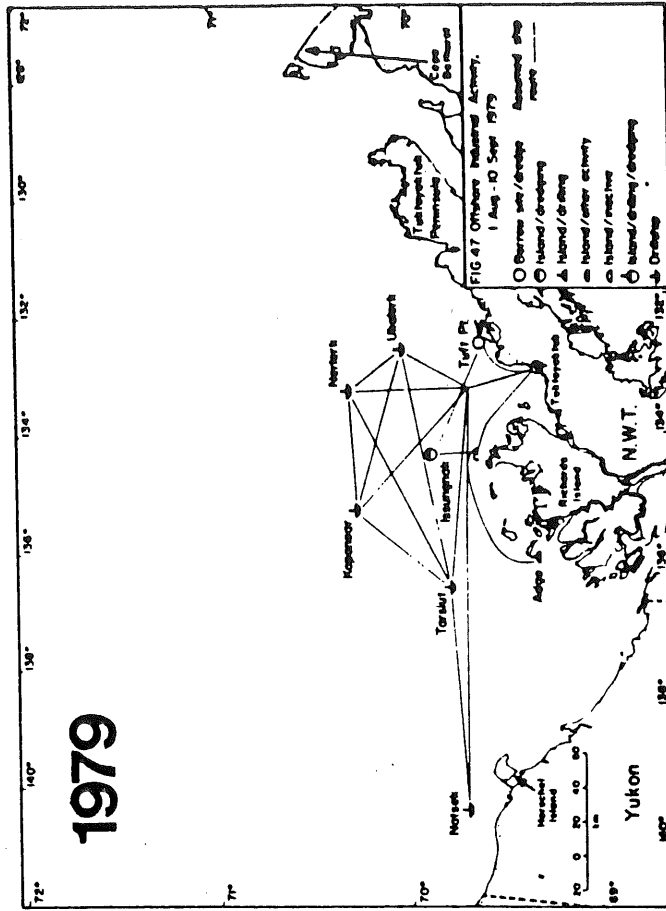
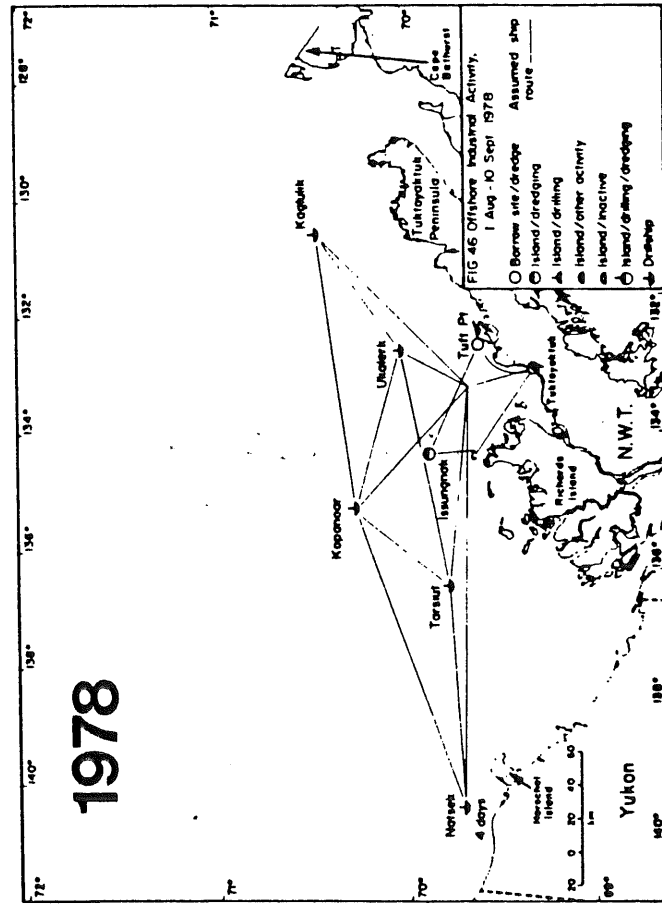
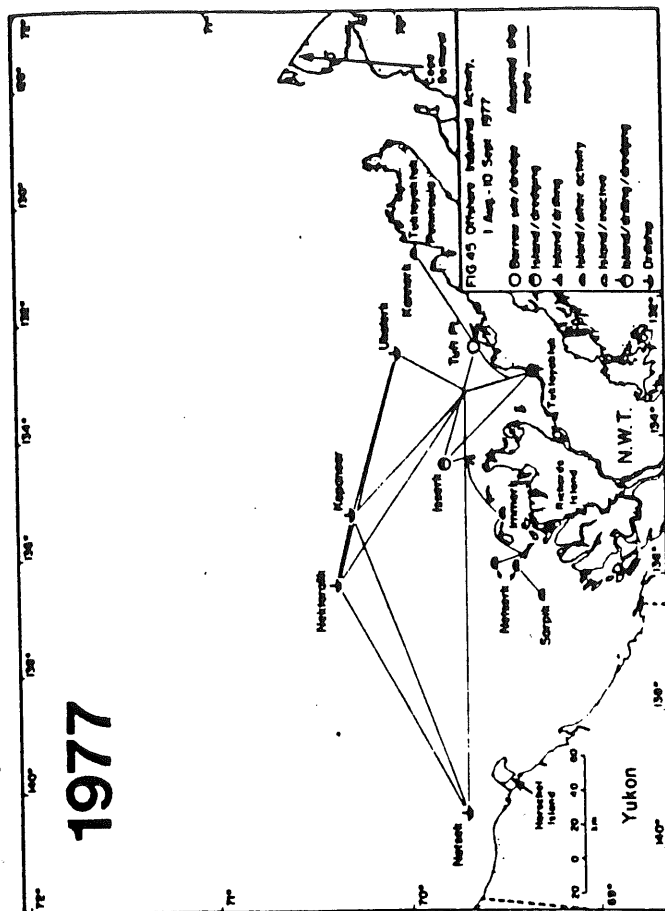
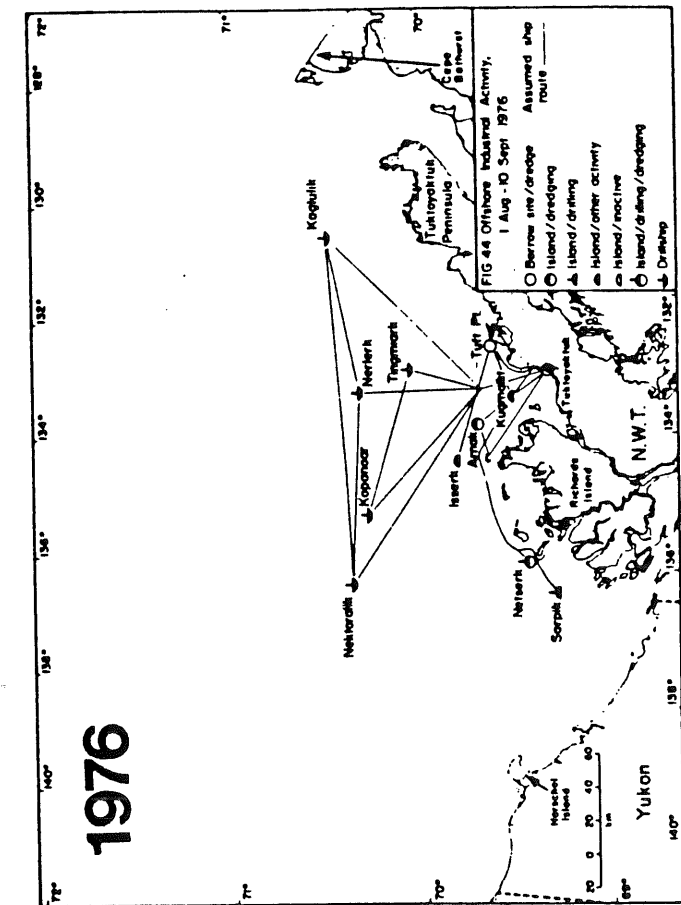
| CANADIAN LANDS |   | AMERICAN LANDS |   |
|----------------|---|----------------|---|
|                | DOMS PETROLEUM LTD. ownership of over 28 percent Beaufort Sea, maximum depth average 540 101 to 114                       |                | EXXON CORPORATION & its subsidiary companies  |
|                | DOMS PETROLEUM LTD. 100% Beaufort Sea, deep water acreage, EA 222   |                | ARCO ALASKA, INC. & its subsidiary companies Prudhoe Bay and acreage  |
|                | ALCO NORTHWEST OIL LTD. Dome Petroleum subsidiary Beaufort Sea, deep water acreage, EA 210                                |                | BP NORTH ALASKA PETROLEUM COMPANY (THE STANDARD OIL COMPANY) & its subsidiary companies acreage             |
|                | DOMS PETROLEUM LTD. & its subsidiary companies Beaufort Sea, EA 117 and 118   |                | CONOCO USA, INC. & its subsidiary companies acreage   |
|                | GULF CANADA RESOURCES, INC. ownership of over 28 percent Beaufort Sea, maximum depth average 540 146 156 176 and 216      |                | WELL WESTERN EXPLORATION & PRODUCTION INC. & its subsidiary companies acreage and acreage owned August 1983 |
|                | WIND RESOURCES (CANADA) LTD. - Home Ltd. Petrol (Canada) subsidiary ownership of over 18 percent Beaufort Sea, EA 101 102 |                | TRIDENT LTD. & its subsidiary companies acreage   |
|                | EMCO RESOURCES CANADA LTD. & its subsidiary companies Beaufort Sea, EA 101 102  |                | AMERGA-HES CORP. & its subsidiary companies acreage and acreage owned United States of America              |

# PETROLEUM INTERESTS IN THE ARCTIC SEA, CANADA/USA

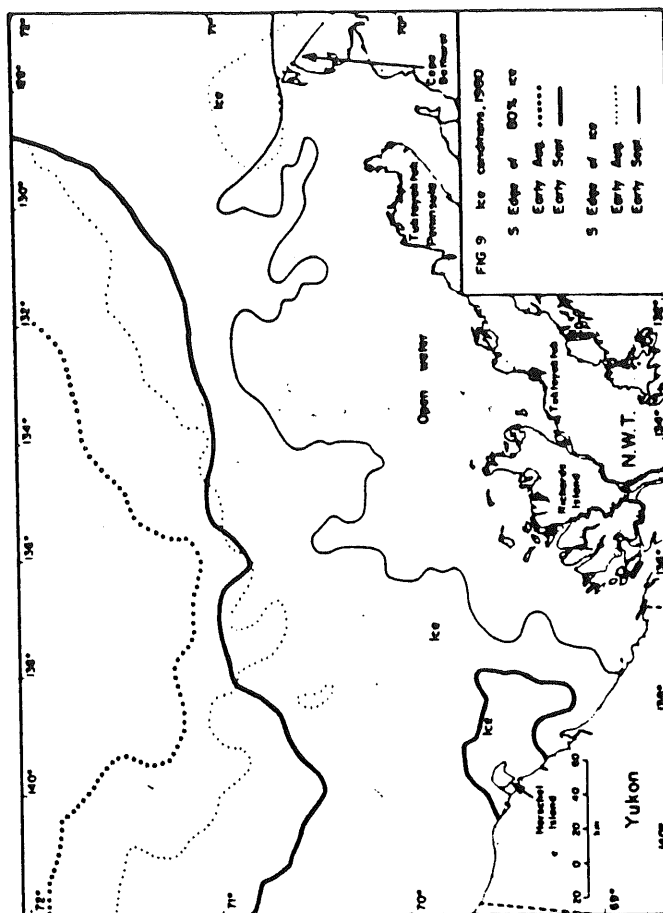
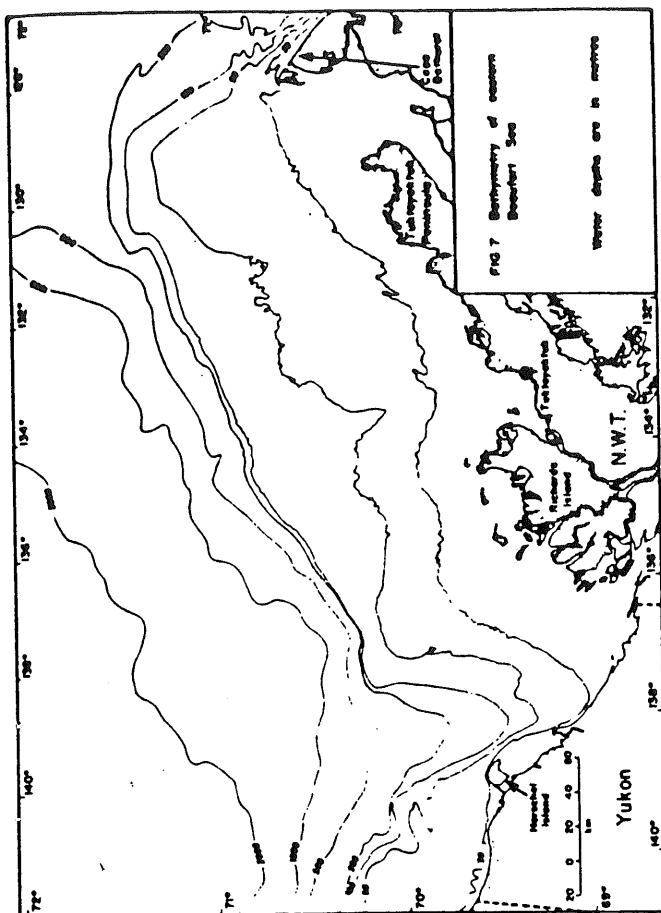
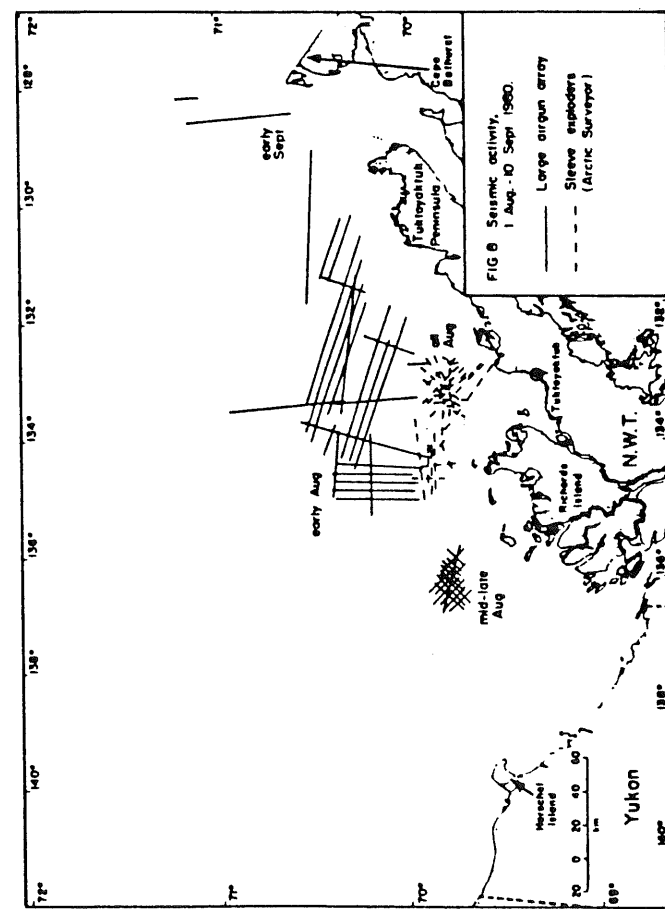
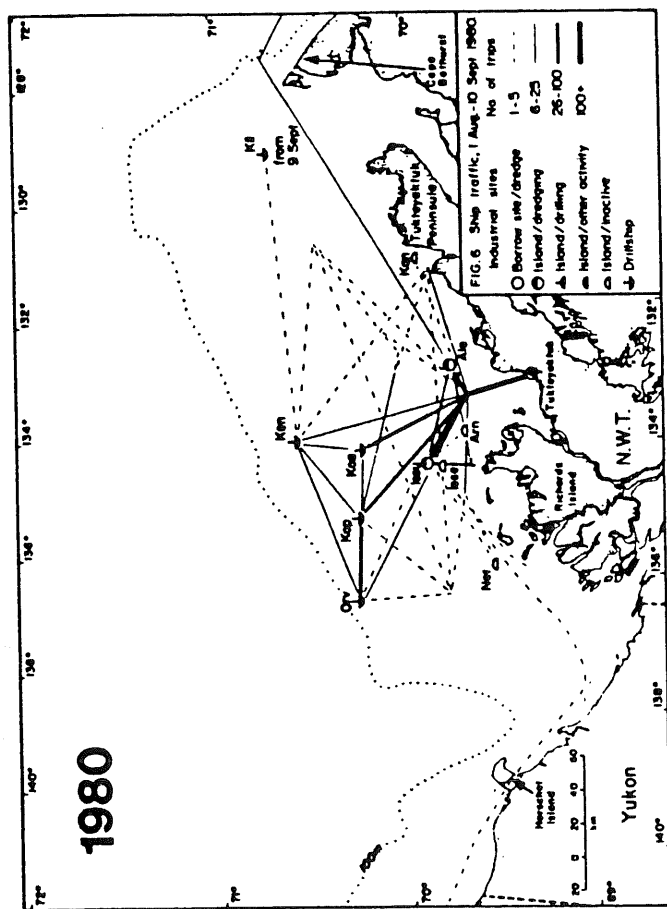


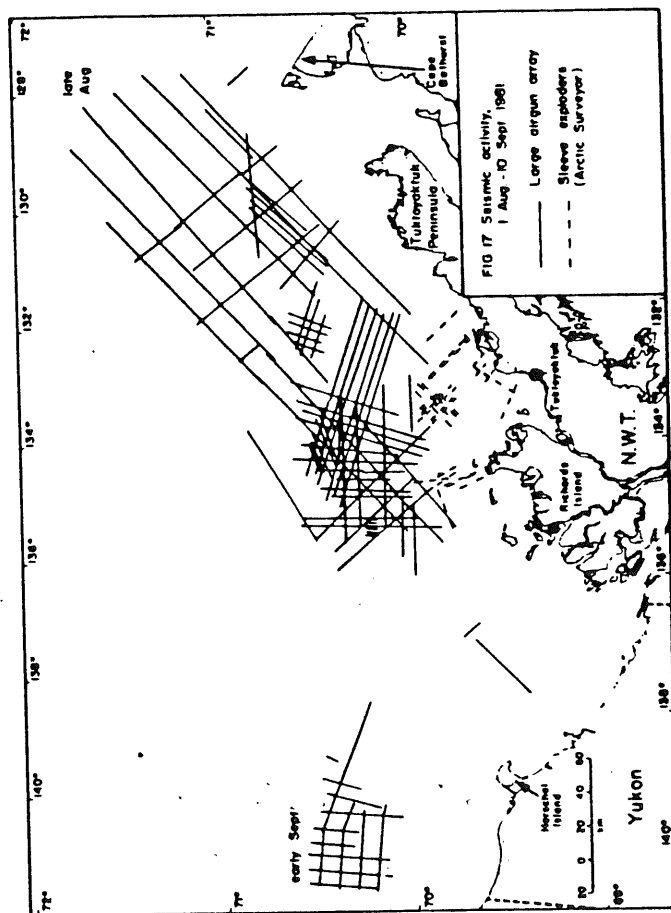
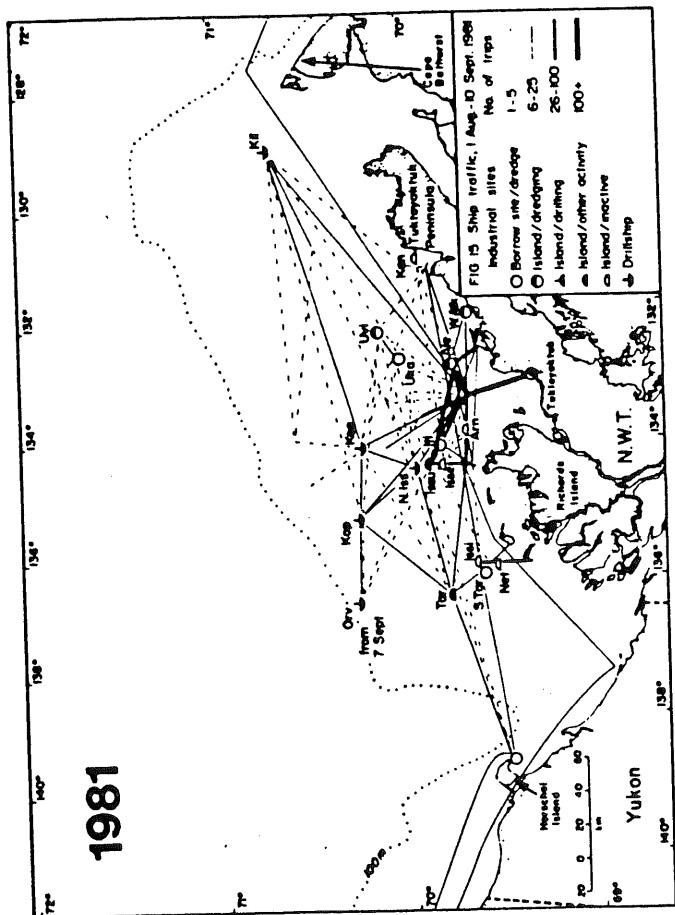
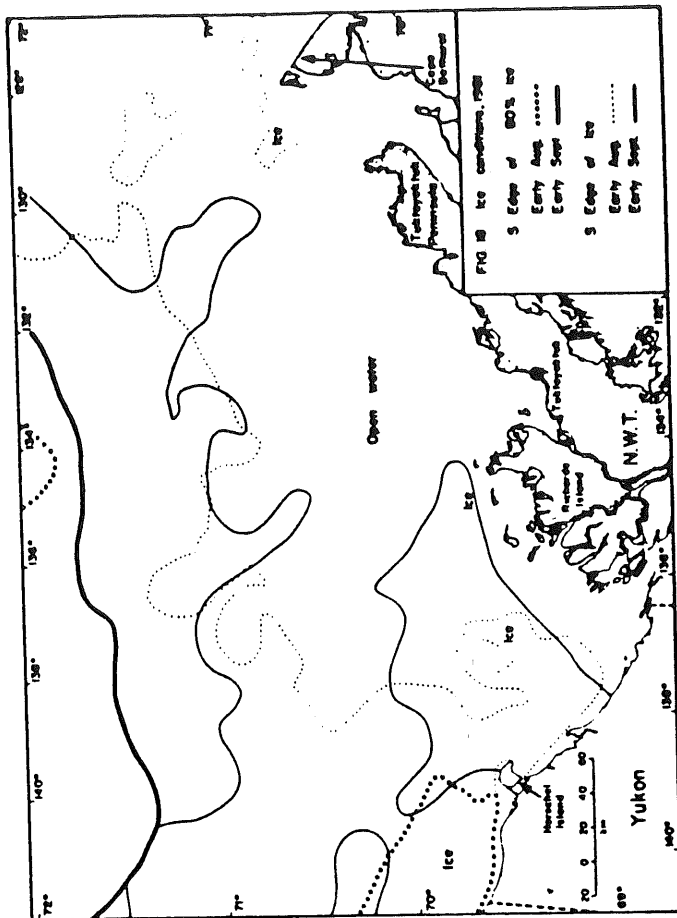
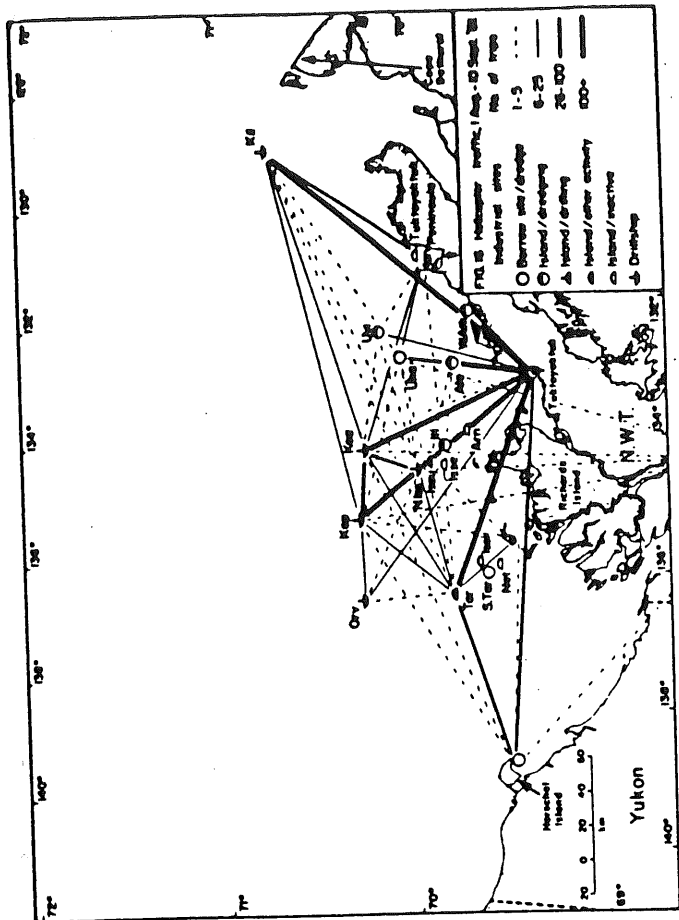
Map 7. a - f. Record of industrial activities on the Mackenzie Shelf, with emphasis on drilling, dredging and seismic operations 1976 to 1984, inclusive.

(Taken from Richardson et al. 1985 'Distribution of Bowheads and Industrial Activity - 1980'84')

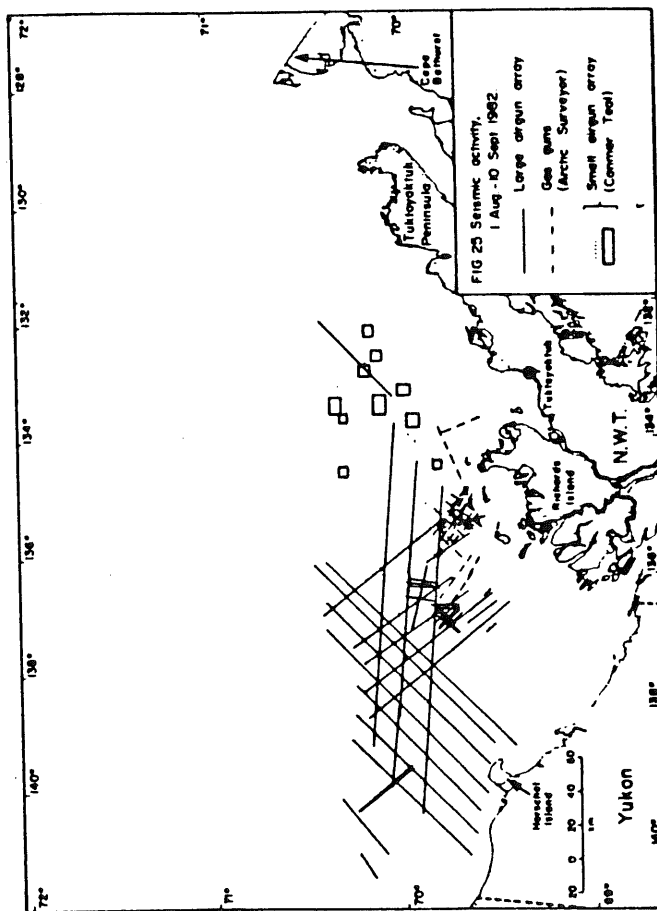
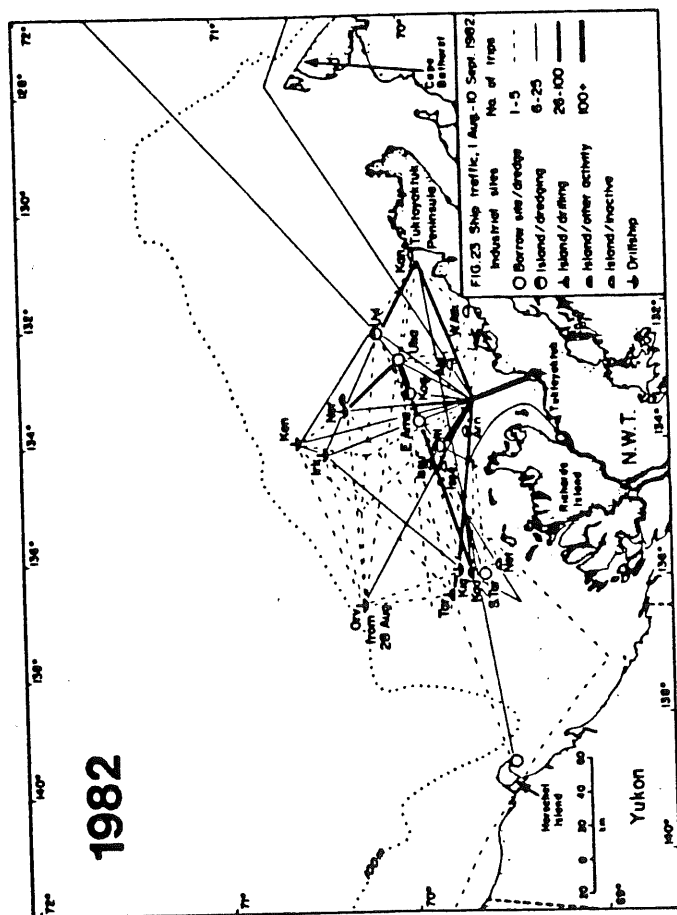
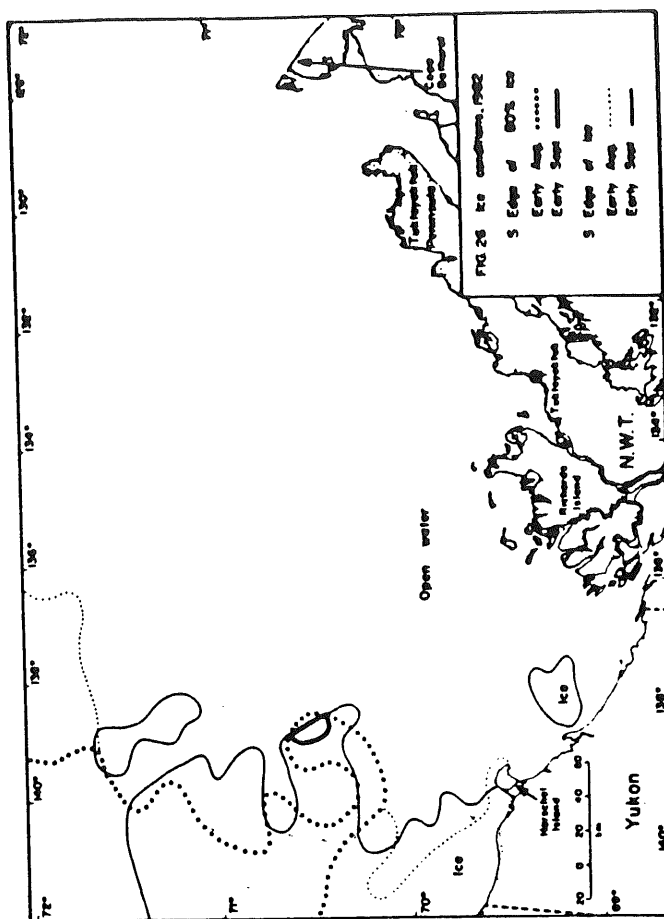
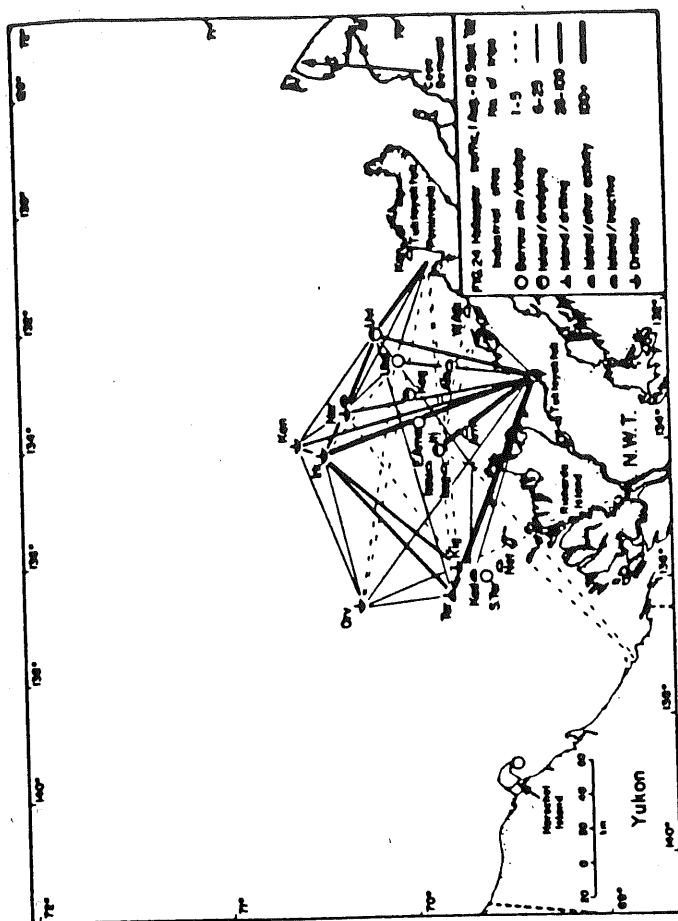


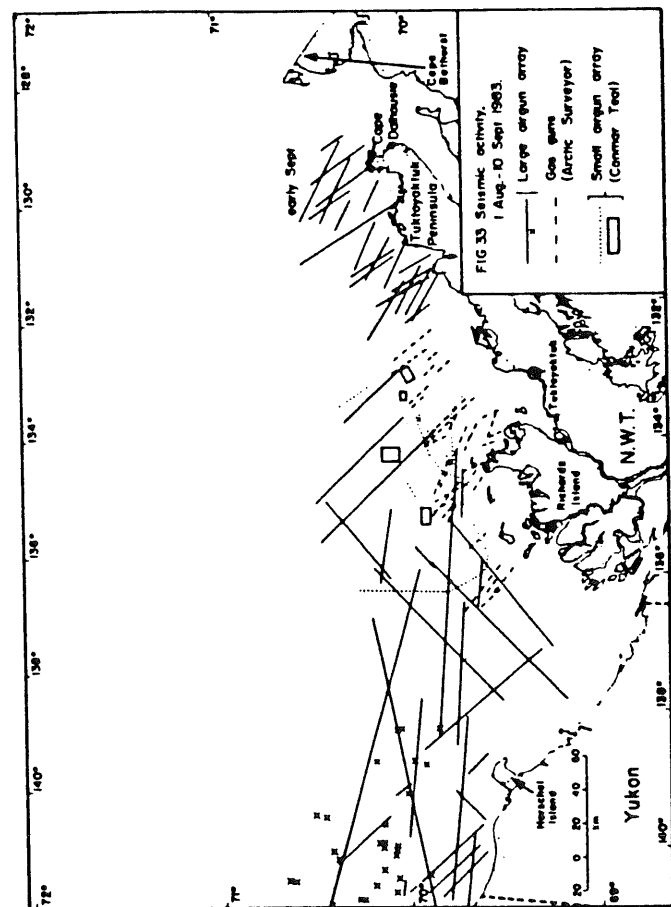
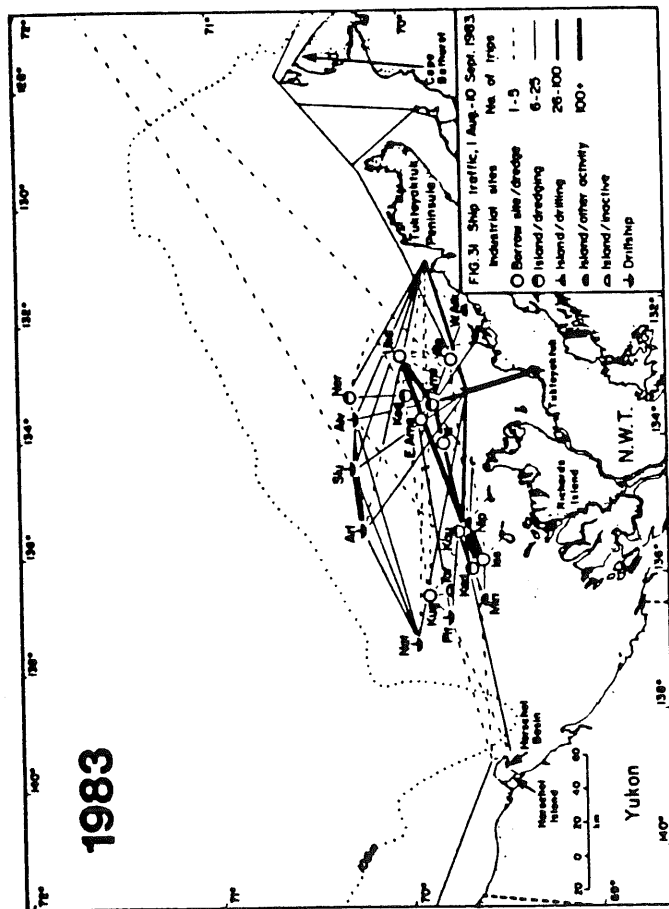
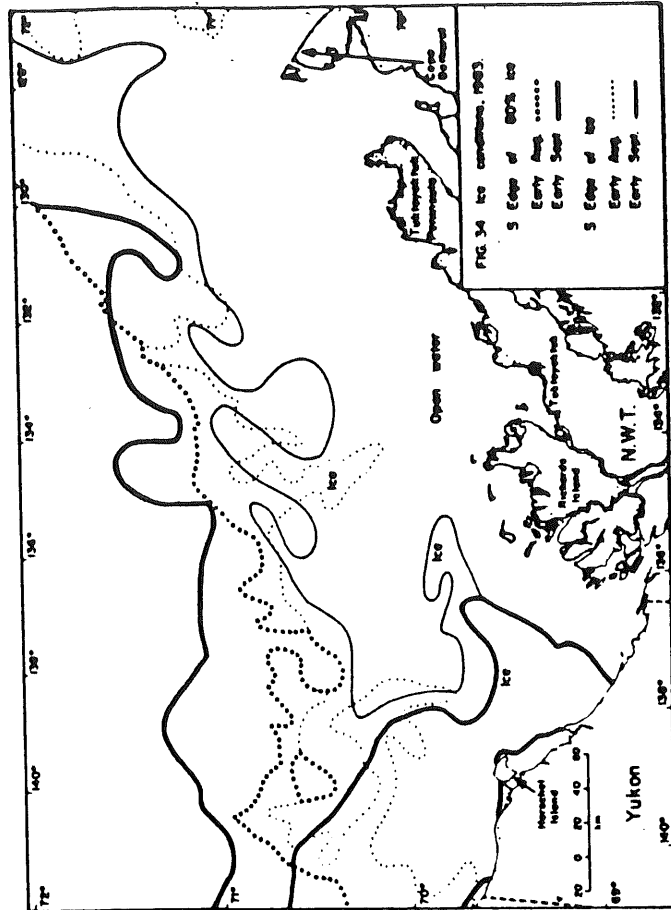
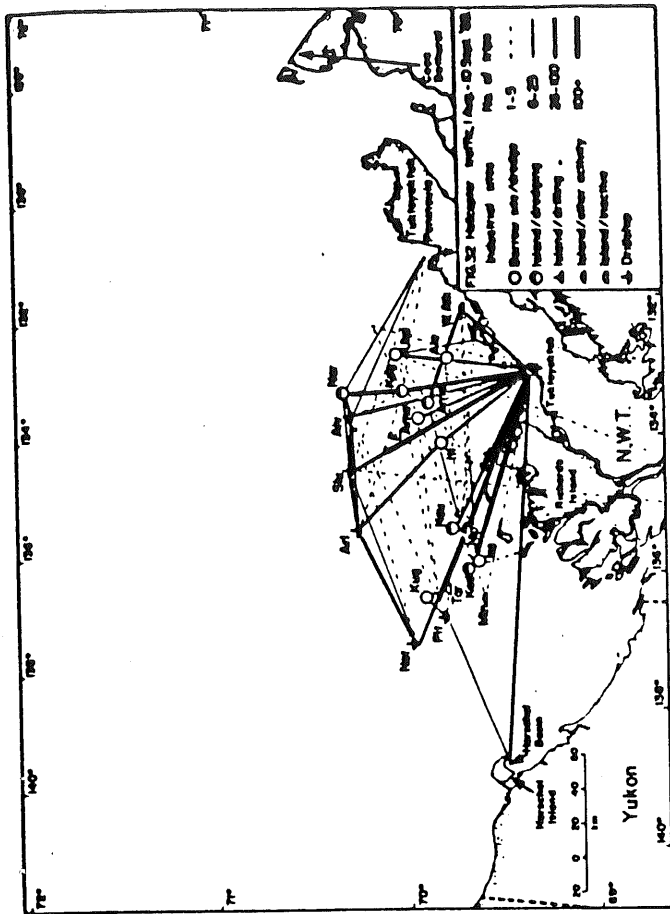
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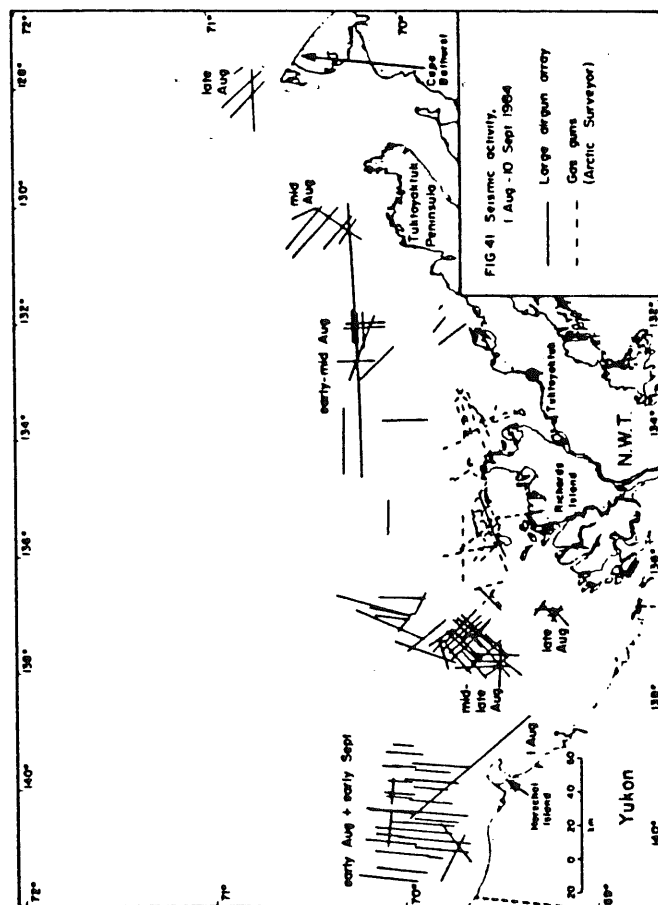
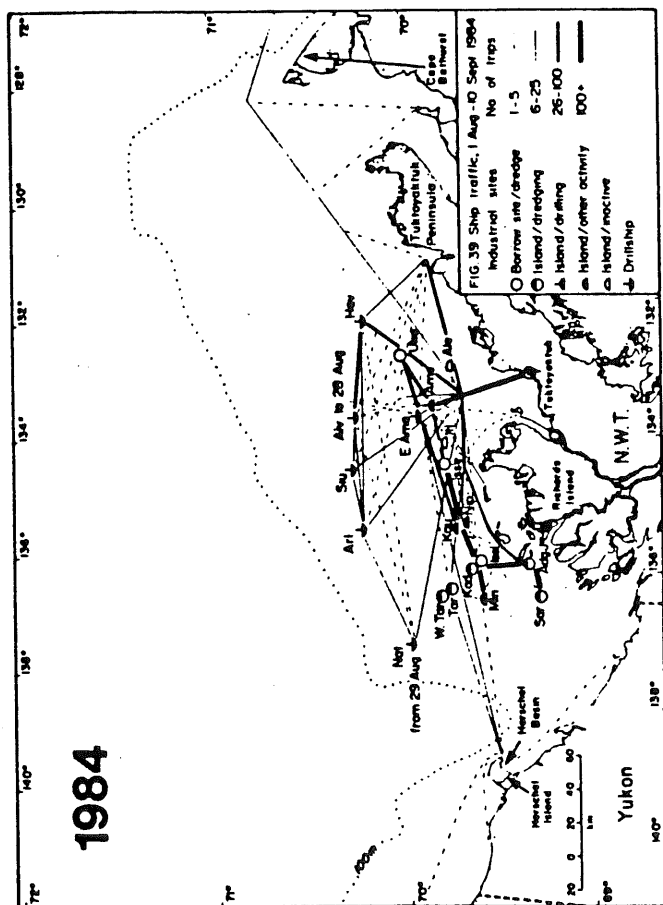
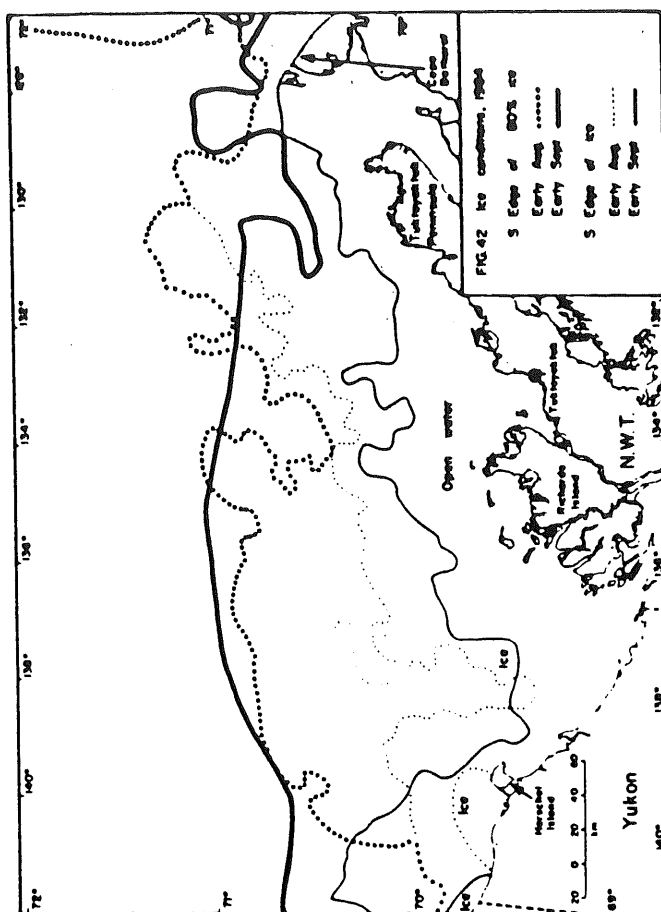
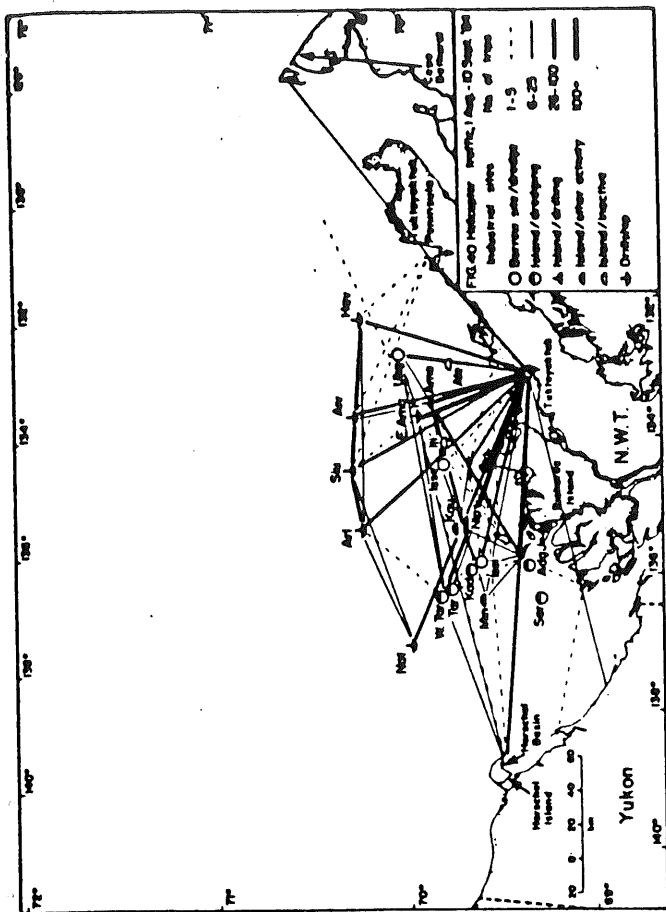




1981

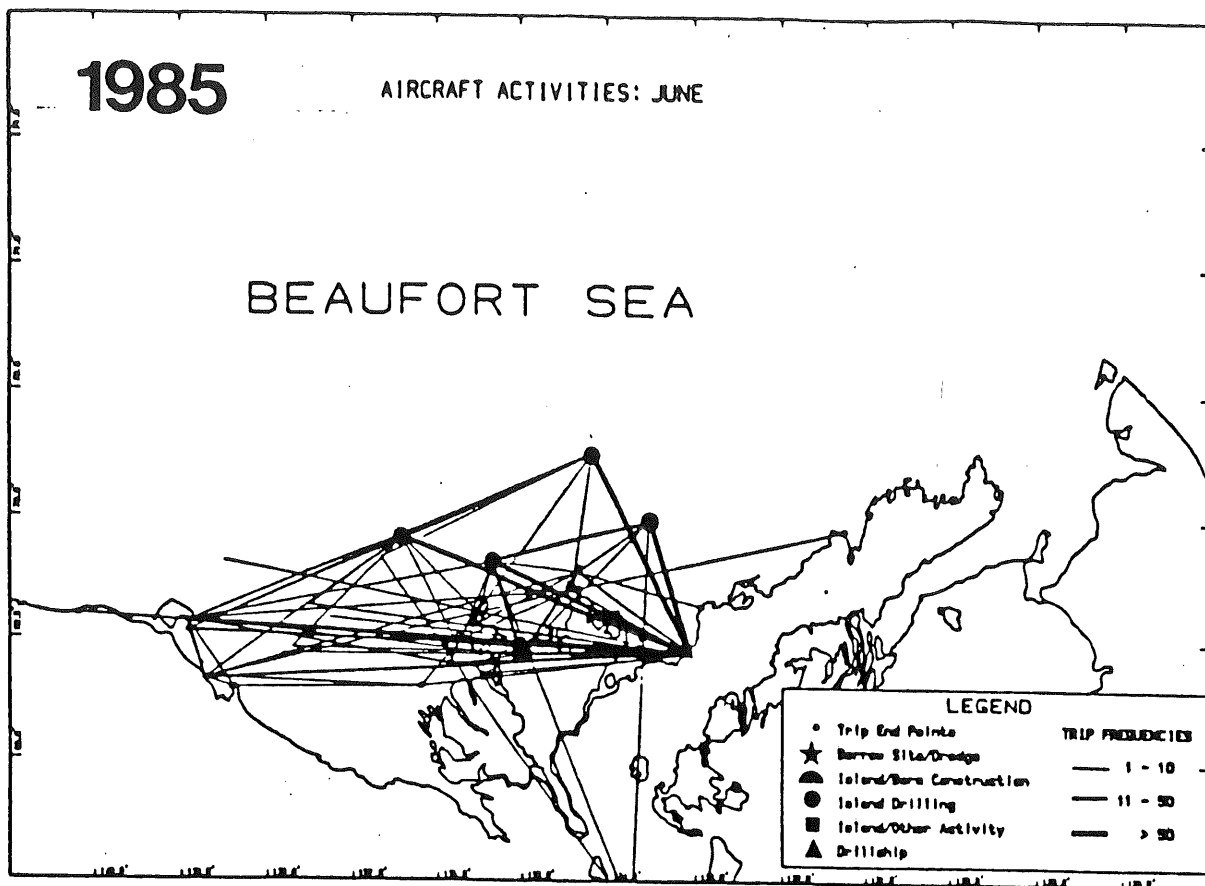




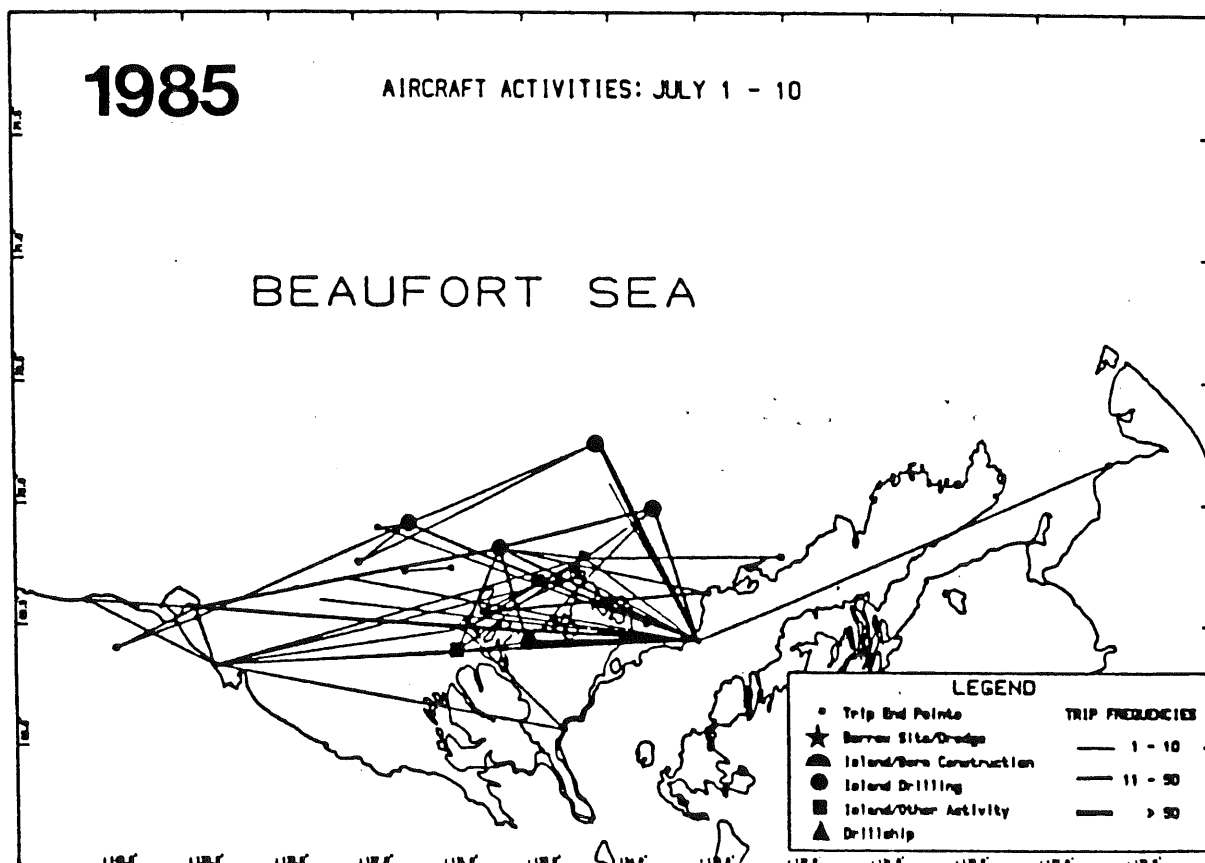


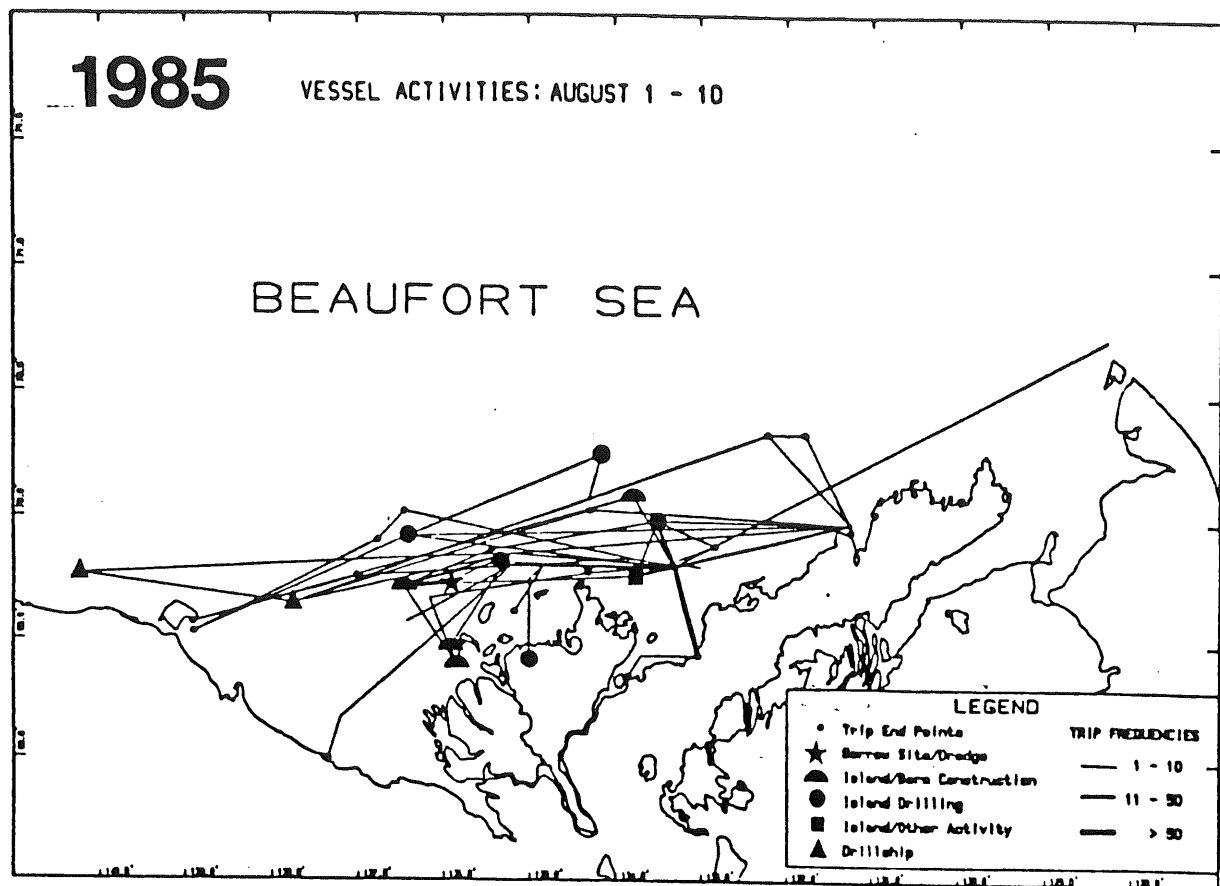
Map 8. a - c. Record of industrial activities on the Mackenzie Shelf, with emphasis on vessel and aircraft movements and seismic operations - 1985

(Taken from Norton and Mcdonal 1986 'Compilation of 1985 Industrial Activities in the Canadian Beaufort Sea')

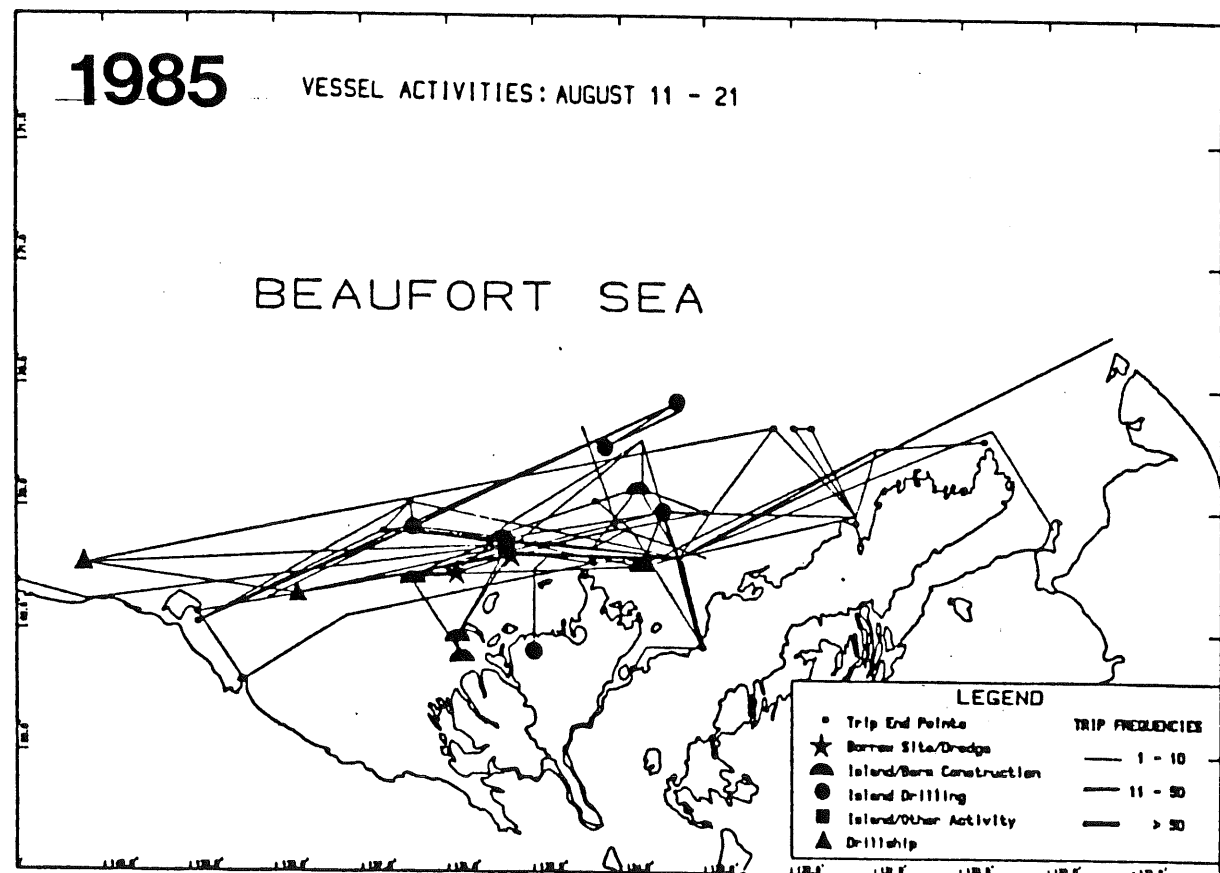


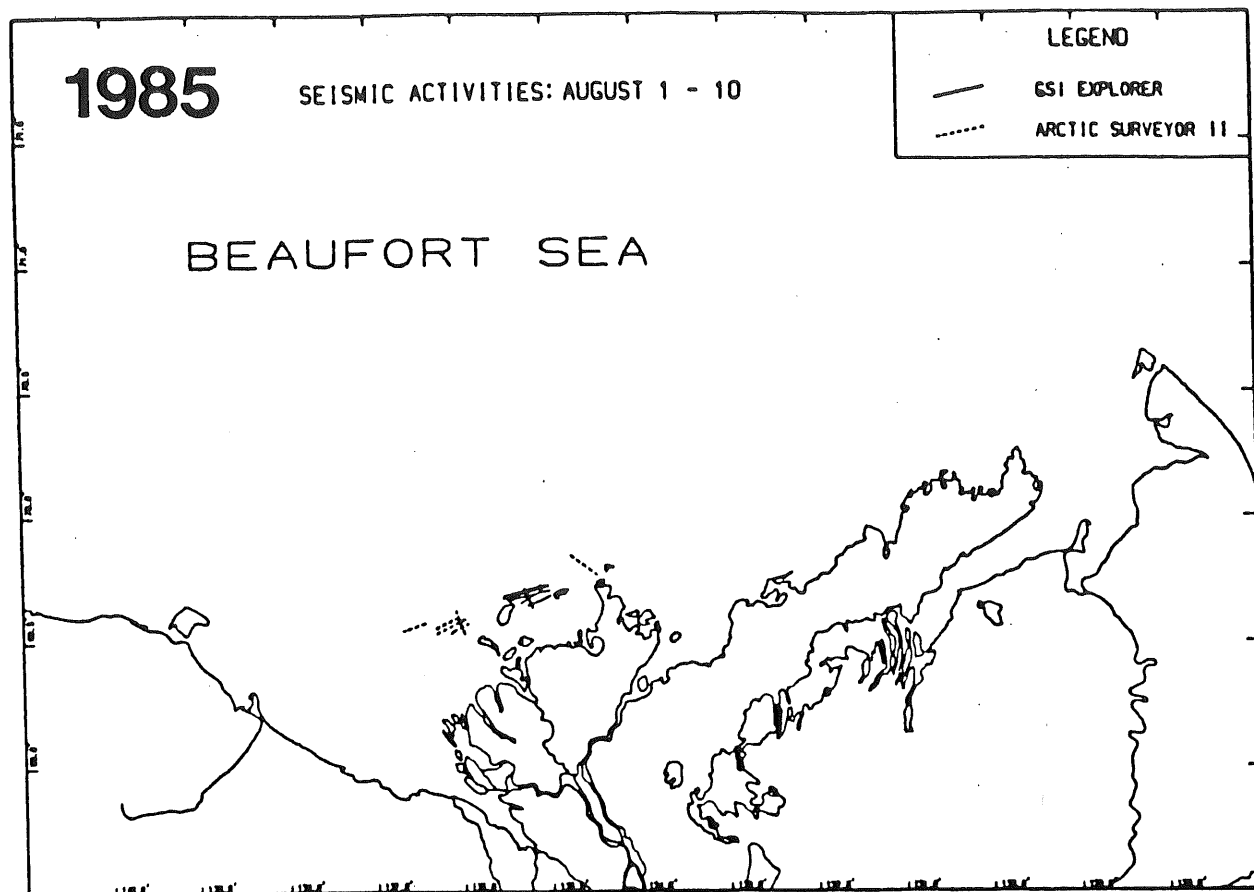
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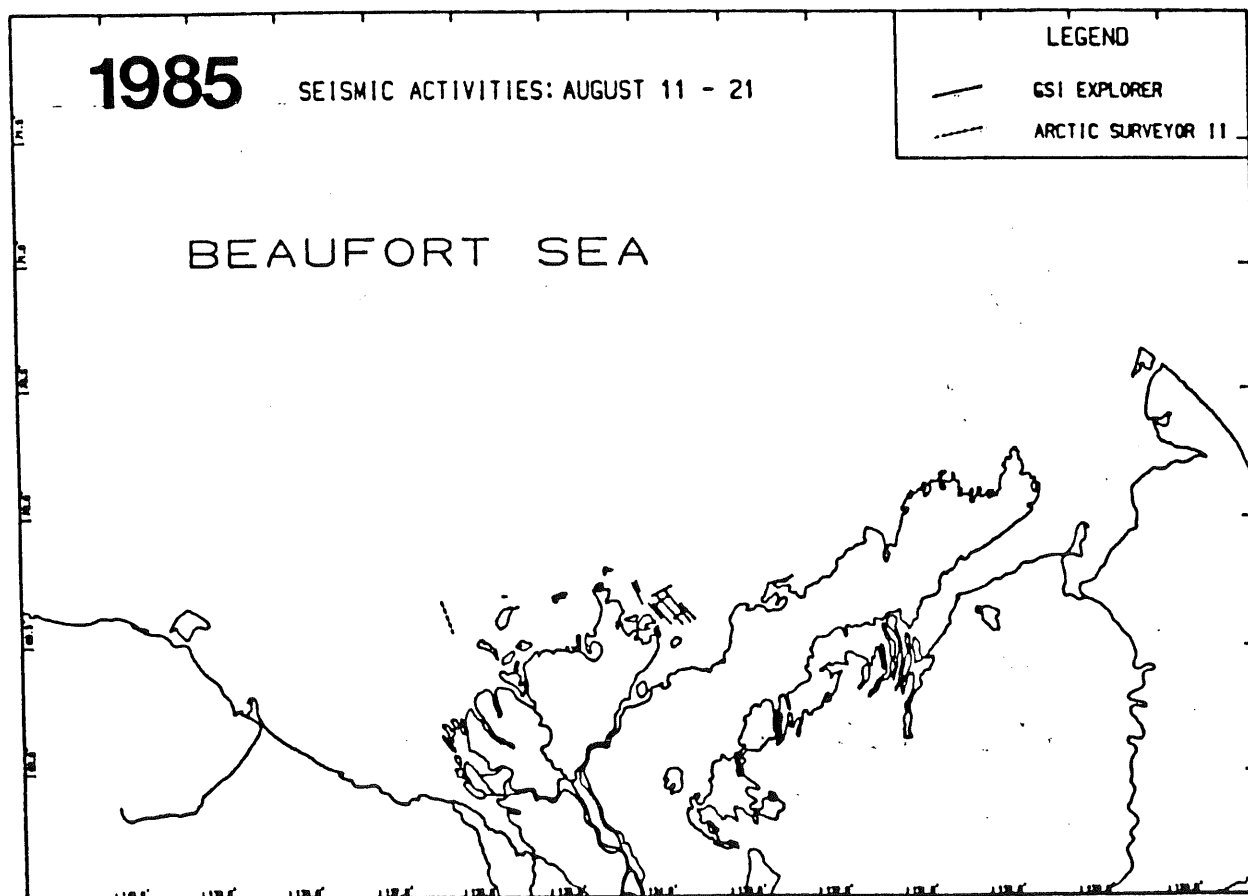


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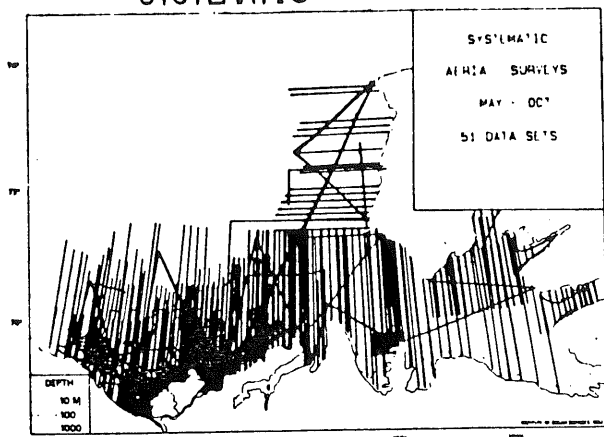
8c



Map 9: Beaufort Sea Aerial Whale Surveys 1955-1983.

# BEAUFORT SEA AERIAL SURVEYS FOR WHALES 1955 - 1983

## SYSTEMATIC



## RECONNAISSANCE

