

INUIT LAND USE AND
ECOLOGICAL KNOWLEDGE

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A report on the first phase of a
research project carried out among
the Inuit of Northern Quebec.

Prepared for:

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INTRODUCTION

The utilization and management of arctic resources has a long and controversial history in the north. The relationship between people and resources has been fundamental to the survival of Inuit culture, but the nature of his relationship is undergoing significant changes. The Inuit use of the land and resources continues to be important, but it is now part of a much larger system of activity and control.

Northern hunters were never aimless, long distance wanderers, nor were they constantly on the edge of starvation - hapless victims of a cold and unrelenting environment. Through skill, through information, and through the ability to unite socially, Inuit were able to apply judgment, strength and technology to the problems of gaining a living from the land. In the process, a very special type of adaptation evolved which is defined as much by the psychological outlook of a hunter as it is by his adaptive skills.

Land use is a physical expression of social and intellectual factors, and it yields a product that can be directly measured through harvest, but it also includes the subjective qualities and satisfactions that people derive from a strong attachment to place. A pattern of land use is, therefore, a pattern of occupancy, and occupancy involves all of the factors that create a living force within a territory.

To the outside world, however, hunting and its requirements for land and resources has often been viewed as contradictory to the pace of cultural change and development that is taking place. The expansion of economic and political systems of the south at the expense of Inuit hunting and gathering activities is often rationalized in terms of the scale and efficiency of resource exploitation. Hunting adaptations do not constitute the maximum utilization of a land's capacity to "produce" either through a managed conversion of sunlight into food or through an expanding production of non-food resources. A constant work effort was thought to be necessary in order to gain a meager return. People could "subsist" but they could not "prosper". Small populations and large territory, high mobility and few material goods, reinforced the viewpoint of marginality and provided a logic of social responsibility that sped the process of territorial acquisition and cultural displacement.

Perhaps this general attitude gives rise to more specific interpretations of the future role of native people, such as that stated by an investment banker in Montreal on May 8, 1974.

... That the north will be developed and the resources utilized for the continuation of the industrial sector of Canadian, and when warranted, Western society, is no longer a question. The millions living in the developed regions of Canada cannot be held captive by a handful of people wishing to hunt rabbits.

An alternative to this assumption of economic development are suggested by commentary of an Inuk from Foxe Basin.

With working, making money is the only thing. It's tiresome and you only think of getting paid. With hunting, it's food to do and it's not tiresome. There is food and the skin will be used...

If I were asked by a white man, "Are you happy with your land?", I'd tell him that I am very happy with it. It has animals and you can see for miles. It seems barren but if you go away you can see animals. Seeing live animals is liked most by our people...

I'm not talking about what I'm thinking just now, but what I've thought of as I get older and also as the white people come up. We, the Inuit, have to work hard. We seem as if we're treated like babies by the white people, when we are not babies. We are realizing it but we seem to be too late. But maybe we are not too late if we try harder. I don't want it to be too late. Not only me but other Inuit here are trying very hard...

When I think of the Inuit I get kind of angry because they're treated that way. We can't turn into white people. We all can't hold permanent jobs, some can but lots of others still want to hunt.

That such attitudes are widely spread across the North American arctic is evident from the statements of an Inuk in southwest Alaska.

Please try to fathom our great desire to survive in a way somewhat different than yours. We do not dislike Western or Whiteman. We simply treasure our young and our culture. It is our belief that both can live together side by side, but not necessarily eating out of the same bowl.

The question, of course, is how can the cultural heritage and survival of Inuit culture be safeguarded.

It is a survival based upon land and resources, and in spite of education, jobs and "investment" opportunities, the land will remain as a central force in the lives of Native people today, and in the lives of their children.

There are numerous starting points for a strategy that incorporates the Inuit perception of land into an action designed to safeguard their land. Confrontation with development, confrontation with new ideas about future life styles, and confrontation with the inevitable process of change must all be considered. In northern Quebec, one of the starting points is to involve Inuit in the process of land and resource management. The following sections of this paper explain a project sponsored in part by I.U.C.N. It is a project that will eventually create an approach to land use planning and resource management that captures the imagination and meets the needs of Inuit.

CONSERVATION, MANAGEMENT AND THE RESEARCH PROJECT

In the spring and summer of 1981, the Inuit of northern Quebec initiated a study aimed at developing a systematic body of information about the land use and resources of the territory used by Inuit of northern Quebec for hunting, fishing and trapping. The source of information to be used for all phases of this study will be drawn from the accumulated knowledge and expertise of Inuit. The findings are a reflection of Inuit observations and perceptions about their environment, as defined through the activities of land use and through the intellectual processes that allow for environmental information to be categorized, organized and applied.

The land use practices of Inuit hunters reflect social institutions as well as available technology and their harvesting activities incorporate an adaptation to marine, land and freshwater ecosystems. Although hunting patterns may include a vast territory, the productivity of the harvest is often based upon the selective use of particular places at specific times of the year. Thus, patterns of land use are inseparable from knowledge about the resource base.

The region under consideration lies north of the 55th parallel in Quebec and serves as the homeland for approximately 5,000 people that reside in fourteen communities. Of this group, twelve communities with a total population of 4,300 will participate in the project.

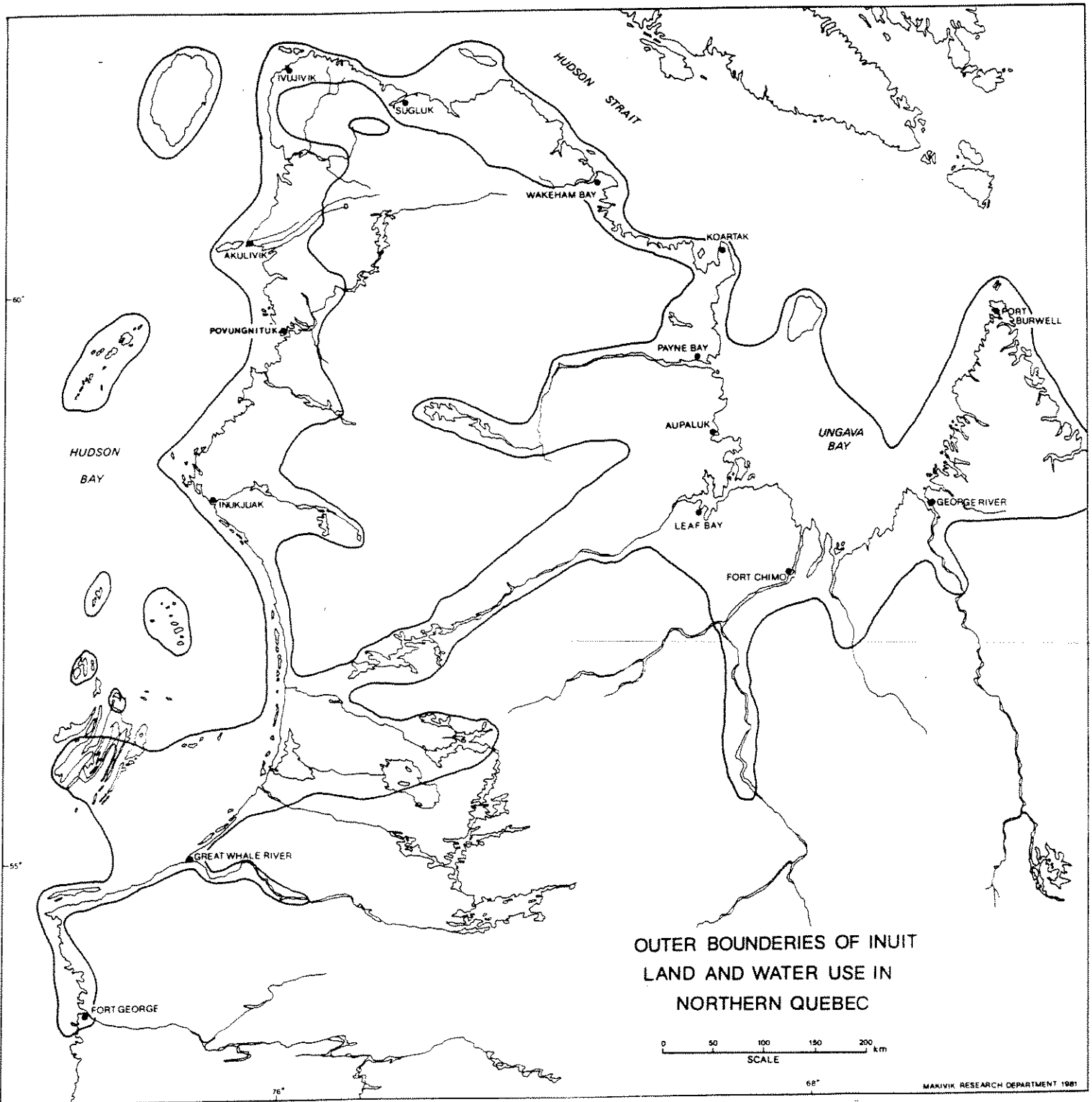


FIGURE 1

Approximately 800 of these individuals are full or part time hunters. The continuing importance of hunting to the household economy of northern Quebec is evident from the fact that from 1976 to 1978, an average of 1,150,000 kilograms of meat was harvested each year.

The orientation of this project and the application of its findings provides a unique opportunity to address a problem area that is recognized to be important by the I.U.C.N. - that of developing resource management tools for indigenous arctic communities. The project is an important step in a process intended to facilitate the active role of native people in land use planning and resource management. The objectives of this research are related to the critical need for Inuit to become active participants in northern resource management and conservation.

The logical assumption is that Inuit hunters, as principal users of the resources, will practice conservation because it is in their long term interest to do so. This point of view has been clearly stated by native people.

There is no group which has a greater interest in protecting fish and game resources than village people who depend upon them for subsistence.

Responsibility, however, can not be superimposed from outside, nor can the assumptions and information upon which problems are identified and decisions are made, ignore the local concerns and points of view of Inuit hunters.

Conservation is a principle objective of such a process, but the definition of this term must be expanded. In the reality of today's north, conservation involves species and habitats, but it must also incorporate the life styles of Inuit who continue to be dependent upon hunting, fishing and trapping for their livelihood and for cultural identity. Conservation implies a concern with the ecology of species, but it must also recognize that these concerns are often linked to political motives, and to the administrative and scientific mandates of governments.

The potential explosiveness of the situation must be realized, and programs and action must reflect the level of Inuit feelings about their lack of ability to make changes. The Inuit feel themselves victimized at many levels. Victims of a political system that forces them to negotiate for land that they already know is theirs; victims of a bureaucracy that does not recognize their desire for an effective voice in decision making; victims of a funding system that does not provide assistance for resource problems viewed as important by local people; victims of a system of economic priorities that allows for development to take place at the expense of native values and life style; victims of having to justify their harvesting practices while development can make massive, long term impacts on the environment and ecology; victims of a system of scientific enquiry and information that does not include the

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ideas and perspective of native people and which does not facilitate their access to sources of expertise who are actually willing to transfer their expertise, not sell it, to native people.

There are, of course, arguments on the other side. Certain development projects have attempted to include native participation at many levels; it is essential to evolve a strategy for the conservation and management of arctic resources that is sensitive to the cultural and ecological realities of the arctic and realistic about the politics of conservation and resource development. The future rights of Inuit to maintain an active life from hunting as well as to exercise other options with respect to their role in northern society is predicated on the assumption that resources can be properly managed and habitats preserved. At present the critical need to conserve and properly manage northern biological resources and habitats is complicated by a lack of essential information about both the ecology and utilization of northern resources. It is also confused and hampered by the politics of jurisdiction and control. This political sphere of influence includes the traditional agencies and government approaches to management, but it also includes the new political power exercised by companies concerned with resource development, and the growing political power of the scientific community.

The Study objectives and Data Base

The study, when completed, will document the extent and seasonal patterns of past and present land use for all of the major species and they will account for areas of intensive land use. This information will be presented as a series of maps that are to be compiled from the individual hunter maps. The description of the resources and ecological system will identify from the Inuit perspective, characteristics of the behavior, distribution and interaction of the species. Critical habitat areas will be located and identified by their seasonal role in the life cycle activities of the wildlife resources. The ecological data base can be portrayed on maps and the critical ecological areas can be defined. Certain details, however, can only be described in a written text.

Specifically, the objectives of the study call for the following objectives to be carried out:

1. Developing a series of base maps that will illustrate the extent and intensity of Inuit land and water use within northern Québec.
2. Creating, through the use of maps and descriptive text, a systematic inventory of the biological resources and of their marine, fresh-water and terrestrial habitats that are utilized by Inuit hunters.

3. Determining and geographically locating seasonally critical marine, freshwater and terrestrial areas based upon five factors:
 - (1) areas that are critical for harvesting;
 - (2) critical habitat support systems;
 - (3) areas of ecological sensitivity or particularly vulnerable habitats;
 - (4) areas that have concentrations of potentially damaging economic development or harvesting activity;
 - (5) areas of potential conflict between ecological and harvesting needs and proposed development;
4. Determining the Inuit perception on management and conservation and establishing preferred methods for carrying out these activities in concert with harvesting needs.

Objectives 1 and 2 above, provide for a systematic data base, while the third objective provides for a systematic interpretation around which conservation oriented management can be designed. The fourth objective, allows for the specific facts of habitat and resource information to be placed in the context of attitudes, concerns and preferred approaches to conservation and management issues.

The basic unit of data will be the individual hunter maps that record information by species and season.

From this data, composite maps can be compiled that show the places and boundaries of hunting activity. The information can be presented by species or season, and areas of intensive use can be identified. Additional data on the level and place of harvest has also been collected for specific years, which allows for the patterns of land use to be defined according to a quantitative statement of productivity. The ecological information assembled in this study is based upon the hunters observation or perception of the resource base. In the north, there is a rich and complex body of knowledge about the behavior of animal life which incorporates both observations and lore. Some of this data will be assembled as maps, other data will be described in the accompanying written report or explanation of the maps.

In this type of an approach, it does not matter whether some of the descriptions and explanations offered by Inuit run counter to the "collective wisdom" of biologists or other scientists; some will and some will not. What is important, is that the information reported by hunters is the same that they use to make land use decisions. It is also their own information base which is considered when they evaluate the findings of other scientists, and, in particular, when they react to the regulations often imposed because of such findings.

Work was carried out over a period of five months in the communities of Great Whale River, Fort Chimo, George River and Akudlivik (Figure 1). During this time, a

total of 95 individual interviews were carried out and these were added to the yearly land use data collected in conjunction with a quantitative study of harvest levels.

The community work in Great Whale River stressed community involvement. The purpose of the study was clarified, changes required by the community were made, and work was carried out in a place frequently visited by individuals. It was the intention of the field workers to use Great Whale River as a prototype for community involvement. The problems and procedures were worked out with the community, public information was distributed, and the design of maps and the selection of data for these design maps was discussed. Samples were drawn up in the community and approved finally. The community was asked to review the data base and the drafts of all materials.

Land Claims, Development and Planning

A rapid involvement of native people and the development of an adequate "indigenous" data base is essential, but it is not possible to proceed faster than Inuit understanding and participation will allow. The problem of time and involvement creates complications, since the Canadian Arctic is quickly becoming a major frontier for large scale development. In northern Quebec massive hydro-electric development projects are a reality while

in other parts of the arctic, plans for extracting and exporting oil, gas and other minerals are proceeding at an accelerated pace. Over time, projects will coincide and their impacts will intensify. As well, the Inuit population is growing, their communities are becoming more stable and new technology is contributing to a shift in the patterns and perspectives of hunting.

The other factors that will have a major impact on land use planning and resource management are the changes that will come about through the growing expectation of Inuit for taking control of their own political, social and economic development. Land claims settlements are the major goal of Inuit groups throughout the Canadian Arctic. The settlement of claims will have a direct impact on the goals of and approach to land use planning. In northern Quebec, the James Bay and Northern Quebec Agreement represents the first land claim settlement to be signed with the Inuit. This Agreement superimposes a complicated structure of political and administrative procedures for managing the land and resources and for regulating the harvest. The 1980's will see an extension of the land claim settlements now established in Quebec to other regions of the arctic.

In Canada, there are 23,300 Inuit, including the 5,000 people of northern Quebec and the 2,200 Inuit of Labrador. The 16,100 Inuit of the Northwest Territories. On a world scale, the total population of Inuit may not be large, but the territory involved is vast and the

principles associated with their aboriginal rights to the use and management of this territory and its resources are of critical importance to the cultural survival of Inuit.

Cultural and Historical Factors

The program of planning and management that should develop from this program of research, must be applied within the context of Inuit culture. It must also recognize certain historical events and forces that have shaped the actual realities of the arctic ecosystem, and which have had a strong influence over the attitudes of Inuit towards the role of outsiders in the management of northern lands and resources. This concern is strongly expressed by the Inuit attitude towards the "southern" scientific approach for the study and regulation of northern resources.

The common denominator of Inuit life has been, and continues to be, a deep and stable attachment to the land. Stability does not imply that the elements that help define the attachment of people to the land have remained unchanged, or even that the system of land tenure has always been able to provide the basic needs of the culture. Stability simply means that the land and the use of its resources has never been abandoned as a central force in the Inuit perception of their life

and livelihood. The Inuit attachment to the land is part attitude and part practice. There are structures, rules and procedures, but there is also a flexibility to allow for innovation and change.

Land use patterns in the Canadian north are as much a function of social organization and behavior as they are of basic ecological conditions and technology when applied to the quest for food. The fundamental feature of Inuit land use involves the seasonal movement of people in order to exploit a certain species at a particular place and time, but the system built around this feature is much more complex. The way people choose to use the land and its resources is grounded in the arrangement of people into social units and by the social control over the allocation of people to harvesting, the sharing of food, the making of decisions and, over the place and pattern of seasonal settlement. These social mechanisms operate through and are controlled by the Inuit kinship system.

The influence of social factors on the use of land and in the management of resources is clearly evident from the way in which Inuit distinguish territory and allocate resources. Inuit define these relationships to territory by the term miut, meaning the people of, or belonging to, a certain place. These people do not own or even control territory, or rights to resources. They are simply recognized as being the people with a special interest in a particular territory and its resources.

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how does this translate

They may have special abilities to use the territory more effectively, because they are familiar with it. They live within the landscape, and have experienced its moods and changes. They are attached through specific knowledge; but they are also attached through linkages of family history and those other special events that create a sense of belonging.

In Inuit society there are few markers that can be used to distinguish territory: no fields, no permanent villages or system of transport, no overt record of change in the land through cultural activity. Instead, there is an almost invisible pattern of seasonal movement and residence that is oriented around the shifting productivity of the ecosystem. There are no land offices and no deeds of sale, making entitlement a matter of social recognition. It is the level of familiarity a person feels within a social and environmental space that is most important.

Territories and boundaries are entirely a function of an Inuk's mental map that is expressed through a knowledge of the land. Measurements of this knowledge are perhaps best exemplified by the system of place names that both differentiates and classifies a wide range of characteristics. In Inuit culture, the name is used to foster a strong relationship between people, and it can also be assumed that a place name will foster the relationship of people to the landscape.

Myths and stories of real events provide yet another dimension to knowledge and attachment to place, as does the specific information about the occurrence and behaviour of the resources. Perception and knowledge operates through the Inuit social network ^{matrix??} and provides a constant need to learn, integrate and organize all of the factors that must be accounted for in patterns of land use. Moreover, the lack of information could well act as a restraint on the movement of people into and out of a new territory. A person's "mental map" serves as a point of reference, but the many invisible bonds to place create a very individualized sense of homeland.

A social group can be recognized as belonging to a particular set of places but this does not constitute exclusive rights to those places. Other people are able to use a territory and to harvest its resources as long as they can establish kinship bonds. Access to kin, therefore, is access to information, to territory and to a share of the harvest derived from exploitation of that territory. It is only possible to make some broad assumptions about the attitudes held by Inuit towards sharing land and resources with one another, but all evidence seems to make it clear that there is no sense of ownership nor exclusive rights to a particular domaine.

The utilization of resources and the associated patterns of land use have been evolving within the arctic for more than 4,000 years. The first phase of

this process involves the major time period in the arctic in which prehistoric cultures established a spatial and seasonal framework of settlement, harvesting and land use that provided a long period of stability within the arctic. Although the last 200 years have been witness to major changes in Inuit culture, the prehistoric configuration of place, time and resource has changed very little.

Contact began in the late 1700's, but only started to have serious impacts after the mid 1800's when foreign whaling operations began year round operations. This caused the first major dislocation of people from place and introduced new technology and diseases, both of which had a swift and severe impact on the pattern of land use and on the skills and ability of the Inuit to survive as a group independent from the outside world. Whalers were followed by fur traders early in the 20th century.

This introduced shift in the Inuit economy created a major shift in the Inuit technological base and in the level of control exercised from outside. The institution of a debit and credit economy was the leading edge of control, and the power of traders to control the life of people was evident from the role they played in changing land use patterns. In order to maintain a flow of trade goods and to minimize their debt, Inuit had to trap. The land use requirements and decisions to be a successful trapper were far different from those required for subsistence hunting.

Whalers and traders were soon followed by missionaries and police. Missionaries had the influence to rearrange the ideological relationships between Inuit and the land. Police were able to reinforce the early game laws and other regulations that would affect Inuit life on the land.

A PLANNING AND MANAGEMENT PERSPECTIVE

In today's world, the Inuit system of land use and resource harvesting must be thought of as a dynamic process. In the past, this process was able to accommodate changes in technology and shifts in the resource base. In the 1980's, changes in technology and resources continue, but these are now complicated by other problems of planning and management. The Inuit hunter of today is far removed from a stone age economy. There are many complex dependencies on the materials, services and economy of Euro-Canadian society and these dependencies can shape the association between the Inuit and their environment.

The future patterns of land use and resource harvesting must be planned according to criteria that recognize change without ignoring the traditional knowledge and the essential rights of Inuit. The nature of the association between the Inuit and the outside world, coupled with the delicate balance of past and present must be maintained in any strategy for the conservation and management of northern resources and habitat.

The Inuit remain an important representative of modern day hunting and gathering societies in spite of the significant modifications that have occurred over the last century of contact with the outside world. Cultural change will continue and significant shifts in the hunting way of life can be expected. Change, however,

does not mean that the local needs for resources will be lessened or that the cultural traditions defined through thought or action will be abandoned.

The importance of this survival remains closely tied to the land and the exploitation of its rewards. That such a strategy is rewarding at a psychological level can not be denied and is translated into the abstract feelings one has about the quality of life. But there is another dimension as well. The use of the land contributes substantially to the food base of northern communities. Regardless of how hunting practices have changed, the act remains critical to the feeding of people. The level of hunting success for northern Quebec Inuit is illustrated in Tables I and II.

A Search for a Cooperative Framework

In order to understand certain aspects of future land and resource management in the north, it is necessary to understand the system of logic that underlies the land use practices of Inuit. Once the logic is clarified, it should be possible to facilitate a better integration of Inuit knowledge, perspectives and principles with those of the southern scientific community involved in the management of land and resources.

The integration will not be easy, and there is no reason to think that a cooperative project such as this

AVERAGE HARVEST BY SPECIES

1976-1978

	Total 1976	Total 1977	Total 1978	3-year average
Ringed Seal	19,865	14,448	6,337	13,550
Bearded Seal	1,396	954	523	958
Harp Seal	272	306	44	207
Ranger Seal	37	13	34	28
Beluga Whale	546	682	294	507
Walrus	71	34	5	37
Polar Bear	72	51	39	54
Caribou	4,513	4,188	4,340	4,347
Wolf	131	186	271	196
Arctic Fox	3,960	5,488	9,902	6,450
Snow Geese	5,895	3,899	4,588	4,794
Canada Geese	19,159	16,548	14,667	16,791
Ducks	14,849	12,137	8,258	11,748
Duck Eggs	26,279	25,891	9,280	20,483
Murre	4,890	2,251	1,326	2,822
Guillemot	2,505	838	800	1,381
Loons	1,159	694	626	826
Arctic Char	133,994	89,421	79,151	100,855
Salmon	9,676	7,017	6,417	7,703
Lake Trout	26,282	23,263	19,176	22,907
Cod-fish	11,995	7,413	4,938	8,115
White-fish	29,785	13,094	11,979	18,286
Brook trout	22,535	18,081	12,899	17,838
Sculpin	19,562	11,390	10,316	13,756
Land-locked Char	3,029	1,565	1,188	1,927
Arctic Hare	683	650	758	697
Snowy Owl	117	264	266	216

TABLE II
ESTIMATED HARVEST BY SPECIES, BY COMMUNITY
AVERAGE FOR 1976, 1977 and 1978

	Great Whale		George	Wakeham	Akulivik
	River	Fort Chimo	River	Bay	
Ringed Seal	2,224	581	864	2,892	669
Bearded Seal	72	103	75	123	74
Harp Seal	1	2	18	49	2
Ranger Seal	1	2	4	2	0
Beluga Whale	55	48	15	93	4
Walrus	1	0	0	4	8
Polar Bear	6	1	7	9	7
Caribou	245	1,391	1,004	146	79
Wolf	4	100	71	0	0
Arctic Fox	118	1,011	504	714	407
Snow Geese	830	10	4	180	453
Canada Geese	4,718	2,104	543	158	1,122
Ducks	3,233	1,175	727	661	714
Duck Eggs	2,348	1,884	3,129	3,831	1,471
Murre	47	458	161	350	28
Guillemot	110	57	157	160	31
Loons	453	63	76	14	39
Arctic Char	1,206	7,902	22,459	8,302	13,530
Salmon	101	6,208	793	34	48
Lake Trout	1,014	3,973	1,182	778	1,482
Cod-fish	3,297	223	93	17	373
White-fish	3,975	3,204	689	1	2,740
Brook trout	4,655	6,823	3,319	32	7
Sculpin	4,719	3,211	722	1,226	182
Land-locked Char	31	129	234	307	4
Arctic Hare	48	149	57	93	6
Snowy Owl	13	41	23	13	6

one alone, has the power to change the situation. There is a long history of suspicion between Inuit and the scientific and planning community and there is now an emerging sense of conflict. This conflict is partly political, but it is also based on a serious disagreement over the quality of data used by planners and resource people, and, therefore, of the value of their interpretations. The very technical nature of the scientific studies of northern ecosystems, especially when these studies are related to development projects, can not be easily understood by Native people. To the Inuit, the language is not clear, the concepts seem vague and the very organization of presentation and discussion, that is the intellectual process itself, is foreign. Because of this, the Inuit find that the only way to deal with the lack of comprehension is to approach everything politically. Consequently, the only strategy is to turn science into politics and then to deal with the politics.

political
Science?

It is felt by Inuit that the basis for establishing research needs requires greater flexibility, and should be oriented towards the requirements that arise from within northern communities or northern organizations and not be dominated by the often complex requirements of southern interest groups. There is also much apprehension about accumulating information in places or in ways that are not easily accessible to understanding and decision making within local communities. The concern

over the need for information is seen by the Inuit to be much more of a problem in the north, since they lack any of the standard documents. They assume that if the south is expert in anything it is certainly expert in acquiring and storing details about northern people and environments. Although Inuit opinion about the value and size of southern data banks may be somewhat exaggerated, it is nevertheless important to understand the context of their concern which implies that the accumulation and storage of data in the south will automatically limit Inuit access to this data except through an even greater dependence upon professional people hired by them.

Coupled closely with this concern is the Inuit concept that just to be guaranteed access to information sources is no guarantee of an equal ability to utilize these resources. The problem, therefore, is not one of accumulating information but one of accumulating information in such a manner that it is of direct use to northern people. It is felt that as long as the mentality of information collection and presentation is "southern", its ultimate use will remain "southern". The mere translation of documents into the Inuit language is no solution.

Finally, it is felt by northern residents that only through the selection of research priorities that allow for cooperative efforts, will an indigenous scientific community evolve that includes both traditional expertise

and acquired "southern" scientific skills and procedures. Without a cooperative approach, decision will remain totally in the sphere of politics and bureaucracy.

The Inuit Logic for Planning

There is a logic that underlies the Inuit pattern of land use and harvesting. This logic enables information to be collected, strategies planned and decisions made. The framework of this intellectual system has been evolving over a long period of time, but, as in most other areas of Inuit life, there is flexibility. There is little reason why the logic of Inuit perception can not incorporate certain important elements of land and resource management that are introduced from outside.

The important factors are those that allow Inuit to differentiate among a multitude of factual observations and images and to select facts and create patterns that allow the external world to be ordered and its elements manipulated. In order to do this, three assumptions are necessary. First, the total environment within which a hunter and the social group exists, is the end result of complex but orderly interactions that form a structure. Second, certain aspects of this structure can be identified and the apparent chaos of the real world can be sorted out into logical patterns. Third, the units and associations making up these logical patterns can be

evaluated according to the various criteria of value and utility upon which adaptive behaviour is based.

The structure of the total environment is formed by units defined as objects, events or forces that are constantly combining and recombining to form reality. The ordering of these units by their position in space or their occurrence in time, provides associations that can be identified and manipulated. The objects, events and forces that comprise reality, however, are not limited to observable and measureable units. They may be drawn from the real or imaginary realm, and the factors controlling them include the force of social control or of ideological beliefs as much as the physical forces of nature. These units have position, occurrence and association, and the images of environmental structure must include all of these associations.

Rules are basic to the process of defining and interpreting the environment. The rules of recognition enable identities of environmental units to be established and their characteristics to be confirmed. The spatial position and temporal occurrence of the units is determined by the rules of organization which identify the linkages between objects, events and forces. The interpretations of how associations and events occur and organizations function, are governed by the rules of interaction. The applications of rules to the structure of the environment enables a constant sorting to go on which gradually reduces the randomness of the environment

through the acquisition of knowledge. The object is to utilize rules in such a way that more and more phenomena are moved from the random to the non-random ledger of environmental knowledge. This process, however, is complex and involves both the rules of science as well as the ideological rules that govern the world of abstractions.

The application of rules to a particular environment creates a continuum of predictability of randomness within which decisions are made and activities carried out. The extremes vary from the predictability of non-randomness in space and time through to total randomness in both space and time. The most predictable component of the structure is where the spatial and temporal position is understood. At the other extreme are the totally random events in which there is no space or time order and consequently little or no predictability.

The next step of the process involves the evaluation of environmental knowledge in order to develop strategies, plan activities, react to events and make decisions. The four basic elements involved with environmental evaluation are those of utility of a particular resource or habitat, its dependability with respect to place, time and behaviour, the degree to which it can be managed by direct or indirect means, and the types of conversions that may be possible from one utility or value to another. Once this evaluation has taken place, decisions are possible and from these decisions particular patterns of adaptation emerge.

A FRAMEWORK FOR MANAGEMENT INFORMATION AND DECISIONS

TABLE III

SPECIES	SEASONAL AVAILABILITY	COST OF HUNT	HARVEST RETURN	HUNT ATTITUDES TOWARD USE <u>Cultural</u> <u>Economic</u>	NON-NATIVE ATTITUDES TOWARD USE <u>Scientific</u> <u>Economic</u>
LEVEL OF KNOWLEDGE <u>Inuit</u> <u>Scientific</u>	ECOLOGICAL BEHAVIOURS AND HABITAT	CRITICAL INTERACTIONS WITH OTHER SPECIES	SUSCEPTIBILITY TO IMPACT	RECOVERY RATE FROM IMPACT (Short/Long Term)	SUSCEPTIBILITY TO MANAGEMENT

This system allows for a variety of units to be identified and interpreted. The characteristics for a resource or habitat are defined and values can be applied. The utility of a resource can be examined and even changed when necessary. The operation of this system has created the Inuit knowledge base, and the application of this knowledge to the process of hunting continues to yield important results.

The important element with respect to present and future planning, is that the logic of Inuit knowledge can be applied to specific formats that will allow communities to convert a hidden process into publicly useful information. The data and concepts are there, only format is missing. Table III attempts ^{to} illustrate the possible ways in which concern can be translated into information. This table is only a beginning, but it allows the data base now being collected in the north, to be applied to northern problems. All of the elements that comprise the knowledge about, and the importance of, resources, are contained in such a table. It should be the first step to a cooperative approach to management, since it also enables Inuit information and perceptions to be compared to those of southern planners.

FROM INFORMATION TO APPLICATION

In his summary of the hearings conducted on the transport of natural gas from the high arctic, Peter Jacobs, who chaired the public review acknowledged that "the very manner by which we deal with information is culturally bound". It seems logical to extend this fact by assuming that if information is available from two cultures, then the more powerful of the two cultures can more easily control the interpretation and application of the information. Consequently it can be concluded, as stated by Jacobs, that

The acquisition of data, its treatment, and the conclusions which we reach on the basis of this data are unlikely to be universally accepted... The issues are compounded when we attempt to integrate these sectors and to understand the dynamics of the ecosystems of the high arctic.

Jacobs then questions "to what extent have we tried to incorporate, let alone understand, centuries of Inuit observations of nature". The situation is difficult, but progress must be made. It is expected that the project now being carried out in northern Quebec can be one of the leading edges of change.

Data on the use of land is needed, and this will be supplied by the hunter maps. Since conservation and management must move from an individual to a group responsibility, the composites developed from a series of maps can at least animate the process. Hunters then must learn how to use the maps externally to support their

land use and management arguments and concerns, but they must also learn how to use them in order to create an internal system of management and decision making.

Land use data alone, can not provide the information or support needed. The recording of ecological data, as known by the Inuit, will offer another capital input. If the Inuit can challenge the arguments and ideas that now dominate the approach towards and attitudes about, northern land and resource planning, a major advance will have been accomplished. If this occurs, the next step is critical. It is then that the Inuit must set a challenge for themselves and create a system that will carry the vitality of improved self-sufficiency into an uncertain future.

APPENDIX

1 - A topographical map of Great Whale River.

This is the first region for which both land use and ecological data have been completed. Within the community of Great Whale there has also been a full animation of the project. These land use and ecological maps shown in the following slides reflect an Inuit point of view on the type and presentation of data.

2. - This map is of the Great Whale River region.

The detail has been simplified in order to highlight the hunter information itself.

3. - Individual hunter map.

Each colour represents a different species; the seasons are indicated by letter codes.

4. - This slide shows the superposition of two individual hunter maps. This represents the process by which a composite map is developed, and also forms the basis for determining hunting intensity. This is only two overlays so that the complexity of the mechanical problems is clearly evident.

5. - The complex of lines shown on slide 4 is simplified to reflect the outer boundary of the total hunting areas, for all species, in each season; this type of composite map will be drawn for each community.

6. - Individual species map depicting the total hunting area for Ringed Seal.
7. - Individual species map depicting the total hunting area for Beluga Whale.
8. - This represents the superposition of slides 6 and 7 and illustrates how composites for groups of animals are developed.
9. - This is such a composite. This map represents the outside boundaries of hunting for marine mammals, including Ringed Seal, Bearded Seal, Beluga Whale and Polar Bear.
- 10 and 11 show the broad distribution of hunting areas for Caribou (10) and Canada Geese (11).
- 12.- This represents the land use mapping that was carried out in order to make an association between a single hunter's land use and a quantitative statement of harvest. This was undertaken at the same time as the harvest study of the N.H.R.C.
- 13.- This map of northern Quebec compares traditional land use by the Inuit of Wakeham Bay with political land categories delineated in the James Bay and Northern Quebec Agreement. The discrepancy between the natural land use and the political selection

indicates the potential conflict that may arise when attempting to establish procedures for land and resource management. The three levels of shading indicate Caribou and small game with the lightest tone, marine mammals with the medium tone and fish and birds by the darkest tone.

Ecological Maps

- 14.- Great Whale ecological map of the Richmond Gulf Region.

This map illustrates the Inuit knowledge of the animals known to the people of Great Whale River. The animals mapped are Ringed Seal, Bearded Seal, Beluga Whale, Fish and Caribou.

- 15.- Fort Chimo ecological map.

This map illustrates the Inuit knowledge of the animals hunted by the people of Fort Chimo. The animals mapped are Caribou, Wolf, Arctic Fox, Salmon, Arctic Char, Brook Trout, Lake Trout, Whitefish and Beluga Whale.