Socio-Economic Importance of Marine Wildlife Utilization

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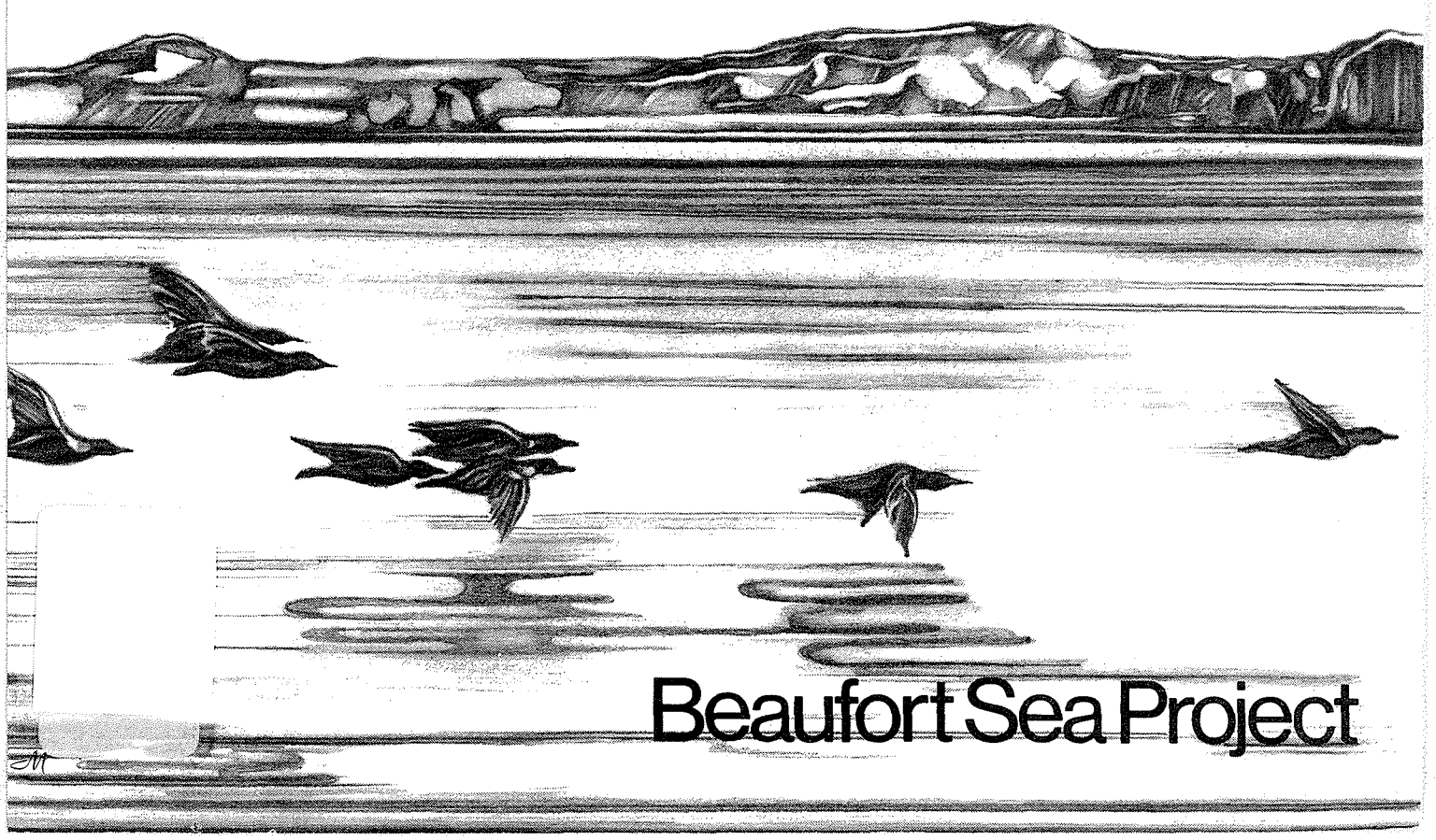

Beaufort Sea Project

THE SOCIO-ECONOMIC IMPORTANCE OF WILDLIFE RESOURCE UTILIZATION IN THE SOUTHERN BEAUFORT SEA

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1. SUMMARY

This study considers the socio-economic importance of fishes, beluga or white whales, seals, white fox and polar bears to Inuit, Metis and Indians living adjacent to the Beaufort Sea. Factors considered as 'socio-economically important' include the level and distribution of local and export sales, domestic uses of wildlife harvests, employment and income. Neither sociological changes nor the cost of compensating for any environmental changes caused by industrial activities are considered in this analysis.

There is a mosiac of socio-economic and marine wildlife utilization for two separate and distinctly different economies. The Mackenzie economy encompasses the settlements of Aklavik, Inuvik and Tuktoyaktuk (known as Tuk) and is closest to the current drilling operations in nearshore and offshore waters of the Beaufort Sea. For this and other reasons, this economy exhibits a highly developed level of industrial and commercial activity. Fishes and whales are the most important species of marine wildlife and their resource use is largely domestic. Their socio-economic importance, however, is overshadowed by commercial and industrial activities.

The Rim economy includes the settlements of Holman, Paulatuk and Sachs Harbour, and lies to the east of the Mackenzie economy. Here, the level of industrial activity is minimal, and export sales of furs is a major commercial activity. Seals, white fox and polar bears are primary sources of income in the Rim economy. For example, over half of the income earned in Paulatuk is from the sale of marine furs and commercial fishing. There is extensive domestic use of fish and of other marine resources, which is reflected in the low levels of income.

Fishes and white whales are the most important forms of marine wildlife to the Mackenzie economy. The domestic or subsistence use of these animals supplements wage or salary income. The export of white fox and polar bear furs from Tuktoyaktuk is the main commercial use of marine wildlife.

Each settlement has an individualized pattern of specialization in the harvesting of marine wildlife. Fishing and whaling are prominent activities in Aklavik, Inuvik and Tuk. In the Mackenzie economy, Tuk hunters monopolize the harvest of marine fur-bearers, such as foxes, polar bears and seals. Marine furs are more important in the settlements of the Rim economy. In particular, seals are critical to the Holman economy, while Sachs Harbour depends primarily on white fox. Paulatuk is the least specialized community since all fur-bearers and fishes are utilized.

These patterns of specialization reflect the relative socio-economic importance of marine wildlife. The importance of hunting, trapping and fishing declines, however, when wage employment and increased imports accompany decreased domestic and commercial utilization. This explains the greater socio-economic importance of marine wildlife in the Rim economy,

where there is little commercial and industrial activity beyond fisheries and fur export.

2. INTRODUCTION

This study investigates the socio-economic importance of renewable, natural resource use in the Beaufort Sea area. Changes in the marine environment, resulting from offshore drilling, could alter resource use patterns and their socio-economic importance by modifying the distribution and abundance of marine, biological resources.

The resources considered are marine-related, since the Beaufort Sea provides their habitat or their food. Fishes, seals, whales, polar bears and arctic fox are included in this study. Utilization is defined as man's consumption of these resources for domestic or trade purposes. Socio-economic considerations include the level of utilization, its value and its relative importance to the users, to individual settlements and to regional economies.

2.1 General Nature and Scope

This study complements other Beaufort Sea studies which consider the vulnerability of the natural environment and its marine resources. If the abundance or reproductive rates of these resources declined, or their mortality rates increased, the level of sustainable subsistence and commercial harvest could be reduced. This would affect the socio-economics of marine wildlife by lowering the standard of living or forcing a change in lifestyle for people utilizing marine wildlife. While offshore drilling could increase employment opportunities, income security and social services, any loss of wildlife would unavoidably affect people dependent on marine species. Offsetting benefits from offshore drilling are by no means assured.

Romantic notions about hunters, trappers and fishermen aside, there are resource-dependent people who could become unrecognized bystanders to the technology and potential wealth of offshore drilling. This study attempts to identify these people, their dependence on marine wildlife and the socio-economics of resource utilization.

2.2 Specific Objectives

This study evaluates the socio-economics of marine wildlife directly utilized by area residents for subsistence, barter or commercial trade. Non-consumptive "uses", like the quality of life, are not included, and the importance of non-utilized and non-marine species is not considered.

The objectives of this study are :

- to acquire resource use and socio-economic information to aid in the assessment of potential environmental changes associated with offshore, exploratory drilling;
- to identify the importance of marine resource utilization in terms of commercial trade and domestic consumption; and
- to identify the importance of resource utilization in the light of other sources of income, employment and economic activities.

3. EXISTING KNOWLEDGE

3.1 Historical Records

Socio-economic and resource use information for the Beaufort Sea has been accumulated for over a century, beginning with the impressions of early explorers, traders and missionaries. This information is more interesting than useful, since substantial changes have occurred in the society, values and economy of the area. Historical levels of consumption seem out of context in terms of the modernization of the area and the present role of industrial and commercial goods, wage employment, imports and exports.

3.2 Contemporary Information

Contemporary socio-economic and resource use data are developed best for the Mackenzie River Delta, which includes the settlements of Aklavik, Inuvik and Tuktoyaktuk (hereafter referred to by its colloquial name "Tuk"). A compendium of existing information for the lower Mackenzie River Valley, compiled for the Environmental-Social Committee of the Federal Task Force on Northern Oil Development, has been extracted for use in this study. This includes an assortment of studies conducted by the Department of Indian Affairs and Northern Development (DIAND) between 1960 and the end of the decade, e.g. Abrahamson (1962), Bisset (1967), Ferguson (1961), Vanstone (1961) and Wolforth (1966). These studies, which concentrated on the area near the Mackenzie Delta, were the first attempt to analyze resource use and its socio-economic importance under modern conditions. The results form an important benchmark to changes in the use, dependency and importance of resources, despite their lack of detail and the basic data problems associated with brief reconnaissance tours.

The Mackenzie Manpower Survey (DIAND, 1969), was a large-scale undertaking which greatly increased the level of existing knowledge. This is the primary source of socio-economic information for the Beaufort Sea area, and proved invaluable to this study. This survey also provided the basis for much of the work used in this study from the Environmental-Social Program. Comparable data for Holman were obtained from the Arctic Coast Manpower Survey (DIAND, 1970).

The work by Peter J. Usher in Sachs Harbour (1971) and Coppermine - Holman (1965) deserves special mention. These are the most outstanding and comprehensive analyses of man-resource inter-relationships, resource utilization and socio-economics in the western Canadian Arctic. The excellence of this work is unmatched and prescribes the norm by which other existing knowledge must be considered inadequate.

4. STUDY AREA

The boundaries chosen for the study area are a function of the mobility of marine wildlife and their human predators. Winds, waves and currents extend the influence of Beaufort Sea environs beyond the well-defined map area. Moreover, people using these resources live in settlements beyond the coastal fringes of the Beaufort Sea. The resulting study area, which is designed to reflect this situation, extends beyond the geographic sea, as shown in Figure 1.

The study area extends from Holman, on Victoria Island in Amundsen Gulf to Herschel Island in the Yukon Territory, and from Aklavik on the Mackenzie River Delta to Sachs Harbour on Banks Island. Other communities in the study area include Tuk on the Tuktoyaktuk Peninsula and Paulatuk on Darnley Bay, near Cape Parry. The portion of the study area in the Yukon Territory is combined with Inuvik and Aklavik, since there are no permanent settlements along the Yukon coast.

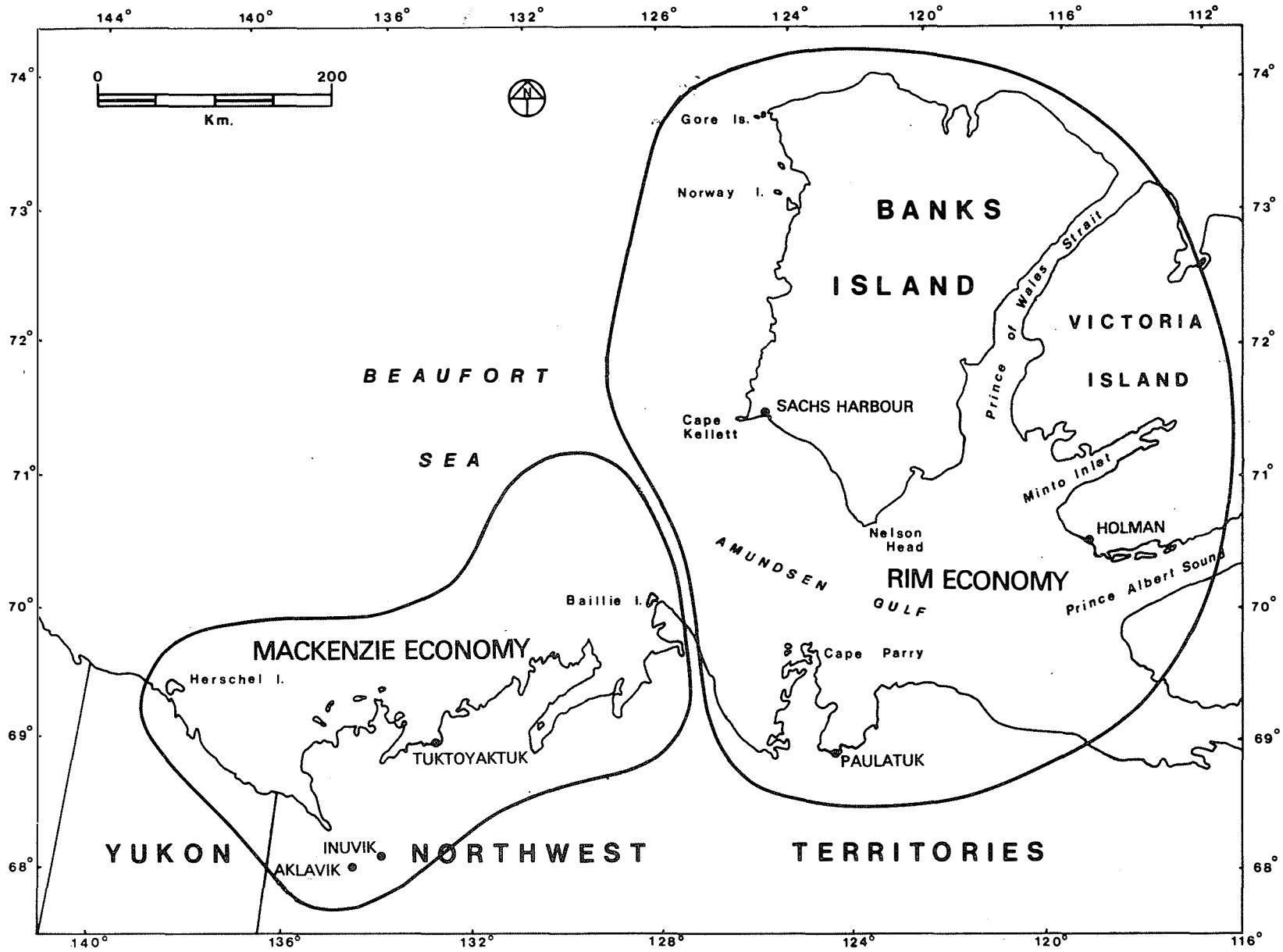

Figure 1. The Study Area showing the general boundaries and settlements of the Mackenzie and Rim economies of the Beaufort Sea.

The study area is divided into the Mackenzie and Rim economies (Figure 1). The Mackenzie economy is situated along the Mackenzie River, its delta and the Beaufort Sea. This estuarine environment supports abundant populations of fishes, whales and fur-bearing animals. Inuvik is the hub of wage employment, service industries and transportation facilities. The influence of industrial and commercial activities in Inuvik is prevalent throughout the Mackenzie economy, including Aklavik and Tuk, and the adjacent areas in the Rim economy.

The Rim economy is dwarfed by the size of the Mackenzie economy. Virtually no industrial activity is located in the Rim area, and the total population of Holman, Paulatuk and Sachs Harbour is less than any one of the Mackenzie settlements. The harvesting of seals, white fox and polar bears is closely identified with these coastal settlements in the Rim economy. This economy is the hinterland of the Mackenzie economy and, as such, is more dependent on its natural resources than on industrial-commercial development.

There are two reasons for dividing the study area into two economies. First, it distinguishes between two patterns of resource use. Fish and whales are the resource base for the Mackenzie economy, while the Rim economy is based on marine fur-bearers. Secondly, it provides a clearer reflection of the socio-economics of these resources. The size and industrial development of the Mackenzie economy would overwhelm the Rim economy if the study area was treated as one economy.

5. METHODS AND TECHNIQUES

This study did not involve elaborate methodology or design since it is, primarily, a summary and synthesis of existing information. Field efforts were restricted by budget and time to the 1975 open water season, and concentrated on the whaling and fishing activities in the Mackenzie economy.

5.1 Data Sources

Field observations were made possible through the patience and consideration of the people in the Mackenzie Delta and coastal camps, and the helpful guidance of W. John Hunt, Fisheries and Marine Service, Inuvik. Unstructured interviews were used to gather harvest information from domestic fishermen and whale hunters, and to provide a basis for interpreting the data gleaned from other sources.

6. RESULTS

6.1 Limitations and Applicability

The results of this study apply only to the indigenous population of Indians, Eskimos and Metis.The socio-economic importance of marine wildlife is measured in terms of employment, domestic income from domestic or subsistence uses of these resources, and cash income from commercial uses.

The socio-economic importance of resource utilization should not be confused with the payment necessary to offset a loss of wildlife species, nor the compensation required to maintain the current standard of living. Moral, ethical, legal and personal factors need to be considered in these cases. This is left in the political and judicial arenas, which extend beyond measures of socio-economic importance, and of this study.

6.1.1 Utilization Values

A technical limitation restricts the addition of dollar values of different resource uses. Values for domestic or subsistence use are not equivalent to values for commercial use and must be treated separately. This distinction is based on the derivation of these values and their economic bases.

Domestic or subsistence values are based on "shadow prices", or the assumed cost of purchasing these goods within the local economy. However, no revenue is ever received for these values, since the producer consumes his own products. Moreover, domestic values have no relationship to the cost of purchasing substitute goods if wildlife were not available.

It is important to recognize that cash income can be exchanged for a variety of goods and services, but domestic production and consumption involves only one good : more fish, more whales, etc. If barter or trade takes place, the rate of exchange results in a domestic price. Consumer satisfaction is still limited to domestic goods, however, and cash incomes are not affected.

6.1.2 Resource Saving and Insurance

An assessment of Beaufort Sea socio-economics would not be complete without considering the importance of marine wildlife as a form of savings and insurance. The economic history of this area is an irregular pattern of booms and busts since the arrival of the bowhead whaling fleet during the late nineteenth century. Boom conditions provide high incomes and abundant employment. Continued imports reduce the supply of money once the boom declines, and the economy quickly returns to commercial and domestic hunting, trapping and fishing. The most important function of marine and other wildlife may well be a guaranteed source of economic survival. Short-lived activities, such as DEW-line, highway and pipeline construction, and petroleum exploration, may easily overshadow the sustained importance of resource utilization.

7. THE MACKENZIE ECONOMY

The Mackenzie economy is, to a large extent, a reflection of Inuvik, the dominant community in the area. Inuvik is the primary source of wage employment, the major export from the Mackenzie economy, and is the centre of the industrial, commercial and service sectors in the Beaufort Sea area. Tuk and Aklavik share in the wealth of development activity radiating from Inuvik. Resource use, per capita, is consequently lower in this area than in the remainder of the study area.

7.1 The People

Less than two thousand native people lived in the Mackenzie economy during 1967. This is 66 per cent of the total inhabitants, including whites and others, who are not included in this study. The ethnic composition of the Mackenzie settlements is 77 per cent Eskimo (Tables A-1 and A-2)*.

Substantial growth occurred in the total population between 1961 and 1971, as many white immigrants moved to Inuvik. The population of Aklavik and Tuk increased by 300 people during the same period, as native people were attracted from other northern communities by activity in the Mackenzie Delta area (Table A-3).

The total native population for this study is 1,735 people (1968), of whom 902 are 14 years of age, or over, and considered to be potential members of the labour force (Tables A-4 and A-5). The study population includes 106 families in Aklavik, 136 in Inuvik and 90 in Tuk (Table A-4).

7.1.1 Employment

The mixture of life-styles obscures labour force and employment characteristics. Some families, especially those living outside settlements, may be completely dependent on natural resources from the land and sea. Other families are virtually independent of renewable resources, depending entirely on wage employment. The majority, however, belong to a third category, with partial or seasonal dependence on domestic and/or commercial use of marine wildlife. A close reciprocal relationship exists between wage employment and resource use, since these activities are the only sources of domestic and cash income.

An analysis of employment included individuals who were 14 years of age, and older, earning at least $200 per month during 1967 (Tables A-5 and A-6). This analysis did not distinguish between hunting, trapping and fishing for marine and other wildlife. Neither did this analysis differentiate between periods of unemployment and time spent in domestic hunting and fishing. The results of this analysis are summarized in Tables 1 and 2 .

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* This notation applies to Tables found in the Appendices to this Report. The letter refers to the Appendix, while the number identifies the Table within the Appendix.

TABLE 1

Employment for Individuals, 14 years of age and over, in the Mackenzie economy.

	Wages	*H-T-F	Self-Employed	Ratio of jobs to potential labour force
Aklavik	121	37	6	164/350
per cent **	(41)	(13)	(2)	
Inuvik	181	31	8	220/292
per cent **	(52)	(9)	(3)	
Tuk	139	18	3	160/260
per cent **	(53)	(7)	(3)	
TOTAL	441	86	17	544/902
per cent ** (average)	(49)	(9)	(2)	

* Hunting, Trapping and Fishing.

** Percentage of potential labour force in settlement.

Source : Table A-4.

Eighty-six people earn at least $200 during at least one month from commercial hunting, fishing and trapping for marine and other wildlife. The majority of these jobs last between one and six months, which is less than other types of employment. Hunting, trapping and fishing provide 22 per cent of the jobs in Aklavik, 14 per cent in Inuvik and 11 per cent in Tuk.

TABLE 2

Monthly employment extremes for the Mackenzie Economy

	Employed	Month	Employed	Month	% of Max.
Aklavik	96	April	68	Nov.	71%
Inuvik	162	June	140	Dec.	86%
Tuk	106	August	64	May	60%

Source : Table A-6.

The highest level of employment occurs during the spring and summer months, although this pattern is not consistent amongst communities. Aklavik employment exceeds the median during the six months of March through July, plus September (Table A-6). Conversely, May and June are the

only months when the level of employment does not exceed the median in Inuvik. In Tuk, June, July and August are above the median. There is no evidence of an exodus from the labour force for resource harvesting, with the possible exception of August employment in Inuvik.

Table 3 is based on trapping, since this is the main source of wildlife employment in the Mackenzie economy. It must be recognized, however, that trapping in this economy concentrates on muskrats, and other non-marine species. This will be explored further in section 7.2.3.

TABLE 3

Active Trappers and Land Dependents as the percentage of total families in Mackenzie economy settlements *

	Active Trappers[1]	Land Dependents
Aklavik	15%	6%
Inuvik	23%	24%
Tuk	7%	4%

* Assumes each individual represents a family. This is the maximum estimate for resource dependence.

[1] Earning $1,000 or spending two months trapping.

Source : MPS Associates Ltd.,[1974(5)].

Smith (1961) reported that 30 hunters, or 150 people, lived entirely off "the land". This is similar to Table 3. Smith also reported that these people required $3,000 cash income, annually, for food staples and other imports. This emphasizes the importance of cash income to enhance domestic resource utilization.

Conventional measures of employment do not reveal much about the socio-economic importance of marine wildlife. Data, showing the balance between domestic resource utilization and other types of employment, and between marine and other wildlife, would be necessary to expand this analysis.

7.1.2 Income

Both Beaufort Sea economies rely on earned income (employment and commercial resource utilization) and on unearned income (social assistance, welfare and similar programs). This cash income supplements domestic resource utilization by financing import purchases of food and clothing, as well as capital goods and supplies for hunting, trapping and fishing.

Earned income is influenced by the individual, his aspirations and his opportunities for wage employment and commercial hunting, trapping and fishing.

A direct relationship exists between earned income, domestic income and the socio-economic importance of marine wildlife, since the need for subsistence income declines as earned income rises.

Developed economies have substantial opportunities to earn income from indigenous business activity. This does not apply to the Beaufort Sea area where earned income is a function of labour exports to firms based in the south and the sale of marine fur and fish. Local business activity is limited to a small service sector in Inuvik.

Tables A-8 through A-17 summarize earned, unearned and total income data for the Mackenzie economy. These data include income from wildlife without differentiating between marine and other wildlife.

7.2 Marine Wildlife

Losses of wildlife during hunting, trapping and fishing, and incomplete utilization are not included in this study, since they are not relevant to socio-economic considerations. These losses include animals which are not recovered, are discarded, or otherwise remain unutilized.

Incomplete utilization is a common occurrence, for several reasons. Complete utilization may not be rational if the animals are abundant and easily harvested. Moreover, only a portion of the animal may be desired and this, alone, may justify harvesting the animal. Lastly, harvesting may be based on sport instead of animal products. Utilization will be incomplete whenever the rewards no not justify the effort required to use a certain portion of the harvest.

7.2.1 Whales

The harvest of beluga or white whales (*Delphinapterus leucas*) is limited to the Mackenzie portion of the Beaufort Sea. Hunting occurs mainly in the warmer waters of Mackenzie, Shallow and Kugmallit Bays. Figure 2 shows the location of traditional camps. Whales enter these waters as leads develop in the surrounding sea ice during early July, and remain until the middle of August. Hunting takes place throughout this period until adequate supplies of whale products have been gathered, or other activities become more urgent.

Whaling is traditional for coastal Eskimos, although present use extends throughout the native population in Aklavik, Inuvik and Tuk. Whaling parties are made up of families, or groups of families, usually from the same settlement. Domestic use is predominant, although intra-settlement sharing is common. Inter-settlement sales are very limited (Appendix F). Three classes of hunters can be hypothesized : those with substantial dependence on wildlife, those enjoying summer conditions along the coast and those who are quasi-sports hunting. Socializing, recreation and the hunt are, undoubtedly, important aspects to whaling. Harvesting is conducted from boats and freighter canoes with outboard motors. Considerable marksmanship and seamanship are required to pursue, shoot and recover the whales.

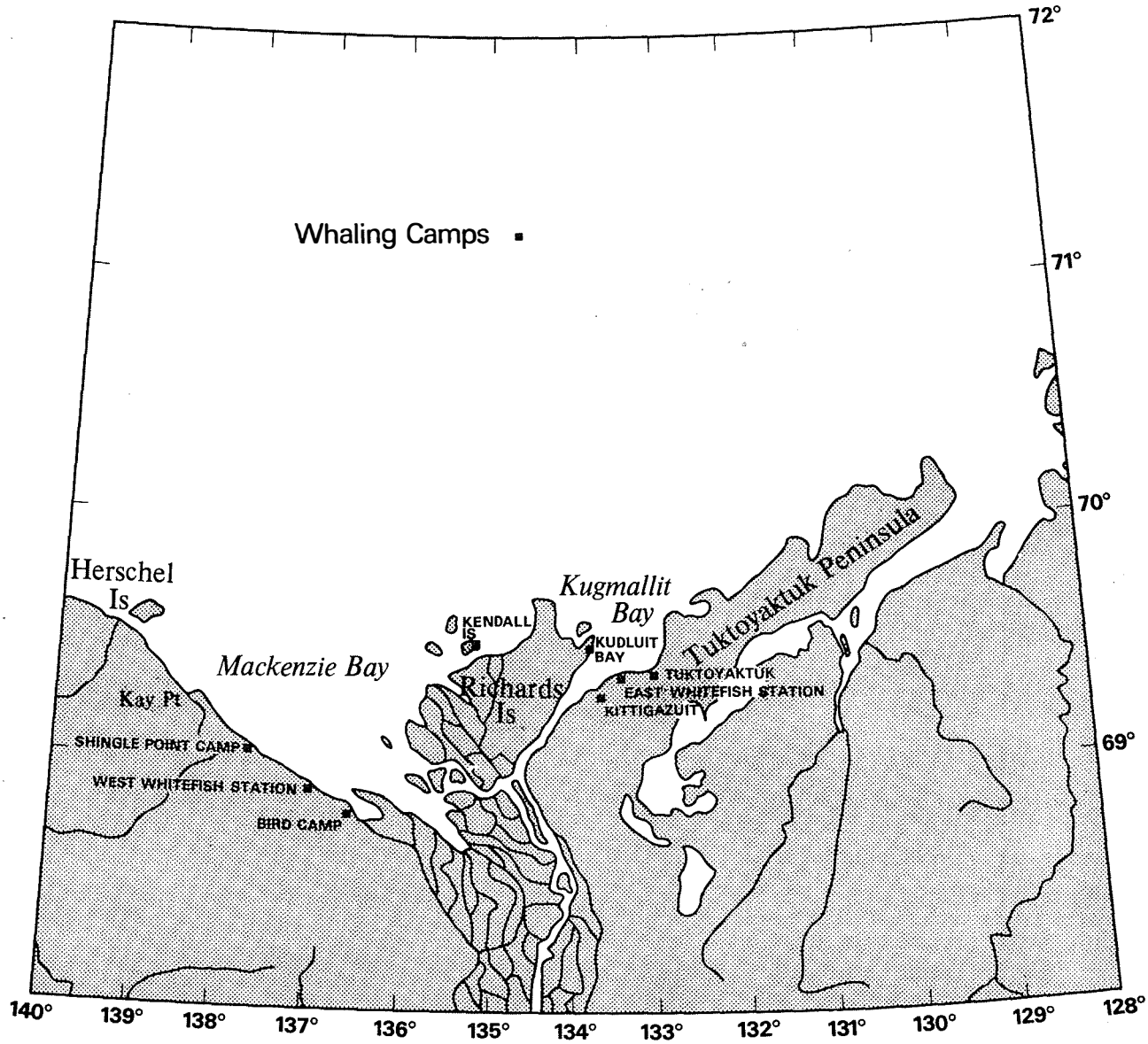

Figure 2. Locations of traditional and active whaling camps in the Mackenzie economy.

Whaling is not regulated, and approximately 120 whales are utilized per year. Whale utilization between 1970 and 1975 is recorded in Table 4. The kill to harvest ratio for beluga whales ranges from 3 : 1 to 2 : 1.

TABLE 4.

Beluga Whale utilization for the Beaufort Sea between 1970 and 1975[1]

Year	Area			
	East Whitefish	West Whitefish	Tuk	Total
1970	0	30	75	105
1971	49	30	3	82
1972	35	33	45	113
1973	58	20	87	165
1974	52	44	40	136
1975	63	26	48	131
Average :	43	30	50	122

[1] Whale harvest and utilization statistics were collected and made available for further use by Mr. W. John Hunt, Fisheries Officer, Fisheries and Marine Service, Inuvik, N.W.T. Any errors or omissions in their analysis remain the responsibility of the author.

Mature whales weigh between 1,200 and 1,700 pounds and measure over 16 feet in length. Fifty-nine per cent of the total weight is edible, including meat (16 per cent), blubber (25 per cent) and skin and flippers (18%).

Whale products include dried meat, muktuk and whale oil. Sun-drying reduces the weight of meat by an estimated 55 per cent. This yields 105 pounds of dried meat from an initial average weight of 232 pounds. Processed skin and blubber yield 30 gallons of muktuk and, perhaps, 20 gallons of oil. The average annual whale harvest between 1973 and 1975 is equivalent to 15,000 pounds of dried meat, nearly 3,000 gallons of oil and over 4,000 gallons of muktuk (Table B-1).

Whale meat is not a prime food, and sharing is common. The main attraction of this meat is the diversity it adds to diets, based on domestic utilization. The value of prime meats, such as moose and caribou, is 75¢ per pound. Bear and waterfowl and worth 50¢ per pound and the value of fish is 30¢ per pound [MPS Associates Ltd., 1974 (5)]. Whale meat is valued at 50¢ per pound for the purposes of this study.

Whale oil, once a major export and domestic product of the Beaufort Sea, is presently used for cooking and dog food. Trading seems to be non-existent, although Bissett (1967) reported prices of $1.00 per gallon on the

Delta and $1.55 in Tuk during 1965. The price in Tuk was reported by Abrahamson (1962) to be $1.00 per gallon. A value of $1.50 per gallon is assumed to represent current conditions.

Muktuk, the most important whale product, accounts for much of the emphasis placed on whaling. It is prepared by repeatedly removing crusted blubber from the skin until a thin, firm layer remains. This is boiled and stored for later use. Abrahamson (1962) reported Tuk prices at $1.00 per gallon, while Bisset (1967) found prices ranging from $1.25 to $1.50 per gallon. Prices reached $5.00 per gallon in 1975 (See Appendix F).

The total value of whale products is $233 (Table 5). This should not be treated as potential income since it is based on domestic prices, and commercial prices could vary considerably because the demand for whale products is untested.

TABLE 5

Domestic value of an average beluga whale to the Mackenzie economy.

Product	Price	Quantity	Value	% of Total
Meat	$0.50	105 lb*	$52.50	22%
Oil	1.50	20 gal.	30.00	13%
Muktuk	5.00	30 gal.	150.00	65%
		Total :	$232.50	100%

* Dried meat converted from 232 lb. fresh weight.

Bisset (1967) reported prices in the neighbourhood of $10 for unprocessed whales. Prices in Tuk ranged from $35 to $60 during 1961 (Abrahamson, 1963). One whale sold for $50 during 1974. The value added during butchering and process is the imputed wage for labour. These wages ($182), presumably, would be required to purchase the products from an average whale. The unpaid hunter retains the whale products, worth $233, in lieu of wages. This is also the case for other types of domestic utilization.

The apportionment of whales' values to families or to settlements is based on fragmentary data regarding whaling parties. The number of whaling parties from Aklavik, Inuvik and Tuk averaged 18, 13 and 24 respectively during 1973 and 1975. Inuvik parties usually hunt near East Whitefish Station, while parties from Aklavik tend to hunt near West Whitefish Station. Since it is impossible to estimate the number of families, or the

number of people per party, the value of whale products is apportioned to the entire 'study' population in each settlement.

The highest value per whaling party was $1,127 at East Whitefish Station in 1975; the lowest value was $293 at West Whitefish Station, in 1973. The average value of whale products ($33,480), is equivalent to $670 per party, or $100 per family. Each party receives $125 worth of whale products for each week of the whaling season.

In summary, the socio-economic importance of beluga whales may be more a matter of preference than necessity. The more intense hunters are probably people who welcome the opportunity to vary their diet while hunting, trapping and fishing, and who enjoy the amenities and sport of whaling.

7.2.2 Fish

Fishing requires a minimum of gear and effort, and provides smoked, frozen and dried food for people, plus dog food. Fishing is also a dependable source of fresh food throughout much of the year. The widespread and abundant fish resources of the Beaufort Sea are intensively utilized as a result.

The primary fish species are freshwater or anadromous (freshwater spawners which migrate to salt water during adolescence). Major species for human consumption are Arctic char (*Salvelinus alpinus*), lake trout (*Salvelinus namaycush*), whitefish (*Coregonus spp.*), pike (*Esox lucius*), inconnu (*Stenodus leucichthys*) and herring (*Clupeaharengus spp.*). Burbot (*Lota lota*), and suckers (*Catostomus spp.*) are used as dog-food.

The importance of fisheries decreased with the declining use of sled dogs for winter transportation. This resulted from migration to settlements, improved air travel, and the snowmobile. Dogs are still major consumers of fish but the importance of food for pet dogs should not be equated to that for sled dogs. The growth of wage employment and increased food imports also decreased the importance of fishing.

7.2.2.1 Commercial Fishing

Two types of commercial fishing take place in the Mackenzie economy. The export fishery is restricted to whitefish sold to the prairie provinces. These fisheries are hampered by erratic catches, product-perishability, and high transportation and production costs. Quotas for this fishery are depressed by the pre-emptive status of domestic fishing and a lack of information on domestic harvests and sustainable yields. The difficult logistics of Arctic commercial fishing and the abundance of other fisheries with competitive advantages in southern markets limit whitefish exports.

Commercial fishing to supply northern markets is limited by the abundance of domestic fishing opportunities and the nonchalent status of fish as food. Sales are limited to retail foodstores, restaurants and direct sales to native and white households with wage employment.

The Yukon Coast char fishery is typical of commercial fisheries in the Mackenzie economy. Menzies Fisheries, an Edmonton firm, operated in 1965 and 1966 between Inuvik, Herschel Island and Ptarmigan Bay on the mainland, south of Herschel Island. The 1965 operation was financially unsuccessful, and the collection barge was lost in drift ice prior to 1966. No commercial fishing has taken place along the Yukon Coast since 1966, although enquiries have been made regarding char quotas for Herschel Island and Shingle Point. No quotas have been released, however, and the 1965 catch is thought to have been above the sustainable yield. Catch and income data for 1965 and 1966 are shown in Table 6. The most significant point of this fishery is its unprofitability, even when sustainable catches were exceeded, and the low incomes to fishermen. The Yukon char fishery does not have any socio-economic importance at the present time.

TABLE 6

Yukon Coast Commercial Fisheries

Year	Species	Harvest (lb)	Value	Fishermen (Number)	Average Income
1965	Char	36,000	$18,000	*N.A.	--
	Whitefish	20,000	$ 4,000	N.A.	--
1966	Char	800	$ 400	6	$66
	Whitefish	--	$24,000	33	$727[1]

* N.A. : Not Available.
[1] Maximum income received was $1,700, while the mode was $150.
Source : (McLeod, undated).

The Holmes Creek Fishery began in 1963 when the Department of Indian Affairs and Northern Development set up a small operation 53 miles north of Inuvik, on the East Channel of the Mackenzie River. Three fishermen earned a total of $5,000 for their catch and the processing work done by their families. No fish were sold. The number of fishermen doubled in 1964, while the catch remained the same. Family incomes dropped to $833.33 and no fish were sold. This fishery was abandoned in 1964, although domestic fishing continued at this site.

The Holmes Creek commercial fishery was revived in 1972 by the Territorial Government. Each year's operation has encountered new problems and the operation has remained a sub-marginal fishery, dependent on price

subsidies and guaranteed payments to fishermen. Catch and income data for 1973 through 1975 are shown in Table 7. The experience gained from the Holmes Creek fishery has been valuable and may form the basis for a more substantial fishery in the future. Each year has presented new obstacles but improvement has been steady. For the present, however, Holmes Creek cannot be considered to be socio-economically important to the Mackenzie economy. The subsidized income is a necessary incentive, but 3 families working less than 3 months do not give this fishery socio-economic importance.

TABLE 7

Holmes Creek Commercial Fisheries

Year	Quota	Catch	Fishermen	Fishing Income[1]	Average Family Income[2]
1973	50,000	50,000	3	$12,000	$6,000[3]
1974	50,000	33,000	3	8,000	4,000
1975	50,000	50,000	----------Not Available----------		

[1] Revenue received for fish caught, based on round-weight at dock.
[2] Includes income received by families of fishermen for filleting, &c.
[3] Quota filled in 6 weeks, prior to major runs which were utilized for domestic fishing.

The remaining commercial fisheries in the Mackenzie economy are individual operations which sell whitefish, lake trout and arctic char. Eight fishermen were licensed in 1974 and 1975. Four supplied fish to Inuvik, three to Aklavik and one reported no sales. Catch records indicate that fishing incomes rarely exceeded $1,000.

The socio-economic importance of commercial fishing in the Mackenzie economy involves eleven families, averaging less than $2,000 annual income from fishing. Over half of the total income is earned from the subsidized fishery at Holmes Creek. Commercial fishing provides 1% of the earned income in the Mackenzie economy and involves less than 6% of the families.

7.2.2.2 Domestic Fishing

Domestic fishing is an important source of food and domestic income to many residents of the Mackenzie economy. This fishing is most intensive during the period of open water, although ice-fishing takes place near settlements and winter camps. Major species are whitefish, pike, inconnu and herring. Char and lake trout are intensively fished as preferred species for human consumption, but are insignificant in terms of the total catch. Domestic fishing extends from Herschel Island, about 80 miles west of the Delta, to the eastward end of the Tuktoyaktuk Peninsula. The main activity, however, centres on the Delta and in the vicinity of Tuk (Figure 3).

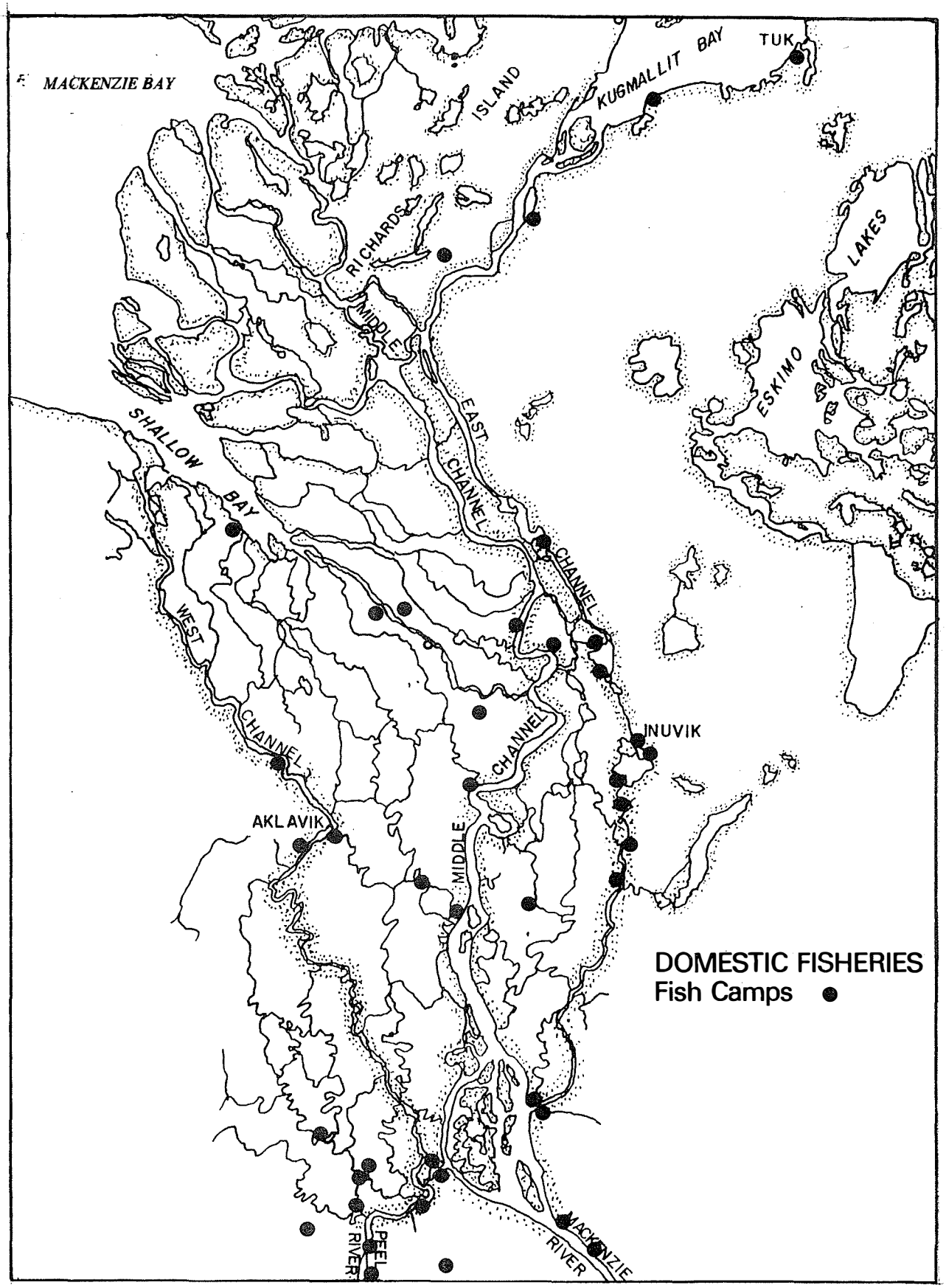

Figure 3. Locations of traditional sites for domestic fishing.

Domestic fishing is not regulated by quota, and catch records are not kept. Fish consumption is usually estimated by projecting the assumed 'requirements' necessary to support the population of dogs and of people.

Domestic fish have been valued from 10¢ to 30¢ per pound, without regard for species or use (Table 8). Even the maximum value, which was selected for this study, provides a striking contrast to other wildlife values. Caribou and moose meat is valued at 75¢ per pound, while bears, fur-bearers and waterfowl are valued at 50¢ (MPS Associates Ltd., 1973). The selected value is the most recent and is consistent with other domestic foods and with local sales by commercial fishermen - "one dollar for small ones and two dollars for large ones".

TABLE 8

Selected values per pound for Beaufort Sea domestic fisheries.

Place	Value (lb.)	Year
Banks Island	$0.10	1967 [Usher, 1971(2)]
Holman	.12	1964 (Usher, 1965)
Mackenzie Delta	.25	1967 (Bissett, 1967)
Mackenzie Delta	.30	1973 (Gemini, 1974)
Tuktoyaktuk	.20	1962 (Abrahamson, 1962)

Domestic fish consumption has been estimated in a number of studies. Consumption at Tuk was placed at 60 to 75 tons per year in 1963. Forty to fifty tons of this was herring for dog food (Abrahamson, 1962). A second estimate for the same area suggested twenty pounds of fish were required daily per family (Ferguson, 1961). Wolforth (1966) estimated that Delta fisheries produced "somewhat under a million pounds " of dog food. This was felt to be the"major portion" of 1,450 thousand pounds total production for Aklavik, Inuvik and Tuk (Wolforth, 1966). A detailed analysis of community and ethnic fish requirements is developed in Appendix D. Considerable differences between recent estimates of domestic fishing are evaluated in this Appendix, as well.

Domestic fish consumption in this study is based on a survey conducted in Aklavik during 1973 by W. John Hunt of the Fisheries and Marine Service. This survey provided the first direct estimates of annual fish requirements :

- a "working" dog ate 1,316 pounds of fish;
- human consumption equalled 100 pounds per individual, or 611 pounds for an average family;
- the average family of 6 people, with 1.5 dogs, consumed 2,649 pounds of fish;
- dogs ate 77% of the 294,306 pounds of fish consumed in Aklavik.

People consume 68,000 pounds of fish in Aklavik, 80,000 pounds in Inuvik and 61,000 pounds in Tuk - or 209,000 pounds in the Mackenzie economy. Preliminary evidence suggested there might be 85 working dogs in Tuk and 15 in Inuvik, in addition to 172 dogs in Aklavik (Table D-4). Total consumption by people and dogs is 567,076 pounds of fish per year. The value of this consumption is summarized in Table 9.

TABLE 9

Domestic fish consumption and value in the Mackenzie economy

Community	Consumption per family[1]	Value per family	Value of human use	Value of dog food
Aklavik	2,778 lb.	$833.42	$192.45	$640.97
Inuvik	761 lb.	228.41	183.20	45.21
Tuk	1,920 lb.	576.20	203.33	372.87
Average	1,820 lb.	$546.01	$192.99	$353.02

[1] Based on the number of families in the community, regardless of fishing activity : from Table D-4.

Fishing is the most valuable domestic use of marine wildlife in the Mackenzie economy. The value of fish eaten by people is $30 per person, and the annual value of dog food is $400 per dog. Domestic fishing is worth more than $170,000 in the Mackenzie economy, or $550 of domestic income per family.

7.2.3 Marine Fur-bearers

Fur exports are the most important source of cash income from marine wildlife in the Mackenzie economy. This income is important during periods of low economic activity and reduced wage employment.

Prices for marine furs have increased dramatically during the past two decades. In 1957, the prices of white fox (*Alopex lagopus*) and polar bear (*Ursus maritimus*) skins were only 50% and 2% of their respective prices in 1974. The price of ringed seals (*Phoca hispida*) increased by 27% between 1961 and 1974 (Table C-1). Wholesale auction prices, which may be considerably higher, do not affect the income of hunters and trappers.

Changes in the price and quantity of fur exports alter the socio-economic importance of marine furs. Record prices were received during 1973 (Table C-1). Income doubled when 1973 prices were applied to average exports in Table 10. The socio-economic importance of fur-bearers is based on 1973 prices since fur prices are expected to remain near this level.

TABLE 10

Average marine fur exports & income

	Average skins exported	Average annual income[1]	Average annual income at 1973 prices[2]
		($)	($)
Aklavik			
Polar bear	a	--	--
White fox	66	622	1,761
Seals	10	141	173
Total :		763	1,934
Inuvik			
Polar bear	1	655	1,610
White fox	383	12,331	19,616
Seals	112	1,265	1,944
Total :		14,251	23,170
Tuk			
Polar bear	13	5,257	10,737
White fox	577	12,285	24,465
Seals	39	518	677
Total :		18,060	35,879
Mackenzie economy			
Polar bear	13	5,912	12,526
White fox	1,026	25,677	45,849
Seals	160	1,924	2,795
Total :		33,513	61,170

a Less than one.
[1] Polar bear and white fox 1968-1973, and seals 1971-1973.
[2] Average exports valued at 1973 peak prices.
Source : Tables C-4 and C-5.

TABLE 11

Muskrat and marine fur income in the Mackenzie economy

	Aklavik		Inuvik		Tuk	
	1973-4	1974-5	1973-4	1974-5	1973-4	1974-5
Fur income	$67,427	$78,816	$70,409	$49,126	$57,723	$33,872
Muskrat Income	38,141	63,841	35,618	37,125	5,266	1,195
% Fur income	57%	81%	72%	53%	9%	4%
White fox income	1,215	1,489	5,907	1,447	38,944	24,505
% Fur income	2%	2%	8%	3%	68%	72%
Other Marine income[1]	995	*N.A.	N.A.	N.A.	3,474	N.A.
% Fur income	3%	N.A.	N.A.	N.A.	6%	N.A.
Average fur income/trapper	624	635	577	438	712	457
Average muskrat income/all trappers[2]	343	514	291	331	65	16
Average muskrat income/trapper[3]	401	575	391	426	175	80
Average White fox income/trapper[4]	202	124	281	90	764	355
Fur trappers : N =	108	124	122	112	81	74
Muskrat trappers : N =	95	111	91	87	30	15
White fox trappers : N =	6	12	21	16	51	30

* Not Available.
[1] Polar bears and ringed seals.
[2] Includes those not trapping muskrats.
[3] Restricted to muskrat trappers, only.
[4] Exclusive of Blue, Cross, Red and Silver fox.

Source : Individual Trapping Record Summaries, Game Management, N.W.T. Fish and Wildlife Service, Yellowknife.

The level of fur exports is shown in Tables C-2 and C-4. White fox pelts are the most abundant, and Tuk is the main exporting community. The quantity of furs exported, and the income earned from these exports fluctuates with changes in hunting and trapping success, fur inventories, fur prices and opportunities for wage employment.

Non-marine furs dominate fur exports from the Mackenzie economy (Table 11). Most of these exports are muskrat furs. Tuk is the only community in this economy where marine furs have any importance relative to total fur exports.

Marine furs provide less than 5% of earned income in the Mackenzie economy (Table 12). These exports are less than 1% of earned income in Aklavik and less than 12% in Tuk. Inuvik trappers earn the highest average income but the highest average fur income, per family, is found in Tuk.

TABLE 12

Community income and marine fur exports from the Mackenzie economy

	Aklavik	Inuvik	Tuk	Mackenzie economy.
Marine fur income[1]	$1,934	$23,170	$35,879	$61,170
Earned income[2]	$267,383	$682,346	$298,973	$1,248,702
per cent fur income	a%	3%	12%	5%
Number of trappers[3]	12	21	51	84
Number of families[4]	106	131	90	327
Trappers per family	.11	.16	.57	.26
Average fur income per:				
Trapper	$161	$1,103	$703	
Family	$ 18	$ 177	$399	$187

[a] less than one per cent.
[1] Average annual marine fur income, based on 1973-4 prices (Table 11).
[2] Community earned income from Table A-17.
[3] Table C-6; higher number of trappers during 1973 and 1974 used.
[4] Table A-4.

The distribution of marine and other fur income (Table C-6) shows that seal exports are infrequent from the Mackenzie economy. Incomes from these and white fox exports are low - often less than $500. Trappers earning less than $500 from white fox furs exported 69% of the pelts in 1973 and 81% in 1974. Marine furs provide small incomes to many of the trappers in the Mackenzie economy. Larger incomes of over $1,000 are restricted to less than a dozen trappers, virtually all of them from Tuk.

Polar bears warrant special attention because their value and socio-economic importance overshadow other marine furs. The average price of polar bear skins was $1,074 in 1973-74. This is equal to the revenue from 36 white fox or 63 seal skins. The harvest of polar bears is regulated by quotas described in section 8.2.2.3. The quota for the Mackenzie economy, 17 bears, is allocated to Tuk. The quota and 1973 prices are used to develop the value of polar bear hides, since one missing record could distort fur-trade totals by 56 per cent (see Table 11, Aklavik).

Polar bear exports, worth $17,000, make a sizeable contribution to marine fur income in the Mackenzie economy. If polar bear income was equally distributed among all white fox trappers and seal hunters in Tuk, their average annual income would increase by $1,473. One polar bear increases a hunter's income from marine furs by, at least, one-third. This income is equal to 26 per cent of the total income for a family in Tuk. The socio-economic importance of polar bear hides is limited to the five per cent of 327 families who receive this income before the quota is filled.

In summary, non-marine furs - primarily muskrats and other species from the Delta comminities of Aklavik and Inuvik - dominate the Mackenzie fur-trade. The bulk of marine furs, i.e. white fox, are exported from Tuk, where polar bears are also a major export. Less than 15 per cent of the large numbers of marine fur hunters and trappers reported incomes, from a single marine species, exceeding $1,000.

8. THE RIM ECONOMY

The settlements of Paulatuk, Holman and Sachs Harbour make up the Rim economy. This area is located to the east of exploratory offshore drilling sites in the Beaufort Sea. However, these communities are closely associated with natural marine environment and could be affected by changes related to offshore drilling.

Paulatuk and Sachs Harbour are obvious parts of the Beaufort Sea region. The justification for including Holman, which is part of another economic system, is the close relationship between the Beaufort Sea and seal exports from Holman.

Offshore activity in the Mackenzie economy could place the people of the Rim economy in the position of 'unsharing partners' in the benefits of offshore drilling, while potentially jeopardizing their marine wildlife resource base.

8.1 The People

The demographic information contained in Appendix A describes the people of the Rim economy. The population consists of 388 people in 73 families. Family size averages 5.3 people, and over half the population is less than 15 years of age. The entire population in the Rim economy is less than any one of the Mackenzie settlements.

The Rim economy is sensitive and does not have a buffer against small changes which a larger and more diversified economy could assimilate without disruption. The average family unit contains 1.4 per cent of the total population. Changes affecting one family, or their pattern of resource-utilization, could modify the socio-economics of an entire settlement.

8.1.1 Employment

The Rim economy is outside the sphere of commercial and industrial activity in the Mackenzie area. This reduces the opportunities for wage employment but does not prevent residents from working in the Mackenzie economy. Labour force statistics for individuals earning at least $200 per month are shown in Tables A-5 and A-6. The potential labour force of people of 14 years of age and over, is 94 in Holman, 33 in Paulatuk and 44 in Sachs Harbour, or 171 in the entire economy. Actual employment is shown in Table 13.

TABLE 13

Employment by activity for Rim economy settlements

	Holman		Paulatuk		Sachs Hbr.		Rim	
	Number	%	Number	%	Number	%	Number	%
Wage and Salary	46	49	12	36	12	27	70	41
Hunting, Trapping, Fishing	24	26	15	45	11	25	50	29
Self-employed	7	7	4	12	0	-	11	6
Potential Labour Force :	94	-	33	-	44	-	171	-

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70.

Wage and salary employment is concentrated at Holman. Hunting, trapping and fishing are a more important source of employment than wages and salaries in Paulatuk and Sachs Harbour. This is in sharp contrast to the Mackenzie economy and an obvious indication of the socio-economic importance of marine wildlife.

Seasonal employment patterns are not consistent within the Rim economy (Table 14). Holman exhibits the least variation of any community in the Beaufort Sea study area while the greatest variation takes place in Sachs Harbour. Paulatuk and Sachs Harbour reach their minimum levels of employment during the summer. This is similar to Aklavik and may be a function of hunting and fishing activity during the open water season.

TABLE 14

Monthly employment extremes for the Rim economy.

	Maximum		Minimum		
	Number	Month	Number	Month	% of Maximum
Holman	81	Oct.	76	June	94
Paulatuk	24	March	17	July,Aug.,Oct.	71
Sachs Harbour	18	Nov.-Mar.	10	May-July	55

Source : Table A-6.

8.1.2 Income

Incomes are not as high in the Rim economy as might be expected from the importance of hunting, trapping and fishing. Six incomes exceed $5,000 and fifteen are above $3,000 (Table A-9). None of the incomes from hunting, trapping and fishing are greater than $5,000 and many are less than the average family income (Table A-17).

Community income (Table A-14) is closely tied to the pattern of employment (Table A-6). Wildlife is the main source of earned income in Paulatuk. One-fifth of the income at Sachs Harbour is from wildlife. At Holman, slightly less income was earned from wildlife, i.e. 13 per cent.

The average family income total was $2,881 or $542 per person (Table A-17). Earned income is 86 per cent of total income in the Rim economy, or $2,686 in Holman, $1,786 in Paulatuk and $2,551 in Sachs Harbour.

In summary, the Rim economy is made up of three small communities where family incomes average less than $3,000. Hunting, trapping and fishing are the main sources of employment and income in Paulatuk and Sachs Harbour.

8.2 Marine Wildlife

8.2.1 Fish

Fishing activity in the Rim economy is not well documented but it is believed to have less socio-economic importance than in the Mackenzie economy. This results, in part, from the greater relative importance of other wildlife resources.

8.2.1.1 Commercial Fishing[1]

The Paulatuk char fishery is the only commercial fishing in the Rim communities. Established in 1968, this fishery had a 5,000 pound quota and

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Source : W. J. Hunt, Fisheries and Marine Service, Inuvik.

sold to commercial and retail outlets in Inuvik. Marketing is controlled by the Paulatuk Co-op, which paid the fishermen 50¢ per pound for their catch. This fishery produced about 4,000 pounds of char annually, until 1973. Char were also being used in Paulatuk for human consumption and dog food during this period. In 1973, sales doubled to 8,000 pounds when whitefish and burbot replaced char for domestic consumption. This shift to less desirable species clearly reflected the monetary interests of Paulatuk fishermen and the importance of fishing income. The quota, 5,000 pounds, was filled in 1974 and 17 fishermen shared $2,500 total revenue from fishing. In 1975, the quota was increased to 10,000 pounds, the price for fish increased to 85¢ per pound and 8,912 pounds were sold. Fishing revenue increased to $7,575, or $689 for eleven fishermen. Table D-6 indicates the distribution of this income. The six lowest incomes (55%) received 29 per cent of the total fishing income, while the top three incomes were 55 per cent. The highest individual income was over $2,000 and the lowest was $228. Income from commercial fishing is equivalent to one-third of the total earned income in Paulatuk during 1969 (Table A-17).

The most noteworthy aspect of this fishery is the shift from domestic use of char to commercial use, which increased average earnings from $147 to $689. This is a significant expression of the importance of this fishery, and commercial fishing income.

8.2.1.2 Domestic Fishing

Domestic fishing is an excellent example of differences between the Rim and Mackenzie economies. The importance of domestic fishing in Sachs Harbour is described by Usher [1971(2)] as follows :

> "Fishing, for example, is done because it is an enjoyable diversion and brings a welcome variation in the diet. Secondary pursuits, such as fishing and fowling have a high entertainment or diversion component, so that strict economic consideration may be overridden."

This is in marked contrast to the Mackenzie economy where domestic fishing is a mainstay of wildlife utilization.

In Sachs Harbour, domestic fishing results in an average, annual catch of 55 fish, or 107 pounds per trapper, or family [Usher, 1971(2)]. The total catch has a domestic value of $867 for all 27 families, at 30¢ per pound.

The domestic fishery at Paulatuk is not documented. The discussion of commercial fishing and the shift from char to whitefish and burbot offers some idea of this fishery. A domestic fishery, equal to the 4,000 pound increase in char sales at the expense of domestic consumption, has a value of $1,200, or $86 for each family.

Holman fisheries have not been studied since Usher (1965) reported on this area. Changes since then have been minor[1], and the following description is taken from Usher :

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[1] Personal communication : Don Dowler, Fisheries & Marine Service, Yellowknife.

The major species are freshwater and anadromous, such as char, whitefish and cisco. The decline of caribou herds increased the emphasis on fishing and led to over-utilization of the Tree and Coppermine Rivers. These fisheries were subsequently abandoned until fish stocks recovered. The assessment of domestic fishing at Holman is overstated, since harvests could not be sustained.

The following estimates were pro-rated from the Coppermine-Holman totals. Half the families (12) in Holman caught 48,000 pounds. The domestic values of these fish were $14,400 in total, i.e. $1,200 per fishing family, or $205 per family member. These values ignore the depletion of fish stocks and reflect the importance of caribou as much as fish. This is also an example of resource insurance from fish.

8.2.2 Marine Fur-bearers

The fur trade provides the main export and the primary source of income in the Rim economy. Each of the marine fur-bearers is considered in the individual sections which follow. Their biology is closely interrelated, however, and the reader should consider seals, white fox and polar bears as a resource unit.

8.2.2.1 Seals

While seal hunting is not widespread in the Beaufort Sea area (see section 7.2.3), it is important near Holman and Sachs Harbour in the Rim economy. Ringed seals are the most common. Their greatest concentrations are found near Banks Island, and east to Cape Parry. These seals which average 54 inches in length and weigh up to 150 pounds, are the most common seals in the Rim economy. This species forms 96% of the harvest at Sachs Harbour and Paulatuk, and slightly higher at Holman [Usher, 1967(2)]. The remainder of the harvest is comprised of bearded seals - a larger species up to 60 inches in length and weighing up to 750 pounds. This species forms 2% of the harvest at Holman (Holman, 1965).

Seal meat was traditionally used for dog food, seal oil for heat and light, and seal skin for clothing. The basis of seal hunting became commercial for its exports of skins, as the use of dog teams declined and imported fuel-oil and clothing replaced domestic uses of seals.

Numerous seals are lost during hunting. One-tenth to one-third of the seals sink between April and June because of low blubber content. However, most harvesting takes place during July and August when the seals are moulting. Additional losses occur due to skins not being suitable for export. Half of the Holman harvest and 70% of the harvest at Sachs Harbour takes place during moulting, which results in half the skins not being suitable for export. In addition to this, 20 to 25% of the skins are juveniles, or 'silver jars'.

The high ratio of kills to utilization demonstrates that, while mortality is important to resource conservation and management, socio-economic importance depends on the level of utilization instead of the

number of animals killed. The harvest of between 8,800 and 9,200 seals at Holman during 1973 resulted in 7,364 skins for export. An even higher ratio was recorded at Tuk and Cape Parry in 1961-62, when 150 seals resulted in 24 skins (Abrahamson, 1962).

Seal harvests are shown in Tables C-3, C-4 and 15. The first Table shows exports between 1957 and 1968. Table C-4 is the basis for evaluating socio-economic importance in this study. Table 15 is a detailed record of seal exports from Banks Island.

TABLE 15

Annual Seal Harvest for Banks Island from 1955 to 1968

Year	No. of Seals	% of previous year's harvest	No. of hunters	Mean harvest per hunter	% of previous year's mean harvest
1955/56	570	-	7	81	-
1956/57	310	54	5	62	76
1957/58	500	161	11	45	73
1958/59	205	41	13	16	36
1959/60	615	300	16	38	237
1960/61	920	150	19	48	126
1961/62	934	101	19	49	102
1962/63	1025	110	18	57	116
1963/64	1125	110	18	63	110
1964/65	2599	231	18	144	229
1965/66	1298	50	19	68	47
1966/67	1268	98	17	75	110

Source : Usher [1971(2)]

The Banks Island data provide an opportunity to compare the level of harvest with the number of hunters and the harvest during the preceding year. From all indications, there is no relationship between the number of hunters, the previous year's harvest, the average harvest per hunter and the number of seals harvested during a given year. Further analysis to relate seal harvests to seal and fox prices and income was not possible within the constraints of this study.

The price of seal skins increased 73% between 1967 and 1974, when the price reached $17.00. This increase was much less than the increase for polar bear skins but greater than for white fox pelts. Table C-1 records a gradual decrease in the differential between seal and white fox prices. Seal skins were still the lowest priced of all marine fur exports in 1974 - but their position had improved considerably.

The domestic value of seal meat is $7.50 to $11.00 for an average of 50 pounds per seal, valued at 15¢ to 22¢ per pound (Usher, 1965). The higher value is approximately half the commercial price of skin exports. These meat prices may be obsolete, however, in view of recent sales :

1. Butchered seal meat sold for $1.20 per pound at Frobisher Bay in 1975, or $42 for 35 lb (Personal communication : R. J. Peet, Fisheries and Marine Service, Winnipeg). This is 2.5 times the value of skins in 1973. No similar sales are known in the Rim economy, but successful inter-settlement trade of whale muktuk enhances the plausibility of a local market for seal meat .

2. The price of seal meat at Frobisher Bay raises many questions about the values used in this study. It should be recognized, however, that prices tend to stabilize at lower levels once the novelty of a product drops. Moreover, this price could reflect higher incomes and fewer alternative sources of meat at Frobisher. Larger supplies of seal meat might reduce the price, in keeping with domestic prices used in this study.

Holman shipped 90% of the annual seal exports, worth $33,195, between 1971 and 1973. The corresponding values were $1,435 and $1,988 for Paulatuk and Sachs Harbour respectively. Average family income from these exports was $790, $102 and $117 respectively for Holman, Paulatuk and Sachs Harbour. Average exports and 1973 prices were adopted in Table 16 to offset annual fluctuations in exports and prices. The resulting income exceeds the actual, average income by 12% at Holman, and by 13% for the whole economy.

TABLE 16

Seal Export Income in the Rim Economy

	Annual Seal Income[1]	% of earned income[2]	Average Seal Income/Hunter[3]	Average Seal Income/family[4]
Holman	$37,602	33%	$895	$895
Paulatuk	$ 1,892	8	$126	$135
Sachs Harbour	$ 2,569	3	N.A.	$151
Rim economy	$42,046[5]	23	$738	$576

1 Table C-4.
2 Table A-13.
3 1973/74; Table C-6 using 1973 prices.
4 Table A-4.
5 Adjusting for missing data.

The domestic value of seals cannot be added to export income, as noted earlier. The potential value of domestic utilization (Table 17) is included as a point of interest, since there is no indication of actual use. Seals may be used for dog food, for human diet and, occasionally, for traditional uses.

TABLE 17

Potential value for domestic uses of seals

	Seals harvested[1]	Potential Value	Value per Hunter[2]	Value per Family[3]
Holman	2,166	$22,743	$541	$541
Paulatuk	109	$11,445	$ 76	$ 81
Sachs Harbour	148	$ 1,554	N.A.	$ 91
Rim economy	2,422	$25,431	$446	$348

1 Table C-4.
2 1973/74, Table C-6; value $10.50.
3 Table A-4

Two characteristics should be recognized from the distribution of seal export income (Table C-6). Seal income is more evenly distributed among hunters than is the income from other marine fur-bearers. Nineteen per cent of the hunters earned 62% of this income, and some hunters had relatively high seal incomes (greater than $3,000). Fifty-four per cent of the hunters reported seal incomes above the average. While a few hunters dominate seal exports, some of the remaining hunters also earn substantial incomes. The second characteristic is the high proportion of hunters and trappers who hunt seals. The number of seal hunters is high in relation to the total number of hunters and trappers.

Holman is the key to the socio-economic importance of seals in the Rim economy and the Beaufort Sea area. If Holman is excluded, seal exports drop by 90%, and their share of earned income declines from 23% to less than 7%. Seal exports are less than 10% of earned incomesin Paulatuk and Sachs Harbour, averaging less than $200 per family.

8.2.2.2 White Fox

The rigours and techniques of fox trapping are adequately described by Usher (1971) and others. White fox are prominent in the fur trade and socio-economics of Rim settlements. The importance of fox exports is well established and surpasses any consideration of domestic uses.

Export prices for fox skins tend to be 30% higher than seal skin prices (Table C-1). Fox prices increased the least of marine furs between 1958 and 1974. For purposes of this report, the exceptional prices prevailing during 1974 are not used in favour of the more characteristic prices during 1973.

The pattern of white fox exports is erratic,and changes by a factor of two or three are not unusual from year to year. Sachs Harbour exported 58% of the white fox furs between 1958 and 1974. This was followed by Holman with 27%, and Paulatuk with 5%. When the number of trappers and size of community are considered, the ranking of Paulatuk and Holman is reversed.

Income from white fox exports is irregular, due to erratic harvests and price fluctuations (Table C-5). However, communities tend to retain their relative share of export income. Sachs Harbour exported 67 to 86% of white fox skins between 1968 and 1972. During the same period, Paulatuk remained in the neighbourhood of 10%. Unexplained factors reduced Sachs Harbour's share to 32%, while Paulatuk's share rose to 47% in 1973. As a result, 1973 is not included in Table 18.

TABLE 18

White Fox export income in the Rim economy

	Percentage of Exports	Annual[1] Fox income	Percentage[2] of earned income	Average[3] Fox income per trapper	Average[4] Fox income per family
Holman	21%	$8,858	8%	$260	$211
Paulatuk	18%	$7,717	31%	$276	$551
Sachs Harbour	61%	$25,774	28%	$1,289	$1,516
Rim economy	100%	$41,387	23%	$504	$567

1 Table C-5
2 Table A-14
3 1973-74, Table C-6
4 Table A-4

In Paulatuk and Sachs Harbour, over 90% of the trappers export white fox skins. This yields 70 to 99% of the total trapping income in these communities, including 82% of the fur incomes, in the Rim economy, above $3,000.

When white fox and seal exports are considered at the same time, each contributes 23% of earned income in the Rim economy. Their contribution to total earned income, per community, is : Holman 41%, Paulatuk 39% and Sachs Harbour 31%. Together, seal and fox exports provide a relatively constant share of earned income, despite the emphasis on one

or the other species in individual communities.

8.2.2.3 Polar Bears

Polar bears are the least abundant of the marine fur species but, individually, the most valuable. Their use has undergone a transition from domestic meat and clothing to commercial exports. Polar bears are the only form of marine wildlife with regulated quotas and controlled hunting.

Prices for polar bear hides have risen dramatically since 1958, when they sold for $25. The average price received by hunters, in 1974, exceeded $1,000 (Table C-1). Resale prices at fur auctions reach $3,000, according to Smith and Jonkel (1973). Auction prices do not affect the socio-economic importance of polar bears, however, since the revenue is received by brokers instead of hunters.

Sports hunting, although very restricted, is another source of income from polar bears (Table C-5). These hunters paid $1,750 for a licence to hunt, and an additional $750 if they were successful (in 1973). The cost of sports hunting increased to $3,000, in 1974, regardless of success.

Polar bear meat is plentiful whenever a bear is killed, but it is not preferred in northern diets. The meat has been valued at 50¢ per pound [MPS Associates Limited, 1974(4)], but utilization is minimal. Large portions of the meat are abandoned if equally desirable meat is available, especially if the hauling distance is substantial.

Harvest quotas are established by the Territorial Government under the 1973 Agreement on the Conservation of Polar Bears - a United Nations Convention among nations which have polar bears within their territory. The quotas are allocated through permits, which are the responsibility of individual settlements for dividing between sports and commercial hunting. The commercial quota is open to settlement hunters on a first-come harvest basis. The quotas are stable, although the actual harvest may vary (Table 19).

TABLE 19

Annual Polar Bear Harvest for the Rim economy between 1969 and 1973

Settlement	1969	1970	1971	1972	1973	Mean Harvest	Mean Quota
Holman	12	15	14	13	9*	13	12
Paulatuk	8	9	8	8	11*	9	8
Sachs Harbour	18	17	4	19	17*	15	18
Totals :	38	41	26	30	37	37	38

* includes two bears harvested by sports hunters in Sachs Harbour and Paulatuk, and one in Holman.
Source : Dr. I. Stirling, Canadian Wildlife Service, Edmonton, from N.W.T. Fish and Wildlife Service, Yellowknife.

The value of polar bear fur exports is $1,000 per skin. The potential domestic value of domestically utilized meat is $100 per bear. Table 20 shows the value of fur exports from the Rim economy based on the mean harvest between 1969 and 1973, using 1973 prices. One polar bear hide has the same value as 36 white fox or 63 seal skins. The average harvest of 36 bears, equal to 19% of earned income in the Rim economy, is an important source of income.

TABLE 20

Potential Revenue from Polar Bear Fur Exports relative to earned income in the Rim economy

	Polar Bear fur revenue	Earned[1] Income	Percentage
Holman	$13,949	$112,835	12%
Paulatuk	$ 9,657	$ 25,005	39%
Sachs Harbour	$18,241	$ 78,880	23%
Rim economy :	$41,847	$216,720	19%

[1] DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969/70.
Source : Fur export tax returns, N.W.T. Fish and Wildlife Service, Yellowknife.

The distribution of polar bear export income is not available. Data were obtained for 11 bears harvested in Paulatuk during 1973/74.[2] These hides were exported for $13,900 and their average price was $1,263. The income to hunters ranged from $800 to $2,500; two were less than $1,000, five equalled $1,500 and two were over $2,000. The average income, per family, was $1,786, equivalent to more than half their average earned income.

The addition of polar bear skins to other fur exports increases their share of earned income to 62% (Table 21). More than half of the earned income in 1968 was provided by marine furs in each settlement of the Rim economy. Marine wildlife, including commercial fishing, is most important in Paulatuk, which has the least wage and salary employment. Marine wildlife is crucial to the Rim economy, and any domestic uses only serve to expand the socio-economic importance of commercial uses.

[2] Fur export tax returns, N.W.T. Fish and Wildlife Service, Yellowknife.

TABLE 21

Marine Fur Exports relative to earned income in the Rim economy

	Percentage of Earned Income[1]			
	Seals[2]	White Fox[3]	Polar Bears[2]	Total
Holman	33%	8%	12%	53%
Paulatuk	8%	31%	39%	78%[3]
Sachs Harbour	3%	28%	23%	54%
Rim economy :	15%	22%	25%	62%

[1] DIAND (1969/70) Mackenzie and Arctic Coast Manpower Surveys.
[2] Based on income estimates shown in resource sections. Earned income is based on 1969 data. Resource sections are usually 1973 prices for average harvests.
[3] Commercial fishing contributes another 30% of earned income in Paulatuk.

8.3 Resource Insurance

Resource insurance may provide exports and subsistence income during periods of low economic activity. This provides export income and minimizes imports. The impact of declining wage and salary employment is minimized through increased domestic utilization.

Resource insurance may also be used to augment changes in domestic and export income due to fluctuations in resource availability, harvesting success and export prices.

Either form of resource insurance is difficult to document since the data requirements are exacting. Although inadequate for sophisticated analysis, the Banks Island data in Table 22 (Usher, 1971) are the only data applicable to resource insurance.

Fox and seal export prices underwent the same relative decline in 1964/65. Fox exports declined as well, although less than fox prices. In contrast, seal exports increased (Table 22). As a result, fur income was maintained at a higher level than would have been possible from fur exports.

The seal harvest was stable during all years, except 1964/65, when fox income was at least half of total income. The same number of seals were harvested, regardless of changes in fur income, and fox and seal prices, during these years. Seal exports increased only when decreased income from fox exports threatened the level of fur income.

The seal harvest increased more than seal exports in 1964/65. This may be another indication of resource insurance for income maintenance, if the increased harvest included a higher proportion of animals lost and skins not suitable for export.

If seals are resource insurance to fox income on Banks Island, there is increased significance to the predator-prey relationship between these species. Seals could be a key to earned income throughout the Rim economy, where wage employment is limited and 46% of earned income is from seal and fox furs.

TABLE 22

Selected Seal, White Fox and Polar Bear utilization and trade characteristics for Banks Island from 1963 through 1967.[a]

	1963/64	1964/65	1965/66	1966/67
Seals				
Seals harvested	1,124	2,599	1,298	1,268
Skins traded	974	2,043	919	672
Per cent traded of harvest	86.6	78.6	70.8	53.0
Average price	$ 30.00	$17.72	$ 9.16	$ 9.25
Value of skins traded	$29,220	$36,205	$8,421	$6,222
Per cent of fur income	35.3	58.7	10.5	3.1
Per cent of total income	30.9	48.9	7.9	2.6
Fox				
Pelts traded	1,982	1,498	2,932	8,447
Average price	$ 24.00	$14.50	$23.89	$22.44
Value of pelts	$47,578	$21,728	$70,046	$189,567
Per cent of fur income	57.6	35.3	88.0	95.7
Per cent of total income	50.2	29.3	65.9	79.9
Bear				
Pelts traded	39	27	8	15
Average price	$ 150.00	$ 137.03	$150.00	$ 151.67
Value of pelts	$5,850	$3,700	$1,200	$2,275
Per cent of fur income	7.1	6.0	1.5	1.1
Per cent of total income	6.1	5.0	1.1	1.0
Furs				
Per cent of total income	88.8	84.0	78.5	91.6
Community				
Total income per family	$4,732	$3,899	$5,595	$11,297
Total income	$94,642	$74,076	$106,306	$237,247

[a] Usher [1971(2)]

9. SYNOPSIS

9.1 Mackenzie Economy : Aklavik, Inuvik, Tuktoyaktuk

9.1.1 Socio-economic characteristics

1. The majority of the Indian, Eskimo and Metis labour force is employed for wages and salaries. Commercial hunting, trapping and fishing employment is one-fifth as frequent as wage and salary employment.

2. Earned income is between 81 and 94 per cent of total income in these communities and 89 per cent for the entire economy. Average earned income, per family, is : Inuvik $5,783, Tuk $3,691 and Aklavik $2,674.

3. More than 90 per cent of earned income is from wage and salary employment. The remaining portion of less than 10 per cent includes earned income from marine and other wildlife.

9.1.2 Commercial Resource Use

4. Marine and other furs are the most important source of hunting, trapping and fishing income. The total fur income in 1973/74 was $161,184, when 124 trappers in Aklavik earned half of this total. The remainder was divided 30 : 20 between 112 trappers in Inuvik and 74 in Tuk. Average fur incomes were $635, $438 and $457 respectively for trappers in Aklavik, Inuvik and Tuk.

5. Marine furs (white fox, ringed seals and polar bears) account for a very small portion of the total fur income in Aklavik, Inuvik and the Mackenzie economy. This income averages less than $125 per trapper in the Mackenzie Delta, where muskrats and other non-marine wildlife provide the majority of furs traded.

6. Marine furs are important in Tuk, where white fox provide 72 per cent of the fur income. Trappers receive an average income of $817 from these furs, or 22 per cent of income earned by the average family.

7. Commercial fishing involves 11 families, or 3 per cent of the population. Eight independent fishermen earn less than $1,000 from local fish sales. Three families average $6,000 income from the subsidized export fishery at Holmes Creek.

8. The socio-economic importance of marine wildlife for commercial use is secondary to wage and salary exports - including employment by firms based outside the study area. Commercial utilization of wildlife provides $60,000 of revenue to 19 families, or 6 per cent of total earned income to 6 per cent of the population. This is less income than social welfare and other unearned income in the economy.

9.1.3. Domestic resource use

9. The determination of non-commercial resource use is seriously hampered by data limitations. The socio-economic importance of domestic utilization is limited by low domestic values relative to export prices and the cost of imports.

10. Whales provide an impressive quantity of products, i.e. 105 lb. of dried meat, 20 gallons of oil and 30 gallons of muktuk, per whale. These products are valued at $233 per whale, or $23,200 annually.

11. Whale harvesting is shared by 18 parties from Aklavik, 13 from Inuvik and 24 from Tuk. The domestic value of whale products is $7,000 for Aklavik, $10,000 for Inuvik and $12,000 for Tuk. The domestic value, per family, is $100 to $600.

12. Consumer preference for whale products and whale hunting may be more important than the value of whale products.

13. Domestic fish consumption by Aklavik residents averages 100 lb. annually, plus 1,316 lb. for each 'working' dog. Fish consumption equals 209,000 lb. in Aklavik - equal to 2,659 lb. per family.

14. The total value of domestic fishing exceeds $170,000, and is valued at $833, $228 and $576, respectively, for Aklavik, Inuvik and Tuk families.

15. Domestic utilization of marine wildlife has a total value of more than $400,000, or over $1,000 per family, based on prices ranging from 30¢ per lb. to $5.00 per gallon.

9.2 Rim Economy : Holman, Paulatuk, Sachs Harbour

9.2.1 Socio-economic characteristics

16. The Rim economy is smaller and less diverse than the Mackenzie economy. There are, for example, 14 families in Paulatuk and 17 in Sachs Harbour. This economy is fragile and sensitive to change.

17. Hunting, trapping and fishing employment is on a par with other employment in the Rim economy, except in Holman where employment in natural resource harvesting constitutes half of wage and salary employment, and self-employment, primarily handicraft sewing, makes up one-third of total employment.

18. Average earned family income ranges from $1,786 to $2,866 in Rim communities, averaging $2,482 in the economy. The average is 20 per cent below that of Aklavik and Tuk - comparable communities in the Mackenzie economy. Income from wages and salaries in relation to total earned income, is lower by one-third than it is in the Mackenzie economy. This difference is divided equally

between self-employment and income from hunting, trapping and fishing.

19. Earned income is 82 to 88 per cent of total income, being slightly less than the Mackenzie values.

20. Paulatuk residents receive 53 per cent of their earned income from commercial hunting, trapping and fishing. This is the only Beaufort Sea community earning more from natural resources than from all other forms of employment.

9.2.2 Commercial resource use

21. Income from marine fur exports, during 1973/74, equals 62 per cent of earned income (1968). The revenue from these exports is $126,242, or $42,000 each for seals, white fox and polar bears.

22. Seal skin exports contribute one-third of earned income at Holman. This provides an average income of $895 per hunter, and per family.

23. White fox fur exports provide 31 per cent of earned income at Paulatuk and 28 per cent at Sachs Harbour. In Sachs Harbour, this is $1,289 per trapper, and $1,516 per family.

24. Polar bear skin exports account for 39 per cent of earned income at Paulatuk, and 23 per cent at Sachs Harbour.

25. Commercial fishing of char, at Paulatuk, yields $7,575, or 30 per cent of earned income in this settlement. The average income, per fisherman, is $689.

26. The revenue from comercially utilized marine wildlife is summarized as follows :

    Marine wildlife income is 108 per cent of earned income at Paulatuk - 8% seals, 31% white fox, 39% polar bears and 30% char. Marine wildlife income at Holman is equal to 53 per cent of earned income - 33% seals, 8% white fox and 12% polar bears. Marine fur exports equal 62 per cent of earned income in the Rim economy - 23% seals, 23% white fox and 16% polar bears.

9.2.3 Domestic resource use

27. There is a lack of domestic resource use information for the Rim economy. The domestic value of marine wildlife is limited to estimates of average animals: seal meat is about $10 and polar bear meat is $100.

28. Domestic utilization of marine wildlife may be at least equal to that in the Mackenzie economy, since there are opportunities for wage employment, and most marine species are abundant.

10. CONCLUSIONS

The conclusions of this study are tempered by the rather poor reliability of little-available information on the socio-economic value of marine wildlife to Inuit and Indians of the Beaufort Sea area. This is especially true of the Rim economy in general, and its domestic utilization in particular. For example, the statistics on income and employment are available only for 1968 and 1969, whereas records of fur exports cover the period from 1968 to 1974. Each of the following conclusions, therefore, is prefaced by - "More research with a wider data base over a longer period of time is desirable."

(1) Marine wildlife has the greatest socio-economic importance to the Rim economy settlements of Holman, Paulatuk and Sachs Harbour. The export sale of seal, fox and polar bear furs makes an essential contribution to personal incomes and living standards. Incomes are usually not high, and employment opportunities other than hunting, trapping and fishing are few.

(2) Marine wildlife has a lesser socio-economic importance in the Mackenzie economy communities of Aklavik, Inuvik and Tuktoyaktuk. Here, wage and salary employment is prevalent among Inuit, Metis and Indians. Commercial utilization of marine wildlife, such as fishes, whales and fur-bearers, is notably minor everywhere, except in Tuk. From Tuk, numerous fox and seal furs are exported. In contrast, the domestic use of fishes and whales is widespread.

(3) The major differences between the Rim economy and the Mackenzie economy are the number of people dependent upon marine wildlife, either domestically or commercially, and the degree to which they are affected by market fluctuations and by natural or man-caused changes in wildlife abundance and distribution. In the Mackenzie economy, only a small segment of the people are intensively active in hunting, trapping and fishing, although a larger segment of the population shares in the benefits from wildlife resources. In contrast, most of the people of the Rim economy are virtually dependent upon marine wildlife for their livelihood.

(4) Based solely on the relative importance of the various marine animals to native peoples, any degradation of the marine fur-bearer resources resulting from offshore exploratory drilling and associated activities would be of great concern to the three Rim economy communities. Fur-bearers are to the Rim economy what fishes are to the Mackenzie economy.

(5) Resource insurance may be the most important attribute of marine wildlife over the long term. A loss or reduction of marine wildlife, as resource insurance, could have greater socio-economic importance than might the immediate effects of environmental changes in the Beaufort Sea.

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APPENDIX A

TABLE A-1

Population Estimates for Beaufort Sea Communities, October, 1969

		Aklavik	Inuvik	Tuk	Mackenzie economy	Holman	Paulatuk	Sachs Harbour	Rim Economy
Treaty Indian	Male	63	33	6	102	0	0	0	0
	Female	75	37	5	117	0	0	0	0
Non-treaty Indian	Male	0	8	0	8	0	0	0	0
	Female	1	8	1	10	0	0	0	0
Eskimo	Male	166	261	261	688	96	40	48	184
	Female	158	270	224	652	110	34	59	203
Metis	Male	57	19	0	76	0	1	0	1
	Female	56	26	0	82	0	0	0	0
Sub-totals :		576	662	497	1,735	206	75	107	388
Other	Male	38	427	0	465	0	0	7	7
	Female	25	377	0	402	0	0	4	4
TOTALS :		639	1,466	497	2,602	206	75	118	399

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969/70 : Table 1.

APPENDIX A

TABLE A-2

Ethnic composition of Mackenzie Economy

	Aklavik	Inuvik	Tuk	Total Population
Treaty Indian	24%	11%	2%	219
Non-treaty Indian	a	2%	a	18
Eskimo	56%	80%	98%	1,340
Metis	20%	7%	0%	158
Mackenzie Economy Population	576	662	497	1,735

a Less than one per cent.
Source : DIAND, Mackenzie Manpower Survey, 1969-70 : Table 1.

TABLE A-3

Population Estimates, 1961-1971, for Mackenzie Economy.

	Aklavik	Inuvik	Tuk	Total
1961	564	1,125	409	2,098
1966	611	2,040	512	3,163
1967	700	2,450	484	3,634
1968	640	2,400	530	3,570
1970	650	2,700	610	3,960
1971	677	2,672	596	3,945

Source : MPS Associates Limited, 1974(4).

APPENDIX A

TABLE A-4

Family size for Beaufort Sea population (Number of people)

	1	2	3	4	5	6	7	8	9	10	11+	Total Families
Aklavik*												
T.I.	6	2	7	4	4	3	3	1	0	1	1	32
N-T I.	1	0	0	0	0	0	0	0	0	0	0	1
Eskimo	6	3	3	3	4	5	7	5	3	1	9	49
Metis	7	3	2	4	2	1	2	0	2	1	0	24
Total :	20	8	12	11	10	9	12	6	5	3	10	106
Inuvik												
T.I.	9	1	1	2	0	1	1	1	2	0	1	19
N-T I.	1	0	0	0	0	1	0	1	0	0	0	3
Eskimo	26	8	4	7	5	8	4	11	5	9	9	96
Metis	6	1	1	2	1	0	0	0	0	1	1	13
Total :	42	10	6	11	6	10	5	13	7	10	11	131
Tuk[1]												
T.I.	0	0	0	1	0	0	0	1	0	0	0	2
Eskimo	13	7	8	8	9	9	9	8	7	3	7	88
Total :	13	7	8	9	9	9	9	9	7	3	7	90
Mackenzie economy:	75	25	26	31	25	28	26	28	19	16	28	327
Holman[1]												
Eskimo	7	3	3	4	10	2	6	3	1	2	1	42
Paulatuk[1]												
Eskimo	1	1	2	2	1	1	3	2	0	1	0	14
Sachs Harbour[1]												
Eskimo	0	0	4	1	2	1	3	2	2	2	0	17
Rim Economy:	8	4	9	7	13	4	12	7	3	5	1	73

* T.I. - Treaty Indian; N-T I. - Non-Treaty Indian.

[1] Only those ethnic groups present are shown for settlement.

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70 : Table 5.

APPENDIX A

TABLE A-5

Labour force participation for individuals
14 years of age and over in the Beaufort Sea economy[1]

	No. of Weeks	Wages and Salary			Hunting Trapping Fishing			Self-Employment			Without Work[2]		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Aklavik	1-3	8	2	10	-	-	-	1	1	2	-	-	-
	4-10	19	13	32	8	2	10	-	1	1	2	-	2
	11-17	10	4	14	6	-	6	2	-	2	3	-	3
	18-24	4	7	11	9	1	10	-	-	-	6	2	8
	25-31	6	4	10	-	-	-	-	-	-	7	-	7
	32-38	3	3	6	-	-	-	-	-	-	6	3	9
	39-45	-	2	2	3	-	3	-	-	-	7	3	10
	46-52	17	19	36	7	1	8	1	-	1	10	8	18
	None	72	99	171	106	149	255	135	151	286	98	137	235
	TOTAL[3]	139	153	292	139	153	292	139	153	292	139	153	292
Inuvik	1-3	2	2	4	-	-	-	-	-	-	-	1	1
	4-10	9	7	16	1	-	1	-	-	-	4	1	5
	11-17	14	9	23	4	-	4	-	1	1	3	-	3
	18-24	8	7	15	4	-	4	1	2	3	6	-	6
	25-31	13	5	18	1	-	1	-	-	-	12	-	12
	32-38	3	1	4	2	-	2	-	-	-	4	1	5
	39-45	7	3	10	2	-	2	-	-	-	6	1	7
	46-52	63	28	91	17	-	17	1	3	4	8	2	10
	None	52	117	169	140	179	319	169	173	342	128	173	301
	TOTAL[3]	171	179	350	171	179	350	171	179	350	171	179	350
Tuktoyaktuk	1-3	5	2	7	-	-	-	-	-	-	-	-	-
	4-10	15	8	23	3	-	3	-	-	-	2	-	2
	11-17	25	6	31	5	-	5	-	-	-	6	-	6
	18-24	19	-	19	6	1	7	-	-	-	7	-	7
	25-31	12	4	16	-	-	-	-	-	-	17	-	17
	32-38	6	1	7	-	-	-	1	-	1	19	-	19

APPENDIX A

TABLE A-5 (Continued)

	No. of Weeks	Wages and Salary			Hunting Trapping Fishing			Self-Employment			Without Work[3]		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Tuk (cont)	39-45	-	1	1	-	-	-	-	1	1	13	2	15
	46-52	17	18	35	3	-	3	1	-	1	6	3	9
	None	43	78	121	125	117	242	140	117	257	72	113	185
	TOTAL[3]	142	118	260	142	118	260	142	118	260	142	118	260
Holman	1-3	-	-	-	-	-	-	-	-	-	-	-	-
	4-10	22	-	22	-	-	-	1	1	2	-	-	-
	11-17	2	1	3	-	-	-	-	-	-	1	-	1
	18-24	2	-	2	2	-	2	1	1	2	-	-	-
	25-31	1	-	1	3	-	3	1	-	1	-	-	-
	32-38	-	1	1	1	-	1	-	2	2	2	-	2
	39-45	-	1	1	16	-	16	-	-	-	-	-	-
	46-52	6	10	16	2	-	2	3	26	29	1	-	1
	None	10	35	45	19	51	70	36	21	57	39	51	90
	TOTAL[3]	43	51	94	43	51	94	43	51	94	43	59	94
Paulatuk	1-3	4	1	5	-	-	-	-	-	-	-	-	-
	4-10	-	1	1	-	-	-	-	-	-	-	-	-
	11-17	-	-	-	-	-	-	-	2	2	-	-	-
	18-24	-	-	-	2	-	2	-	-	-	-	-	-
	25-31	-	4	4	-	-	-	-	2	2	-	-	-
	32-38	-	-	-	-	-	-	-	-	-	-	-	-
	39-45	-	-	-	-	-	-	-	-	-	-	-	-
	46-52	1	1	2	12	1	13	-	-	-	2	-	2
	None	11	10	21	2	16	18	16	13	29	14	17	31
	TOTAL[3]	16	17	33	16	17	33	16	17	33	16	17	33

APPENDIX A

TABLE A-5 (Continued)

	No. of Weeks	Wages and Salary			Hunting Trapping Fishing[2]			Self-Employment			Without Work[3]		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Sachs Harbour	1-3	-	-	-	-	-	-	-	-	-	-	-	-
	4-10	4	-	4	-	-	-	-	-	-	-	-	-
	11-17	2	1	3	-	-	-	-	-	-	-	-	-
	18-24	-	-	-	-	-	-	-	-	-	-	-	-
	25-31	-	-	-	8	-	8	-	-	-	2	-	2
	32-38	-	-	-	-	-	-	-	-	-	-	-	-
	39-45	-	-	-	1	-	1	-	-	-	-	-	-
	46-52	3	2	5	2	-	2	-	1	1	-	-	-
	None	11	21	32	9	24	33	20	23	43	18	24	42
	TOTAL[3]	20	24	44	20	24	44	20	24	44	20	24	44

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70 : Table 4.

[1] Employment activities are not exclusive. Data include employment in more than one area by the same individual so long as earnings were at least $200 per month.

[2] This may be interpreted as "not otherwise occupied", i.e. excludes housewives, students, medically unfit, retired and voluntarily idle persons.

[3] Refers to the entire population 14 years of age and over.

APPENDIX A

TABLE A-6

Monthly distribution of employment for Beaufort Sea population 14 years of age and over

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Man Months	Avge.
Aklavik[1]	78	83	92	96	91	86	85	82	96	76	68	67	1,000	83
Inuvik[1]	156	157	159	155	151	162	159	161	156	157	153	140	1,866	156
Tuk[1]	71	78	80	77	64	93	101	106	85	72	75	73	975	81
MACKENZIE ECONOMY:	305	318	331	328	306	341	345	349	337	305	296	280	3,841	320
Holman[2]	77	77	77	77	76	76	79	79	80	81	77	77	933	78
Paulatuk[2]	23	23	24	21	21	20	17	17	18	17	19	19	240	20
Sachs Harbour[2]	18	18	18	15	10	10	10	13	17	13	18	18	178	15
RIM ECONOMY :	118	119	119	113	107	106	106	109	115	111	114	114	1,351	113

[1] Source : MPS Associates Limited [1974(6)]

[2] Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70 : Table 56.

APPENDIX A

TABLE A-7

Distribution of employment income and total income for individuals in the Lower Mackenzie River Valley[1]

Earned Incomes

Income ($)	Wages & Income	Hunting Trapping Fishing	Self-Employed	Total Income
1 - 699	37	37	4	51
700 - 999	26	7	-	26
1000 -1999	95	12	1	110
2000 -2999	66	3	1	70
3000 -3999	40	2	1	52
4000 -4999	36	-	-	38
5000 -5999	28	-	-	28
6000 -6999	73	2	-	76
10,000 +	6	-	-	7
Unknown	39	34	6	35
None	71	419	504	24
TOTAL INDIVIDUALS :	517	517	517	517

[1] Includes Arctic Red River, Fort McPherson and Mackenzie Economy.

Source : MPS Associates Limited [1974(6)].

APPENDIX A

TABLE A-8

Distribution of earned income for Individuals in the Rim Economy[1]

Earned Income ($)	Holman	Paulatuk	Sachs Harbour	Rim Economy
1 - 499	13	9	0	22
500 - 999	20	3	0	23
1000 - 1999	32	7	1	40
2000 - 2999	9	3	0	12
3000 - 3999	4	0	2	6
4000 - 4999	1	1	1	3
5000 - 5999	0	0	0	0
6000 - 6999	2	0	3	5
10,000 +	0	0	1	1
Unknown	1	3	10	14
None	124	49	89	262
TOTAL POPULATION :	206	75	107	388

[1] Earned income from all forms of employment, including commercial use of marine wildlife. This does not include social welfare and other sources of unearned income.

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969 - 70 : Table 28.

TABLE A-9

Distribution of total income for individuals in the Rim Economy[1]

Total Income ($)	Holman	Paulatuk	Sachs Harbour	Rim Economy
1 - 499	11	9	7	27
500 - 999	20	5	2	27
1000 - 1999	31	7	4	42
2000 - 2999	10	4	0	14
3000 - 3999	5	0	2	7
4000 - 4999	2	0	9	2
5000 - 5999	0	1	1	2
6000 - 6999	2	0	3	5
10,000 +	0	0	1	1
Unknown	1	2	2	5
None	124	47	85	256
TOTAL POPULATION :	206	75	107	388

[1] Income from all sources, includes earned and unearned income.

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70 : Table 30.

APPENDIX A

TABLE A-10

Distribution of earned incomes by the type of employment for families in the Beaufort Sea economy

	Earned Income ($)											
	1 499	500 999	1000 1999	2000 2999	3000 3999	4000 4999	5000 5999	6000 5999	10,000 +	Unknown	None	Total Families
Aklavik												
Wages & salary	11	12	14	9	7	2	5	14	2	1	29	106
H-T-F*	16	6	5	-	-	-	-	-	-	3	76	106
Self-employed	3	1	-	-	-	-	-	-	-	1	101	106
Inuvik												
Wages & Salary	3	3	4	7	9	9	10	34	16	9	27	131
H-T-F*	3	1	2	1	1	-	1	1	1	11	109	131
Self-employed	2	-	1	1	1	-	-	-	-	4	122	131
Tuk												
Wages & Salary	2	1	13	6	9	12	3	13	5	8	18	90
H-T-F*	2	1	-	-	-	-	-	-	-	15	72	90
Self-employed	1	1	-	-	-	-	-	-	-	1	17	90
Mackenzie Economy												
Wages & Salary	16	16	31	22	25	23	18	61	23	18	74	327
H-T-F*	21	8	7	1	1	-	1	1	1	29	257	327
Self-employed	6	2	1	1	1	-	-	-	-	6	310	327
Holman												
Wages & Salary	-	17	7	-	8	1	-	2	-	-	7	42
H-T-F*	9	12	3	-	-	-	-	-	-	-	18	42
Self-employed	11	8	4	4	-	-	1	-	-	-	14	42

APPENDIX A

TABLE A-10 (Continued)

Earned Incomes ($)

	1 499	500 999	1000 1999	2000 2999	3000 3999	4000 4999	5000 5999	6000 6999	10,000 +	Unknown	None	Total Families
Paulatuk												
Wages & Salary	-	5	1	-	-	-	-	1	-	-	7	14
H-T-F*	1	1	5	2	1	-	-	-	-	2	2	14
Self-employed	5	1	-	-	-	-	-	-	-	1	7	14
Sachs Harbour												
Wages & Salary	-	-	1	-	-	-	-	3	1	4	8	17
H-T-F*	-	-	-	1	-	1	-	-	-	9	6	17
Self-employed	-	-	-	-	-	-	-	-	-	1	16	17
Rim Economy												
Wages & Salary	-	22	9	-	8	1	-	6	1	4	22	73
H-T-F*	10	13	8	3	1	1	-	-	-	11	26	73
Self-employed	16	9	4	5	-	-	1	-	-	2	37	73

* Hunting - Trapping - Fishing.

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969 - 70: Tables 37, 38, 39.

APPENDIX A

TABLE A-11

Distribution of earned incomes for families in the Beaufort Sea economy

	Total Income ($)											
	1 499	500 999	1000 1999	2000 2999	3000 3999	4000 4999	5000 5999	6000 6999	10,000 +	Unknown	None	Total Families
Aklavik	11	12	17	12	6	3	4	15	2	4	20	106
Inuvik	2	4	6	7	10	9	10	37	17	12	17	131
Tuk	2	1	14	6	9	12	3	13	5	11	14	90
Mackenzie Economy :	15	17	37	25	25	24	17	65	24	27	51	327
Holman	3	3	12	11	6	2	1	4	-	-	-	42
Paulatuk	2	2	6	2	1	-	-	1	-	-	-	14
Sachs Harbour	-	-	1	-	-	1	-	2	2	8	3	17
Rim Economy :	5	5	19	13	7	3	1	7	2	8	3	73

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969-70 : Table 40.

APPENDIX A

TABLE A-12

Distribution of total incomes for families in the Beaufort Sea Economy.

	Total Income ($)											
	1 499	500 999	1000 1999	2000 2999	3000 3999	4000 4999	5000 5999	6000 6999	10,000 +	Unknown	None	Total Families
Aklavik	14	7	27	14	12	3	3	17	3	-	6	106
Inuvik	9	5	12	5	12	10	10	34	21	5	8	131
Tuk	9	4	14	9	10	9	6	12	8	1	8	90
Mackenzie Economy	32	16	53	28	34	22	19	63	32	6	22	327
Holman	1	3	9	12	9	2	2	4	-	-	-	42
Paulatuk	2	1	5	4	1	-	-	1	-	-	-	14
Sachs Harbour	6	1	3	1	-	-	1	2	2	-	1	17
Rim Economy :	9	5	17	17	10	2	3	7	2	-	1	73

Source : DIAND, Mackenzie and Arctic Coast Manpower Surveys, 1969 - 70 : Table 42.

APPENDIX A

TABLE A-13

Distribution of employment income and total income for families in the Lower Mackenzie River Valley[1]

Income ($)	Type of Employment: Wages and Salaries	Hunting-Trapping - Fishing	Self Employment	Total Income
1 - 699	28	41	9	26
700 - 999	17	9	1	17
1000 - 1999	65	9	1	60
2000 - 2999	43	1	1	41
3000 - 3999	35	1	1	27
4000 - 4999	31	-	-	19
5000 - 5999	26	1	-	23
6000 - 9999	75	1	-	66
10,000 +	24	1	-	20
Unknown	21	33	7	23
None	164	432	509	207
Total Families :	529	529	529	529

[1] Includes Arctic Red River, Fort McPherson and Mackenzie economy.

Source : MPS Associated Limited [1974(6)]

APPENDIX A

TABLE A-14

Levels of earned income shown by type of employment for families in the Rim economy

	Earned income ($)										
	250	750	1500	2500	3500	4500	5500	8000	10,000	Total ($)	Percentage
Holman											
Wages & Salary	-	12750	10500	-	28000	4500	-	16000	-	71,750	61%
H-T-F	2250	9000	4500	-	-	-	-	-	-	15,750	13
Self-employed	2750	6000	6000	10000	-	-	5500	-	-	30,250	26
										$117,750	100%
Paulatuk											
Wages & Salary	-	3750	1500	-	-	-	-	8000	-	13,250	41%
H-T-F	250	750	7500	5000	3500	-	-	-	-	17,000	53
Self-employed	1250	750	-	-	-	-	-	-	-	2,000	6
										$32,250	100%
Sachs Harbour											
Wages & Salary	-	-	1500	-	-	-	-	24000	10000	35,500	84%
H-T-F	-	-	-	2500	-	4500	-	-	-	7,000	16
Self-employed	-	-	-	-	-	-	-	-	-	-	-
										$42,500	100%
Rim Economy											
Wages & Salary	-	16500	13500	-	28000	4500	-	48000	10000	120,500	62%
H-T-F	2500	9750	12000	7500	3500	4500	-	-	-	39,750	21
Self-employed	4000	6750	6000	10000	-	-	5500	-	-	32,250	17
										$192,500	100%

Source : Table A-10.

APPENDIX A

TABLE A-15

Average earnings received by families employed in the Beaufort Sea economy

Average earned income ($)

	Wages & Salaries	Hunting Trapping Fishing	Self-Employment
Aklavik[1]	2086	1780	132
Inuvik[1]	3518	2786	881
Tuk[1]	2134	526	374
Holman[2]	2050	656	1080
Paulatuk[2]	1892	1700	333
Sachs Harbour[2]	7100	3500	-

[1] Source : MPS Associates Limited [1964(6)]
[2] Table A-10

APPENDIX A

TABLE A-16

Source of total income for Aklavik and Tuk Residents[1], 1965

	Aklavik Percentage of Total Income	Tuk Percentage of Total income
Earned Income		
Wage Employment :		
Government	42	20
Other	12	19
Trapping	14	7
Commercial Fishing	1	0
Fur Garment and/or Handicrafts	5	18
	74	64
Unearned Income		
Family Allowance	7	11
Treaty Monies	1	1
Pensions	5	1
Social Assistance	13	23
	26	36

[1] Includes resident Indians, Eskimos and Metis, but does not include non-native government employees or entrepreneurs.

Source : Bissett, D. (1968)

APPENDIX A

TABLE A-17

Total and earned income for families in the Beaufort Sea economy[4]

	Total Income[2] ($)	Earned Income[3] ($)	Percent-age	Avg. Total Income[1] ($)	Avg. Earned Income[1] ($)
Aklavik	330,017	267,383	81	3,300	2,674
Inuvik	729,204	682,346	94	6,180	5,783
Tuk	339,451	298,973	88	4,190	3,691
Mackenzie Economy	1,398,672	1,248,702	88	4,557	4,049
Holman	127,747	112,835	88	3,041	2,686
Paulatuk	30,345	25,005	82	2,168	1,786
Sachs Harbour	52,196	43,380	83	3,070	2,552
Rim Economy	210,288	181,220	84	2,760	2,341

1 Adjusted for the number of families reporting income

2 Total income from all sources

3 Earned income from employment, commercial use of wildlife, &c.

4 DIAND, Mackenzie and Arctic Manpower Surveys, 1969-70 : Tables 65 and 67.

APPENDIX B

TABLE B-1

Quantity of products from beluga whale harvesting in the Mackenzie economy

Year	Whales harvested[1]	Meat[2] (pounds)	Oil[3] (gallons)	Muktuk[4] (gallons)
1973	165	17,325	3,300	4,950
1974	136	14,280	2,720	4,080
1975	131	13,755	2,620	3,930
Average :	144	15,120	2,880	4,320

[1] Source : Fisheries and Marine Service, Inuvik

[2] Assumes 105 pounds per whale

[3] Assumes 20 gallons per whale

[4] Assumes 30 gallons per whale

TABLE B-2

Value of products from beluga whale harvesting in the Mackenzie economy

Year	Whales harvested[1]	Meat[2] ($)	Oil[3] ($)	Muktuk[4] ($)	Total
1973	165	8,662	4,950	24,750	38,362
1974	136	7,140	4,080	20,400	31,620
1975	131	6,878	3,930	19,650	30,458
Average :	144	7,560	4,320	21,600	33,480

[1] Source : Fisheries and Marine Service, Inuvik
[2] Value : 50¢ per pound
[3] Value : $1.50 per gallon
[4] Value : $5.00 per gallon.

APPENDIX B

TABLE B-3

Residence of whaling parties, from 1973 to 1975

Year	Aklavik	Inuvik	Tuk	Unknown	Total
1973	17	14	19	3	53
1974	18	12	24*	3	57
1975	20	13	28	0	61
Average :	18	13	24	2	57

* This value was interpolated from the total number of parties (N=24) and the average number of Tuk parties (N=23.5)

TABLE B-4

The value of beluga whale harvest, per party and per family, in the Mackenzie economy

Year	Harvested whales (No.)	Value[1] ($)	Value per party ($)	Value per family ($)
		Aklavik - West Whitefish		
1973	20	4,650	293	44
1974	44	10,230	568	97
1975	26	6,045	302	57
Average :	30	6,975	388	65
		Inuvik - East Whitefish		
1973	58	13,485	963	103
1974	52	12,090	1,008	92
1975	63	14,648	1,127	112
Average :	58	13,408	1,033	102
		Tuktoyaktuk		
1973	87	20,228	1,064	225
1974	40	9,300	388	103
1975	48	11,160	399	124
Average :	58	13,562	617	151
		Mackenzie economy		
1973	165	38,363	767	117
1974	136	31,620	588	97
1975	131	30,458	499	93
Average :	144	33,480	618	102

[1] Based on value per whale : $232.50

Source : Fisheries and Marine Service, Inuvik.

APPENDIX C

TABLE C-1

Average Fur prices for Northwest Territories*

Year	Polar Bear	Fox (Blue	Cross	Red	Silver	White)	Seals
1957-58	$25.00	$5.00	$3.00	$1.61	$3.20	$15.26	$ -
1958-59	70.00	8.00	1.98	1.98	3.00	19.63	-
1959-60	55.00	8.00	4.22	4.22	4.50	25.00	-
1960-61	55.00	8.00	4.22	4.22	4.50	15.00	-
1961-62	54.07	5.68	3.61	2.57	8.68	10.05	$4.65
1962-63	56.70	6.76	4.31	4.40	6.85	14.37	8.49
1963-64	68.91	5.33	4.44	5.00	7.98	14.98	14.78
1964-65	99.47	5.21	3.76	3.87	8.00	9.23	11.08
1965-66	128.98	7.87	8.30	8.00	10.02	15.55	5.97
1966-67	126.86	9.91	8.75	7.66	14.33	15.65	6.82
1967-68	135.20	7.68	6.82	4.92	15.40	9.99	3.80
1968-69	157.25	10.31	11.78	11.78	17.31	12.21	7.68
1969-70	222.11	11.00	14.05	12.43	18.57	14.03	8.64
1970-71	214.13	9.73	14.35	10.28	16.77	12.30	9.22
1971-72	339.76	12.93	17.62	13.75	14.69	11.32	9.81
1972-73	599.38	17.43	35.86	22.02	18.62	18.32	15.10
1973-74	1073.68	23.10	53.29	42.16	41.44	30.21	17.36
% $\frac{1973}{1957}$	2%	22%	6%	4%	7%	50%	27%

* All fur data is based on a 'trapping year' from July 1 to June 30.

Source : Traders' Fur Record Books, Game Management, NWT Fish and Wildlife Service, Yellowknife.

APPENDIX C

TABLE C-2

Furs exported from Beaufort Sea economy between 1967 & 1973

Aklavik	Polar Bear	Fox (Blue & Black	Cross	Red	Silver	White)
1957-58	3	5	2	2	1	370
1958-59	2	5	11	9	1	235
1959-60	1	1	2	5	3	9
1960-61	-	-	9	2	1	8
1961-62	-	-	1	1	-	55
1962-63	-	-	4	4	1	3
1963-64	-	-	3	6	-	26
1964-65	-	-	5	2	-	22
1965-66	-	-	10	20	3	-
1966-67	-	-	6	18	4	10
1967-68	-	-	7	17	1	38
1968-69	-	-	21	24	4	12
1969-70	-	-	23	32	7	18
1970-71	-	-	9	12	3	93
1971-72	-	-	43	35	-	56
1972-73	-	-	29	42	11	85
1973-74	-	-	32	31	7	87
Average :	-	1	13	15	3	66
Inuvik						
1957-58	*	*	*	*	*	*
1958-59	*	*	*	*	*	*
1959-60	*	*	*	*	*	*
1960-61	-	-	6	23	1	2
1961-62	-	2	21	25	1	144
1962-63	-	1	14	16	2	10
1963-64	-	-	20	78	3	428
1964-65	-	-	-	-	1	16
1965-66	-	-	26	33	1	75
1966-67	5	10	27	46	5	1845
1967-68	-	1	27	14	3	101
1968-69	1	5	48	82	10	502
1969-70	-	1	95	125	13	227
1970-71	6	1	39	53	7	1098
1971-72	1	3	117	146	12	491
1972-73	-	2	67	73	11	173
1973-74	2	6	69	119	9	1405
Average :	1	2	34	49	5	383

/Continued :

APPENDIX C

TABLE C-2 (Continued)

Tuk	Polar Bear	Fox (Blue & Black	Cross	Red	Silver	White)
1957-58	24	1	3	-	2	420
1958-59	4	6	4	3	-	757
1959-60	5	-	16	15	2	104
1960-61	4	1	5	8	-	267
1961-62	9	1	2	-	-	848
1962-63	4	2	15	24	1	577
1963-64	18	5	18	60	2	905
1964-65	22	1	4	4	-	137
1965-66	25	6	30	52	6	260
1966-67	32	-	22	46	1	249
1967-68	14	-	4	9	-	420
1968-69	7	-	58	65	13	539
1969-70	5	2	62	59	12	351
1970-71	4	-	22	31	3	476
1971-72	12	3	29	33	4	2067
1972-73	21	4	111	124	2	852
1973-74	11	6	57	67	3	574
Average :	13	2	27	35	3	577
Mackenzie Economy						
1957-58	27	6	5	2	3	790
1958-59	6	11	15	12	1	992
1959-60	6	1	18	20	5	113
1960-61	4	1	20	33	1	277
1961-62	9	3	24	26	2	1047
1962-63	4	3	33	44	3	590
1963-64	18	5	41	144	5	1359
1964-65	22	1	9	6	1	175
1965-66	25	6	66	105	10	335
1966-67	37	10	55	110	10	2104
1967-68	14	2	38	40	4	559
1968-69	8	5	127	171	27	1053
1969-70	5	5	180	216	32	596
1970-71	10	-	70	96	13	1667
1971-72	13	6	189	214	16	2614
1972-73	21	6	207	239	24	1110
1973-74	13	15	158	217	19	2066
Average :	14	5	74	100	10	1026

/Continued :

APPENDIX C

TABLE C-2 CONT'D

Holman	Polar Bear	Blue & Black	Fox Cross	Fox Red	Fox Silver	Fox White
1957-58	25	2	-	-	-	-
1958-59	13	*	*	*	*	*
1959-60	29	-	-	-	-	52
1960-61	13	37	2	4	1	3202
1961-62	10	8	-	4	1	1181
1962-63	4	2	-	-	-	434
1963-64	31	5	-	-	-	1251
1964-65	14	2	-	-	-	586
1965-66	61	-	-	-	-	567
1966-67	38	23	-	2	-	2736
1967-68	12	-	-	-	-	829
1968-69	12	-	1	3	-	346
1969-70	12	-	1	3	-	346
1970-71	9	10	2	16	-	1376
1971-72	8	17	4	40	-	2215
1972-73	10	11	2	12	-	703
1973-74	15	10	12	38	-	3892
Average	18	7	1	7	-	1214
Paulatuk: Cape Parry & Cape Bathurst						
1957-58	34	3	2	11	-	135
1958-59	11	1	1	1	1	65
1959-60	24	-	12	11	-	59
1960-61	17	-	2	3	-	206
1961-62	15	1	2	8	-	570
1962-63	4	-	2	1	-	51
1963-64	4	2	-	3	1	530
1964-65	14	1	-	1	-	268
1965-66	16	-	2	4	-	96
1966-67	11	-	-	-	-	23
1967-68	5	-	3	3	-	287
1968-69	-	-	6	20	-	130
1969-70	2	6	11	14	-	179
1970-71	8	1	6	2	-	-
1971-72	11	5	10	15	1	223
1972-73	10	-	3	7	2	310
1973-74	13	1	11	16	1	870
Average	12	1	4	7	-	235

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TABLE C-2 CONT'D

Sachs Harbour	Polar Bear	Fox Blue & Black	Fox Cross	Fox Red	Fox Silver	Fox White
1957-58	18	2	-	-	-	2601
1958-59	31	1	-	-	1	1187
1959-60	40	1	-	-	-	865
1960-61	46	8	1	-	-	5162
1961-62	42	7	1	-	1	1969
1962-63	21	2	-	-	1	3440
1963-64	42	1	-	-	-	1590
1964-65	33	5	-	1	-	1446
1965-66	17	12	1	1	1	8984
1966-67	14	25	1	1	-	6779
1967-68	12	7	1	-	-	1479
1968-69	17	1	-	-	2	1225
1969-70	14	1	1	-	5	1419
1970-71	2	4	-	-	-	2811
1971-72	18	15	-	3	2	2687
1972-73	16	8	-	2	-	2000
1973-74	9	17	2	1	-	6007
Average	23	7	-	-	-	3038
Rim Economy						
1957-58	77	7	2	11	-	3665
1958-59	55	2	1	1	2	1252
1959-60	93	1	12	11	-	976
1960-61	76	45	5	7	1	8570
1961-62	67	16	3	12	2	3720
1962-63	29	4	2	1	1	3925
1963-64	77	8	-	3	1	3371
1964-65	61	8	-	2	-	2300
1965-66	94	12	3	5	1	9647
1966-67	63	48	1	3	-	9538
1967-68	29	7	4	3	-	2595
1968-69	29	1	7	23	2	1701
1969-70	28	7	13	17	5	1944
1970-71	19	15	8	18	-	4187
1971-72	37	37	14	48	3	5125
1972-73	36	19	5	21	2	3013
1973-74	37	28	25	55	1	10769
Average	53	16	6	14	1	4488

* Missing data

Source: Fur Export Tax Returns, NWT Fish and Wildlife Service, Yellowknife

APPENDIX C

TABLE C-3

Seals harvested in the Rim economy from 1957 to 1969

	Holman[1]	Paulatuk[3]	Sachs Harbour[2]
1957 - 58	452	n/a	500
1958 - 59	195	n/a	205
1959 - 60	301	n/a	500
1960 - 61	758	n/a	205
1961 - 62	679	n/a	615
1962 - 63	2,309	n/a	920
1963 - 64	4,922	n/a	934
1964 - 65	3,900	n/a	1,025
1965 - 66	2,704	n/a	1,125
1966 - 67	1,346	n/a	2,599
1967 - 68	1,740	n/a	1,298
1968 - 69	2,372	n/a	1,268

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1 Data compiled by Dr. T. G. Smith, Fisheries and Marine Service, Arctic Biological Station, Ste-Anne de Bellevue, P.Q.

2 Source : Usher [1971(2)]

3 not available

APPENDIX C

TABLE C-4

Seal exports and income from the Beaufort Sea economy, 1971 - 1973

	1971-72	1972-73	1973-74	1971-1973 average	1973 Valued[3] Average income
Aklavik					
Seals Exported[1]	(10)	(10)	10	10**	
Income[2]	($98)	($151)	$174	$141**	$174
Inuvik					
Seals Exported[1]	268	7	61	112	
Income[2]	$2,629	$107	$1,059	$1,265	$1,944
Tuk					
Seals Exported[1]	53	26	37	39	
Income[2]	$520	$393	$642	$518	$677
Mackenzie Economy					
Seals Exported	331**	43**	108		
Income	$3,247	$650	$1,875	$1,924	$2,795
Holman					
Seals Exported[1]	1,096	2,189	3,213	2,166	
Income[2]	$10,752	$33,045	$55,778	$33,195	$37,602
Paulatuk					
Seals Exported[1]	179	1	146	109	
Income[2]	$1,756	$15	$2,535	$1,435	$1,892

APPENDIX C

TABLE C-4 : (Continued)

	1971-72	1972-73	1973-74	1971-1973 average	1973 Valued[3] Average income
Sachs Harbour					
Seals Exported[1]	200	95	(148)	148	
Income[2]	$1,962	$1,434	($2,569)	$1,988	$2,569
Rim Economy					
Seals Exported	1,475	2,285	3,507**	2,422	
Income	$14,470	$36,788	$60,882**	$36,618	$42,046

* Missing data replaced by averages (within brackets).

** Includes averages for missing data.

1 Source : Fur Export Tax Returns, Game Management, N.W.T. Fish & Wildlife Service, Yellowknife.

2 Based on average prices for N.W.T.

3 Based on average exports (1971-73) using 1973 prices.

APPENDIX C

TABLE C-5

Polar bear and white fox export income from the Beaufort Sea economy, 1968 - 1973.

	Income ($)							
	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	Average income 1968-73	Average income[2] 1973 values
Aklavik								
Polar Bear	-	-	-	-	-	-	-	-
White Fox	146	252	1,144	634	1,557	2,628	622	1,761
Inuvik								
Polar Bear	157	-	1,284	340	-	2,147	655	1,610
White Fox	6,129	3,185	13,505	5,558	3,169	42,445	12,331	19,616
Tuk								
Polar Bear	1,100	1,111	857	4,077	12,587	11,810	5,257	10,737
White Fox	6,581	4,924	5,855	23,398	15,609	17,341	12,285	24,465
Mackenzie Economy								
Polar Bear	1,257	1,111	2,141	4,417	12,587	13,957	5,912	12,526
White Fox	12,856	8,361	20,504	29,590	20,335	62,414	25,677	45,849
Holman								
Polar Bear	1,887	57,355	1,927	2,718	5,994	16,105	14,336	13,600
White Fox	4,225	4,854	16,925	2,507	12,879	11,758	8,858	44,701
Paulatuk								
Polar Bear	-	444	1,713	3,737	5,994	13,958	5,169*	9,448*
White Fox	1,587	2,511	-	2,524	5,679	26,283	7,717*	10,344**

APPENDIX C

TABLE C-5 : (Continued)

Income ($)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	Average income 1968-73	Average income[1] 1973 values
Sachs Harbour								
Polar Bear	2,673	3,110	428	6,116	9,590	9,663	5,263	13,600
White Fox	14,957	19,909	34,575	30,417	36,640	18,147	25,774	81,310
Rim Economy								
Polar Bear	5,943**	60,939	4,068	12,578	21,578	39,726	24,139**	33,284
White Fox	20,769	25,014	55,707**	35,448	55,198	56,188	41,387**	134,631

* Based on data shown, without adjusting for missing records.

** Average harvest included for missing records.

[1] Based on average fur exports 1968-73, using 1973 prices

Source : Fur Export Tax Returns, N.W.T. Fish and Wildlife Service, Yellowknife.

APPENDIX C

TABLE C-6

Income distribution of fur exports and trappers in the Beaufort Sea economy during 1973 & 1974.

Aklavik (1973-74)	Fur Exports	%	White Fox Exports	%	Seal Exports	%
Total fur income	$67,427	34[2]	$1,215	2[1]	$ 216	a[1]
$1,000/$2,999	$27,530	41	-	-	-	-
$3,000 +	$16,366	24	-	-	-	-
Number of Trappers:	108	35[2]	6	6[1]	3	3[1]
$1/499	77	71	5	83	3	100
$500/999	11	10	1	17	-	-
$1,000/2,999	17	16	-	-	-	-
$3,000 +	3	3	-	-	-	-
Aklavik 1974-75						
Total fur income	$78,816	49[2]	$1,489	2[1]	-	-
$1,000/2,999	$29,099	37	-	-	-	-
$3,000 +	$22,725	29	-	-	-	-
Number of Trappers:	124	40[2]	12	10[1]	-	-
$1/499	80	64	11	92	-	-
$500/999	23	19	1	8	-	-
$1,000/2,999	16	13	-	-	-	-
$3,000 +	5	4	-	-	-	-
Inuvik 1973-74						
Total fur income	$70,409	36[2]	$5,907	8[1]	$1,166	2[1]
$1,000/2,999	$23,204	33	$2,135	36	$1,166	100
$3,000 +	$19,992	28	-	-	-	-
Number of Trappers:	122	39[2]	21	17[1]	-	1[1]
$1/499	85	70	16	76	-	-
$500/999	15	12	3	14	-	-
$1,000/2,999	17	14	2	10	1	100
$3,000 +	5	4	-	-	-	-

APPENDIX C

TABLE C-6 (Continued)

Inuvik (1974-75)	Fur Exports	%	White Fox Exports	%	Seal Exports	%
Total Fur income	$49,126	30[2]	$1,447	3[1]	-	-
$1,000/$2,999	$15,081	31	-	-	-	-
$3,000 +	$11,182	23	-	-	-	-
Number of trappers:	112	36[2]	16	14[1]	-	-
$1/499	87	77	15	94	-	-
$500/999	13	12	1	6	-	-
$1,000/2,999	9	8	-	-	-	-
$3,000 +	3	3	-	-	-	-
Tuk 1973/74						
Total fur income	$57,723	30[2]	$38,944	67[1]	$924	2[1]
$1,000/2,999	$17,927	31	$ 9,968	26	-	-
$3,000 +	$23,886	41	$18,767	48	-	-
Number of trappers:	81	26[2]	51	63[1]	16	20[1]
$1/$499	53	65	32	62	16	100
$500/999	11	14	8	16	-	-
$1,000/2,999	11	14	7	14	-	-
$3,000 +	6	7	4	8	-	-
Tuk 1974/75						
Total fur income	$33,872	21[2]	$24,505	72[1]	10	a[1]
$1,000/2,999	$18,069	53	$ 9,063	37	-	-
$3,000 +	-	-	-	-	-	-
Number of trappers:	74	24[2]	69	93[1]	1	1[1]
$1/$499	53	72	53	77	1	100
$500/$999	9	12	10	14	-	-
$1,000/2,999	12	16	6	9	-	-
$3,000 +	-	-	-	-	-	-
Mackenzie Economy, 1973/74.						
Total fur income	$195,559	-	$46,066	38[1]	$2,306	1[1]
$1,000/2,999	$ 68,661	35	$12,103	26	$1,166	51
$3,000 +	$ 60,244	31	$18,767	41	-	-
Number of trappers:	311	-	78	25[1]	20	6[1]
$1/$499	215	69	53	69	19	95
$500/$999	37	12	12	15	-	-
$1,000/2,999	45	14	9	11	1	5
$3,000 +	14	5	4	5	-	-

APPENDIX C

TABLE C-6 (Continued)

Mackenzie Economy, 1974/75	Fur Exports	%	White Fox Exports	%	Seal Exports	%
Total fur income	$161,184	-	$27.441	17[1]	10	a[1]
$1,000/2,999	$62,249	30	$9,063	33	-	-
$3,000 +	$33,907	21	-	-	-	-
Number of trappers:	310	-	97	31[1]	1	a[1]
$1/$499	220	71	79	81	1	100
$500/$999	45	14	12	12	-	-
$1,000/2,999	37	12	6	7	-	-
$3,000 +	8	3	-	-	-	-
Holman, 1973/74.						
Total fur income	$117,375	53[2]	$38,963	33[1]	$77,303	66[1]
$1,000/2,999	$21,863	19	$ 7,488	19	$21,392	28
$3,000 +	$87,903	75	$27,125	70	$49,100	64
Number of trappers	50	50[2]	34	68[1]	42	84[1]
$1/$499	19	38	21	61	17	40
$500/$999	6	12	3	9	4	10
$1,000/2,999	11	22	5	15	10	24
$3,000 +	14	28	5	15	11	26
Holman, 1975/75.						
Total fur income	$91,271	71[2]	$33,749	37[1]	$56,991	62[1]
$1,000/2,999	$19,422	21	$24,427	72	$26,246	46
$3,000 +	$64,365	71	-	-	$25,138	44
Number of trappers:	45	50[2]	39	87[1]	40	89[1]
$1/$499	14	31	18	46	14	35
$500/$999	6	13	6	15	4	10
$1,000/2,999	12	27	15	39	16	40
$3,000 +	13	29	-	-	6	15
Paulatuk, 1973/74.						
Total fur income	$78,360	35[2]	$55,061	70[1]	$ 2,179	3[1]
$1,000/2,999	$12,951	16	$18,511	37	-	-
$3,000 +	$58,055	74	$34,031	62	-	-
Number of trappers:	30	30[2]	28	93[1]	15	50[1]
$1/$499	9	30	8	28	-	93
$500/$999	5	17	3	11	-	7
$1,000/$2,999	6	20	10	36	-	-
$3,000 +	10	33	7	25	-	-

APPENDIX C

TABLE C-6 (Continued)

Paulatuk, 1974/75	Fur Exports	%	White Fox Exports	%	Seal Exports	%
Total fur income	$13,487	10[2]	$11,780	87[1]	-	-
$1,000/2,999	$ 6,099	45	$ 5,936	50	-	-
$3,000 +	-	-	-	-	-	-
Number of trappers:	24	27[2]	23	96[1]	-	-
$1/499	17	71	17	74	-	-
$500/$999	3	12	2	9	-	-
$1,000/2,999	4	17	4	17	-	-
$3,000 +	-	-	-	-	-	-
Sachs Harbour, 1973/74						
Total fur income	$27,167	12[2]	$26,912	99[1]	-	-
$1,000/2,999	$16,675	61	$16,675	62	-	-
$3,000 +	$ 6,160	23	$ 6,160	23	-	-
Number of trappers:	20	20[2]	20	100[1]	-	-
$1/499	5	25	6	30	-	-
$500/$999	4	20	3	15	-	-
$1,000/2,999	9	45	9	45	-	-
$3,000 +	2	10	2	10	-	-
Sachs Harbour, 1974/75						
Total fur income	$24,058	11[2]	$21,820	91[1]	247	1[1]
$1,000/2,999	$ 4,939	20	$ 4,919	22	-	-
$3,000 +	$12,084	50	$10,939	50	-	-
Number of trappers:	21	23[2]	20	95[1]	1	5[1]
$1/$499	9	43	10	50	1	100
$500/$999	7	33	6	30	-	-
$1,000/$2,999	2	10	2	10	-	-
$3,000 +	3	14	2	10	-	-
Rim Economy, 1973/74						
Total fur income	$222,209	-	$120,936	54[1]	$79,482	36[1]
$1,000/2,999	$ 51,489	23	$ 42,674	35	$21,392	27
$3,000 +	$152,118	68	$ 67,316	56	$49,100	62
Number of trappers:	100	-	82	82[1]	57	57[1]
$1,/$499	33	33	35	43	31	54
$500/$999	15	15	9	11	5	9
$1,000/2,999	26	26	24	29	10	18
$3,000 +	26	26	14	17	11	19

APPENDIX C

TABLE C-6 (Continued)

Rim Economy, 1974/75	Fur Exports	%	White Fox Exports	%	Seal Exports	%
Total fur income	$128,816	-	$67,349	52[1]	$57,238	44[1]
$1,000/2,999	$ 30,460	24	$35,282	52	$26,246	46
$3,000 +	$ 76,449	59	$10,939	16	$25,138	44
Number of trappers:	90	-	82	91[1]	41	46[1]
$1/$499	40	44	45	55	15	36
$500/$999	16	18	14	17	4	10
$1,000/2,999	18	20	21	26	16	39
$3,000 +	16	18	2	2	6	15

Source : Individual Trapping Record Summaries, Game Management, N.W.T., Fish and Wildlife Service, Yellowknife.

a less than one per cent.

[1] Per cent is relative to "Fur income' column. All other values refer to column totals.

[2] Per cent is relative to Mackenzie or Rim economy totals.

APPENDIX D

Domestic fishing in the Mackenzie economy

Domestic fish consumption in the Mackenzie economy was estimated to be 110,000 pounds annually by Gemini North (1974). This represents a 92% decline from an estimate of 2,160,000 pounds (Bisset, 1966) and is 81 per cent less than the Aklavik survey estimate used in this study (Hunt, 1973).

Examination of the Gemini North estimate in Table D-1 shows that fish consumption is remarkably low - approximately 20 pounds per person - when all consumption is allotted to human food. This ignores the use of fish as dog food and should, therefore, yield inflated results. The uniformity of consumption rates in Table D-1 is also unexpected since the results are based on the entire population, while domestic fishing is restricted to the native population (Table A-1). When the use, per person, is revised to reflect the native population, the rate of consumption in Inuvik is five times greater than in Aklavik or Tuk. The results of this examination seem unlikely and suggest that the Gemini figures may not consider fish used as dog food, nor the presence of a large non-fishing (white) population in Inuvik.

TABLE D-1

Domestic fishing estimate for the Mackenzie economy by Gemini North (1974)

	Aklavik	Inuvik	Tuk
Pounds of fish	15,400	80,300	14,300
Value of fish @ 30¢ per lb.	$ 4,620	$24,090	$ 4,290
Total settlement population	680	3,300	650
Use per person (lbs)	23	24	22
Fishing (native) population[1]	576	662	517
Use per fishing person (lbs)	27	121	28

[1] DIAND, Mackenzie Manpower Survey (1969) - Indian, Eskimo and Metis population.

The domestic fishing estimates by Bisset and Hunt are in basic agreement. Bisset does not distinguish between fish used as dog food and that eaten by people. However, if 100 pounds of fish is allocated for each person of the native population, the remaining consumption is equivalent to 1,270 pounds of fish per dog. Hunt estimates that a dog

consumes 1,316 pounds of fish per year, while a person eats 100 pounds per year.

Table D-2 compares the Bisset, Gemini and Hunt estimates of fish consumption on the basis of the total population, the fishing (native) population and the number of dogs. All of the fish are allotted to a single use, i.e. the population being considered, in each case.

TABLE D-2

A comparison of rates of domestic fish consumption for Aklavik

	Bisset (1966)	Gemini (1974)	Hunt (1973)
Total catch (pounds)	500,000	15,400	294,306
Total population	629	650	677
Fishing population	426	450	450
Dog population	360	172	172
Fish consumption per :			
total population (pounds)	794	23	435
fishing population (pounds)	1,173	34	654
number of dogs (pounds)	1,389	89	1,711

The most important variable in Table D-2 is the size of the dog population. Bisset based fish consumption on 360 dogs, and Hunt sampled 172. This difference is eliminated when fish consumption is put on an average-per-dog basis. Once again, there is basic agreement between Bisset and Hunt, while Gemini is not comparable. This analysis also shows the importance of the number of dogs to estimates of domestic fish consumption.

Hunt (1973) sampled a cross-section of families in Aklavik, without regard for their fishing activity or the number of dogs. The resulting data can be stratified according to fishing activity and the uses of fish. Four groups form the basis for identifying the distribution of domestic fish consumption, and the significance of human consumption relative to the use of fish as dog food (Table D-3).

TABLE D-3

Analysis of Aklavik domestic fishery survey based on the pattern of fish consumption and the number of dogs per family

	Human food only	Human & dog food	Seven or more dogs*
Percentage of families	45	45	14
Percentage of people	54	35	15
Percentage of dogs	17	83	53
People per family	6.7	4.4	6.0
Dogs per family	1.1	5.6	11.7
Percentage of total fish	3	97	76
Percentage of human food	27	73	36
Percentage of dog food	0	100	82
Total fish per family (lbs)	376	11,586	30,107
Human food per family (lbs)	376	1,031	1,679
Dog food per family (lbs)	0	10,554	28,429
Average fish per person (lbs)	56	235	280
Average fish per dog (lbs)	0	1,867	2,427
Consumption during summer (%)[1]	40/31	30/31	26/31
Consumption during winter (%)[2]	60/69	70/69	74/69

* This is a subset of the "human and dog food" families, i.e. those feeding fish to at least 7 dogs, and cannot be added to the previous columns.

[1] Sixteen weeks = 31%

[2] Thirty-six weeks = 69%

The first group neither fishes nor eats fish. This is 10 per cent of the families and, therefore, restricts domestic fishing to the remaining 90 per cent of the families in Aklavik. This group does not include any working dogs.

The second group eats fish but does not feed fish to dogs. This group includes half of the families and 17 per cent of the dogs. These families consume 3 per cent of the total domestic fish and 27 per cent of the fish consumed by people. The average fish consumption, per capita, is 56 pounds - just over half the average for all families.

These groups, which do not use fish as dog food, include 55 per cent of the families, 64 per cent of the people and 17 per cent of the dogs in Aklavik.

The third group of families includes the remainder of Aklavik families who eat fish and feed them to dogs. This group utilizes 97 per cent of the fish consumed : 73 per cent of human consumption, and all the fish used as dog food. The bulk of domestic fishing is done by less than half of the families in Aklavik, making up one-third of the population - who have 83 per cent of the dogs. Total fish consumption is 11,586 lbs. per family, with 10,554 lbs. of dog food and 1,031 lbs. of fish for people (235 lbs. per person).

The final group is selected from the third group of Table D-3. These families not only use fish as dog food but have 7 or more dogs in the family. This is the core of domestic fishing. More than half of the working dogs belong to these families, which consume 76 per cent of the fish.

The seasonal pattern of fish consumption differs between groups. Those using fish for dog food have higher rates of usage during winter. However, the high rate of cónsumption for groups not feeding dogs is during the summer.

The socio-economic importance of domestic fishing is closely related to families with working dogs - primarily those with 7 or more dogs. These people also eat more fish than those families not feeding dogs. This may indicate a difference in the life-style of these groups of families.

The pattern and interpretation of the socio-economic importance of domestic fishing would change if the findings in Aklavik were to extend to other communities. The base of socio-economic importance would narrow and intensify, until similar to other marine wildlife. The appropriate socio-economic interpretation of fish consumed by dogs remains the single most important unanswered question.

APPENDIX D

TABLE D-4

Summary of projected domestic fishing catch, value and use for Mackenzie area of Beaufort Sea.

Community	Fishing population		Total catch	Human food[1]	Dog food[4]	Total value	per capita value ($)
	People*	Dogs**	pounds	($)	($)	($)	
Aklavik	677[1]	172[1]	294,476	20,400	67,943	88,343	130.49
Inuvik	300[2]	15[3]	99,740	24,000	5,922	29,922	37.40
Tuktoyaktuk	570[2]	85[3]	172,860	18,300	33,558	51,858	90.98
Mackenzie economy :	1,547	272	567,076	$62,700	$107,423	$170,123	$86.29 (Avg)

* Eskimo, Indian and Metis fishermen and their families.
** Dog population for fishing families - not community.

1 Source : Hunt, W.J.: Aklavik fish utilization study, Fisheries and Marine Service, Inuvik, N.W.T.

2 DIAND, Mackenzie Manpower Survey (1969)

3 Estimated

4 Valued on the basis of 30¢ per lb. [MPS Associates Limited, 1974(5)]

The Aklavik survey data in this Appendix indicates that 45 per cent of the families consumed 97 per cent of the fish. One-third of this group fed fish to 7 or more dogs, and consumed three-quarters of the fish. Although the average person ate 100 lbs. of fish, and 90 per cent of the families ate fish, any reduction in domestic fishing is more likely to result in hungry dogs than in hungry people.

APPENDIX D

TABLE D-5

Domestic fishing requirements for the Mackenzie economy (Bisset, 1967)

Community	Annual harvest	Population			
		Indian	Eskimo	Other*	Dogs
Aklavik	500,000 lb.	144	282	203	360
Inuvik	350,000 lb.	340	563	1,355	110
Tuktoyaktuk	600,000 lb.	5	405	65	200

* White and Metis

TABLE D-6

Commercial fishing incomes for char fishermen at Paulatuk (percentage of total revenue)

	Fishermen's incomes		
	27%	8%	4%
	16%	7%	4%
	12%	6%	3%
	10%		3%
Total :	65%	21%	14%

Source : Commercial fisheries' sales slips, Fisheries and Marine Service, Inuvik.

APPENDIX E

Costs and Net Income

The costs of resource utilization include supplies and equipment used in hunting, trapping and fishing. Direct or operating costs include gas, ammunition and other supplies which are directly consumed during utilization. Nets, guns, traps, boats and snowmobiles gradually wear out and must be replaced. The capital cost of hunting, trapping and fishing equals depreciation, or the pro-rated cost of replacing equipment. Wages, or the cost of labour are usually the same as net income since hunters, trappers and fishermen employ only themselves and their families. Their income is whatever remains after operating and capital costs have been paid.

The costs of resource utilization are not well documented. Their importance is lessened by the close integration between resource utilization and life-styles, the variability of harvest as a function of resource availability, and the integration of commercial and domestic resource use. Usher (1971) provided one of the few insights to resource utilization costs and net income for Banks Island and Sachs Harbour. This information is shown in Tables E-1 to E-5 inclusive.

Usher did not differentiate betweem cash income and domestic income since the values for domestic use were based on replacement costs.[1] The cost of exporting a seal skin (Table E-3) was $11.26, while prices were less than $10.00. However, seal meat was also valued at $10.00 (Table E-4), making seals profitable if the skins were exported and their meat used. Perhaps more importantly, seal exports provided cash income to pay the costs of harvesting for domestic or commercial uses. Caribou and fowl were less expensive sources of domestic food, but they did not contribute to the operating or capital costs of production. Moreover, the cost of harvesting seals could be shared between the production of meat and skins. This was not the case for other forms of domestic utilization. The reader is referred to Usher [1971(2)] for a complete consideration of resource utilization and profitability.

The lack of cost data in this study is not a serious constraint if it is assumed that resources are utilized according to their profitability. The utilization and income data used in this study represent actual behaviour which reflects profitability.

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[1] See Section 6.1.1

APPENDIX E

TABLE E-1

Investment in capital goods, depreciation and operating costs per hunter, Banks Island

Capital Goods

Item	Replacement value	Expected life in years	Annual depreciation
Hunting & trapping equipment :			
600 traps, size 11/2	$750.00	10.0	$75.00
.22 rifles (birds, small game)	70.00	3.5	20.00
.222 rifles (seals)	175.00	3.5	58.33
.243 or .30/06 rifle (big game)	175.00	6.0	29.17
12g shotgun (birds)	135.00	8.5	15.88
2 telescopic sights (4 power)	130.00	10.0[a]	13.00
Sub-totals:	$1,435.00		$211.38
Travelling & camping equipment :			
20 ft. canoe	$600.00	6.0	$100.00
15 h.p. out-board	500.00	3.5	142.86
Toboggan (10 ft. bottom)	50.00	2.5	20.00
Mud sled (12 ft.)	50.00	3.5	14.29
Harnesses	125.00	2.0	62.50
Dogline and chains	50.00	10.0[a]	5.00
Tent	80.00	2.0	40.00
Other gear	200.00	4.0[a]	50.00
Sub-totals :	$1,655.00		$434.65
TOTALS :	$3,090.00		$646.03

Operating Costs :

Item	Annual Expenditure
Ammunition (rounds: .22-500, .222-350, heavy gauge-150, shotgun-125)	$135.00
Cornmeal (1100 lbs)	220.00
Gasolene (150 gals.)	187.50
Outboard oil (25 qts.)	37.50
Naphtha gas (50 gals.)	62.50
TOTAL :	$642.50
Total annual depreciation and operating costs :	$1,288.53

[a] Estimated
Source : Usher [1971(2)]

APPENDIX E

TABLE E-2

Production costs of country foods and pelts, Banks Island

Commodity	Cost per animal	Cost per lb. edible food	Cost per[a] pelt
Fox	$4.34	$ .91[b]	$4.34
Seal	7.78	.71	9.15[c]
Caribou	9.70	.12	-
Bear	50.67	.19	50.67
Goose	.93	.27	-
Duck	.13	.05	-
Ptarmigan	.04	.05	-
Owl	1.00	.25	-
Fish	1.09	.58	-
Hare	.53	.10	.53

[a] This is a duplication of cost per lb. of edible food - not a separate cost. Either may be used, depending on the primary use made of the animal.

[b] Based on direct input costs of $2.10 per fox.

[c] Based on number of saleable pelts (60), which is less than the total taken. It is assumed for other species that all pelts retrieved are saleable.

Source : Usher [1971(2)].

TABLE E-3

Cost of furs and skins f.o.b. selected locations

	Fox	Seal	Bear
Sachs Harbour	$4.34	$9.15	$50.67
Inuvik[a]	4.52	9.93	55.17
Edmonton[b]	5.50	11.26	68.00

[a] Includes shipping costs

[b] Includes shipping costs, export tax and 6% sales commission.

Source : Usher [1971(2)].

APPENDIX E : TABLE E-4

Gross profits on resource utilization, Banks Island

Commodity	Cost ($)	Substitution cost or sale value[a] ($)	Gross Profit ($)
Fox pelt	4.34	22.00	17.66
Bear skin	50.67	145.00	94.33
Seal skin	9.15	17.00	7.85
Seal meat, per edible lb.	.17	.22	.05
Caribou meat, per edible lb.	.12	.50	.38
Fowl, per edible lb.	.05 -.27	.55	.28-.50
Fish, per edible lb.	.58	.35	.23
Dogfeed, all types, per ed. lb.	.17	.23	.08
Human food, all types, per ed.lb.	.16	.50	.34

[a] Substitution cost used for meat products; recent (1963-67) approximate, average prices paid to producers used for furs and skins.
Source : Usher [1971(2)].

TABLE E-5

Annual and cyclical family expenditures, Sachs Harbour

Item	Annual Expenditures		Cyclical (4-year) Expenditures	
	Normal	Minimum	Assumption A	Assumption B
Capital equipment	$1,300	$650	$5,200	$5,200
Food (except dog feed)	1,200	1,000	4,400	4,200
Shelter	300	50	1,200[b]	1,200[b]
Heat and light	600	500	2,200	2,100
Furniture and household goods	500	100	2,000[b]	2,000[b]
Clothing	500	300	1,800	1,700
Transportation and communication[a]	400	50	900	700
Tobacco and alcohol	300	200	1,000	900
Miscellaneous	300	100	900	800
Total :	$5,400	$2,950	$19,600	$18,800
Mean :	n.a.	n.a.	$ 4,900	$ 4,700

[a] Does not include local dog or snowmobile transport.
[b] Since these items have, in general, a life of longer than 4 years, the full level of expenditure is not necessarily required in any given cycle although, for ease of presentation, they have been given as such.

n.a. - not available.
Assumption A - Two years at normal expenditure and two at minimum, adjusting for fixed and variable long-term costs.
Assumption B - One year at normal expenditure and three at minimum, adjusting for fixed and variable long-term costs.

Source : Usher [1971(2)]

APPENDIX F

Muktuk ; Inter-settlement trade during 1975

Inter-settlement trade could have an important influence on the future socio-economic importance of whales. Commercial use could also provide an incentive for increased harvests, efficiency and utilization.

The Hunters and Trappers Association produced 335 five-gallon cans of muktuk in 1975. The price per can was $25.00, or $8,375 potential revenue. The sales distribution of 287 cans is shown below.

40	cans	- Northern Games
100	"	- Sachs Harbour
10	"	- Cambridge Bay
35	"	- Coppermine
55	"	- Holman
20	"	- Paulatuk
27	"	- unspecified

The implications of inter-settlement trade are the following : Muktuk may have a high commercial value. Commercial sales may provide a cash option to whale hunters. A shift from domestic utilization to commercial production by people seeking to maintain a traditional life-style may result from inter-settlement trade.

APPENDIX G

Local, Export and Replacement Values

The values in this study are based on local sales and export prices. It has been emphasized that these prices do not represent replacement costs, i.e. the retail price of substitute food. The difference between local and export prices was also described in terms of demand, the supply of money and the dual economy. This appendix is a comparison of local, export and replacement values for Coppermine-Holman and Banks Island.

TABLE G-1

A comparison of resource values for Holman and Sachs Harbour

	Local Value (per lb)	Export Value (per lb)	Replacement Value (per lb)
Holman[1] (1963)			
Fish	10¢ - 15¢	15¢	12¢
Seal	11¢ - 20¢	-	15¢
Caribou	15¢ - 33¢	-	25¢
Sachs Harbour[2] (1967)			
Fish	10¢	25¢	35¢
Seal	10¢	-	22¢
Caribou	-	30¢	50¢
Ptarmigan	-	40¢	55¢

[1] Source : Usher (1965)

[2] Source : Usher [1971(2)]

These values reflect economic and market conditions at the time they were determined. Their relationship to current conditions is not known. It is interesting to note, however, that local values were at least equal to replacement values for Holman. If sufficient income were available to purchase retail substitutes for domestically-utilized resources at Holman, there would not be an increase in the cost of living. Resource dependence is restricted to the availability of cash income and employment opportunities under these conditions.

Sachs Harbour exemplified the opposite case. Replacement values were greater than local or export values. The cost of living would increase with a decrease in domestic utilization. Since the replacement costs exceeded local values, less income would be available for other purchases if retail foods were purchased. Under these conditions, domestic foods would be traded only when the income was needed for imports or when local food supplies were inadequate. Resource dependence is not restricted by replacement costs since commercial foods are more expensive than domestic foods.