# Canadian Zooarchaeology
# Zooarchéologie canadienne

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# Editors' Note/ Note des éditrices

We welcome you to the first issue of *Canadian Zooarchaeology* published at the University of Victoria. Becky Wigen and Yin Lam of the Department of Anthropology at UVic have joined Kathy Stewart as co-editors of CZ. We hope that you will be pleased with the new format, and we welcome your comments and suggestions. CZ will continue to publish news, reports, articles, letters, conference notes, book reviews, and lists of recent publications.

In this issue, we are extremely pleased to present a peer-reviewed feature article by Duncan McLaren, Becky Wigen, Quentin Mackie, and Daryl W. Fedje on the early evidence of bear hunting and bear ceremonialism on the Northwest Coast. We intend to publish peer-reviewed articles on a regular basis and we welcome your submissions.

At the end of this issue, we provide a list of titles of relevant dissertations and theses that have been completed at universities in British Columbia in the past decade. In future issues, we will publish similar lists for other Canadian universities, and we would appreciate any contributions to that end. In addition, we would be grateful for submissions for future listings of recent publications.

We gratefully acknowledge the assistance of Ariane Burke, Hulya Demirdirek, Ralph Lubin, and David Stoll in the preparation of this issue.

To cover the costs of CZ's new format, subscription rates have increased slightly. *Please note that our new rates now cover **two** years of subscription*.

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# Bear Hunting at the Pleistocene/Holocene Transition on the Northern Northwest Coast of North America

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## ABSTRACT

Recent discoveries on the northern Northwest Coast of North America provide evidence of bear hunting dating to the Pleistocene/Holocene transition. This paper describes the faunal assemblage from the Kilgii Gwaay wet site in southern Haida Gwaii. This assemblage includes a high proportion of remains of black bear. Ethological data, ethnographic sources, and the archaeological record are examined in order to provide an interpretative context for this assemblage and others in this region. The significance of bear hunting, the use of different hunting strategies, the economic utility of bears, bear ceremonialism, and the occurrence of bear bones at other Pleistocene archaeological sites are discussed. Evidence from Kilgii Gwaay suggests that bear hunting at the Pleistocene/Holocene transition on the northern Northwest Coast had both economic and ceremonial significance.

## RÉSUMÉ

De récentes découvertes sur la côte nord-ouest de l`Amérique du Nord nous fournissent des données sur la chasse à l`ours pendant la transition pléistocène/holocène. Cet article décrit la faune de Kilgii Gwaay, un gisement archéologique du sud de Haida Gwaii. Cet assemblage faunique comprend un fort pourcentage de restes d`ours noir. L`interprétation se fait dans le cadre d`une recherche ethnographique, éthologique et archéologique. L'importance de la chasse à l'ours, les différentes stratégies de chasse, l'utilité économique des ours, les pratiques cérémonielles liées aux ours et la présence de restes d`ours dans d`autres sites sont les thèmes discutés ici. Les données archéozoologiques de Kilgii Gwaay suggèrent l`importance économique et cérémonielle de la chasse à l`ours sur la côte du nord-ouest pendant la transition pléistocène/holocène.

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Recent archaeological discoveries on the northern Northwest Coast of North America indicate that bear hunting was practiced by humans during the Pleistocene/Holocene transition. This paper draws upon a range of ethnographic, archaeological, ethological, and biological data to provide an interpretative framework for the archaeological evidence of bear hunting in this region. In particular, the following questions are considered: Was bear hunting a common practice during the late Pleistocene and early Holocene periods on the northern Northwest Coast? What types of hunting strategies were employed? What evidence suggests that ethnographically observed commonalities in bear hunting and ceremonial practices, which are found across northern North America and Eurasia, have roots that date back to the Pleistocene? What role did bears play in the prehistoric economy of this region?

In establishing an interpretative framework, this paper draws from both scientific and non-scientific sources regarding bear behavior and bear–human interaction. As suggested by Irving Hallowell, renowned ethnographer and author of the influential volume *Bear Ceremonialism in the Northern Hemisphere*, traditional ecological knowledge has much to offer scientific inquiry:

> In our culture, as a result of several centuries of the scientific tradition, animal life has been studied from a rational point of view. On the one hand, this mental attitude has led to a classification of the creatures of the earth into phyla, order, classes, etc., based on their morphology and genetic relationships, and, on the other, to an interpretation of animal behavior in terms of instinct, reflexes, environmental adaptations, and so forth. Consequently, there is today a marked absence of "folk attitudes" towards animals… (Hallowell 1926: 5-6).

For archaeologists interested in prehistoric hunter-gatherer economies, "folk attitudes" towards animals provide an appropriate starting point when considering possible interpretations of archaeological evidence (e.g., Binford 2002). Given that the "average individual in a hunting or fishing culture has much greater practical knowledge about the animal world" than those in most modern societies (Darnell 1977:21), folk and traditional knowledge provides an essential complement to scientific data in our attempts to understand prehistoric human-animal interactions.

The contextual information reviewed here was derived from studies representing a variety of different localities across the northern hemisphere. Archaeological evidence comes from sites dating from the late Pleistocene and Holocene. Where possible, a focus is placed on information drawn from studies on the Northwest Coast. The discussion of bear-human interactions is extensive in both the ethnographic and archaeological literature, and the review presented here is by no means exhaustive. In the following sections, we discuss the ecology and behavior of bear species on the Northwest Coast, traditional strategies used to hunt bears, the economic and ritual significance of bears, and the archaeological evidence of bear hunting. This discussion provides the context for interpreting the faunal data that we present from the site of Kilgii Gwaay in southern Haida Gwaii (the Queen Charlotte Islands).

## The Natural History of Bears on the Northwest Coast

There is currently very little literature concerning the archaeology of bear-human interaction on the Northwest Coast. Bears appear to have occupied this area for longer than human populations. North American black bears (*Ursus americanus*) and grizzly (brown) bears (*Ursus arctos*) occurred on the northern Northwest Coast before and immediately following the last major (Fraser) glaciation (Heaton et al. 1996; Nagorsen et al. 1995; Ramsey et al. 2004). There is evidence of both black and grizzly bears in this region prior to the Fraser glacial event, between 40,000 bp and 27,000 bp (Heaton and Grady 2003). The earliest post-glacial evidence of bear on the northern Northwest Coast are grizzly bear remains dating to 14,500 bp[1] recovered from cave deposits on Haida Gwaii (Ramsey et al. 2004).

Evidence for human occupation in the area begins around 10,600 bp (Fedje et al. 2004). Despite this, there is considerable evidence suggesting that humans could have inhabited the Northwest Coast long before this time period (Fladmark 1975; 1979). The post-glacial appearance of bears in the region at about 14,500 bp suggests that the environment at the time was also capable of supporting human occupation (Ramsey et al. 2004).

Black and grizzly bears of the northern Northwest Coast are genetically distinct from inland continental species (Byun et al. 1997, Leonard et al. 2000). During the Late Glacial Maximum, black and grizzly bear populations inhabited isolated glacial refugia on the northern Northwest Coast and subsequently repopulated areas that had been glaciated. Interior areas were repopulated independently following de-glaciation. This pattern of distinct lineages on the coast and inland likely predates the last glaciation (Byun et al. 1997, Leonard et al. 2000). Heaton et al. (1996:190) suggested that glaciations may have promoted, rather than inhibited, coastal range extension by grizzly bears because, during such times, a combination of marine foods and ice bridges may have provided a viable coastal corridor for this species. Both black and grizzly bears continue to inhabit many parts of the Northwest Coast today. In some areas they are sympatric but, on certain islands, particularly those with smaller catchments or lacking suitable habitat, only one species is found. For example, as a result of changing post-glacial environmental conditions and sea level rise, it appears that grizzlies disappeared from Haida Gwaii during the late Pleistocene, while black bears have remained (Ramsey et al. 2004).

## Bear Behavior and the Hunting of Bears

The paleontological evidence described above indicates that late Pleistocene human inhabitants of the Northwest Coast co-existed with bear populations. Due to the widespread geographic occurrence of bears across the northern hemisphere (Leonard et al. 2000), it is very likely that these people, regardless of their geographic origin, would have had an intimate knowledge of bear behaviour as well as of bear-hunting strategies.

[1] All dates are reported in radiocarbon years before present (bp).

According to Hallowell's (1926:42) survey of ethnographic and historical literature on the practice of bear hunting, three general types of bear hunting techniques were traditionally used from Scandinavia across northern Eurasia and North America to Labrador:

> 1. The animal was sought in its lair and, being forced out by the hunters, was as a rule dispatched with a spear or axe as it emerged, or shot with the bow and arrow.
> 2. The bear was frequently attacked in the open (even after it came out from its den) in what often amounted to a kind of "hand to hand" combat in which the favorite weapon was the spear or lance. One or more hunters might participate.
> 3. The bear was trapped by any one of a number of devices, most frequently of the deadfall variety.

Hallowell (1926:36) noted that "the use of trapping devices for killing bears and the custom of seeking them out in their winter dens seems to characterize the bear hunting customs of the natives of the North Pacific Coast." These differences in hunting techniques were influenced in part by season. For example, amongst the Tlingit, the black bear

> was sought with dogs in its winter den, which was located by scratches which the animal had made on the bark of the trees in the neighborhood. In summer it was the custom to lie in wait until about sunset, for at this time of day the bear would descend the mountains to the clearings in the forest (*Waldeslichtungen*) in order to feast upon the young verdure there. (f.n. When bears were killed in the open the bow seems to have been the typical weapon employed…) In the autumn, when bears would come to the streams to catch salmon during the night, deadfalls of planks would be constructed near their haunts in order to kill them" (Krause (1885), cited in Hallowell 1926: 37).

The success of a bear hunt would have depended largely on the hunter's understanding of bear behaviour. In particular, knowledge of the seasonal behaviours of bears, particularly in relation to hibernation and trail use, would have been integral to hunting success.

### *Bear Hibernation*

Both black and grizzly bears hibernate (Folk et al. 1976). While there is considerable variation in the amount of time that bears from different habitats remain in their winter dens, black and grizzly bears in all geographic regions spend at least some of the winter in isolated dens. There are several physiological and behavioural traits characteristic of bear hibernation. Some researchers have argued that bears hibernate as a result of a lack of food rather than the cold of the winter (Holzworth 1930:283; Mills 1955:97). For example, bears in some parts of Mexico will hibernate in the wintertime when food is scarce. Bears will not hibernate until they have laid down enough fat to last the winter (Holzworth 1930:283).

Black bears will den in hollow trees, excavated dens, caves, and ground nests

(Seryodkin et al. 2003). Grizzly bears will either dig dens in areas with enough sediment accumulation, or they will use natural shelters like caves (Reynolds et al. 1976). When possible, bears like to use the same den every year (Mack 1993: 145). Dens that are excavated into sediment have a tendency to collapse and will thus be built anew each year. Dens of more permanent structure, such as hollow trees or caves, may be used for several consecutive years and, in the case of caves, through subsequent generations over several millennia (Kurten 1976).

With the exception of some data obtained by physiological monitoring, activities that occur within the den during the winter are not well known to researchers. Most of this time is spent sleeping. In contrast to other denning carnivores, bears do not eat or drink during this period or even in the days immediately preceding their hibernation. The digestive tracts of grizzlies killed while hibernating have been found to be empty (Mills 1919:82-97). Similarly, bears do not urinate during hibernation; their bodies recycle their urea (Hellgren 1995:469). Other physiological aspects of hibernating bears include a minimal reduction in body temperature, a lowering of the average heart rate, some weight loss, protein conservation, and continued bone (osteoblast) activity in the absence of skeletal loading (Hellgren 1995).

Bears lose both lipid stores and lean body mass during hibernation. The amount of lean body mass lost is proportional to the amount of lipid stored at the onset of hibernation (Hilderbrand et al. 2000: 181). Female bears will give birth and lactate for two to three months in the winter dens (Hilderbrand et al. 2000:178). Lactating bears must do so for this long period without eating or drinking. Cubs may continue to nurse during dormancy for an additional 3 years. Bear milk has the highest fat of any known terrestrial mammal, an advantageous trait during the lean times of hibernation (Hellgren 1995:472).

During this long period of dormancy, bears may be roused from their winter quarters. Some observers have noted that, regardless of their stage of hibernation, bears awaken in a very alert state, able to flee or fight in a normal manner (Mills 1919:88). However, the amount of prodding needed to awaken a hibernating bear may vary with the temperature of the winter. In colder climates, it can be difficult to wake a sleeping bear (Rogers 1987:21).

When bears emerge from their hibernation dens, they will often do so very gradually. For several days they will remain in the vicinity of the den, eating and drinking little. Again, there is variation in this aspect of bear behavior. One observer recorded an occasion in which a lactating black bear dragged the carcass of a white-tailed deer into her den shortly after her first emergence (Rogers 1987:23). Once this liminal stage of emergence has passed, bears will abandon their dens to begin roaming for the remainder of the year. There is some documentation of bears returning to their dens or shelters before the denning season recommences. For example, wounded bears will often seek refuge in their dens (Mack 1993:147). In the vicinity of readily available resources, such as a stream with late running salmon, a bear may take advantage of nearby caves and other natural shelter in the area (Mack 1993:144).

### *Hibernation and the Hunting of Bears in Winter*

In economic terms, a hibernating bear is a sedentary source of fattened meat and warm fur. To any hunter desiring to add to a meager larder or to provide warmth during the cold of winter, hibernating bears likely presented worthwhile, albeit dangerous, prey. There is a considerable amount of information on traditional winter bear hunting techniques, most of which involve luring the bear out of hibernation.

The first task in hunting bears in the winter is to find their dens. This is not necessarily an easy task, as bears, aware of their vulnerability during this period, will den in secluded and hidden areas (Charles 1997). Bears seeking dens may encounter ones already occupied by other bears. In the early winter, observant hunters may thus locate bear dens by following other bears.

> …sometimes bears will use other bear dens. Especially black bears will do this. My grandfather, he want to get meat for the winter. He found a black bear that winter. He followed that black bear in the snow to his den. A black bear don't care where he den. Will use hollow tree, go in there through a little hole in the bottom. The old man see where a black bear make a hollow den in a big cedar tree. My grandfather he go and chase that black bear out. The black bear come out in the snow. He go look for another den. That black bear walk and walk until he found another den. He try to go in but come out. There's another bear in there. My grandfather knows now where there is one hibernating bear. That black bear go on looking for another den. Same thing happens again, tried to go in a den but come out again because there was another bear in there. This happened four or five times. Once my grandfather knew where all the bear dens are, he go and kill a bear each month … Do this until April or so. At that time fish start to come back up the river, he don't have to go look for any more black bear to eat (Mack 1993:146).

Before the introduction of firearms, the preferred weapon of the winter bear hunter was the spear (Hallowell 1926). Bear-hunting spears of the Yakutat Tlingit[2] were described as having a "double-edged blade (like that of a dagger) about 14 inches long, set into a handle that was about 6 or 7 feet long" (de Laguna 1972:368). A Haida story from the bear totem described the hunting spear as having "a shaft two feathers in length" (Deans 1899:46). A Nuu-chah-nulth spear for killing bears is described as five feet long with points that are generally a finger's length (Mills 1955:22).

Hunters would not enter and kill the bear in the confines of its den, but would seek to roust the bear from its den using smoke, prods, or dogs (Hallowell 1926:39). De Laguna (1972:364) describes this type of hunt amongst the Tlingit:

[2] The general location of the peoples discussed in the text are as follows: Yakutat Tlingit (south coast of Alaska); Haida (Haida Gwaii), Nuu-chah-nulth (west coast of Vancouver Island), Tlingit (southeast Alaska), Eyak (south coast of Alaska); Ainu (northern islands of Japan); Kwakwaka'wakw (central coast of BC); Tsimshian (northern coast of BC)

> The bear usually attacked as he emerged from the den. A party of men would wait on the slope above the den for the bear to come out. They were armed with bows and arrows, but the bravest used spears. The butt end of the spear was braced against the ground, and when the bear charged, the man would quickly jump aside, letting the bear impale himself on the spear.

The Eyak of the Copper River Delta undertook winter bear hunting in much the same manner as recorded for the Tlingit, using dogs to locate the dens and either spearing the bear as it emerged or taunting it into charging into a trap of spears (Birket-Smith and de Laguna 1938:100). Ainu hunters in eastern Asia would engage in even closer hand-to-hand combat with their prey.

> The entrance of the den was sometimes blocked, the animal stirred out of its den by prodding, dogs, or smoke, an Ainu armed with nothing but [his] hunting knife will go in and force the animal to come out. Even when the beast appeared outside, the bow and arrow was not always used, especially when the animal stood upon his haunches at close quarters. "Drawing the knife," an Ainu "rushes into the animals embrace, hugs him closely and thrusts the knife home into his heart." Or the spear will be held in readiness, and when the beast makes a rush at the hunter, the latter will step back a few paces and allow the bear to fall on the spear (Batchelor 1911, cited in Hallowell 1926:39).

It was difficult to directly attack bears with spears because they were capable of parrying spear thrusts with their forepaws (Hallowell 1926:39). One strike of a spear was often not sufficient to dispatch a bear, and hunters trying to withdraw a spear may pull loose the handle, leaving the point embedded in the animal (de Laguna 1972: 365).

While bears may appear to be very vulnerable during hibernation, the ethnographic literature suggests that winter hunting of bear was a risky venture, and many hunters were injured or killed undertaking such pursuits (Hallowell 1926). Regardless, this strategy was efficient and successful enough to have been adopted by peoples across northern Eurasia and North America as a primary means for hunting bears.

Archaeological traces of such bear-hunting activities may be rare in bear dens. However, injured bears returning to their dens may leave some archaeological traces in the form of broken spear points that had been lodged in their bodies.

## *Trails and Trapping*

In the spring, after bears have emerged from their dens and have begun to roam, they can no longer be hunted in their dens. Hunting bears with arrows is a dangerous venture even with modern archery equipment (Mack 1993:90-91). To avoid active confrontation with bears, humans have used several methods to trap bears during the spring, summer, and fall. The success of these methods relied heavily on

the ability of the hunter to predict the movements of the intended prey.

Bears are known to keep to regular trails (Holzworth 1930:289-290). They have even been observed to exhibit a tendency to step in old footprints, a habit known as "step-marking" (Hummel and Pettigrew 1991:62). The recognition of such trails was integral to efforts to bait and trap bears. This repeated use of trails is of particular interest to hunters, enabling them to predict the movements of bears and to set bait and traps accordingly.

The use of snares to trap bears has been documented across the northern hemisphere (Hallowell 1926). Deadfall traps were used up and down the Northwest Coast of North America as well as along the Siberian coast. Both types of devices are designed to attract bears with some sort of bait. Snares, when triggered, will close around the body of the prey, sometimes suspending it in the air. Harrison (1925: 93) described the construction of bear snares by the Haida:

> They sometimes made a trap with the help of a soft sapling which they found near a bear trail; the top of the tree was bent towards the ground and fastened down, a rope made of spruce root fiber was attached to the bent sapling and a noose on the top was cunningly arranged and almost touching a log placed there for the purpose of affixing a fish on either side as bait. No matter from which direction the bear approached he would scent the bait, and would first eat the fish on the near side of the log, to secure the other fish he would have to place his head through the noose, a light trigger catch would be released, and the sapling would spring back to its normal condition with the suspended bear…

In deadfall traps, a trigger is disrupted when the bait is taken, and a heavy object such as a log falls on the bear. Swanton (1905b:68-69) described a Haida deadfall trap, illustrated in Figure 1:

> The *hadjigā'ñwa-i* (a) are four posts, two on each side of a bear trail. These are fastened together in pair by the *kiut!a'sk!î* (b). Between them lies a timber called the *q!at$_A$'nlanu* (c), while the deadfall proper consists of a timber called *sî'txasq!a'gida* (d) hung above this at one end and weighted at the other end, which rests upon the ground. The suspended end is held by a loop (*lq!ō'ya-i*), which passes over a short stick, the *x.ā'ña* (e), which is supported in its turn by one of the *kiut!a'sk!î*. A rope is fastened to the inner end of this *x.ā'ña* and carried down to the notch in another stick called sqaolg.*ai'wa- î* (f), which is fastened to a stake at one side of the bear trail. Other cords, *qa-ĭ'tu* (g), are then fastened between the two front posts and carried down to this loop. The bear, coming against the latter, in its endeavors to get through pulls the loop (h) out of the notch in the *sqaolg.ai'wa- i*. This in turn releases the *x.ā'ña* allowing the *sî'txasq!a'gida* to fall upon the animal's back.

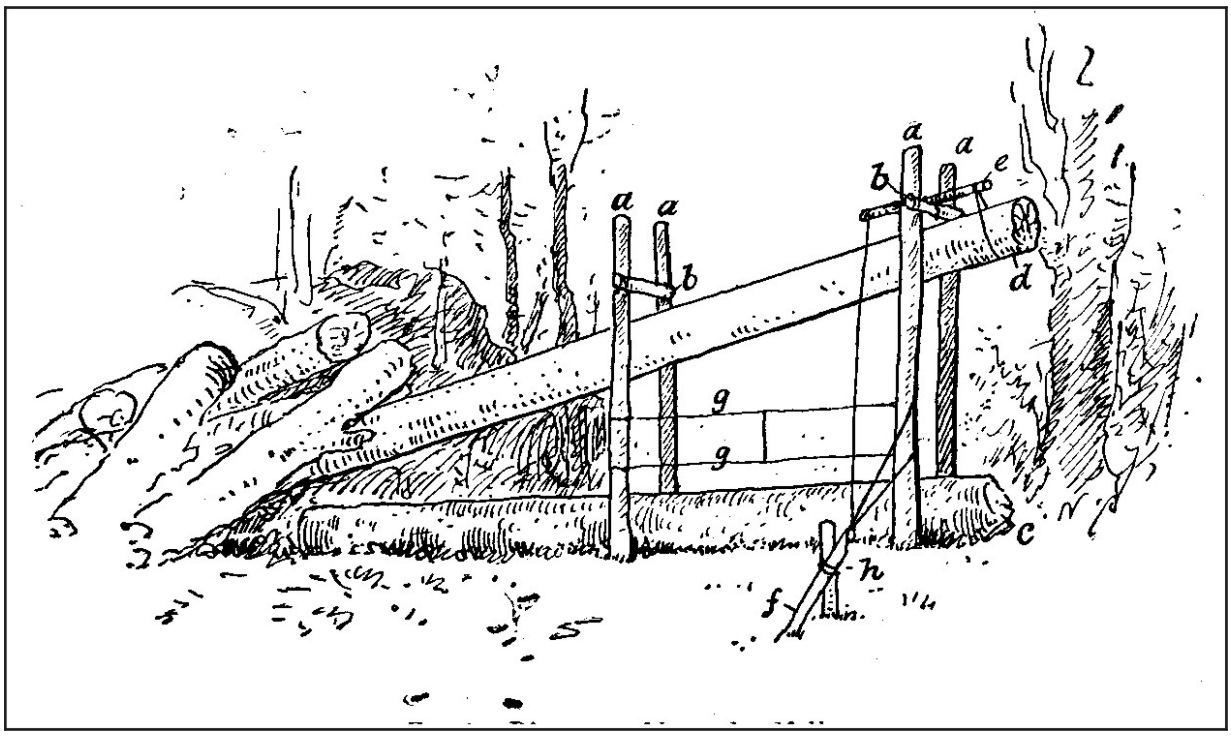


**Figure 1: Haida deadfall trap (from Swanton 1908). See text for description.**

Emmons (1991:134) observed that the mainland Tlingit preferred snares, while the island dwellers preferred deadfall traps. He suggested that the snare was likely introduced from inland areas. Deadfall traps and snares have the benefit of allowing the capture of bears without having to get close to them. In some regions, their use was restricted to locations away from villages, as it was considered too dangerous to erect these traps near the rivers of fishing camps where women and children accompanied the men to prepare salmon (Harrison, 1925). The Masset (Haida) story of *The Bear Hunters* tells the story of a man with copper bands around his legs who is caught in a remote deadfall trap (Swanton 1908: 672).

Archaeological evidence of snare and deadfall traps would be limited as they are made primarily of organic components unlikely to be preserved, but the remains of butchery activities may occur in the vicinity of such trapping localities.

## The Economy of Bears

Employing traditional means of winter bear hunting was undoubtedly a risky venture. Engineering and constructing a deadfall trap or snare for summer hunting would have involved considerable effort. Where such efforts were undertaken, one possible interpretation is that the exploitation of bears was an important component of the subsistence economy.

Ethnographic documents indicate that bear parts were used in a variety of different manners. For example, among the Yakutat Tlingit, bear bladders were used as floats for harpoon lines, split humeri were used for skinning small fur-bearing animals, prepared bear intestines were woven into

waterproof jackets and bags, canines were used by basket makers to smooth out lumps, meat was preserved by smoking, teeth and jaws were made into amulets by shaman, and skins were used for warmth and clothing. The hard, cortical bone of bears was used for the manufacture of bone tools (de Laguna 1972: 366):

> The hunter used to carry a heavy [bear] bone awl, suspended by a cord around his neck, or over one shoulder and under the other arm. With this he could sew the bear hide to make a bag in which to carry home the meat and fat.

However, the traditional economies of the Northwest Coast focused on the rich diversity of marine resources that are periodically available in great quantities (Suttles 1990). Given the reliability and abundance of these resources, it appears unlikely that bears figured prominently as economic necessities. Such marine foods were available during the Pleistocene/ Holocene transition (Fedje et al. 2001). Therefore, evidence of bear hunting from this period may indicate that bears had a cultural significance beyond their economic utility.

## Bear Ceremonialism

In addition to the widespread similarities in traditional bear hunting techniques, other pan-boreal commonalities uncovered by Hallowell's (1926) research involve ceremonial aspects that surround the hunting of bears. These include the avoidance of using the word for "bear", the custom of talking to the bear after it has been killed, the holding of post-mortem ceremonies, and the special disposal of bear remains. Many specific post-mortem ceremonies are found to have had wide geographic distributions. The head and skin of the bear are the focus of special ceremonial attention, offerings are made to the bear, taboos surround the preparation or consumption of the bear, and a communal feast is often held. Other ceremonial activities involving bear kills may include the special disposal of the skull, distinct methods of butchery, the stuffing of the skin, the bringing of carcass parts into a house through an opening other than the door, and a final bear feast in which all is consumed at one sitting. Hallowell (1926: 148) noted that "no other animal was found to attain such universal prominence as the bear, nor to have associated with it, over such a wide geographical areas, such a large series of customs."

There is considerable ethnographic evidence on the Northwest Coast for bear ceremonialism, which occurred in many different manifestations. Compared with the many cultures in Eurasia and other parts of North America among whom the bear held a unique ritual significance, the ceremony with which the native peoples of the Northwest Coast treated bears was extended to other animals such as salmon and whales. In the *Haida Song of the Capture*, the ritual importance of the bear is compared to that of the salmon and contrasted to that of a captured enemy (Fraser 1957:13).

Ritual behaviors in preparation for bear hunting have been documented for the peoples of the Northwest Coast. Before embarking on a expedition, Tlingit bear hunters prepared for the hunt by engaging in bathing, fasting, and abstinence in order to ensure their success (de Laguna,

1972:365). Furthermore, while the hunters were out, the women were to remain quiet and calm. Bears were often referred to by names other than "bear" – for example, "Big Flappy Foot" (de Laguna 1972:880-881). Tsimshian hunters would practice purification rituals to help ensure a decent hunt. Twenty days of abstinence from bathing and sex were followed by two days of indulgence in both (Tate 1993:35). Similarly elaborate ritual preparations are described in the Haida story, *The Bear Hunters* (Swanton 1908).

Once a bear has been killed, several other ritual behaviors were observed. When a Haida hunter had killed a black bear "and was carrying the skin home, he tried not to sneeze; but if such a thing did happen, he exclaimed, 'hali'xiasa!' [f.n. This is perhaps the Black-Bear word for "chief".]" (Swanton 1905b:57). In Nuu-chah-nulth, Kwakwaka'wakw, and Haida societies, bears were venerated when returned to the village by being placed at the centre of attention in the chief's house (Hallowell 1926; Fraser 1957).

When a Haida hunter prepared a bear's body to be skinned and butchered, the bear would "sing" through the hunter, as recorded in the *Story Told to Accompany Bear Songs* (Swanton 1905b:94). A Haida story of a bear-trapping adventure tells that it was the practice to cut a bear open away from one's self (Swanton 1905a:57). In another, *The Woman that Married the Bear*, the bear sacrifices itself to the woman's brother, after teaching her the proper way in which to prepare and respect him once killed (Barbeau 1946).

After butchery, several other ceremonial actions have been documented, particularly in regards to the disposal of various bear parts. The Tsimshian narrative, *The History of Kbi'shounty,* instructs that the head and tail of the bear should be burnt, red ochre should be placed on the skin, and the skin placed near the fire to keep it warm. A special song is to be sung at each different stage – when the bear is first killed, when it is butchered, when the skin is dried, and when its heart is roasted and its head burnt (McClellan 1970:31; Tate 1993:38). Yakutat Tlingit bear hunters often removed the bear head and buried it facing the mountains (de Laguna 1972:362). They sang a traditional "dead bear" song during bear butchery (de Laguna 1972:366). The Tlingit were also observed to put eagle down on the heads of skinned bears to honor their spirits, and to take the head and feet and either bury them deep in the ground or cast them into the sea. Bear flesh was consumed and the pelt was used much like that of any other animal (Emmons 1991:133).

Bears have played a prominent role in the belief system and worldview of Northwest Coast peoples. The Haida, Tlingit, and Tsimshian peoples use grizzly bear crests. Historical narratives reveal that grizzly bears were believed to have contributed to the lineages of people with these crests (e.g., Swanton 1905b). In discussing the origins of the Tongass Tlingit, Emmons (2000) noted that:

> Of the three families that constitute this tribe the origin of the two oldest is a matter of conjecture, and it seems most reasonable, from their traditions, that they were among the first of the migrating bands to descend the Skeena and the Nass and settle on the nearby

> coast, but there is a curious belief prevalent among the old people that one of these families, the Teikweidi, came from over the sea. As told to me by a very intelligent older man, the Teikweidi came from the ocean and were the first people to reach the outer coast. They settled on Dall Island off the southwestern portion of Prince of Wales Island. In time, they increased and were joined by people from the Interior who had come to the coast and this combination formed a nucleus from which the Tlingit, Haida, and some Tsimshian were derived… The Teikweidi (Brown Bear rock house or cave people) are unquestionably the oldest family here. Their origin is unknown but a close relationship with the Haida is recognized.

Given the abundance of ritual surrounding bears, it is clear that the importance of bear hunting transcended simple economic considerations. Hallowell (1926) evaluated three hypotheses that address why these pan-boreal commonalities in bear hunting practices and their associated ceremonial activities became so widespread: the psychological, the economic, and the historico-geographic. The psychological hypothesis argues that bears have made a common impression on the human psyche that resulted in the widespread similarity of ritual practices. It suggests that human-like form of a skinned bear impresses itself deeply into the human psyche. Hallowell rejected this hypothesis on the basis that bear ceremonialism is not found in all areas where bears occur and that there is a great deal of variability in the degree of bear veneration. The economic hypothesis proposes that the veneration of a particular animal is in proportion to its usefulness, but Hallowell found that this was not supported by ethnographic observations. Hallowell favored a historico-geographic hypothesis that the common traits found in bear hunting and ceremonialism are due to common historic roots and spread as a result of later migration and diffusion:

> In short, I think it more than likely that a bear cult was one of the characteristic features of an ancient Boreal culture, Old World in origin and closely associated with the pursuit of reindeer. Later, it became intercontinental in its scope, extending from Labrador to Lapland. As this culture spread… a veneration of the bear and simple rites connected with hunting the animal became more and more widely diffused and radically modified in the course of time. This hypothesis would account, it seems to me, for the ostensible differences in the customs described, as well as for the peculiar underlying trends and similarities observed (Hallowell 1926:161-162).

He went on to speculate that bear ceremonialism may have originated among some Paleolithic peoples and persisted among hunting peoples of the north for millennia (Hallowell 1926:162-163.). If such were the case, one would expect to find some evidence of bear hunting and ceremonialism in archaeological contexts from the Late Pleistocene and Holocene. Despite the case made for the historico-geographic hypothesis and the association of bear and cultural remains in many

archaeological contexts, evidence for the practice, antiquity, and continuity of bear ceremonialism remains controversial.

## Archaeological Evidence of Bear Hunting

The archaeological record of bear hunting and utilitization is best known from the Middle and Upper Paleolithic periods of Europe and Western Asia (e.g., Tillet and Binford 2002). Archaeologists working in cave sites dating to these periods have found many bear bones in association with cultural material. Despite the claims of early archaeologists for the existence of bear cults and extensive bear exploitation during these periods (e.g, Bächler 1921), more recent studies – incorporating scientific methods and, in particular, taphonomic analyses – have found little clear association between bear remains and the human occupation of caves. Their findings have resulted in the assessment that "there is no good evidence that cave bears were hunted by hominids" (Gargett 1996:38); "…many professionals are now convinced that bear remains in Paleolithic caves most likely represent hibernation-related deaths that occurred independently of human uses of the same localities" (Stiner 1998:304). However, tool marks indicating butchery have been found on cave bear bones in some Middle Paleolithic and later contexts (Barta 1989, cited in Stiner 1998:304; Stiner 1994:109-123). Some researchers have argued that the archaeological evidence does indicate that bears held particular significance for the Middle Paleolithic, Upper Paleolithic (Gabori-Csank 1968; Bonifay 2002; Morel and Garcia 2002), and Neolithic (Arbogast and Meniel 2002) peoples of Europe, although not to the same degree as originally suggested by Bächler (1921).

The primary reason for the controversy concerning past bear–human interaction is the frequent association of bear and cultural remains in cave excavations. Those who discount this as evidence of bear–human interaction have argued "that humans and ursids used [the same] localities at different times" (Wolverton 2001:56). This ongoing debate has provided little insight into whether the practice of bear hunting from the Pleistocene/Holocene transition on the northern Northwest Coast of North America had its roots in the Old World.

Only a few archaeological sites from the Pleistocene/Holocene transition in North America and East Asia have produced possible evidence of bear use by human populations. Two recent anthologies on the Pleistocene/Holocene transition in these regions indicate that bear remains are rarely found in archaeological contexts dating to this period (Bonnichsen and Turnmire 1999; West 1996). There are exceptions, including the possible grizzly remains that are noted from the Lime Hills Cave 1 in southwestern Alaska (9,500–8,000 bp). It is unclear if these remains are associated with the cultural material located in this cave (Ackerman 1996:470). Grizzly bear remains have also been noted at Bluefish Caves in the northern Yukon, in archaeological strata of late Pleistocene age (Cinq-Mars and Morlan 1999:202). Some of these bear bones exhibit cut marks (J. Cinq-Mars, pers. comm.). In Idaho, on the banks of the lower Snake River, a site dating to 10,300 bp was found with remains attributed to grizzly bear. During the single, brief occupation of this site, an elk and a grizzly bear were prepared and

possibly consumed (Sappington and Schuknecht-McDaniel 2001).

On the Siberian island of Zhokhov, an early Holocene habitation site (8,000 bp) has produced an abundance of polar bear remains. This site indicates that the early inhabitants of this Arctic island relied heavily upon polar bears for subsistence (Pitul'ko and Kasparov 1996:15; Pitul'ko 2003). The predominance of polar bears in the Zhokhov assemblage differs greatly from other Arctic sites, where they usually comprise only a minor element (Pitul'ko and Kasparov 1996:15). Many of the bones excavated from this site exhibit cut marks. Measurements of the skulls suggest that female bears with cubs were killed more often than male bears. Female bears venture into this area to look for dens to give birth, and they were hunted on Zhokhov Island during this period (Pitul'ko and Kasparov 1996:18). Differential transport is evident from the remains at Zhokhov, with an abundance of cranial and fore-limb elements, and a paucity of vertebrae, scapulae, and hind-limbs (with the exception of fibulae). The evidence from this site indicates that early Holocene populations were able to inhabit High Arctic islands by engaging in the intensive exploitation of bears during the winter months.

### *Archaeological Evidence for Bear Hunting on the Northern Northwest Coast of North America*

Bear bones and cultural remains have been found in association in some of the earliest archaeological contexts on the northern Northwest Coast. In particular, three limestone caves – On-Your-Knees Cave in southeast Alaska (Dixon et al. 1997), and K1 Cave (Fedje et al. 2004; Ramsey et al. 2004) and Gaadu Din (Fedje 2004), both on Haida Gwaii – have produced accumulations of bear bones associated with hunting equipment (Figure 2). At the early Holocene open-air wet site of Kilgii Gwaay, bear are the most abundant land mammal in the faunal assemblage, which is discussed in greater detail below (Fedje et al. 2001). Limited testing at other intertidal and raised beach sites in southern Haida Gwaii has also produced bear remains (Fedje et al. 1996; Mackie and Sumpter, in press). With regards to the prevalence of bear remains at these sites, Mackie and Sumpter (in press) have suggested that bears were economically more important in these earlier time periods. With the exception of On-Your-Knees Cave, all of the sites discussed in this section are located in southern Haida Gwaii.

The importance of bears to this early economy may be in part due to the paucity of large terrestrial mammals on island locations such as southern Haida Gwaii (Wigen, in press). Contrary to the speculations of Mackie and Sumpter (in press), it is possible that this pattern of bear hunting continues as a tradition into later Holocene periods. For example, black bear remains were recovered from the following contexts on Haida Gwaii: Cohoe Creek (5,700–4,400 bp) (Wigen and Christensen

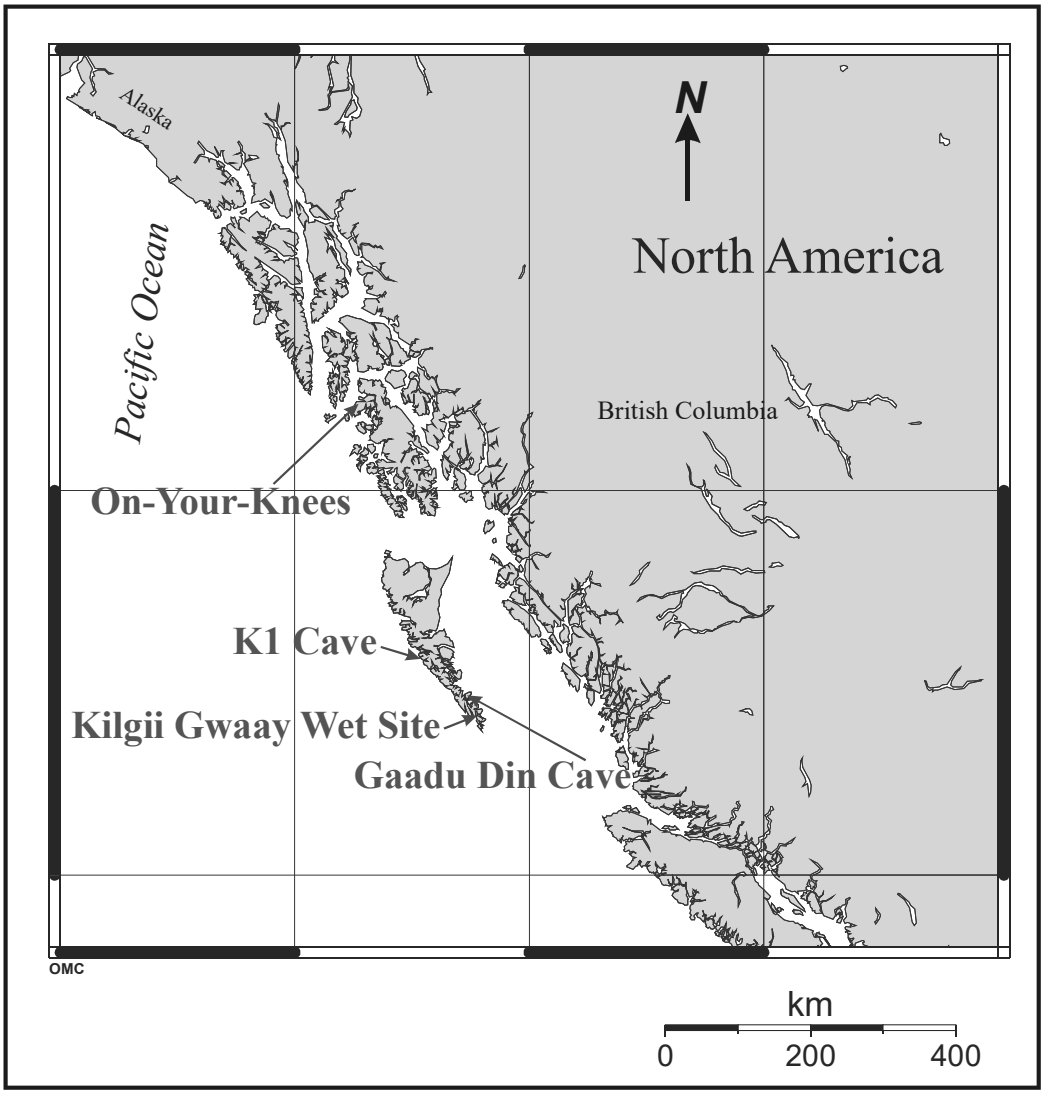


**Figure 2: Location of sites discussed in the text. [This map was created using Online Map Creation at www.aquarius.geomar.de]**

2001:16), Blue Jackets Creek (4,200–2,000 bp) (Severs 1974), later Holocene deposits at Second Beach (Christensen et al. 1999), and test excavations at several late Holocene shell middens in southern Haida Gwaii (T. Orchard, pers. comm.). The very small number of bear bones that were found at late Holocene sites on Kunghit Island, at the very southern end of Haida Gwaii, may simply reflect the general absence of bears in this area (Acheson 1998).

In light of the debate over similar evidence from the Middle and Upper Paleolithic, the co-occurrence of bear and cultural remains from early period sites on the northern Northwest Coast should be interpreted with caution. For the three cave localities with late Pleistocene and early Holocene bear and archaeological remains, no detailed taphonomic analyses have yet been undertaken to address this issue. However, preliminary investigation suggests that hibernating bears at these den sites were hunted by humans.

Archaeological and paleontological investigations at On-Your-Knees Cave on Prince of Wales Island, southeast Alaska, have revealed cultural remains dating to 10,300–9,800 bp and paleontological remains dating from 40,000 bp to present (Dixon et al. 1997). Bear bones are a significant component of the assemblage from the cave, particularly between 40,000–27,000 bp and 13,000–5,000 bp (Heaton and Grady 2003). According to Hall (1999), the association of cultural material and bear remains suggests the possibility that bear hunting was being practiced. However, as in the Middle and Upper Paleolithic, the association of bear remains and cultural remains does not necessarily demonstrate the interaction of these species. A detailed site report on the archaeology of On-Your-Knees Cave has not yet been published.

Some archaeological evidence from On-Your-Knees Cave is suggestive of bear-human interaction. One is the presence of a spear fragment within the cave. This fragment conjoins with another found outside of the cave (Dixon et al. 1997). This situation may have resulted from a hunting incident in which a spear point was broken in a bear, after which the wounded bear returned to its den to die, leaving the broken point. In addition, a split bear tibia found in the cave and dating to 10,300 bp may represent human modification of the bear bones, possibly an early stage of the manufacture of bone tools. Finally, human remains dating to 9,200 years bp were also recovered from the cave. They exhibited signs of carnivore gnawing (Dixon 1999) and have been interpreted to represent the bones of an unsuccessful bear hunter (Hall 1999).

At K1 Cave on the western shore of South Moresby Island, Haida Gwaii, bear remains dating to 14,500–9,500 bp have been recovered (Ramsey et al. 2004). Excavations in Locus 11 of the cave have revealed stratified deposits with a number of bear bones and other fauna dating between 12,500 bp and 10,000 bp. In addition to these faunal remains, two spear point bases were recovered in a stratigraphic context dated to 10,900–10,600 bp (Fedje et al. 2004). No other archaeological material was found in association with these bones, suggesting that the broken projectile points may have entered the cave in the body of a wounded bear.

At Gaadu Din Cave in southern Haida Gwaii, a complete chipped stone spear point, a fragmented bifacial spear point, a retouched flake, and the tip of a bone point were recovered in association with bear remains dating to 10,000 bp (Fedje 2004). No debitage or additional archaeological materials were found at this site, suggesting that it was most likely used as a hunting and butchery site rather than a place of residence. Charcoal flecks were common in the deposits and may have originated from attempts to smoke denning bears out of the layers by throwing burning branches into the den.

These three sites present evidence of bear hunting during the Pleistocene/Holocene transition. In particular, the presence of spear points is suggestive of winter hunting. However, it must be reiterated that detailed taphonomic analyses of these assemblages remain to be conducted. There are several other species represented in the faunal collections from these sites

that are not bear (Heaton and Grady 2003; Ramsey et al. 2004). Because bears are not known to eat during their winter hibernation, there must be some explanation as to how these other bones entered the cave. Furthermore, many of the bear bones have tooth marks on them (Dixon et al. 1997; Ramsey et al. 2004; Fedje 2004), suggesting that they may not have died naturally during hibernation. It is possible that they were killed and/or that their remains were scavenged by other bears. Lastly, the presence of cultural remains within the caves may be indicative of some human occupation.

The co-occurrence of bear remains and stone artifacts at these sites may represent evidence of winter bear hunting practices during the Pleistocene/Holocene transition. Evidence from the early Holocene site of Kilgii Gwaay clearly illustrates the hunting and exploitation of bears.

## The Kilgii Gwaay site

Kilgii Gwaay, also known as Ellen Island, is located close to the southernmost end of Haida Gwaii. The Kilgii Gwaay site (1325T) is a wet shell-midden, currently located in the intertidal zone, and was occupied for a short period of time between 9,450 and 9,400 bp, when sea levels were slightly lower than at present. In addition to preserved wooden, bone, and stone tools, a large number of faunal remains were recovered from this site (Fedje et al. 2001).[3]

The high species diversity of the Kilgii Gwaay faunal assemblage is indicative of a broad diet, and its species composition reflects a generalized, marine-oriented subsistence economy (Table 1). However, the faunal assemblage is notable because of the high proportion of bear. Black bear was the only large terrestrial mammal identified in the assemblage. Several bear bones exhibit cut marks, others were burnt, and seven long bone elements were split longitudinally. Kilgii Gwaay itself is too small of an island to sustain a bear population but is within swimming range of larger islands.

**Table 1: Minimum number of individuals (MNI) and number of identified specimens (NISP) for mammals at Kilgii Gwaay**

| SPECIES | MNI | NISP | % NISP |
|---|---|---|---|
| Black bear (*Ursus americanus*) | 5 | 83 | 47.4 |
| Harbour seal (*Phoca vitulina*) | 6 | 65 | 37.1 |
| Sea otter (*Enhydra lutris*) | 4 | 20 | 11.4 |
| River otter (*Lontra canadensis*) | 1 | 3 | 1.7 |
| Northern sea lion (*Eumetopias jubata*) | 1 | 2 | 1.1 |
| Northern fur seal (*Callorhinus ursinus*) | 1 | 2? | 1.1 |
| TOTAL ID | 18 | 175 | |
| Sea mammal | | 1 | |
| Large land mammal | | 11 | |
| Medium mammal | | 10 | |
| Large mammal | | 68 | |
| Mammal | | 499 | |
| TOTAL MAMMAL | | 764 | |

The large amount of bear bone associated with the short cultural occupation suggests that bears were being hunted by the site's inhabitants. No bones were found in the non-cultural deposits at the site. Unlike the

[3] A 1/8" screen size was used during the excavation.

cave sites discussed in the previous section, there is a paucity of spear points at Kilgii Gwaay, with only one small unifacial point and one biface edge fragment found in a sample of 2271 stone artifacts recovered from the site.

Based on the faunal evidence, Kilgii Gwaay appears to represent what was primarily a non-winter occupation (Table 2). The species of bird and fish in the assemblage indicate that the site was occupied some time between spring and fall, an interpretation supported by the presence of sea mammal pups, which likely died during or not long after the birth season from May to July. Given the absence of spear points and the faunal evidence for non-winter occupation of the site, it is most likely that traps or snares were used for bear harvesting. Spears would not have been necessary, and butchery could have been conducted using large flake tools, which are abundant at Kilgii Gwaay.

**Table 2: Seasonality of species at Kilgii Gwaay**

| SPECIES | winter | spring | summer | fall |
|---|---|---|---|---|
| Salmon (*Oncorhynchus* sp.) | | | x | x |
| Herring (*Clupea pallasi* ) | | x | | |
| Harbour seal pup | | | x | |
| Northern sea lion pup | | x | x | |
| Cackling Canada goose (*Branta canadensis minima* ) | | x | | x |
| Pacific loon (*Gavia pacifica* ) | | | | x |
| Albatross (*Phoebastria* sp.) | | | x | |

Of particular interest is the fact that the Kilgii Gwaay site lies in a sheltered area, but in close proximity to the west coast. The presence of the remains of albatross, which are common off the shore of the west coast, suggests that the site inhabitants traveled the short distance to the coast (Fedje et al. 2001:114). Drawing from the ethnographic observations noted earlier (Harrison 1925), one may speculate that bear traps were set in areas on the west coast where there was less human activity and thus less likelihood of accidentally trapping a person.

From the total of 83 identified black bear bones, the distribution of elements from Kilgii Gwaay shows the influence of selective processes (Figure 3). Most notably, cranial and mandibular specimens are relatively abundant, vertebrae and metapodials are virtually absent, and there is a disproportionately low representation of canines.

A number of factors may determine skeletal element representation in a faunal assemblage. The two that have received the most attention are differential preservation and differential transport. Certain elements preserve better than others, and bone density has been used as a proxy measure of a bone's ability to resist destruction (Lyman 1994). While bone density data have been derived for a number of mammal species, none are available for bear or any mammalian carnivore. As a result, the influence of post-depositional destructive processes on the Kilgii Gwaay fauna may not be readily quantified. In terms of differential transport, evidence of human selection of different skeletal elements is typically interpreted in terms of "utility", a measure

of the nutritive value represented by each element, including its associated meat, marrow, and grease (Binford 1978). Unfortunately, as is the case with bone density values, no utility data are available for bear elements.

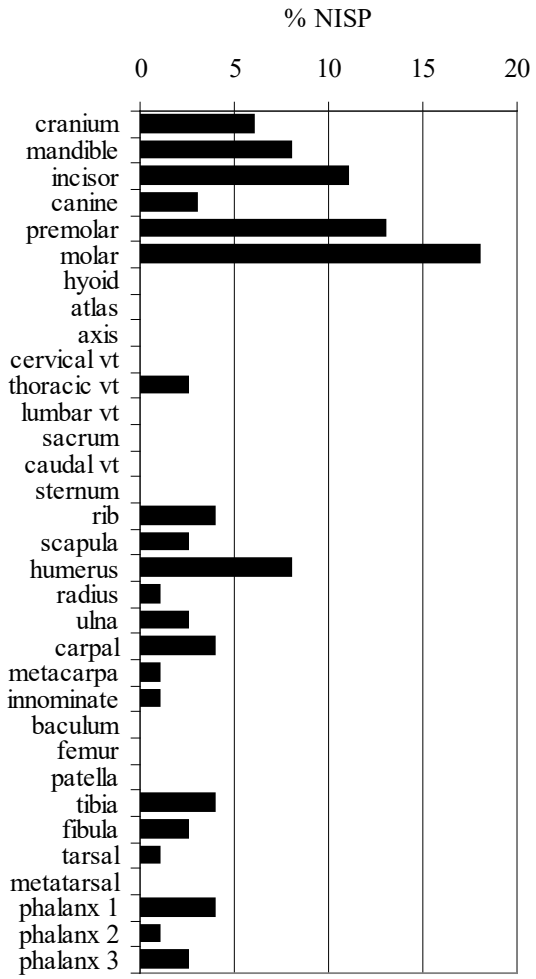


**Figure 3: Relative abundance of black bear elements at Kilgii Gwaay**

There is some indication, however, that differential transport did play a role in shaping the representation of bear bones at the Kilgii Gwaay site. The pattern of skeletal element abundance for black bears at Kilgii Gwaay resembles that described for polar bears at the Zhokhov Island site (Pitul'ko and Kasparov 1996). The lack of vertebral elements and hind limbs at Zhokhov was interpreted to be the result of differential transport from the initial kill and butchery site. The large number of cranial elements at Zhokhov was attributed to the economic importance of the brain and tongue. At Kilgii Gwaay, a similar paucity of vertebrae and hind limbs and abundance of cranial elements, some of which exhibit cut marks (Plate 1)[4], may have also reflected preferential selection by hunters. For mammal species for which utility data are available, cranial elements are considered to be of low utility despite the value of the brain and tongue (Lyman, 1994). If the crania of bear were selectively transported to Kilgii Gwaay, this did not necessarily indicate a purely economic decision. In addition, the paucity of canines compared to other teeth may have reflected their value and curation as charms or talismans.

While the utility of bear elements remains undocumented, it is likely subject to some seasonal variation. Bear meat is less tough during the spring and summer months (Dudoward 1983). Conversely, bear hides will be of better quality in the early winter, when bears will have accumulated a substantial amount of fat prior to hibernation. As the bears at this site did not appear to have been killed in the winter, it would seem that they were hunted primarily for their meat, which may have been preserved through smoking. As bears were the only large land mammals available to the Kilgii inhabitants, their bones were likely valued as a raw material. Because of the general lack of bone raw material, a greater number of elements may have been transported to the site than would be expected under other

[4] Please see the inside of the back cover for Plate 1.

circumstances. Several bone tools, including a barbed point, a billet flaker, two awls, and two split tibiae (Plate 1), have been documented from the site. Although it can not be determined if all the bone tools were fashioned from bear bones, this is most likely the case. The structure of sea mammal bone, also abundant at the site, is less suitable for tool manufacture.

Seventy burnt bone fragments were recovered from Kilgii Gwaay. Of these, half (35) could be attributed to land mammal – most likely bear – but only one specimen to sea mammal, even though the two taxa are represented in similar frequency in the assemblage. The remaining burnt fragments consist mostly of fish (29) and some bird (7). The differential treatment of the mammal remains resembles the ethnographic patterns of ceremonialism bestowed upon bear and the first salmon caught in the spring (e.g., Fraser 1957:13). Such patterns suggest the possibility of the ceremonial importance of bears (Hallowell 1926) and fish to the inhabitants of the site. An alternative, functional explanation may be that the bear and fish bone were used as fuel for fire. However, climax forests were established in the area at this time, indicating that there was plenty of fuel available to site inhabitants.

Drawing from analogy, the evidence from Kilgii Gwaay and the cave sites mentioned above suggests that bear hunting was practiced in both summer and winter. Indeed, the hunting technologies practiced may well have been similar to those recorded ethnographically across northern Eurasia and North America. The remains from Kilgii Gwaay demonstrate that the use of bears supplemented a marine-oriented subsistence pattern.

## Conclusions

Bear hunting and bear ceremonialism, which have been documented across northern Eurasia and northern North America (Hallowell, 1926), were a part of the lifeways of the early island inhabitants of the northern Northwest Coast. These practices may have been less an adaptation to the environmental conditions of the Northwest Coast than a continuation of ancestral bear hunting traditions by the earliest human settlers of this region.

Bear-hunting strategies benefit from certain predictable aspects of bear behavior. Knowledge of the location of bear dens provides those willing to hunt a bear in mid-hibernation a potential mid-winter source of food, fur, and bone. While roaming in warmer seasons, grizzly and black bears are known to habitually make and follow trails, particularly in forested areas. This reuse of the same travel corridor allows hunters to predict the movements of bears and thus set traps or hunt them along those trails. Ethnographic data show that the practice of bear hunting was pan-boreal, across the northern hemisphere. They indicate that winter hunting was often conducted with spears, which were either wielded by the hunter or set in a stationary position at which the bear was provoked or tricked into charging. In warmer weather, when bears were no longer in their dens, they were typically hunted through the use of traps and snares. As a result, the frequency of spear points at a site may provide insight into the seasonality of bear-hunting activities.

Ethnographic observations of Northwest Coast peoples document multiple economic uses of bear remains as food, raw material for tool manufacture, and clothing. Bears were also venerated and accorded special ceremonial rites.

Evidence from three cave sites – On-Your-Knees, K1, and Gaadu Din – on the northern Northwest Coast suggests that the practice of bear hunting may date back to the Pleistocene/Holocene transition in this region. As these archaeological sites are the earliest discovered in this region thus far, it appears that bear hunting was an activity of its earliest inhabitants. The focus on cave sites may bias our knowledge of this period, limiting it to a narrow view of what was likely a broad subsistence economy.

At the open-air wet site of Kilgii Gwaay, the faunal assemblage and a lack of spear points indicates that its early Holocene inhabitants engaged in the hunting of bear in the warmer seasons. Bear was the only terrestrial mammal recovered, and the remainder of the assemblage shows that these inhabitants had a marine-oriented subsistence economy. The frequency of burnt bear bones and the differential transport of bear elements suggest that the inhabitants of Kilgii Gwaay practiced some aspects of bear ceremonialism. This evidence, combined with the marine focus of the subsistence activities, indicates that bear hunting may have been as important in ritual terms as it was for economic reasons.

The archaeological data from this region show evidence of bear hunting and ceremonialism dating to its earliest human occupation. These data add a temporal dimension to the ethnographic observations of the pan-boreal continuity of ancestral bear hunting traditions. Together, the archaeological and ethnographic data provide evidence for a pattern of bear-human interaction on the Northwest Coast of North America dating back to the Pleistocene/Holocene transition.

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## References Cited

Acheson, S.
1998 *In the Wake of the ya'aats'xaatgaay ['Iron People']: A Study of Changing Settlement Strategies Among the Kung-hit Haida*. BAR International Series 711.

Ackerman, R. E.
1996 Lime Hills, Cave 1. In *American Beginnings: The Prehistory and Palaeoecology of Beringia*, edited by F. H. West, pp. 470-478. University of Chicago Press, Chicago.

Arbogast, R. M. and P. Meniel
2002 Au subjet du rôle de l'ours brun sur les sites Néolithiques et protohistoriques d'Europe tempérée occidentale. In *L'Ours et L'Homme*, edited by T. Tillet and L. R. Binford, pp. 193-200. Études et Recherches Archéologiques de l'Université de Liège, Liège.

Bächler, E.
1921 Das Drachenlock ob Vättis im Tamintale, 2445 m ü.M. und seine Bedeutung als Paläontologische Fundstätte und prähitoriche Niederlassung aus der Altsteinzeit im Schweizerlande. *Jahrbuch der St. Gallischen Naturwissenschaftlichen Gessellschaft* 57:1-144.

Barbeau, M.
1946 Bear Mother. *Journal of American Folklore* 49:1-12.

Batchelor, J.
1901 *The Ainu and Their Folklore*. The Religious Tract Society, London.

Binford, L. R.
1978 *Nunamiut Ethnoarchaeology*. Academic Press, New York.

2002 L'interaction homme-ours dans les données ethnographiques et les gisements Européens d'ours des cavernes. In *L'Ours et L'Homme*, edited by T. Tillet and L. R. Binford, pp. 141-156. Études et Recherches Archéologiques de l'Université de Liège, Liège.

Birket-Smith, K. and F. de Laguna
1938 *The Eyak Indians of the Copper River Delta, Alaska*. Det Kgl. Danske Videnskabernes Salskab, Copenhagen.

Bonifay, E.
2002 L'homme de Néandertal et l'ours (*Ursus arctos*) dans la grotte de Regourdou (Montignac-sur-Vézère, Dordogne, France). In *L'Ours et L'Homme*, edited by T. Tillet and L. R. Binford, pp. 247-254. Études et Recherches Archéologiques de l'Université de Liège, Liège.

Bonnichsen, R. and K. L. Turmine (editors)
1999 *Ice Age People of North America: Environments, Origins, and Adaptations*. Oregon State University Press, Corvallis.

Borrero, L. A.
1990 Taphonomy of Guanaco bones in Tierra Del Fuego. *Quaternary Research* 34:361-371.

Byun, S. A., B. F. Koop and T. E. Reimchen
1997 North American black bear mtDNA phylogeography: Implications for morphology and the Haida Gwaii glacial refugium controversy. *Evolution* 51:1647-1653.

Charles, R.
1997 The exploitation of carnivore and other fur-bearing mammals during the northwestern European Late Upper Palaeolithic and Mesolithic. *Oxford Journal of Archaeology* 16:253-277.

Christensen, T., J. Stafford, and J. Lindberg
1999 *Qay'llnagaay Heritage Center Development, Skidegate Indian Reserve #1, Archaeological Impact Assessment*. Report prepared for the Skidegate Band.

Cinq-Mars, J. and R. E. Morlan
1999 Bluefish Caves and Old Crow Basin: a new rapport. In *Ice Age People of North America: Environments, Origins, and Adaptations*, edited by R. Bonnichsen and K. L. Turmine, pp. 200-212. Oregon State University Press, Corvallis.

Craighead, F. C., Jr. and J. J. Craighead
1972 Data on grizzly bear denning activities and behavior obtained by using wildlife telemetry. In *Bears - Their Biology and Management: Papers of the International Conference on Bear Research and Management, Calgary, Alberta, 6-9 November 1970*, pp. 84-106. International Union for Conser-

vation of Nature and Natural Resources, Morges, Switzerland.

Darnell, R.
1977 Hallowell's "bear ceremonialism" and the emergence of Boasian anthropology. *Ethos* 15:13-30.

de Laguna, F.
1972 *Under Mount Saint Elias: The History and Culture of the Yakitat Tlingit*. Smithsonian Contributions to Anthropology, Volume 7. Smithsonian Institution, Washington, D.C.

Deans, J.
1899 *Tales from the Totems of the Hidery, Vol. II.* Archives of the International Folklore Association, Chicago.

Dixon, J. E.
1999 *Bones, Boats, and Bison: Archaeology of the First Colonization of Western North America.* University of New Mexico Press, Albuquerque.

Dixon, J. E., T. H. Heaton, T. E. Fifield, T. D. Hamilton, D. E. Putnam and F. Grady
1997 Late Quaternary regional geoarchaeology of southeast Alaska karst: a progress report. *Geoarchaeology* 12: 689-712.

Dudoward, P.
1983 Bear meat. In *Port Simpson Foods*. School District No. 52 Curriculum Development Project. Port Simpson Curriculum Committee, Port Simpson, BC.

Emmons, G. T.
1991 *The Tlingit Indians*. University of Washington Press, Seattle.

2000 Excerpts from George Thornton Emmons's unpublished 1916 manuscript "The History of Tlingit Tribes and Clans". In *Will the Time Ever Come? A Tlingit Source Book*, edited by A. H. Hope and T. F. Thornton, pp. 131-145. University of Washington Press, Seattle.

Fedje, D. W.
2004 Results of 2004 excavations at Gaadu Din Cave, Haida Gwaii. Paper presented at the 2004 British Columbia Archaeological Forum.

Fedje, D. W., A. P. Mackie, J. B. McSporran and B. Wilson
1996 Early Period archaeology in Gwaii Haanas: results of the 1993 field program. In *Early Human Occupation in British Columbia*, edited by R. L. Carlson and L. Dalla Bona, pp. 133-150. UBC Press, Vancouver.

Fedje, D. W., D. McLaren and R. Wigen
2004 *Pre-Holocene archaeology and environment from karst caves in Haida Gwaii, West Coast, Canada*. Unpublished permit report submitted to the BC Archaeology Branch.

Fedje, D. W., R. J. Wigen, Q. Mackie, C. R. Lake and I. D. Sumpter
2001 Preliminary results from investigations at Kilgii Gwaay: an early Holocene archaeological site on Ellen Island, Haida Gwaii, British Columbia. *Canadian Journal of Archaeology* 25:98-120.

Fladmark, K. R.
1975 *A Paleoecological Model for Northwest Coast Prehistory*. Mercury Series Paper 43. National Museum of Man, Archaeological Survey of Canada, Ottawa.

1979 Routes: alternate migration corridors for early man in North America. *American Antiquity* 44:55-69.

Folk, G. E., M. A. Folk and J. J. Minor
1972 Physiological condition of three species of bears in winter dens. In *Bears - Their Biology and Management: Papers of the International Conference on Bear Research and Management, Calgary, Alberta, 6-9 November 1970*, pp. 107-124. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Folk, G. E., A. Larson and M. A. Folk
1976 Physiology of hibernating bears. In *Bears - Their Biology and Management: Papers of the International Conference on Bear Research and Management, Binghamton, New York, USA, and Moscow, USSR, June 1974*, pp. 373-380. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Fraser, H. H.
1957 *The Arrow-maker's Daughter and other Haida Chants*. Ryerson Press, Toronto.

Gabori-Csank, V.
1968 *La Station du Paléolithique Moyen d'Erd-Hongrie*. Maison d'Édition de l'Academie des Sciences de Hongrie, Budapest.

Gargett, R. H.
1996 *Cave Bears and Modern Human Origins: The Spatial Taphonomy of Pod Hradem Cave, Czech Republic*. University Press of America, Lanham, MD.

Hall, D. A.
1999 Charting the way into the Americas. *Mammoth Trumpet* 14(1).

Hallowell, A. I.
1926 Bear ceremonialism in the Northern Hemisphere. *American Anthropologist* 28:1-175.

Harrison, C.
1925 *Ancient Warriors of the North Pacific: The Haidas, their Laws, Customs and Legends, with some Historical Account of the Queen Charlotte Islands*. H. F. & G. Witherby, London.

Heaton, T., S. L. Talbot and G. F. Shields
1996 An Ice Age refugium for large mammals in the Alexander Archipelago, southeastern Alaska. *Quarternary Research* 46:186-192.

Heaton, T. H. and F. Grady
2003 The Late Wisconsin vertebrate history of Prince of Wales Island, southeast Alaska. In *Ice Age Cave Faunas of North America*, edited by B. W. Schubert, J. I. Mead and R. W. Graham, pp. 17-53. Indiana University Press, Bloomington, IN.

Hellgren, E. C.
1995 Physiology of hibernation in bears. *Ursus* 10:467-477.

Hilderbrand, G. V., C. Schwartz, C. T. Robbins and T. A. Hanley
2000 Effect of hibernation and reproductive status on body mass and condition of coastal brown bears. *Journal of Wildlife Management* 64:178-183.

Holzworth, J. M.
1930 *The Wild Grizzlies of Alaska*. G. P. Putnam's Sons, New York.

Hummel, M. and S. Pettigrew
1991 *Wild Hunters: Predators in Peril*. Key Porter Books Limited, Toronto.

Krause, A.
1885 *Die Tlinkit-Indianer*. H. Costenoble, Jena.

1956 *The Tlingit Indians: Results of a Trip to the Northwest Coast of America and the Bering Straits*. University of Washington Press, Seattle.

Kurten, B.
1976 *The Cave Bear Story*. Columbia University Press, New York.

Lentfer, J. W., R. J. Hensel, L. H. Miller, L. P. Glenn and V. D. Berns
1972 Remarks on denning habits of Alaska brown bears. In *Bears - Their Biology and Management: Papers of the International Conference on Bear Research and Management, Calgary, Alberta, 6-9 November 1970*, pp. 125-132. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Leonard, J. A., R. K. Wayne and A. Cooper
2000 Population genetics of Ice Age brown bears. *Proceedings of the National Academy of Sciences of the United States of America* 97:1651-1654.

Lyman, R. L.
1994 *Vertebrate Taphonomy*. Cambridge University Press, Cambridge.

Mack, C.
1993 *Grizzlies and White Guys*. Harbour Publishing, Vancouver.

Mackie, A. and I. Sumpter
in press Shoreline settlement patterns of Early and Late Holocene archaeological sites in Gwaii Haanas. In *Haida Gwaii: Human History and Environment from the Time of the Taadl [Loon] to the Time of the ya'aats'xaatgaay [Iron People]*, edited by D. Fedje and R. Mathewes. UBC Press, Vancouver.

Marks, S. A.
1966 Age determination in the black bear. *Journal of Wildlife Management* 30: 389-410.

McClellan, C.
1970 *The Girl Who Married the Bear*. National Museum of Man, Publications in Ethnology 2.

Mills, E. A.
1919 *The Grizzly: Our Greatest Wild Animal*. Houghton Miffin Company, Cambridge, MA.

Mills, J. E.
1955 *The Ethnohistory of Nootka Sound, Vancouver Island*. PhD dissertation, University of Washington.

Morel, P. H. and M. Garcia
2002 La chasse à l'ours dans l'art Paléolithic. In *L'Ours et L'Homme*, edited by T. Tillet and L. R. Binford, pp. 219-228. Études et Recherches Archéologiques de l'Université de Liège, Liège.

Nagorsen, D. W., G. Keddie and R. J. Hebda
1995 Early Holocene black bears, *Ursus americanus*, from Vancouver Island. *The Canadian Field Naturalist* 109:11-18.

Pitul'ko, V.
2003 The Bear-Hunter of Zhokov Island, east Russian Arctic. *Senri Ethnological Studies* 63:141-152.

Pitul'ko, V. and A. K. Kasparov
1996 Ancient Arctic hunters: material culture and survival strategy. *Arctic Anthropology* 33:1-36.

Ramsey, C. L., P. A. Griffiths, D. W. Fedje, R. J. Wigen and Q. Mackie
2004 Preliminary investigation of a late Wisconsinan fauna from K1 cave, Queen Charlotte Islands (Haida

Gwaii), Canada. *Quaternary Research* 62:105-109.

Reynolds, H. V., J. A. Curatolo and R. Quimby
1976 Denning ecology of grizzly bears in northeastern Alaska. In *Bears - Their Biology and Management: Papers of the International Conference on Bear Research and Management, Binghamton, New York, USA, and Moscow, USSR, June 1974*, pp. 403-410. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Rogers, L. L.
1987 Effects of food supply and kinship on social behavior, movements, and population growth of black bears in northeastern Minnesota. *Wildlife Monographs* 97:1-72.

Sappington, R. L. and S. Schuknecht-McDaniel
2001 Wewukiyepuh (10-NP-336): Contributions of an early Holocene Windust Phase site to lower Snake River prehistory. *North American Archaeologist* 22:353.

Seryodkin, I. V., A. V. Kostyria, J. M. Goodrich, D. G. Miquelle, E. N. Smirnov, L. L. Kerley, H. B. Quigley and M. Hornocker
2003 Denning ecology of brown bears and Asiatic black bears in the Russian Far East. *Ursus* 14:152-161.

Severs, P. D. S.
1974 Archaeological investigations at Blue Jackets Creek, FlUa-4, Queen Charlotte Islands, British Columbia, 1973. *Bulletin of the Canadian Archaeological Association* 6:163-205.

Stiner, M. C.
1994 *Honor Among Thieves: A Zooarchaeological Study of Neanderthal Ecology*. Princeton University Press, Princeton.
1998 Mortality analysis of Pleistocene bears and its paleoanthropological relevance. *Journal of Human Evolution* 34:303-326.

1999 Cave bear ecology and interactions with Pleistocene humans. *Ursus* 11:41-58.

Suttles, W. (editor)
1990 *Handbook of North American Indians, Vol. 7: The Northwest Coast*. Smithsonian Institution, Washington, D.C.

Swanton, J. R.
1905a Contributions to the ethnology of the Haida. *Publications of the Jesup North Pacific Expedition 10(2): Memoirs of the American Museum of Natural History* 8:1-300.

1905b Haida texts and myths, Skidegate dialect. *Bureau of American Ethnology Bulletin 29*.

1908 Haida texts, Masset dialect. *Publications of the Jesup North Pacific Expedition 10(2): Memoirs of the American Museum of Natural History* 14(2):273-803.

Tate, H.
1993 *The Porcupine Hunter and Other Stories: The Original Tsimshiam Texts of Henry W. Tate. Newly transcribed from the original manuscripts and annotated by Ralph Maud.* Talonbooks, Vancouver.

Tillet, T. and L. R. Binford
2002 *L'Ours et L'Homme*. Études et Recherches Archéologiques de l'Université de Liège, Liège.

West, F. H. (editor)
1996 *American Beginnings: The Prehistory and Palaeoecology of Beringia*. The University of Chicago Press, Chicago.

Wigen, R. J.
in press History of the vertebrate fauna. In *Haida Gwaii: Human History and Environment from the Time of the Taadl [Loon] to the Time of the ya'aats'xaatgaay [Iron People]*, edited by D. Fedje and R. Mathewes. UBC Press, Vancouver.

Wigen, R. J. and T. Christensen
2001 The fauna from Cohoe Creek: An early shell midden in Haida Gwaii. *Canadian Zooarchaeology* 19:16-20.

Wolverton, S.
2001 Caves, ursids, and artifacts: a natural-trap hypothesis. *Journal of Ethnobiology* 21:55-72.

## Dissertations and Theses in Zooarchaeology from Universities in British Columbia (1994-2005)

*Simon Fraser University*

### Ph.D.

Muir, Robert James (1999)
*Zooarchaeology of Sand Canyon Pueblo, Colorado*

Tarcan, Carmen (2005)
*Counting Sheep: Fauna, Contact and Colonialism at Zuni Pueblo, New Mexico, A.D. 1300-1700*

### M.A.

Adams, Ron (2001)
*Ethnoarchaeology of Feasting in Tana Toraja, Indonesia*

Barton, Andrew John (1994)
*Fishing for Ivory Worms: A Review of Ethnographic and Historical Recorded Dentalium Source*

Chu, Pei Pei (1998)
*Dietary Variation Among the Prehistoric Asiatic Eskimo*

Clarke, Michael Joseph (1998)
*Feasting Among the Akha of Northern Thailand: An Ethnoarchaeological Case Study*

Crellin, David Frederick (1995)
*Is There a Dog in the House: The Cultural Significance of Prehistoric Domesticated Dogs in the Mid Fraser River Region of British Columbia*

Darwent, Christyann M. (1995)
*Late Dorset Faunal Remains from the Tasiarulik Site, Little Cornwallis Island, Central High Arctic, Canada*

King, Jerome Hardy (1997)
*Prehistoric Diet in Central Baja California, Mexico*

Lindsay, Corene Texada (2003)
*Investigations into the Ethnographic and Prehistoric Importance of Freshwater Shellfish on the Interior Plateau of British Columbia*

Munro, Natalie D. (1994)
*An Investigation of Anasazi Turkey Production in Southwestern Colorado*

Park, Julie (2001)
*Food from the Heartland: The Iwawi Site and Tiwanaku Political Economy from a Faunal Perspective*

Pegg, Brian (1999)
*The Taphonomic History of the Vertebrate Faunal Assemblage from British Camp, San Juan Islands, Washington*

Storey, Alice A. (2004)
*SAVE ME A DRUMSTICK: Molecular Taphonomy, Differential Preservation and Ancient DNA from the Kingdom of Tonga*

Trost, Teresa (2005)
*Forgotten Waters: A Zooarchaeological Analysis of the Cove Cliff Site (DhRr 18), Indian Arm, B.C.*

Vallieres, Claudine (2004)
*The Paleoindian Bison Assemblage from Charlie Lake Cave*

*University of British Columbia*

**Ph.D.**

Wachowich, Nancy (2001)
*Making a Living, Making a Life: Subsistence and the Re-Enactment of Iglulingmiut Cultural Practice*

**M.A.**

McLay, Eric (1999)
*The Diversity of Northwest Coast Shell Middens: Late Pre-Contact Settlement-Subsistence Patterns on Valdes Island, British Columbia*

*University of Victoria*

**Ph.D.**

Crockford, Susan (2004)[1]
*Domestication and Vertebrate Speciation: A Paradigm for the Origin of Species*

**M.A.**

Orchard, Trevor (1998)
*The Role of Selected Fish Species in Aleut Paleodiet*

[1] The editors congratulate Susan Crockford for being recognized by the Canadian Society of Zoologists with an Honourable Mention in the T. W. N. Cameron Award competition for the best zoological Ph.D. dissertation defended at a Canadian university in 2004.

## International Council for Archaeozoology (ICAZ) International Conference

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