Prehistoric exploitation of white whales (*Delphinapterus leucas*) and narwhals (*Monodon monoceros*) in the eastern Canadian Arctic

JAMES M. SAVELLE

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Zooarchaeological data relating to prehistoric Paleoeskimo (ca. 4000–1000 B.P.) and Neoeskimo (ca. 1000 B.P. to historic times) use of white whales (*Delphinapterus leucos*) and narwhals (*Monodon monoceros*) in the eastern Canadian Arctic are reviewed. Remains of these two species are extremely rare in Paleoeskimo sites, probably because of the lack of a sophisticated whale-hunting technology.

While white whale and narwhal remains are more common in Neoeskimo sites, they nevertheless make up relatively insignificant portions of the total faunal assemblages. Since Neoeskimos possessed a sophisticated whaling technology, the problem becomes one of explaining the general paucity of such remains. Four potential factors are addressed: a) taphonomy, b) processing and transport, c) lack of appropriate archaeological data and d) lack of these two species in the diet of Inuit during prehistoric and early historic times.

Key words:
White whale, beluga, *Delphinapterus leucas*, narwhal, *Monodon monoceros*, hunting, archaeology, Paleoeskimo, Thule Eskimo.

James M. Savelle, Department of Anthropology, McGill University, 855 Sherbrooke St. West, Montreal, P.Q. H3A 2T7, Canada.

Introduction

The hunting of white whales (*Delphinapterus leucas*) and narwhals (*Monodon monoceros*) is an important activity in many Inuit communities in the eastern Canadian Arctic, and a growing body of literature relates to this hunting in the context of whale population assessment and hunt management (*e.g.* Reeves & Mitchell 1987a, 1987b, Richard 1991a, 1991b, Richard *et al.* 1990, Richard & Pike 1993). Furthermore, ethnographic sources (*e.g.* Boas 1888, Mathiassen 1928, McGhee 1974) and major land-use and occupancy projects, based largely on oral history, document at least some use of white whales and narwhals by early historic Inuit societies in many areas of the Canadian Arctic (see *e.g.* Freeman 1976, Brice-Bennett 1977, Riewe 1992).

Small-whale hunting by prehistoric inhabitants of the eastern Canadian Arctic, however, has been virtually ignored. Instead, research into prehistoric whaling has focused almost exclusively on the nature and extent of the use of large baleen whales, primarily the bowhead (*Balaena mysticetus*; see *e.g.* reviews by McCartney 1984, Maxwell 1985, Savelle & McCartney 1990, McCartney & Savelle 1993). As a result, summaries of the prehistory of this region note that small cetaceans were certainly a part of the diet of coastal groups during much of the period of prehistoric occupation (*e.g.* Maxwell 1984, 1985, McGhee 1978), but do so primarily on the basis of circumstantial evidence, scattered references to occasional white whale or narwhal bone elements from archaeological sites, or ethnographic analogy.

While acknowledging that the lack of research on the hunting of white whales and narwhals in this context often results from the general paucity of identifiable small whale remains in prehistoric sites, we nevertheless lack any summary or overview of (1) the archaeological evidence for the use of these species (however limited that evidence may be), (2) how such use may have influenced other aspects of the societies or, alternatively, (3) why such abundant and potentially useful resources would have been, for the most part, ignored. Accordingly, this paper attempts to provide a synthesis of archaeological data relating to white whale and narwhal use in the

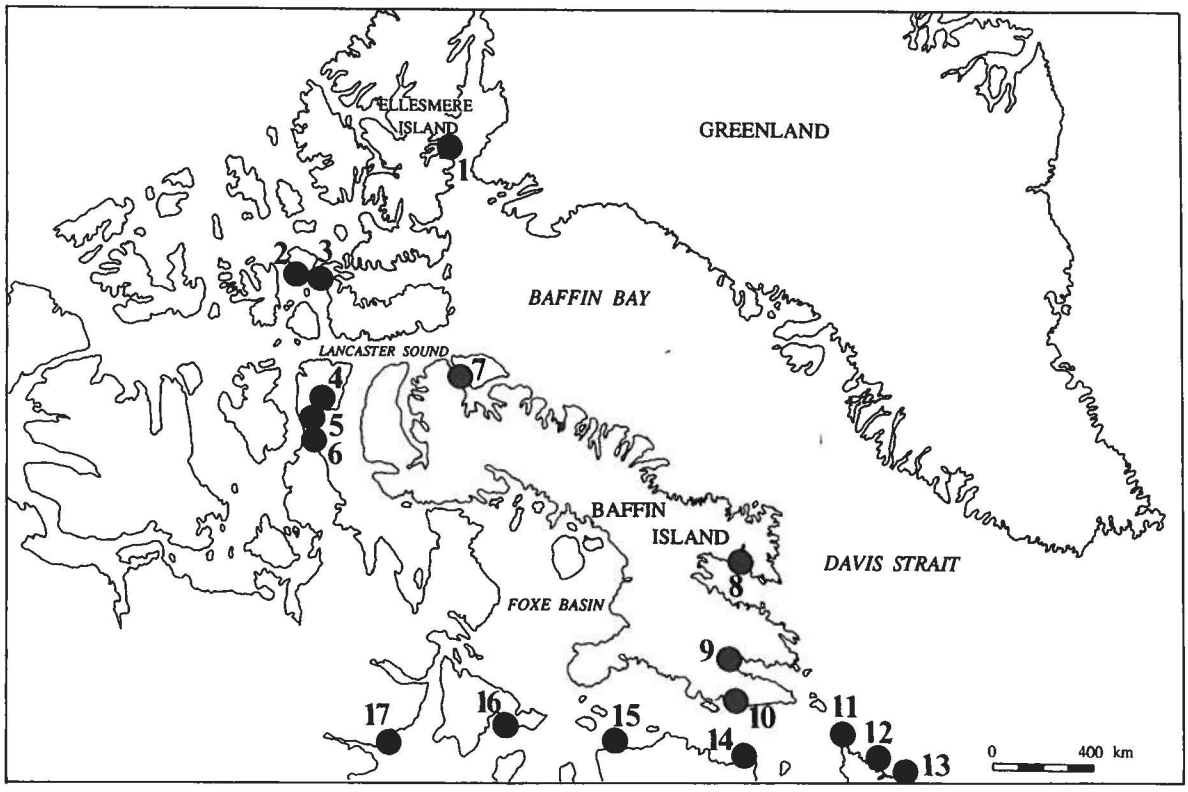

Fig. 1. Locations of archaeological sites or site complexes listed in Tables 1–12.
1. Ellesmere Island. 2. Port Refuge. 3. Porden Point. 4. Learmonth. 5. Cape Garry. 6. Hazard Inlet. 7. Navy Board Inlet. 8. Cumberland Sound. 9. Peale Point. 10. Talaguak. 11. Akulialuk. 12. Avayalik. 13. Koliktalik. 14. Diana Bay. 15. Tyara. 16. T-1 (Native Point). 17. Silumiut.

eastern Canadian Arctic. These data are then interpreted in the context of the historic and modern harvesting of these two species by Inuit.

Archaeological sites in the eastern Canadian Arctic are emphasized over those in Greenland because data from the Canadian sites are more amenable to geographical and temporal comparisons. However, when appropriate, data from Greenland are also incorporated. Furthermore, this study includes only those sites a) which lie within the historic, and by analogy prehistoric, ranges of white whales and narwhals and b) for which quantifiable faunal data are available. These sites are indicated in Fig. 1.

Archaeological evidence

Two major cultural complexes are recognized in the eastern Canadian Arctic and Greenland: Paleoeskimo and Neoeskimo. Both of these complexes are described in summary fashion in Maxwell (1985), Dumond (1987), and various papers in Damas (1984).

Paleoeskimo

Paleoeskimo incorporates the Independence I (ca. 4000–3700 B.P.), PreDorset (ca. 3700–2800 B.P.), Sarqaq (ca. 4000–2800 B.P.), Independence II (ca. 2000–1500 B.P.) and Dorset (ca. 2800–1000 B.P.) cultures. It originated to the west, in Alaska or possibly northeastern Asia. Coastal sites relating to this cultural complex occur throughout the Canadian High Arctic, along Hudson Bay and Hudson Strait, and in Labrador and Greenland. Although no whaling gear comparable in sophistication to that of Neoeskimo cultures (see below) has been identified, all the cultures listed above apparently possessed efficient seamammal harpoons, and Dorset, at least, apparently possessed some form of kayak (Maxwell 1985:137). Furthermore, it has been suggested that at least one type of large harpoon head (so far found only at an Early Dorset site in the Igloolik area) may have been used for hunting white whales (Maxwell 1985:115).

Unfortunately, we have relatively little information on faunal material from Paleoeskimo sites. While much of this lack of information is due to the generally poor

organic preservation at many of the sites, it must also be admitted that much of the material that has been recovered has either not been identified or has not been described in detail in published work. Tables 1–6 provide summaries of the faunal material from representative coastal Paleoeskimo sites in the eastern Canadian Arctic. Although the level of identification and quantification is not always consistent, the number of identified specimens per taxon (NISP) can be used for comparisons in a rather gross fashion, as can the minimum number of individual animals per taxon (MNI).

Not unexpectedly, sea mammal remains predominate, with seals (and where differentiated, ringed seals; *Phoca hispida*) being by far the most common, followed in most areas by walruses (*Odobenus rosmarus*), and locally by caribou (*Rangifer tarandus*), foxes (*Alopex lagopus*) or birds. White whales and narwhals, on the other hand, are extremely rare. Bones identifiable to either of these two species, or indeterminate "small whale" species, have been reported at only three sites: Nunguvik in Navy Board Inlet, Tyara in northern Quebec and Avayalik-1 in northern Labrador, with NISP percentages ranging from 0.3% to 4.2%. Maxwell (1985:84) also referred to white whale remains from the Pre-Dorset Arnapik (northern Hudson Bay) and Port Refuge (Grinnell Peninsula, Devon Island) sites, which he interpreted as evidence of the hunting of small whales. However these remains consisted of only one vertebral disc and a narwhal tusk fragment, respectively.

In western Greenland preservation of faunal materials at Paleoeskimo sites is generally poor. Fitzhugh's (1984) summary of the archaeological data from Paleoeskimo sites in this region makes no reference to the hunting of small whales.

Neoeskimo

Neoeskimo includes the prehistoric Thule and the early historic and modern Inuit of the eastern Canadian Arctic and Greenland. For the purposes of this paper only the prehistoric Thule Eskimo culture will be considered.

Thule culture was originally defined and described by Mathiassen (1927) who, on the basis of structural whale bone in Thule dwellings, considered the hunting of bowhead whales a hallmark of the culture. Since Mathiassen's pioneering study, the initial development of Thule culture in Alaska prior to 1000 B.P., the migration of Thule Eskimos from Alaska across northern Canada into Greenland and the subsequent decline of the human population and abandonment of the High Arctic approximately 400–600 B.P., have all been related directly to the availability of bowhead whales (see *e.g.* McGhee 1969/70, McCartney 1977, and summaries in Maxwell 1985, Savelle & McCartney 1990). While some scholars, most notably Freeman (1979), have questioned the nature and extent of bowhead whaling by Thule Eskimos, there can be little doubt that bowheads played an extremely important role in the Thule diet, and consequently in their settlement systems, social organization and ideology (see *e.g.* McCartney 1980, Savelle & McCartney 1988, 1990, McCartney & Savelle 1993).

One component of Thule material culture directly related to bowhead whaling was the sophisticated whaling-gear complex. Items associated with this complex included specialized whaling harpoons and whaling lances, inflatable seal-skin floats, and kayaks and umiaks (*cf.* Maxwell 1985). Because Thule possessed a sophisticated whaling technology suitable for capturing bowheads, it has often been assumed that smaller cetaceans (primarily white whales and narwhals) were also hunted (or otherwise acquired) on a regular basis (Mitchell & Reeves 1981: 667 citing Kumlien 1879 and Schledermann 1975, Maxwell 1985: 263, Breton & Smith 1990:7). Although no specialized whaling equipment designed specifically for white whales or narwhals has been recognized, the assumption has been that the whaling gear used for bowheads would also have been used for these species, as would have the smaller "generic" harpoons, lances and related material (Maxwell 1985: 265–273).

Considerably more faunal material is available from Thule sites than from earlier Paleoeskimo sites, due in large part to the better preservation of organic material. Tables 7–12 provide summaries of faunal materials from representative coastal Thule sites in the eastern Canadian Arctic. As for the Paleoeskimo sites, the level of identification and quantification is not always consistent, but again the NISP and the MNI can be used for comparisons in a rather gross fashion. These tables do not include bowhead remains, since most such remains are incorporated within structures, making it less straightforward to judge these animals' role in the diet. However, the omission of bowhead remains is not a major concern, since the purpose of the comparisons presented here is to establish the relative importance of smaller cetaceans, compared with non-cetacean species, in the diet.

It is immediately apparent from the tables that, although white whale and narwhal remains are considerably more common in Neoeskimo sites than they are in Paleoeskimo sites, they still form very minor components of the assemblages relative to other species, whether based on NISP or MNI percentages. As previously noted by Savelle & McCartney (1988), ringed seal remains dominate almost all faunal assemblages from coastal Thule sites, with caribou, fox and bearded seal (*Erignathus barbatus*) remains often constituting secondary, but important, components (as discussed previously, this does not include bowhead whale elements). Thus, on the basis of recovered faunal material only, it could be suggested that white whales and narwhals contributed little to the diet of Thule Eskimos.

While comparative data from Greenland are not presented, the situation there is generally similar to that in the eastern Canadian Arctic. Mathiassen (1934:179), in commenting on the subsistence of, for example, prehis-

Table 1. Faunal remains from Paleoeskimo sites, Ellesmere Island.

TAXA	Sarqaq (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	192	7.0	–
Harbor seal	–	–	–
Harp seal	6	0.2	–
Small seal	1947	71.5	–
Bearded seal	274	9.9	–
Large seal	60	2.2	–
Walrus	–	–	–
Caribou	2	<0.1	–
Musk-ox	127	4.7	–
Moose	–	–	–
Bear (polar/grizzly)	1	<0.1	–
Fox (arctic/red)	12	0.4	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	–	–	–
Wolverine	1	<0.1	–
Arctic Hare	15	0.6	–
Lemming	–	–	–
Birds	87	3.2	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	2724	100.0	–

Table 1. continued

TAXA	"Transitional" (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	–	–	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	5	71.4	–
Bearded seal	–	–	–
Large seal	1	14.3	–
Walrus	1	14.3	–
Caribou	–	–	–
Musk-ox	–	–	–
Moose	–	–	–
Bear (polar/grizzly)	–	–	–
Fox (arctic/red)	–	–	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	–	–	–
Wolverine	–	–	–
Arctic Hare	–	–	–
Lemming	–	–	–
Birds	–	–	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	7	100.0	–

Table 1. continued

TAXA	Pre-Dorset (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	–	–	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	303	76.9	–
Bearded seal	5	1.3	–
Large seal	49	12.4	–
Walrus	2	0.5	–
Caribou	2	0.5	–
Musk-ox	–	–	–
Moose	–	–	–
Bear (polar/grizzly)	–	–	–
Fox (arctic/red)	8	2.0	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	–	–	–
Wolverine	–	–	–
Arctic Hare	8	2.0	–
Lemming	–	–	–
Birds	17	4.3	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	394	99.9	–

Table 1. continued

TAXA	Early Dorset (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	1	<0.1	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	780	54.5	–
Bearded seal	1	<0.1	–
Large seal	102	7.1	–
Walrus	78	5.5	–
Caribou	–	–	–
Musk-ox	–	–	–
Moose	–	–	–
Bear (polar/grizzly)	5	0.4	–
Fox (arctic/red)	66	4.6	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	1	<0.1	–
Wolverine	–	–	–
Arctic Hare	3	0.2	–
Lemming	–	–	–
Birds	395	27.6	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	1432	100.00	–

Table 1. continued

TAXA	Late Dorset (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	4	<0.1	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	1044	30.8	–
Bearded seal	33	1.0	–
Large seal	69	2.0	–
Walrus	107	3.2	–
Caribou	–	–	–
Musk-ox	11	0.3	–
Moose	–	–	–
Bear (polar/grizzly)	51	1.5	–
Fox (arctic/red)	219	6.5	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	4	<0.1	–
Wolverine	–	–	–
Arctic Hare	188	5.6	–
Lemming	30	0.9	–
Birds	1618	47.8	–
Fish	9	0.3	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	3387	100.0	–

Table 1. continued

TAXA	Other Paleoeskimo (Schledermann 1989) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	–	–	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	1056	91.7	–
Bearded seal	5	0.4	–
Large seal	11	1.0	–
Walrus	9	0.8	–
Caribou	1	<0.1	–
Musk-ox	–	–	–
Moose	–	–	–
Bear (polar/grizzly)	2	0.2	–
Fox (arctic/red)	60	5.2	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	–	–	–
Wolverine	–	–	–
Arctic Hare	–	–	–
Lemmings	–	–	–
Birds	8	0.7	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	1152	100.0	–

Table 2. Faunal remains from Paleoeskimo sites, Grinnell Peninsula, Devon Island.

TAXA	Independence I Port Refuge (McGhee 1979) NISP	%	MNI	%	Independence II Port Refuge (McGhee 1981) NISP	%	MNI	%
White whale	–	–	–	–	–	–	–	–
Narwhal	–	–	–	–	–	–	–	–
Small whale indet.	–	–	–	–	–	–	–	–
Ringed seal	928	81.5	36	48.6	1335	93.2	18	62.1
Harbor seal	–	–	–	–	–	–	–	–
harp seal	–	–	–	–	–	–	–	–
Small seal	–	–	–	–	–	–	–	–
Bearded seal	49	4.3	6	8.1	4	0.3	1	3.4
Large seal	–	–	–	–	–	–	–	–
Walrus	–	–	–	–	1	0.1	1	3.4
Caribou	9	0.8	2	2.7	7	0.5	2	6.9
Musk-ox	–	–	–	–	–	–	–	–
Moose	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	–	–	–	–	2	0.1	1	3.4
Fox (arctic/red)	92	8.1	12	16.2	80	5.6	4	13.8
Dog	–	–	–	–	–	–	–	–
Wolf	–	–	–	–	–	–	–	–
Canid indet.	1	<0.1	1	1.4	–	–	–	–
Wolverine	–	–	–	–	–	–	–	–
Arctic Hare	–	–	–	–	–	–	–	–
Lemming	–	–	–	–	–	–	–	–
Birds	60	5.3	17	23.0	3	0.2	2	6.9
Fish	–	–	–	–	–	–	–	–
Shellfish	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–
TOTAL	1139	100.0	74	100.0	1432	100.0	29	99.9

Table 3. Faunal remains from Paleoeskimo sites, Navy Board Inlet, northern Baffin Island.

TAXA	Early Dorset (Mary-Rousselière 1976) NISP	%	MNI	Middle Dorset (Mary-Rousselière 1976) NISP	%	MNI	Late Dorset (Mary-Rousselière 1976) NISP	%	MNI
White whale	–	–	–	–	–	–	–	–	–
Narwhal	–	–	–	–	–	–	–	–	–
Small whale indet.	79	4.2	–	–	–	–	22	2.8	–
Ringed seal	–	–	–	–	–	–	–	–	–
Harbor seal	–	–	–	–	–	–	–	–	–
Har seal	–	–	–	–	–	–	–	–	–
Small seal	474	25.4	–	13,208	83.9	–	147	18.6	–
Bearded seal	9	0.5	–	63	0.4	–	75	9.3	–
Large seal	–	–	–	–	–	–	–	–	–
Walrus	249	13.3	–	6	<0.1	–	50	6.3	–
Caribou	1044	55.9	–	1,181	7.5	–	302	37.9	–
Musk-ox	–	–	–	–	–	–	–	–	–
Moose	–	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	–	–	–	2	<0.1	–	4	0.5	–
Fox (arctic/red)	–	–	–	693	4.4	–	31	3.9	–
Dog	–	–	–	–	–	–	2	0.2	–
Wolf	–	–	–	–	–	–	–	–	–
Canid indet.	–	–	–	–	–	–	–	–	–
Wolverine	–	–	–	–	–	–	–	–	–
Arctic Hare	–	–	–	394	2.5	–	6	0.7	–
Lemming	–	–	–	–	–	–	–	–	–
Birds	6	0.3	–	63	0.4	–	151	19.1	–
Fish	–	–	–	126	0.8	–	–	–	–
Shellfish	–	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–	–
TOTAL	1861	99.6	–	15,736	100.0	–	788	99.3	–

Table 4. Faunal remains from Paleoeskimo sites (Middle Dorset), northern Labrador.

TAXA*	Koliktalik-1 (Cox & Spiess 1980) NISP	%	MNI	Akulialuk (Cox & Spiess 1980) NISP	%	MNI	Avayalik-1 (Cox & Spiess 1980) NISP	%	MNI
White whale	–	–	–	–	–	–	–	–	–
Narwhal	–	–	–	–	–	–	–	–	–
Small whale indet.	–	–	–	–	–	–	6	0.3	–
Ringed seal	–	–	–	–	–	–	–	–	–
Harbor seal	–	–	–	–	–	–	–	–	–
Harp seal	–	–	–	–	–	–	–	–	–
Small seal	5223	98.3	–	609	98.5	–	898	52.9	–
Bearded seal	38	0.7	–	–	–	–	52	3.1	–
Large seal	–	–	–	–	–	–	–	–	–
Walrus	31	0.6	–	3	0.5	–	596	35.1	–
Caribou	3	0.1	–	5	0.8	–	28	1.6	–
Musk-ox	–	–	–	–	–	–	–	–	–
Moose	–	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	6	0.1	–	1	0.2	–	42	2.5	–
Fox (arctic/red)	7	0.1	–	1	0.2	–	72	4.2	–
Dog	–	–	–	–	–	–	–	–	–
Wolf	–	–	–	–	–	–	–	–	–
Canid indet.	7	0.1	–	–	–	–	2	0.1	–
Wolverine	–	–	–	–	–	–	–	–	–
Arctic Hare	–	–	–	–	–	–	–	–	–
Lemming	–	–	–	–	–	–	–	–	–
Birds	–	–	–	–	–	–	–	–	–
Fish	–	–	–	–	–	–	–	–	–
Shellfish	–	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–	–
TOTAL	5315	100.0	–	618	100.0	–	1696	99.8	–

*Mammalian bones only

Table 5. Faunal remains from Paleoeskimo sites (Dorset), northern Quebec.

TAXA	Diana Bay (Julien 1980) NISP	%	MNI	Tyara (Taylor 1968) NISP	%	MNI
White whale	–	–	–	46	1.9	–
Narwhal	–	–	–	–	–	–
Small whale indet.	–	–	–	–	–	–
Ringed seal	7	1.1	–	–	–	–
Harbor seal	–	–	–	–	–	–
Harp seal	–	–	–	–	–	–
Small seal	296	46.5	–	679	28.3	–
Bearded seal	15	2.4	–	589	24.5	–
Large seal	–	–	–	–	–	–
Walrus	44	6.9	–	445	18.5	–
Caribou	238	37.4	–	207	8.6	–
Musk-ox	–	–	–	–	–	–
Moose	–	–	–	–	–	–
Bear (polar/grizzly)	28	4.4	–	75	3.1	–
Fox (arctic/red)	–	–	–	130	5.4	–
Dog	–	–	–	–	–	–
Wolf	–	–	–	–	–	–
Canid indet.	–	–	–	–	–	–
Wolverine	–	–	–	–	–	–
Arctic Hare	–	–	–	–	–	
Lemming	–	–	–	–	–	–
Birds	8	1.3	–	231	9.6	–
Fish	–	–	–	–	–	–
Shellfish	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–
TOTAL	636	100.0	–	2402	99.9	–

Table 6. Faunal remains from the T-1 Paleoeskimo site (Dorset), Southampton Island.

TAXA*	(Cox & Spiess 1980) NISP	%	MNI
White whale	–	–	–
Narwhal	–	–	–
Small whale indet.	–	–	–
Ringed seal	–	–	–
Harbor seal	–	–	–
Harp seal	–	–	–
Small seal	2426	62.6	–
Bearded seal	304	7.8	–
Walrus	438	11.3	–
Caribou	29	0.7	–
Musk-ox	–	–	–
Moose	–	–	–
Bear (polar/grizzly)	17	0.4	–
Fox (arctic/red)	659	17.0	–
Dog	–	–	–
Wolf	–	–	–
Canid indet.	–	–	–
Wolverine	–	–	–
Arctic Hare	–	–	–
Lemming	–	–	–
Birds	–	–	–
Fish	–	–	–
Shellfish	–	–	–
Ground squirrel	–	–	–
TOTAL	3873	99.8	–

*Mammalian bone only

toric Neoeskimo groups in the Disko Bugt region, concluded that sealing was "the principal occupation", that caribou were next in importance after seals and bowheads, and that walruses, narwhals and white whales were "caught occasionally, but scarcely in any great numbers."

Interpretation

There are at least four possible reasons for the general paucity of white whale and narwhal remains from archaeological sites in the eastern Canadian Arctic, each of which will be discussed in turn.

Taphonomy

Organic decay and chemical and mechanical weathering (see *e.g.* Lyman 1984, 1985) are the most important taphonomic factors that affect faunal assemblages. However, these factors are unlikely to have caused a decrease in the relative abundance of white whale and narwhal remains at the various sites, since the bones of most of the other species represented in the same faunal assemblages are thinner, less dense or more delicate (*cf.* Wall 1983).

Table 7. Faunal remains from Thule sites, Ellesmere Island.

TAXA	(McCullough 1989) NISP	%	MNI	%
White whale	–	–	–	–
Narwhal	–	–	–	–
Small whale indet.	–	–	–	–
Ringed seal	–	–	–	–
Harbor seal	–	–	–	–
Harp seal	–	–	–	–
Small seal	10,197	65.3	238	44.8
Bearded seal	–	–	–	–
Large seal	379	2.4	34	6.4
Walrus	1097	7.0	53	10.0
Caribou	7	<0.1	–	–
Musk-ox	148	0.9	24	4.5
Moose	–	–	–	–
Bear (polar/grizzly)	357	2.3	35	6.6
Fox (arctic/red)	2073	13.3	76	14.3
Dog	–	–	–	–
Wolf	–	–	–	–
Canid indet.	1015	6.5	55	10.4
Wolverine	–	–	–	–
Arctic Hare	86	0.6	15	2.8
Lemming	1	<0.1	1	0.2
Birds	270	1.7	–	–
Fish	–	–	–	–
Shellfish	–	–	–	–
Ground squirrel	–	–	–	–
TOTAL	15,630	100.0	531	100.0

The reverse outcome should in fact be expected – that is, the white whale and narwhal would be over-represented relative to other species (except the bowhead) in comparison to the faunal assemblage as originally deposited.

Processing and Transport

It might be argued that given the size and weight of individual white whales and narwhals, relatively few of their bone elements would have originally been transported from the kill site to the residential site (*i.e.* place of consumption). Instead much of the mattak (edible skin), meat and blubber would have been selectively removed (culled) and transported (see *e.g.* Figs 2 & 3), leaving almost complete skeletons at the kill sites (Fig. 4). Culling and transport are important considerations (see *e.g.* Binford 1978, Metcalfe & Jones 1988, O'Connell *et al.* 1988), and there is no doubt that some culling would have taken place. However there are several lines of argument that could be made against selective culling and transport being primary determinants in this context.

First, "traditional" Inuit societies that engaged in intensive white whale hunting have been documented both ethnographically and archaeologically in the Mackenzie Delta region of the western Canadian Arctic. McGhee (1974), citing ethnohistorical accounts, described inten-

Table 8. Faunal remains from Thule sites, Porden Point, Grinnell Peninsula, Devon Island.

TAXA	(Park 1983) NISP	%	MNI	(Park 1989) NISP	%	MNI	%
White whale	–	–	–	17	0.2	3	0.8
Narwhal	–	–	–	–	–	–	–
Small whale indet.	1	0.1	–	–	–	–	–
Ringed seal	315	33.8	–	–	–	–	–
Harbor seal	–	–	–	–	–	–	–
Harp seal	6	0.6	–	–	–	–	–
Small seal	332	35.6	–	8654	80.3	171	44.2
Bearded seal	15	1.6	–	64	0.6	12	3.1
Large seal	–	–	–	–	–	–	–
Walrus	1	0.1	–	45	0.4	11	2.8
Caribou	19	2.0	–	119	1.1	13	3.4
Musk-ox	2	0.2	–	10	0.1	6	1.5
Moose	–	–	–	–	–	–	–
Bear (polar/grizzly)	12	1.3	–	132	1.2	17	4.4
Fox (arctic/red)	194	20.8	–	1250	11.6	47	12.1
Dog	6	0.6	–	193	1.8	19	4.9
Wolf	–	–	–	2	<0.1	1	0.3
Canid indet.	13	1.4	–	–	–	–	–
Wolverine	–	–	–	–	–	–	–
Arctic Hare	–	–	–	13	0.1	6	1.5
Lemming	–	–	–	–	–	–	–
Birds	17	1.8	–	257	2.4	71	18.4
Fish	–	–	–	27	0.2	10	2.6
Shellfish	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–
TOTAL	933	99.9	–	10,783	100.0	387	100.0

Table 9. Faunal remains from Thule sites, Somerset Island.

	Learmonth (Taylor & McGhee 1979)			Learmonth (Rick 1980)				Cape Garry (Rick 1980)				Hazard Inlet (Whitridge 1992)			
TAXA	NISP	%	MNI	NISP	%	MNI	%	NISP	%	MNI	%	NISP	%	MNI	%
White whale	10	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–
Narwhal	3	0.1	–	–	–	–	–	–	–	–	–	–	–	–	–
Small whale indet.	–	–	–	–	–	–	–	–	–	–	–	6	0.1	1	0.6
Ringed seal	2,155	63.9	–	850	57.1	19	19.2	2,100	73.4	32	21.2	7230	76.6	77	43.5
Harbor seal	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Harp seal	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Small seal	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bearded seal	207	6.1	–	9	0.6	2	2.0	19	0.7	3	2.0	50	0.5	3	1.7
Large seal	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Walrus	113	3.4	–	4	0.3	1	1.0	1	<0.1	1	0.7	1	<0.1	1	0.6
Caribou	270	8.0	–	45	3.0	2	2.0	42	1.5	3	2.0	93	1.0	3	1.7
Musk-ox	4	0.1	–	24	1.6	3	3.0	9	0.3	3	2.0	2	<0.1	1	0.6
Moose	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	105	3.1	–	25	1.7	5	5.1	21	0.7	2	1.3	13	0.1	2	1.1
Fox (arctic/red)	137	4.1	–	400	26.9	37	37.4	410	14.3	59	39.1	1071	11.4	20	11.3
Dog	–	–	–	–	–	–	–	–	–	–	–	7	0.1	3	1.7
Wolf	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Canid indet.	146	4.3	–	28	1.9	4	4.0	55	1.9	11	7.3	111	1.2	1	0.6
Wolverine	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Arctic Hare	43	1.3	–	2	0.1	1	1.0	1	<0.1	1	0.7	32	0.3	3	1.7
Lemming	–	–	–	1	<0.1	1	1.0	70	2.5	4	2.6	150	1.6	16	9.0
Birds	180	5.3	–	101	6.8	24	24.3	133	4.6	31	20.5	654	6.9	45	25.4
Fish	–	–	–	–	–	–	–	1	<0.1	1	0.7	14	0.1	1	0.6
Shellfish	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	3,373	100.0	–	1,489	100.0	99	100.0	2,862	99.9	151	100.1	9434	99.9	177	100.1

Table 10. Faunal remains from the Nungavik site (early to late Thule), Navy Board Inlet, northern Baffin Island.

	Nungavik 52 (early Thule) (Mary-Rousselière 1976)			Nungavik 42 (early Thule) (Mary-Rousselière 1976)			Nungavik 15, 17, 21 (late Thule) (Mary-Rousselière 1976)		
TAXA	NISP	%	MNI	NISP	%	MNI	NISP	%	MNI
White whale	–	–	–	–	–	–	–	–	–
Narwhal	–	–	–	–	–	–	–	–	–
Small whale indet.	20	1.0	–	43	3.7	–	49	5.8	–
Ringed seal	–	–	–	–	–	–	–	–	–
Harbor seal	–	–	–	–	–	–	–	–	–
Harp seal	–	–	–	–	–	–	–	–	–
Small seal	776	37.0	–	640	54.9	–	471	56.3	–
Bearded seal	35	1.7	–	56	4.8	–	26	3.1	–
Large seal	–	–	–	–	–	–	–	–	–
Walrus	119	5.7	–	45	3.8	–	113	13.5	–
Caribou	1118	53.3	–	376	32.2	–	171	20.4	–
Musk-ox	–	–	–	–	–	–	–	–	–
Moose	–	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	2	0.1	–	1	0.1	–	7	0.8	–
Fox (arctic/red)	–	–	–	3	0.3	–	–	–	–
Dog	9	0.4	–	1	0.1	–	–	< –	–
Wolf	–	–	–	–	–	–	–	–	–
Canid indet.	–	–	–	–	–	–	–	–	–
Wolverine	–	–	–	–	–	–	–	–	–
Arctic Hare	–	–	–	1	0.1	–	–	–	–
Lemming	–	–	–	–	–	–	–	–	–
Birds	18	0.9	–	–	–	–	–	–	–
Fish	–	–	–	–	–	–	–	–	–
Shellfish	–	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–	–
TOTAL	2097	100.1	–	1166	100.0	–	837	99.9	–

Table 11. Faunal remains from Thule sites, southern and eastern Baffin Island.

TAXA	Cumberland Sound (Schledermann 1975) NISP	%	MNI	%	Peale Pt. (Stenton 1983) NISP	%	MNI	%	Talaguak (Sabo 1981) NISP	%	MNI	%
White whale	15	0.4	2	1.6	39	0.4	4	1.2	4	0.2	2	1.0
Narwhal	–	–	–	–	5	0.1	1	0.3	–	–	–	–
Small whale indet.	–	–	–	–	–	–	–	–	–	–	–	–
Ringed seal	3469	93.6	92	72.4	7,400	78.3	191	57.5	1,864	46.1	112	57.1
Harbor seal	–	–	–	–	–	–	–	–	–	–	–	–
Harp seal	55	1.5	7	5.5	48	0.5	17	5.1	–	–	–	–
Small seal	–	–	–	–	–	–	–	–	–	–	–	–
Bearded seal	26	0.7	4	3.2	166	1.8	13	3.9	153	3.8	10	5.1
Large seal	–	–	–	–	–	–	–	–	–	–	–	
Walrus	–	–	–	–	43	0.5	3	0.9	–	–	6	3.1
Caribou	103	2.8	5	3.9	1,241	13.1	43	13.0	1,823	45.1	28	14.3
Musk-ox	–	–	–	–	–	–	–	–	–	–	–	–
Moose	–	–	–	–	–	–	–	–	–	–	–	–
Bear (polar/grizzly)	1	<0.1	1	0.8	11	0.1	3	0.9	11	0.3	5	2.6
Fox (arctic/red)	–	–	–	–	50	0.5	14	4.2	43	1.1	8	4.1
Dog	33	0.9	14	11.0	407	4.3	30	9.0	–	–	–	–
Wolf	–	–	–	–	1	<0.1	1	0.3	–	–	–	–
Canid indet.	–	–	–	–	–	–	–	–	59	1.5	12	6.1
Wolverine	–	–	–	–	–	–	–	–	–	–	–	–
Arctic Hare	3	0.1	1	0.8	1	<0.1	1	0.3	2	<0.1	2	1.0
Lemming	–	–	–	–	3	<0.1	2	0.6	–	–	–	–
Birds	1	<0.1	1	0.8	33	0.3	9	2.7	84	2.1	11	5.6
Fish	–	–	–	–	–	–	–	–	–	–	–	–
Shellfish	–	–	–	–	–	–	–	–	–	–	–	–
Ground squirrel	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	3706	100.0	127	100.0	9,448	100.0	332	99.9	4,045	100.0	196	100.0

Table 12. Faunal remains from the Silimiut site (Thule), northwest Hudson Bay.

TAXA	(Staab 1979) NISP	%	MNI	%
White whale	–	–	–	–
Narwhal	–	–	–	–
Small whale indet.	–	–	–	–
Ringed seal	11,177	61.0	309	41.6
Harbor seal	31	0.2	13	1.7
Harp seal	–	–	–	–
Small seal	–	–	–	–
Bearded seal	1,204	6.6	54	7.3
Walrus	706	3.9	34	4.6
Caribou	4,310	23.5	150	20.2
Musk-ox	113	0.6	11	1.5
Moose	–	–	–	–
Bear (polar/grizzly)	–	–	–	–
Fox (arctic/red)	243	1.3	27	3.6
Dog	92	0.5	21	2.8
Wolf	53	0.3	8	1.1
Canid indet.	59	0.3	14	1.9
Wolverine	3	0	3	0.4
Arctic Hare	5	0	4	0.5
Lemming	–	–	–	–
Birds	133	0.7	45	6.1
Fish	108	0.6	17	2.3
Shellfish	81	0.4	33	4.5
Ground squirrel	–	–	–	–
TOTAL	18,318	99.9	743	100.1

sive hunting of white whales by two Mackenzie Inuit groups, the Kupugmiut and Kittegaryumiut. Both of these groups employed a system of driving whales into shallow water where they became trapped or grounded. McGhee excavated two late prehistoric and early historic coastal winter residential sites in the area historically occupied by these groups, and the recovered faunal remains are summarized in Table 13. The differences between these assemblages and those from the eastern Canadian Arctic are striking. NISP percentages for white whales range from 62% to 87% in McGhee's assemblages, which contrast sharply with the range of 0.0% to 2.1% for eastern Canadian Arctic sites. While MNI percentages were not provided by McGhee, there is no doubt that white whales would comprise the bulk of the diet represented by the faunal assemblages. Similarly 2266 (31%) of the 7343 bone elements recovered from the prehistoric Gupuk residential site, also in the Mackenzie Delta, were from white whales (Friesen & Arnold 1993). The above two examples suggest that intensive (that is, through the use of mass killing techniques) white whale hunting can indeed result in faunal assemblages dominated by white whales.

Second, sites for processing or caching white whales and narwhals have yet to be identified in the eastern Canadian Arctic (see also below). While taphonomic factors such as dispersal of carcasses by tides, currents or scavengers are important in this context, we would still

Fig. 2. Processing narwhals close to the kill site, Creswell Bay, Somerset Island, August 1989. The processing site is approximately 3 km from the residential site. Photo: J. M. Savelle.

expect at least an occasional special-purpose processing or caching site to have been recognized (see *e.g.* Fig. 4).

Lack of Appropriate Archaeological Data

The argument could be made that archaeologists have not addressed the problem of white whale and narwhal hunting in a systematic fashion. In other words, archaeological projects have been conducted with other, very different, research goals, and thus any data relating to the use of white whales or narwhals have been collected only incidentally. Recognizable primary processing or caching sites, or summer and fall camps located specifically for the hunting of white whales or narwhals (and thus probably containing abundant remains of these whales), for example, may exist, but appropriate surveys have not been made to locate them. In this regard it is significant that all of the faunal material summarized in Tables 7–12 is from winter residential sites.

With this problem in mind, two related projects have recently been initiated. The first is the detailed survey and excavation of summer and fall, as well as winter, Thule residential features on southeastern Somerset Island begun by the author in 1988. These coastal features are well within the present range of white whales and narwhals. Of over 10 000 animal bones from these features thus far identified, less than two dozen can be positively identified as either white whale or narwhal.

The second project has involved aerial and ground surveys to locate prehistoric archaeological sites which might relate to intensive white whale use in particular. These surveys were conducted in collaboration with Allen McCartney (University of Arkansas, Fayetteville, Arkansas) in 1988, and with Thomas G. Smith (Pacific Biological Station, Nanaimo, British Columbia) in 1991, 1992 and 1993. They concentrated upon the detailed examination of areas near known seasonal concentrations of white whales along the coasts of Somerset Island and southern Devon Island. These concentrations are centered primarily in major estuaries and bays (see Figs 5 & 6; see also Sergeant & Brodie 1975, Smith *et al.* 1985), many of which could have functioned as natural "traps". Given that white whales are at least to some extent site tenacious (Caron & Smith 1990), it seems reasonable to suggest that similar concentrations occurred at the same sites during much of the recent prehistoric period (*i.e.* 1000

Fig. 3. Narwhal mattak and blubber in a cache at Creswell Bay, Somerset Island, August 1989. The caching site is approximately 1.5 km from the residential site. Photo: J. M. Savelle.

B.P. onwards). The rationale for these surveys was that if prehistoric Inuit were exploiting white whales to any significant degree in the Somerset Island-southern Devon Island area, they would have tended to do so at localities of major accessible concentrations. The remains of whaling camps and processing and caching sites would be expected adjacent to these localities.

At only one locality, Fellfoot Point on the southeastern corner of Maxwell Bay, was there any evidence of extensive prehistoric white whale use. A site at this locality consists of at least 15 shallow, semi-subterranean dwellings, most of which are probably Thule, with at least 10 white whale skulls in apparent association. If the skulls are indeed associated with the Thule dwellings, this site is unique within the surveyed areas. Otherwise, the surveys have yielded no evidence of significant white whale (or narwhal) use. Furthermore, at the sites in the surveyed areas for which we have quantitative data (Learmonth and Cape Garry, adjacent to the Creswell River white whale concentration – see Fig. 1 & Table 9) white whale and narwhal bone elements range from 0.0% to 0.4% of the NISP for the total assemblages.

Contribution to Diet

The final, and certainly the most parsimonious line of argument, is simply that the white whale and the narwhal rarely formed a significant part of the diet of prehistoric Inuit of the eastern Canadian Arctic. Given the archaeological data and discussions thereof presented above, this would seem to be a reasonable interpretation. However, here we are faced with a situation, alluded to above, in which we have very little data from summer or fall sites – the recent study of Thule sites on southeastern Somerset Island being an exception. It is precisely at these sites that we would expect the majority of white whale and narwhal remains if these species were being hunted to any significant degree.

Discussion

The archaeological data available at present are inadequate to draw any firm conclusions regarding the nature and extent of white whale and narwhal use by prehistoric Inuit in the eastern Canadian Arctic. Clearly, additional

Fig. 4. Narwhal remains at Creswell Bay several years after processing. This processing site is approximately 1.5 km from the contemporaneous residential site. August 1993. Photo: J. M. Savelle.

research designed specifically with this goal in mind is needed. The potential problems of taphonomy, processing and transport, and inadequate surveys and excavation will need to be addressed. Detailed studies of processing and transport, and of "seasonal" summer and fall sites, are especially critical in this regard. However, if the overall lack of white whale and narwhal bones at archaeological sites is taken to suggest that (with some exceptions) these species did not contribute significantly to the diets of prehistoric inhabitants of the eastern Canadian Arctic, the question arises of why such abundant and valuable resources would have been largely ignored.

For Paleoeskimo groups the answer would appear to relate primarily to technology. Specifically, Paleoeskimos lacked an elaborate whaling technology. Although watercraft, perhaps kayaks, may have been used at least by Dorset Eskimos, there is no evidence that Paleoeskimos made extensive use of boats. While other large sea mammals such as walruses and bearded seals could have been taken without specialized equipment, the capture of white whales and narwhals without boats, harpoons and floats would probably have been extremely difficult.

Thule Eskimos, on the other hand, possessed sophisticated whaling gear such as specialized harpoons and lances, floats and possibly drags, and kayaks and umiaks (large open boats traditionally associated with whale hunting – see *e.g.* Maxwell 1985, Dumond 1987). Although most of these were originally designed for large baleen whales, such gear could be, and was, used for white whales and narwhals during the historic period (see *e.g.* Lyon 1824, Birket-Smith 1924, Nelson 1969).

If in fact Thule Eskimos were not actively hunting white whales and narwhals, one possible explanation may lie in the scheduling of subsistence activities. Hunter-gatherer societies in marginal areas that rely primarily on storage, as do many arctic groups, and certainly as the prehistoric Thule did, typically follow structured and predictable (but relatively inflexible) annual rounds (*cf.* Bettinger 1991: 69–70). It has been suggested that hunter-gatherer subsistence behaviour, as reflected by these annual rounds, can be considered optimizing behaviour (*cf.* Winterhalder 1981, Bettinger 1991). Since, for the most part, prehistoric Thule subsistence in the eastern Canadian Arctic was based on the bowhead whale, residential and logistical organization during the open-water whaling season would have been focused specifically on that resource (see *e.g.* Savelle 1987, Savelle & McCartney 1988). Accordingly, other resources, although seasonally available and harvestable with Thule technology, would have been essentially ignored during the bowhead

Table 13. Faunal remains from late prehistoric and early historic sites on the Mackenzie Delta reported by McGhee (1974).

	Kittigazuit			
	M-1 NISP = 338	M-2 NISP = 177	M-4 NISP = 1357	'Old House' NISP = 217
white whale	80%	79%	87%	81%
caribou	17%	13%	7%	12%
waterfowl	2%	4%	3%	4%
ringed seal	1%	3%	2%	–
moose	–	0.5%	1%	–
fox	–	–	–	3%

	Radio Creek NISP = 386
white whale	62%
caribou	30%
waterfowl	present
ringed seal	present
fox	2%
wolf	3%
'bird'	present

whaling season (unless they could be "co-harvested" within the residential and logistical constraints imposed by bowhead hunting – see *e.g.* Nelson 1969: 213). In those areas (*e.g.* most of the Canadian High Arctic Islands) where bowheads, white whales and narwhals are all available during approximately the same period (late

Fig. 5. White whale concentration at an estuary near Wadworth Island, northwestern Somerset Island (see Fig. 6). Photo: J. M. Savelle.

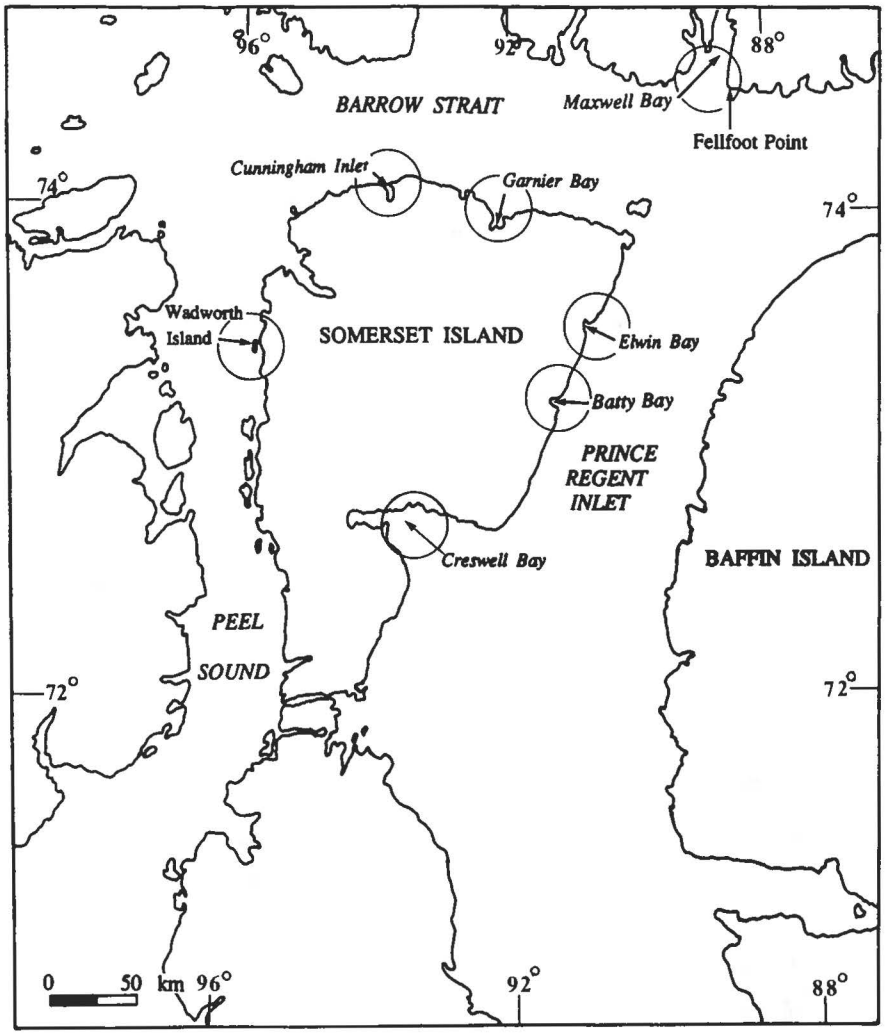

Fig. 6. Locations of known major white whale concentrations (indicated by circles) along the coasts of Somerset and southwest Devon islands that were surveyed for archaeological sites (data from Sergeant & Brodie 1975, Smith *et al.* 1985, T. G. Smith 1992 pers. comm.).

summer and early fall), any major effort to acquire smaller whales would have lessened the chances of success in the bowhead hunt.

If the suggestion that most Thule groups ignored white whales and narwhals is correct, the question arises of why the hunting of these species in the eastern Canadian Arctic (and Greenland) was apparently quite common during the early historic period (*i.e.* at the time of first contact by explorers, missionaries, ethnographers, *etc.*)

The most parsimonious explanation relates to bowhead whale availability. Specifically, it has been suggested by several authors (see *e.g.* McGhee 1969/70, McCartney 1977) that deteriorating climatic conditions beginning approximately 800 years B.P. and culminating in what has been termed the Little Ice Age of approximately 400–100 B.P., resulted in a decrease in the abundance and predictability of bowhead whales. Consequently, Thule expanded their diet breadth to include a) an increased diversity of harvested resources and b) an increased use of resources that had previously been ranked as secondary (see *e.g.* Savelle & McCartney 1988). Accordingly, white whale and narwhal use would have increased amongst those groups that occasionally harvested these species, and possibly would have added to the diet of those groups that had not harvested them at all.

The above scenario, of course, is based on the premise that there was substantial use of white whales and narwhals by many traditional Inuit societies during the early historic period. While beyond the scope of this paper, a detailed investigation of early historic sources may suggest that it was mainly after the introduction of new technologies (*e.g.* firearms, nets, motorized boats) that allowed more efficient whale harvesting, and the development of European and Euroamerican markets for whale products, that substantial white whale and narwhal hunting took place.

Conclusions

Identifiable remains of white whales and narwhals are, with very few exceptions, absent at Paleoeskimo (ca. 4000–1000 B.P.), and rare at Thule Eskimo (ca. 1000–400 B.P.), archaeological sites in the eastern Canadian Arctic. The lack of remains of these species at Paleoeskimo sites can most readily be explained by the lack of an appropriate whaling technology.

Thule Eskimos, on the other hand, possessed a sophisticated whaling technology. The paucity of white whale and narwhal remains at Thule sites can more readily be attributed to one, or more, of the following: a) taphonomic factors, b) processing and transport, c) lack of surveys for, and excavations of, appropriate sites, or d) a relatively low contribution to the Thule diet due to scheduling conflicts with other, higher-ranked resources, primarily the bowhead whale.

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