Ⓐ A very good faunal found analysis of Operation 4.
Good geographical background account.
Very good analysis discussion.
Good account of habitats of mammalian species.

Final Faunl Report
Operation-4, Nunaingok Site (JcDe-1)
Extreme Northern Labrador

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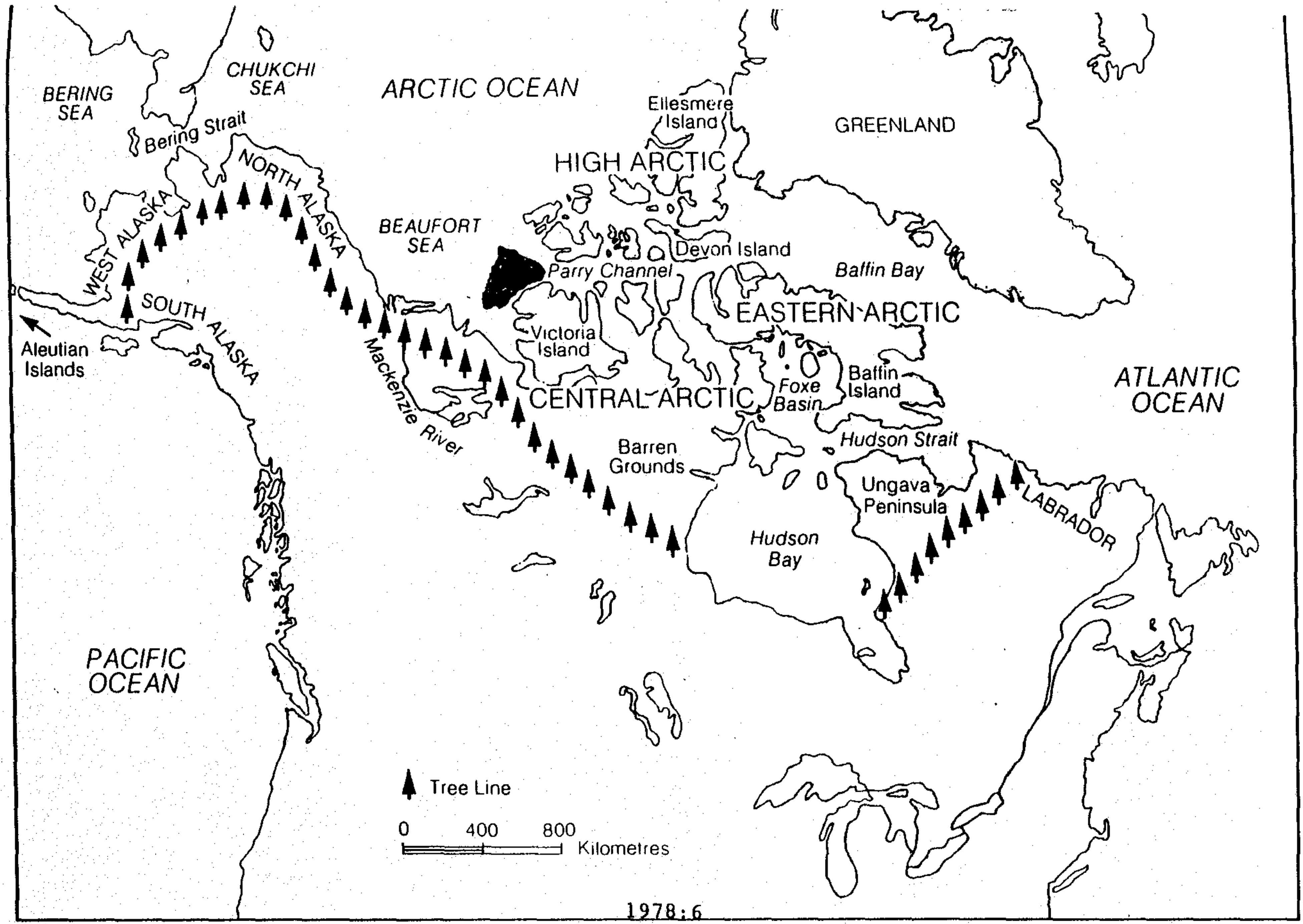
INTRODUCTION

Site Description

The Quebec-Labrador Peninsula is a relatively small body of land, extending some 140 miles into Hudson Strait. It is bordered by Ungava Bay on the west, and on the east by the Labrador Sea, and is bisected down its length by what is today the Quebec-Labrador border. To the south, of course, it adjoins the mainland, which falls partly in Quebec and partly in Labrador. Its northernmost tip reaches 60.5 degrees north while its base can be said to fall roughly on the 58 degree north line (see map 1).

The area is extremely interesting in that it is cross-cut by the tree line and is bisected by the Torngat Mountain Range, so that the coast line is rugged and barren, the interior is a flat, barren plateau, and the south is wooded. Thus, several ecological zones are represented in a relatively small area. As well, the region is blessed with many polynyas, or areas (usually narrow channels) which remain ice free all year. Therefore, the land is extremely rich in resources (see map 2).

On the northern tip of the peninsula, meanwhile, is the Nunaingok Site (JcDe-1). Nunaingok-1 is the first in a series of seven spatially related archaeological sites located on the south shore of McClelan Strait, looking towards Kilinek Island (see map 3). Generally, this area consists of low, barren, and highly dissected skerries, and



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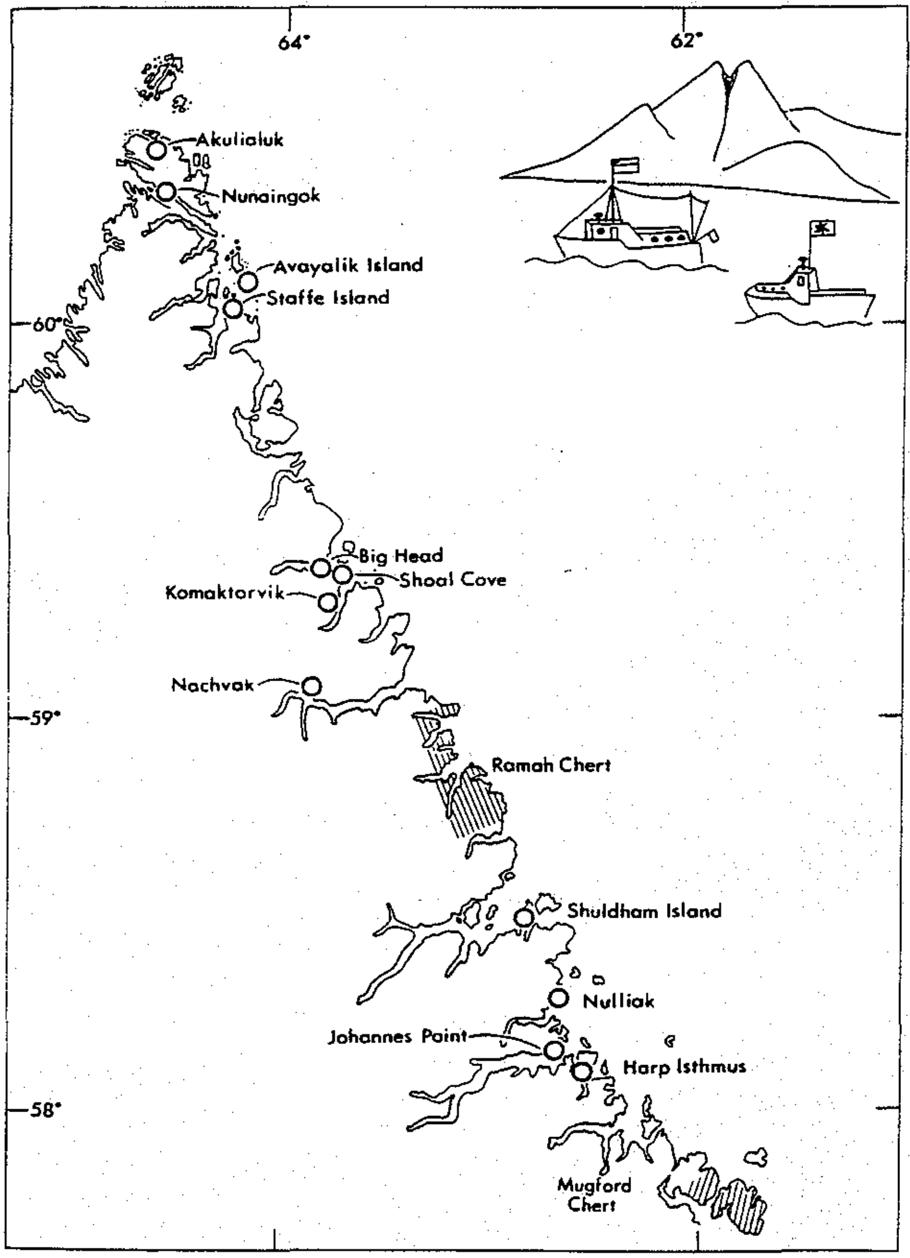
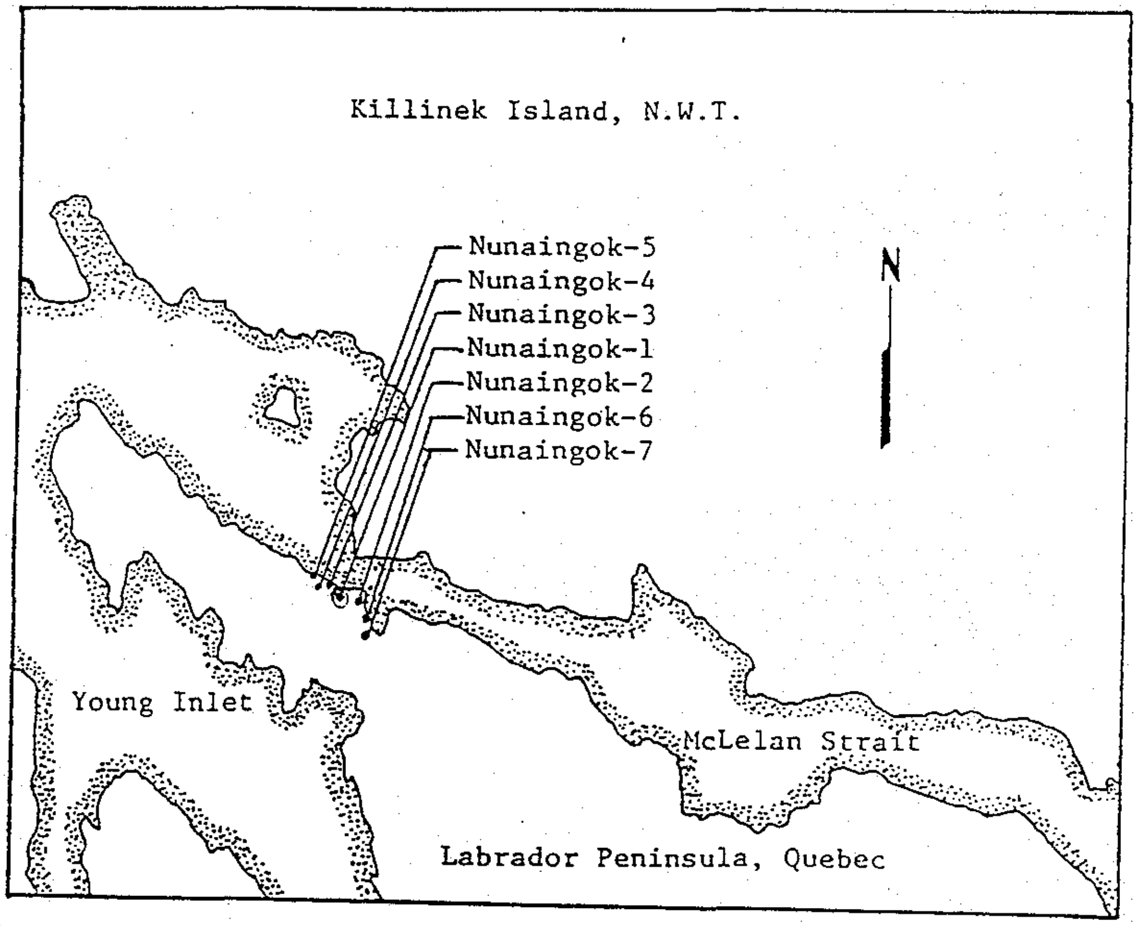
Map 1. Arctic North America from Mcghee,

Map 1: Quebec-Labrador Penninsula And Associated Archaeological Sites



From Fitzhugh (1980: 593)

Map 2: McLelan Strait And Associated Archaeological Sites



Nunaingok 1-7. Torngat Archaeological Project Survey, 1977 (modified after Killinek Island East, 1:50,000).

From Fitzhugh (1980: 595)

is "exceedingly rich in seals and sea-birds" (Fitzhugh 1980: 585). As well, tidal surges of up to thirty feet keep this particular strait ice free all year, creating what is known as a polynya.

A polynya is defined by Schledermann (1980: 292-293) as "any non-linear shaped opening enclosed in ice. Sometimes the polynya is limited on one side by the coast and is called a shore polynya, or by fast ice and is called a flaw polynya. If it occurs in the same position every year it is called a recurring polynya." He then goes on to describe several mechanisms which can cause an area to remain ice free, and two of the most important are tidal surges - which will either prevent ice from forming or inhibit its growth by sweeping away ice platelets growing into the water from the sea ice - and wind - which can break up young ice and carry it away. It is the former which occurs at Nunaingok.

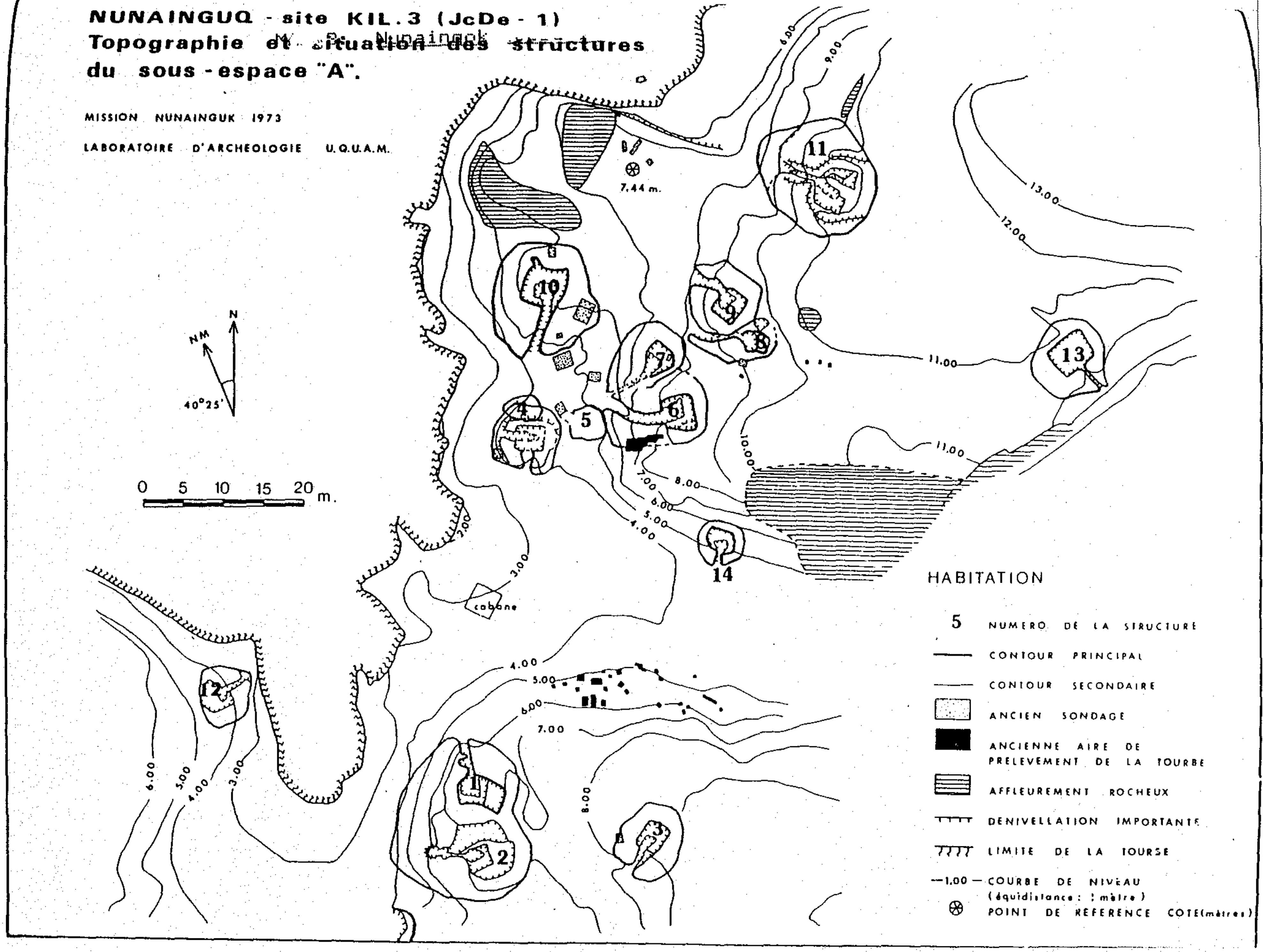
These polynya were significant to the prehistoric hunter in that they are known for being areas of prolific hunting. In the summer, the ebb and flow of the tide exposes sea floor plankton to more sunlight then would normally be received, attracting, therefore, mammals which feed off of it (Maxwell 1985: 16). As well, seals prefer to bask on the young ice. And since, during the winter, only young ice ever has a chance to form in areas of high tidal surges, certain non-migratory species, such as Ringed, Harbour and particularly Bearded Seal would be abundant all year long. It is no surprise then, that polynyas, known ethnographically as rattles, were "often a good place to catch seals" (Taylor 1974: 22). And Schledermann (1980:295), points out that small islands which sometimes appear in these ice-free areas are home to large numbers of nesting birds, and that these must have provided an important source of food in the past, both in terms of meat and eggs. All and all then, Nunaingok was an area of extremely abundant resources.

The site itself was first recorded in 1884 by a geologist named Robert Bell, who led an expedition up the peninsula from Port Burwell, and came across the remains of many houses, all but one of which he considered quite ancient (Watson 1988: 1). The first excavations were conducted at the site in 1977 as part of a massive survey expedition carried out by the Torngat Archaeological Project (TAP), a joint venture conducted by Bryn Mawr College and the Smithsonian Institute. Their reports of soil slumping caused by serious erosion prompted a return to Nunaingok in 1978, and again in 1979, by the Laboratoire D'Archaeologie, Universite de Quebec à Montreal (U.Q.U.A.M.). A salvage operation was conducted, supervised by Henry Stewart, and efforts were made to stabilize an eroding midden face. The second season resulted in about thirty random test pits being excavated. It was discovered from this work that the site consisted of at least 14 houses, and evidence was found of Pre-Dorset, Groswater Dorset,, Middle Dorset, Late Dorset and Neo-Eskimo occupation (see map 4). As well, an Early Dorset occupation was tentatively identified. "As such, Nunaingok-1

NUNAINGUQ - site KIL. 3 (JcDe - 1)
Topographie et situation des structures du sous-espace "A".

MISSION NUNAINGUK 1973

LABORATOIRE D'ARCHEOLOGIE U.Q.U.A.M.



functioned as one of the most important sites in the Kilinek region for the past 3000-4000 years" (Jordan 1985: 1). Faunal preservation, however, is very poor beyond the Neo-Eskimo layer.

Method of Excavation and Analysis

The material analyzed in this report is from Level-1 of Operation-4 and was actually excavated by Ian Badgley, of U.Q.U.A.M. during the 1987 field season. Operation-4 is a small, shallow midden, being about 4mx4m and located at the entrance of Structure 1. The operation was excavated using historical archaeological techniques. That is, it was divided into four sub-operations, each being 2mx2m: 4A, 4B, 4C and 4D. 4A was the North-West quadrant, 4B was the North-East quadrant, 4C the South-West and 4D the South-East. Finally, any features identified within a grid were given a supplementary number. For example, 4CI refers to the rim of the dwelling at the entrance extremity, which falls within unit 4C. These units were then simply excavated using a shovel (Badgely 1990).

Level 1, meanwhile, refers to the sod layer, this being only about 5cm thick, and very well drained. Just beneath this layer is another of compact sand and gravel with clay inclusions which has yet to be excavated. It is likely, however, that the midden extends down into this level or beyond. Unfortunately preservation of the faunal material is very poor beyond the sod layer. Indeed, all that remains beyond level 1 is bone stains. (Badgely 1990).

The the method I used to label the faunal material from Operation-4 follows this same system. Any given bone was catalogued with a 3 part reference number. For example: I-4A-125. The uppercase roman numeral at the beginning refers to the stratigraphic level from which the bone came (all elements from this sample were excavated from Level-I). The second part consists of a number and an upper case letter. This corresponds to the unit from which the bone was excavated. Finally, the number at the end simply refers to the fact that this was the 125th bone analyzed from leve I, unit 4A.

Cultural Background

Structure-1, the house itself, is what is referred to as a sod Quarmat. These are very large bee hive shaped structures w~~h~~ith roofs relatively higher than earlier houses. It is likely that this is related to increased efficiency in heating. In 1884 a weather station was put up at Port Burwell, which later became a coaling station. Port Burwell is only 9km from Nunaingok and thus it is no surprise that a lot of coal was found in the structure (Badgely 1990).

Structure 1, and the associated Operation 4, are securely dated to the late 19th century and definitely no later than the 1920s. This is demonstrated by a series of artifacts which includes the plastic handle from a straight razor, a plastic arrow head, a fragment of a bible written in the native dialect and a newspaper clipping dating to January 19th, 1917. Thus, Structure 1 relates to the last phase of Inuit occupation of the site as a dwelling area, although a cache was constructed there sometime after (Badgely, personal communication).

Hence, the occupants of Structure 1 can be said to be historic Labrador Eskimo. This means then, that European influences would have been significant enough to have altered both Inuit settlement and subsistence patterns (Kaplan 1980: 652). These influences took three forms. First, European demands for baleen and whale blubber was the likely cause of decline in large sea mammals during the early historic period. "Examination of mission records reveals that in the 1800s, less and less mention of the capture or sighting of whales and walrus was made, to the point that by the mid-1800s such instances were worthy of note" (Kaplan 1980: 652). This meant that more emphasis was put on small sea mammals such as seal. Second, Moravian missionaries pressured their Inuit converts into catching and storing fish in vast quantities, as they were afraid that if these converted families reverted to the annual subsistence cycle of Thule times, then they would fall under the influence of non-Christian families. Thus these families tended to remain more sedentary, living off of stored fish during the winter. Finally, the Hudson Bay Company emphasized fox hunting for furs, and fishing, which would allow the HBC posts to survive through the long hard winters, in the case of the latter, and financial gain in the case of the former. (Kaplan 1980: 653). These new subsistence strategies de-emphasized the need for cooperative hunting. That is, whereas whaling is a community effort, sealing is a more solitary activity. Likewise, fox trapping is generally conducted by a single family as is fishing. Finally, the widespread use of guns by the later 19th c. made even caribou hunting a solitary activity. Thus, large multiple family dwellings and multiple dwelling sites tend to disappear at this time. "The faunal assemblages and the settlement locations suggest a shift away from large sea mammal hunting, with an increased reliance on seals, caribou and fish, and in some cases indicate a considerable amount of fox trapping" (Kaplan 1980: 652).

FAUNAL FINDINGS

All of the faunal material so far excavated from operation 4 is included in this report. This consists of a total of 598 specimens, all of which are identified to class or better. Of these, 465 (77.8%) are identified to order or better, 463 (77.4%) are identified to family or better, 452 (75.6%) are identified to genus or better and 362 (60.5%) are identified to species.

From this it can be said that the preservation of the faunal material from Operation 4 is excellent. The fact that only 60.5% of the sample is identified to species is misleading and can be attributed to the fact that the three species of the genus Phoca - hispida, groenlandica and vitulina - which dominate the sample, are often very difficult to distinguish. The fact that 75.6% of the sample is identified to genus is a far better indicator of the success of the identifications. All and all then, the preservation of this sample is excellent.

This is particularly interesting given the fact that in the humus and underlying levels bone remains are non-existent. Dr. Badgely did not take Ph samples from the midden. However it is known that since level 1 is only 5cm deep, it would be unaffected by permafrost, which begins about 50cm below the surface. This may have something to do with the differential preservation between levels.

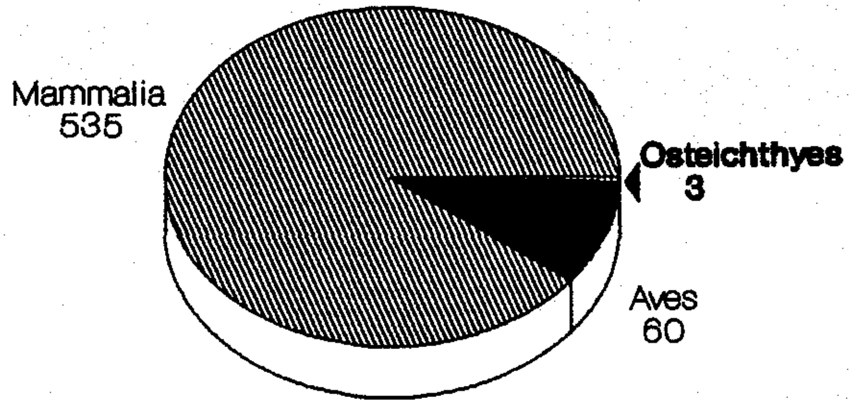
Distribution by Class

Of the 598 bones analyzed in this report, 535 (89.4%) are ascribed to the class mammalia, 60 (10.0%) are of the class Aves and 3 (0.5%) are Osteichthyes (see figure 1).

Account of Mammal Elements

Of the 535 mammal elements included in the sample, 110 (20.6%) are unidentifiable beyond class. However, 3

Figure 1: Distribution of Identified Specimens by Class

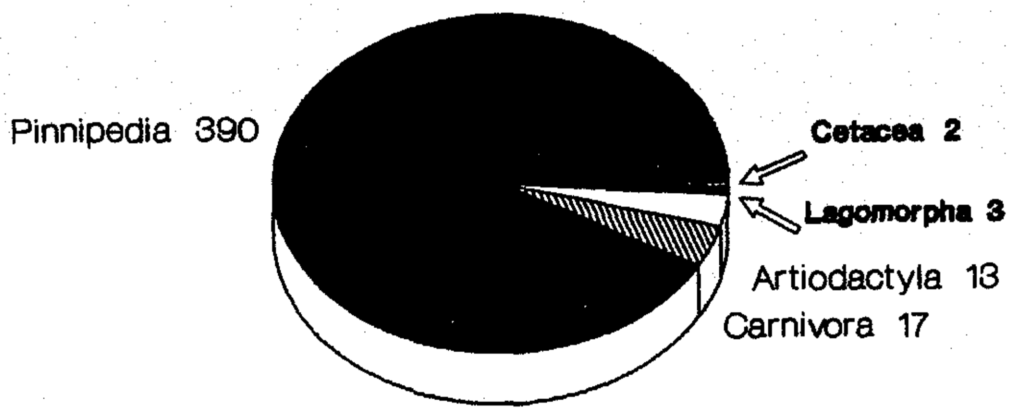


specimens (0.6%) are identified as belonging to the Order Lagomorpha. Two elements (0.4%) meanwhile, are identified as Cetacea, 17 (3.2%) are identified as Carnivora and 13 (2.4%) are identified as Artiodactyla. The sample is dominated though, by the order Pinnipedia (the seals). These account for 390 specimens, or 72.9% of the analyzed material (see figure 2).

The Lagamorphs

The bones attributed to the order lagomorpha consist entirely of the species *Lepus Arcticus* (Arctic Hare).

Figure 2: Distribution of Mammal Bones By Order



The Cetacea

The two Cetacea elements in the sample (one rib and one left humerus) can not be identified further than order due to a lack of a suitable reference skeleton. However, it can be said that the two elements are definitely from a medium size whale. The species which fit this description and range into extreme northern Labrador include *Hyperoodon ampullatus* (the northern bottlenosed whale), *Physeter catodon* (the sperm whale), *Monodon monoceros* (the narwhale), *Orcinus orca* (killer whale) and *Balaenoptera acutorostrata* (minke whale) (Banfield 1974:238-286).

Ian Badgely (personal communication) mentions that *Balaena mysticetus* (bowhead whale) is common in McClelan strait. However, the Bowhead is considered a giant even among whales. And given the fact that both specimens were aged as immature+, and therefore could not simply be small individuals, it is all but impossible that the two elements found in this sample are large enough to represent a bowhead.

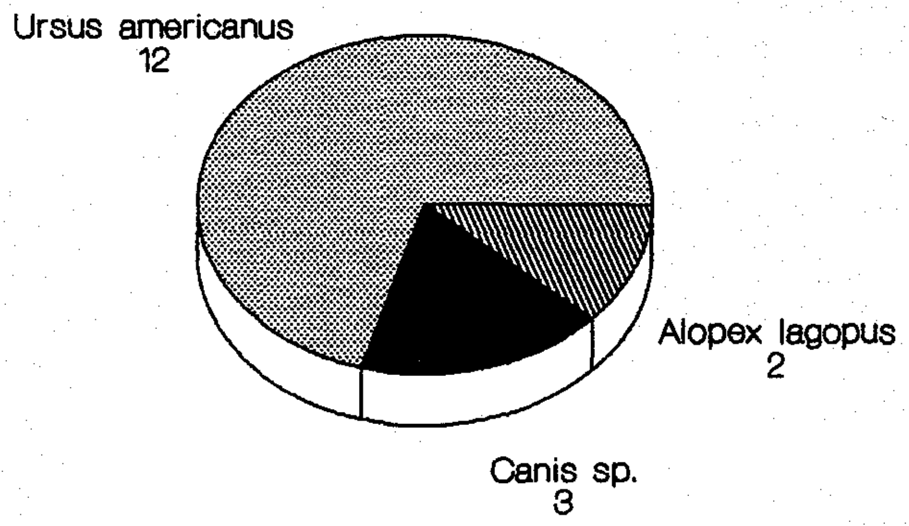
Dr. Badgely also mentions, however, that two humpback whales were seen moving through the strait in 1978. The humpback is also a large whale, but not nearly as large as the bowhead. The former reaches a length of 41 feet in adulthood, on average, whereas the latter averages 58 feet (Banfield 1974: 279; 283). This makes the size of the humpback just about right. One may argue though that the appearance of the humpback in McClelan strait is a very rare occurence. This is true, but then again, the appearance of whale bone on the site seems equally rare. Thus it is very possible that the two elements in question are actually from a small, or sub-adult humpback.

The Carnivores

Two families of the order carnivora are represented in Operation-4. The first is canidae, or dogs. Two of the canid specimens have been positively identified as *Alopex lagopus* (arctic fox). Of the remaining three, however, all ribs, it can only be said that they are a Canid species. This is due to the difficulties inherent in distinguishing the wolf (*Canis lupus*) from the domestic dog (*Canis familiaris*) osteologically. Thus, all that can be said is that 3 elements are of a Canis sp. and two are from an arctic fox.

The family Ursidae, meanwhile, is represented by twelve ribs from the black bear (*Ursus Americanus*). Of the total number of specimens identified to the order Carnivora, then, 3 (17.6%) are identified as Canis sp. (either wolf or domestic dog), 2 (11.8%) are identified as arctic fox and 12 (70.6%) are identified as black bear (see figure 3).

Figure 3: Distribution of Species
Within the Order Carnivora



The Artiodactyls

Thirteen specimens were identified to the order Artiodactyla. All of these were positively classified as *Rangifer tarandus caribou* (woodland caribou).

The Pinnipeds

By far the most abundant species in Operation-4 at Nunaingok-1 belong to the order Pinnipedia. All of these, in turn, belong to the family Phocidae, the true seals. Of the 390 Phocidae specimens examined then, 11 (2.8%) are unidentifiable beyond family. 87 (22.3%) can not be classified beyond the genus *Phoca*, 82 (21.0%) are *Phoca Groenlandica*, 110 (28.2%) are *Phoca Hispida*, and 49 (12.6%) are identified as *Phoca Vitulina*. Finally, 51 bones (13.1%) were recognized as being *Erignathus barbatus* (see figure 4).

Figure 4: Distribution of Species
Within the Family Phocidae

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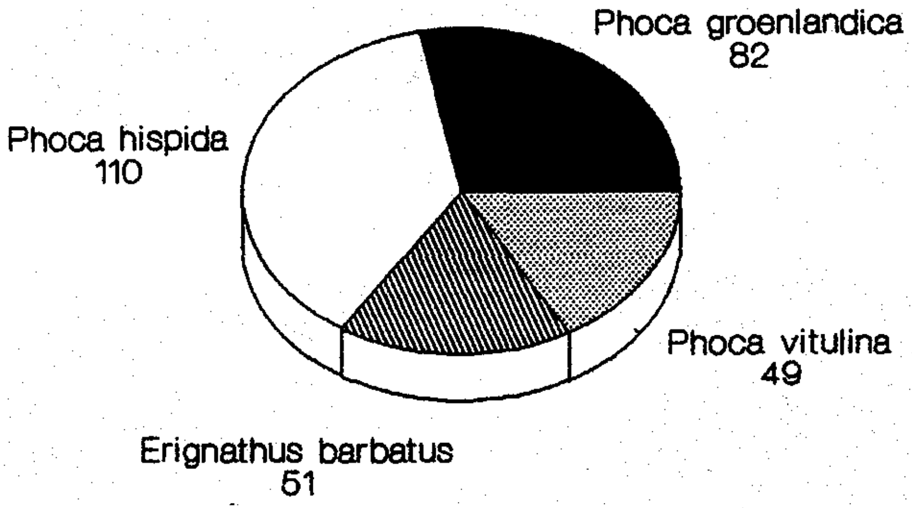
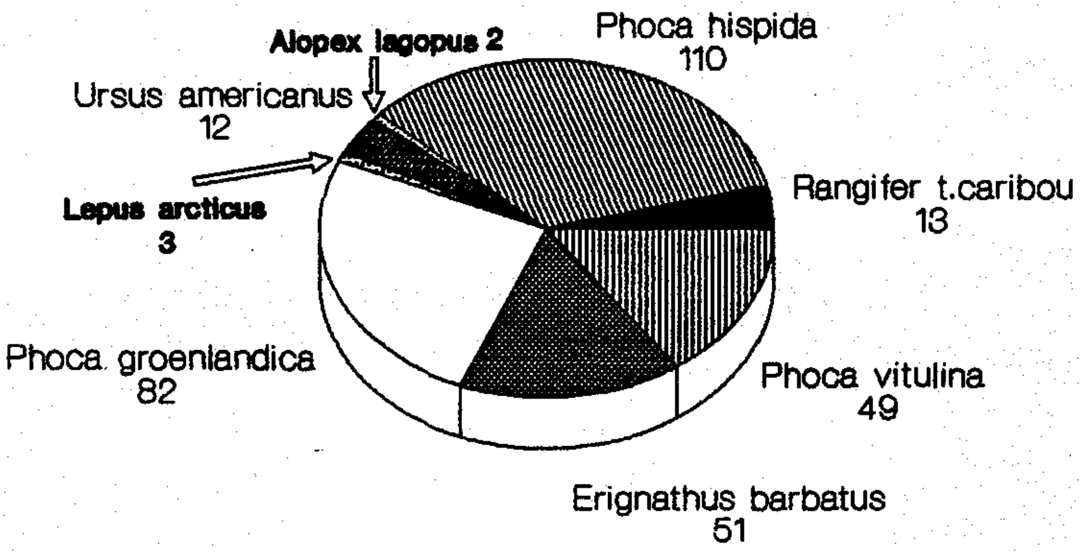


Excluding unidentified Phoca sp.

Figure 5: Summary of Mammalian Elements from Operation-4, level 1, Nunaingok Site (JcDe-1).

Taxon	Common Name	NISP	% of total NISP
Mammal sp.	Mammals	110	20.6%
Lepus arcticus Ross	Arctic hare	3	0.6%
Cetacea sp.	Whales	2	0.4%
Canis sp.	Dogs	3	0.6%
Alopex lagopus (Linnaeus)	Arctic fox	2	0.4%
Ursus americanus Pallas	Black bear	12	2.2%
Phocidae sp.	True seals	11	2.0%
Erignathus barbatus(Erxleben)	Bearded seal	51	9.5%
Phoca sp.	-	87	16.3%
Phoca vitulina Linnaeus	Harbour seal	49	9.2%
Phoca hispida Schreber	Ringed seal	110	20.6%
Phoca groenlandica Erxleben	Harp seal	82	15.3%
Rangifer t. caribou (Gmelin)	Woodland Caribou	13	2.4%
Total		535	100.1%

Figure 6: Distribution of Identified Mammal Species



Account Of Avian Elements

Of the 60 bird elements recovered from Operation-4, 23 (38.3%) could not be identified beyond class. The remaining thirty seven bones are almost equally distributed between two orders: Anseriformes and Charadriiformes. 19 (31.7%) of these elements are attributable to the order Anseriformes and of these, all are of the family Anatidae and of the species *Somateria mollissima* (Common eider). On the other hand, 18 (30.0%) are of the order Charadriiformes, all of which are of the family Laridae. 10 of these represent the species *Larus argentatus* (Herring gull) and 8 represent the species *Larus marinus* (Great Black-backed gull) (see figures 7 & 8). [illegible]

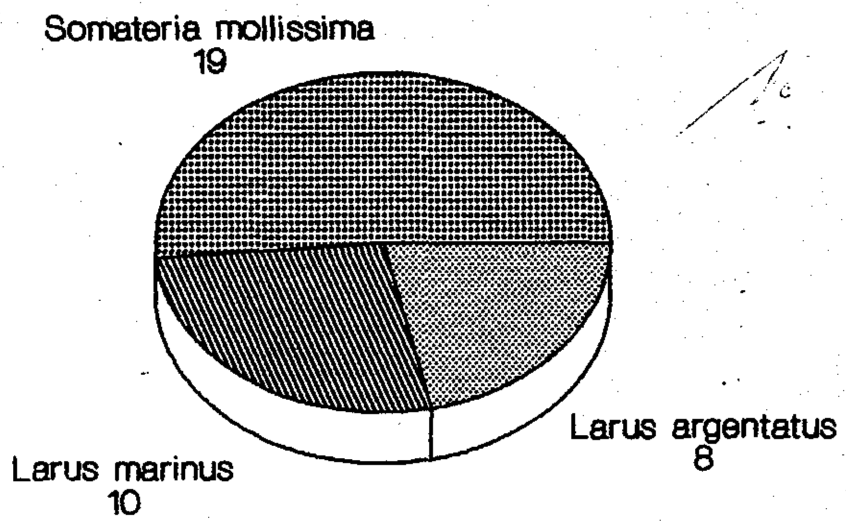
Figure 7: Summary of Avian Elements Excavated From Operation-4, Level 1, Nunaingok Site (JcDe-1).

Taxon		NISP	% of Total NISP
Aves sp.	birds	23	38.3%
Somateria mollissima (Linnaeus)	Common eider	19	31.7%
Larus argentatus Pontoppidan	Herring gull	8	13.3%
Larus marinus Linnaeus	Great Black-backed gull	10	16.7%
Total		60	100.0%

Account of Osteichthyes Elements

Bony fishes account for less than 1% of the total sample. That is, only three elements were excavated. These were all identified as belonging to the order Gadiiformes, the family Gadidae and the species *Gadus morruha* (Atlantic cod).

Figure 8: Distribution of Avian Species



Minimum Numbers and Meat Yields

Ever since materialist explanations of cultural change became popular in the mid 1960s, faunal analysis has become increasingly more important in archaeological theory and interpretation. And so it is little surprise that faunal analysis has also become increasingly more complex and sophisticated. It used to be, for example, that any analysis of bone from an excavated site would include a simple count of the number of bones of each species in a sample as a rudimentary measure of relative abundance. This count was referred to as the Number of Identified Specimens per taxon, or NISP. But as the need for more precise measurements of relative abundance increased, the validity of NISP came to be seriously questioned on a number of grounds. As a result, a method for calculating the minimum number of individuals in an assemblage (MNI) was developed. Today, however, many criticize this approach as well, claiming it is unreliable and inconsistent. Some, such as Grayson (1984), have responded by reverting back to NISP. Others such as Binford (1984) and Krantz (1968) have their own methods which they, obviously, feel are superior. However, none of the problems originally associated with NISP have gone away, and Minimal Animal Units, as presented by Binford, and the Matched Pairs Technique, as presented by Krantz, are designed to address completely different questions, and so are ill suited to estimates of relative abundance. Therefore, it seems that MNI is still the preferred technique for determining relative abundance in a faunal sample.

The earliest, and probably the simplest, method developed to this end was the Number of Identified Specimens, or NISP. Simply put, this method consists of nothing more than counting the number of bones, or fragments thereof, identified to a particular taxon. So if 150 bones were identified as *Odocoileus Virgineanus* (White-Tailed Deer), 50 were identified as *Ursus Americanus*, and 25 were decided to be *Castor Canadensis* (beaver) then it would be concluded that deer was three times as prevalent in the site's economy as bear which was, in turn, twice as important as beaver.

Likewise, NISP was used to make inferences regarding changing subsistence patterns through time. So that if 5% of the total NISP in strata A was identified as *Canis Familiaris* and this increased to 10% in Strata B and then 30% in Strata C, then it would be argued that domestic dog became increasingly more important through time at the site in question. Needless to say, this technique is fraught with difficulties (Grayson, 1984: 17).

One of the most obvious flaws in NISP analysis is that it fails to take into account differential preservation. Grayson (1984: 22) notes that larger mammals would be more likely to produce a greater number of bone fragments when subjected to either natural or cultural stresses. Likewise, certain elements are more likely to produce a greater number of fragments. Thus, the skull of a bison may come to be represented by some thirty fragments, not to mention several teeth, while the femur of a small rodent is unlikely to be represented by any more than one. Hence, the abundance of larger animals and more fragile elements tend to be over represented in a faunal sample so that "identification by an analyst today may bear an unknown relationship to the numbers originally deposited" (Grayson 1984: 22).

Associated with this is the fact that NISP studies assume all bones are equally affected by deliberate breakage, and that all species are subjected to identical butchering techniques. This is nonsense. It has been noted, for instance, that sometimes the abundance or lack of certain elements or species "cannot be accounted for by accident of preservation. It is difficult to escape the inference that the parts either were not brought into camp ... or that they were mutilated beyond recognition..." (White, 1953: 337).

An example of this is the Schlepp Effect. Originally, the Schlepp Effect (a name derived from the German verb meaning 'to drag') was used by Perkins and Daly (1968) to explain the over-representation of leg and foot bones on a Neolithic site in Turkey. As the argument goes, Suberde hunters would kill a wild ox, skin the animal, and use the hide as a sort of bag to carry the meat home. The feet of the animal, meanwhile, made excellent handles, and so were left on. Therefore, on habitation sites, the lower leg and foot bones of wild ox were in greater proportion to other body parts than any other element (Perkins and Daly, 1968: 104). This interpretation has come under attack, notably by Lewis Binford (1981: 184-185) as being fanciful. But the important point regarding the Schlepp Effect is not so much that ancient hunters dragged meat back to a base camp in impromptu sacks, nor that this phenomenon may be used to distinguish kill sites from habitation sites as some have attempted (Turnbull and Reed, 1974). Instead the Perkins and Daly article was important at the time in that it popularized the idea that butchering techniques are species specific, and that these can skew the usefulness of NISP measures.

Yet a third criticism leveled against NISP is that it can be effected by such things as excavation and analytical techniques. Screening would be an excellent example of this:

whereas all of the elements of larger species would be retrieved by screening, only the larger elements of smaller species would find their way into the lab. So even though all of the vertebrae, teeth, and even the smallest carpals of a large bison would be recovered, one could not expect any more than the longbones and skull of a small bird to survive. The same can also be said for the analysis of the faunal material. Whereas most of the bones of a bison would be easily identified as such by an analyst, very few vole fragments would ever be identified to species. Thus, the latter would be under-represented in a count of the number of identified specimens. Therefore, even excavation and analysis techniques can distort the economic importance of certain species when NISP is used as the primary indicator of relative abundance (Grayson 1984: 20-24).

Finally, far fewer tests of statistical analyses can be applied to NISP then to other measures of relative abundance, such as Minimum Numbers of Individuals (MNI). Some have argued, for instance, that meat yield is a far greater indicator of the importance of species in a prehistoric diet than simply the number of times the species appears. This is based on the very logical premise that it is unfair to treat ten large animals as being equal in importance, from a dietary perspective, to ten smaller animals. It is far more telling, so the argument goes, to determine the amount of edible meat available from a species, and to compare the relative abundance of calories, rather than the relative abundance of species (Grayson 1984: 23). Meat yields can not be determined from NISP.

Given all of the flaws inherent in the measure of numbers of identified specimens, then, it is little wonder that the concept of minimum numbers of individuals was so widely and rapidly accepted when it first appeared in the archaeological literature. In reality, MNI had been used by Paleontologists since 1829 (Grayson 1984: 27) and had first been applied to archaeological faunal assemblages by a Russian in 1882 (Casteel 1977: 125). But it was not until it was presented by White in 1953 that it began its ascent to its current state of popularity. Essentially, White proposed to find the element of each species in a sample which was in greatest abundance, and then to count the number of these from the left side of the body, and compare it to the number from the right. The largest number was then used to represent "the unit of calculation" (White 1953: 396). As an example, suppose 35 bones of a faunal sample had been identified as *Ursus Americanus* (Black Bear), and of these, the most abundant element was femora. These femora would then be divided into, say, 20 lefts and 15 rights. From this it would be concluded that there are a minimum of 20 black bears represented in the sample.

It is little wonder that MNI was so quickly adopted; it was incredibly simple yet still eliminated many of the flaws which had been associated with NISP. For one thing, even though MNI counts could still be distorted by differential preservation of species, differential representation of various elements was no longer a problem. That is, although it is still more likely for Bison elements to be unearthed than those of a mouse, that fact that more bones per Bison would be recovered, while significantly fewer elements per mouse would be found, no longer matters, as this does not affect the numbers of individuals.

MNI also eliminates the problems associated with differential butchering techniques. Not only does it not matter that certain species are butchered in such a way as to produce a greater number of fragments, it no longer matters if only certain selected elements are being brought back to a base camp. As Grayson (1984: 28) puts it: "minimum numbers can diminish the effect of differential retrieval of bone material from a kill site. If only the long bones of bison were brought back to an occupation site while entire skeletons of deer, antelope and rabbits were retrieved, minimum numbers would not be affected, but specimen counts would be."

The same can be said for problems associated with excavation. Just as it little matters if a prehistoric hunter brings back only the longbones of a bison, so too does it little matter if all but the longbones of a mouse are consistently lost through the screen during excavation.

Finally, as mentioned, MNI is amenable to a far greater variety of statistical analyses than is NISP. Thus, it can be said that MNI is a simple, straightforward technique which eliminates many of the problems associated with NISP.

It is not, however, without problems of its own. One of these is that minimum numbers increase at a decreasing rate with increasing sample size (Ducos 1968 after Grayson 1984: 50). This has been demonstrated on many occasions using statistical analysis (eg Grayson 1984; Casteel 1977), and in order to avoid getting into complicated mathematical formulas and statistical arguments, suffice it to say that there is a hyperbolic relationship between the total number of identified specimens per taxon and the ratio of MNI and NISP. That is, as sample size increases, there is an increase in the number of identified specimens which are required to define an individual or carcass. In Grayson's work, for example, it was demonstrated that "in samples consisting of one specimen per taxon, each specimen allows the definition of an individual while...after the number of specimens per taxon [reaches] 50, the number of specimens per individual is about 11, the precise figure depending upon the site (Grayson 1978: 58). Therefore, MNI is an inconsistent measure.

This manifests itself in two ways. First, there is "a potential for over-representation of species with low identified bone counts in the assemblage and relative under-representation of those with high identified bone counts" (Casteel 1977: 126). Put another way, when one is comparing relative abundance of species within a particular horizon on a site, one must keep in mind that the importance of rare species will be exaggerated.

Related to this is the fact that when plotting the change in relative abundance of a particular species through a series of stratigraphic levels on a site, it is difficult to distinguish between changes due to significant cultural processes and changes due simply to varying sample size. For example, Grayson (1981) scrutinized a series of conclusions drawn from the faunal analysis of Hogup Cave. At this site it was noted that the importance of Xeric rodents increased through time, and several cultural and environmental explanations were offered in an attempt to explain this phenomenon (Grayson 1981: 79). What Grayson noted, though, is that Xeric rodents increased in relative abundance through time, but that this increase was highly correlated with sample size. That is, the number of specimens per MNI of rarer species were relatively lower than that of the more common species, so that when sample size increased the relative abundance of all species changed, but disproportionately. This example serves to demonstrate then, that it is unfair to compare relative abundance measures between different strata on a site using minimum numbers as a unit of measure.

Another major problem with MNI is that absolute results will vary, depending upon how the faunal analyst organizes his sample. This can best be illustrated by a hypothetical example. Suppose that the faunal material from a small proto-Historic Huron village consisting of one house and an associated midden yielded the following results: from the house were excavated 12 femora from a white tail deer (2 right and 10 left) and 15 beaver humerii (15 right and none from the left side). In the midden, meanwhile, were 10 left femora of a deer and 7 right, and 25 left beaver humerii and 9 right. What then, is the MNI of this assemblage? It all depends upon how the analysts aggregates the material.

If he treats each feature as a discrete sample he would calculate a minimum of twenty deer (ten from the house and ten from the midden) and forty beaver (twenty five from the midden and fifteen from the house). Thus, it would be concluded that beaver are twice as significant in the economy of this particular site as white tail deer. But if the analyst decides to treat the entire village as a single assemblage, the data will tell a different story. Calculations would indicate a minimum of 20 deer (twenty left femora and nine right) and 25 beaver. Granted the numbers are small and may not prove statistically significant, but the point is that MNI is not consistent with changing aggregation techniques. As a larger number of smaller samples are created, MNI increases, whereas a smaller number of larger samples decreases MNI (Casteel 1977: 126).

The problem becomes more complex as one considers more realistic scenarios. How does one aggregate a site consisting of ten longhouses and associated middens, and several community middens? Should each be treated as a discrete sample? Should each house be considered alone or along with its associated midden? Or would it make more sense to treat all of the middens as being more relevant to one another than either is to any house? The question is not an easy one and, unfortunately, the real problem lies in the fact that the answer to this question is usually based more on how well the resulting minimum numbers support the researcher's hypothesis than anything else (Grayson 1984: 39). Therefore, absolute values of minimum numbers change disproportionately for each species, depending upon how a faunal assemblage is aggregated. Not only does this make the measure unreliable, but it leaves it open to statistical manipulation.

Ironically, a final criticism leveled against MNI is that it is not very amenable to statistical analysis (Grayson 1984: 50); this is precisely the opposite of what others have argued. But according to Grayson, a Frenchman named Ducos pointed out that even when dealing with very large samples, calculating minimum numbers rarely yields numbers large enough for meaningful interpretations to be made. As well, he argued, MNI depends on one particular element, and further excavation may change that number drastically.

For all of these reasons, Grayson, in 1984, rejected minimum numbers as a reliable statistical unit. The fact that it relates inconsistently to NISP as sample size increases, combined with the fact that "the effects of aggregation on minimum numbers are such as to allow us little faith in the meaning of those numbers" Grayson (1984: 91-92) concludes that MNI is "an extremely poor choice as the basic measure of relative taxonomic abundance."

I would be forced to disagree. There are really only two legitimate complaints which can be leveled against the use of MNI: sample size and aggregation. Both of these problems can be solved by formalizing the procedure. Ironically, Grayson himself admits that the relationship between MNI and NISP can be normalized statistically, based on the fact that the relationship is predictable (Grayson 1981 : 83). This is demonstrated by the formula $\mathrm{MNI}/\mathrm{NISP} = a(\mathrm{NISP})^{m}$. As well, even though MNI is dependant to a large extent on sample size, this should not pose any great problem, as long as one realizes that the relationship does exist when interpreting the data.

The problems pertaining to aggregation, meanwhile, are even easier to solve. There are two extremes which can be employed when determining MNI. One is the Maximum Distinction Approach in which all possible units of analysis, including both horizontal and vertical excavation units, are treated as discrete. The other extreme is the Minimum Distinction Approach in which "all faunal material from the site is considered as a single large cluster from which minimum numbers are derived" (Grayson 1978: 58). Again, the problem is solved simply by formalizing the use of MNI and defining a reasonable and appropriate compromise between these two extremes, to be used whenever faunal material is analyzed. And again, as long as the method employed is made perfectly clear whenever data is presented, the problem is really a minor one.

It should be noted at this point that other methods have been developed in an attempt to obtain reliable counts of relative abundance, but that it is unfair to compare these to MNI and NISP as they were really designed for completely different purposes. The first of these is the Matched-Pairs approach, as presented by Krantz (1968). Krantz felt that "maximum bone counts may not accurately indicate the number of individuals originally represented simply because all of the original bones may not have been available to be counted" (1968: 286). The method then, attempts to determine which bones are not present in a sample by examining those which are. Quite simply, one chooses an element - Krantz used mandibles-and separates them into left and right. One then tries to match these bones into pairs based on age categories, size, and whatever else seems practical given the particular situation. The following formula is then applied:

$$N = \frac{R^2 + L^2}{2P}$$

where: N = Number of animals in original population.
R = Total number of right elements found.
L = Total number of left elements found.
P = Number of pairs established.

Some, notably Casteel have criticized the Krantz method, arguing that, as demonstrated by empirical testing, it can not be relied upon to give an accurate measure of MNI

(Casteel 1977: 130). But what Casteel does not take into consideration is that Krantz never intended to determine MNI. Minimum Numbers attempt to "summarize the number of animals that are needed to account for a given assemblage of bones" (Grayson 1984: 72). Krantz's purpose, on the other hand, was to determine the number of bones which had originally made up the assemblage (Grayson 1984: 72). Thus, the two can not rightly be compared.

Other, more valid, criticisms have been leveled against the Krantz approach, though. Bokonyi, for one, complained that the method was "too theoretical, also impractical particularly on material from Old World sites" (Bokonyi 1970: 291). Indeed, archaeologists are rarely afforded the privilege of working with well preserved, whole bone, and "have no means of validly extracting true matched pairs from post-cranial material" (Grayson 1984: 88).

Finally, it can be said that the method requires a highly experienced analyst to distinguish pairs, and even so, the procedure is a highly arbitrary one. This problem is compounded by the fact that falsely matched and unmatched pairs result in serious inaccuracies (Grayson 1984: 88). Thus it can be concluded that the Krantz method of Matched Pairs analysis is not a very useful one.

Another method to come to the fore in recent years is Binford's measure of Minimal Animal Units (MAU). This is based on the very logical premise that MNI does not represent a minimum number of individuals at all. Rather, the presence of six left femora of a white tail deer simply indicates that the left hind limbs of six white deer were present on the site at some time. "The presence of a particular segment at a site does not imply that the entire animal, anatomically speaking, was ever there" (Binford 1984: 50).

Binford argues instead to develop two measures from any faunal sample. The first of these is MNE, or minimum number of elements. This is simply a matter of comparing the fragmented remains of various skeletal parts to decide the least number of elements these fragments represent. Thus, if two distal ends of right femora and six proximal ends of right femora are found in a sample, then at least six right femora are present. If one of the distal ends happens to be juvenile, meanwhile, while all of the rest of the fragments represent adults, then the MNE would increase to seven. It is essentially the same as MNI, only it pertains to specific skeletal elements rather than entire carcasses. Once MNE is determined, MAU is simply a matter of dividing the MNE by the frequency with which that element appears in the body. Therefore, since a deer has two femora, the MAU in the above example would be 3.5 (Binford 1984: 51).

Two serious problems are inherent in MAU measurements. First, it is impractical. Faunal remains can rarely be neatly classed as proximal or distal and then paired off. As Grayson (1984: 90) points out, what happens when one is faced with 100 badly fragmented proximal femora? Does one simply divide by two to get MAU? If yes, than it ignores the fact that many of these fragments came from the same bone. And on top of this, MNE is essentially the same thing as MNI, and so is hindered by all the same problems (Grayson 1984: 19). But in addition to even this, MAU and MNI are aimed at achieving completely different goals and again, it is unfair to compare the two. MNI is a measure of relative abundance designed to determine economic importance of various species in a faunal assemblage. MAU is an attempt to measure the relative abundance of certain skeletal elements of a particular species, and to compare that to the abundance of another element of the same species. From this inferences can be made regarding butchering techniques and site type analysis. Therefore, MAU, like Matched-Pairs, really has little place in a debate regarding the theories of the determination of relative abundance in a faunal assemblage.

Really, there are only two main methods currently in widespread use for this purpose: number of identified specimens per taxon (NISP) and minimum number of individuals (MNI). The former is simply a total count of the bones identified to species, while the latter is an attempt to determine the minimum number of carcasses required to account for these bones. The most obvious problem with NISP is interdependence. Surely a good number of the bones present in a sample are from the same element. And given the fact that not all bones are affected equally by taphonomic processes, this means that some species will be over-represented. MNI, on the other hand, eliminates this and associated problems, as well as allowing for a greater range of interpretation (such as meat yield studies). But MNI has also been criticized. Some argue it is unreliable. Admittedly it can be shown that MNI as a ratio of NISP increases at a decreasing rate and that MNI is subject to manipulation by altering the aggregation of a faunal sample. These things can, however, be taken care of by formalizing the use of MNI. Other methods such as Krantz's matched pairs and Binford's MAU have been put forth as alternatives, but neither seem practical or useful. Hence, it can be said that MNI is still the most useful method for determining relative abundance in a faunal sample.

(from a paper submitted to Dr. G. Coupland. April, 1990)

For these reasons then, MNI was chosen as the best measure of relative abundance in Operation-4 at Nunaingok-1, although NISP has been, and will be, presented. As mentioned, MNI can be a very useful measure, as long as a few points regarding technique are made perfectly clear from the beginning. With this in mind, MNIs were determined using the following procedure.

First, given the fact that Operation-4 is a discrete feature - a midden in obvious association with a dwelling - and the units 4A through 4DI are artificial divisions imposed by the archaeologist, it seems fair to treat the entire sample as a single unit for the purpose of determining minimum numbers. Second, the method is basically that proposed by White (1953). However, the added trouble was taken to further divide specimens according to six age categories: juvenile, immature, immature +, sub-adult, and adult. For the purposes herein, immature + was ignored as an effective age category as, during the course of analysis, it was essentially used as a catch all category when the age was unknown. Therefore, it would be dangerous to use immature+ to distinguish one specimen from another, unless one of these specimens happens to be juvenile. Using this technique then, the following results were obtained:

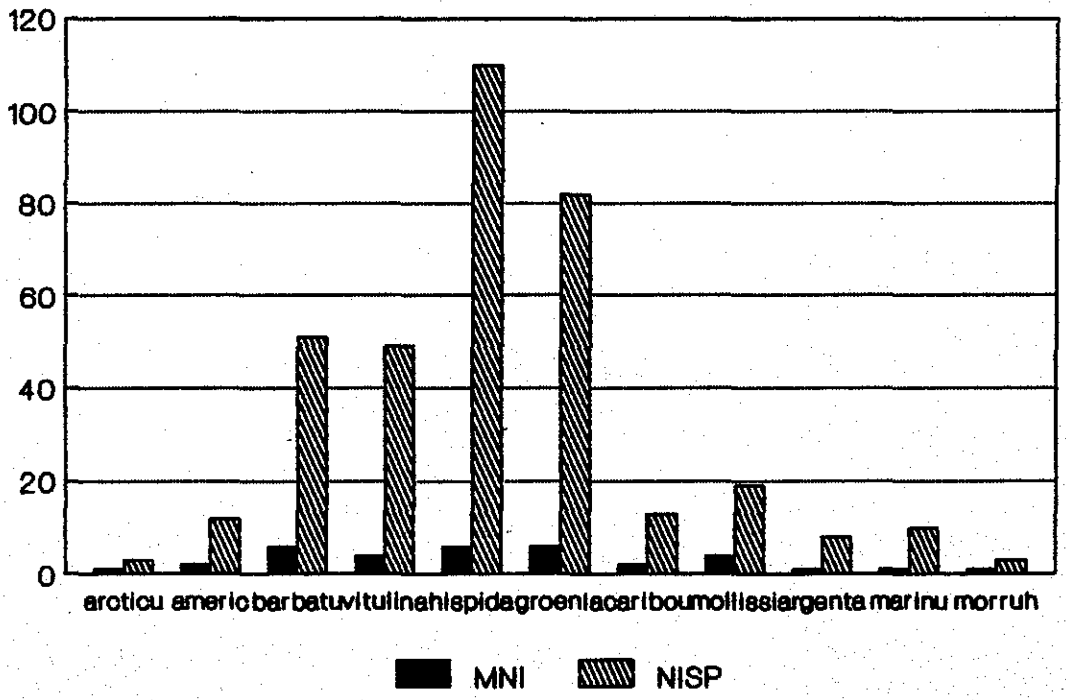
Figure 9: Minimum Numbers of Species Identified from Operation-4

		% TOTAL MNI	DETERMINED USING
Lepus arcticus	1	2.9%	humerii
Ursus americanus	2	5.9%	11th rib
Erignathus barbatus	6	17.6%	axis, age
Phoca vitulina	4	11.8%	humerii, age
Phoca hispida	6	17.6%	rib 10, age
Phoca groenlandica	6	17.6%	tibiae
Rangifer t. caribou	2	5.9%	scapulae
Somateria mollissima	4	11.8%	tibiatarsi
Larus Marinus	1	2.9%	humerii
Larus argentatus	1	2.9%	ulnae
Gadus Morruha	1	2.9%	dentary
Total	34	99.9%	

Of course, not much can be made of most of these figures. As pointed out above, the rarer species in the sample tend to be over-represented by MNI - this is best illustrated by figure 10 - making inferences regarding the dietary significance of most of these species dangerous. However, given the fact that members of the family Phocidae appear in much greater numbers than any other, and that the NISP values of the four Phocidae species are relatively close, it would be useful to make inferences regarding the relative importance of each of these species in the Labrador-Eskimo diet.

Yet, it would be unfair to make these comparisons on the basis of MNI alone. That is, each of these species varies greatly from the other in size, and therefore in terms of the amount each carcass would contribute to the diet. For instance, "the bearded seal provides about five times the flesh and blubber of the ringed seal, since the male and female each weigh in the neighborhood of 750 pounds" (Taylor

Figure 10: MNI and NISP of Species Identified From Operation-4



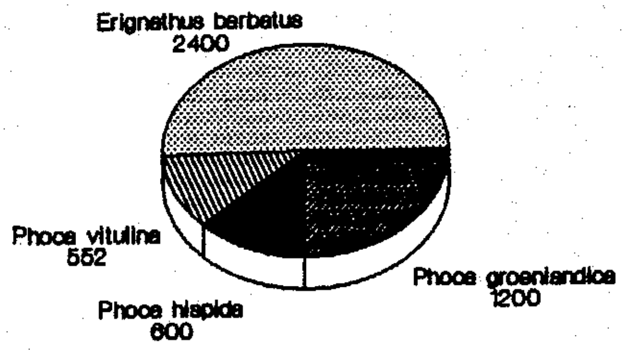
1974: 28). Thus, it seems much more useful to determine meat yields first, and then to compare the relative importance of each of the Phocidae species.

To this end, three sources were consulted: White (1953), Stewart (1977) and Banfield (1974). Each of the former two present a number of species, their average live weight, and the percent of the total weight of each species which is usable meat. The latter author, meanwhile, presents more reliable live weight figures. Hence, all live weight data is from Banfield (1974) and all usable meat data is from White (1953) and Stewart (1977). Where Stewart and White differed, the mean was taken (see figure 11).

Figure 11: Meat Yield by Identified Species of the Family Phocidae

Species	Avg Live Weight	% Usable Meat	Pounds Usable Meat	MNI	Total Usable Meat
Erignathus barbatus	800lbs	50	400	6	2400
Phoca vitulina	275lbs	50	138	4	552
Phoca hispida	200lbs	50	100	6	600
Phoca groenlandica	400lbs	50	200	6	1200

Figure 12: Relative Dietary Importance Of Phocidae Species



based on meat yields

Archaeological Aspects of Faunal Findings

Representation of Skeletal Elements by Body Portion

Mammals

For the purpose of examining the distribution of skeletal elements by body portion, no taxonomic unit lower than family was used. This allows for the seals, which all would have been butchered in a very similar manner given their similar form and uses, to be examined as a single unit. Likewise, since no other family is represented in this sample by more than one species, no other family will be affected by this method of division.

Thus, all of the bones of a particular taxon are here divided into one of four categories: anterior limb, posterior limb, head or trunk. Anterior limb refers to the humeri, ulnae, radii, and carpals and associated metacarpals and phalanges. The posterior limb refers to the femora, tibiae, fibulae, metatarsals, tarsals and associated phalanges. The trunk includes the vertebrae, scapulae, ribs, and pelves. Finally, the head refers to all of the bones of the skull including the teeth.

Of the 110 elements identified only as Mammal sp., then, 77 (70.0%) are unidentifiable fragments, 20 (18.2%) belong to the trunk, 12 (10.9%) are from the head, and 1 (0.9 %) is from the posterior limb.

Of the two elements identified as Cetacea, one is from the anterior limb is one is from the trunk.

Of the three elements identified as Leporidae, one is from the anterior limb, one is from the posterior limb and one is from the trunk.

Of the five elements from the family canidae, three are from the trunk and two are from the anterior limb. It is interesting to note that all three of the Canis sp. elements are from the trunk and the two from the arctic fox (a humerus and ulna) are both from the anterior limb. Unfortunately, the very small sample size prevents one from drawing any conclusions from this.

All of the twelve elements from the Ursidae family are ribs, and therefore from the trunk area. This is very interesting, especially when considering the fact that the northern most range of the black bear ends some one hundred miles to the south (Badgely, personal communication). It seems logical that if *Ursus Americanus* was indeed hunted by the people of Nunaingok sometime in the course of their annual cycle and brought back to the site, they would only bring the trunk of the animal: the part bearing the most meat.

Of the 390 specimens identified as Phocidae, meanwhile, 53 (13.6%) are from the anterior limb, 86 (22.0%) are from the posterior limb, 44 (11.3%) are from the head and 187 (47.9%) are from the trunk. There were a total of 20 elements, meanwhile (5.1% of the family) which either could not be identified as to element, or, as is the case with many of the hand bones, could not be definitely assigned to the fore or hind limb.

Finally, the thirteen elements identified to the family Cervidae are distributed as follows. Seven (53.8%) are from the trunk, three (23.1%) are from the head, two (15.4%) are from the posterior limb and 1 (7.7%) is from the forelimb.

Figure 13: Distribution of Mammal Elements by Body Portion

	No of elements from the:				
Taxon	Trunk	Head	Hindlimb	Forelimb	Unidentified
Mammal sp.	20	12	1	0	77
Cetacea sp.	1	0	0	1	0
Leporidae	1	0	1	1	0
Canidae	3	0	0	2	0
Ursidae	12	0	0	0	0
Phocidae	187	44	86	53	20
Cervidae	7	3	2	1	0
Total	231	59	90	58	97

Examining this data closely, it becomes clear that in all taxon, trunk elements outnumber any other. This is easily explained by the fact that there are more bones in the axial skeleton of a living animal. Likewise, bones from the head and from the anterior limb are about equal in number, the only exception to this being unidentified mammal species. On this point, however, it should be pointed out that most of the unidentifiable mammal bones were fragments, and that skull bones, being very distinctive, can be recognized even when material is very poor. Thus, the distribution is about as expected.

The only exception is the fact that there are far more hind limb bones then forelimbs. This is particularly so in the Phocidae. Since this phenomenon can not be explained taphonomically, it must be concluded that it is the result of one or more cultural factors.

Birds

Of the twenty three elements identified only as Aves sp., 11 (47.8%) are unrecognizable fragments. A further five (21.7) are from the posterior limbs and seven (30.4%) are from the wing. Nineteen bones from this sample were found to belong to the family Anatidae. Ten of these (52.6%) are from the wing, seven (36.8%) are from the legs, and two (10.5%) are from the trunk. Finally, of a total of eighteen bones from the family Laridae, ten (55.6%) are from the wing, four (22.2%) are from the lower limbs, two (11.1%) are from the head and another two are from the trunk (see figure 14).

Figure 14: Distribution of Bird Elements by Body Portion

Taxon	Head	Trunk	Wing	Legs	Unident.
Aves sp.	0	0	7	5	11
Anatidae	0	2	10	7	0
Laridae	2	2	10	4	0
Total	2	4	27	16	11

One of the first things one might notice when examining the distribution of bird elements by body portion is the relative paucity of trunk elements. This, though, is of no great significance. Unlike the mammal, the axial skeleton of a bird - particularly the ribs and vertebrae - are so small and fragile that they are not likely to survive in the archaeological record. The same can be said for the bones of the skull. The over-representation of the anterior limb bones, however, is a quandary for which there are two possible explanations.

First, the differences may be ascribed to the small sample size. Even though, in terms of percentages, there are nearly twice as many wing bones as leg bone, in reality the difference is only eleven elements. On the other hand, it is possible that the difference reflects the fact that the pectoral girdle is the meatiest part of the bird, and therefore likely the preferred portion (Howard Savage, personal communication).

Alteration of Bone

Aside from some simple cases of weathering, there are not many examples of natural alteration of bone. In fact, there are only three. One is the rib of black bear which shows very faint green staining at one end. It is likely a mould of some sort which formed after excavation, as it started to disappear when scrubbed hard with a toothbrush. The second is the right shaft of a *Phoca hispida* tibia with rodent gnawing. Finally, the rib from a Phoca sp. was covered with curious grooves. These were deep and wide suggesting that they are definitely not cut marks. They are also too irregular to be from a rodent. It seems most likely that they are scratches from some sort of abrasive, such as sand or rock. Thus, less than one percent of the sample shows signs of non-human modification. This could possibly be attributed to the late date assigned to the material.

Likewise, there are very few examples of human alteration. A scant fifteen specimens, 2.5% of the total sample, show signs of butchering in the form of cutmarks. There a also a few (four) elements which show signs of trowel trauma. But perhaps most interesting is that many of the Phoca ulnae in the sample have been broken in precisely the same way. It seems that each bone is broken about 3/4 of the way down the length of the shaft such that there is a smooth, but uneven, diagonal break. Thus, it seems that the bones were snapped, and not cut. This pattern occurs on eight ulnae, which accounts for 44% of the total Phoca ulnae in the sample.

Finally, there is one pathological specimen in the sample. This is the fractured left scapula of one of the Phoca species. The break must have been a very severe one, for there is still a wide separation between the two broken edges in places, despite the fact there had already been much healing and callusing. Indeed, the area around the fracture was so badly deformed from excess bone growth that the specimen could not be identified beyond genus. It is also interesting to note that, given the large muscle mass around the scapula, and the fact that it is placed well beneath the surface of the body, it is very rare for a scapula to fracture in nature (Howard Savage, personal communication). Hence, this is a fascinating find indeed.

Seasonality

Spiess (1984) argues that Nunaingok was likely a spring/fall site, being abandoned in the summer and then again in the winter. Subsequent work at the site, however, has demonstrated otherwise. Seal is by far the resource most utilized at Nunaingok. And of the various seal species, Harp (*Phoca Groenlandica*) is the best indicator of season. The Harp Seal moves north from its moulting areas off Newfoundland and south Labrador in early May, passing McClelan Strait in the last week of June, and then on the return voyage in early November (Taylor 1974: 26). Since many of the Harp specimens analyzed were juvenile individuals it seems safe to say that Nunaingok was definitely occupied during the summer. That is, with infant seal pups being born in late February to early March (Banfield 1974: 377), it is on the summer migration only that they would appear. By the time they returned in November, they would have matured to the point where juvenile cortex would no longer appear on the bone. Hence, it is safe to say that Structure-1 was occupied in the late spring/early summer.

This is corroborated by the presence of *Gadus Morruha* (Atlantic Cod). According to Taylor (1974: 30) Cod do not enter inshore waters until early July, and go out to sea again in November. Thus, they are available only during the summer and fall. Apparently, they are best taken in October, "when they are very big and fat " (Taylor 1974: 30). This implies that they were likely taken in the fall. But since they were known to have been caught in the summer as well, little more can be said other than the presence of Atlantic Cod in level-1 of Operation-4 indicates either a spring or summer occupation, if not both.

The presence of caribou on the site is also very telling. Taylor demonstrates, through ethnographic records, that the Labrador Eskimo families who were most fit to make a journey into the interior to hunt caribou did so in late summer (mid-August to mid-September). The rest, meanwhile, would stay behind at the coastal summer camp, fishing and gathering berries. Those families which had left would then return in mid October and all would settle into winter houses (Taylor 1974: 57). Whether these families returned with only caribou hides or whether entire carcasses were brought back is unclear. However, it was pointed out that some winters, in times of desperation, "it was necessary to send sledges inland to get caribou meat that had been cached the previous autumn" (Taylor 1974: 54). Either way - whether these caribou bones were brought in late fall or sometime during the winter - it doesn't matter, for the site occupants would have been in their winter dwellings at this time. Therefore, the presence of caribou bones indicates a late fall and winter occupation of Nunaingok-1.

Finally, the presence of certain bird species, particularly *Somateria Mollissima* (Common Eider) indicates a definite spring occupation. That is, the Common Eider is one of the species which can only be found in the area during the spring time (Taylor 1974: 29). [illegible] Therefore, it is clear from the faunal evidence that the Nunaingok site was definitely occupied in the spring (as evidenced by the presence of Common Eider), Summer (as indicated by juvenile Harp Seal bones), and fall (as indicated by the presence of caribou bones and corroborated by fish bones and ethnographic data), and possibly winter (it is a possibility as caribou was cached, but can not be confirmed). But on this latter point it is important to note that if the site's inhabitants were bringing caribou into their autumn homes, they were utilizing the site during the winter as well, as ethnographic data indicates that the same residence was used in both seasons. Hence, Structure-1 at Nunaingok was used in all seasons of the year.

Subsistence Inferences

Lepus arcticus (Arctic hare)

The arctic hare is a large, tundra dweller, weighing from seven to twelve pounds. Although basically a solitary animal, it tends to always travel along the same well worn paths, and is thus very easy to capture. "Eskimos take advantage of the hare's refusal to jump over a thong line stretched across its pathway. The hare invariably crawls under the line and is therefore easily captured in snares suspended from the line" (Banfield 1974: 87).

It is not likely that the arctic hare was ever a major contributor to the economy of the Labrador Eskimo, it was on occassion taken. The meat is usually lean, and the Inuit enjoyed splitting "the hind leg bones [to] suck out the marrow" (Banfield 1974: 87). The fur on the other hand, is not of much use. Even though it is thick and exceptionally warm, the skin is paper thin and therefore useless for clothing. Nonetheless, the hide of *Lepus arcticus* was sometimes used for stockings, hand towels, and even bandages (Banfield 1974: 85-87).

Alopex lagopus (Arctic fox)

The arctic fox is a small nocturnal canid, being about the size of a terrier. Even though they are very abundant in northern Labrador and are synonomous with human camps, they were never important to the Inuit until they began to be traded to the Hudson's Bay Company in the late 19th century. "Fox received little mention in the earliest diaries until the Eskimos began to obtain steel traps. Then they became much sought after for both fur and meat" (Taylor 1974: 28).

Ursus americanus (American black bear)

Theoretically, the black bear is a forest dweller and does not range onto the tundra. "Black bears," says Banfield (1974: 305) "inhabit either coniferous or deciduous forest regions, as well as swamps and berry patches." Realistically, however, this is not the case. Taylor (1974: 29) argues that ethnographic sources report black bear "at least as far north as Okak" and Rasmussen (1935: 102) reports sighting a black bear at Baker Lake (over 400 miles north of the treeline!).

Rasmussen also reports that it was not uncommon for the Labrador Eskimos to hunt black bear when they found themselves in the forest:

> In Labrador the Eskimos frequently fall in with the black bear when they go into the forest . . . it is usually taken in its winter lair when asleep. When a lair is discovered, the hunters uncover a little of the entrance. The bear is well down under timber and brushwood. The hunters move about in front of the hole and tease the animal by prodding it with a lance or stick. There is always a small hole down to it, but in the course of the winter it becomes covered with snow. When it has been sufficiently disturbed, the bear will awake and grunt its displeasure, but each time the hunters cease irritating him, he retires again and resumes his sleep. The idea is to tease it until it comes right out of the hole, or at any rate one forepaw and its head appear, so that it can be shot there (Dejerbol 1935: 102).

Erignathus barbatus (Bearded seal)

The bearded seal is a large (up to 850lbs), solitary, non-migratory animal, which enjoys basking on the moving ice. The Eskimo used its flesh for food for dogs and men alike. The hide of the bearded seal, meanwhile, is particularly tough and durable, and so was used for kayaks, tents, the soles of shoes, and "for strong lines and dog traces" (Banfield 1974: 366).

Phoca vitulina (Harbour seal)

Vitulina is a small, non-migratory species which is perhaps the most gregarious of the seals. "They haul out on sand banks and rocky shoals and lie side by side in loosely organized bands of up to 500 individuals" (Banfield 1974:

370). Yet despite the large numbers, the harbour seal is very wary and very difficult to stalk. The hide of the species was very highly prized by the Eskimo for its water proof qualities (Rasmussen 1935: 232).

Phoca hispida

Even though it is the smallest of the Pinnipeds, the ringed seal is "the cornerstone of the native economy of the coastal Eskimos" (Banfield 1974: 373). The flesh was eaten and the valuable blubber used as fuel. The hide was made into mukluks, parkas, tents, mats, light lines, receptacles, floats, dog harnesses, and tent coverings. The internal organs, particularly the liver, are high in vitamin A and thus are an indispensable part of the northern diet. Even the intestines were used as containers and the bones, in prehistoric Thule society, made into tools.

The ringed seal loves areas of open water, as it likes to crawl out onto the young ice and bask. Hence Nunaingok, being located in the vicinity of a polynya, is an excellent area to capture ringed seals.

Phoca Groenlandica (Harp seal)

The harp seal is the only migratory Pinniped which ranges into extreme northern Labrador, and therefore is an excellent seasonality indicator. The species was also very important in the native economy. "In early contact times sealing productivity was at its peak when the harps were passing through the area, and they were undoubtedly one of the species most commonly stored in aboriginal stone caches" (Taylor 1974: 27).

Rangifer t. caribou (Woodland caribou)

Even though the woodland caribou was eaten by the Labrador Eskimo, and it was often cached in case of a lean winter, its primary purpose was to provide hides for clothing. For this reason, they were hunted during the fall migration as this is when the skins are best. But in addition to even this, caribou sinew was used as thread, and the fat from the animal was used as fuel.

Aves (Birds)

Many species of birds were exploited by the Labrador Eskimo both for meat and for eggs. "In spring, countless eggs are gathered from the waterfowls breeding along the rocky islands and inlets of the coast. The surplus is laid aside until they have a very "gamey" flavour, when they figure in the winter feasts as a special delicacy" (Hawkes 1916: 33).

Gadus morruha (Atlantic cod)

Cod was not a favorite food of the Labrador Eskimo. That is not to say that they did not utilize it as a resource, only that they utilized it only when absolutely necessary. Considered a starvation food in the early days of contact, cod became more important in the 19th century as missionaries encouraged natives to store smoked fish as a buffer against starvation. As well, it also became an important trade item at this time, as winter stores were desperately needed by both the Moravian missionaries and the Hudson's Bay Company traders (Taylor 1974: 30).

Inter-Site comparisons

For the most part, the faunal remains from Operation-4 of Structure-1 are precisely what one would expect from a historic Labrador Eskimo site. There is a paucity of large marine mammals such as whale and walrus, and the sample is instead dominated by seals, with a smattering of bird, caribou, hare, fox and bear. The only anomaly in this sample is the small selection of arctic fox.

This seems to contrast with Kaplan's view of the historic Eskimo site in this area: "a shift away from large sea mammal hunting, with an increased reliance on seals, caribou and fish, and in some cases a considerable amount of fox hunting" (Kaplan 1980: 652). One can say that either the late date of the site (early 20th century) suggests that the influence of the fur trade had already subsided, or that the people of Nunaingok simply were not participating to a large degree in the trade of fox fur.

With regards to the fish mentioned by Kaplan, it must be pointed out that the very low incidence of fish bone in Operation-4 is nothing out of the ordinary. The great importance of fish in the native diet is only known ethnographically. Archaeologically, osteichthyes elements rarely survive (Kaplan 1980:653). Thus, the faunal material from Operation-4, level-1, Nunaingok site (JcDe-1) is typical of historic Labrador Eskimo faunal assemblages.

Summary and Conclusions

The faunal material investigated in this report represents the entire bone assemblage excavated from a historic Labrador Eskimo midden. And the results of this excavation are no surprise. The sample is dominated by sea mammals of the family Phocidae, particularly *Phoca hispida* in terms of sheer numbers, but *Erignathus barbatus* in terms of available meat.

The presence of certain other species, however, such as caribou, Atlantic cod, and common eider, combine to suggest that Structure-1 at Nunaingok was occupied year round. If this is so, it must be a direct result of the prolific resources which result from the close proximity of the McClelan Strait polynya. This aside, the historic occupation of the Nunaingok site can best be described as typical.

Acknowledgments

I am deeply indebted to several people who have helped me tremendously during the formulation of this report. First, thanks is owed to Dr. Ian Badgely for supplying the material which was the subject of my study, and for providing me with invaluable information and insight on the excavations at Nunaingok. As well, I must acknowledge Neal Walters, for allowing me the use of a myriad of computer programs, without which this project could never have been completed.

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APPENDICES

Abbreviations used in Appendix A

1/2AR = 1/2 OF ARCH
1STSG = FIRST SEGMENT
AC&BL = ACETABULUM AND BLADE FRAGMENT
AC&RM = ACETABULUM AND RAMUS
ACETA = ACETABULUM
ADU = ADULT
AMERICAN = AMERICANUS
AN1/2 = ANTERIOR 1/2
ANEDG = ANTERIOR EDGE
ANFAC = ANTERIOR FACET
ANRIB = ANTERIOR RIB
ANSERI = ANSERIFORMES
ARTIODAC = ARTIODACTYLA
BACUL = BACULUM
BD&RM = BODY AND RAMUS
BD&SP = BODY AND SPINOUS PROCESS
BDY+F = BODY AND ONE FACET
BULLA = AUDITORY BULLA
CA = CAUDAL VERTEBRAE
CALCA = CALCANEUM
CANIN = CANINE
CARNIVOR = CARNIVORA
CARPO = CARPOMETACARPUS
CATALOGU = CATALOGUE NUMBER
CE = CERVICLE VERTEBRAE
CERAT = CERATOHYAL
CHARADRI = CHARADRIFORMES
CORAC = CORACOID
D 1/2 = DISTAL 1/2
DENTA = DENTARY
DEPIP = DISTAL EPIPHYSIS
ELEME = ELEMENT
ERIGNATH = ERIGNATHUS
FIBUL = FIBULA
FORAM = FORAMEN MAGNUM
FR&NS = FRONTAL AND NASALS
FRAGM = FRAGMENT
FRONT = FRONTAL
FURCU = FURCULUM
GADIFORM = GADIFORMES
GROENLAN = GROENLANDICA
HPLAT = HORIZONTAL PLATE
HUMER = HUMERUS
IM+ = IMMATURE PLUS

IMM = IMMATURE
INNOM = INNOMINATE
ISCHI = ISCHIUM
JUV = JUVENILE
L 1/4 = LATERAL I/4
L INC = LATERAL INCISOR
LAGOMORP = LAGOMORPHA
LEPORIDA = LEPORIDAE
LNGBN = LONGBONE
LPROC = LATERAL PROCESS
LU = LUMBAR VERTEBRAE
M 1/2 = MEDIAL 1/2
M INC = MEDIAL INCISOR
MAETU = AUDITORY MAETUS
MAMMA = MAMMALIA
MANDI = MANDIBLE
MAXIL = MAXILLA
MC = METACARPAL
METAP = METAPODIAL
MOLLISSI = MOLLISSIMA
MP = MIDDLE PHALANX
MPH = MIDDLE PHALANX OF THE HINDLIMB
MTT = METATARSAL
OCCIP = OCCIPITAL
OSTEI = OSTEICHTHYES
P 1/2 = PROXIMAL 1/2
PALAT = PALATINE
PARIE = PARIETAL
PATEL = PATELLA
P END = PROXIMAL END
PH = PHALANX, HIND
PINNIPED = PINNIPEDIA
(P)ML = MOLAR OR PREMOLAR
PORTI = PORTION
PPF = PROXIMAL PHALANX, FORELIMB
PPH = PROXIMAL PHALANX, HINDLIMB
PREMX = PREMAXILLA
PRIB = POSTERIOR RIB
PBDR = POSTERIOR BORDER
RADIU = RADIUS
RIBMD = MIDDLE RIB
S = SIDE
S1/2D = SHAFT AND 1/2 OF THE DISTAL EPIPHYSIS
S1/2P = SHAFT AND 1/2 OF THE PROXIMAL EPIPHYSIS
SAD = SUB-ADULT
SACRU = SACRUM
SBEPI = SUPERIOR BODY EPIPHYSIS
SCAPU = SCAPULA
SFACE = SUPERIOR FACE
SFACT = SUPERIOR FACET
SOMATERA = SOMATERIA
ST1/2 = STERNAL 1/2
STEND = STERNAL END
STERN = STERNUM

T = THORACIC VERTEBRAE
TAR = TARSAL
TB-FB = FUSED TIBIA-FIBULA COMPLEX
TCENT = TARSAL CENTRALI
TEMPO = TEMPORAL
TIBTR = TIBIATARSUS
TRFOR = TRANSVERSE FORAMEN
V1/2S = VENTRAL 1/2 OF SHAFT
VEND = VERTEBRAL END
VERTE = VERTEBRAE
VL 1/2 = VENTRO-LATERAL 1/2
VPLATE = VERTICLE PLATE
ZYGPR = ZYGOMATIC PROCESS

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4A, LEVEL I
NUNAINGOK (JcDe-1)

Jan. 1, 1980

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CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4A-178	AVES	?	?	?	?	CARPO	SHAFT	?	IM+
I-4A-157	AVES	?	?	?	?	FRAGM	FRAGM	-	IM+
I-4A-179	AVES	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-110	AVES	?	?	?	?	HUMER	FRAGM	?	IM+
I-4A-112	AVES	?	?	?	?	HUMER	SHAFT	R	IM+
I-4A-106	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4A-116	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4A-111	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4A-114	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4A-117	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4A-104	AVES	?	?	?	?	TIBTR	FRAGM	?	IM+
I-4A-108	AVES	?	?	?	?	TIBTR	FRAGM	R	IM+
I-4A-113	AVES	?	?	?	?	TIBTR	SHAFT	L	IM+
I-4A-115	AVES	?	?	?	?	TIBTR	SHAFT	L	IM+
I-4A-109	AVES	?	?	?	?	ULNA	FRAGM	?	IM+
I-4A-134	AVES	?	?	?	?	ULNA	FRAGM	?	IM+
-4A-107	AVES	?	?	?	?	ULNA	FRAGM	?	IM+
I-4A-93	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	CARPO	BODY	R	IM+
I-4A-77	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	FURCU	WHOLE	-	IM+
I-4A-99	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	HUMER	D 1/2	L	IM+
I-4A-82	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	HUMER	P 3/4	R	IM+
I-4A-168	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	RADIU	WHOLE	R	IM+
I-4A-177	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	D 1/2	R	IM+
I-4A-83	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	D 3/4	L	IM+
I-4A-85	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	SHAFT	L	IM+
I-4A-88	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	SHAFT	L	IM+
I-4A-87	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	SHAFT	L	IM+
I-4A-86	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	SHAFT	R	IM+
I-4A-84	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	TIBTR	SHAFT	R	IM+
I-4A-172	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSIMA	ULNA	SHAFT	L	IM+
I-4A-96	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	CARPO	BODY	L	IM+
I-4A-98	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	HUMER	SHAFT	R	IM+
I-4A-166	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	MANDI	BD&RM	L	IM+
I-4A-167	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	MANDI	BD&RM	R	IM+
I-4A-101	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	TIBTR	D 3/4	L	IM+
I-4A-103	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	TIBTR	S1/2D	R	IM+
I-4A-64	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	ULNA	P 3/4	R	IM+
I-4A-63	AVES	CHARADRI	LARIDAE	LARUS	ARGENTATUS	ULNA	WHOLE	L	IM+
I-4A-165	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	CORAC	BODY	R	IM+
I-4A-97	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	HUMER	D 1/4	L	IM+
I-4A-65	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	HUMER	P 1/4	R	IM+
I-4A-102	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	HUMER	SHAFT	L	IM+
I-4A-94	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	STERN	ANEDG	-	IM+
I-4A-89	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	TIBTR	SHAFT	R	IM+
I-4A-95	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	ULNA	P 1/4	L	IM+
I-4A-105	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	ULNA	S1/2P	R	IM+
I-4A-139	MAMMA	?	?	?	?	FRAGM	FRAGM	-	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4A, LEVEL I
NUNAINGOK (JcDe-1)

Jan. 1, 1980

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4A-160	MAMMA	?	?	?	?	FRAGM	FRAGM	-	IM+
I-4A-142	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-145	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-122	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-128	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-147	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-148	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-125	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-121	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-138	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-146	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-130	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-120	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-40	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-124	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-144	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-129	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
-4A-133	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-135	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-143	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-41	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-151	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4A-154	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4A-131	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4A-149	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4A-91	MAMMA	?	?	?	?	SCAPU	FRAGM	?	IM+
I-4A-71	MAMMA	?	?	?	?	SCAPU	FRAGM	?	IM+
I-4A-92	MAMMA	?	?	?	?	SCAPU	FRAGM	?	IM+
I-4A-39	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	T. CARIBOU	RIB	BODY	?	IM+
I-4A-43	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	T. CARIBOU	RIB	BODY	?	IM+
I-4A-10	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	T. CARIBOU	SCAPU	M 1/2	R	IM+
I-4A-9	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	T. CARIBOU	SCAPU	M 3/4	R	IM+
I-4A-90	MAMMA	CARNIVOR	CANIDAE	CANIS	?	RIB10	BODY	L	IM+
I-4A-156	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICANUS	RIB11	BODY	R	IM+
I-4A-22	MAMMA	CETACEA	?	?	?	RIB	WHOLE	R	IM+
I-4A-100	MAMMA	LAGOMORP	LEPORIDA	LEPUS	ARCTICUS	FEMUR	D 1/4	L	ADU
I-4A-8	MAMMA	LAGOMORP	LEPORIDA	LEPUS	ARCTICUS	HUMER	WHOLE	R	ADU
I-4A-52	MAMMA	LAGOMORP	LEPORIDA	LEPUS	ARCTICUS	SCAPU	L 1/4	L	IM+
I-4A-173	MAMMA	PINNIPED	PHOCIDAE	?	?	FIBUL	FRAGM	R	IM+
I-4A-174	MAMMA	PINNIPED	PHOCIDAE	?	?	FRAGM	FRAGM	?	IM+
I-4A-171	MAMMA	PINNIPED	PHOCIDAE	?	?	LNGBN	FRAGM	?	IM+
I-4A-127	MAMMA	PINNIPED	PHOCIDAE	?	?	METAP	FRAGM	?	IM+
I-4A-68	MAMMA	PINNIPED	PHOCIDAE	?	?	RIB	FRAGM	?	IM+
I-4A-118	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	(P)ML	WHOLE	-	IM+
I-4A-119	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	(P)ML	WHOLE	-	IM+
I-4A-20	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	CA	BODY	-	IM+
I-4A-21	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	CA 6	BODY	-	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4A, LEVEL I
NUNAINGOK (JcDe-1)

Jan. 1, 1980

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4A-1	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	LU	WHOLE	-	IM+
I-4A-51	MAMMA	PINNIPED	PHOCIDAE	ERIGNATHUS	BARBATUS	TIBIA	P3/4	R	ADU
I-4A-78	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	ATLAS	ARCH	-	IM+
I-4A-158	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	SHAFT	L	IM+
I-4A-161	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	SHAFT	L	IM+
I-4A-159	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	SHAFT	R	IM+
I-4A-58	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	DEPIP	R	IMM
I-4A-60	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	PEPIP	R	IMM
I-4A-69	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	INNOM	ACETA	?	IM+
I-4A-45	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P RIB	ANGLE	L	IM+
I-4A-44	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P RIB	ANGLE	L	IM+
I-4A-126	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P RIB	ANGLE	R	IM+
I-4A-42	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P RIB	ST1/2	R	JUV
I-4A-47	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	ANGLE	R	IM+
I-4A-34	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	?	IM+
I-4A-37	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	L	IM+
I-4A-38	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	L	IM+
-4A-36	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	L	IM+
I-4A-31	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	L	IM+
I-4A-170	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	R	IM+
I-4A-155	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	FRAGM	?	IM+
I-4A-152	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	FRAGM	?	JUV
I-4A-18	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SACRU	1stSG	-	IM+
I-4A-54	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SCAPU	PSBDR	L	IM+
I-4A-55	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SCAPU	PSBDR	L	IM+
I-4A-79	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	FRAGM	L	IM+
I-4A-72	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	FRAGM	L	IM+
I-4A-153	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	FRAGM	R	IM+
I-4A-123	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	SHAFT	R	IM+
I-4A-13	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	HUMER	WHOLE	R	IMM
I-4A-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	HUMER	WHOLE	R	IMM
I-4A-66	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	MANDI	BODY	R	IM+
I-4A-67	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	MTT 2	WHOLE	L	IM+
I-4A-24	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	PP 1	WHOLE	L	IM+
I-4A-26	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	PPF 1	WHOLE	L	IM+
I-4A-76	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RADIU	P 1/2	L	IMM
I-4A-74	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RADIU	P 1/3	L	IMM
I-4A-61	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RADIU	P 1/3	L	IMM
I-4A-30	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RIB	BODY	L	IM+
I-4A-132	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RIB14	ANGLE	R	IM+
I-4A-48	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	RIBMD	BODY	R	IM+
I-4A-53	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLANDI	SCAPU	SPINE	R	IM+
I-4A-49	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	CALCA	WHOLE	L	IM+
I-4A-190	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	CANIN	WHOLE	L	IM+
I-4A-17	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	CE	BDY+F	-	IMM
I-4A-2	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	CE	WHOLE	-	IMM
I-4A-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	CE	WHOLE	-	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4A, LEVEL I
NUNAINGOK (JcDe-1)

Jan. 1, 1980

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4A-81	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	FIBUL	SHAFT	L	IM+
I-4A-80	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	FIBUL	SHAFT	R	IM+
I-4A-11	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	HUMER	WHOLE	R	ADU
I-4A-4	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	LU	WHOLE	-	IM+
I-4A-19	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	LU 3	BD+AR	-	IMM
I-4A-46	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MANDI	BD&AN	L	IM+
I-4A-75	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MC 4	WHOLE	R	IM+
I-4A-73	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MC 5	WHOLE	R	IM+
I-4A-59	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RADIU	P 2/3	R	IM+
I-4A-33	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB	VT1/2	R	IM+
I-4A-32	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB	VT3/4	L	IM+
I-4A-137	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	ANGLE	L	IM+
I-4A-169	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB13	WHOLE	R	IMM
I-4A-176	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB14	SHAFT	R	IMM
I-4A-41	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIBMD	BODY	L	IM+
I-4A-35	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIBMD	BODY	L	IM+
I-4A-150	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIBMD	FRAGM	?	IM+
I-4A-50	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TALUS	WHOLE	L	IM+
I-4A-62	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	WHOLE	L	IM+
I-4A-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 3/4	L	ADU
I-4A-6	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 3/4	R	ADU
I-4A-7	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 3/4	R	SAD
I-4A-23	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FEMUR	SHAFT	L	IM+
I-4A-57	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	DEPIP	R	IMM
I-4A-12	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	WHOLE	R	ADU
I-4A-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	WHOLE	R	IMM
I-4A-56	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	INNOM	ACETA	L	IM+
I-4A-70	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	INNOM	ACETA	R	IM+
I-4A-25	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	MT 4	WHOLE	R	IMM
I-4A-27	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	PPH 5	WHOLE	R	JUV
I-4A-40	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB 3	WHOLE	R	IM+
I-4A-28	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB 9	BODY	R	IM+
I-4A-29	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB10	WHOLE	R	IMM
I-4A-175	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB15	BD&AN	L	IM+
I-4A-16	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TH 15	WHOLE	-	IMM
I-4A-136	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TIBIA	FRAGM	R	IM+
I-4A-163	OSTEI	GADIFORM	GADIDAE	GADUS	MORRUHA	CERAT	WHOLE	L	IM+
I-4A-164	OSTEI	GADIFORM	GADIDAE	GADUS	MORRUHA	DENTA	FRAGM	L	IM+
I-4A-162	OSTEI	GADIFORM	GADIDAE	GADUS	MORRUHA	DENTA	FRAGM	R	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4B, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4B-65	AVES	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-165	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4B-174	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4B-177	AVES	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4B-176	AVES	?	?	?	?	TIBTR	FRAGM	?	IM+
I-4B-167	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSI	HUMER	BODY	L	IM+
I-4B-41	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSI	HUMER	BODY	L	IM+
I-4B-161	AVES	ANSERIFO	ANATIDAE	SOMATERI	MOLLISSI	HUMER	BODY	R	IM+
I-4B-166	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	TIBTR	BODY	L	IM+
I-4B-102	MAMMA	?	?	?	?	FRAGM	FRAGM	?	?
I-4B-146	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-147	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-182	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-145	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-104	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-171	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-134	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
-4B-135	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-114	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-118	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-157	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-144	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-181	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-143	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-139	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-72	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-149	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-141	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-122	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-142	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-9	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-133	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4B-124	MAMMA	?	?	?	?	FRAGM	FRAGM	?	JUV
I-4B-180	MAMMA	?	?	?	?	FRONT	FRAGM	?	IM+
I-4B-42	MAMMA	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4B-32	MAMMA	?	?	?	?	LNGBN	FRAGM	?	IM+
I-4B-77	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4B-129	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4B-44	MAMMA	?	?	?	?	SKULL	FRAGM	-	IM+
I-4B-164	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4B-112	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4B-110	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4B-27	MAMMA	?	?	?	?	TIBIA	V1/2S	R	IM+
I-4B-88	MAMMA	?	?	?	?	VERTE	FRAGM	-	IM+
I-4B-7	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	METAC	P 1/2	R	IM+
I-4B-6	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	METAT	SHAFT	?	IM+
I-4B-90	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	T 5	BD&SP	-	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4CI, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4CI-48	AVES	?	?	?	?	RADIU	FRAGM	?	IM+
I-4CI-44	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSI	SCAPU	BODY	R	IM+
I-4CI-26	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-24	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-30	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-27	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-25	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-28	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-29	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4CI-55	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4CI-40	MAMMA	?	?	?	?	RIB	STEND	?	IMM
I-4CI-47	MAMMA	?	?	?	?	SKULL	FRAGM	-	JUV
I-4CI-13	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB 9	BODY	L	IM+
I-4CI-41	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB12	V END	R	IM+
I-4CI-42	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB13	V END	R	IM+
I-4CI-43	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB14	V END	R	IM+
I-4CI-12	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	FIBUL	SHAFT	L	IM+
-4CI-31	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB	ANGLE	L	IM+
I-4CI-4	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 1	WHOLE	L	IM+
I-4CI-22	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	STERN	WHOLE	-	IMM
I-4CI-10	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T 4	L 1/2	-	JUV
I-4CI-36	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	PATEL	FRAGM	?	IM+
I-4CI-54	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	BODY	?	IM+
I-4CI-46	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	FRAGM	?	IM+
I-4CI-59	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SCAPU	M 1/2	L	IM+
I-4CI-58	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TAR 3	L 1/2	R	IM+
I-4CI-33	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	THORA	EPIPH	-	IMM
I-4CI-53	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	DP 2	PEPIP	L	JUV
I-4CI-2	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	FEMUR	BODY	R	IM+
I-4CI-21	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MTT 2	DEPIP	L	JUV
I-4CI-52	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MTT 4	DEPIP	L	JUV
I-4CI-51	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MTT 4	WHOLE	L	JUV
I-4CI-8	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MTT 5	WHOLE	R	IMM
I-4CI-57	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PP 1	PEPIP	L	JUV
I-4CI-56	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PP 1	WHOLE	L	JUV
I-4CI-9	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPF 2	WHOLE	R	IM+
I-4CI-19	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPH 5	PEPIP	R	JUV
I-4CI-17	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPH 5	WHOLE	L	JUV
I-4CI-18	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPH 5	WHOLE	R	JUV
I-4CI-7	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB13	WHOLE	L	IMM
I-4CI-45	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB15	BD&AN	L	IM+
I-4CI-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	T 10	BD&AR	-	IMM
I-4CI-16	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	T 14	EPIPH	-	JUV
I-4CI-32	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	SHAFT	R	IM+
I-4CI-34	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	C 3	TRFOR	-	IMM
I-4CI-1	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	FEMUR	WHOLE	L	ADU
I-4CI-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	HUMER	BODY	R	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4CI, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4CI-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	L 4	BD&AR	-	IMM
I-4CI-20	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MP 3	WHOLE	L	JUV
I-4CI-49	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MTT 3	WHOLE	R	JUV
I-4CI-50	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MTT 4	WHOLE	R	JUV
I-4CI-35	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	PATEL	WHOLE	L	IM+
I-4CI-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 3	WHOLE	R	IMM
I-4CI-6	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 8	D 1/4	R	IMM
I-4CI-39	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	V END	R	IM+
I-4CI-38	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	T 6	ANTFA	-	IM+
I-4CI-37	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	CALCA	WHOLE	R	IMM
I-4CI-23	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FIBUL	SHAFT	L	IMM
I-4CI-11	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TIBIA	SHAFT	-	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4D, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4D-70	AVES	CHARADRI	LARIDAE	LARUS	MARINUS	RADIU	BODY	L	IM+
I-4D-83	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-85	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-60	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-61	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-62	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-64	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-65	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-75	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-76	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-78	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-82	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-84	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4D-63	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4D-87	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4D-86	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4D-58	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
-4D-74	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4D-57	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	MANDI	FRAGM	L	IM+
I-4D-56	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	MANDI	RAMUS	L	IM+
I-4D-55	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	MANDI	RMFOR	L	IM+
I-4D-51	MAMMA	CARNIVOR	CANIDAE	CANIS	?	MDRIB	BD&AN	R	IM+
I-4D-50	MAMMA	CARNIVOR	CANIDAE	CANIS	?	MDRIB	BD&AN	R	IM+
I-4D-59	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB 3	BODY	L	IM+
I-4D-53	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB11	BD&AN	R	IM+
I-4D-26	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	ATLAS	V 1/2	-	IM+
I-4D-25	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	ATLAS	WHOLE	-	IM+
I-4D-66	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	BACUL	BODY	-	ADU
I-4D-16	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	BULLA	FRAGM	L	IM+
I-4D-34	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 4	WHOLE	-	IM+
I-4D-40	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	LUMBA	EPIPH	-	IMM
I-4D-6	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RADIU	WHOLE	R	ADU
I-4D-10	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	SCAPU	V 1/2	R	IM+
I-4D-44	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T	EPIPH	-	IMM
I-4D-41	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T	EPIPH	-	IMM
I-4D-39	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T 15	PEPIP	-	IMM
I-4D-21	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	TIBIA	SHAFT	R	IM+
I-4D-4	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	ULNA	WHOLE	R	ADU
I-4D-54	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	PEPIP	R	IMM
I-4D-31	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	LUMBA	BD&AR	-	IM+
I-4D-32	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	LUMBA	BD&AR	-	IM+
I-4D-89	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	METAP	BODY	?	IM+
-4D-88	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MTT 3	WHOLE	R	IMM
I-4D-72	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB 1	ANGLE	L	IM+
I-4D-33	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SACRU	1stSG	-	IMM
I-4D-36	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	T	BD&AR	-	IMM
I-4D-81	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TB-FB	P END	R	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4D, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4D-43	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	VERTE	EPIPH	-	IMM
I-4D-42	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	VERTE	EPIPH	-	IMM
I-4D-8	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	FEMUR	WHOLE	R	IMM
I-4D-67	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	FIBUL	BODY	L	IM+
I-4D-28	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	L 3	WHOLE	-	IM+
I-4D-17	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MANDI	WHOLE	R	IM+
I-4D-79	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PATEL	WHOLE	R	IM+
I-4D-23	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPF 1	WHOLE	R	IMM
I-4D-24	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PPF 2	WHOLE	R	IM+
I-4D-45	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB 6	BD&AN	L	IM+
I-4D-48	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB11	BODY	L	IM+
I-4D-52	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB13	BD&AN	R	IM+
I-4D-13	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TEMPO	WHOLE	R	IM+
I-4D-71	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TEMPO	ZYGPR	R	IM+
I-4D-73	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ANRIB	VFACE	L	IM+
I-4D-77	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	BULLA	FRAGM	R	IM+
I-4D-38	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	C 7	BD&AR	-	IMM
I-4D-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	INNOM	ACETA	L	IM+
I-4D-2	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	INNOM	WHOLE	L	OLD
I-4D-27	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	L 4	WHOLE	-	IM+
I-4D-22	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	MTT 4	WHOLE	R	JUV
I-4D-46	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 6	BD&AN	L	IMM
I-4D-47	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	BD&AN	L	IM+
I-4D-49	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BD&AN	L	IMM
I-4D-68	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB14	BD&AN	L	IM+
I-4D-9	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	SCAPU	M 1/2	L	IM+
I-4D-29	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	T 15	WHOLE	-	IM+
I-4D-35	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	T 5	WHOLE	-	IM+
I-4D-80	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TAR 4	WHOLE	R	IM+
I-4D-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	FRAGM	R	IM+
I-4D-12	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	FRAGM	R	IM+
I-4D-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	FRAGM	R	IM+
I-4D-11	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	WHOLE	R	IM+
I-4D-20	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TIBIA	SHAFT	R	IM+
I-4D-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	WHOLE	L	ADU
I-4D-37	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	C 5	BD&AR	-	IMM
I-4D-30	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	C 6	WHOLE	-	IM+
I-4D-69	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FIBUL	BODY	R	IM+
I-4D-1	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	INNOM	P 3/4	R	IM+
I-4D-7	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RADIU	WHOLE	L	SA
I-4D-18	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TB-FB	P END	R	ADU
I-4D-19	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TIBIA	SHAFT	L	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4DI, LEVEL I
NUNAINGOK (JcDe-1)

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CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4DI-13	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4DI-12	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4DI-25	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4DI-18	MAMMA	?	?	?	?	PARIE	FRAGM	?	IMM
I-4DI-23	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4DI-24	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4DI-19	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4DI-9	MAMMA	CARNIVOR	CANIDAE	ALOPEX	LEGAPUS	HUMER	WHOLE	R	ADU
I-4DI-8	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	P RIB	BODY	L	IM+
I-4DI-11	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB	STEND	L	IM+
I-4DI-22	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MANDI	FRAGM	R	IM+
I-4DI-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P	WHOLE	?	IM+
I-4DI-16	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	P	WHOLE	?	IM+
I-4DI-17	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	PARIE	FRAGM	?	IM+
I-4DI-10	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	ULNA	BODY	L	IM+
I-4DI-21	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	VERTE	1/2BD	-	IMM
I-4DI-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RADIU	WHOLE	R	IMM
I-4DI-7	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB11	WHOLE	R	IM+
I-4DI-4	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 3	WHOLE	R	ADU
I-4DI-1	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 8	WHOLE	L	ADU
I-4DI-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB11	WHOLE	R	ADU
I-4DI-6	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB13	WHOLE	R	IM+
I-4DI-20	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TEMPO	ZYGPR	R	IM+
I-4DI-2	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	WHOLE	L	IMM
I-4DI-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB11	BODY	R	IM+

Appendix B: List of Specimens Exhibiting Cutmarks

Catalogue Number	Taxon	Element	Portion	Side	Age
I-4A-32	Phoca hispida	Rib	Body	L	IMM
I-4A-33	Phoca hispida	Rib	Body	R	IM+
I-4A-80	Phoca hispida	Fibula	Shaft	R	IM+
I-4A-81	Phoca hispida	Fibula	Shaft	L	IM+
I-4A-112	Aves sp.	Humerus	Shaft	R	IM+
I-4A-113	Aves sp.	Tibiatar.	Shaft	L	IM+
I-4A-136	Phoca vitulina	Tibia	Shaft	R	IM+
I-4A-137	Phoca hispida	Rib 10	Angle	L	IM+
I-4B-163	Phoca sp.	Fibula	Body	R	IM+
I-4B-166	Larus marinus	Tibiatar.	Body	L	IM+
I-4C-6	Phoca hispida	Ulna	P 9/10	L	IM+
I-4C-9	Rangifer taran.	Rib	Fragm	?	IM+
I-4D-5	Phoca hispida	Ulna	Whole	L	ADU
I-4D-7	Phoca vitulina	Radius	Whole	L	SAD
I-4D-9	Phoca hispida	Scapula	M 1/2	L	IM+
I-4D-64	Mammal sp.	Fragm	Fragm	?	IM+
I-4d-85	Mammal sp.	Fragm	Fragm	?	IM+

Appendix C: Osteometrics

For the purpose of conducting an exercise in osteometric analysis, seven ulnae from various *Phoca hispidae* were chosen from the Operation-4 material and measurements were taken at two points. The first of these was the greatest breadth across the coronoid process (BPc) and the second was the smallest depth of the olecranon (SDO) (Von den Driesch 1976: 79-81). The same two measurements were then taken using four specimens from the Faual Archaeo-Osteology lab at the University of Toronto. Each bone was actually measured three times for each measurement, and the average of the three results used for statistical analysis. The results are as follows:

Figure 15: Measurements taken Of Archaeological Ulnae

Cataloguque No.	Age	Side	BPc	SDO
I-4C-3	ADU	R	18.85mm	30.65mm
I-4C-4	ADU	R	17.76mm	32.53mm
I-4D-5	ADU	L	20.37mm	31.58mm
I-4A-5	ADU	L	13.13mm	22.47mm
I-4A-6	SAD	R	14.15mm	22.35mm
I-4A-7	ADU	R	13.40mm	22.65mm
I-4B-4	ADU	R	13.10mm	24.63mm
RANGE:			7.27mm	10.18mm
MEDIAN:			14.15mm	24.63mm
MEAN:			15.82mm	26.69mm

Figure 16: Measurements Taken of Laboratory Ulnae

FA No.	Sex	Age	Side	BPc	SDO
303-6	M	IMM	R	15.00mm	25.95mm
303-6	M	IMM	L	14.70mm	26.00mm
303-9	F	IMM	R	15.67mm	25.52mm
303-9	F	IMM	L	15.38mm	25.10mm
Range:				.68mm	.90mm
Median:				15.19mm	25.74mm
Mean:				20.25mm	25.64mm

It would be folly to attempt to make any comparisons specimens, given the fact that the former are all adults or sub-adults and the latter are immature. However, some interesting conclusions can still be drawn. The archaeological material seems to cluster into two groups. The first (which shall be called group A) has BPc measures between 17.76mm and 20.37mm and the second has BPc measures from 13.10mm to 14.15mm (which shall be called group B). The range within group A is 2.61mm, and the range within group B is 1.05. Both of these numbers are significantly lower than the range between groups - detirmined as the difference between the lowest measure in group A and the highest measure from group B - which is 3.61. This becomes even more clear when one examines the SDO measures. In this case, the range within group A is 1.88mm while the range within group B is 2.28mm. The range between the two groups, meanwhile, is

6.02mm. Thus it seems safe to say that the archaeological data clusters into two distinct groups.

But what does this mean? The first answer which springs to mind is sexual dimorphism. Indeed, Banfield (1974: 373) points out that the male ringed seal is slightly larger than the female - 11 cm on average. This seems to fit the data well. That is, the A group is slightly larger than the B group. The minimal difference between the measurements of the male and female lab specimens can easily be explained by their young age. Thus it can be concluded, based on osteometric data, that elements I-4C-3, I-4C-4, and I-4D-5 represent males while I-4B-4, I-4A-5, I-4A-6 and I-4A-7 are from females.

Appendix D: List of Specimens Showing Similar butchering Patterns

The following is a list of Phoca ulnae which show similar and distinctive breaks, suggesting a consistent pattern of butchering seals which included snapping off the front flippers (see page 46).

Catalogue No.	Taxon	Side	Age	Portion
I-4A-5	*Phoca hispida*	L	ADU	P 3/4
I-4A-6	*Phoca hispida*	R	ADU	P 3/4
I-4A-7	*Phoca hispida*	R	SAD	P 3/4
I-4B-2	*Phoca groenlandica*	L	ADU	P 3/4
I-4B-3	*Phoca groenlandica*	R	SAD	P 3/4
I-4B-4	*Phoca hispida*	R	ADU	P 3/4
I-4B-5	*Phoca hispida*	R	ADU	P 3/4
I-4C-5	*Phoca vitulina*	R	ADU	P 3/4

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4B, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4B-138	MAMMA	CARNIVOR	CANIDAE	ALOPEX	LEGAPUS	ULNA	P 1/4	L	IM+
I-4B-66	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB 4	BD&AN	R	IM+
I-4B-40	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB 6	ANGLE	R	IM+
I-4B-100	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	RIB11	BD&AN	R	IM+
I-4B-17	MAMMA	PINNIPED	PHOCIDAE	?	?	FRAGM	FRAGM	?	IM+
I-4B-154	MAMMA	PINNIPED	PHOCIDAE	?	?	LNGBN	FRAGM	?	IM+
I-4B-35	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	FEMUR	WHOLE	L	ADU
I-4B-82	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	L 2	WHOLE	-	IMM
I-4B-128	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	L 4	1/2AR	-	IM+
I-4B-84	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	LUMBA	BODY	-	IM+
I-4B-8	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 2	BODY	L	IM+
I-4B-53	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 2	V 1/2	L	IM+
I-4B-130	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 4	V END	L	IM+
I-4B-52	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 6	AN&FA	R	IM+
I-4B-63	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB 9	ANGLE	R	IM+
I-4B-18	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB11	STEND	L	IM+
I-4B-33	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB12	ANGLE	L	IM+
-4B-67	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB12	ANGLE	R	IM+
I-4B-43	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB13	ST1/4	L	IM+
I-4B-79	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	SCAPU	L 1/2	L	IM+
I-4B-113	MAMMA	PINNIPED	PHOCIDAE	ERINGATH	BARBATUS	T 5	SBEPI	-	IMM
I-4B-116	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	C	SBEPI	-	IMM
I-4B-117	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	CANIN	WHOLE	?	IM+
I-4B-38	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FEMUR	BODY	L	IMM
I-4B-163	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	BD&AN	R	IM+
I-4B-170	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	BODY	?	JUV
I-4B-178	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FIBUL	FRAGM	?	JUV
I-4B-151	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FRONT	FRAGM	L	IM+
I-4B-96	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FRONT	ST1/2	-	IMM
I-4B-136	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	BODY	L	IMM
I-4B-140	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	FRAGM	?	IM+
I-4B-109	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	HUMER	HEAD	?	IM+
I-4B-26	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MANDI	BD&AN	R	IM+
I-4B-98	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MANDI	BD&GN	R	IM+
I-4B-94	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MAXIL	WHOLE	R	IMM
I-4B-93	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	MAXIL	WHOLE	R	IMM
I-4B-175	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	PUBIS	FRAGM	R	IM+
I-4B-179	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RADIU	FRAGM	L	JUV
I-4B-172	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	STEND	?	JUV
I-4B-80	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	SCAPU	FRAGM	R	IM+
I-4B-89	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	T	BD&FA	-	IM+
I-4B-150	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TB-FB	P END	R	ADU
I-4B-160	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	BODY	L	JUV
I-4B-173	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	BODY	L	JUV
I-4B-153	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	PEPIP	R	IMM
I-4B-11	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	SHAFT	L	IM+
I-4B-20	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	SHAFT	L	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4B, LEVEL I
NUNAINGOK (JcDe-1)

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4B-183	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	SHAFT	R	IM+
I-4B-152	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	TIBIA	SHAFT	R	IM+
I-4B-159	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	ULNA	FACET	L	IM+
I-4B-158	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	ULNA	P 1/2	L	JUV
I-4B-87	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	VERTE	FRAGM	-	IM+
I-4B-132	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	BULLA	AN1/2	L	IM+
I-4B-148	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	C	SFACT	-	IM+
I-4B-95	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	CANIN	WHOLE	?	IM+
I-4B-37	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	FEMUR	BODY	R	IMM
I-4B-92	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	FR&NS	WHOLE	-	IMM
I-4B-10	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	HUMER	EPIPH	L	IMM
I-4B-16	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	L 2	VL1/2	-	IM+
I-4B-156	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	LUMBA	1/2BD	-	IMM
I-4B-81	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MANDI	GONIA	R	IM+
I-4B-91	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MANDI	WHOLE	L	IM+
I-4B-137	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MAXIL	FRAGM	R	IMM
I-4B-28	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	MPH 1	WHOLE	L	IM+
I-4B-123	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PALAT	HPLAT	L	IM+
I-4B-131	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PALAT	V PLA	L	IM+
I-4B-29	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PH 1	P9/10	L	IM+
I-4B-168	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	PREMX	WHOLE	R	IM+
I-4B-74	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB 4	ANGLE	R	IM+
I-4B-155	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB 5	BODY	R	IM+
I-4B-58	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB 9	ANGLE	L	IM+
I-4B-64	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB10	BD&AN	R	IM+
I-4B-60	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB11	BD&AN	L	IM+
I-4B-50	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB11	WHOLE	R	IM+
I-4B-162	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	RIB14	BD&AN	R	IM+
I-4B-121	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TCENT	WHOLE	L	IMM
I-4B-111	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TEMPO	MAETU	R	IM+
I-4B-12	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	SHAFT	L	IM+
I-4B-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	SHAFT	R	IM+
I-4B-19	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	SHAFT	R	IM+
I-4B-13	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	SHAFT	R	IM+
I-4B-30	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	ULNA	BODY	L	IM+
I-4B-2	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	ULNA	P 3/4	L	ADU
I-4B-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	ULNA	P 3/4	R	SA
I-4B-1	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	ULNA	WHOLE	L	IMM
I-4B-45	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	DEPIP	L 1/2	L	JUV
I-4B-36	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	FEMUR	BODY	L	IMM
I-4B-34	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	FIBUL	SHAFT	R	IM+
I-4B-126	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	L.INC	WHOLE	L	IM+
I-4B-127	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	M.INC	WHOLE	L	IM+
I-4B-99	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	OCCIP	FORAM	-	IM+
I-4B-125	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	PREMX	WHOLE	L	IMM
I-4B-76	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 5	ANGLE	R	IM+
I-4B-68	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 7	BD&AN	L	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4B, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4B-71	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 8	ANGLE	R	IM+
I-4B-70	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 9	ANGLE	R	IM+
I-4B-61	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 9	BD&AN	R	IM+
I-4B-47	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	BD&AN	L	IM+
I-4B-51	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	WHOLE	L	IM+
I-4B-55	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB11	ANGLE	L	IM+
I-4B-57	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB11	ANGLE	R	IM+
I-4B-48	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BD&AN	L	IM+
I-4B-56	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BD&AN	L	IM+
I-4B-49	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BD&AN	R	IM+
I-4B-69	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BD&AN	R	IM+
I-4B-62	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB12	BODY	L	IM+
I-4B-73	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB13	ANGLE	R	IM+
I-4B-59	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB13	ANGLE	R	IM+
I-4B-46	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB13	BD&AN	L	IM+
I-4B-78	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB14	BD&AN	L	IM+
I-4B-75	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB15	ANGLE	R	IM+
-4B-83	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	T 1	WHOLE	-	IMM
I-4B-54	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TB-FB	P END	R	IM+
I-4B-23	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TIBIA	SHAFT	L	IM+
I-4B-21	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TIBIA	SHAFT	L	IM+
I-4B-22	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TIBIA	SHAFT	L	IM+
I-4B-24	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	TIBIA	SHAFT	L	IM+
I-4B-105	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 1/2	L	IM+
I-4B-4	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 3/4	R	ADU
I-4B-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 3/4	R	ADU
I-4B-101	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	BULLA	V 1/2	L	IM+
I-4B-106	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	BULLA	WHOLE	R	IM+
I-4B-85	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	C 4	WHOLE	-	IMM
I-4B-86	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	C 5	WHOLE	-	IMM
I-4B-115	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	CANIN	WHOLE	?	IM+
I-4B-107	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FEMUR	BODY	R	IMM
I-4B-103	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	BODY	L	IM+
I-4B-39	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	BODY	L	IMM
I-4B-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	BODY	R	IM+
I-4B-108	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	HUMER	DEPIP	R	IMM
I-4B-31	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	ISCHI	WHOLE	R	IM+
I-4B-169	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB10	ANGLE	L	IM+
I-4B-120	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TALUS	SFACE	R	JUV
I-4B-119	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TAR 4	WHOLE	R	IM+
I-4B-97	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TEMPO	WHOLE	R	IM+
I-4B-25	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	TIBIA	SHAFT	L	IM+

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4C, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4C-55	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSI	RADIU	BODY	L	IM+
I-4C-54	AVES	ANSERIFO	ANATIDAE	SOMATERA	MOLLISSI	ULNA	BODY	R	IM+
I-4C-45	MAMMA	?	?	?	?	FRAGM	FRAGM	-	IM+
I-4C-40	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4C-37	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4C-50	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4C-53	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4C-39	MAMMA	?	?	?	?	FRAGM	FRAGM	?	IM+
I-4C-52	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4C-51	MAMMA	?	?	?	?	RIB	FRAGM	?	IM+
I-4C-26	MAMMA	?	?	?	?	RIB	FRAGM	?	JUV
I-4C-60	MAMMA	?	?	?	?	RIB	FRAGM	?	JUV
I-4C-30	MAMMA	?	?	?	?	SKULL	FRAGM	-	IM+
I-4C-59	MAMMA	?	?	?	?	SKULL	FRAGM	?	IM+
I-4C-9	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	RIB	BODY	?	IM+
I-4C-48	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	RIB	BODY	?	IM+
I-4C-31	MAMMA	ARTIODAC	CERVIDAE	RANGIFER	TCARIBOU	RIB	BODY	R	IM+
-4C-35	MAMMA	CARNIVOR	URSIDAE	URSUS	AMERICAN	ANTRB	BODY	R	IM+
I-4C-41	MAMMA	CETACEA	?	?	?	HUMER	D 1/2	L	IM+
I-4C-46	MAMMA	PINNIPED	PHOCIDAE	?	?	FRAGM	FRAGM	?	IM+
I-4C-61	MAMMA	PINNIPED	PHOCIDAE	?	?	FRAGM	FRAGM	?	IMM
I-4C-58	MAMMA	PINNIPED	PHOCIDAE	?	?	LNGBN	FRAGM	?	IM+
I-4C-42	MAMMA	PINNIPED	PHOCIDAE	?	?	METAP	WHOLE	?	IM+
I-4C-2	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 1	WHOLE	-	IM+
I-4C-1	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 1	WHOLE	-	IM+
I-4C-7	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 2	WHOLE	-	IM+
I-4C-12	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 3	BD&AR	-	IM+
I-4C-11	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	C 4	WHOLE	-	IM+
I-4C-13	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	L 1	WHOLE	-	IMM
I-4C-18	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB10	WHOLE	R	IM+
I-4C-17	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	RIB11	WHOLE	L	IM+
I-4C-24	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T	EPIPH	-	IMM
I-4C-38	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T	EPIPH	-	JUV
I-4C-22	MAMMA	PINNIPED	PHOCIDAE	ERIGNATH	BARBATUS	T10	PEPIP	-	IMM
I-4C-16	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	FEMUR	HEAD	?	IMM
I-4C-28	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	L 1/2	L	IM+
I-4C-29	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	M 1/2	L	IM+
I-4C-33	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	RIB	M 1/2	L	IM+
I-4C-36	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	T	ARCH	-	IM+
I-4C-56	MAMMA	PINNIPED	PHOCIDAE	PHOCA	?	T	BODY	-	JUV
I-4C-57	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	BULLA	ANTEN	R	IM+
I-4C-32	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	HP 1	WHOLE	R	IM+
I-4C-49	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	LUMBA	LPROC	-	IM+
I-4C-15	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	BODY	R	IM+
I-4C-27	MAMMA	PINNIPED	PHOCIDAE	PHOCA	GROENLAN	TIBIA	BODY	R	JUV
I-4C-25	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ILIUM	AC&BL	R	IMM
I-4C-23	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ISCHI	AC&RM	R	IMM

APPENDIX A: FAUNAL FINDINGS FROM OPERATION 4, UNIT 4C, LEVEL I
NUNAINGOK (JcDe-1)

Apr. 20, 1990

CATALOGU	CLASS	ORDER	FAMILY	GENUS	SPECIES	ELEME	PORTI	S	AGE
I-4C-44	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	PPH 1	WHOLE	R	JUV
I-4C-19	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB 7	WHLE	L	IM+
I-4C-20	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB10	BD&AN	L	IM+
I-4C-62	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	RIB11	V 3/4	L	IM+
I-4C-8	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	SCAPU	P 1/2	L	IM+
I-4C-6	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 4/5	L	ADU
I-4C-3	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 4/5	R	ADU
I-4C-4	MAMMA	PINNIPED	PHOCIDAE	PHOCA	HISPIDA	ULNA	P 4/5	R	ADU
I-4C-21	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FEMUR	BODY	R	IMM
I-4C-43	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	FIBUL	BODY	R	IM+
I-4C-34	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	L 2	1/2AR	-	IM+
I-4C-14	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	L 2	BD&AR	-	IMM
I-4C-47	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	RIB13	BODY	R	IM+
I-4C-10	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	ULNA	BODY	R	IM+
I-4C-5	MAMMA	PINNIPED	PHOCIDAE	PHOCA	VITULINA	ULNA	P 3/4	R	IM+