A DETAILED ANALYSIS OF RINGED SEAL REMAINS (*Phoca hispida)* FROM THREE SEASONALLY DIFFERENT THULE SITES AT HAZARD INLET, SOMERSET ISLAND (NUNAVUT)

by

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Abstract

This thesis presents an exploratory approach using detailed zooarchaeological analysis to evaluate the nature of ringed seal (*Phoca hispida)* remains from three seasonally different Thule sites in the Hazard Inlet area of Somerset Island, Nunavut. Most Thule research focuses on winter occupation and presents Thule as a whaling society. Little attention has been given on the nature of sealing during Thule occupation and research on seasonal differences of seal remains from Thule sites remains scarce. This thesis is thus one of the first to focus on ringed seal remains from seasonally different Thule sites through an analysis of over 30,000 bone specimens. The goal of this thesis is to determine if the seal assemblages are a product of differential butchering and transport, taphonomic processes, or if external factors are also playing a role in shaping the faunal record. The analysis considers variability within each site as well as between the sites.

Overall, a moderate to strong correlation was found between bone density and the seal bone elements identified while a negative correlation existed with the elements and FUI (food utility indices). This led to the conclusion that taphonomy was the leading agent shaping the seal remains at Hazard Inlet. However, enough variation existed within each site to consider the role of outside factors, such as the presence of dogs, food preferences, food storage and season of occupation in shaping the seal remains at Hazard Inlet.

Resumé

Cette thèse présente une analyse zooarchéologique détaillée d'ossements de phoques annulés (*Phoca hispida*) préservés dans trois sites Thule d'occupation saisonnière variée de la région d'Hazard Inlet sur l'Ile de Somerset (Nunavut). Les études antérieures effectuées sur la culture thuléenne virent surtout à déterminer le comportement hivernal des thuléens en tant que chasseurs de baleine, et peu d'intérêt fut porté sur la signification des ossements de phoques préservés. Cette thèse est donc, par l'entremise de plus de 30,000 ossements analysés, l'une des premières études à se concentrer sur la caractérisation d'ossements de phoques annulés provenant de trois sites thuléens d'occupation saisonnière différente.

Le but de cette thèse est de déterminer la nature de l'assemblage des ossements de phoques pour déterminer s'il est le résultat des pratiques de chasse et de désarticulation, du transport des portions de phoques ou encore de causes externes, exemple, saison d'occupation, présence de chiens...ect.

Une corrélation modérée à forte fut établie entre la densité des ossements et leurs proportions, et une corrélation négative entre les ossements et leur utilisation économique. Ceci montre que la taphonomie est ce qui explique le mieux l'assemblage des ossements préservés dans la région d'Hazard Inlet. Toutefois, la présence de variation entre les différents sites suggère que les causes externes aient aussi joué un rôle dans la création de l'archéofaune.

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Dedication:

This thesis is dedicated to my parents.

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Chapter 1: Introduction

Since the 1970's, zooarchaeology has experienced an explosion in analytical technique and analysis. Zooarchaeologists no longer merely list species types making-up assemblages but attempt to identify factors that create the assemblages. This thesis is an exploratory approach using detailed zooarchaeological methodology and analysis to evaluate the nature of ringed seal (*Phoca hispida)* remains from three seasonally different Thule sites in the Hazard Inlet area of Somerset Island, Nunavut (Figure 1 and 2).

The goal of this thesis is to determine if the seal assemblages were affected by either differential butchering and transport and/or taphonomic processes, or if external factors also played a role in shaping the faunal record. This analysis also considers variability within, and between each site.

The Thule (approximately 1000 to 200 B.P.), ancestral to modern day Inuit, exploited both marine and terrestrial environments. Within approximately 300 years, they successfully expanded from Alaska across northern Canada to Greenland (Maxwell 1985). Archaeological and ethnographic evidence has suggested that the Thule, along with their modern Inuit descendants, occupied seasonal camps depending on resource availability at particular times of the year (Damas 1984). Ringed seals are available year round and different sealing techniques were developed to successfully hunt them accordingly.

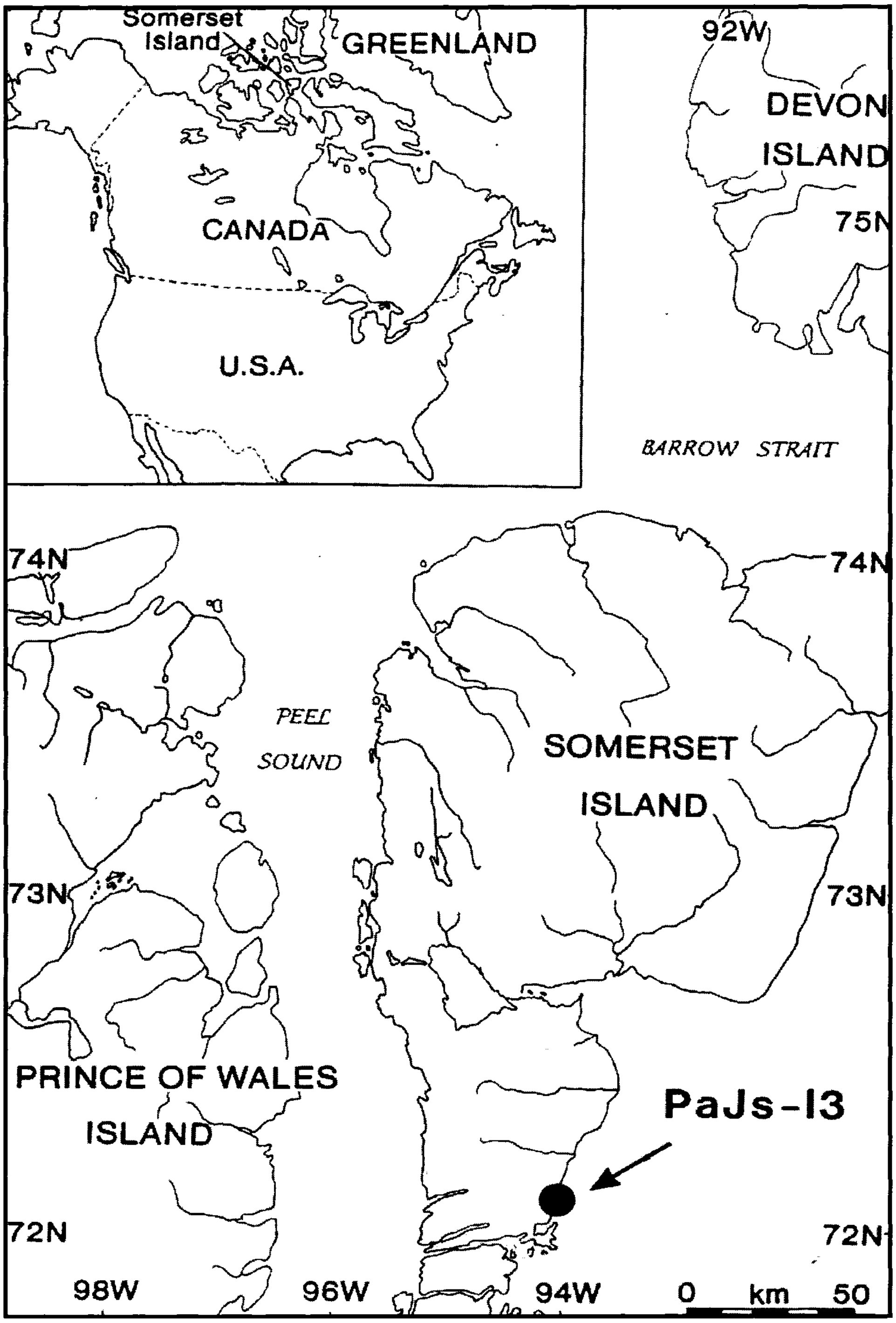

Figure 1.1. Somerset Island indicating the location of PaJs-13 (Savelle and Habu 2004: 206).

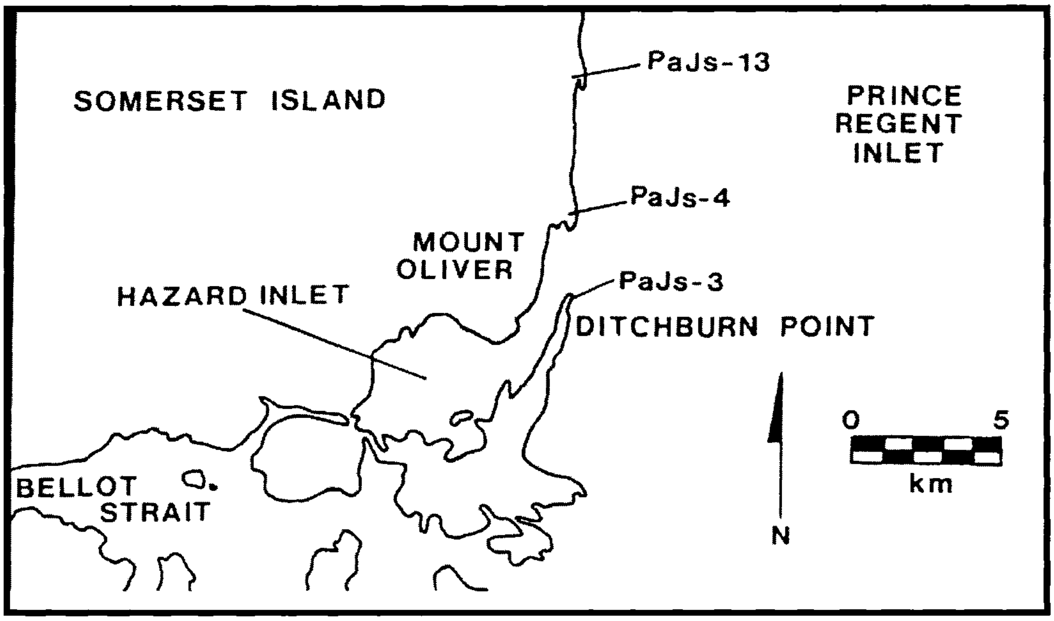

Figure 1.2. Hazard Inlet indicating PaJs-13, PaJs-3 and PaJs-4 (Whitridge 1992: 3).

Utility indices of ringed seal will be employed to determine which elements are most economic in terms of meat. According to Binford (1978), the higher the 'utility' of an element, the more likely that part will be transported back to a residential site and therefore be expected in the archaeological record. In addition, taphonomic consideration of resistance of seal bone to modification, alteration, and destruction will also be addressed based on known measurements of bone density. This information will provide insight on which skeletal parts of ringed seal would more likely survive taphonomic processes and be expected to be present in the archaeological record.

Other 'external' factors considered are food sharing among Inuit societies described by Damas (1972a), Iñupiut taste preferences observed by Diab (1998), the presence of dogs, and the season of occupation of the site.

Chapter 2 provides background information on Thule culture, specifically Thule subsistence. This chapter also discusses Inuit ethnographic sources for analogues of Thule sealing. A discussion on Robert Park's Ph.D. (1989) on seal remains from Porden Point will also illustrate how seal remains can be used to detect variability.

Chapter 3 describes the three sites considered in this thesis and presents a short overview of published data. The sites consist of a winter village, PaJs-13, a summer/early fall camp, PaJs-3, and a fall whaling camp, PaJs-4.

Chapter 4 presents the methodological theory and practice used in this research. Utility and bone density are described in detail, as well as methodological steps taken in order to produce the analytical graphs used in data analysis.

Chapter 5 consists of the data analysis and interpretation of the data presented. The data analysis is based on the composition of element distribution, food utility, and bone density graphs for each feature within a site, and for the entire site. By creating two sets of analytical units, it is expected that variability within each site and between the sites can be detected.

Chapter 2: Background Research

2.1 Thule Inhabitants in the Central Canadian Arctic

> "The Thule culture, as we know it from these old finds, shows us a *highly developed and remarkable Eskimo culture*. It presents to us a people, living in permanent winter features by the coast, in conical tents in the summer, hunting whale, walrus, the seal, the bear and the caribou, trapping foxes, catching birds and salmon, all by means of a highly developed implement technique (Mathiassen 1927: 6)."

Therkel Mathiassen (1927) first defined Thule during the Fifth Thule Expedition as a complex and developed culture. Thule are commonly characterized as a coastal group concentrating their energy on hunting large baleen whales (McGhee 1969/70). Archaeological evidence has pointed to a rapid eastern migration of Thule from Alaska to Greenland in approximately 300 years coinciding with a warming period (Maxwell 1985). It is widely believed that Thule followed bowhead whales east with newly opened waters and reached further east in the Canadian Arctic by about 1200-1450 A.D (Savelle 2002). Figure 2.1 illustrates the hypothetical route taken by Thule based on archaeological evidence (from McGhee 1984: 370).

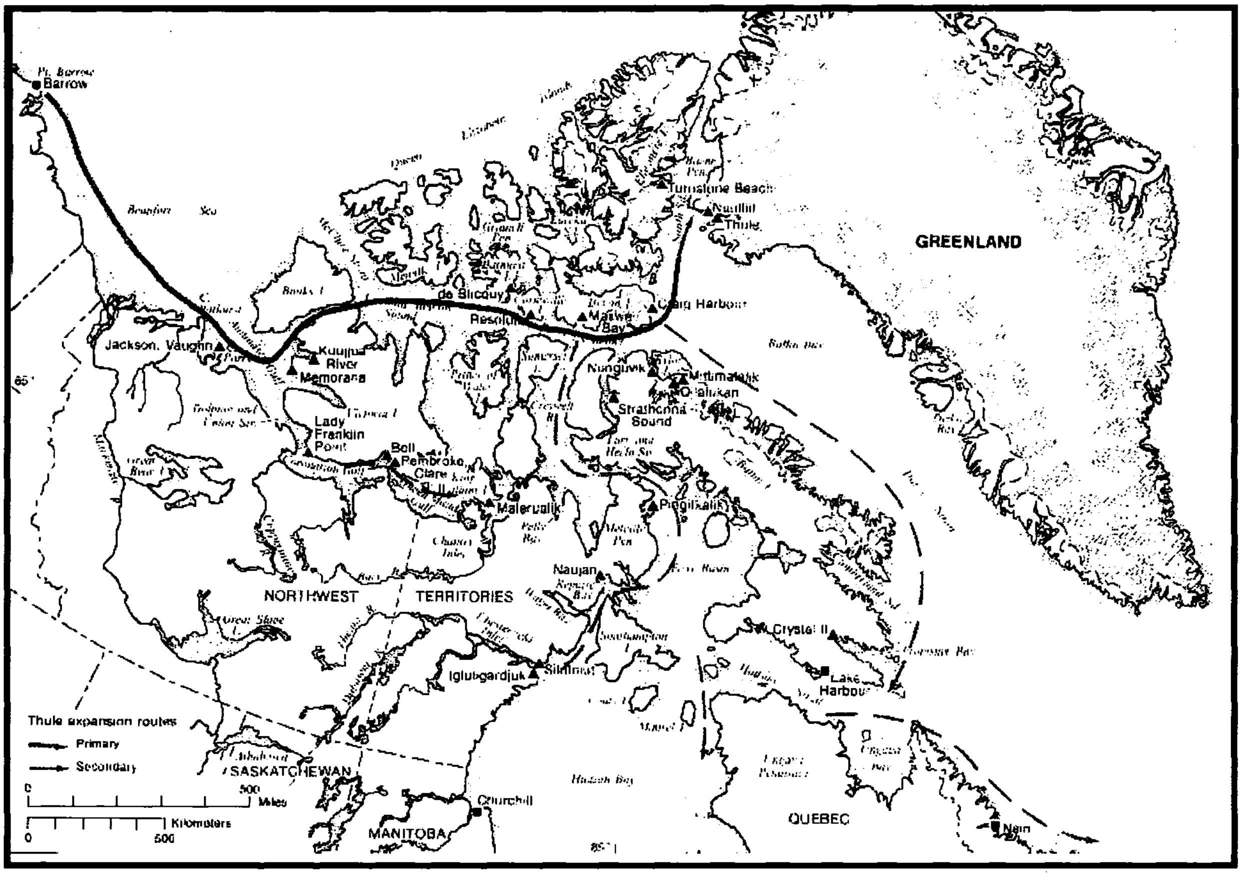

Figure 2.1 Hypothetical routes taken by Thule out of Alaska (McGhee 1984: 370).

Thule culture is thought to be descendant of the Birnirk culture of Northern Alaska. Birnirk relied on a maritime-based economy using harpoon technology and exploiting mostly seal. Yorga (1979) notes that whaling equipment is 'absent' from Birnirk sites and "site inventories suggest only minor utilization of large whales (Yorga 1979: 287)," contrary to the popular conception of Thule as whaling peoples.

Prior to the arrival of Thule (or Neoeskimo peoples), Paleoeskimo groups inhabited the Central Canadian Arctic. It is thought that Neoeskimo either displaced or, less likely, amalgamated with Paleoeskimo, although archaeological evidence has yet to paint a clear picture. In 1960, Meldagaard noted, "It gradually becomes clear that one can hardly talk about *the* origin of Eskimo culture... Eskimo culture appears to have grown up like the arctic willow, a bush with root-suckers rising from below the ground" (Meldegaard 1960: 65). Many arctic archaeological sites present a lower Dorset cultural horizon overlain by a Thule cultural layer.

There were several cultural phases during Thule occupation in the Canadian Arctic (ca. 1000 A.D. to 1600 A.D.), but general technology consisted of bow and arrow, umiaks or large whaling boat, kayaks, dog sleds, harpoons (including toggling harpoon heads), ulu knives, whalebone mattocks, snow goggles, and soapstone lamps and cooking pots (McGhee 1984). Cultural phases are traditionally defined by harpoon head styles categorizing Thule into Early, Middle, and Late phases (McGhee 1984). Thule is additionally categorized as 'Classic Thule' and 'Modified Thule,' the former depicting an earlier occupation with greater dependence on whale hunting (McGhee 1984). An important characteristic of Classical Thule sites is whalebone used as architectural structural support in semi-subterranean features. The three sites from Hazard Inlet fall primarily into Classic to possibly early Modified Thule phases and were occupied ca. 1200 – 1500 (Savelle 2005, personal communication).

2.2 Thule Subsistence

Mathiassen (1927) first described Thule subsistence as a whaling economy but also noted the importance of walrus, seal, and caribou. Taylor (1966) described Eskimo economy as a dichotomy of coastal-inland hunting. He noted that Thule sites in some areas, such as Somerset Island, indicated a whaling economy, but other areas, like Victoria Island, held 'scant' remains of whale (Taylor 1966). It is expected that Thule quickly developed into regional variants and ethnographic evidence of Inuit groups at the time of contact depicted highly differentiated groups (Damas 1984). It is likely that these regional variations developed during Thule occupation.

2.2.1. Archaeological studies on Thule subsistence

Subsistence studies on Thule have had "...considerable variation in their level of identification and description and the extent of quantification (Savelle & McCartney 1988: 24)."

Notable Thule subsistence studies include Stanford (1976), Staab (1979), Sabo & Jacobs (1980), Rick (1980), McCartney (1980a), Morrison (1983a, 1983b), McCartney & Savelle (1985, 1993), McCullough (1988, 1989), Stenton (1989), Savelle (1987), Park (1989), Savelle & McCartney (1988, 1994, 1999), Danielson (1994), and Whitridge (1992, 2000).

Savelle and McCartney (1988) note that most early Thule subsistence studies are restricted in that they simply provided a list of identified species. They note however that studies by Staab (1971, 1979), Stanford (1976), and Rick (1980) introduced higher analytical techniques with research on age determination of killed species, and determination of the season of death of animals killed based on dental annuli analysis.

Stanford's (1976) analysis of the faunal material from the Walakpa site considered skeletal part frequencies, and frequencies of species represented at the site. Stanford (1976) further considered which skeletal parts of ringed seal were transported back to residential camps based on economic utility. He found that head elements, lumbar vertebrae, ribs and hindlimbs were expected in the faunal record at residential sites (Stanford 1976).

Staab's (1979) research on the Silumiut site discussed skeletal part data and addressed seasonality, age preference, butchering techniques, and meat weight available for consumption. Staab (1979) thus opened the door to more in-depth analysis in Thule subsistence research.

Most Thule subsistence studies have demonstrated small seal to be the most abundant species hunted, followed by fox and caribou (McCartney and Savelle 1988). Larger animals, such as walrus, beluga, baleen whales, musk ox, and polar bear are also present in the faunal record, albeit to a lesser degree. Rick (1980) calculated usable meat weight of faunal material from two sites on Somerset Island, and discovered that ringed (small) seals comprised approximately 29-37% of the total noncetacean usable meat.

Thule subsistence research has additionally focused on subsistence settlement patterns. Savelle & McCartney (1988) suggested that Thule subsistence settlement patterns shifted from a 'collector' strategy to a 'forager' strategy during later occupation. Briefly, the forager-collector model, introduced by Binford in 1980, divides hunter-gatherers into foragers, who leave a more simplistic settlement pattern in the archaeological record, and collectors, complex hunter-gatherers. Collectors will concentrate their energy on one or more key game and logistically organize themselves to hunt these prime species. Their trace in the archaeological record consists of several site types including residential sites, kill/butcher sites, logistical sites, hunting camps, and caches, all associated with one occupation (Binford 1980). Foragers normally function out of their residential camp, then move the entire camp when need be.

During the Thule period, declining availability of bowhead whales probably from climatic change would have discouraged the pattern of low residential mobility to a higher residential mobility (Savelle 1987), resulting in a shift to a foraging strategy (Savelle & McCartney 1988). Thule "probably formed larger seal hunting groups…thereby introducing the beginnings of a "serial" foraging strategy (Savelle & McCartney 1988: 67)."

2.3 Ethnographic Data and Seal Hunting

Greenlandic explorer Knud Rasmussen first encountered the Netsilik Eskimos (meaning seal) in 1923. The Netsilik lived in an area of unpredictable and mobile fauna. Caribou migrated through this area only once a year and as a result, Netsilik relied heavily on seal (Balikci 1970).

Summers would see groups splitting into smaller, nuclear family units that would move inland to hunt caribou and fish for salmon, lake trout and Arctic char. Sealskin tents were utilized for summer habitation and sealskin-covered kayaks were used for transportation (Balikci 1970).

During the winter months, groups would congregate in snowhouse villages on the sea ice to participate in breathing hole sealing. The size of the villages ranged from large camps of approximately one hundred persons to camps of about fifty-sixty occupants (Balikci 1970). Important tools used for breathing hole sealing were the ice-hunting harpoon with a harpoon head attached to the end, and the breathing-hole searcher (Figure 2.2, Balikci 1970: 68).

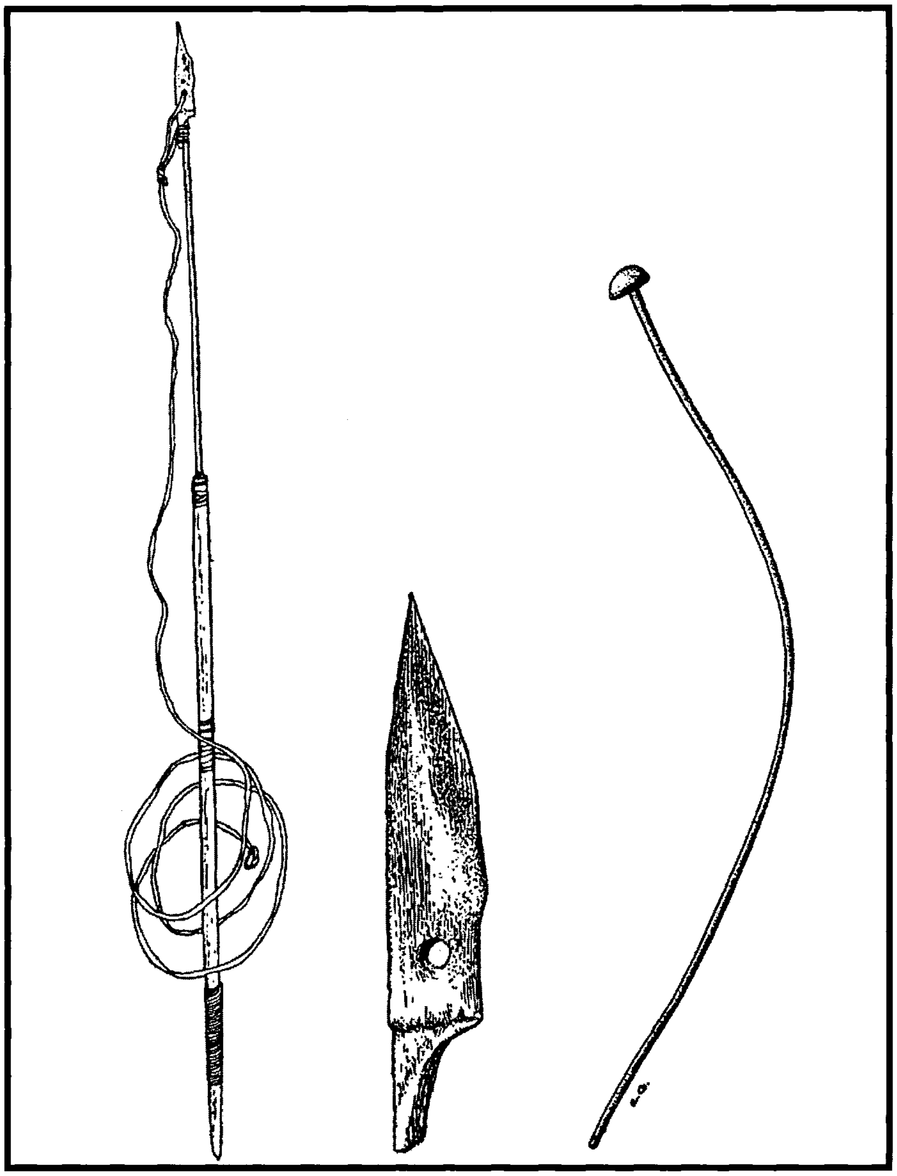

Figure 2.2. Seal hunting tools used by Netsilik Inuit (Balikci 1970: 68).

Although ethnographic evidence recorded groups moving inland during summer months, McCartney and Savelle (1985) have found that Thule winter and summer camps on Somerset Island were closely located, suggesting that groups would stay in a fairly restricted area year round. This pattern seems coherent with the geographical locations of PaJs-13, PaJs-3 and PaJs-4.

Boaz (1888), Rasmussen (1931), Balikci (1970) and Sabo & Jacobs (1980) describe seasonal differences of seal hunting observed among Inuit. They identify several traditional methods of sealing including breathing hole sealing, stalking basking seals, snow lair hunting, and open water sealing.

Boaz recorded snow lair seal hunting by Central Eskimo groups in 1888. Dogs were used to locate a lair where seal pups were born where the hunter would break the ice to harpoon the mother.

Another method described by Sabo & Jacobs (1980) is open water sealing from kayaks from June to September. However, it has been observed that the Netsilik had no method for hunting seal in open water, and were therefore restricted to winter hunts (Balikci 1970).

The *uttuq* method sees hunters crouched against the sea ice slowly creeping towards basking seals (Balikci 1970). This method was used from April to June.

Breathing hole sealing was used from October to April and consisted of several sophisticated techniques. Dogs were normally used to locate the breathing holes and hunters would wait at the hole for the seals to appear. Ethnographic accounts recorded some hunters waiting up to twelve hours in - 50°C before abandoning the breathing hole to find another (Rasmussen 1931).

There are several techniques for breathing hole sealing. The *maulerktoq* technique was normally used in the spring when breathing holes became exposed from melting. Dogs were not needed to locate these holes, and women and children participated in watching and waiting (Balikci 1970). *Sivuliksiroq* sealing consisted of waiting for a seal to return to its breathing hole. Balikci (1970) explains that prior to midnight, a seal would enter the water through a breathing hole, and would always haul out at that particular hole in the morning. An observing hunter would then know which holes to stake out. The *itertulerineq* method sees hunters building structures that resembled breathing holes in early spring along exposed cracks where seals travelled. The hunters would wait for the seal to approach the false hole then harpoon the animal (Rasmussen 1931). Figure 2.3a shows a seal at a breathing hole while Figure 2.3b illustrates a seal basking on the sea ice.

From October to March, some groups also participated in floe-edge hunting.

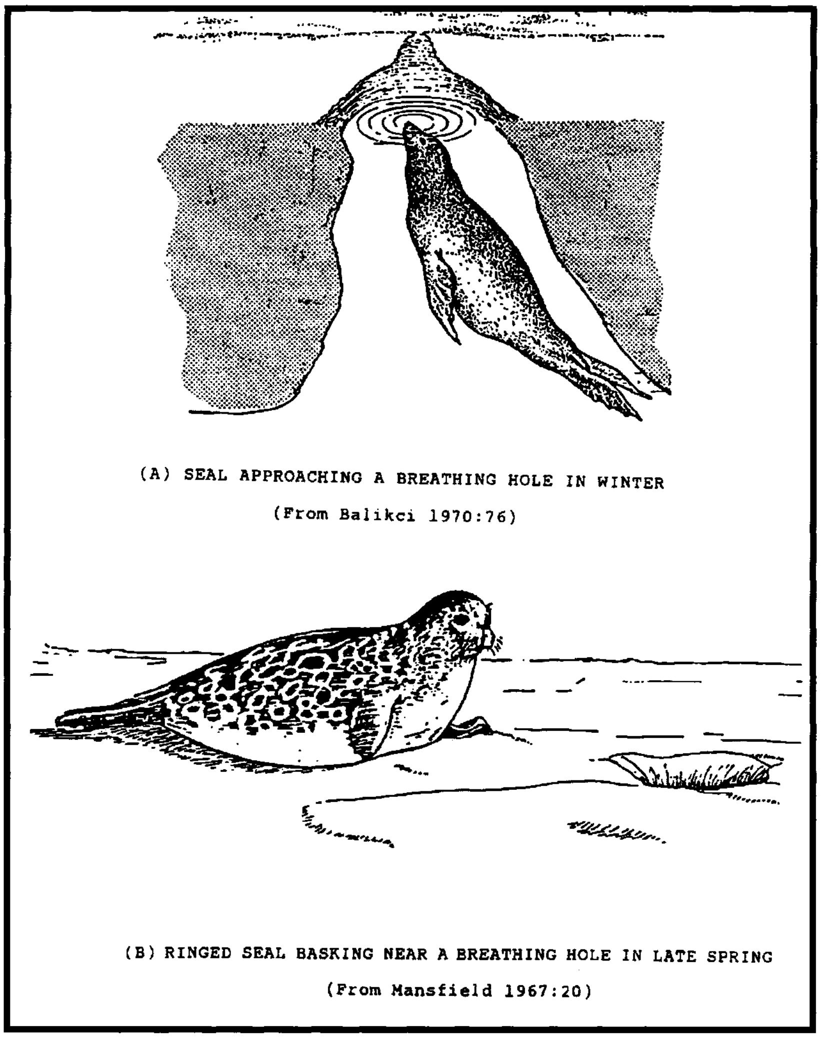

Figure 2.3. a & b. Seal at a breathing hole (Balikci 1970: 76) and seal basking on the sea ice (Mansfield 1967: 20) (Taken from Danielson 1994: 24).

Lyman et al. (1992), and Diab (1998) discuss transport decisions of seal hunters. One important observation recorded is the common transport of the entire seal carcass back to residential camps by dog sleds, boats, or harnesses. Seals were also procured from the residential camps eliminating transport altogether.

Another extremely important observation is the presence of dogs. Large amounts of seal meat would have been required to maintain dog teams (Diab 1998) and dogs have been known to be active modifiers of the faunal record. Moreover, Binford and Bertram (1977) have shown that animal parts fed to dogs could also be seasonally dependent. For example, the Nunamiut fed caribou heads and necks to their dogs only during the spring (Binford and Bertram 1977: 87).

2.3.1 Ethnographic Accounts of Food Storage and Food Drying

High day-to-day and seasonal variability of resources forces groups to store food and in response, move residential bases less often (Kelly 1995). Many Thule sites show evidence of food storage with caches commonly associated with residential sites.

Recent studies have begun to consider butchering processes for meat drying and storage. Friesen (2001) has derived a meat-drying index for caribou illustrating differential butchering for these purposes. Binford (1978) also recorded differentiated butchering and processing of caribou for storage. Only Savelle (1984) has addressed seal storage, by noting that the upper trunk and "associated elements are sometimes removed for consumption prior to caching (Savelle 1984: 520)."

2.3.2 Ethnographic Accounts of Food Sharing among Netsilik Inuit

It is known that kin relationships in Inuit societies shape food and material distribution (Damas 1972a). Ethnographic data illustrates complex systems of seal-meat sharing observed in various Inuit groups (Damas 1972a). Based on these observations, it is expected that Thule would have also shared seal meat.

Damas (1972a) has described Netsilik social organization as a "local structure by the band, which can be identified in most cases with the largest aggregation of the year... in connection with breathing-hole sealing (ibid: 221)."

The system of seal sharing observed among the Netsilik is known as *niqaiturvigiit* (Damas 1972a). Each sharing partner would receive a certain portion of the seal alongside a portion of external fat, and almost everyone had a sharing partner where they would receive a portion of the hindquarters with one flipper. Sharing partners were recorded as hereditary and the father of the extended family designated the partnerships. The wife of the "*ihumataaq,*" or leader of extended family, was in charge of butchering the seal into sharing parts (ibid. 229). Damas (1972a) also explains that rules existed that governed meat taken from caches as well as parts given to visitors. He suggests that the minimum economic unit was restricted to the extended family, thus diminishing the chance of village-wide sharing. This interpretation is favourable for archaeological interpretation since it can be assumed that sharing was restricted to the extended family and therefore within one household. Other earlier references to Netsilik sharing can be found in Rasmussen (1931), Van de Velde (1956) and Balikci (1964).

2.4 Thule Sealing: Archaeological Approaches to Understanding Seal Hunting

With ethnographic data, faunal remains at Thule sites can be better understood. Almost all past subsistence and butchering studies involving Neoeskimo cultures have mentioned the importance of seal as part of the diet. Past studies on Thule sealing include Staab (1979), Mohl (1979), Stenton (1983), Morrison (1983), McCullough (1989), Park (1989), and Danielson (1994).

Staab's (1979) analysis used epiphyseal sutures of seal bones in an attempt to determine existing selectivity of age groups of hunted seals. As previously mentioned, she was the first arctic zooarchaeologist to go beyond simple quantification of faunal remains and introduced an analytical component to Arctic faunal research.

Mohl's (1979) research used seal bones to determine site function and seasonality, noting the strong importance of ringed seal from Thule sites. Mohl (1979) utilized NISPs and NISP ratios to determine seasonality and confirmed the importance of ringed seal at Thule winter sites. NISP is defined as the number of identified specimens and will be discussed in detail in Chapter 5.

Stenton's (1983) M.A. thesis used epiphyseal fusion and dental annuli to determine the ages and the season of death of hunted seals. He concluded that most seals were killed during the spring and the summer. The above two studies illustrates that seals were hunted throughout the year which supports the ethnographic data showing the different seal-hunting techniques used for the different seasons.

McCullough (1989) also used epiphyseal fusion to determine the proportions of adult to immature seals killed from a number of Thule sites. She revealed that 63.7% of seals killed were adult, concluding that Thule were selective hunters (McCullough 1989: 282). McCullough (1989) also used dental annuli to determine the season of death.

Danielson (1994) evaluated mortality and seasonality of seals from PaJs-13. His research is discussed in Chapter 3 (see Chapter 3 on Hazard Inlet).

One important detailed analysis of seal remains is found in Robert Park's (1989) Ph.D. on Thule sites from Porden Point. Park (1989) noted intrasite variability amongst seal parts, and is an excellent start in understanding the nature of seal remains at Thule sites.

Park (1989) excavated three sites, RbJr-1 (seven winter features), RbJr-4 (three winter features), and RbJr-5, which Park describes as a mixture of features. In total, three winter features and "three of the others" were excavated in the 1984-1985 field seasons (Park 1989: 110) from RbJr-5. His analysis consisted of over 8000 identifiable seal bones (from appendix 2: Park 1989: 306-308).

Park (1989) grouped the excavated features into two groups (Group A and B) based on element representation patterns. Group A consisted of a "pronounced under-representation of thoracic vertebrae in comparison to cervical and lumbar (ibid. 220)," while the scapula values were closer to those of humerus and ulna/radius, suggesting that the forelimb and scapula remained articulated during butchering and transport. Group B is characterized by a lower overall representation of vertebrae and ribs than Group A, and very low values for scapulae (Park 1989). Group B has also a lower representation of hindlimbs than Group A (Park 1989). Park (1989) concludes that differences in seal element representation between the two groups are a result of differing butchering procedures with respect to procurement location. He rules out taphonomy as a factor shaping the assemblage on the assumption that "the consistent recovery (presumably) at

Porden Point of smaller artefacts and smaller bones from animals of other species...seems to argue against this (Park 1989: 224)." Park (1989) also eliminates destruction by dogs since excavations were conducted inside the features and little evidence of carnivore disturbance was observed. Overall, Park's (1989) final conclusion determines that the differences in Group A and Group B of seal element representation is most likely a product of seals being obtained locally vs. seals being obtained at some distance from the camp.

2.5. Summary

Neoeskimos have occupied the Canadian Arctic from the Thule period (c. 1000 A.D) to the Inuit of today. Thule are thought to have evolved from the Birnirk culture of Northern Alaska and were genetically different from the earlier inhabitants of the Canadian Arctic, the Paleoeskimo peoples. With newly open waters, Thule followed bowhead whales eastward, and replaced, or amalgamated with Paleoeskimo groups. Thule have been defined as a whaling culture who experienced a shift in foraging strategy from collectors to foragers probably increasing their dependence on seals at some point during their occupation.

Ethnographic accounts have proven Neoeskimos to be efficient seal hunters relying heavily on small seal. Seal hunting techniques consisted of sophisticated methods varying seasonally.

Past studies on Thule sealing have focused more on Thule winter sites. Studies have used seals mostly to determine selective hunting, and season of death via dental annuli analysis. Park's (1989) Ph.D. thesis has been thus far the most detailed analysis of the variability in seal remains found at Thule sites.

Chapter 3: Hazard Inlet, Somerset Island (Nunavut)

3.1 Hazard Inlet, Somerset Island, Nunavut: The sites and Background Research

During the summers of 1989 to 1991, several graduate and undergraduate students from McGill University collected faunal and artefact material from Mount Oliver and Ditchburn Point in Hazard Inlet, Somerset Island (Nunavut) (Figure 1.1) under the supervision of Dr. James Savelle. Figure 1.2 (see Chapter 1) illustrates the locations of these three sites. Most of the data from these sites is unpublished with the exception of Savelle and Habu (2004) and Savelle and Wenzel (2003). M.A. theses by Peter Whitridge in 1992, and Robert Danielson in 1994 provide the remaining background information for the sites.

3.2 PaJs-13

PaJs-13 has been described as a winter village dominated by semi-subterranean features with whalebone serving as structural support to the features. In total, eleven features were excavated. Features 1, 2, 3, 4, 5, 6 were defined as semi-subterranean (Savelle 2005, personal communication).

Savelle and Habu (2004) have recently described Feature 5 from PaJs-13 as a *karigi* (ceremonial feature). Historic whaling societies observed in Northern Alaska show *karigit* were traditionally used as centres for preparation and organization of whaling crews, workshop activities, celebrations, and feasts (ibid: 216). Feature 5 is described as having a "neatly flagged floor of flat limestone and dolomite slabs, but no apparent sleeping platform (Savelle and Habu 2004: 205)" (see Figures 3.1 and 3.2). Both the dwelling and the associated midden were excavated yielding 3,281 artefacts made from various materials and falling into the subsistence and manufacturing categories (ibid: 210).

Six large bowhead whale crania were placed in the entrance framework of the feature. Savelle and Habu (2004) consider the structural framework of the feature as representing a whale (Figure 3.3). Documented ethnographic data from Northern Alaskan whaling societies recorded *karigit* as purposely representing a whale.

Figure 3.1. Photograph of PaJs-13 Feature 5, after excavation (Savelle and Habu 2004: 209).

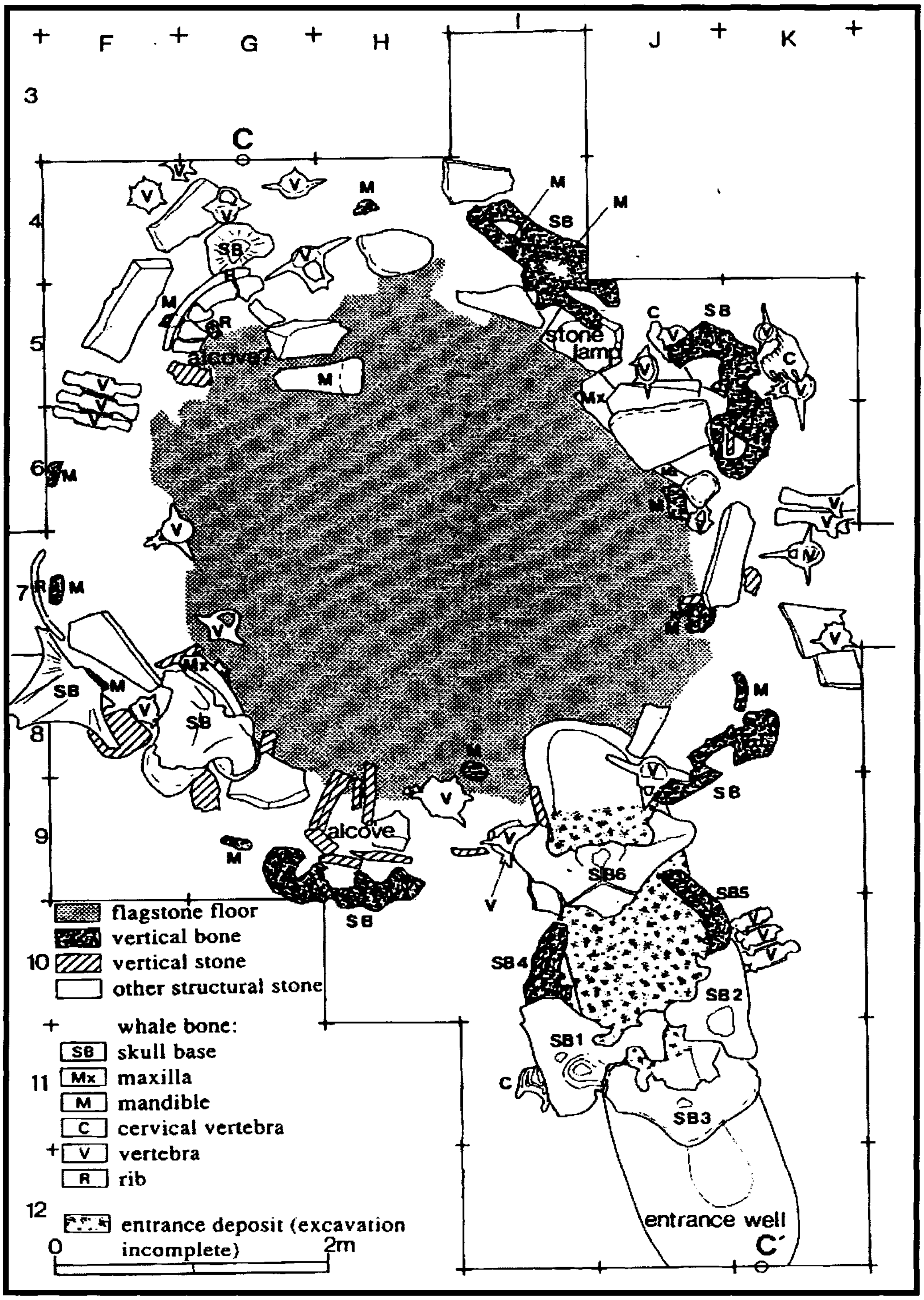

Figure 3.2. Plan of PaJs-13 Feature 5 indicating principal structural supports (Savelle and Habu 2004: 212).

Figure 3.3. Bowhead crania as structural entrance framework for PaJs-13 Feature 5 (Savelle and Habu 2004: 213).

3.3 PaJs-3 – Ditchburn Point

Little data has been published from PaJs-3, and only Whitridge's M.A. thesis considered faunal data from this site. PaJs-3 is located on the tip of Ditchburn Point and is primarily characterized as a summer to early fall camp, although it also includes winter "sod house" components. In all, three sod houses were tested and twenty-four tent rings were excavated. Savelle and Wenzel (2003) have identified several features as *karigit* (Fig. 3.4).

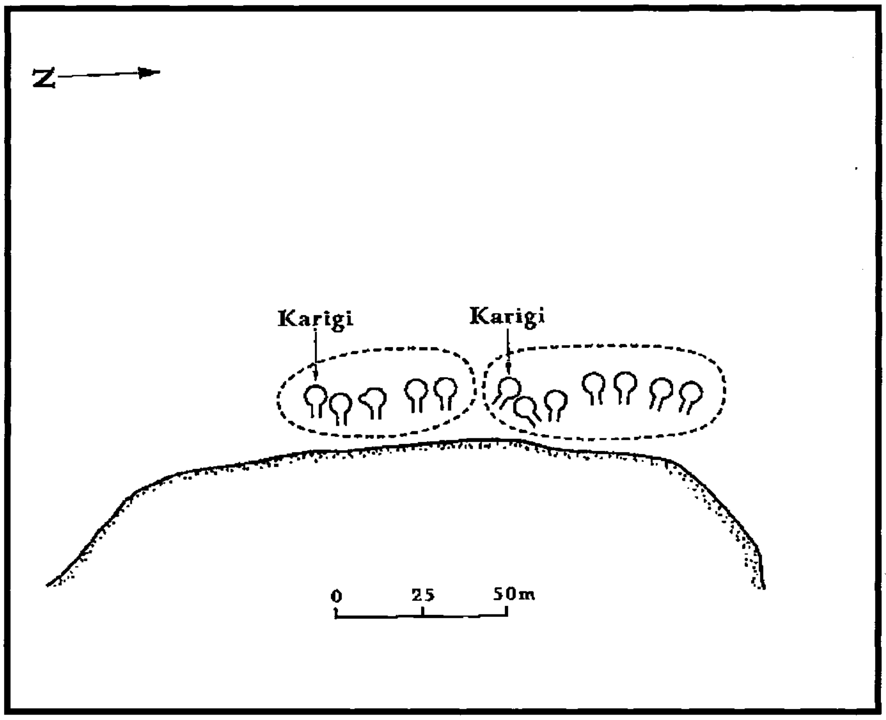

Figure 3.4. Portion of PaJs-3 indicating possible *karigit* (Savelle and Wenzel 2003: 111).

3.4 PaJs-4

PaJs-4 has been described as a fall whaling camp. The only published material from PaJs-4 is Savelle and Wenzel (2003). The site consists of approximately fifty qarmats, of which twelve have been excavated, with one of these identified as a *karigi*. At least two other possible *karigit* are located at the site (see Figure 3.5) (Savelle and Wenzel (2003).

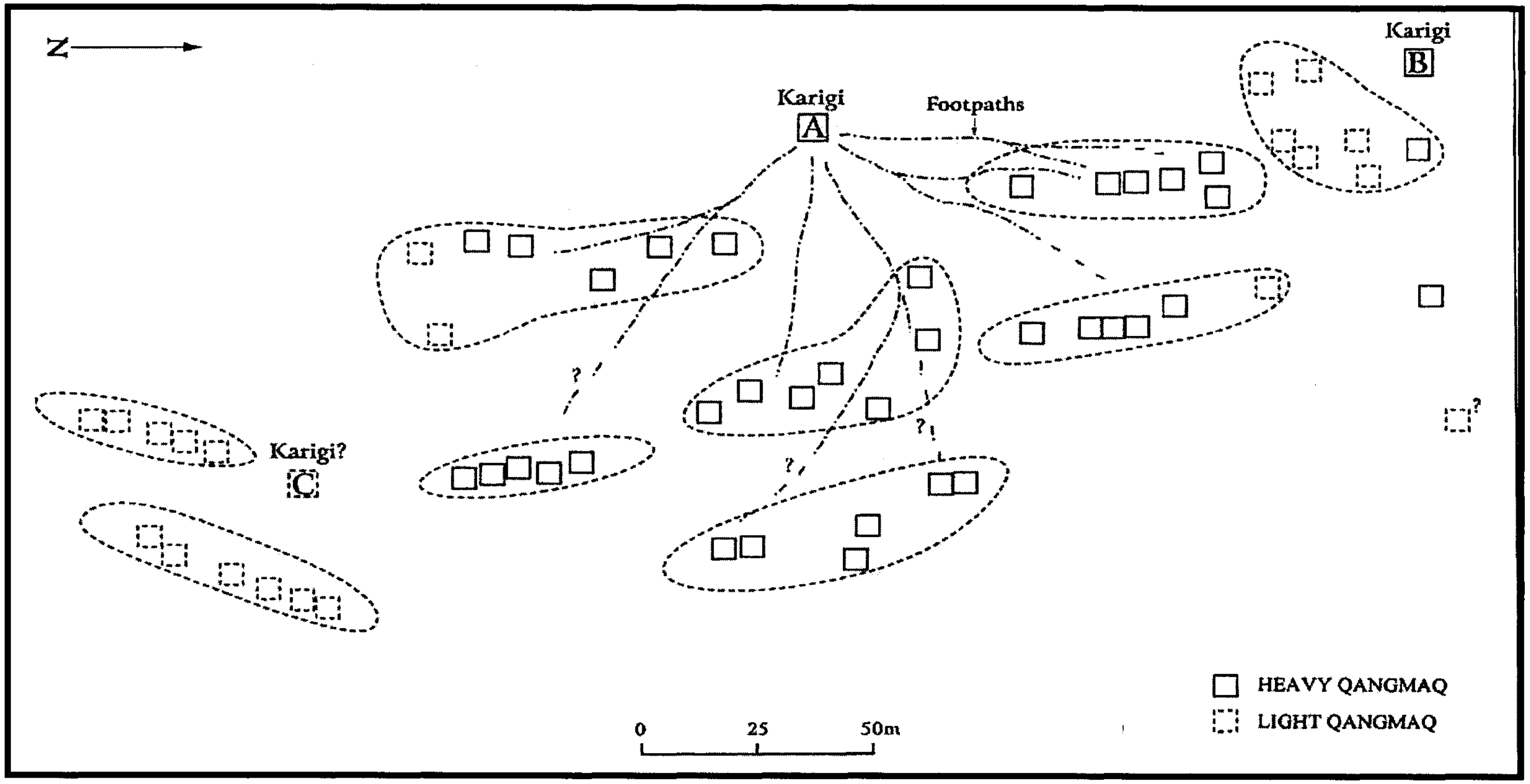

Figure 3.5. PaJs-4 indicating possible *karigit* (Savelle and Wenzel 2003: 116).

3.5 Past subsistence studies from Hazard Inlet

Whitridge (1992) participated in the 1989 and 1990 field season and described the collection method as following a classic archaeological methodology using one-meter square excavation units. Laboratory procedures included cleaning the faunal material with a dry brush and providing a unique catalogue number for each specimen (Whitridge 1992).

The goal of Whitridge's thesis was to analyze Thule subsistence through a linear programming model developed by Arthur Keene in 1979. Keene (1979) set up variables to evaluate nutritional requirements for the Netsilik to ultimately explain if their diet was optimal for the environment they lived in. In order to use Keene's model, Whitridge (1992) conducted detailed faunal identification with material from PaJs-13 and PaJs-3. He confirmed that of the overall composition of mammalian species at PaJs-3, 97.9% NISP were ringed seal (Whitridge 1992: 82) and that ringed seal consisted of an average of 96.4% NISP of mammalian remains found at PaJs-3 and PaJs-13 combined (Whitridge 1992: 73).

Whitridge (1992) plotted ringed seal element frequency against MUI (meat utility index, see Chapter 4 for detailed discussion) using derivations by Lyman et al. (1992) for pinnipeds. He determined that ribs and vertebrae were under-represented at Hazard Inlet. Whitridge (1992) felt that if unknown taphonomic factors were present affecting vertebrae and ribs, the frequency of the elements would be biased and he therefore removed these elements for further analysis. By removing the ribs and vertebrae, Whitridge (1992) found that a correlation did exist between the seal assemblages and the meat utility index for pinnipeds.

Whitridge (1992) also compared the seal elements recovered at PaJs-13 and PaJs-3 with observed transport practices of Inuit from Clyde River, Nunavut. Whitridge (1992) noted that the scapula, humerus, radius-ulna, and sternum were often left articulated and attached to the ribs while the femur and innominate were also left articulated. Moreover, head elements and cervical vertebrae were often left at the butchery site, and were not considered choice elements by Clyde River Inuit.

Danielson's (1994) M.A. thesis focused on seal remains from PaJs-13 in an attempt to explain Thule seal hunting strategies. Seasonality and mortality profiles were constructed through close examination of thin sections of seal teeth. Danielson (1994) attempted to distinguish between random and selective seal hunting practices of Thule. He concluded that the inhabitants of PaJs-13 exploited both fast ice and packed ice seal populations (Danielson 1994).

3.6. Summary

Little data has been published on PaJs-13, PaJs-3, and PaJs-4 from Hazard Inlet. Savelle and Habu (2004) provide a detailed description of the *karigi* in PaJs-13 while Savelle and Wenzel (2003) discuss whaling cultures and consider the *karigit* at PaJs-3 and PaJs-4. Savelle and McCartney (1994) and Savelle (2000) provide information concerning the important representation of whalebone from these sites.

Chapter 4: Approaches to Utility Indices in Zooarchaeology

The following chapter discusses the theory behind the methodological and analytical steps taken in this thesis. Economic utility and bone density of seal elements will be discussed in detail followed by a detailed description of the methodology.

4.1 Utility Indices

T.E. White was one of the first to propose the concept of "economic utility" in 1952. Working with Plains Indians, White was initially interested in the importance of bison in peoples diet. White asked: "Which elements were brought into the camp or village and which elements were left at the kill (White 1953c: 59)?" He believed that anatomical proportions brought back to residential camps would be those with the highest usable meat (Lyman 1985, 1994).

In 1978, Lewis Binford published *Nunamiut Ethnoarchaeology,* an innovative and advanced book addressing the nature of faunal remains at various types of archaeological sites. Spending several months amongst the Nunamiut of Northern Alaska, Binford (1978) observed and recorded how caribou carcasses were butchered, transported, distributed and stored. Following White's earlier study on transport, Binford (1978) noted which anatomical portions were most commonly transported back from the kill/butcher site to the residential site. Binford (1978) derived an index in which anatomical elements and portions were evaluated on meat, marrow, and grease content. The well-known "Utility Index" was thus defined and quickly adopted by archaeologists. "The measured values were used to construct indices of the food utility of the individual carcass parts for human consumers" (Lyman 1994: 225).

Binford (1978) ultimately derived two sets of four utility indices based on data of measured meat from two domestic sheep (*Ovis aries)* (one set) and one caribou (*Rangifer tarandus*) (the second set): The MUI (meat utility index), the grease utility index, the marrow utility index, and the GUI (general utility index). The GUI accounts for meat, marrow, and grease content of anatomical portions.

Binford (1978) observed that parts were not always butchered in discrete elements and certain bones with medium to low utility were sometimes transported back to residential sites. Binford (1978) consequently created the MGUI (modified general utility index) to account for these lower utility parts (known as 'riders'). As a result, skeletal parts with low GUI values attached to parts with high GUI values were given a value of the average of the two. The derived MGUI can be normed and converted into %MGUI.

The MGUI is the most commonly used utility index and although there have been some modifications since 1978, most archaeologist still abide by Binford's original rules. One modification worth noting is the FUI (food utility index) derived by Metcalfe and Jones in 1988. Using Binford's caribou data, they demonstrated that Bindford's derivation of the MGUI was "unnecessarily complex, and that a mathematically and conceptually simpler index could be derived" (Lyman 1994). Metcalfe and Jones (1988) created two utility indices, the proximal-distal FUI, and the complete-bone FUI.

Although Binford (1978) believed that human behaviour could be inferred from an existing correlation between the skeletal parts represented at an archaeological site and the %MGUI, he did not ignore the role of other factors shaping the faunal record.

"Any variability in the relative frequencies of anatomical parts among archaeological sites must derive from the dynamics of their use. Man's role is only one of the partitioning, segmenting, and differentially distributing the segments of animal anatomy during the course of his exploitation of the animal (Binford 1978:11)."

To interpret "man's role", Binford (1978) produced a set of scatter plots measuring correlations between the frequency of skeletal parts represented and the %MGUI. The common unit used in measuring the relative frequency of elements is the *minimal animal unit* (MAU). The MAU "stands for the minimum number of animal units necessary to account for the specimens in a collection (Lyman 1994: 105)" and is derived from the MNE (*minimum number of elements*). The MNE "signifies the minimum number of a particular skeletal element or portion of that taxon (Lyman 1994: 102)" (see Methodology sub-section for full explanation of how these values are derived). MAU can also be normed and converted into %MAU.

Binford (1978) inferred several butchering and transport strategies by considering possible correlations between %MAU and % MGUI. Figure 4.1 illustrates five possible strategies (taken from Lyman 1994: 228-229): a) reverse/bulk strategy, b) gourmet strategy, c) bulk strategy, d) unbiased strategy, and e) reverse gourmet strategy.

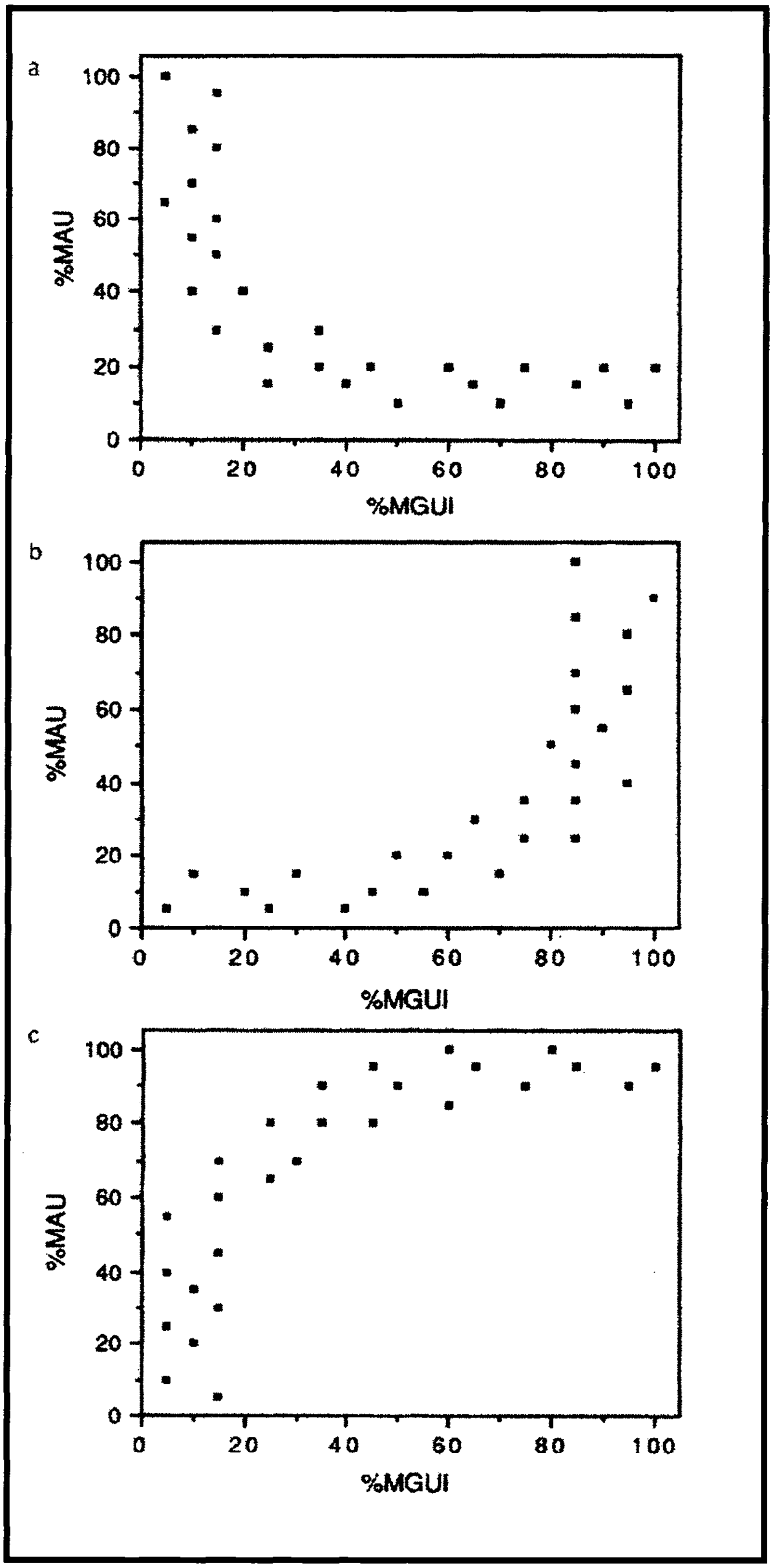

Figure 4.1. Butchering and transport strategies based on modified general utility indices (Lyman 1994: 228-229).

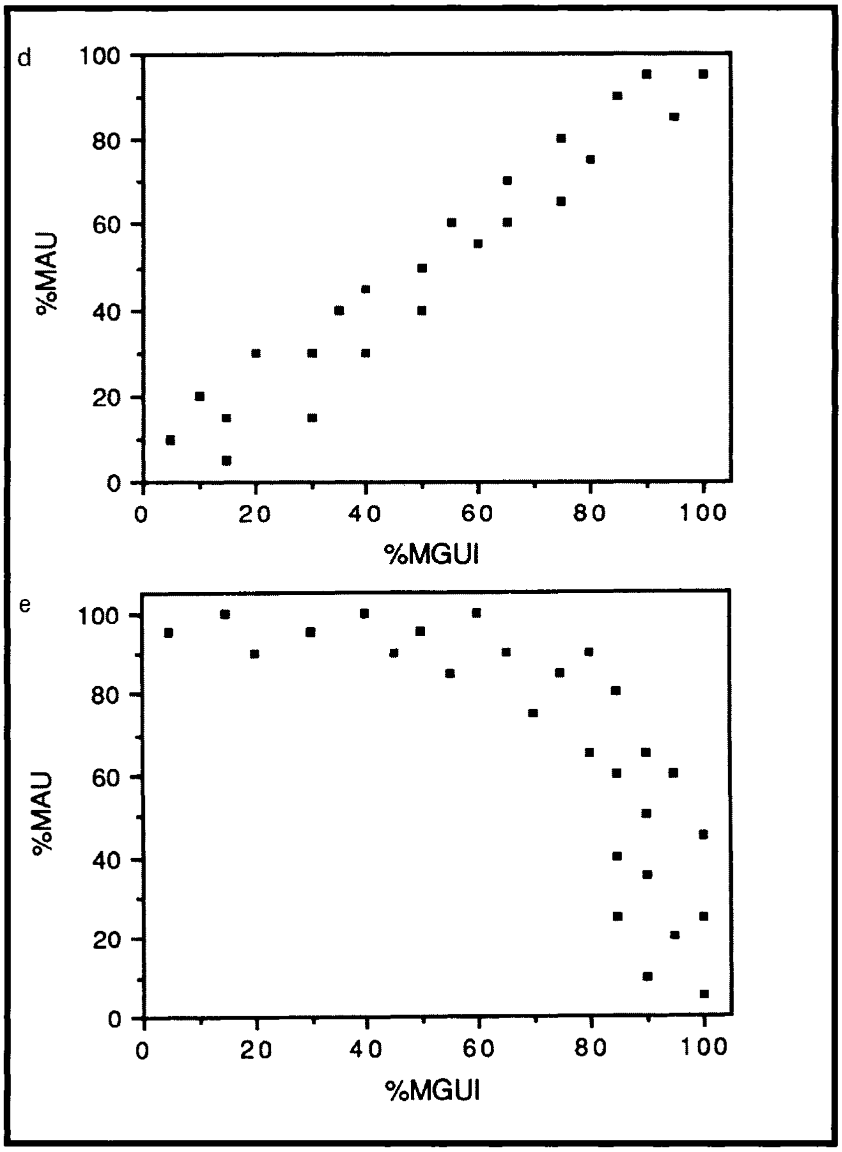

Figure 4.1 continued. Butchering and transport strategies based on modified general utility indices (Lyman 1994: 228-229).

Binford's logic defines butchering and transport strategies based on the amount of high and low utility elements present at a site. The utility curves not only define groups' strategies but also categorizes sites into kill/butchery sites and residential sites. Sites represented by high and medium utility elements define residential sites while those with an abundance of primarily low utility elements characterize kill/butcher sites.

In the two decades following *Nunamiut Ethnoarchaeology,* utility indices have been derived for: caribou (*Rangifer tarandus*; Binford 1978, Metcalfe & Jones 1988), sheep (*Ovis aries*; Binford 1978), muskox (*Ovobis moschatus*; Will 1985), bison (*Bison bison;* Emerson 1990), guanaco (*Lama guanicoe*; Borrero 1990, Lyman 1992a), impala (*Aepyceros melampus;* O'Connell et al. 1990), llama (*Lama peruana;* Mengoni-Gonalons 1991), sea lions (Savelle et al. 1996), cetaceans (Savelle & Friesen 1996), and, pertinent to this study: harp seal and hooded seal (*Phocid groenlandica & Cystophora cristana;* Lyman et al. 1992b), and ringed seal (*Phoca hispida;* Diab 1998).

4.1.1 Meat Utility Index for Phocid Seals

Lyman, Savelle, and Whitridge (1992) derived meat utility indices for seals. Following standard 'biological procedures' in measuring and dissecting the animals, the gross weight (including bone) and the flesh weight (excluding bone) of the animals were derived to create utility indices (Lyman et al. 1992: 532; 534). Results indicated that, despite age or sex of the animal, the rib cage yielded the highest gross and flesh weight utility (see Lyman et al. 1992 for values).

> "The %MUI values are of particular interest because they underscore the fact that the rib cage far surpasses any other skeletal portion in terms of associated meat with the % MUI for the ribs being more than twice as large as the next highest % MUI value. The rib cage value would be even greater were the weights of the abdominal meat included, which has no associated bone (Lyman et al. 1992: 536)."

Like Binford's (1978) %MGUI, Lyman et al. (1992) created a %MMUI (*modified meat utility index)* averaging low utility parts or portions that are often attached to higher utility parts. The %MMUI was derived from the flesh weights and generated an ordinal index with ribs ranked at 100%.

Diab (1998) derived a ringed seal (*Phoca hispida*) meat utility index based on three ringed seals. In his study, Diab (1998) also considered food preferences of Iñupiat, bone density, and carnivore destruction of bone as factors contributing to the faunal record.

Diab's ringed seal meat utility index was restricted to MUI or %MUI and did not include the hide, blubber, and viscera, but did include the brain (1998: 5). Using flesh weight, Diab's derivation of %MUI yielded similar results as Lyman et al. (1992) with the rib cage consisting as the highest ranked element or portion at 100%. Table 4.1 is taken from Diab (1998) and these values were used in this thesis.

Table 4.1. (from Diab 1998: 7). *Ringed seal %MUI derived by Diab (1998).*

Skeletal part	%MUI
Head and hyoid	41.34
Head (hyoid & Mandibles)	47.21
Mandibles	8.81
Cervical	58.59
Thoracic	35.48
Lumbar	53.12
Pelvic girdle	58.68
Rib-cage	100.00
Sternum	6.58
Scapula	31.37
Humerus	20.95
Radius-ulna	15.45
Front flipper	2.86
Femur	10.81
Tibio-fibula	29.97
Rear flipper	4.76

Diab (1998) compared the %MUI with Iñupiat taste preferences. Interestingly, the Inũpiut ranked ribs 10th among the 15 skeletal parts mentioned in Table 4.1 (Diab 1998).

The first ranked skeletal portion was tibio-filuba, although this was not consistent for each individual interviewed. Diab (1998) concludes that individual taste preferences therefore introduces variability and can play a role in shaping the faunal assemblage.

Diab (1998) tested his %MUI and taste preference indices on Historic Greenlandic sites and Eastern Canadian Thule sites. His objective was to determine if the assemblages were a product of utility, bone density, and/or if there existed any correlations with Iñupiat food preferences. Diab (1998: 16) found that for the Thule sites, no correlation existed between MAU and %MUI. However, Diab (1998: 16) found a strong positive relationship between MAU and bone density. In one case, Diab (1998) found an existing correlation with Iñupiat food preferences.

4.2 Taphonomy and Bone Structural Density

Utility indices allowed archaeologists and zooarchaeologists to interpret human behaviour based on bone assemblages. Binford's (1978) utility indices provided a basis for interpreting butchering and transport behaviour but other factors, such as preservation, bone destruction and site disturbance also needed addressing.

Ideas concerning preservation in archaeology are not new. Most research conducted recognizes the loss of material from mechanical and chemical weathering and natural and cultural disturbances. Archaeologists try to understand chemical and mechanical processes that bones undergo from the time of deposition to the time of recovery.

Michael Schiffer (1995) focused in detail on the stages that archaeological materials undergo through time. Schiffer explains how "...archaeological remains are a distorted reflection of a past behavioural system. ...[Artefacts]...have been subjected to a series of cultural and non-cultural processes which have transformed them spatially, quantitatively, formally, and relationally (Schiffer 1995: 35)." Figure 4.2 illustrates post-depositional stages where information is lost.

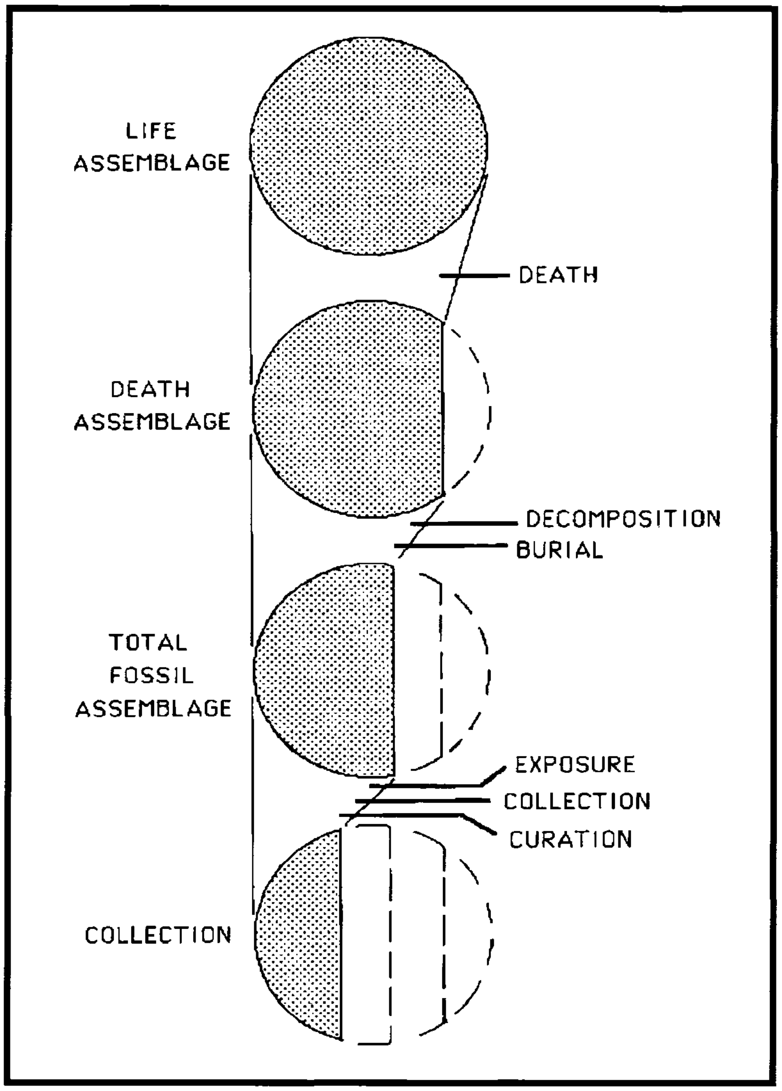

Figure 4.2. Loss of information in the faunal record from the time of deposition to the time of recovery (Lyman 1994: 19).

4.2.1 Taphonomy

Efermov (1940), a Russian palaeontologist, was the first to coin the term 'taphonomy' in reference to the processes of change that organic materials undergo through burial. By the 1960s, taphonomy gained recognition with important studies by Voorhies (1969) and Clark et al. (1967) (see Lyman 1994). Consideration of taphonomy at archaeological sites became an important component in faunal analysis, and by the 1970s taphonomic studies were carried out in Africa (Behrensmeyer 1975a, 1975b; and Boas and Behrensmeyer 1976), the Near East, Europe (notably Noe-Nygaard 1977), and the Americas (e.g., Binford and Bertram 1977; see especially Lyman 1994 and various references within his work therein). Taphonomic research is now incorporated in all faunal analyses, especially with the advancement of bone density studies.

Lyman's (1994) *Vertebrate Taphonomy* thoroughly examines taphonomic processes and bone modification. He explicitly describes the pre-, syn-, and post-depositional stages bones undergo. Lyman (1994) notably discusses bone density in detail and provides bone density measurements for various taxa.

4.2.2 Bone Structural Density

Bone structural density (g/cm^3) strongly influences the resistance of a particular part of a bone to taphonomic processes. Structural density depends on bone composition and is based on the ratio of bone mineral, predominantly hydroxyapatite ($Ca_{10}(PO_4)_6 \cdot 2OH$), to collagen. The denser the bone, i.e. the lower the amount of collagen, the more resistant the bone is to taphonomic agents (Lyman 1994). Different parts of a single bone can yield different structural densities. For example, a seal femur will have a greater density in the centre of the shaft since this area has a lower porosity.

A 'photon densitometry' or 'photon absorptiometry' measures how weak a photon beam of known strength becomes when passed through a section of a bone (Lyman 1994: 238). This measured location is labelled the *scan site*. *Scan site* measurements of bone density have been derived for bison, deer, pronghorn, sheep, guanaco (Lyman 1984a), vicuna (Kreutzer 1992), marmot (Lyman 1992a), and seal (Lyman 1994). Figure 4.3 (from Lyman 1994: 244-245) shows *scan site* locations for seal bones. The values of these scan sites are listed in Appendix 2 and were used in this analysis.

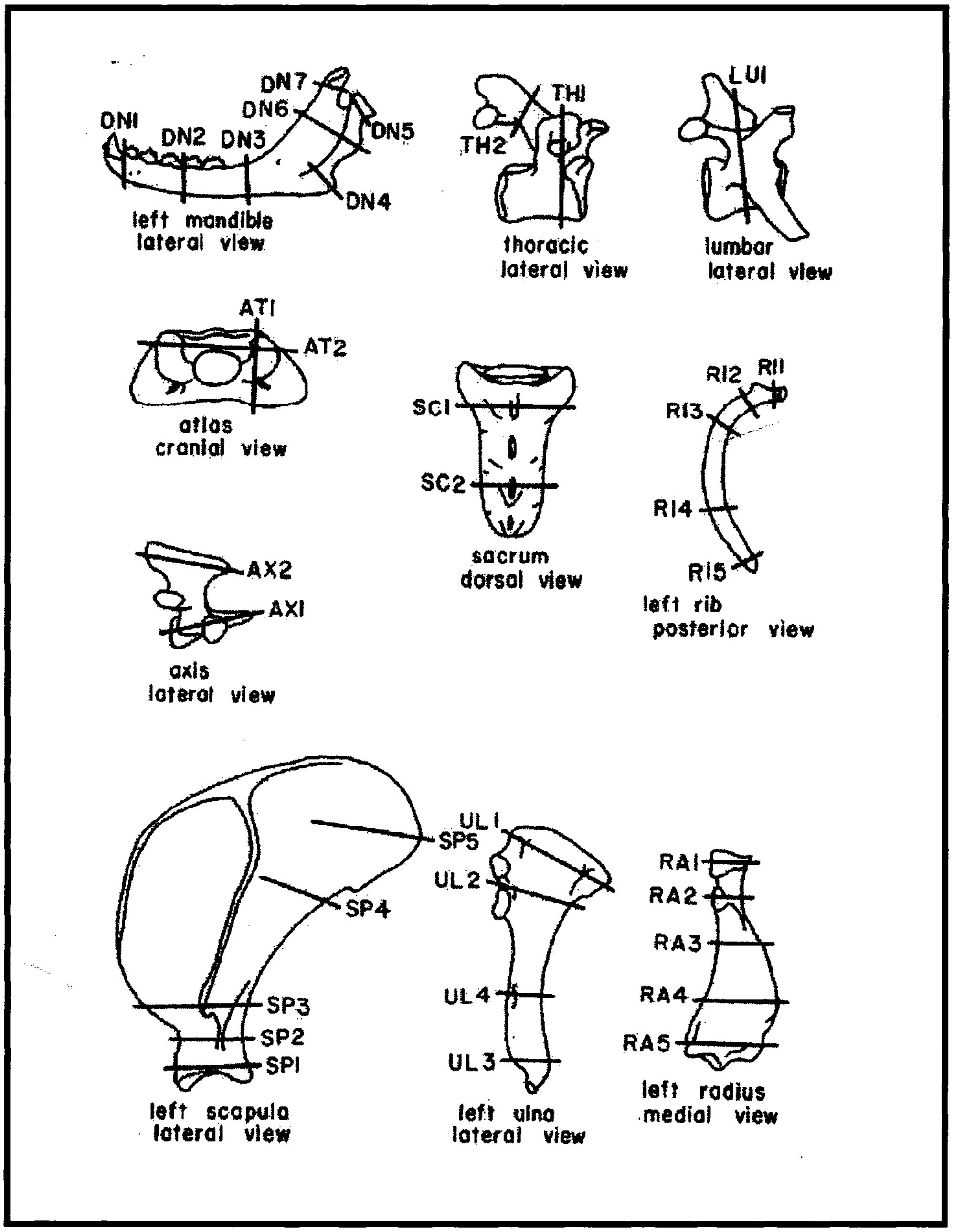

Figure 4.3. Scan sites of various seal bones (Lyman 1994: 244-245).

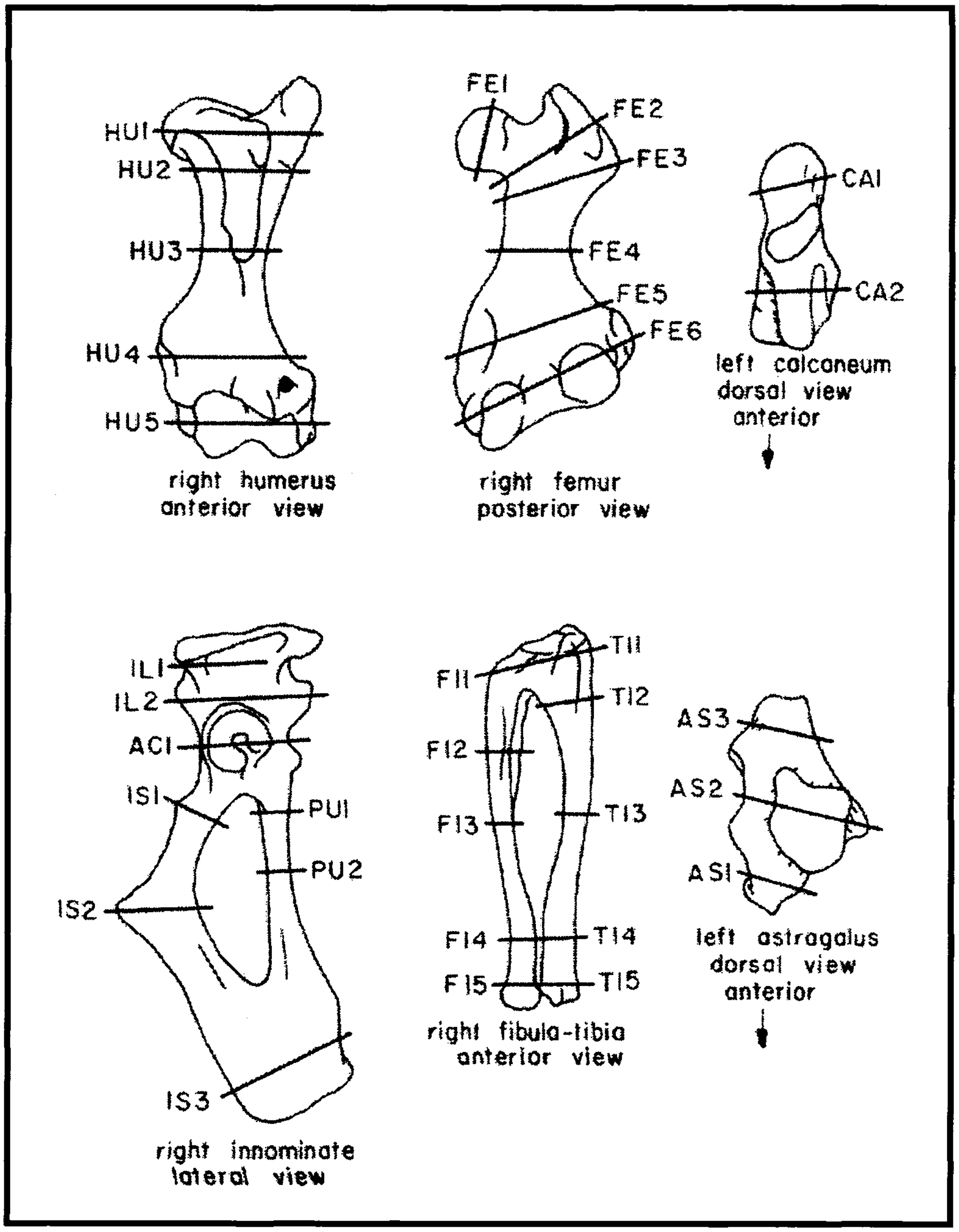

Figure 4.3 continued. Scan sites of various seal bones (Lyman 1994: 244-245).

4.2.3 Utility and bone density as variables in faunal analysis

Scan site density measurements are often used in comparison with utility indices to try and understand skeletal part representation in faunal assemblages. The goal is to determine whether the assemblage was a product of taphonomic processes, butchering and transport decisions, or a combination of both.

Percent MAU is statistically compared to %MGUI (or MUI or FUI) and density. If %MAU is correlated with density, the faunal assemblage can often, although not always, be attributed to differential preservation. If %MAU is positively correlated with utility, then the assemblage is typically inferred to as being attributed to differential butchering and transport. If %MAU is correlated with both density and utility, then the analyst is faced with equifinality.

Lyman has described equifinality as the "…production of similar results by different processes (Lyman 1993b: 324)." Fortunately, Lyman (1993b) has experimentally observed that if a high frequency of low utility elements and a low frequency of high utility elements exists, a negative correlation with utility and a positive correlation with structural density is expected, and vice versa. Lyman (1993b) therefore *generalizes* that high utility elements have a low structural density since high utility portions will tend to have a higher amount of collagen, fat, and marrow content. The bone will therefore be more porous and thus more prone to weathering.

When considering seal bones, Lyman et al. (1992) suggest the potential for equifinality is less of an issue. According to Lyman et al. (1992), 1) pinniped bones have less marrow (than ungulates), and the majority of grease is contained in an accessible blubber layer, therefore there are less broken bones; and 2) pinniped bones have greater densities than ungulate bones (ibid: 537-538). Lyman notes however, that neither density nor utility will "...provide trustworthy bases for explanations of skeletal part frequencies (Lyman 1994: 258)" since there exist several variables controlling both transport and destruction.

Chapter 5: Methodology

As previously mentioned, the seal remains analyzed in this study were collected from three Thule sites in the Hazard Inlet area of Somerset Island, Nunavut by Dr. James Savelle and several students during the 1989-1991 field seasons.

The methodology consisted of a laboratory component of which detailed analysis of seal bones over the period of the last two years was conducted. The bones had already been washed and partially identified and analyzed by previous students. A new database was created for the purpose of this study, and in total, 35,249 specimens were identified of which 34,163 were positively identified as seal. Bones were compared to a complete articulated and two disarticulated harp seals in the zooarchaeology lab at McGill University. Elements were *generally* categorized by age where embryonic sized bones were not counted as individuals. Otherwise, there were no further distinctions made between juveniles and adults, and no distinction was made between genders. Butchering marks and evidence of gnawing were not examined.

Once bones were identified, they were counted and converted into data sets in order to conduct correlative studies between the assemblages and seal utility and bone density.

Bones were initially counted by NISP *(number of identified specimens)*. NISP has been described as "[the] basic counting unit that must be used in any attempt to quantify the abundances of taxa within a given faunal assemblage...(Grayson 1984: 17)." Every complete element and element fragment (identified or unidentified) was counted as an NISP. NISPs are affected by butchering patterns, size and type of the animal killed, trampling by other animals, natural breakage, differential preservation (i.e. taphonomic processes), and by collection techniques of archaeologists (Grayson 1984: 20-22). NISP is not an ideal representation of the amount of animals represented at a site and thus many look to MNI *(minimum number of individuals)* as a preferred unit of measurement.

White first introduced MNI in 1953 based on his concern with "the amount of meat furnished by any given species (Grayson 1984: 27)." White (1953a) separated the most abundant elements of his assemblage into left and right components and used the greater number to measure the number of species present.

> "The method I have used in the studies on butchering techniques is to separate the most abundant element of the species found...into right and left components and used the greater number as the unit of calculation. This may introduce a slight error on the conservative side because, without the expenditure of a great deal of effort with small return, we cannot be sure all of the lefts match the rights" (White 1953:397, taken from Grayson 1984: 27).

Today, MNI is defined as "the minimum number of individual animals necessary to account for some analytically specified set of identified faunal specimens; it is a derived unit because it may or may not take inter-specimen variation such as age, sex, or size into account (Lyman 1994: 100)."

Potential problems in using NISP and MNI lie predominantly in aggregation techniques. Aggregating all of the features within one site, as one unit of measurement will produce a low MNI, while treating each feature within a site as a separate unit will provide a high MNI (Grayson 1984). Consideration of how to cluster the site may also depend on what sort of information is desired. For the purpose of this thesis, two sets of data were constructed for each site. In one case, all of the features within one site were treated as separate aggregates. This step was important to determine if there were any differences in elemental representation between the features in one village. The second technique aggregated the site as a whole so the three sites could be statistically compared.

Bones were quantified as MNE and MAU values. MNE *(minimum number of elements)* "signifies the minimum number of a particular skeletal element or portion of that taxon (Lyman 1994: 102)," while MAU *(minimum animal units)* "stands for the minimum number of animal units necessary to account for the specimens in a collection (Lyman 1994: 105)." MNE allows quantification based on elemental portions (such as distal ends, proximal ends, shafts, and epiphysis) and is critical to consider when conducting bone density studies.

The MAU is calculated by dividing the MNE by the number the elements represented in a complete skeleton. For example, if 10 proximal femora are represented in a collection, the MNE is 10 and the MAU is 5, since there are 2 proximal femora represented in a complete skeleton.

Once the MAU values were derived, %MAU vs. elements, MAU vs. FUI, and MAU vs. bone density graphs were created. The correlation coefficient used in this analysis was *Spearman's rho* (r_s).

Chapter 6: Data Analysis

This chapter provides a detailed analysis of identified seal remains from each feature excavated from sites PaJs-13, PaJs-3 and PaJs-4 from Hazard Inlet. The purpose of this analysis is to determine if the seal remains were a product of either FUI, bone density, or if there were other factors playing a role. Since the three sites were occupied at different times of the year, the analysis also attempted to detect seasonal variability.

The analysis presents three graphs for each feature, as well as for each site as an aggregate: %MAU vs. element, MAU vs. FUI, and MAU vs. bone density. The first graph illustrates the elements found in each feature and the site overall and evaluates the distribution of seal elements throughout each site.

The next two graphs analytically test the relationships. MAU vs. FUI examines any existing correlations between the elements found and utility. Since we cannot ignore the fact that both nature and humans can play a destructive role in the faunal record, it is imperative to include bone density studies alongside utility. MAU vs. bone density will possibly detect any correlation between the elements represented and their resistance to taphonomic processes.

In order to use the FUI values from Diab (1998) for the FUI vs. MAU graphs, the ulna-radius and the tibio-fibula were combined. For the bone density graphs, all longbones were separated into proportions of proximal, intermediate (or shaft portions), and distal portions. For the tibia and fibula, more than one bone density value existed for the shaft portions and these are labelled according to scan sites from Lyman (1994) (see Appendix 2 for values).

6.1 PaJs-13: Thule winter village

PaJs-13 Feature #1

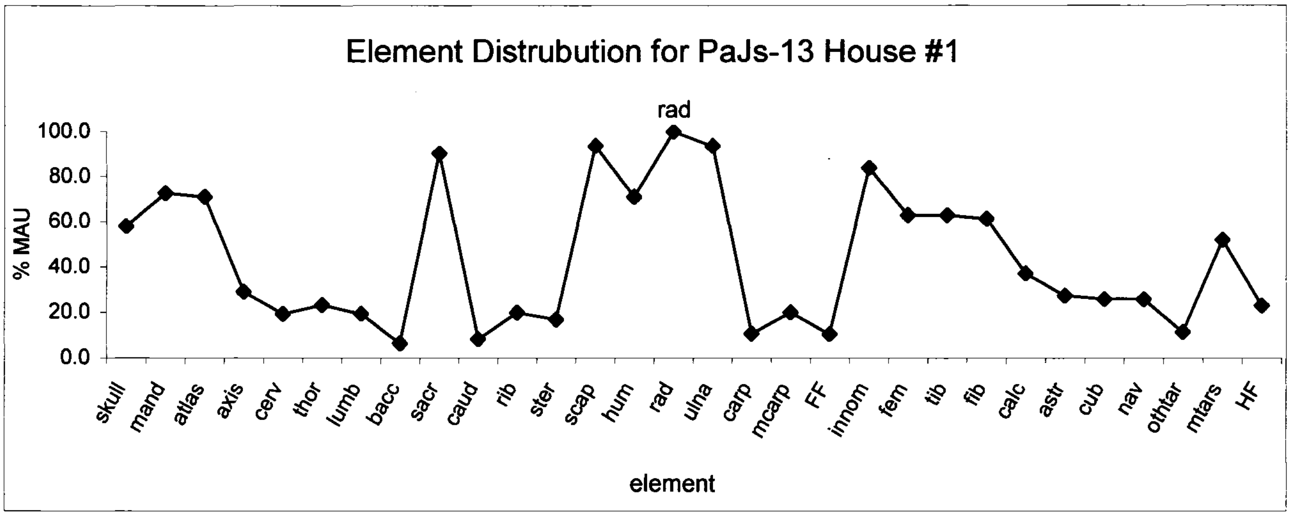

Figure 6.1 Element distribution for PaJs-13 Feature 1.

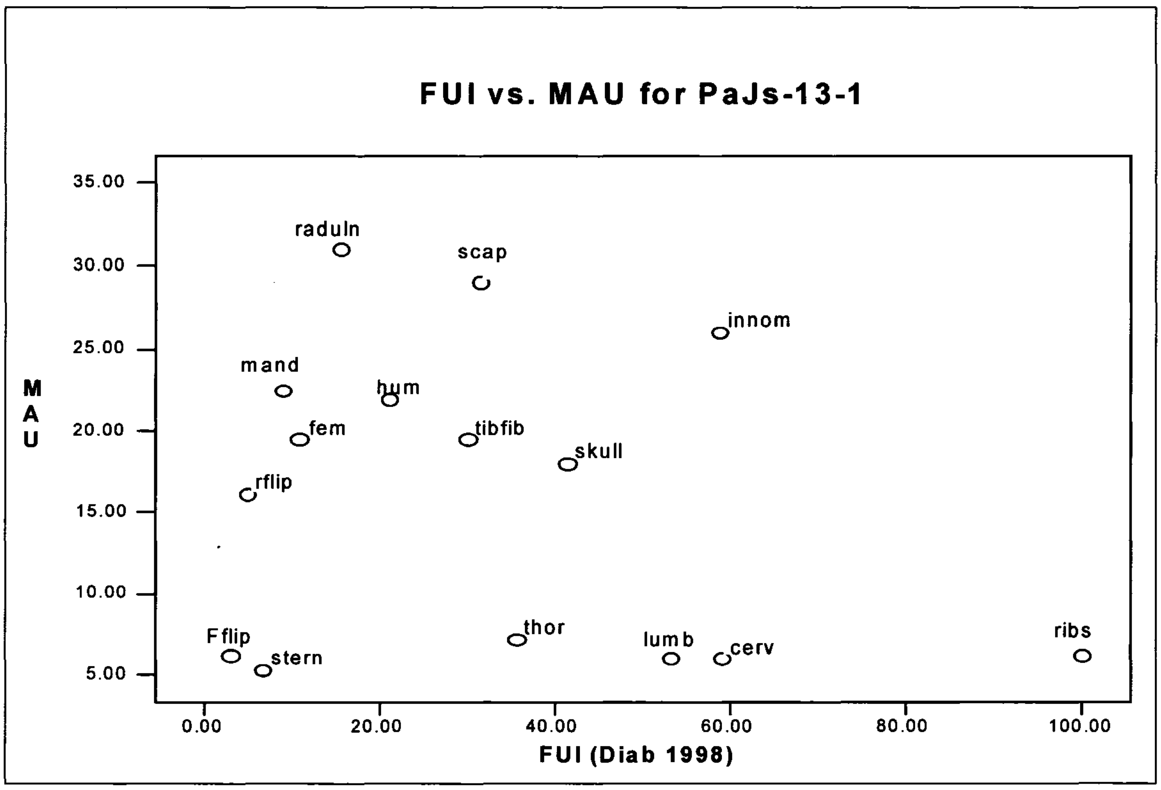

Figure 6.2: FUI vs. MAU for PaJs-13 Feature 1.

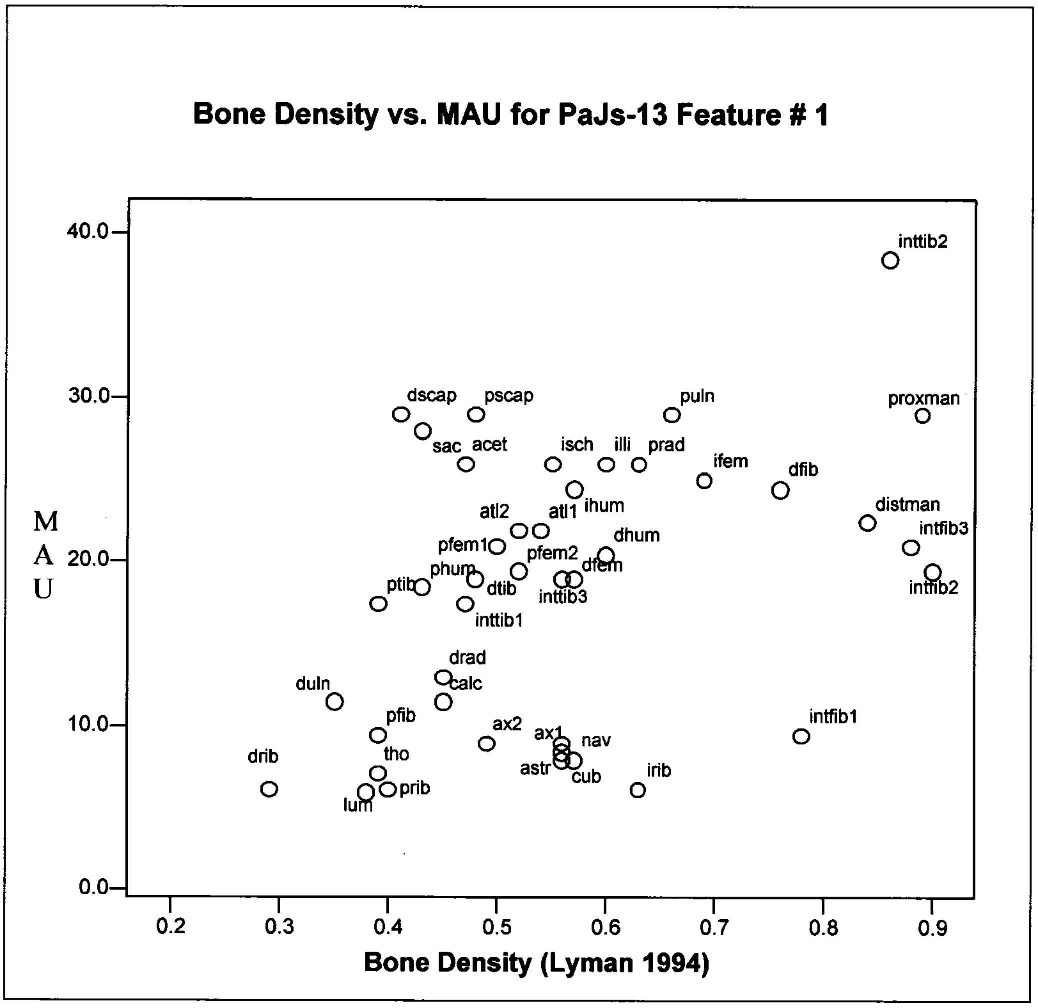

Figure 6.3. Bone density vs. MAU for PaJs-13 Feature 1.

PaJs-13 Feature #2

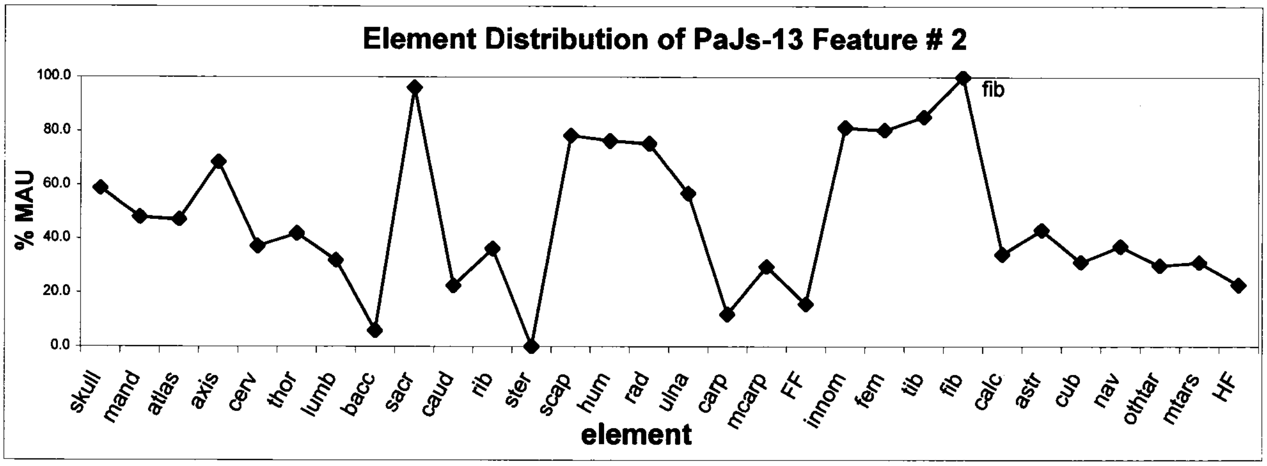

Figure 6.4. Element distribution for PaJs-13 Feature 2.

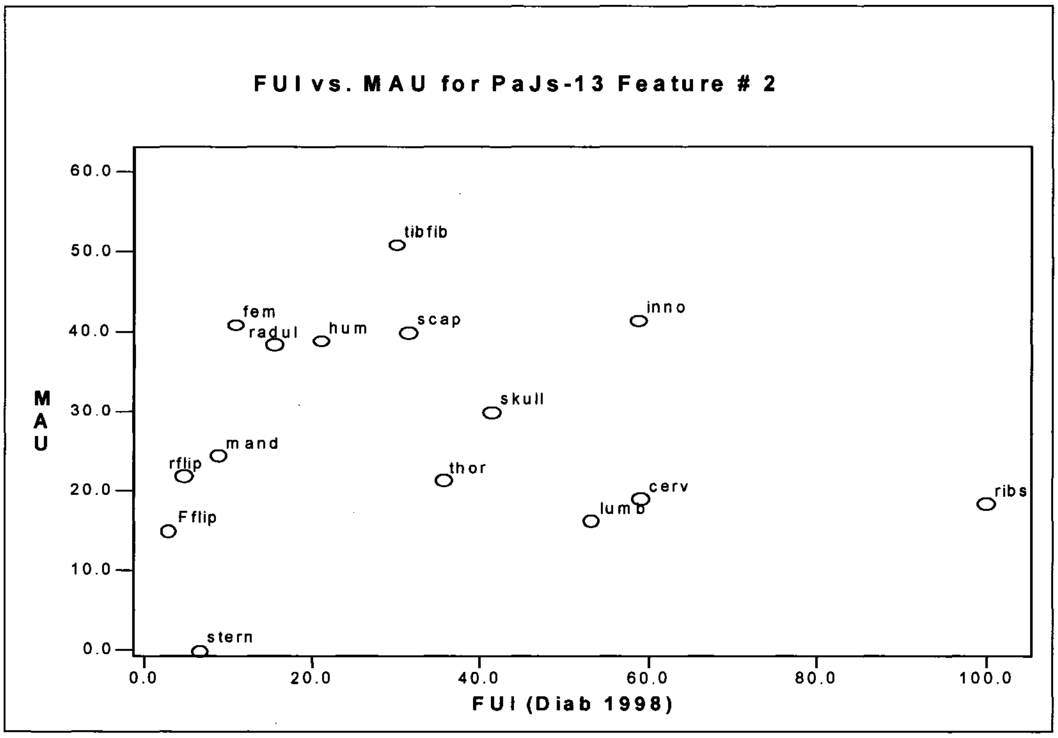

Figure 6.5. FUI vs. MAU for PaJs-13 Feature 2

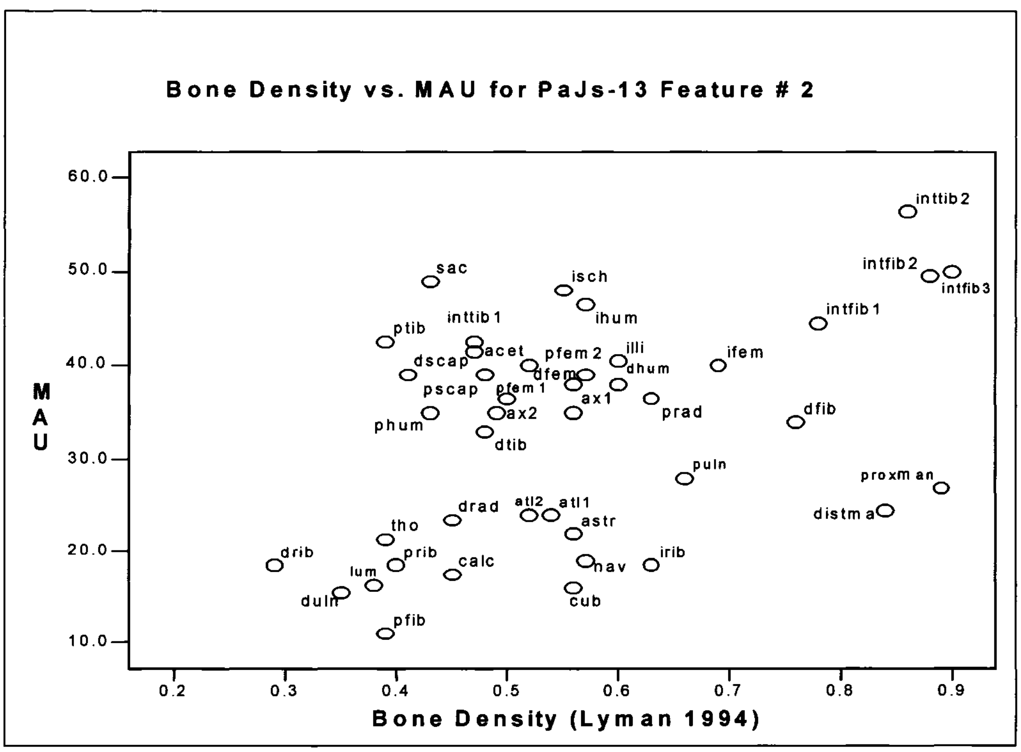

Figure 6.6. Bone density vs. MAU for PaJs-13 Feature 2.

PaJs-13 Feature #3

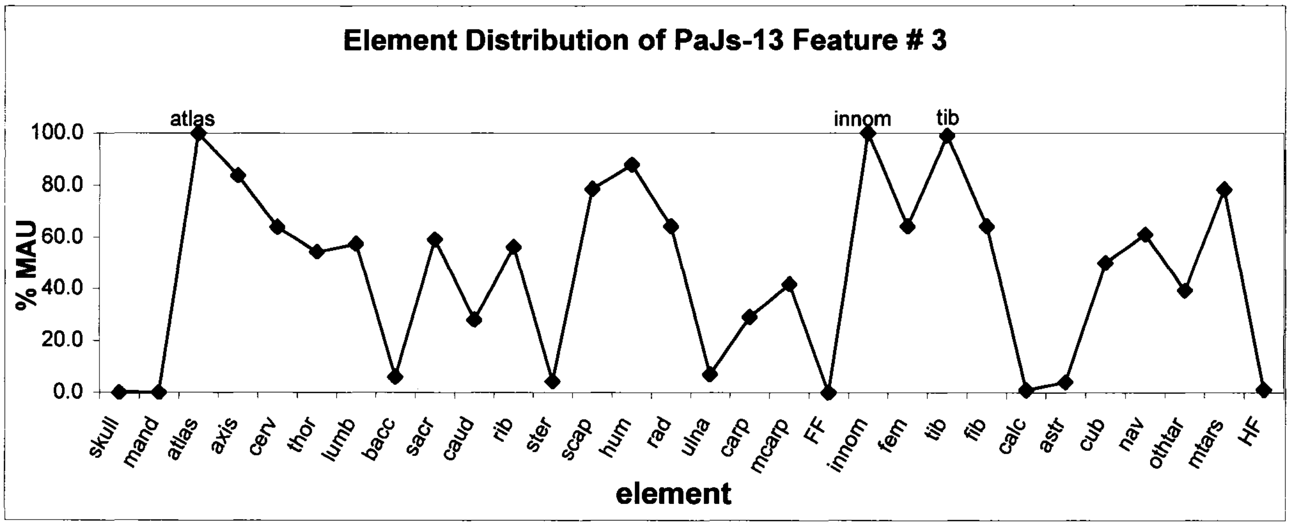

Figure 6.7. Element distribution for PaJs-13 Feature 3.

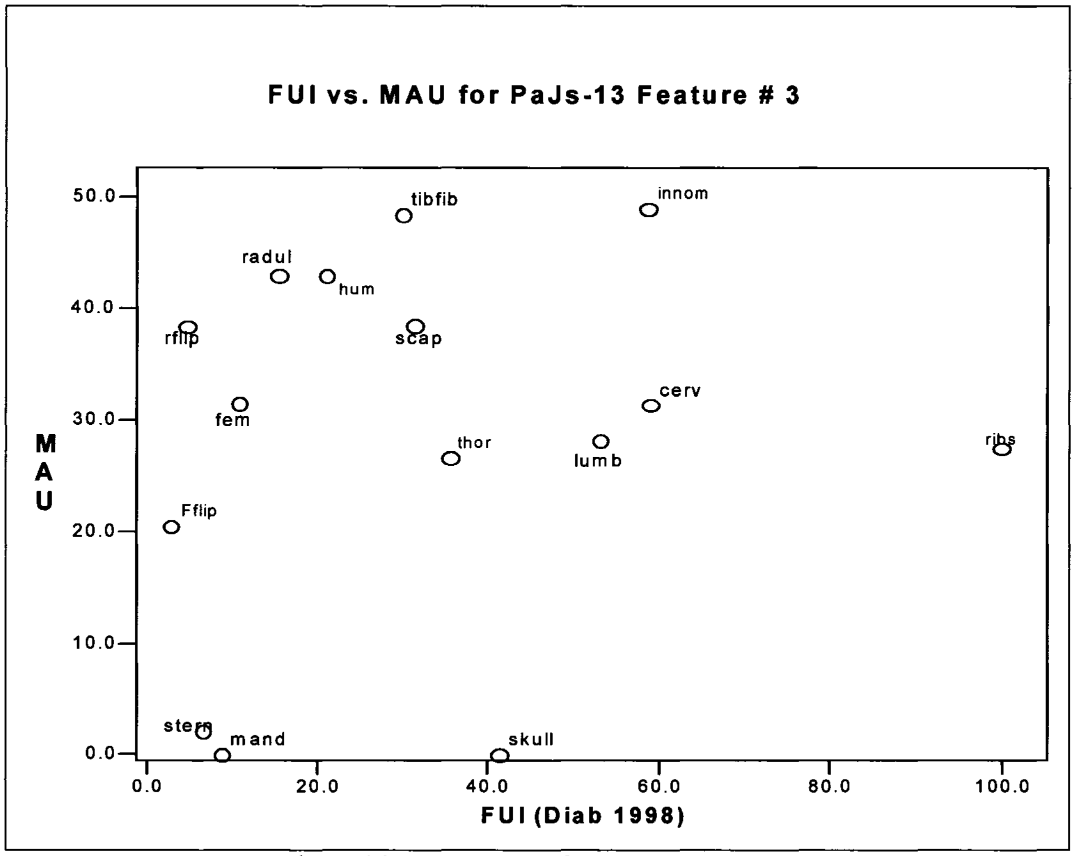

Figure 6.8. FUI vs. MAU for PaJs-13 Feature 3.

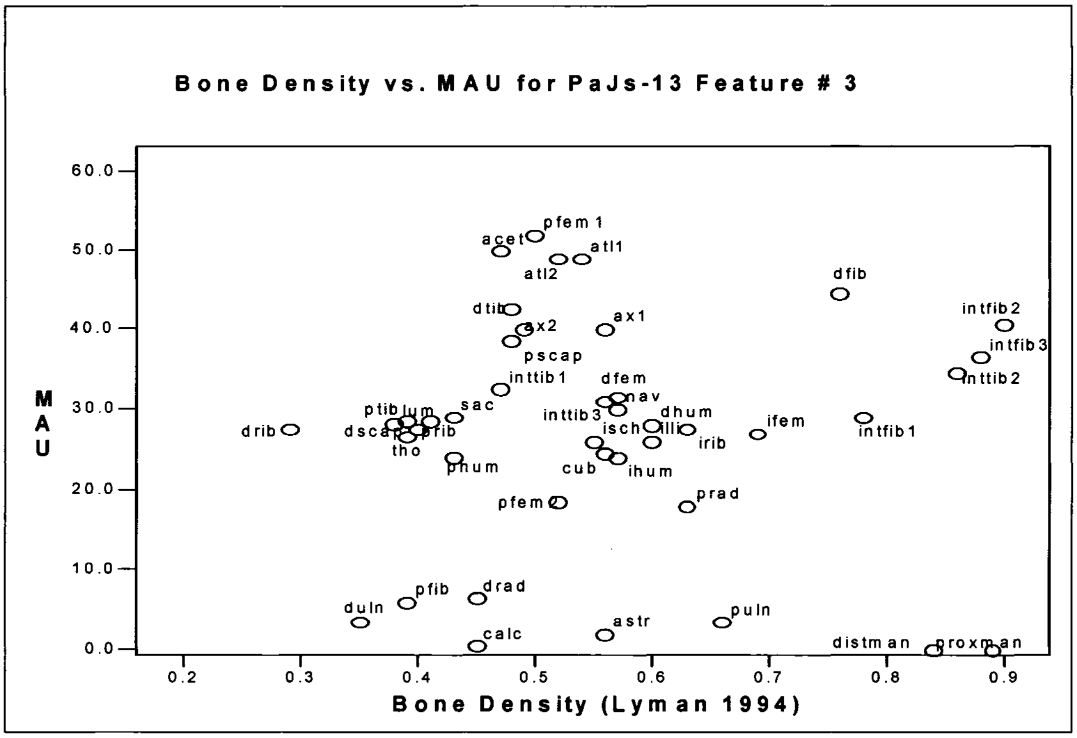

Figure 6.9. Bone density vs. MAU for PaJs-13 Feature 3.

PaJs-13 Feature #4

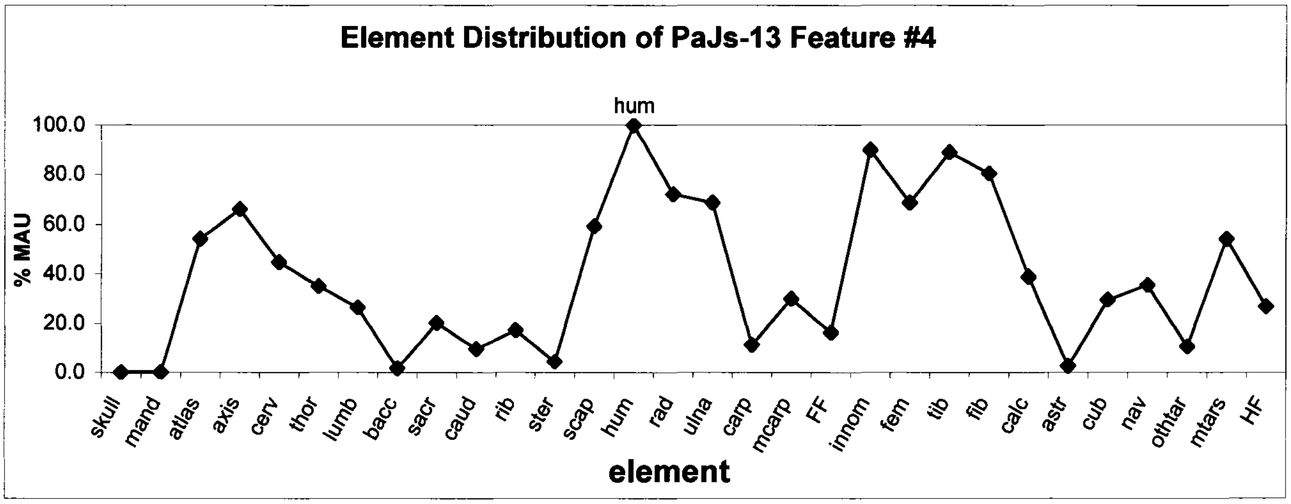

Figure 6.10. Element Distribution for PaJs-13 Feature 4.

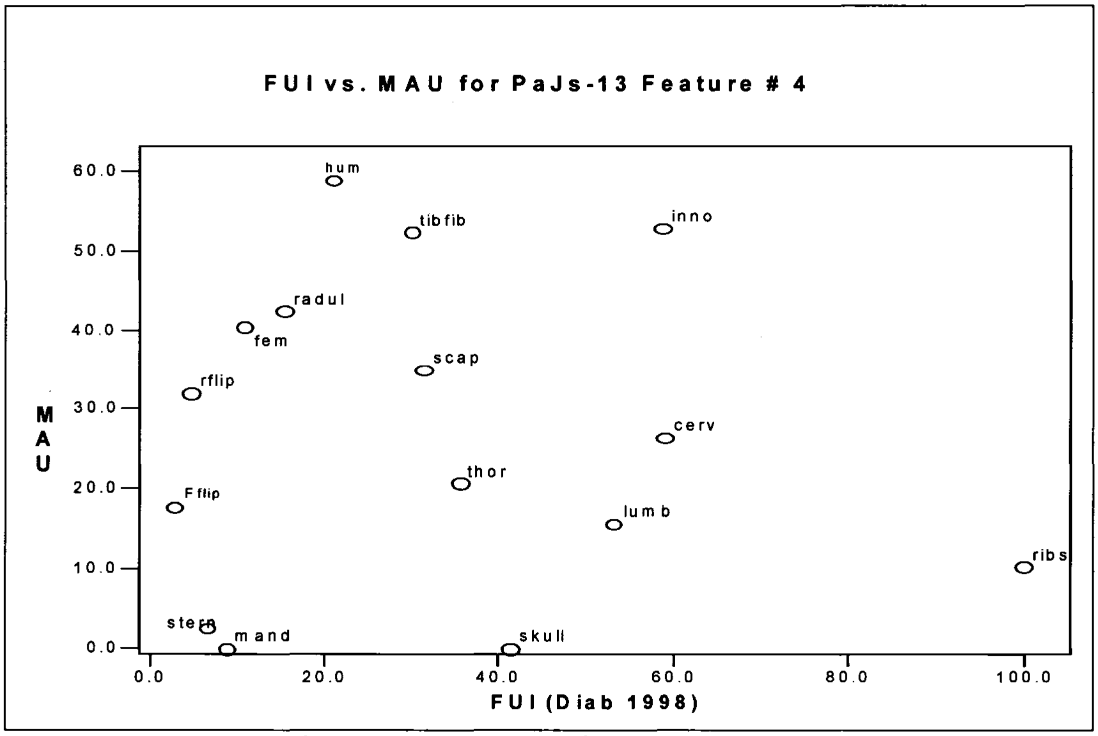

Figure 6.11. FUI vs. MAU for PaJs-13 Feature 4.

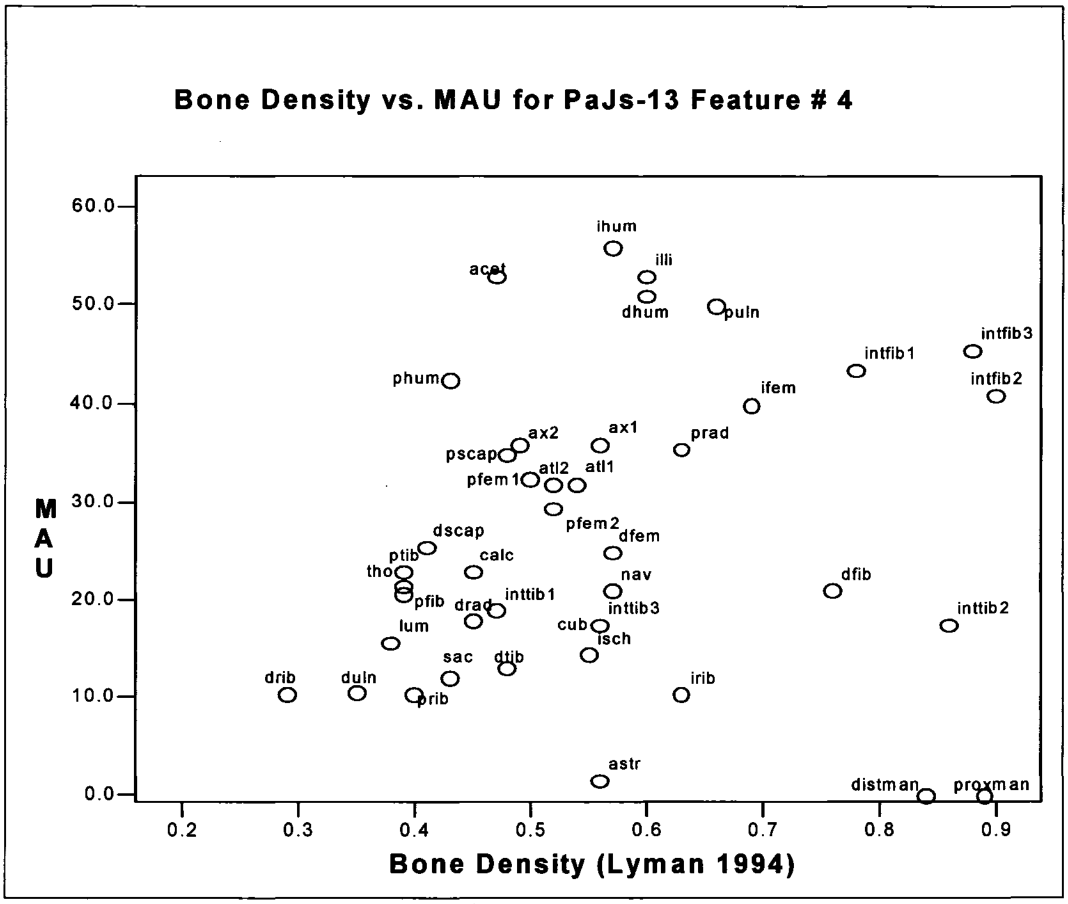

Figure 6.12. Bone density vs. MAU for PaJs-13 Feature 4.

PaJs-13 Feature #5

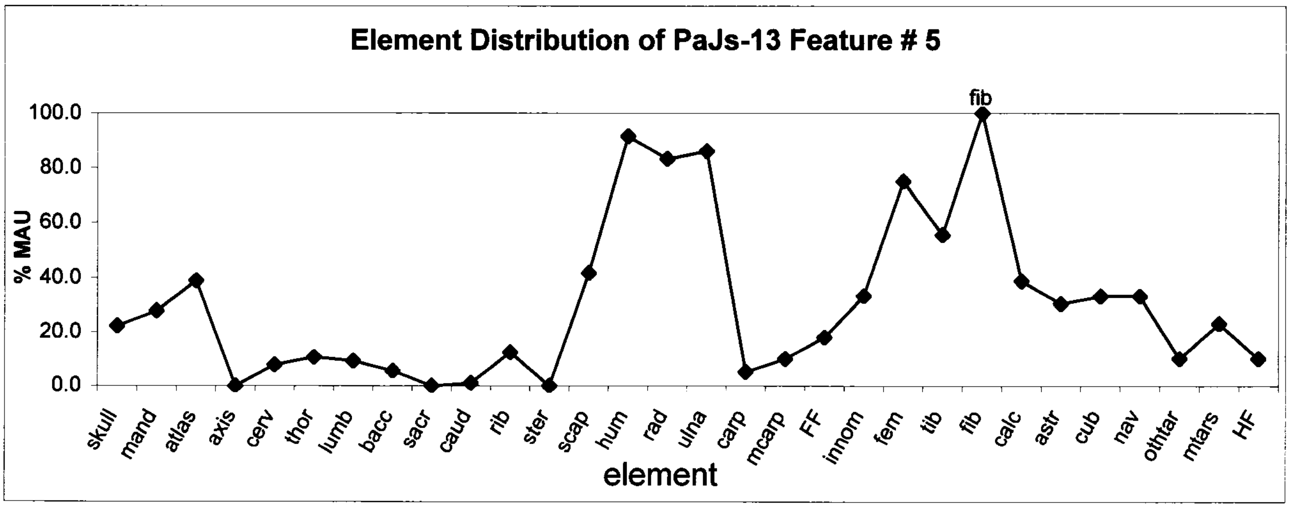

Figure 6.13. Element distribution for PaJs-13 Feature 5.

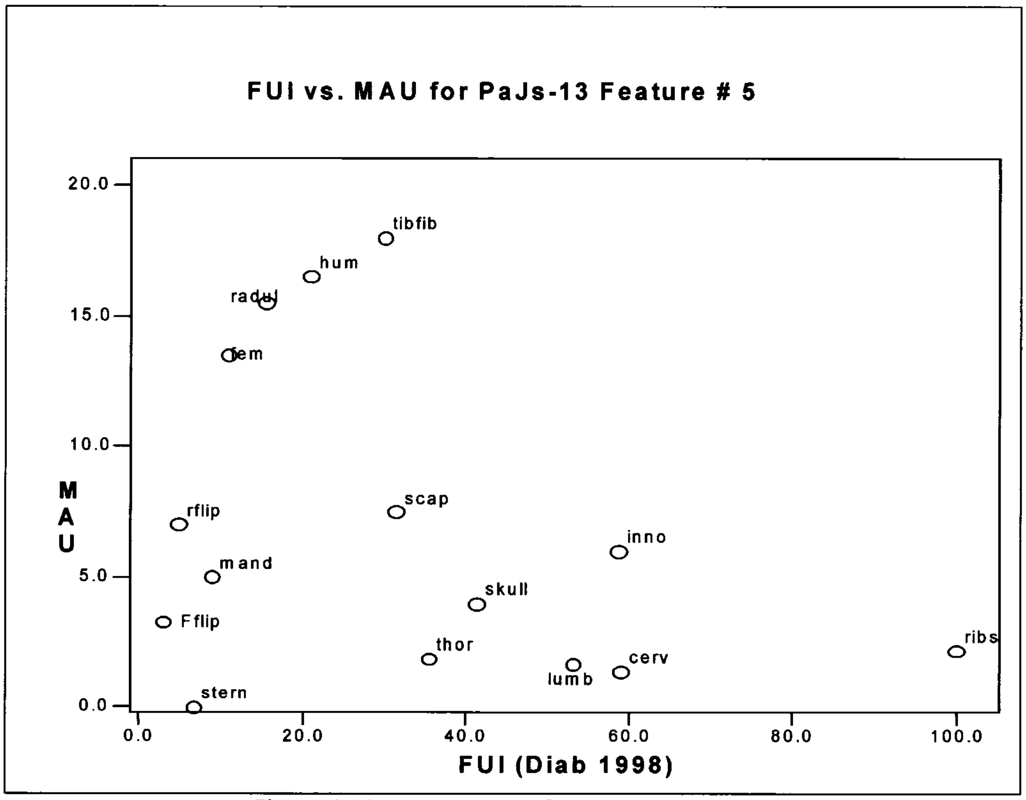

Figure 6.14. FUI vs. MAU for PaJs-13 Feature 5.

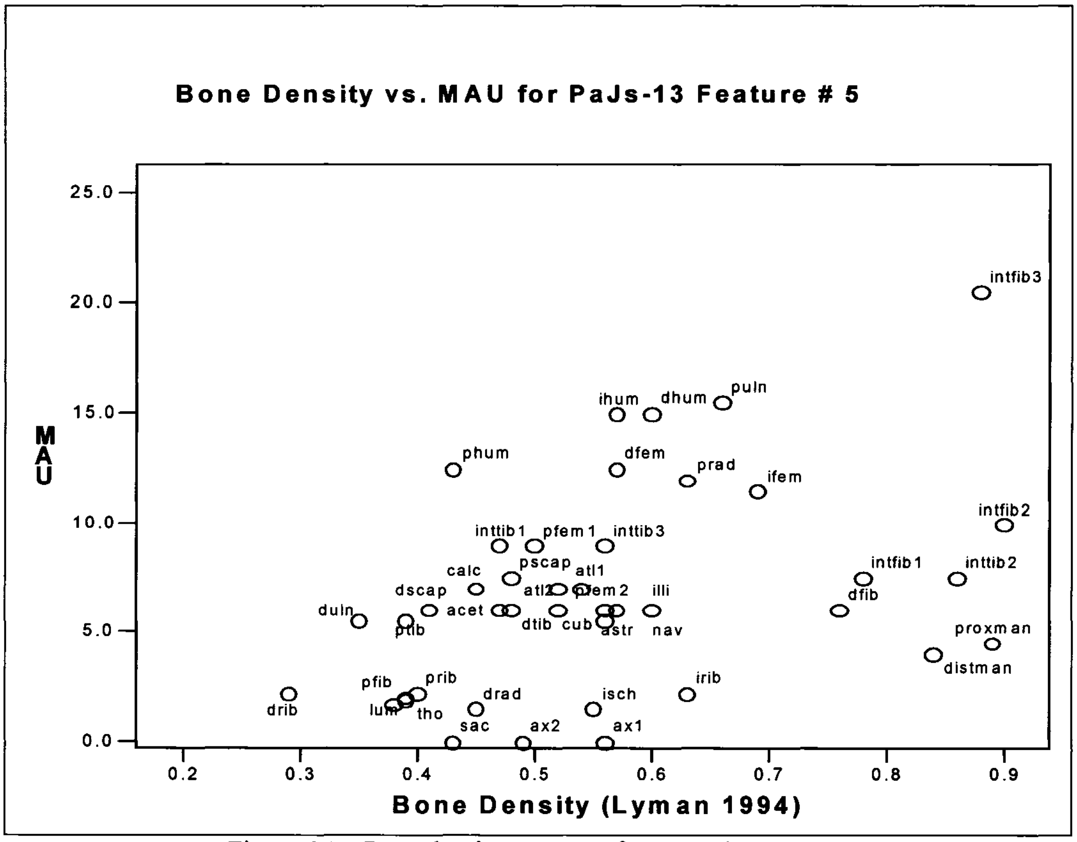

Figure 6.15. Bone density vs. MAU for PaJs-13 Feature 5.

PaJs-13 Feature #6

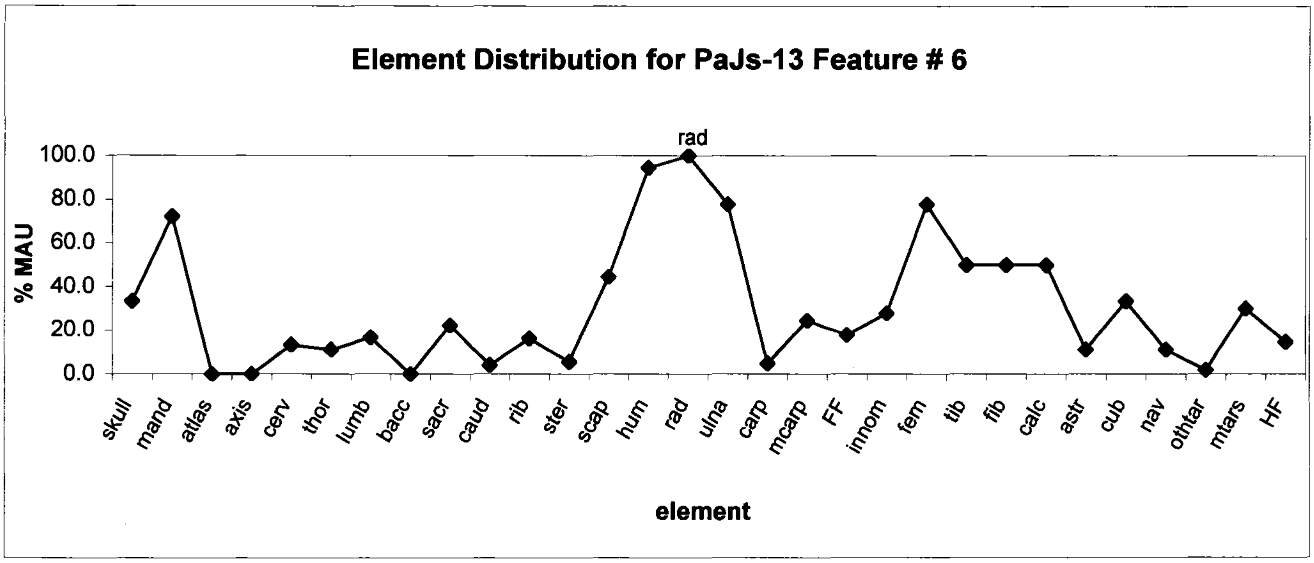

Figure 6.16. Element distribution for PaJs-13 Feature 6.

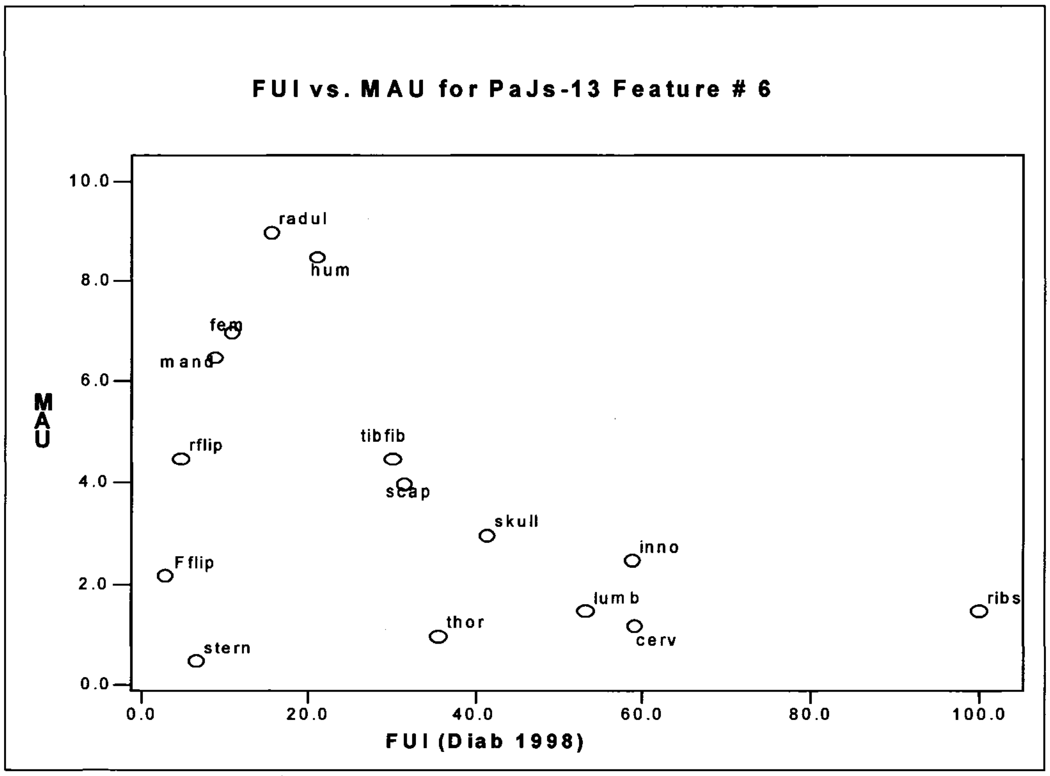

Figure 6.17. FUI vs. MAU for PaJs-13 Feature 6.

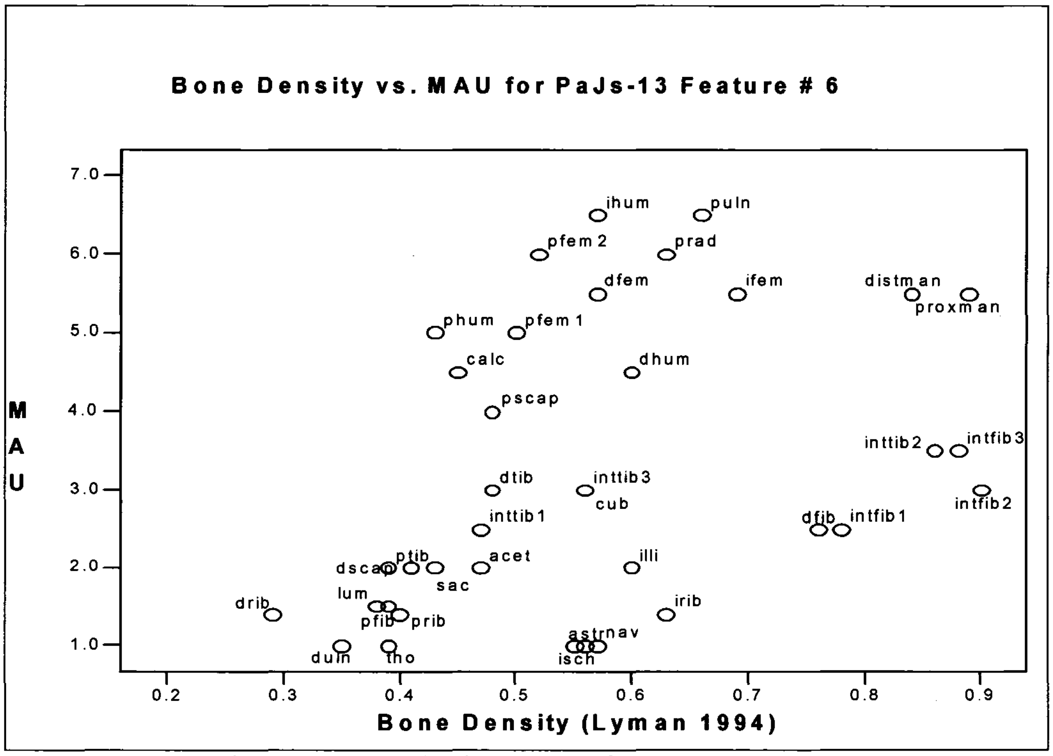

Figure 6.18. Bone density vs. MAU for PaJs-13 Feature 6.

PaJs-13 Feature #10

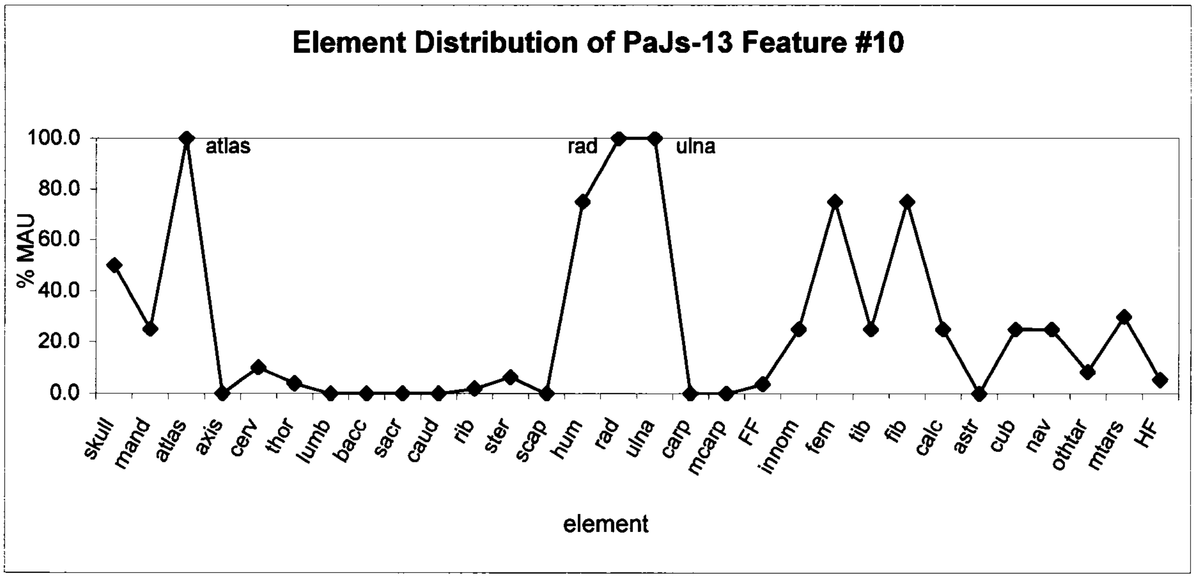

Figure 6.19. Element distribution for PaJs-13 Feature 10.

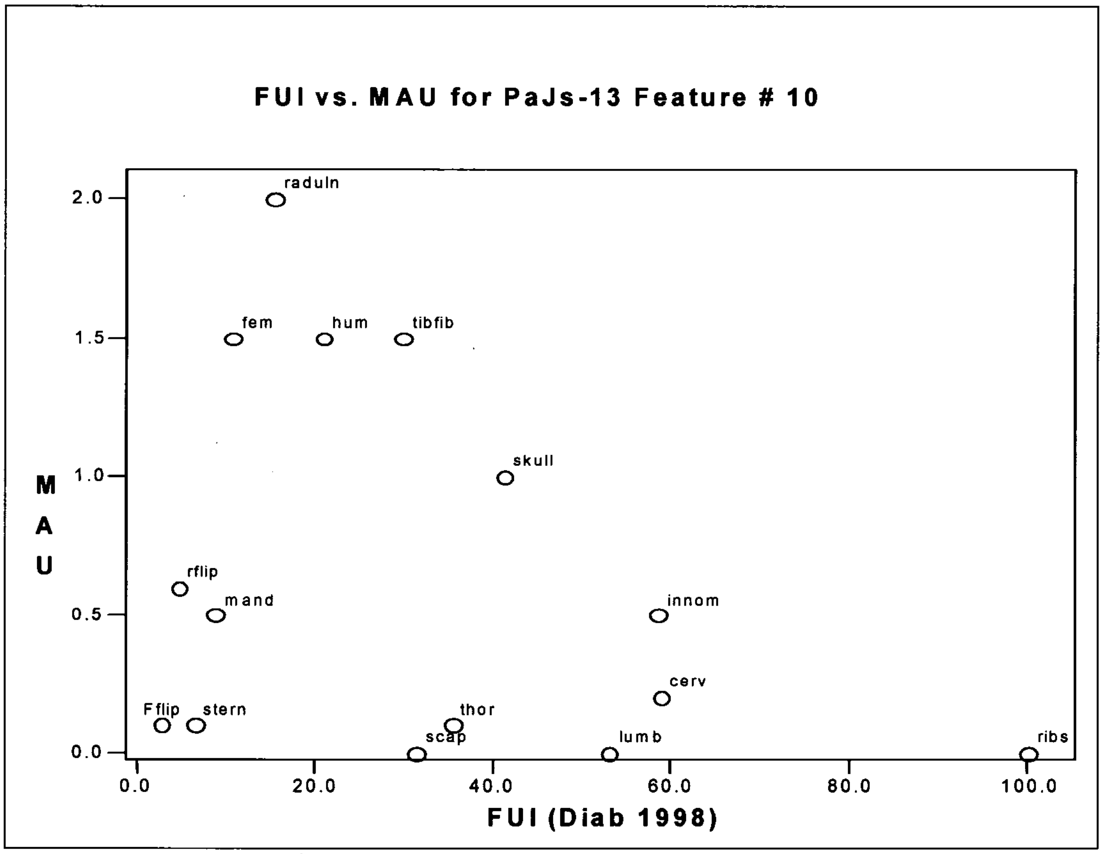

Figure 6.20. FUI vs. MAU for PaJs-13 Feature 10.

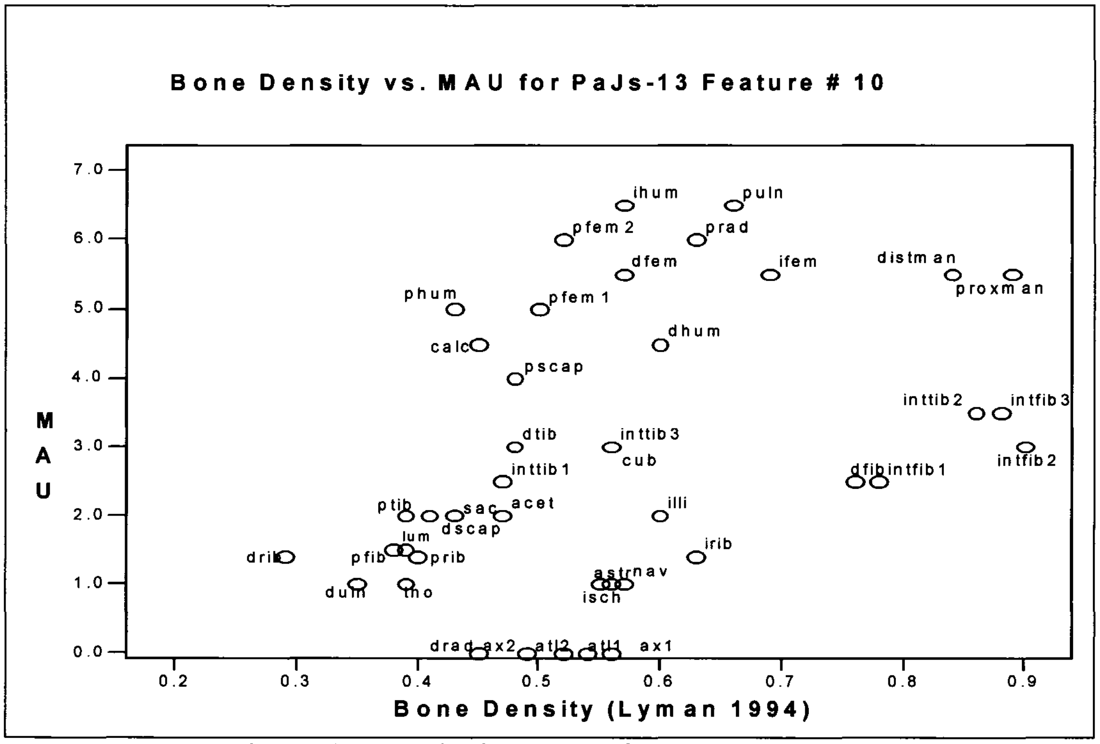

Figure 6.21. Bone density vs. MAU for PaJs-13 Feature 10.

PaJs-13-ALL

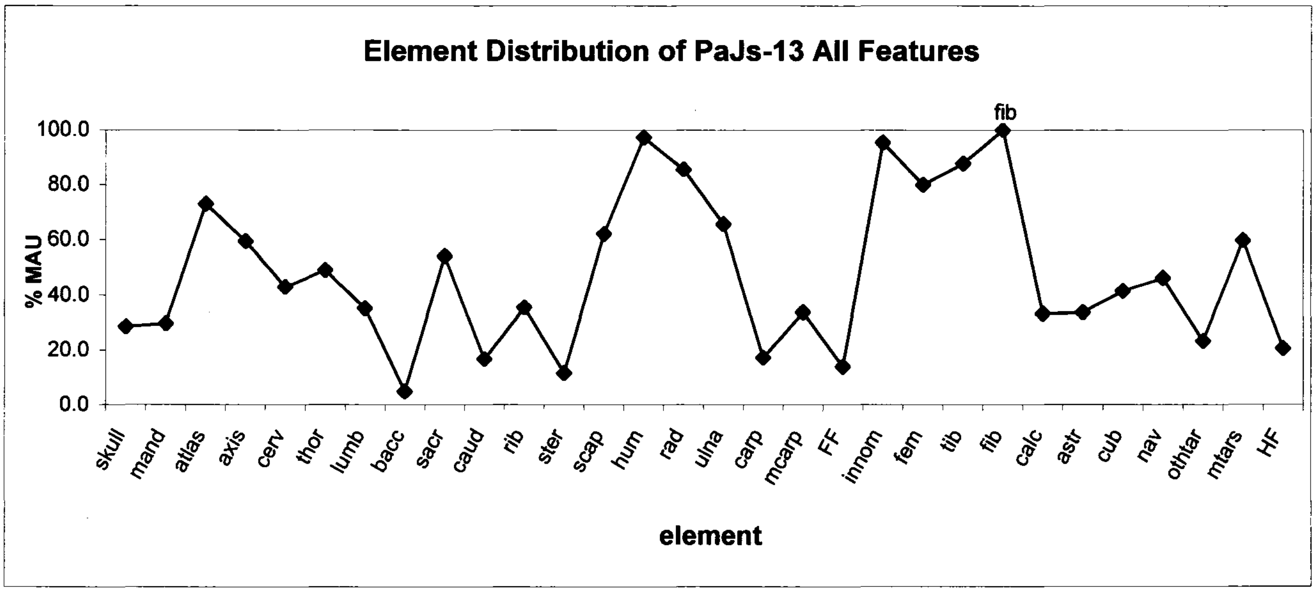

Figure 6.22. Element distribution for all features from PaJs-13.

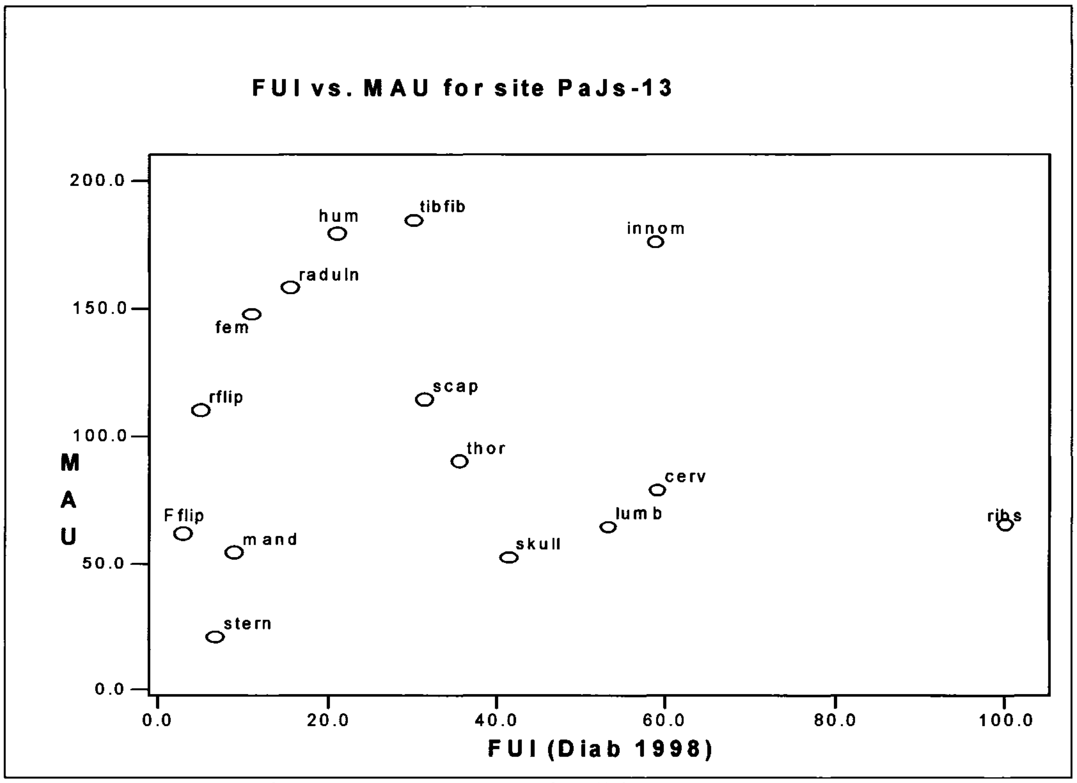

Figure 6.23. FUI vs. MAU for all features at PaJs-13.

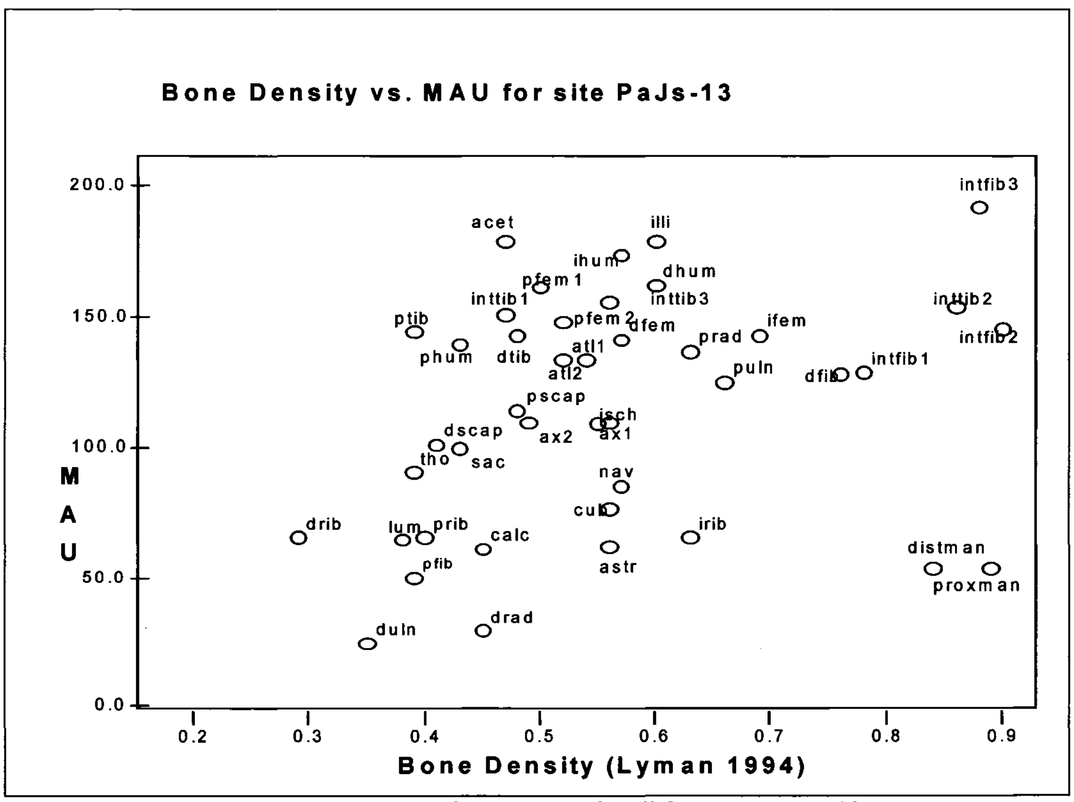

Figure 6.24. Bone density vs. MAU for all features at PaJs-13.

6.2 Analysis of PaJs-13

The following two tables summarize the data used to create the above graphs. Table 6.1 provides the NISPs and MNIs for each feature and for the site as one aggregate. Table 6.2 provides Spearman's rho values for FUI and bone density.

Table 6.1. NISP and MNI values for PaJs-13

Feature	NISP	MNI
PaJs-13-1	3099	37
PaJs-13-2	6664	59
PaJs-13-3	7449	63
PaJs-13-4	6638	61
PaJs-13-5	1066	22
PaJs-13-6	739	10
PaJs-13-10	186	3
PaJs-13 (treating site as one aggregate. N.b. This is not the sum of all the features but rather regrouping all features as one whole and determining the MNI)	25, 841	245

Table 6.2. Spearman's rho values FUI and bone density graphs for PaJs-13

Feature	FUI	Bone Density
PaJs-13-1	r_s = -.088 (p =.756)	r_s = .406 (p =.008)
PaJs-13-2	r_s = .100 (p=.723)	r_s = .390 (p =.011)
PaJs-13-3	r_s = .161 (p=.566)	r_s = .042 (p =.794)
PaJs-13-4	r_s = .020 (p=.945)	r_s = .246 (p =.116)
PaJs-13-5	r_s = -.254 (p=.362)	r_s = .457 (p =.002)
PaJs-13-6	r_s = -.363 (p=.183)	r_s = .494 (p =.002)
PaJs-13-10	r_s = -.305 (p=.268)	r_s = .132 (p =.406)
PaJs-13 (all features aggregated)	r_s = .111 (p=.694)	r_s = .333 (p =.031)

6.2.1 Seal Element Distribution for PaJs-13

Features 1, 2, 3, 4, and 5 have been previously defined as semi-subterranean winter features, with Feature 5 defined as a *karigi*. Feature 6 has been defined as a qarmat-like structure. Feature 10 has not been defined as a winter structure (Savelle 2005, personal communication) and will therefore be addressed separately.

To recall, it has been noted by Stanford (1976) that the most expected elements of seal to be found at a base camp should be cranial bones, ribs, lumbar vertebrae, and hindlimb bones. The front and rear flipper elements are the most frequent at all of the features at PaJs-13 with abundances in radius, humerus and fibula bones (see Figure 6.22). This is to be expected since it has been observed that flippers are normally kept articulated during butchering (Balikci 1970, Park 1989).

Features 1, 2, and 3 have an abundance of sacrum elements. As Stanford (1976) suggested, lumbar vertebrae are expected to be transported to residential camps. It may therefore be possible that the sacrum may have tagged along as a "rider". Lumbar vertebrae have a slightly lower density than the sacrum (Lyman 1994), which may lead to over-representation of the sacrum.

Feature 3 is dominated by atlas and innominate bones. Innominates can often stay articulated with the rear flipper, and also have a high FUI (Diab 1998). Innominates have a relatively high-density value and could be over-represented.

Feature 5 is particularly interesting when looking at the overall element distribution. Front and rear flippers are in great abundance relative to other elements in this feature. Savelle and Habu (2004) have identified Feature 5 as a *karigi* based on structural and artefact evidence. Looking at the seal element distribution, the argument of defining

Feature 5 as a *karigi* is plausible. It seems as though only choice elements are represented in Feature 5, suggesting possible ceremonial use by important individuals.

Feature 6 bears similar patterns with Features 1-4 with flipper elements in abundance.

Feature 10 has virtually no vertebrae present except for a very high value of the atlas alongside the radius and ulna, followed by the femur and fibula. This feature is not defined as a winter structure and the amount of seal bones was significantly less than the other features.

Amalgamating all of the features of PaJs-13 into one aggregate bears a similar pattern to most of the features with front and rear flipper elements in abundance. There tends to be an under-representation of head and cervical elements. As Whitridge (1992) observed among the Clyde River Inuit, head and cervical elements were not choice pieces. There may be certain taste preferences or other cultural reasons why there is an under-representation of these otherwise economically important portions.

Overall, the element distribution suggests preferential butchering and transport of prime seal portions back to the residential site. Feature 5 is represented by *only* choice elements and, in addition to strong evidence by Savelle and Habu (2004), can be defined as a *karigi.*

6.2.2 FUI vs. MAU for PaJs-13

FUI vs. MAU graphs were created in order to examine the correlation between food utility indices for ringed seal and the faunal assemblage. In all features, r_s was either very weak, or negative with values ranging from $r_s = -0.363$ to 0.161. These values suggest that differential butchering and transport play only a minor role in shaping the faunal assemblage. For PaJs-13 as a whole, the r_s value falls into the same range with a value of 0.111.

Feature 5 was no exception. With an r_s value of – 0.254, it seems difficult to make any sort of conclusion about differential butchering and transport for the *karigi*. However, the over abundance of prime seal parts, alongside the almost absence of any other portion suggests cultural factors creating this pattern.

6.2.3 Bone Density vs. MAU for PaJs-13

When considering bone density for the features of PaJs-13, a clearer pattern evolves. In *every* case the correlation between bone density and MAU is positive to strongly positive. Spearman's rho ranges from 0.042 to 0.494 with an r_s value of 0.333 for the whole site. There is strong evidence that the faunal assemblage at PaJs-13 is a function of differential preservation.

6.2.4 Other considerations for PaJs-13

PaJs-13 has been identified as a winter site. Through ethnographic records, it is known that winter saw the largest congregation of groups participating in breathing-hole sealing where dogs were used to pull sleds for transportation purposes (Boaz 1888, Balikci 1970). Figure 6.22 shows that front and rear flippers are the most represented elements, with lower amounts of vertebrae. If dogs were present, then it would be expected that vertebrae would have been fed to the dogs and would be under-represented in the assemblage.

Another important consideration is food preferences. Diab (1998) showed that some seal assemblages from Thule sites in the Eastern Canadian Arctic coincided with Inũpiat food preferences. The top five ranked seal portions by Inũpiat were the tibio-fibula, femur, the pelvic girdle, the radius-ulna, and the humerus (Diab 1998: 9). The assemblages from PaJs-13 repeatedly see the front and rear flipper as the most abundant elements, and Feature 3 had high innominate values. There is enough evidence to argue that taste preferences may have also played a role.

Analytically, it seems as though differential preservation is the leading factor shaping the faunal record for seal at PaJs-13. However, enough variability exists to consider outside factors.

6.3. PaJs-3: Thule summer to early fall camp:

PaJs-3 Feature QA (qarmat A)

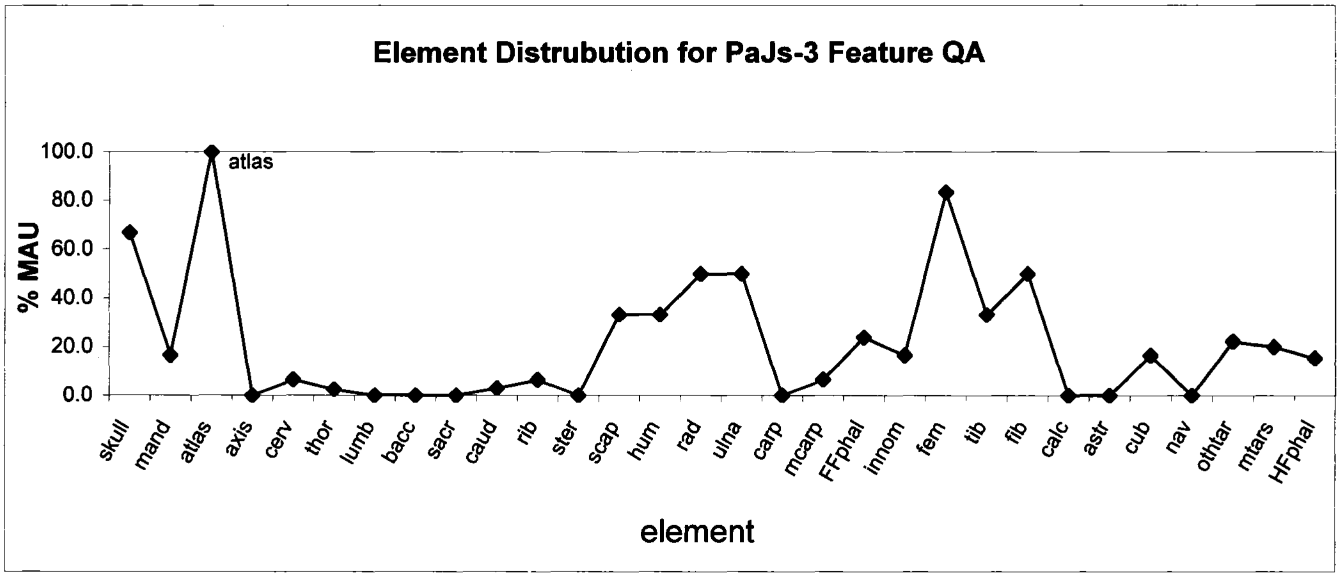

Figure 6.25. Element distribution for PaJs-3 Feature QA.

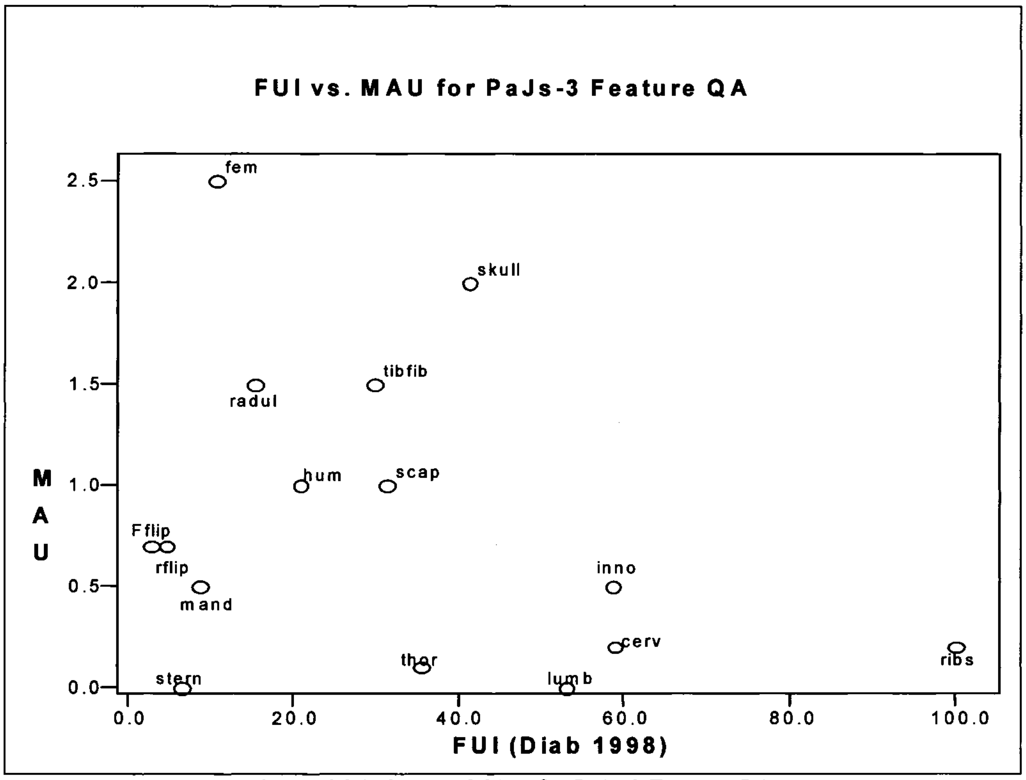

Figure 6.26. FUI vs. MAU for PaJs-3 Feature QA.

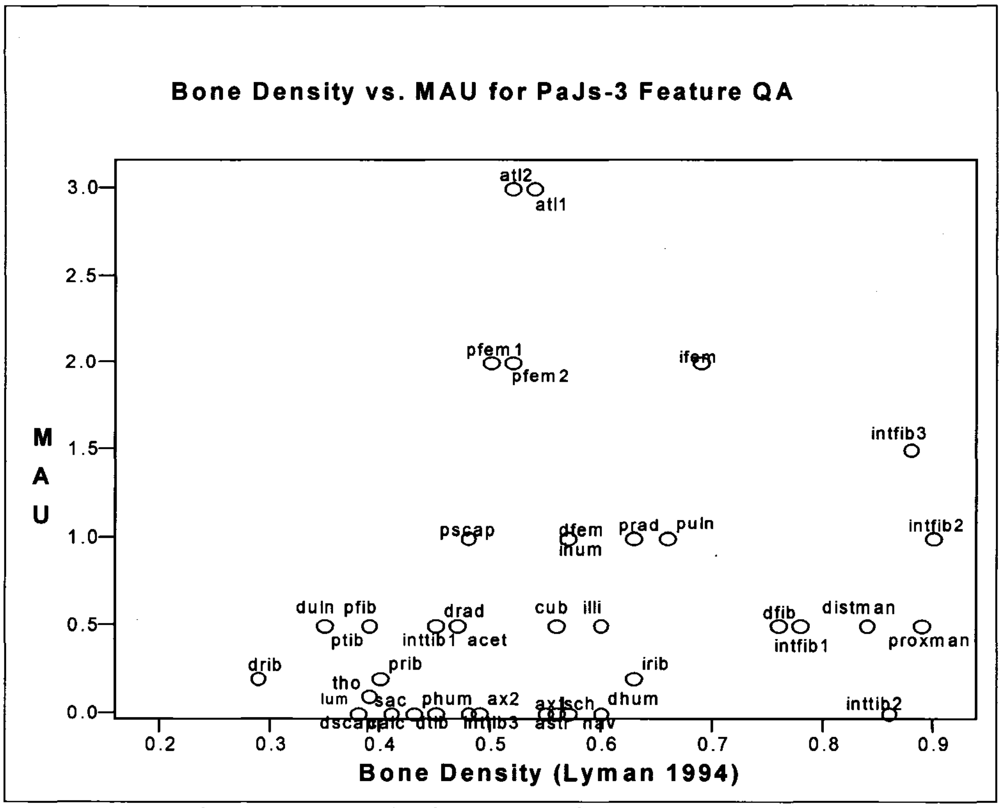

Figure 6.27. Bone density vs. MAU for PaJs-3 Feature QA.

PaJs-3 Feature QB (qarmat B)

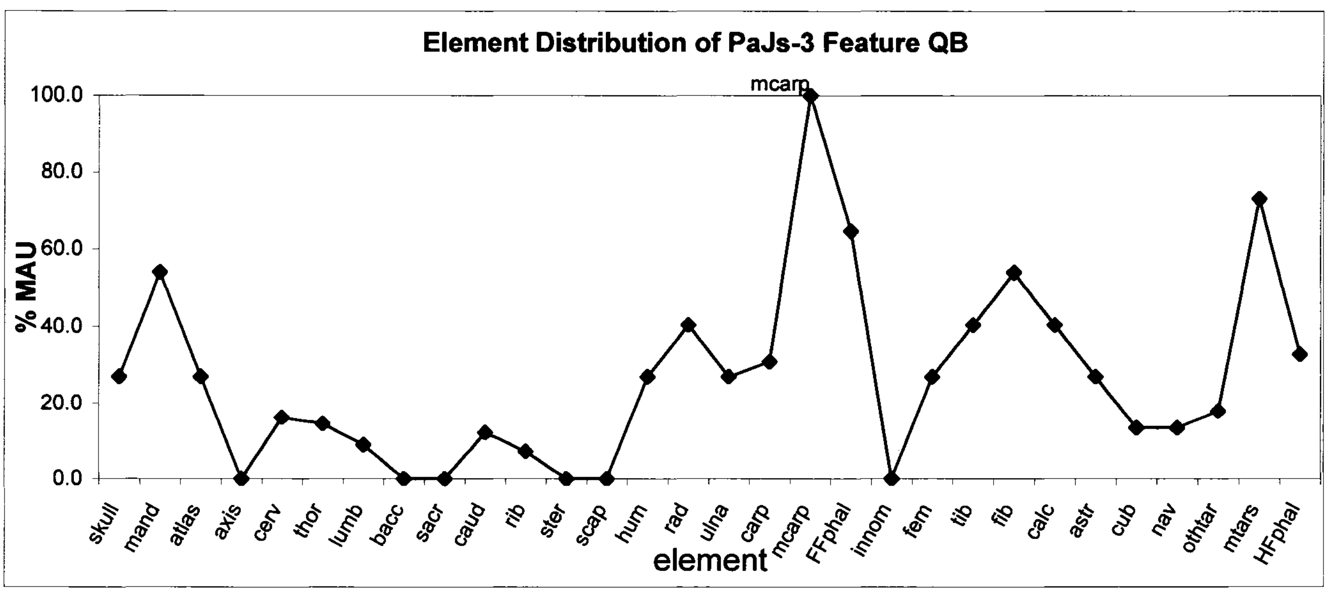

Figure 6.28. Element distribution for PaJs-3 Feature QB.

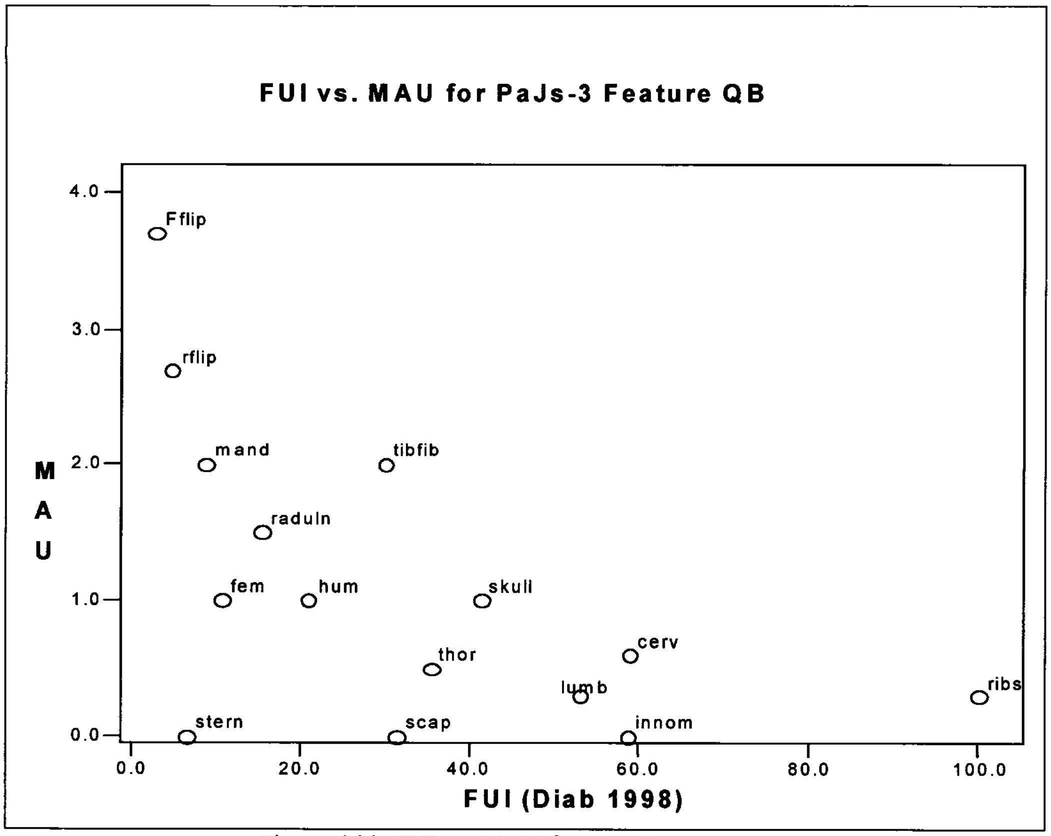

Figure 6.29. FUI vs. MAU for PaJs-3 Feature QB.

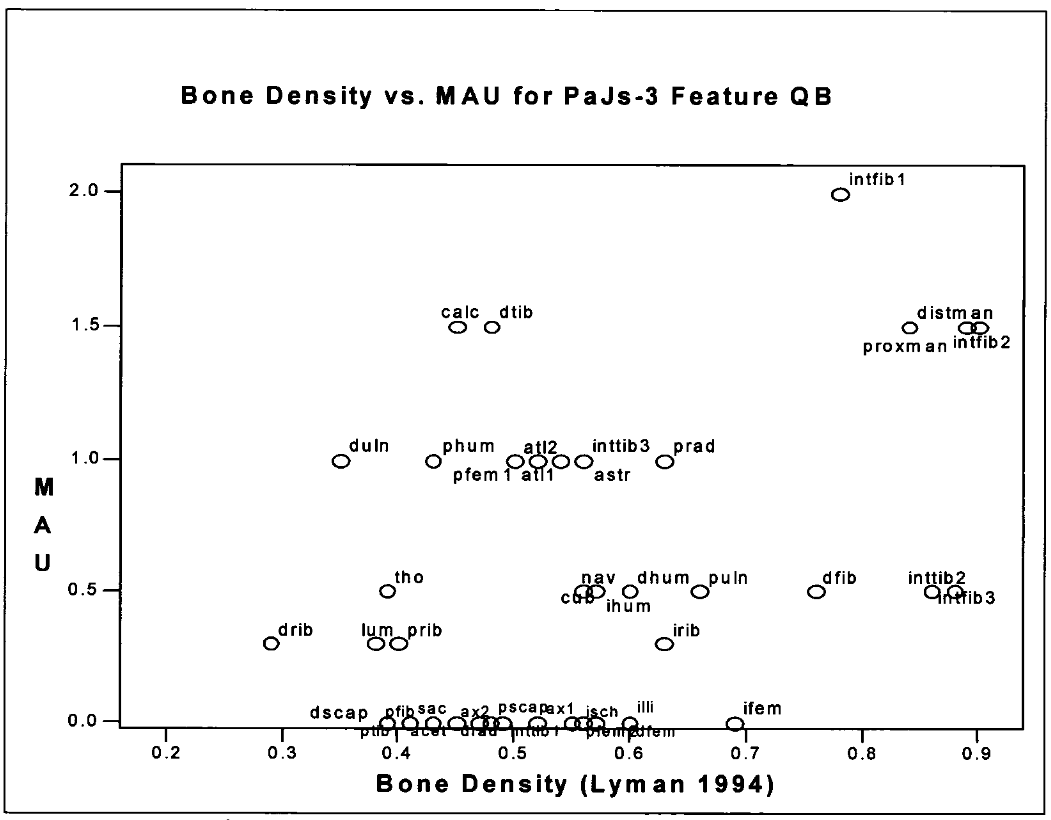

Figure 6.30. Bone density vs. MAU for PaJs-3 Feature QB.

PaJs-3 Feature S/QA (sod feature A)

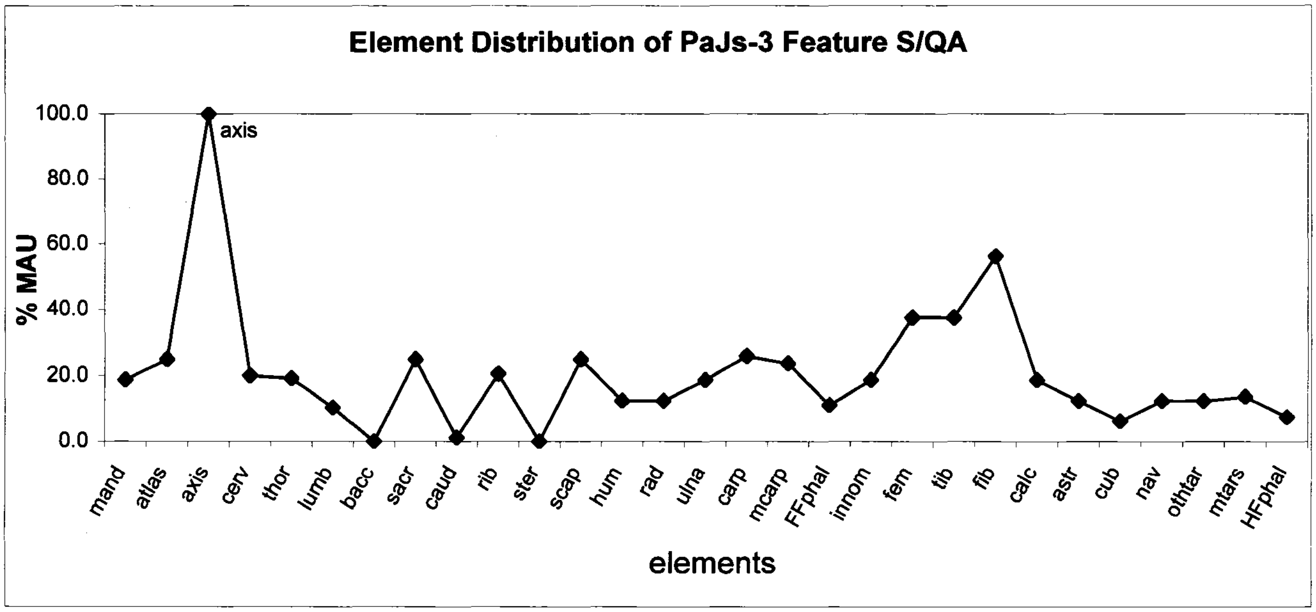

Figure 6.31. Element distribution for PaJs-3 Feature S/QA.

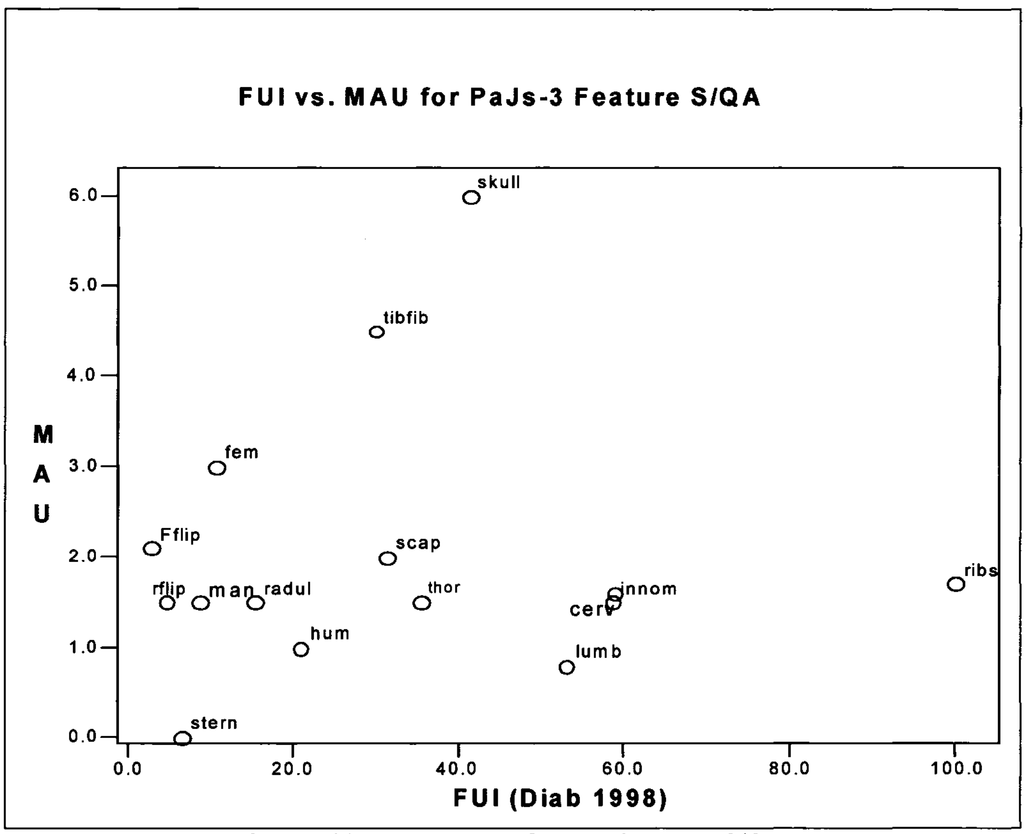

Figure 6.32. FUI vs. MAU for PaJs-3 Feature S/QA.

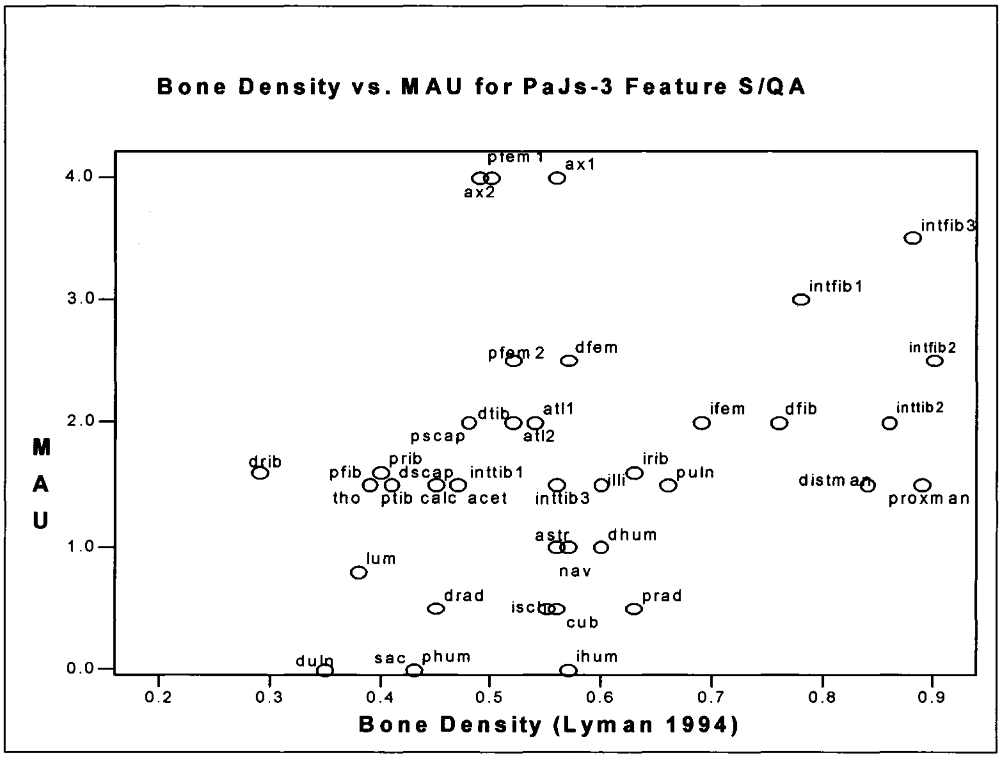

Figure 6.33. Bone density vs. MAU for PaJs-3 Feature S/QA.

PaJs-3 Feature TRB : (Tent Ring B)

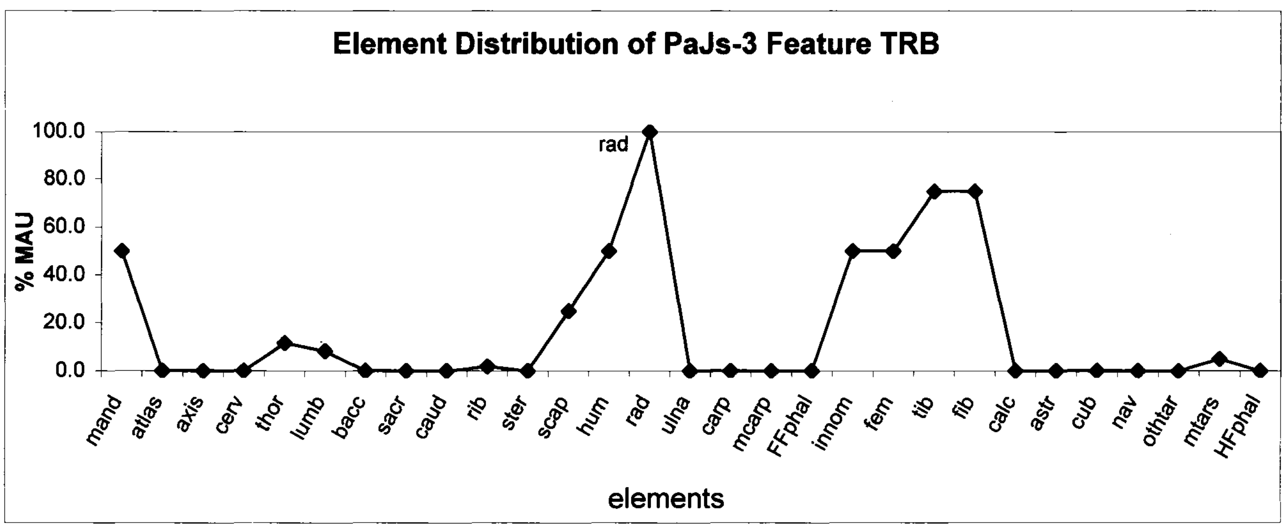

Figure 6.34. Element distribution for PaJs-3 Feature TRB.

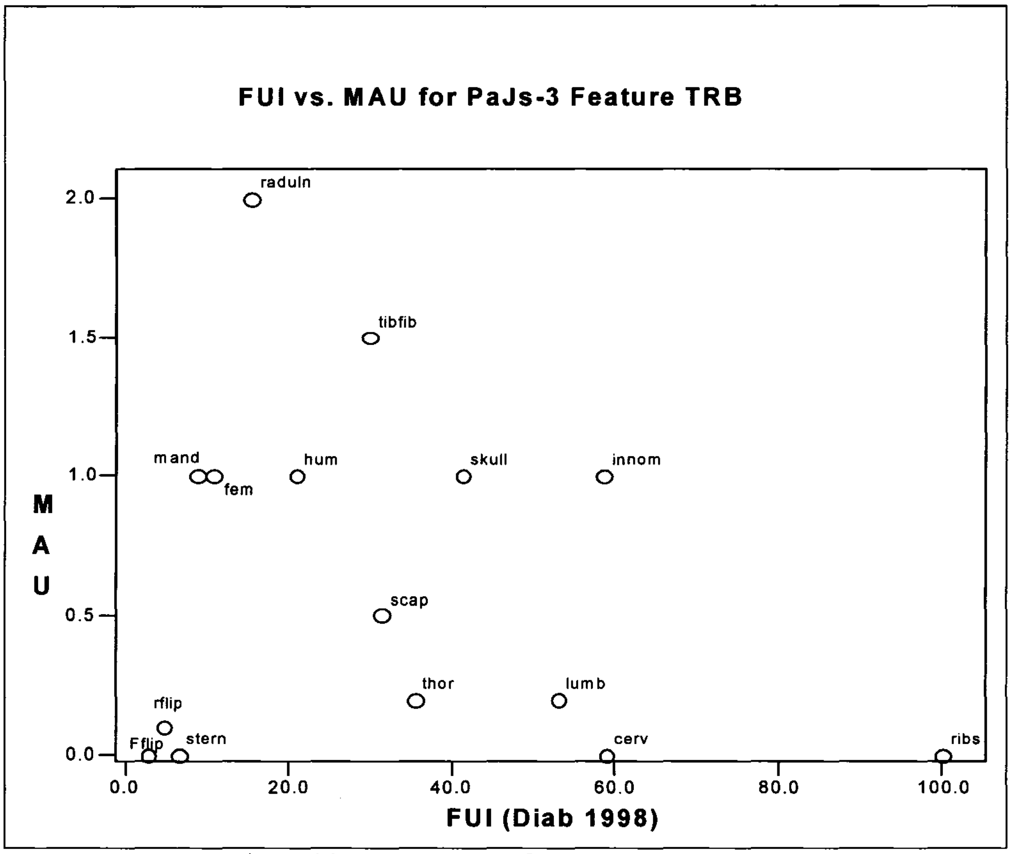

Figure 6.35. FUI vs. MAU for PaJs-3 Feature TRB.

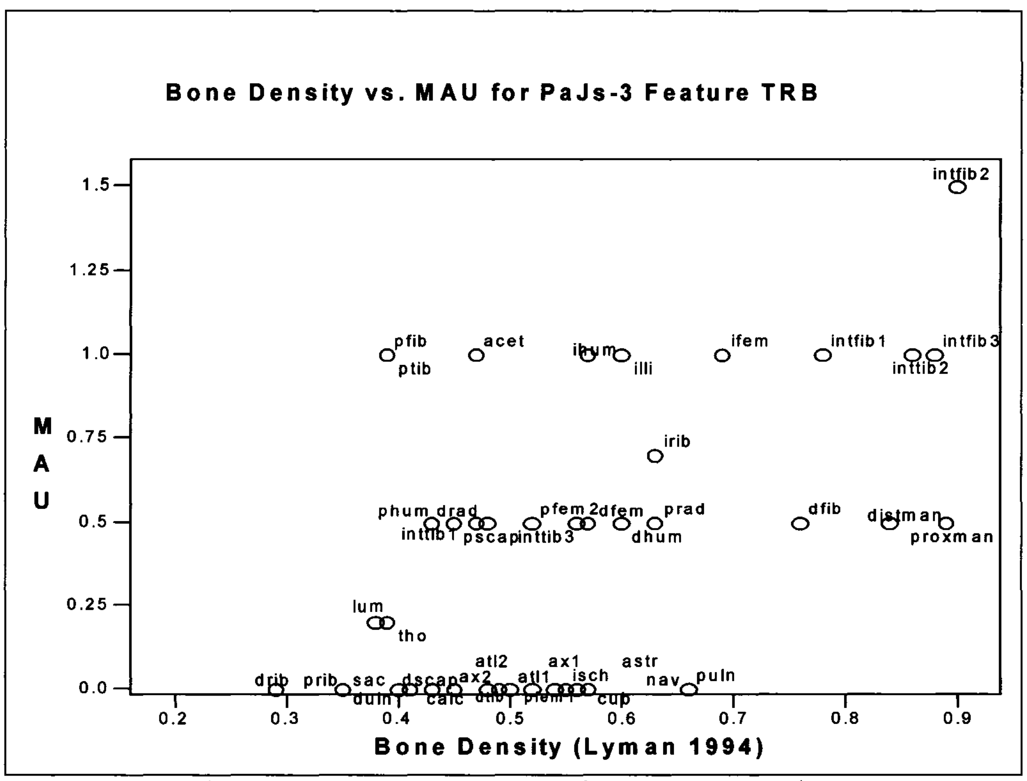

Figure 6.36. Bone density vs. MAU for PaJs-3 Feature TRB.

PaJs-3 Feature TRC: (Tent Ring C)

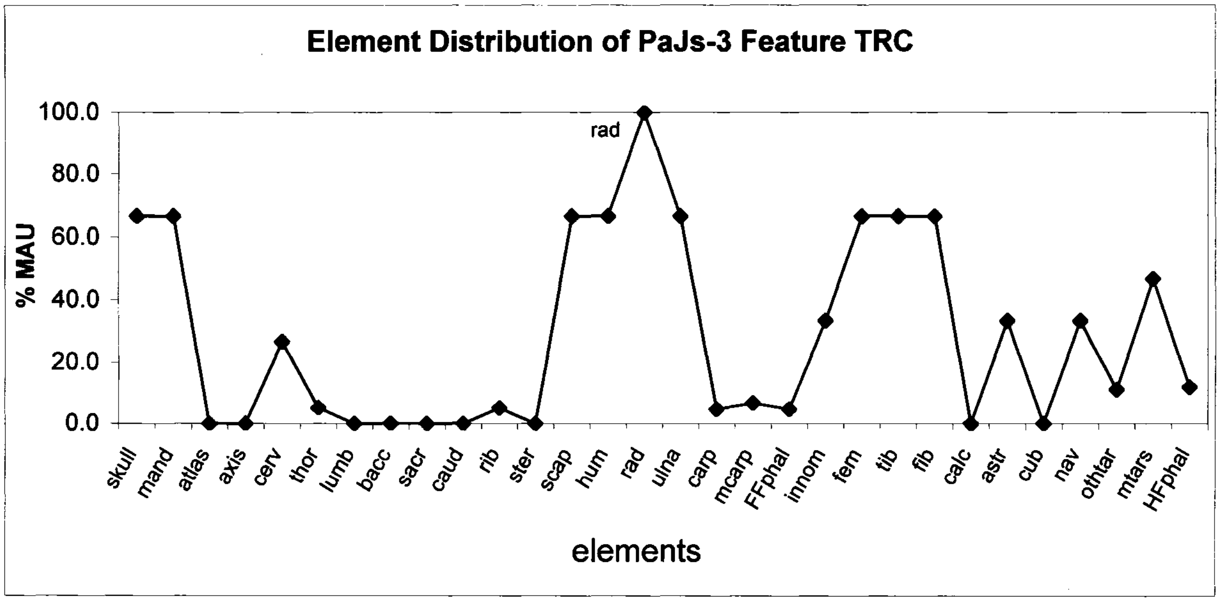

Figure 6.37. Element distribution for PaJs-3 Feature TRC.

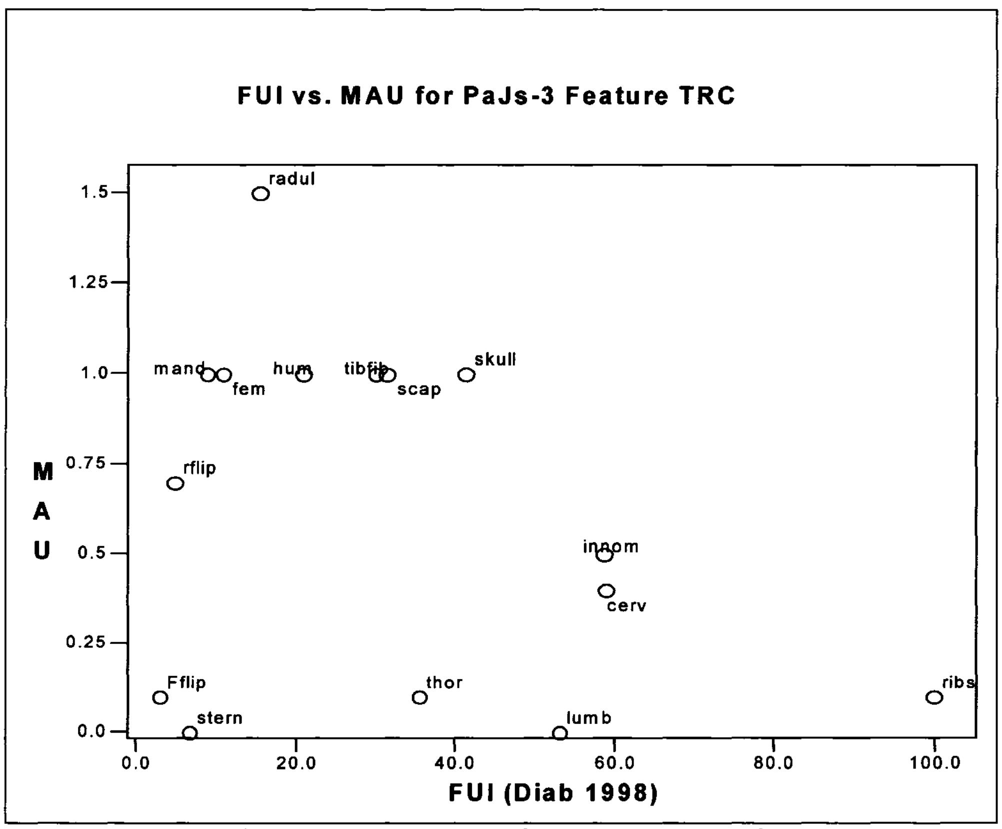

Figure 6.38. FUI vs. MAU for PaJs-3 Feature TRC.

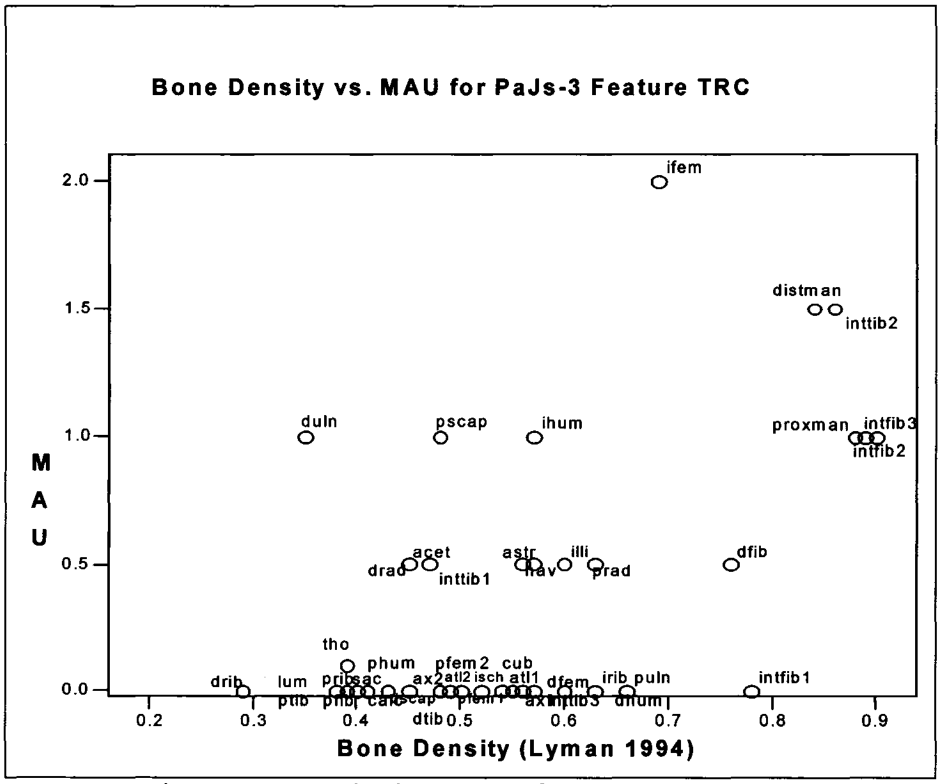

Figure 6.39. Bone density vs. MAU for PaJs-3 Feature TRC.

PaJs-3 Feature KA : (Karigi)

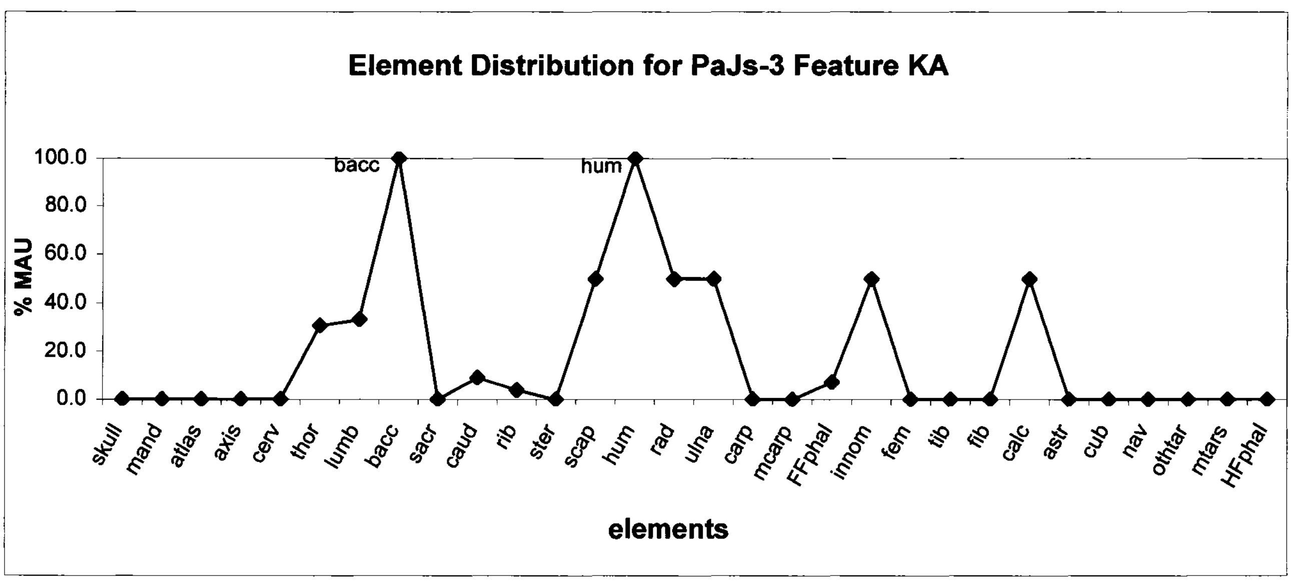

Figure 6.40. Element distribution for PaJs-3 Feature KA.

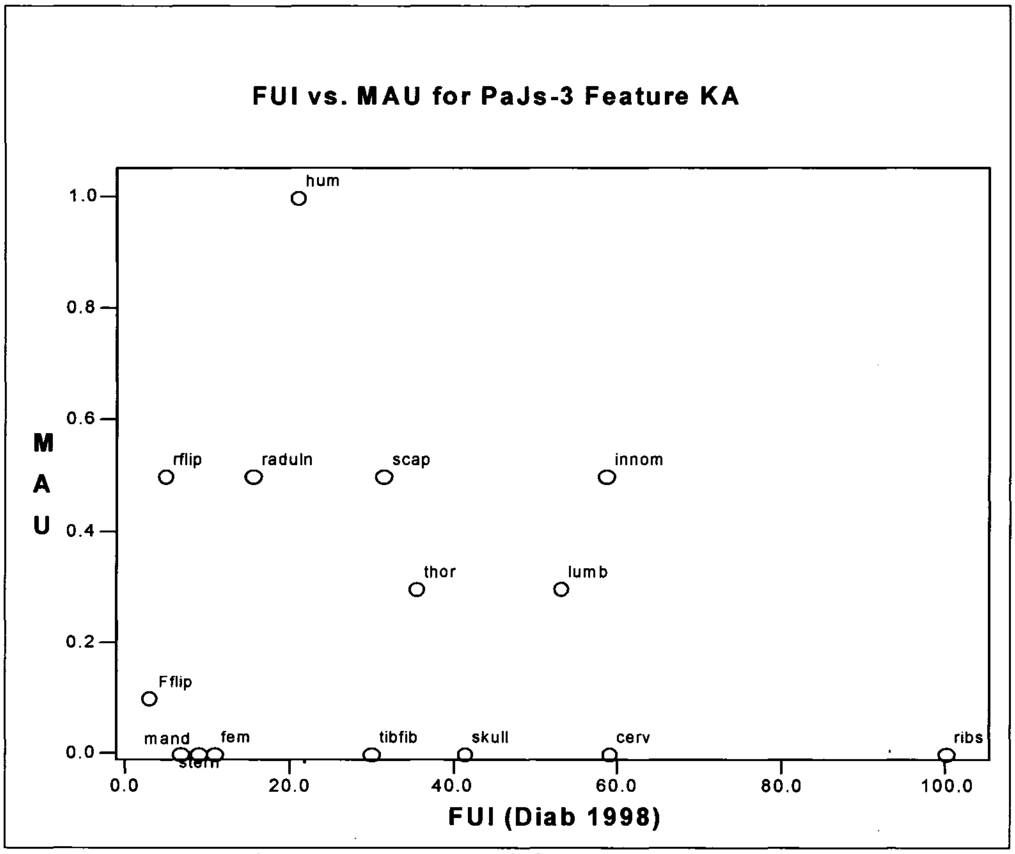

Figure 6.41. FUI vs. MAU for PaJs-3 Feature KA.

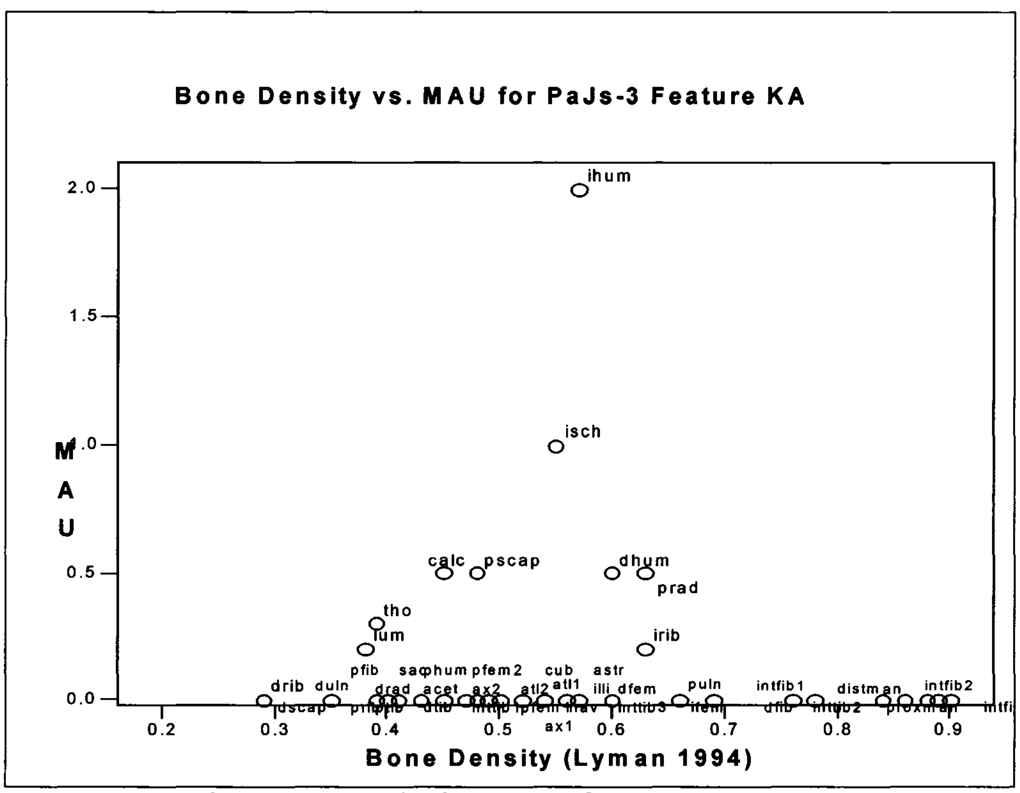

Figure 6.42. Bone density vs. MAU for PaJs-3 Feature KA.

PaJs-3 - NHG (test pit in sod feature)

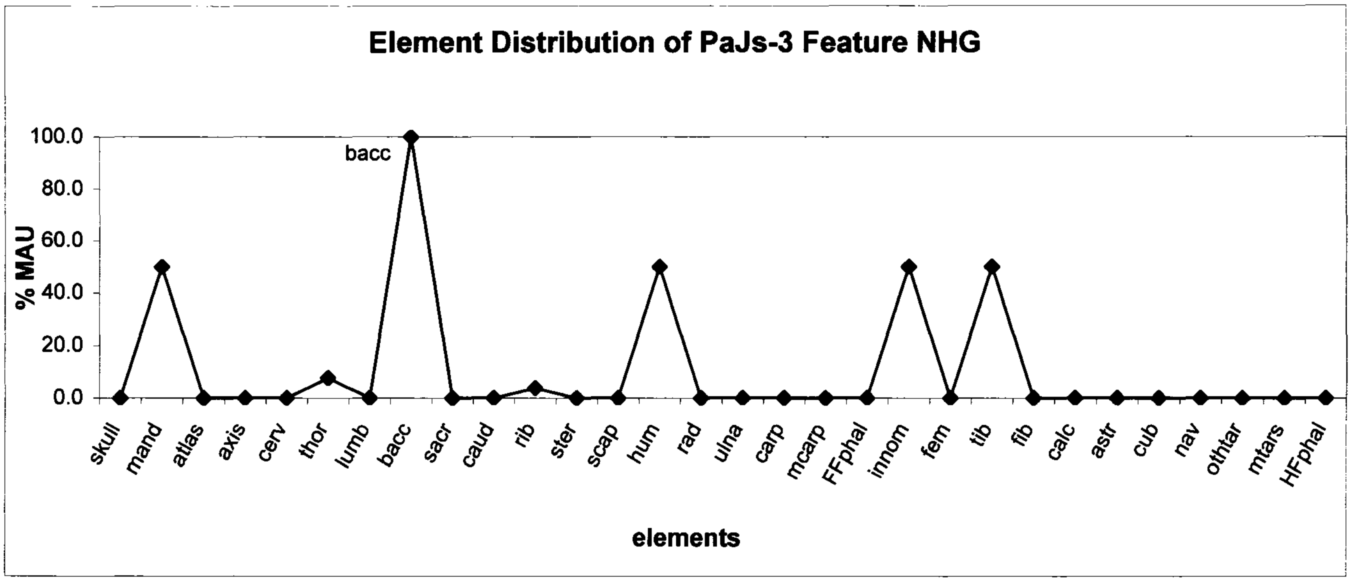

Figure 6.43. Element distribution for PaJs-3 NHG.

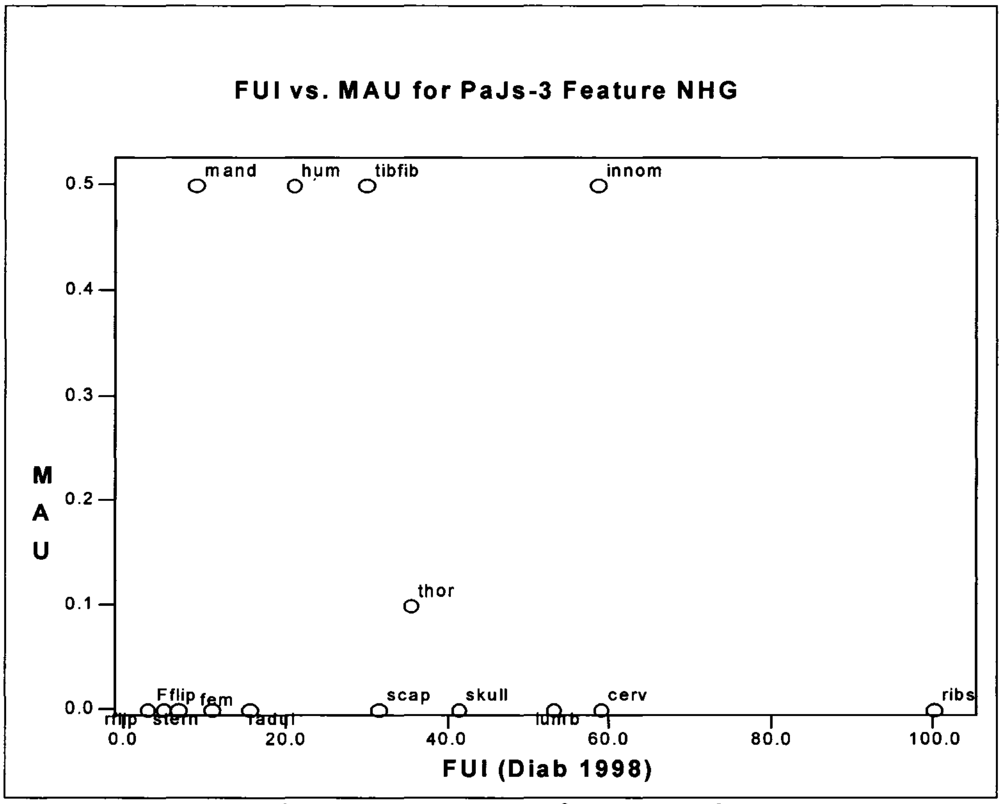

Figure 6.44. FUI vs. MAU for PaJs-3 NHG.

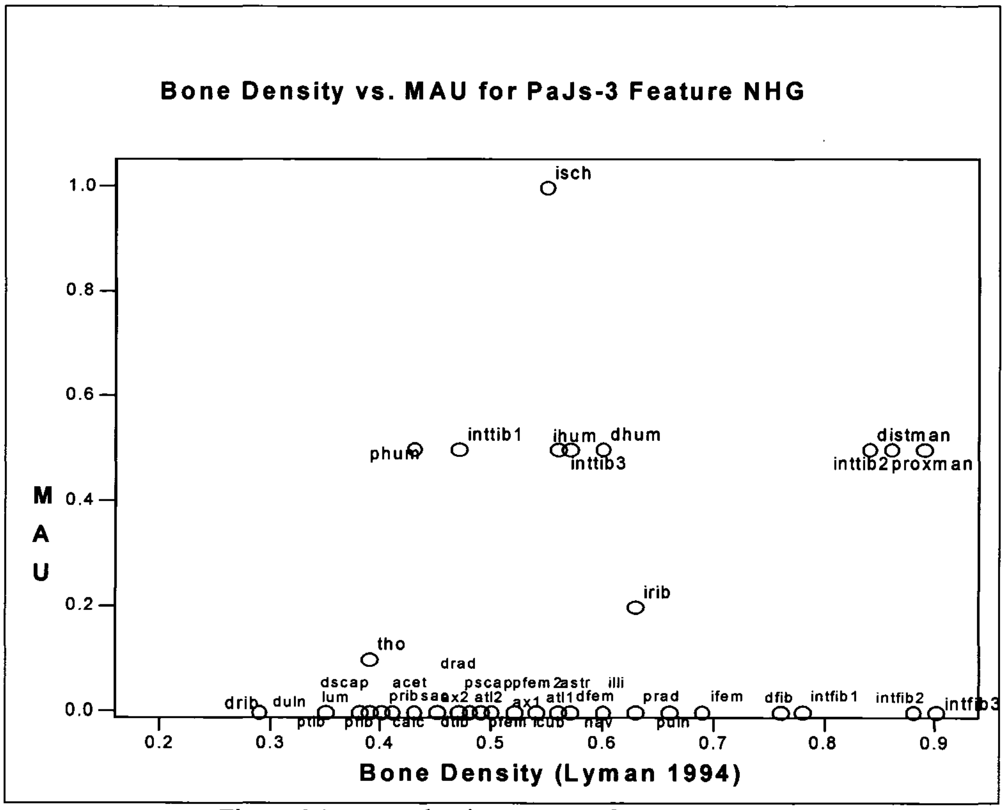

Figure 6.45. Bone density vs. MAU for PaJs-3 NHG.

PaJs-3 Feature # 6: (Tent Ring)

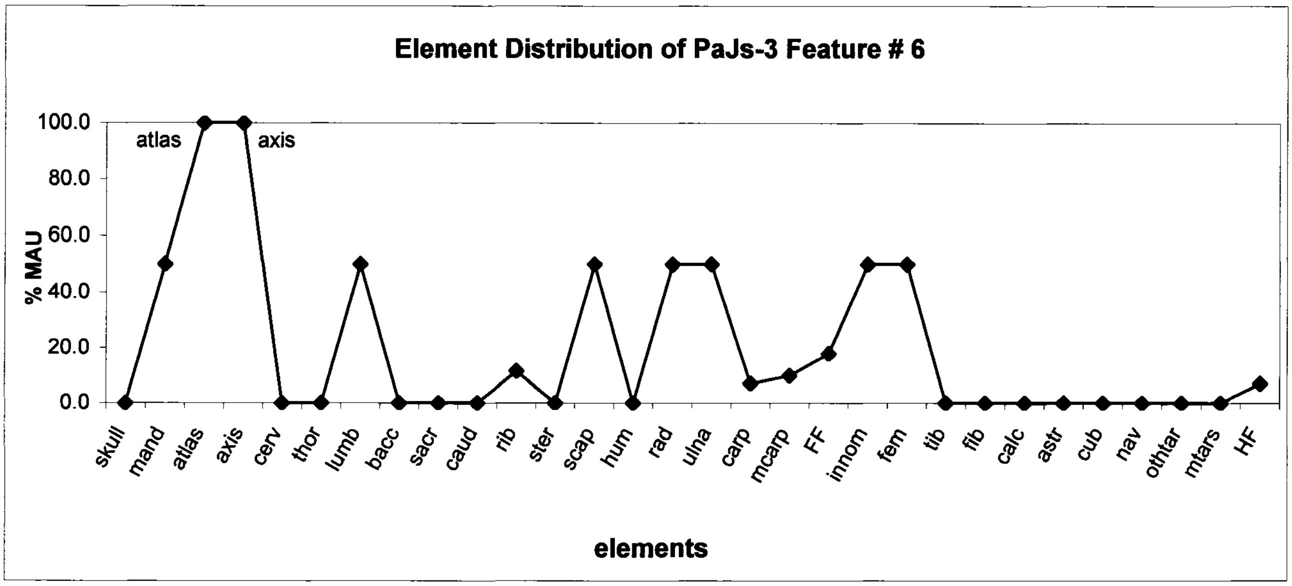

Figure 6.46. Element distribution for PaJs-3 Feature 6.

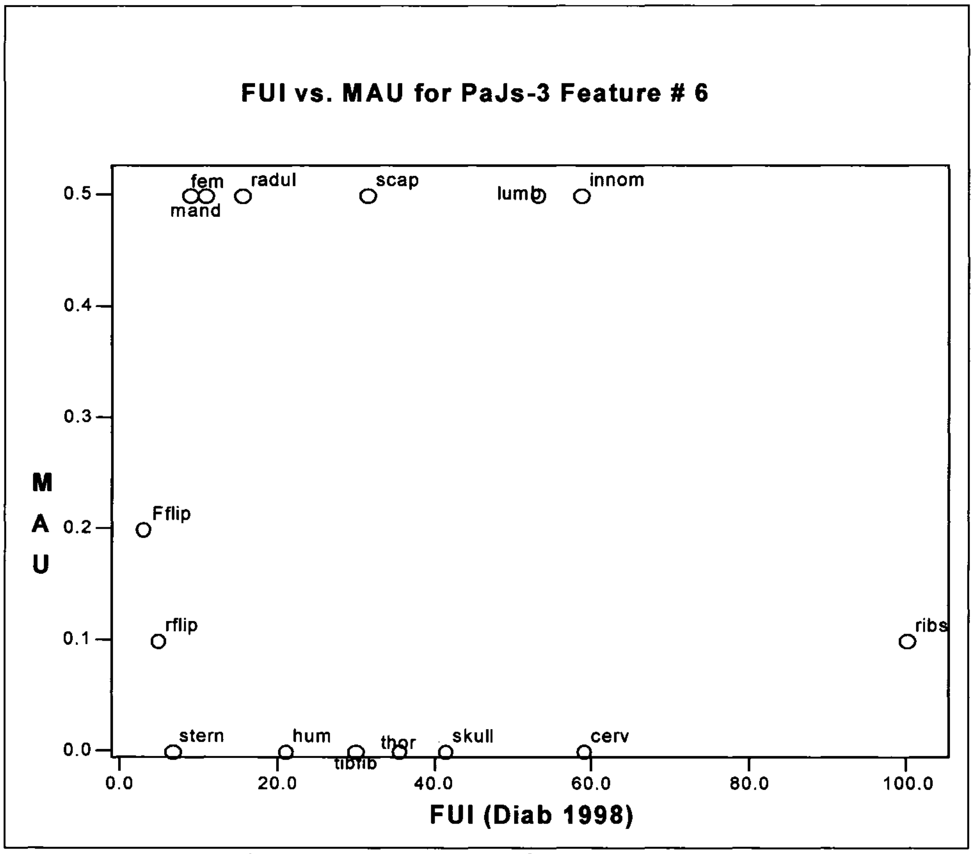

Figure 6.47. FUI vs. MAU for PaJs-3 Feature 6.

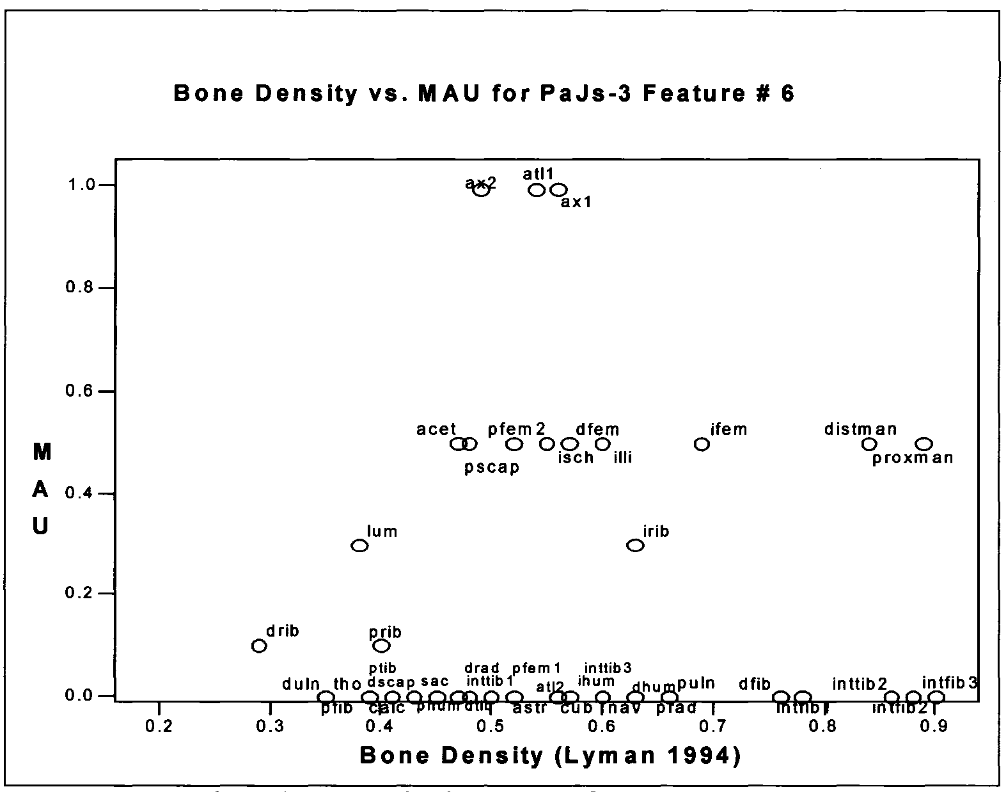

Figure 6.48. Bone density vs. MAU for PaJs-3 Feature 6.

PaJs-3 Feature #7: (Tent Ring)

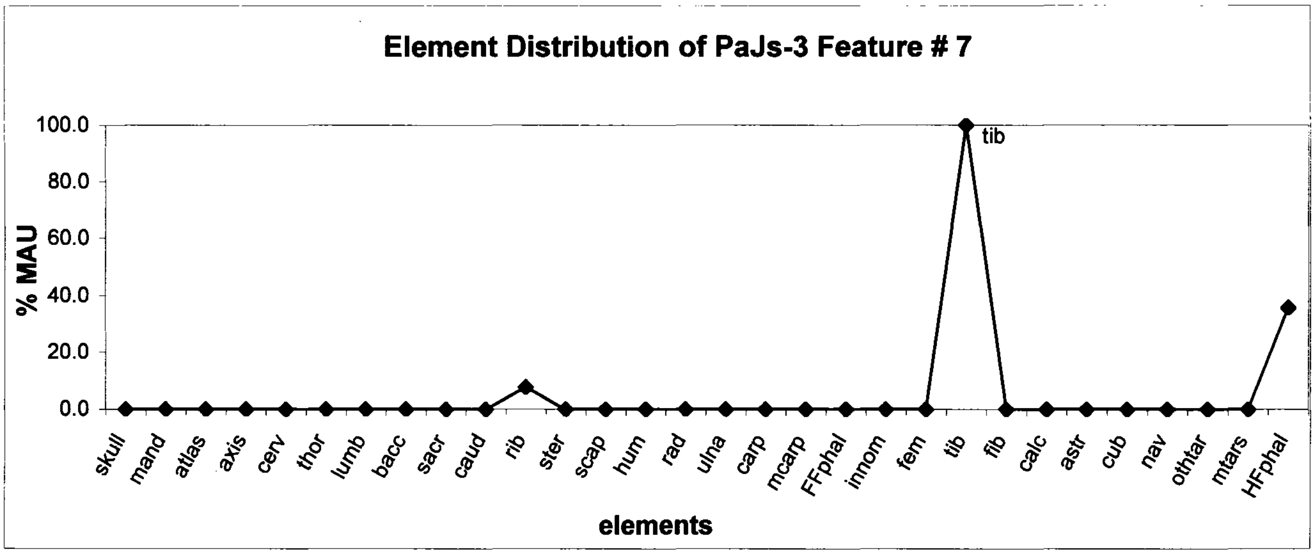

Figure 6.49. Element distribution for PaJs-3 Feature 7.

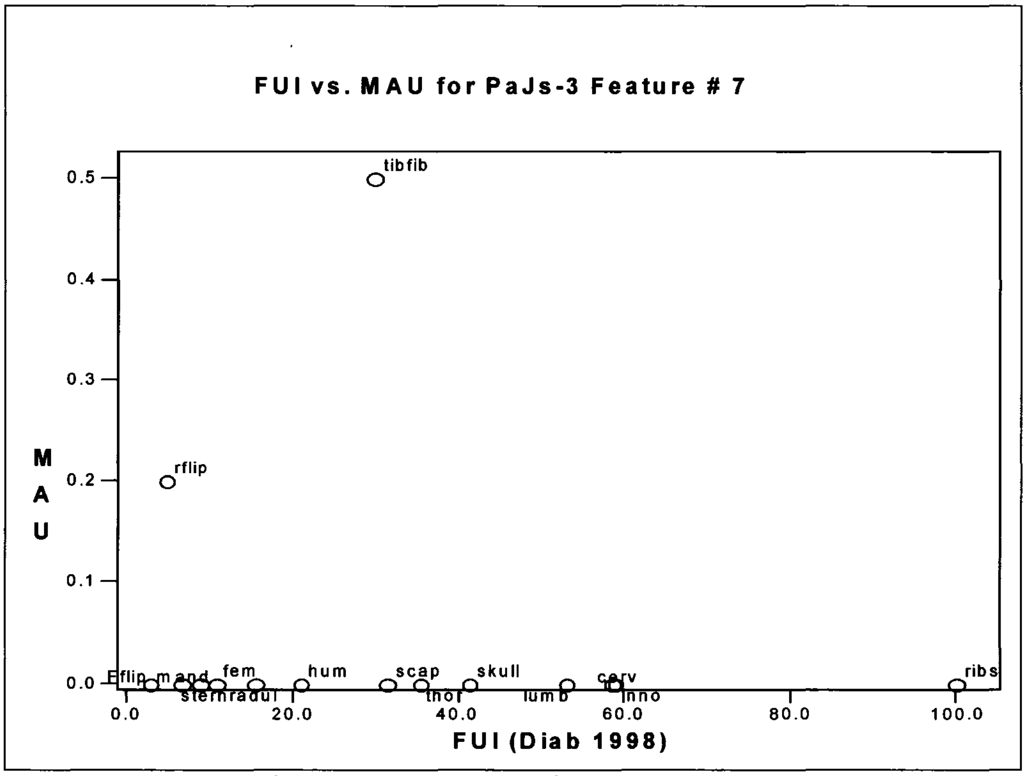

Figure 6.50. FUI vs. MAU for PaJs-3 Feature 7.

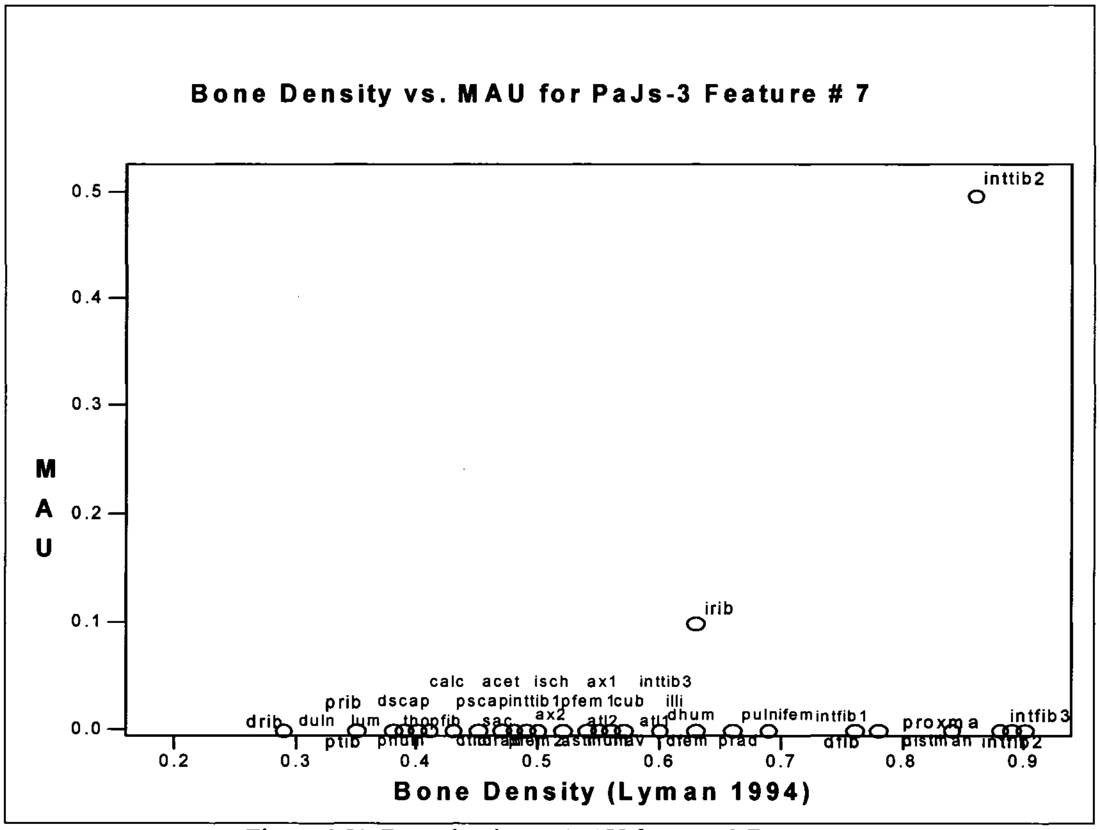

Figure 6.51. Bone density vs. MAU for PaJs-3 Feature 7.

PaJs-3 Feature #9: (Tent Ring)

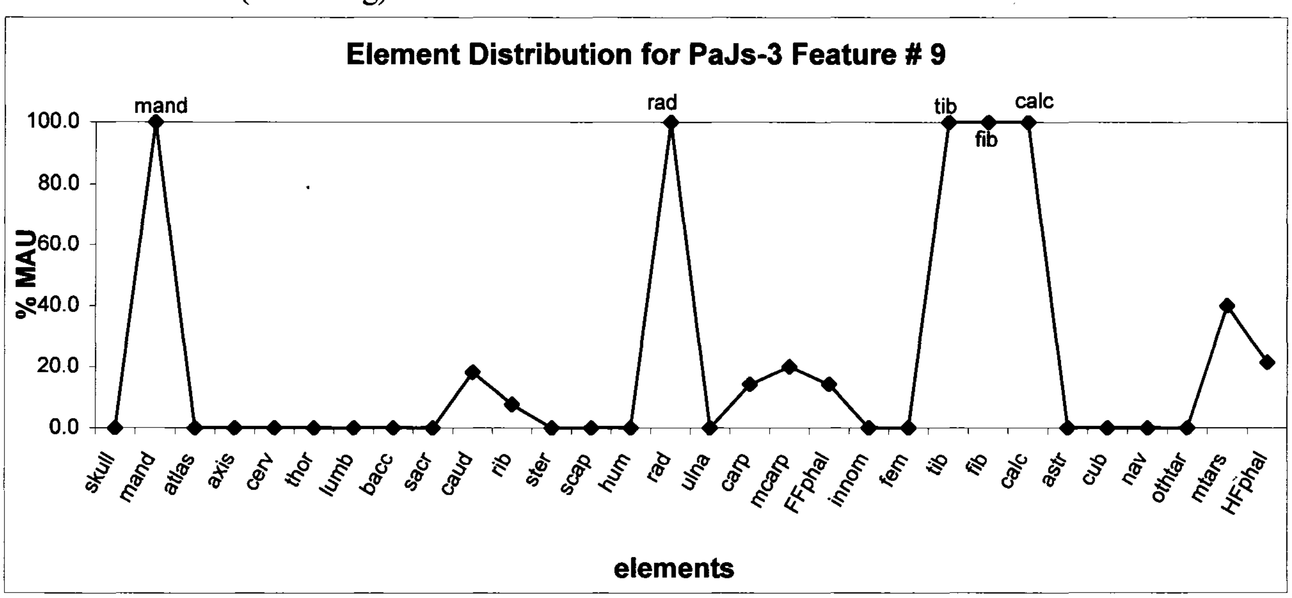

Figure 6.52. Element distribution for PaJs-3 Feature 9.

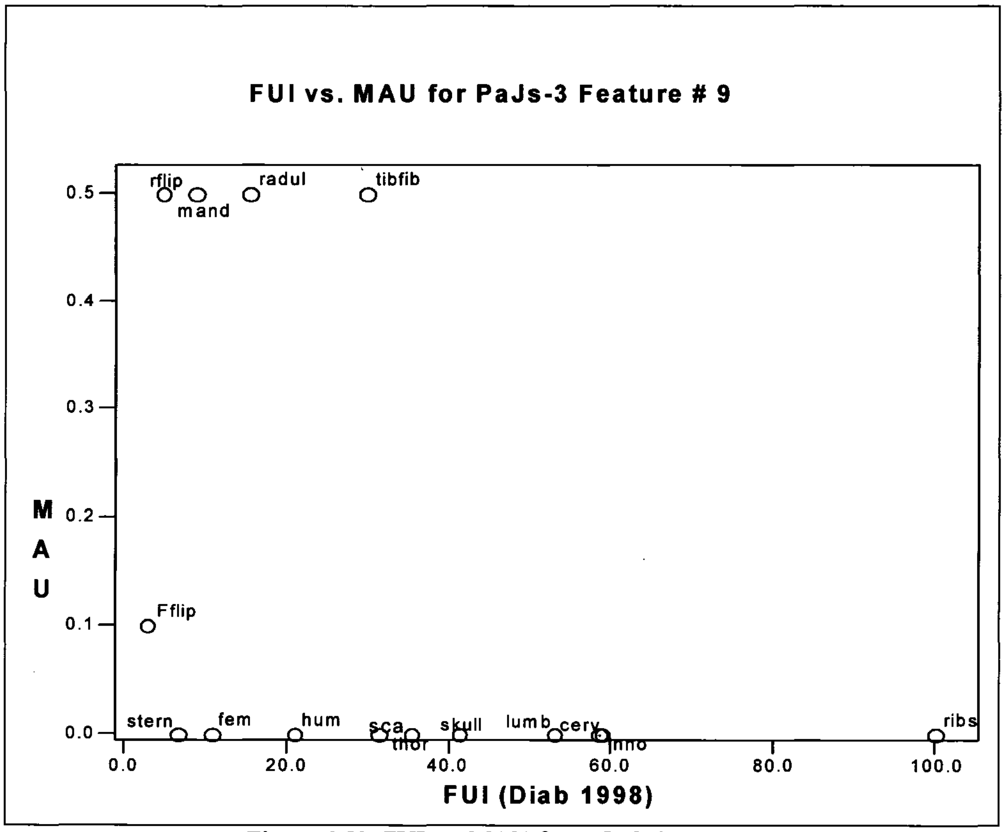

Figure 6.53. FUI vs. MAU for PaJs-3 Feature 9.

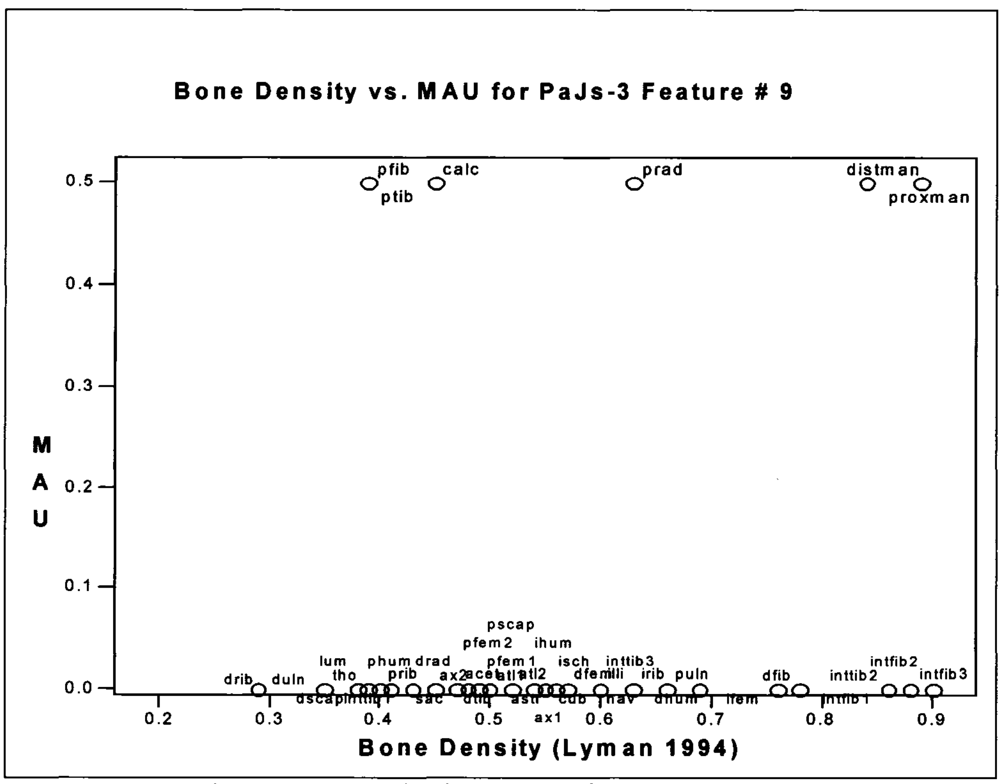

Figure 6.54. Bone density vs. MAU for PaJs-3 Feature 9.

PaJs-3 Feature #10: (Tent Ring)

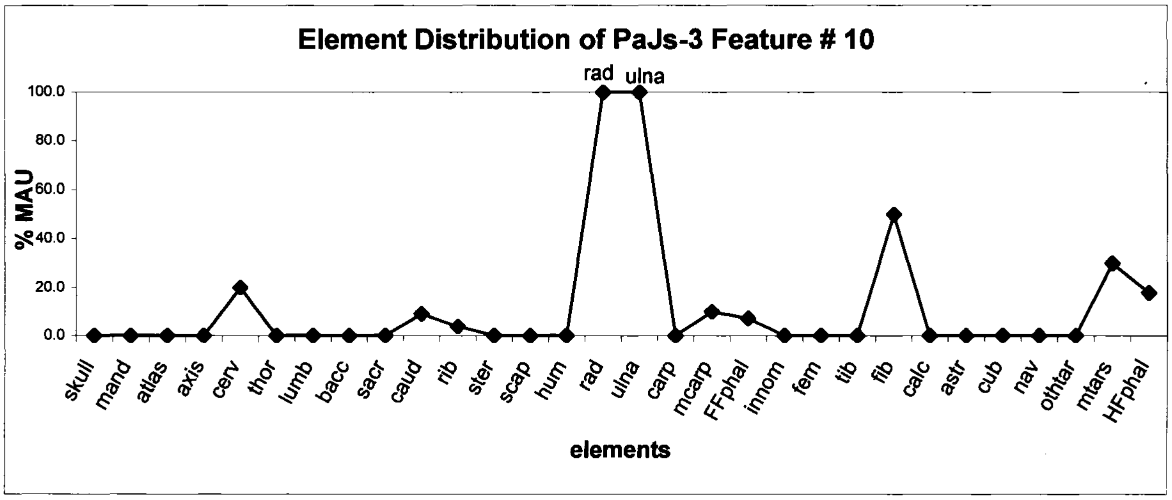

Figure 6.55. Element distribution for PaJs-3 Feature 10.

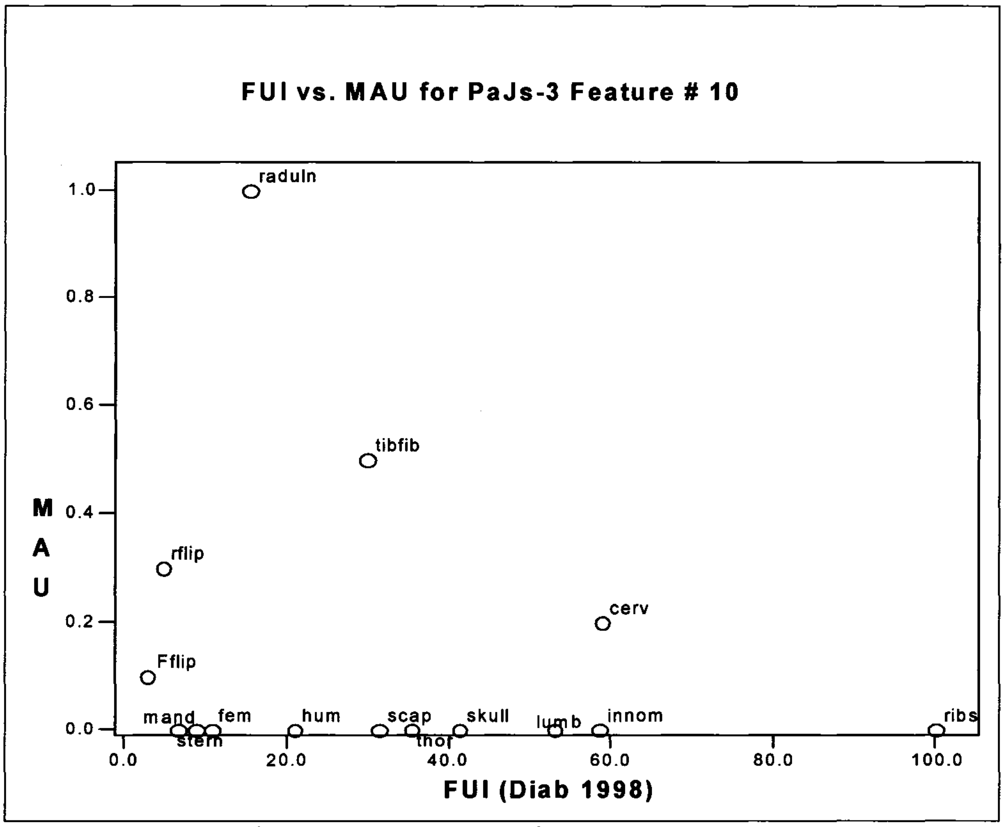

Figure 6.56. FUI vs. MAU for PaJs-3 Feature 10.

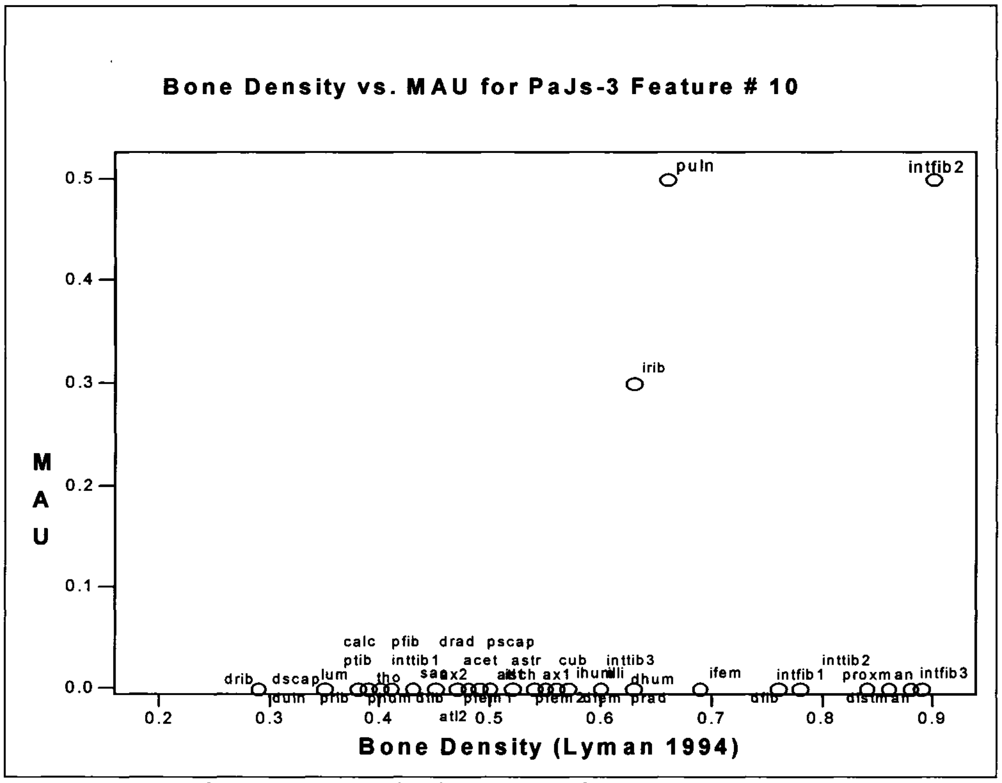

Figure 6.57. Bone density vs. MAU for PaJs-3 Feature 10.

PaJs-3 Feature #11: (Tent Ring)

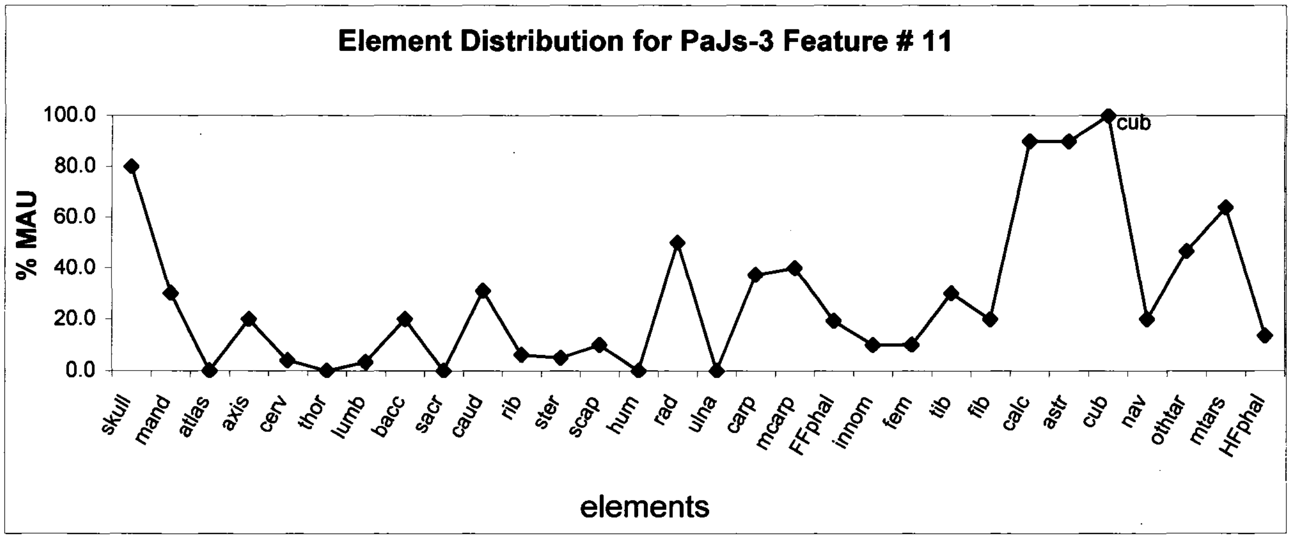

Figure 6.58. Element distribution vs. MAU for PaJs-3 Feature 11.

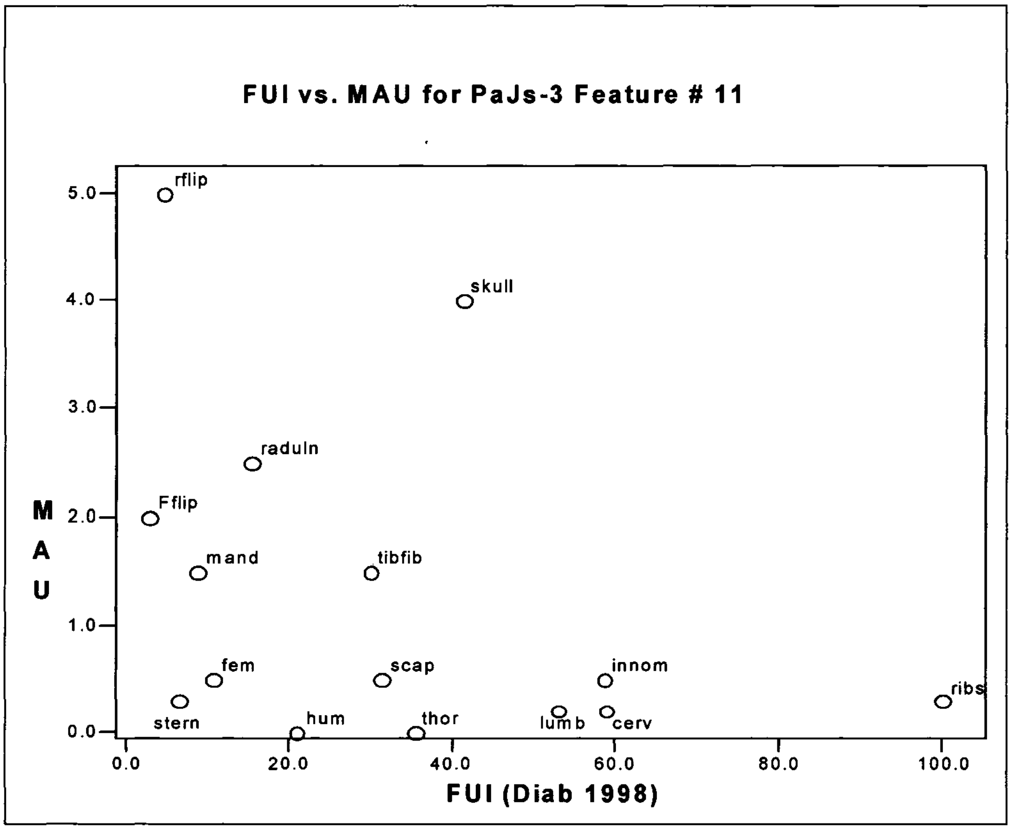

Figure 6.59. FUI vs. MAU for PaJs-3 Feature 11.

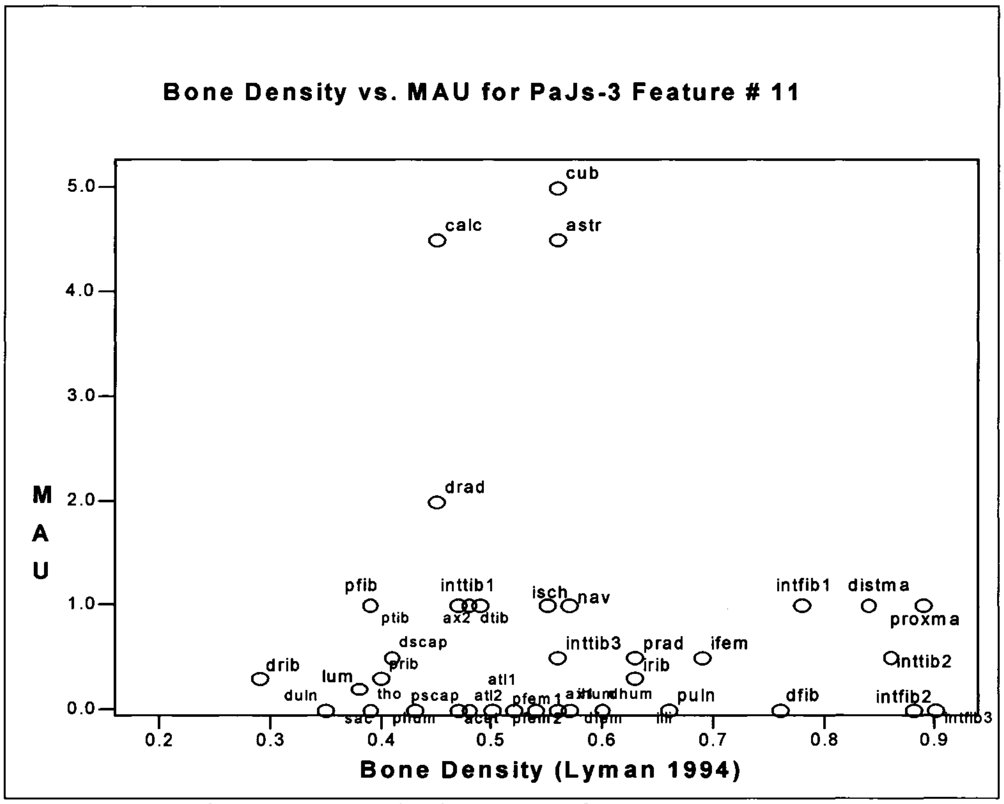

Figure 6.60. Bone density vs. MAU for PaJs-3 Feature 11.

PaJs-3 Feature #12: (Tent Ring)

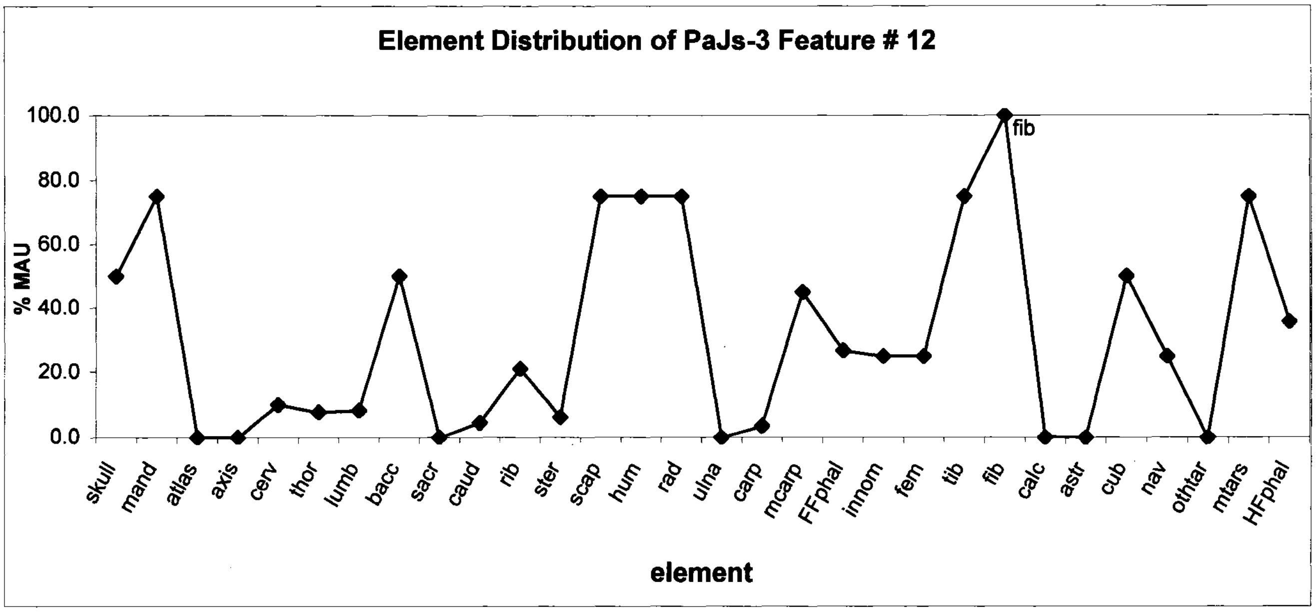

Figure 6.61. Element distribution for PaJs-3 Feature 12.

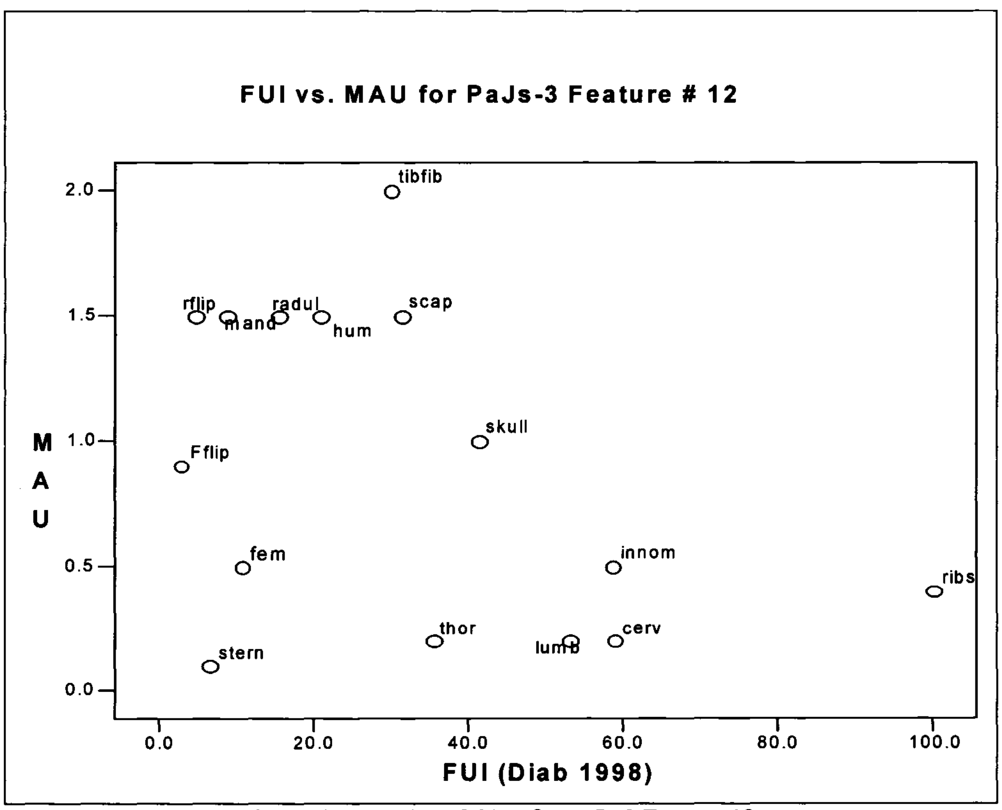

Figure 6.62. FUI vs. MAU for PaJs-3 Feature 12.

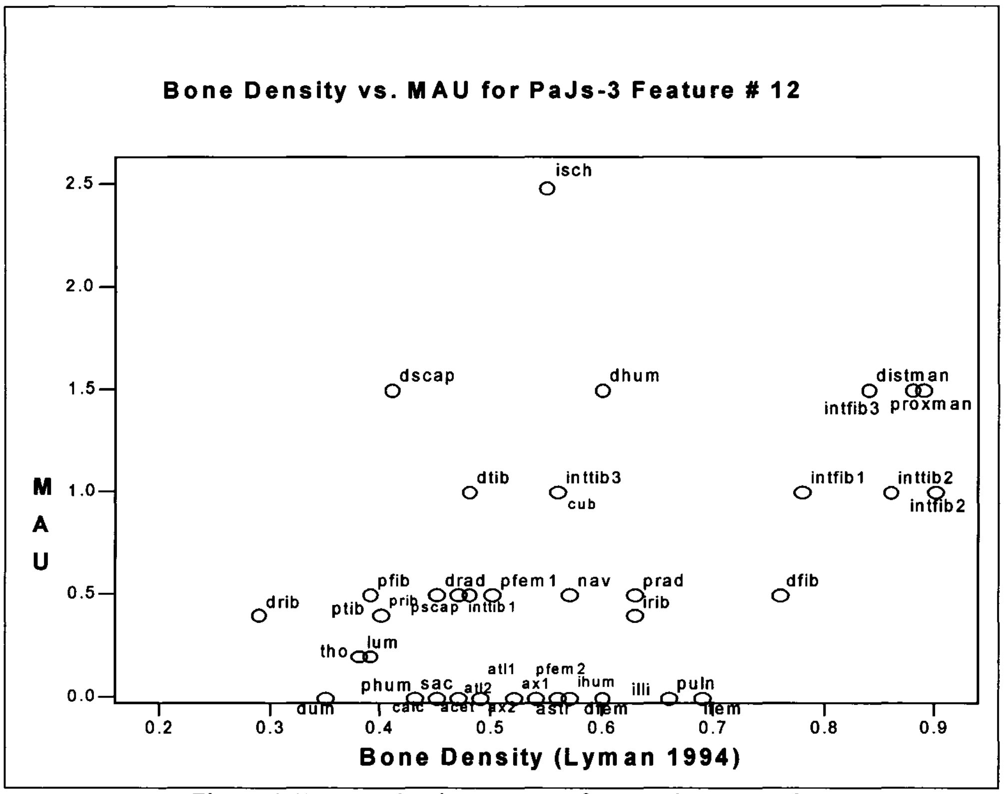

Figure 6.63. Bone density vs. MAU for PaJs-3 Feature 12.

PaJs-3 Feature #13: (Tent Ring)

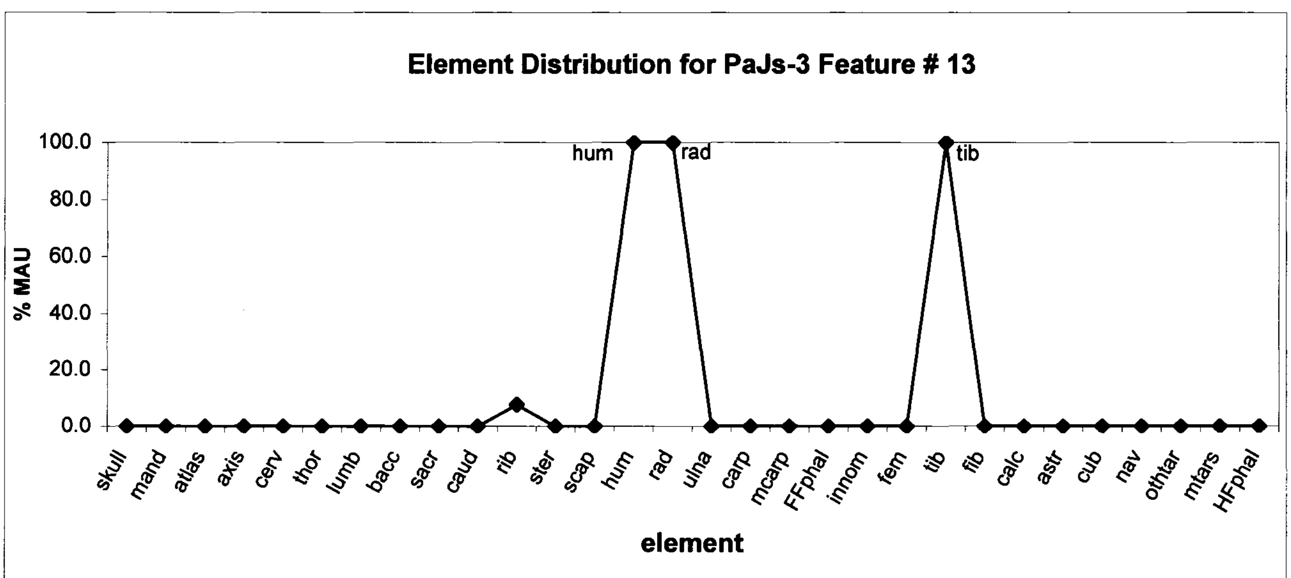

Figure 6.64. Element distribution for PaJs-3 Feature 13.

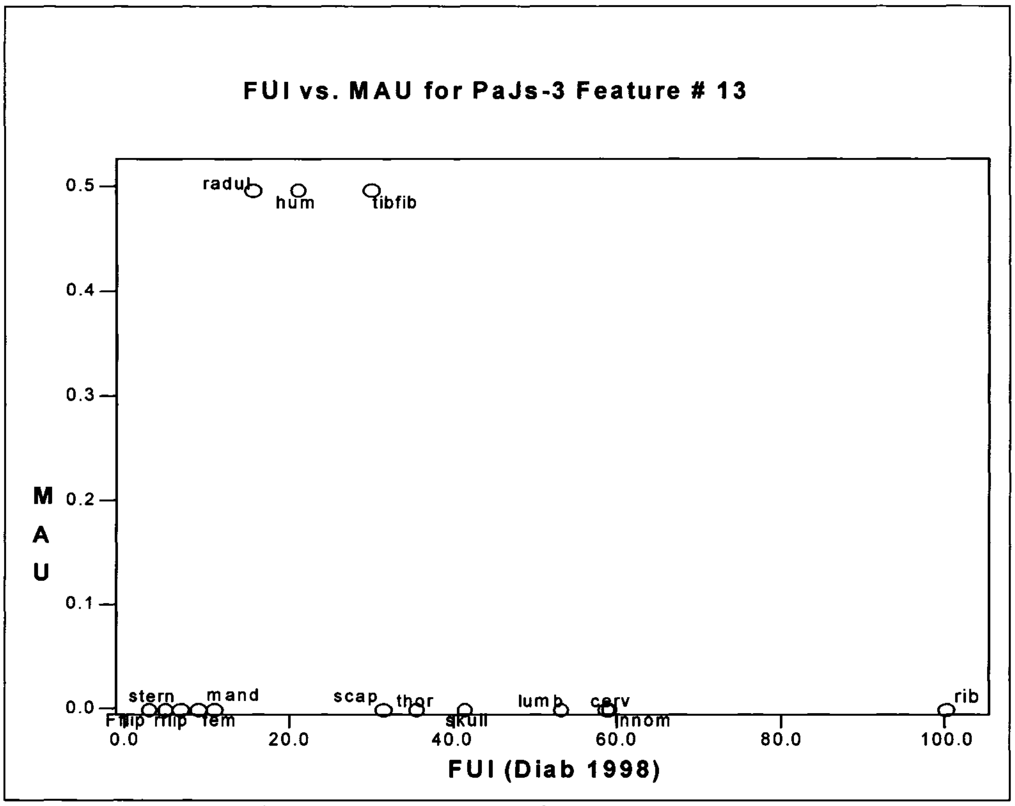

Figure 6.65. FUI vs. MAU for PaJs-3 Feature 13.

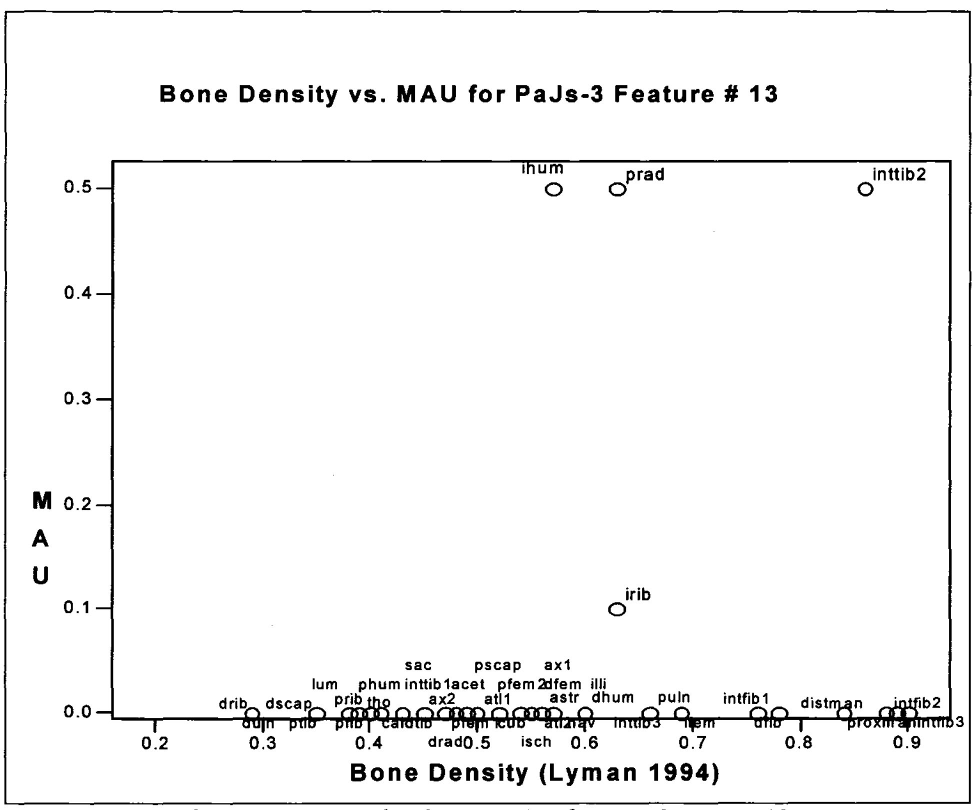

Figure 6.66. Bone density vs. MAU for PaJs-3 Feature 13.

PaJs-3 Feature #14: (Tent Ring)

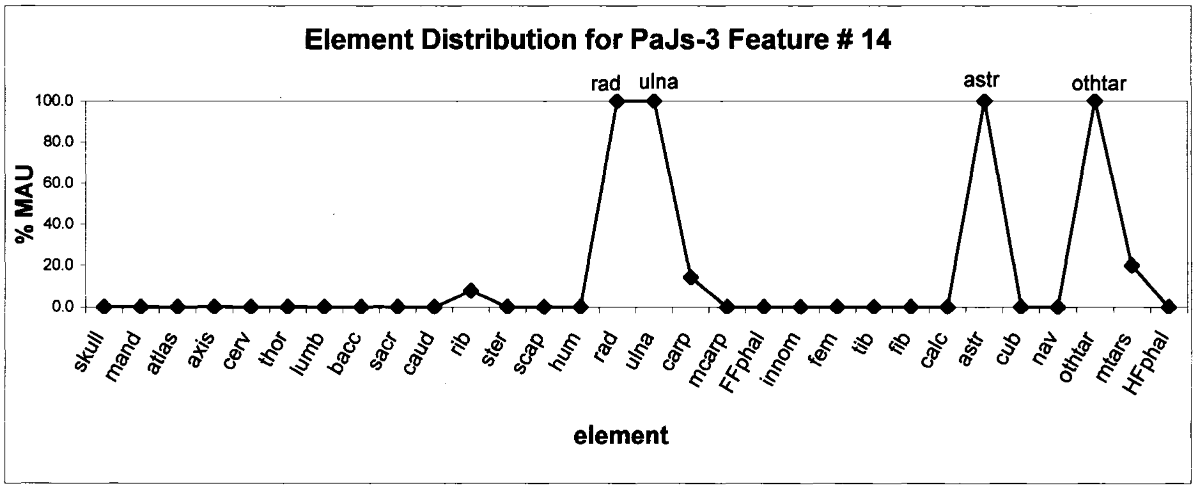

Figure 6.67. Element distribution for PaJs-3 Feature 14.

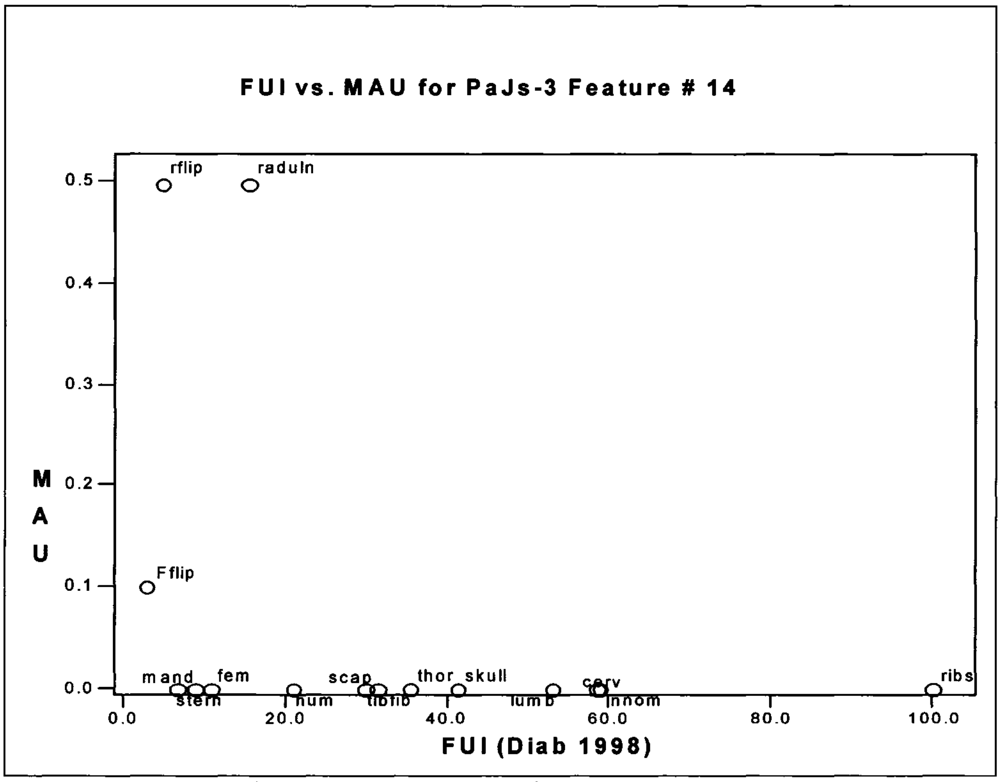

Figure 6.68. FUI vs. MAU for PaJs-3 Feature 14.

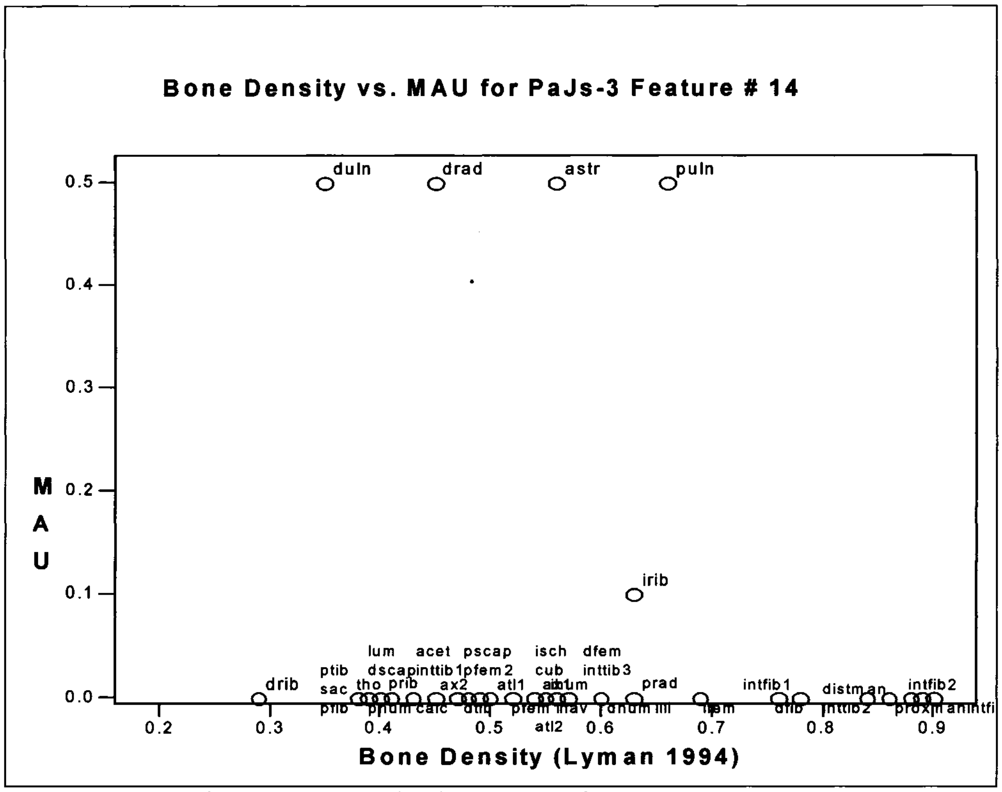

Figure 6.69. Bone density vs. MAU for PaJs-3 Feature 14.

PaJs-3 Feature #15: (Tent Ring)

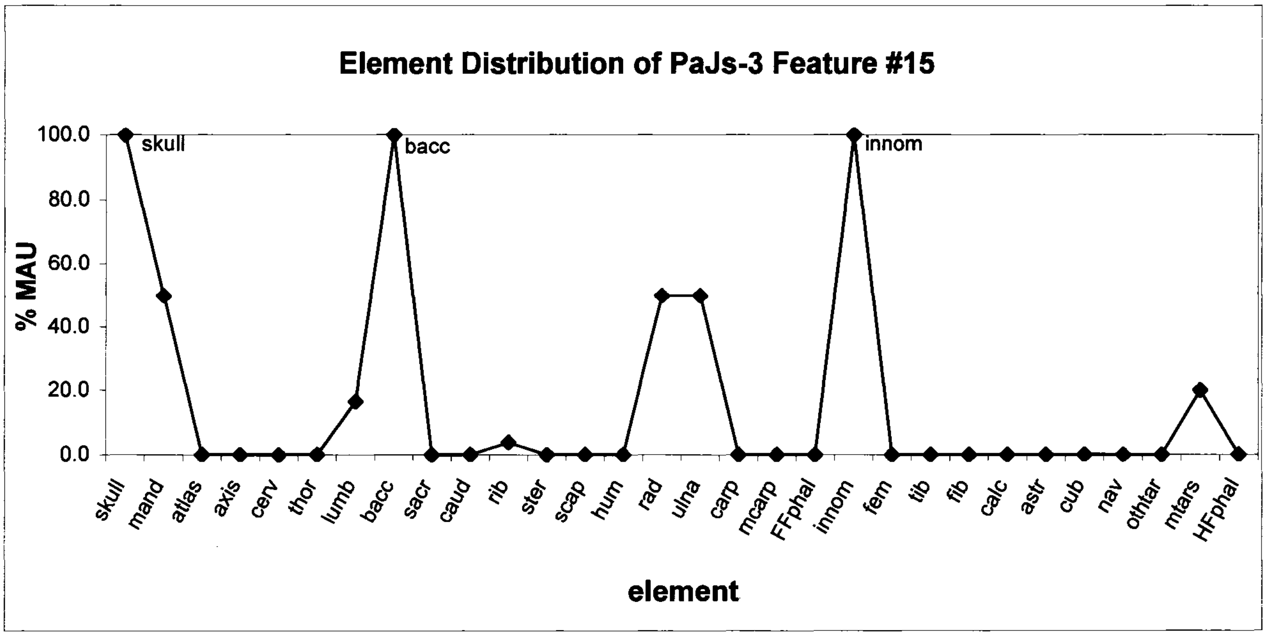

Figure 6.70. Element distribution for PaJs-3 Feature 15.

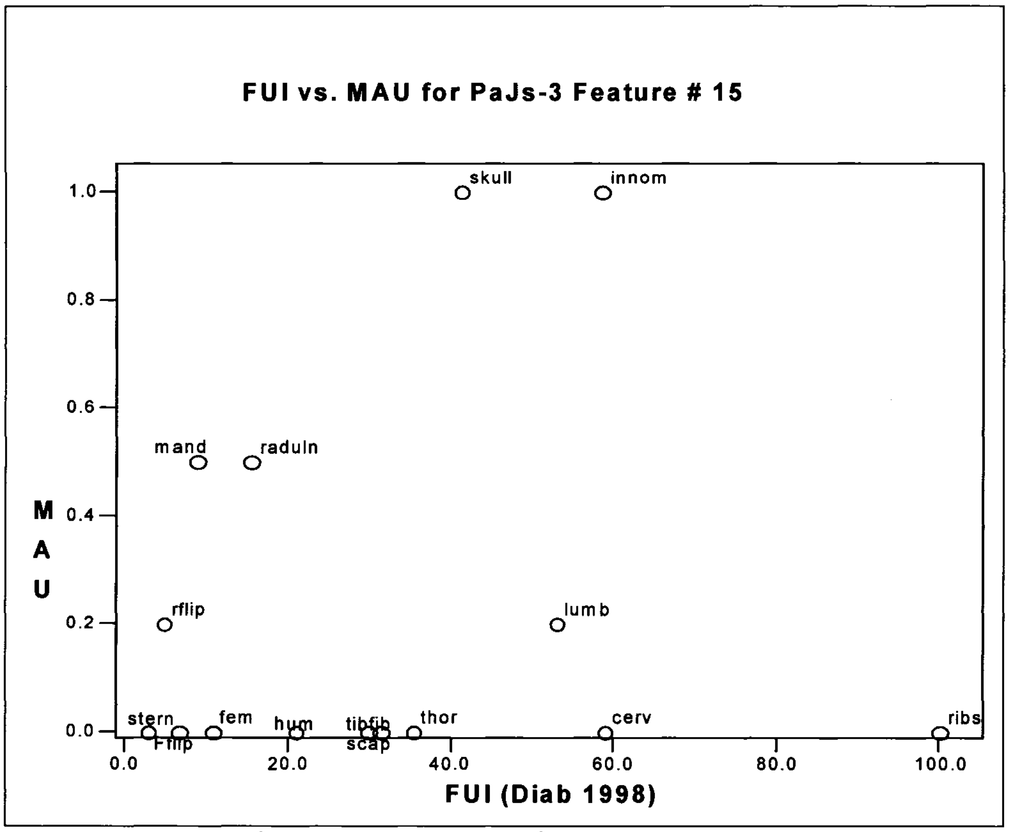

Figure 6.71. FUI vs. MAU for PaJs-3 Feature 15.

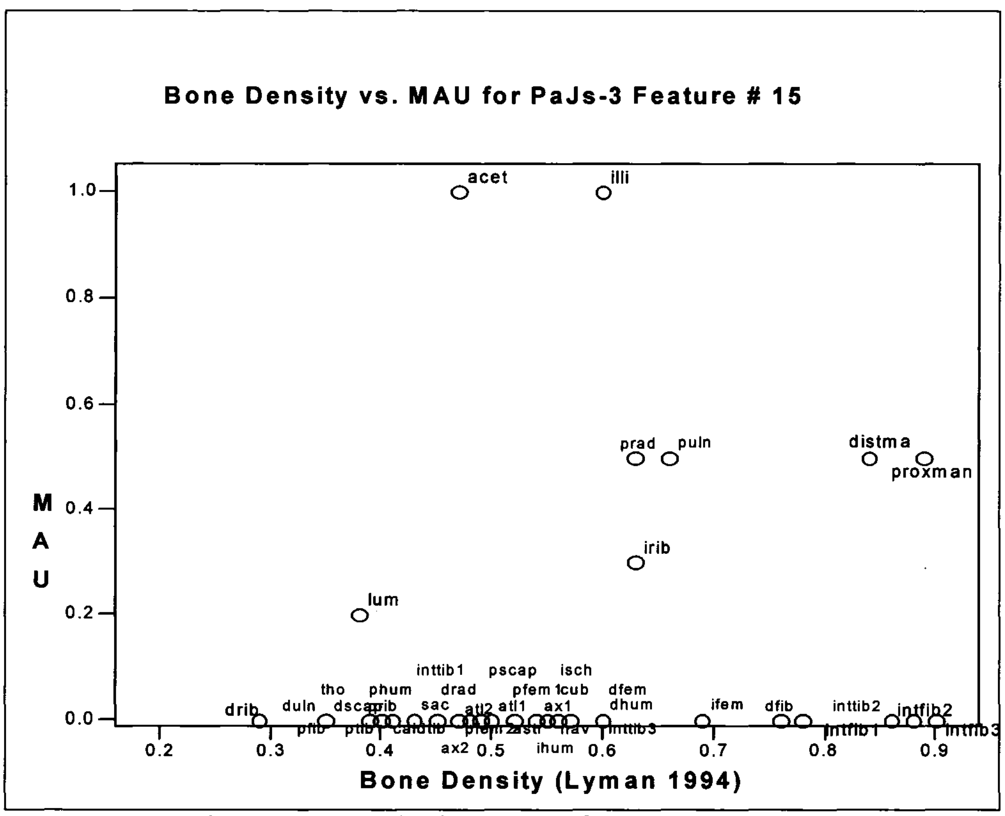

Figure 6.72. Bone density vs. MAU for PaJs-3 Feature 15.

PaJs-3 Feature #16: (Tent Ring)

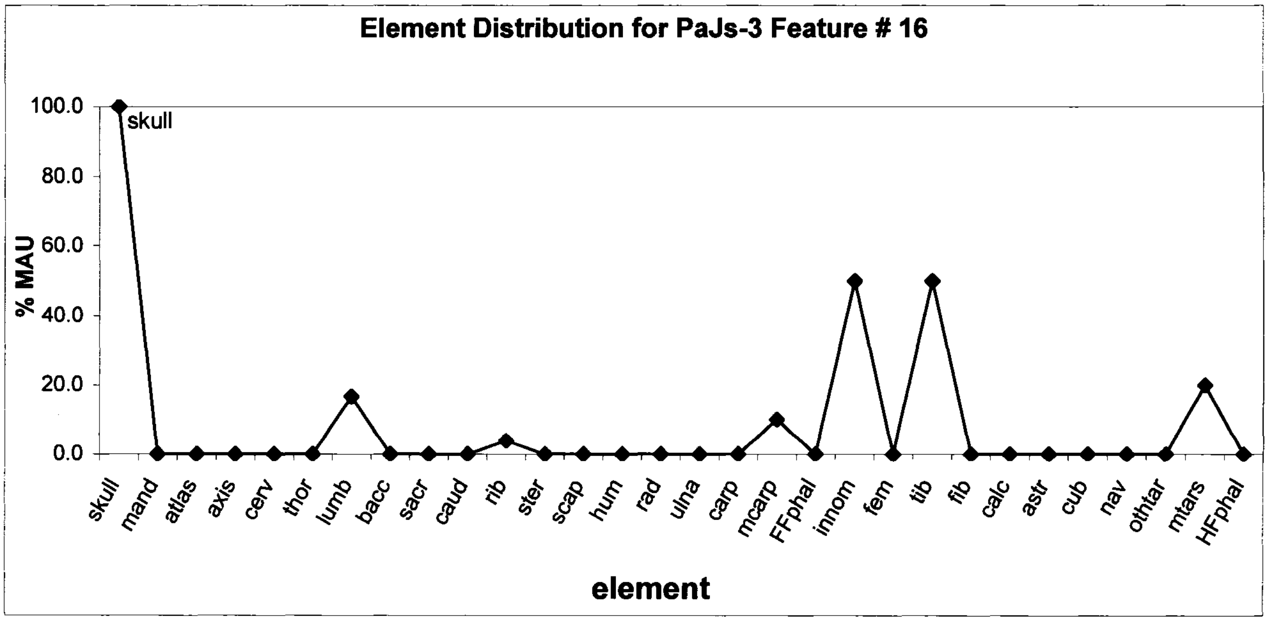

Figure 6.73. Element distribution for PaJs-3 Feature 16.

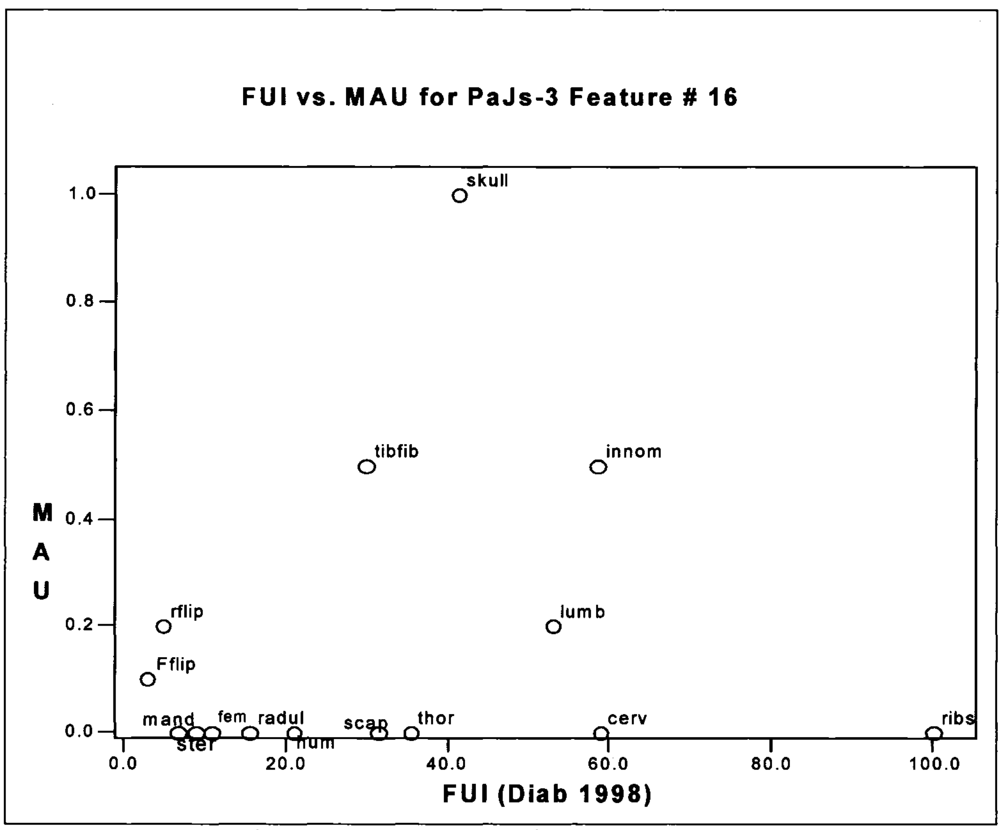

Figure 6.74. FUI vs. MAU for PaJs-3 Feature 16.

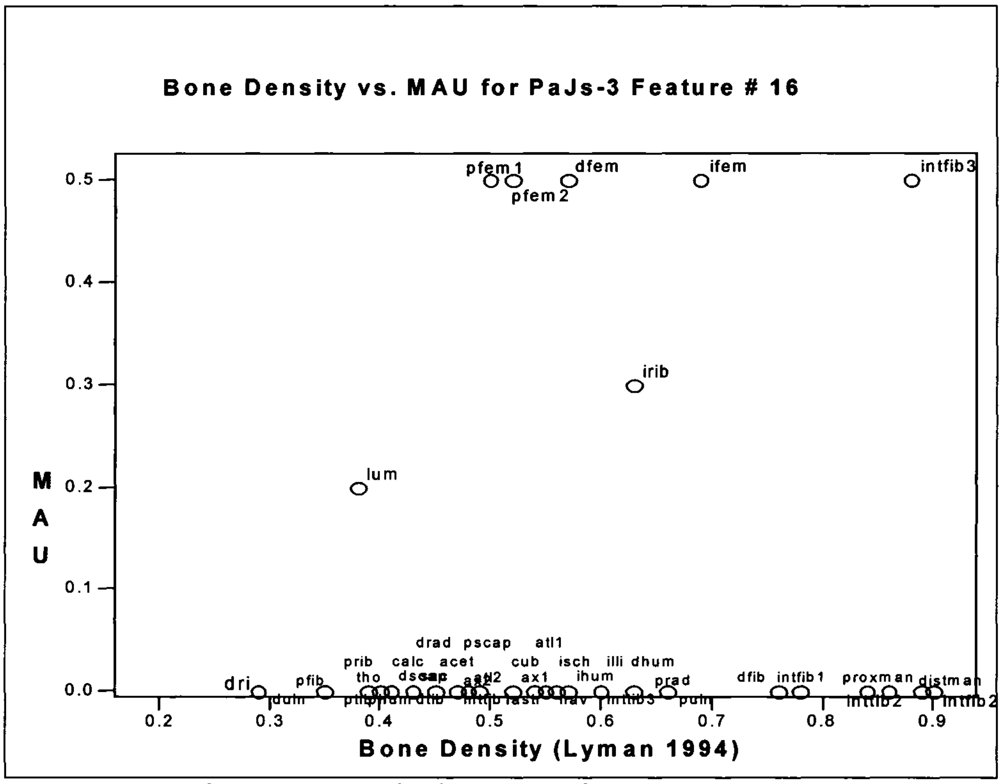

Figure 6.75. Bone density vs. MAU for PaJs-3 Feature 16.

PaJs-3 Feature #17: (Tent Ring)

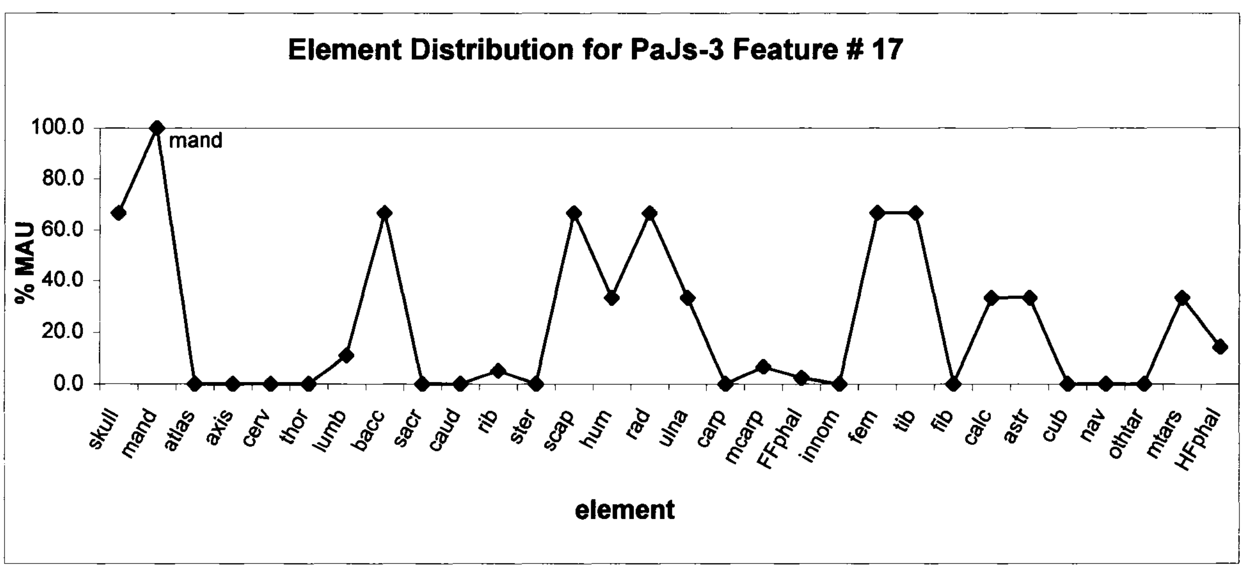

Figure 6.76. Element distribution for PaJs-3 Feature 17.

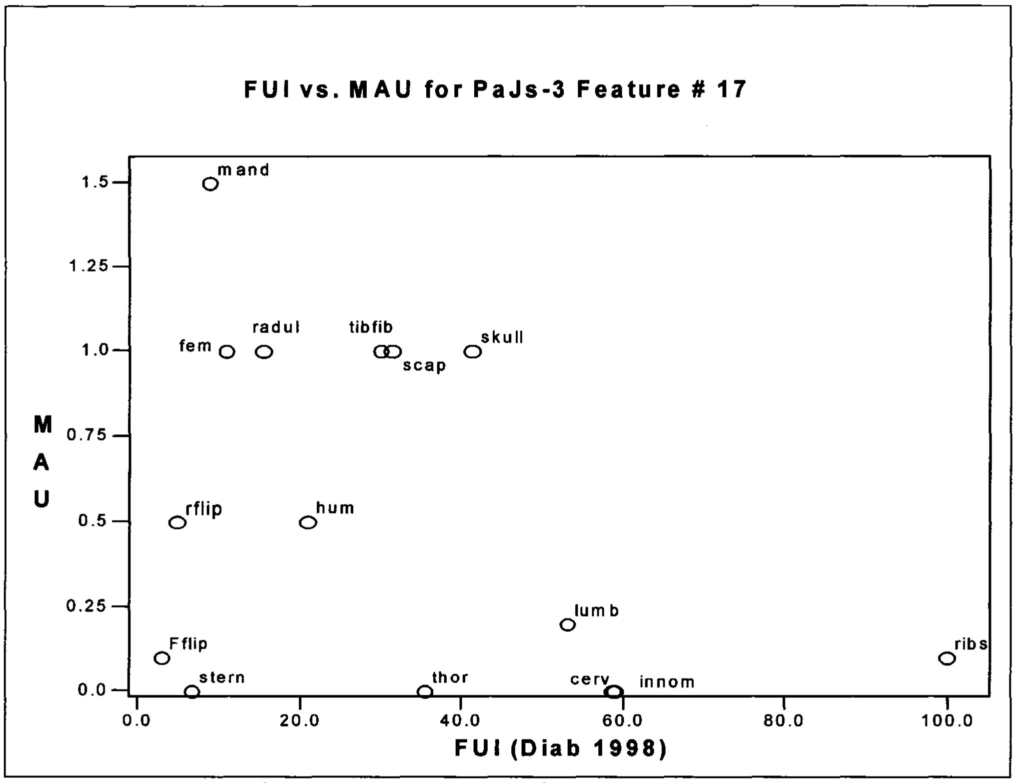

Figure 6.77. FUI vs. MAU for PaJs-3 Feature 17.

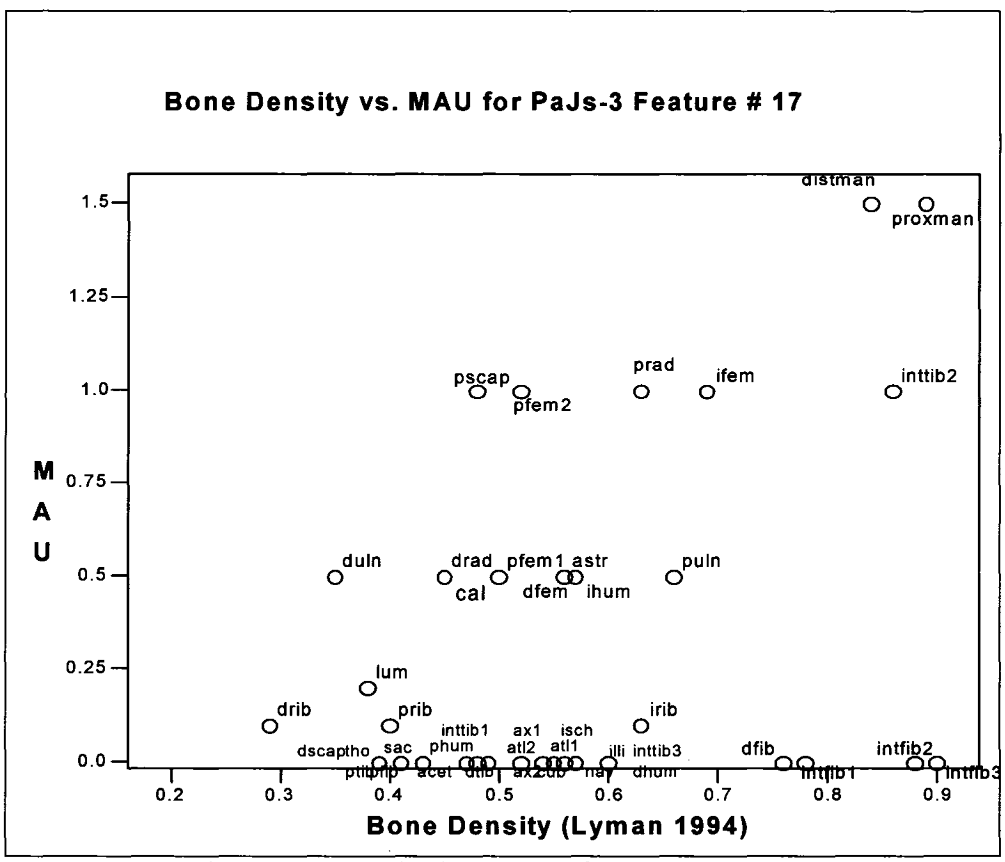

Figure 6.78. Bone density vs. MAU for PaJs-3 Feature 17.

PaJs-3 Feature #18: (Tent Ring)

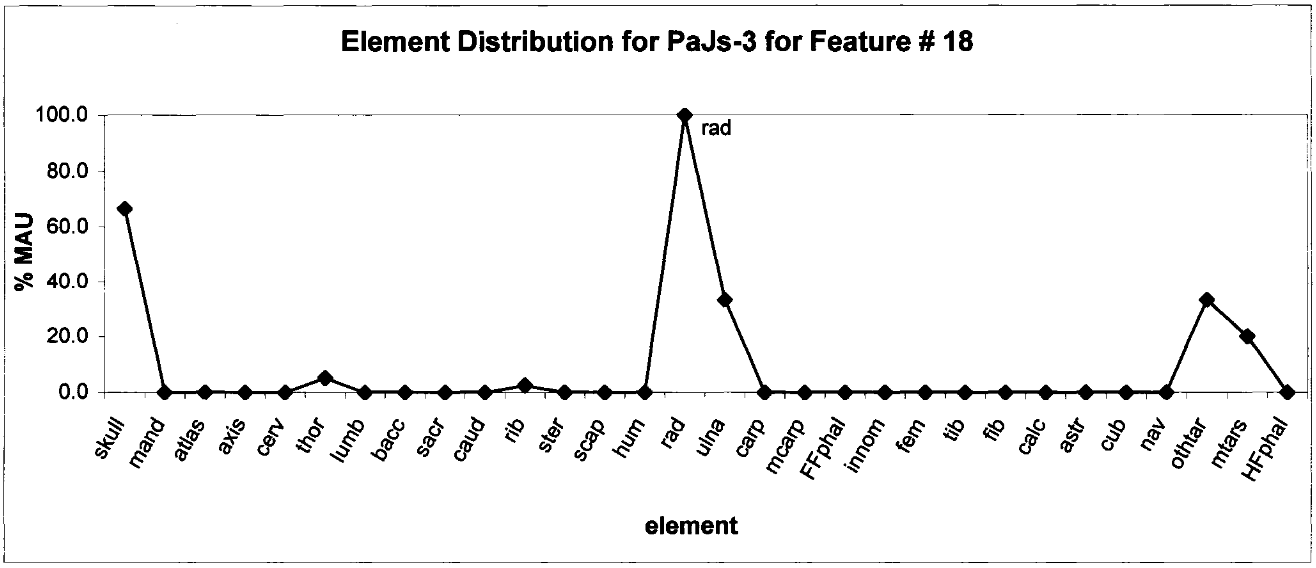

Figure 6.79. Element distribution for PaJs-3 Feature 18.

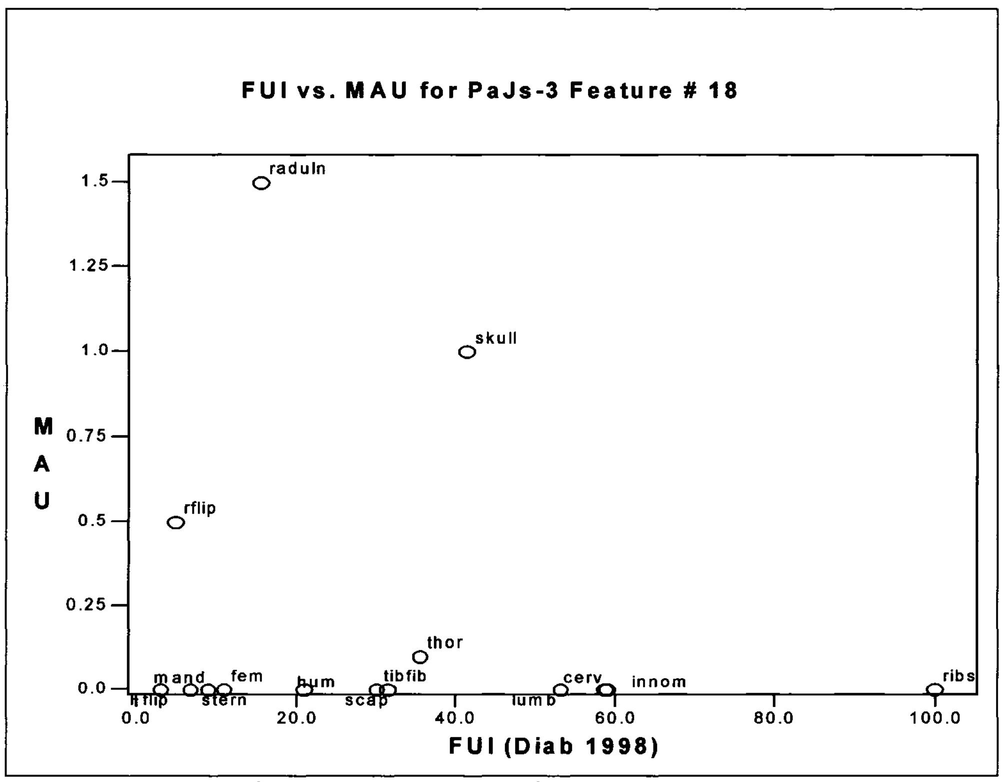

Figure 6.80. FUI vs. MAU for PaJs-3 Feature 18.

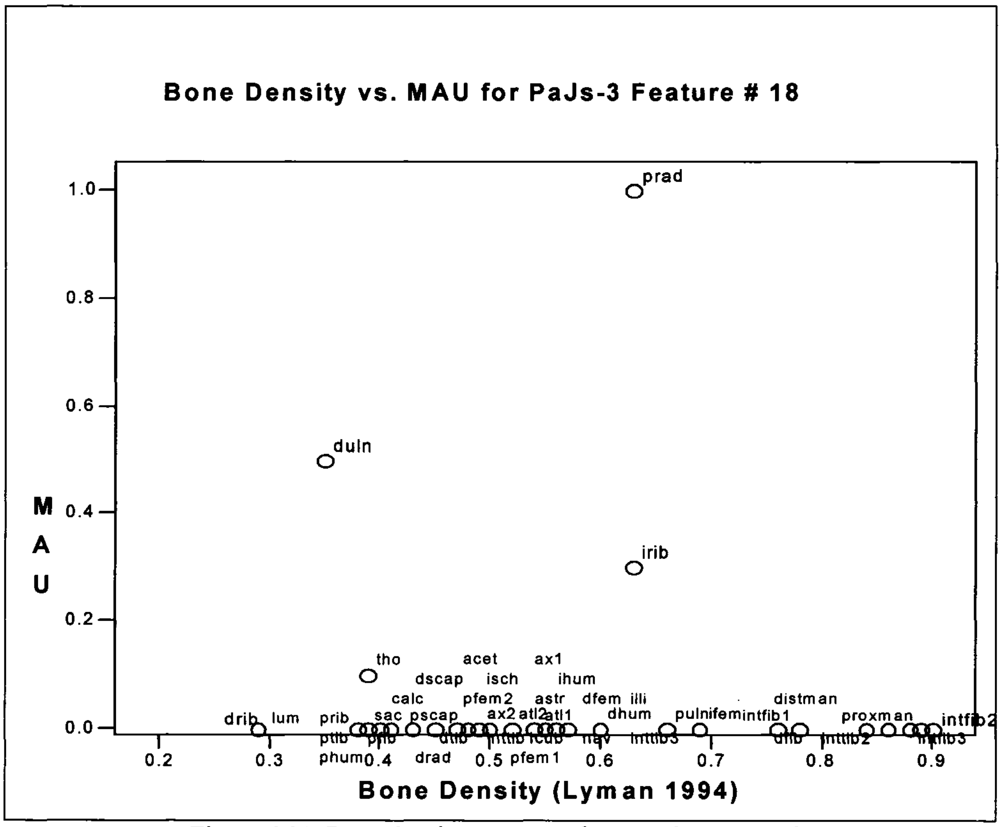

Figure 6.81. Bone density vs. MAU for PaJs-3 Feature 18.

PaJs-3 Feature #19: (Tent Ring)

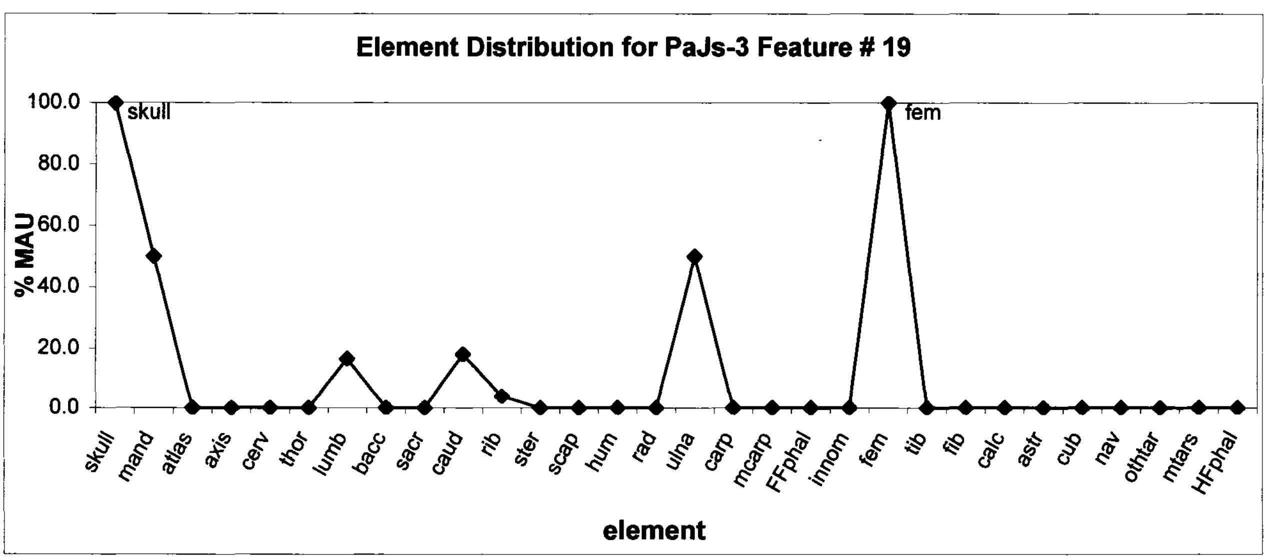

Figure 6.82. Element distribution for PaJs-3 Feature 19.

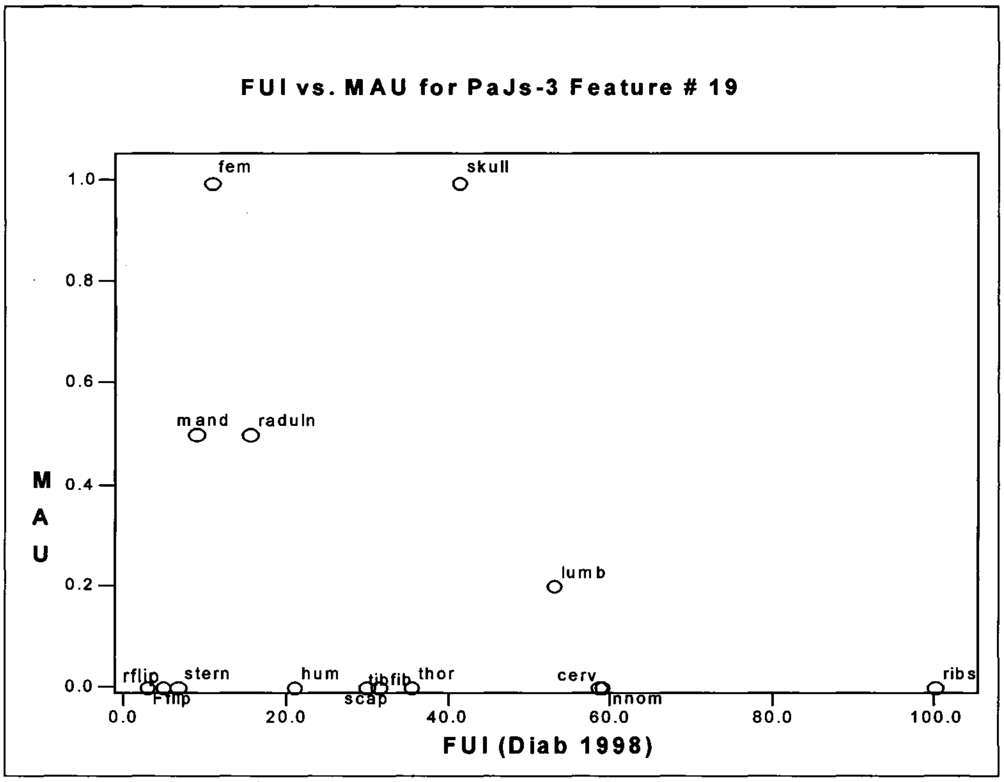

Figure 6.83. FUI vs. MAU for PaJs-3 Feature 19.

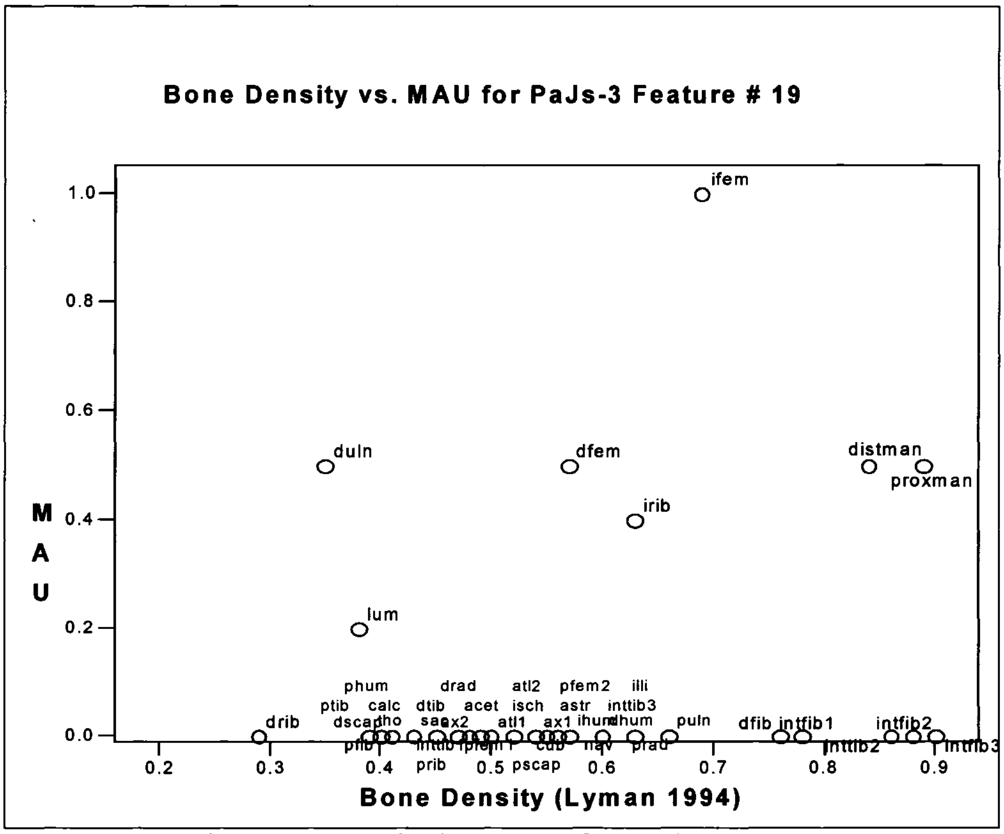

Figure 6.84. Bone density vs. MAU for PaJs-3 Feature 19.

PaJs-3 Feature #20: (Tent Ring)

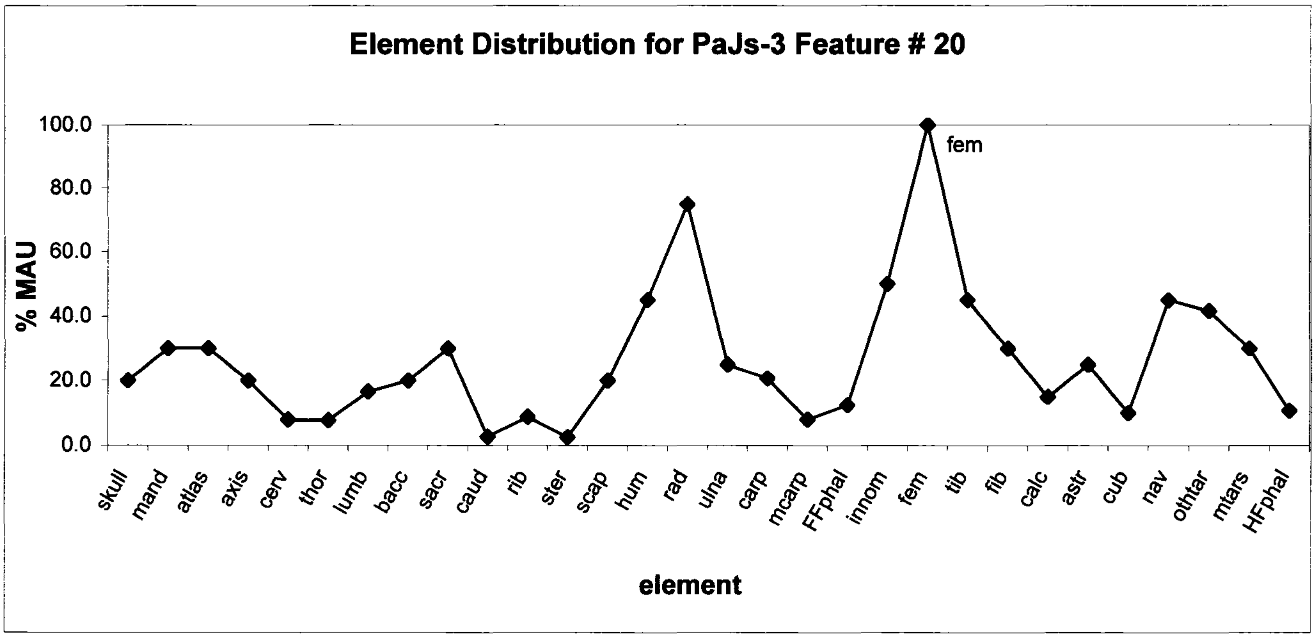

Figure 6.85. Element distribution for PaJs-3 Feature 20.

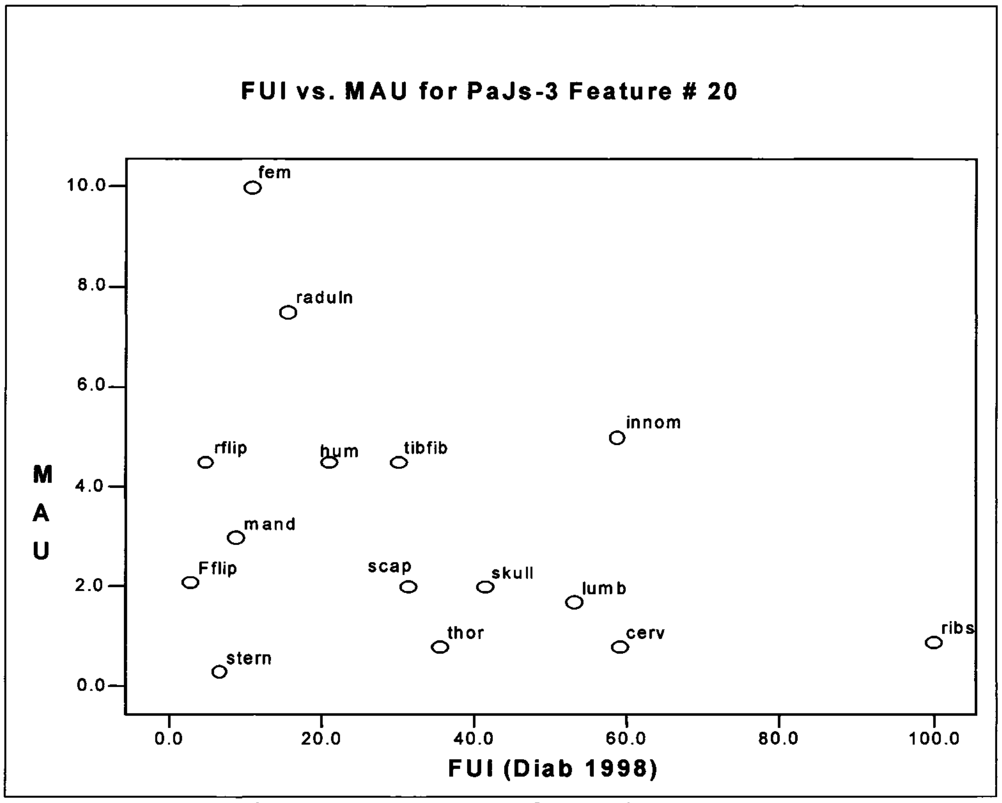

Figure 6.86. FUI vs. MAU for PaJs-3 Feature 20.

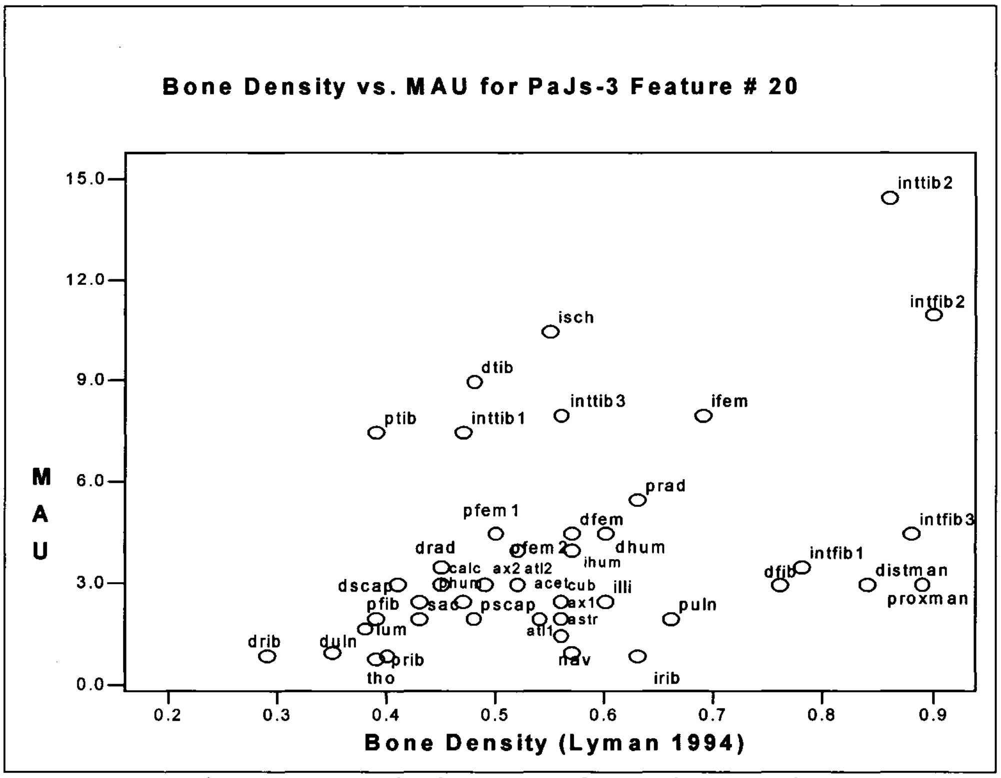

Figure 6.87. Bone density vs. MAU for PaJs-3 Feature 20.

PaJs-3 Feature #21: (Tent Ring)

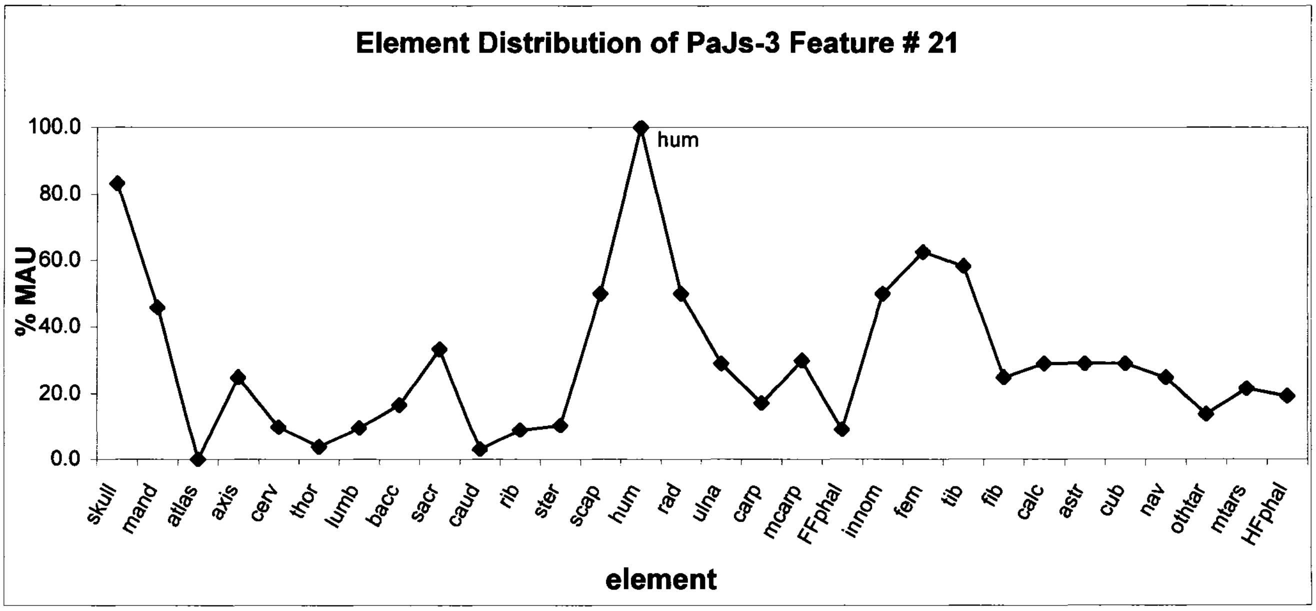

Figure 6.88. Element distribution for PaJs-3 Feature 21.

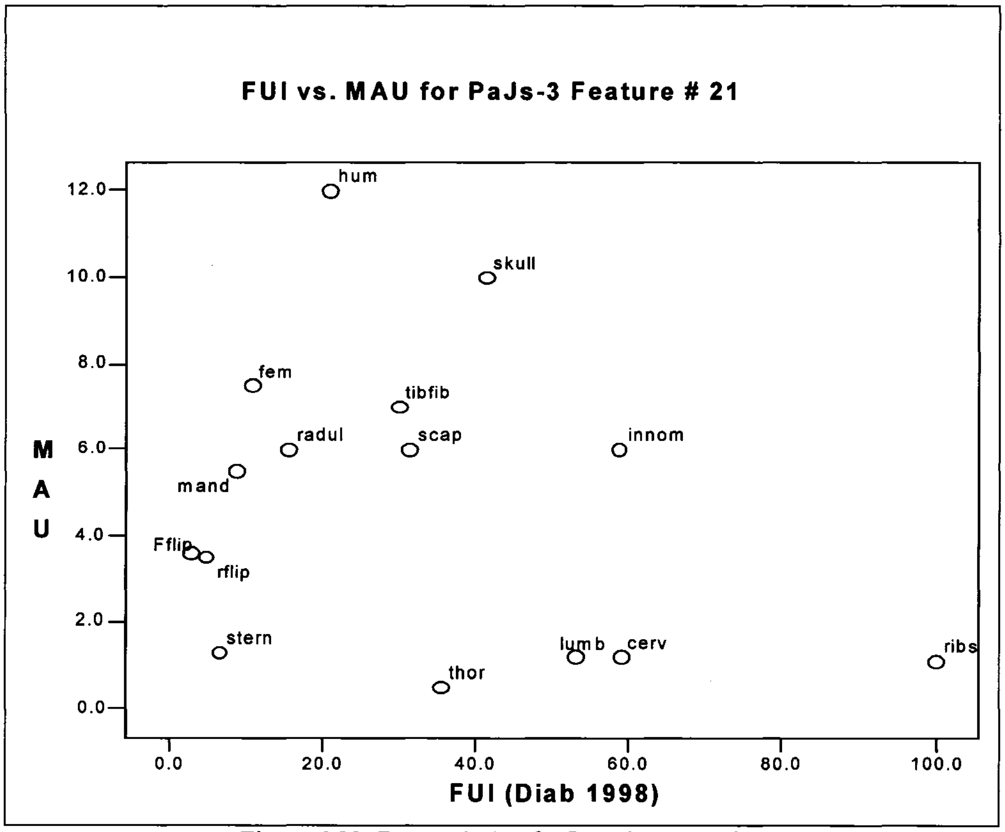

Figure 6.89. FUI vs. MAU for PaJs-3 Feature 21.

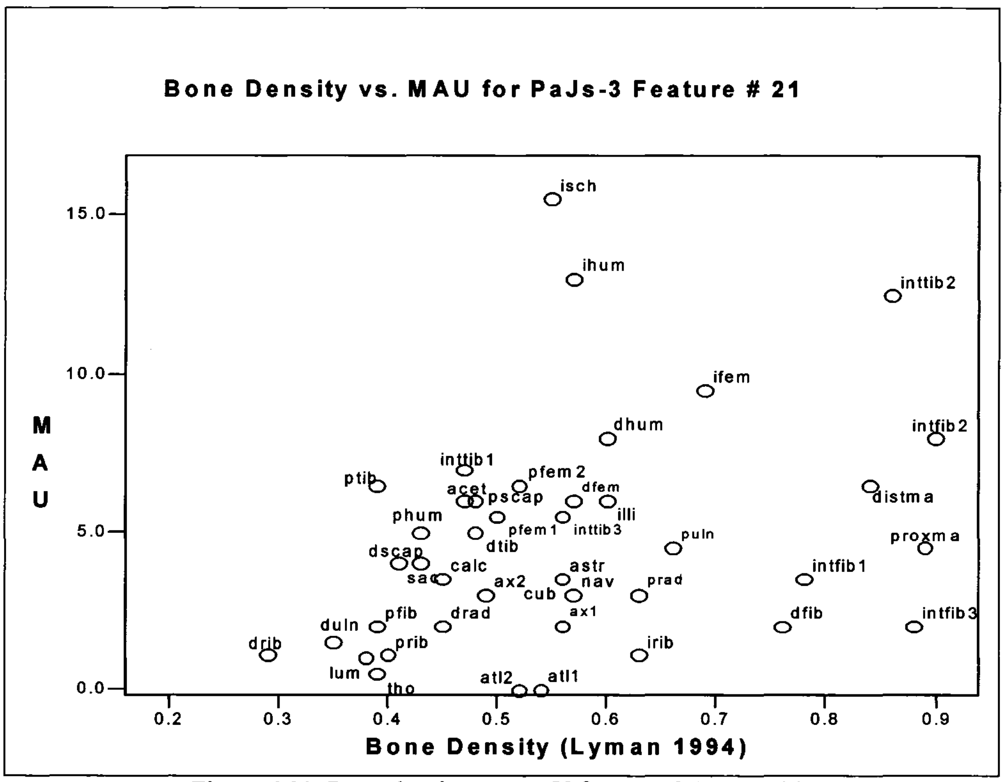

Figure 6.90. Bone density vs. MAU for PaJs-3 Feature 21.

PaJs-3 Feature #22: (Tent Ring)

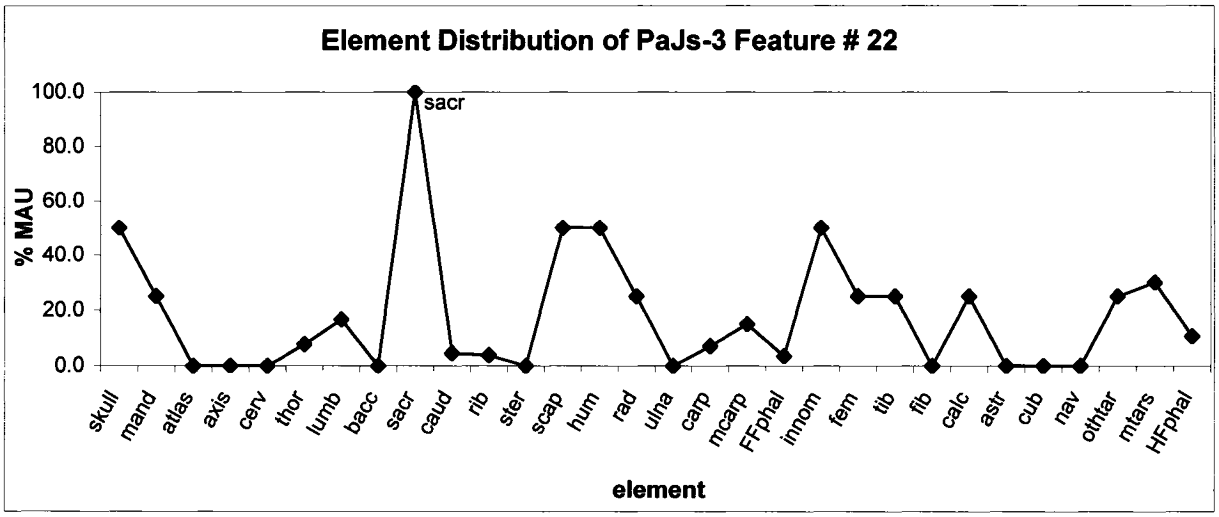

Figure 6.91. Element distribution for PaJs-3 Feature 22.

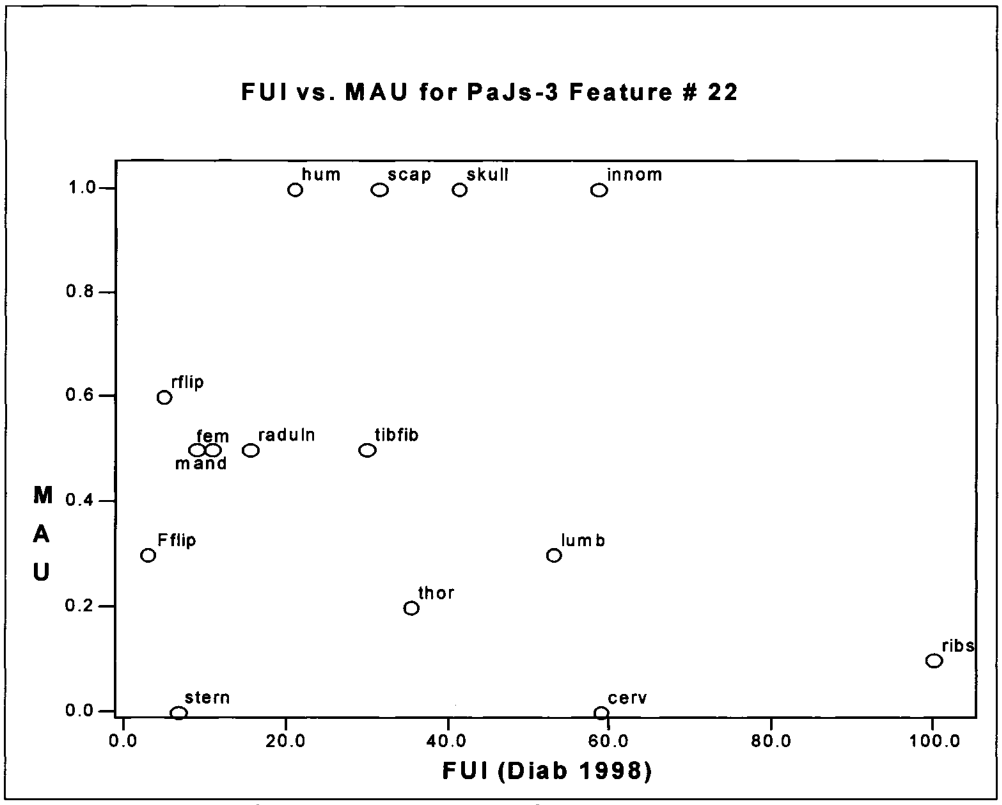

Figure 6.92. FUI vs. MAU for PaJs-3 Feature 22.

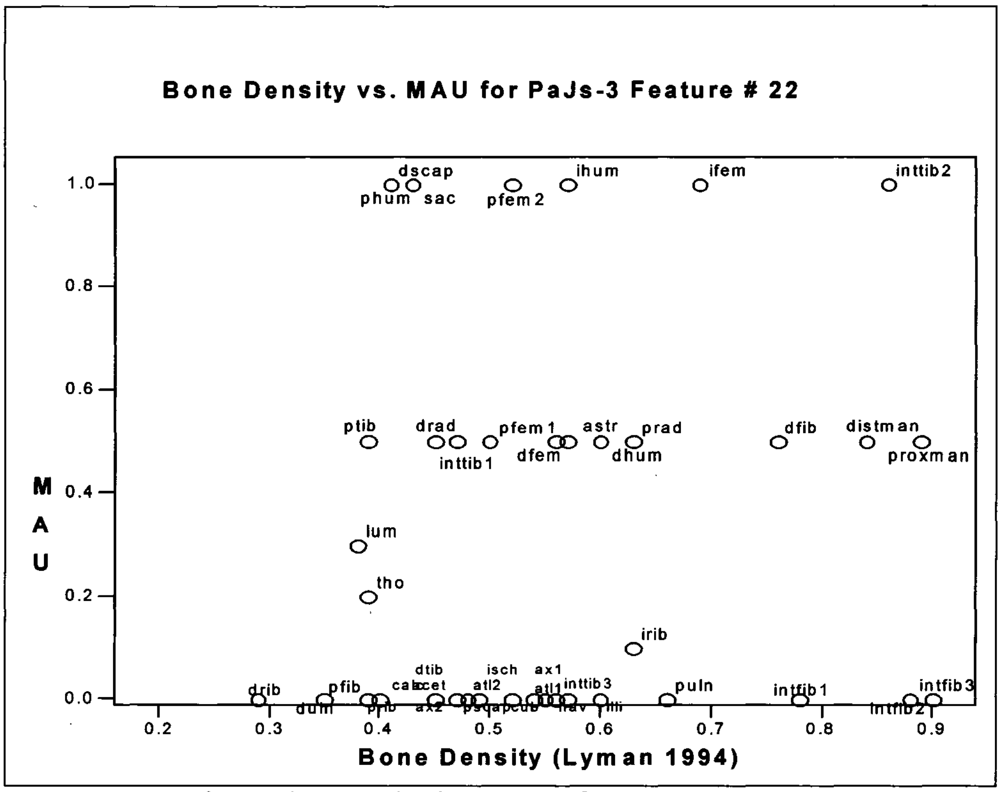

Figure 6.93. Bone density vs. MAU for PaJs-3 Feature 22.

PaJs-3 Feature #23: (Tent Ring)

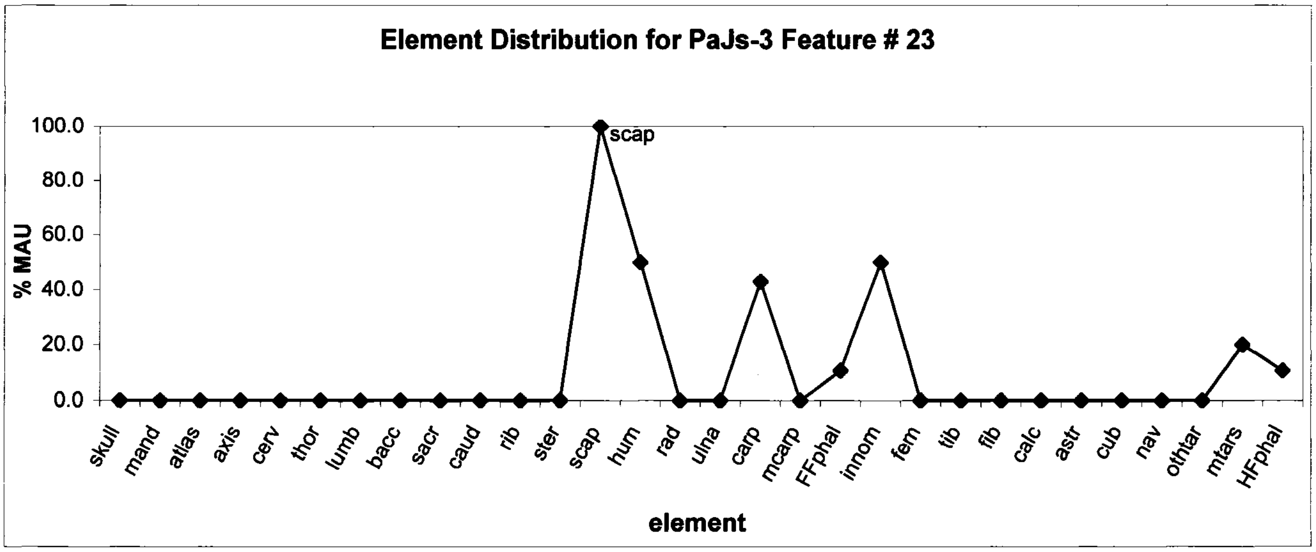

Figure 6.94. Element distribution vs. MAU for PaJs-3 Feature 23.

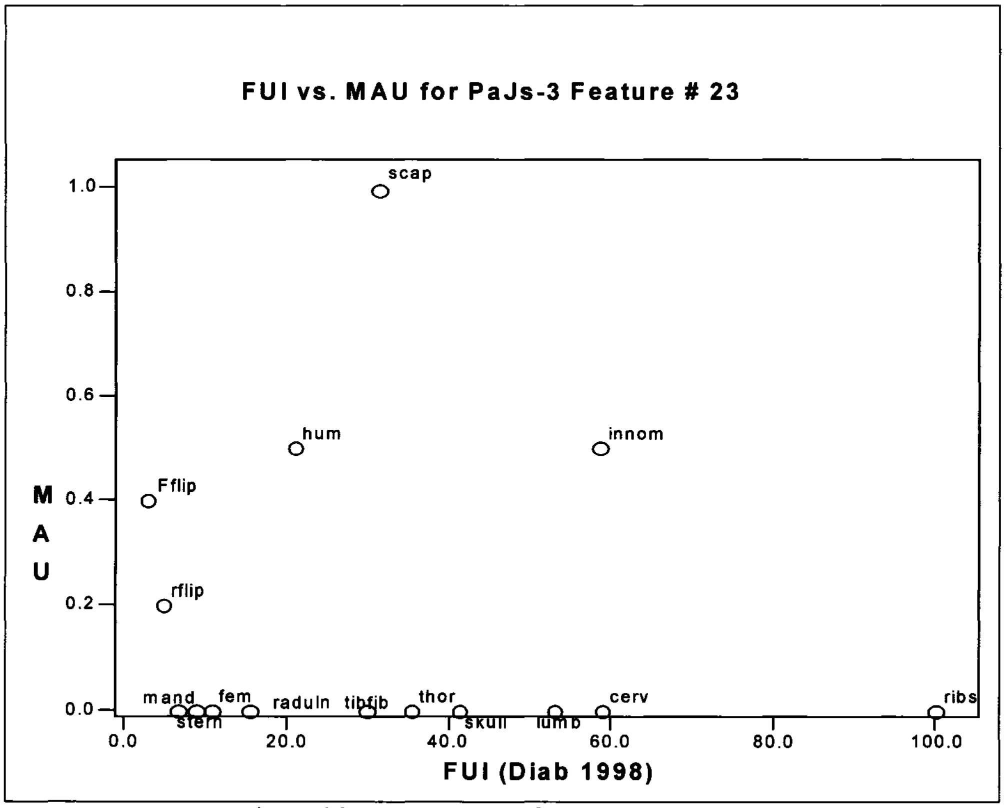

Figure 6.95. FUI vs. MAU for PaJs-3 Feature 23.

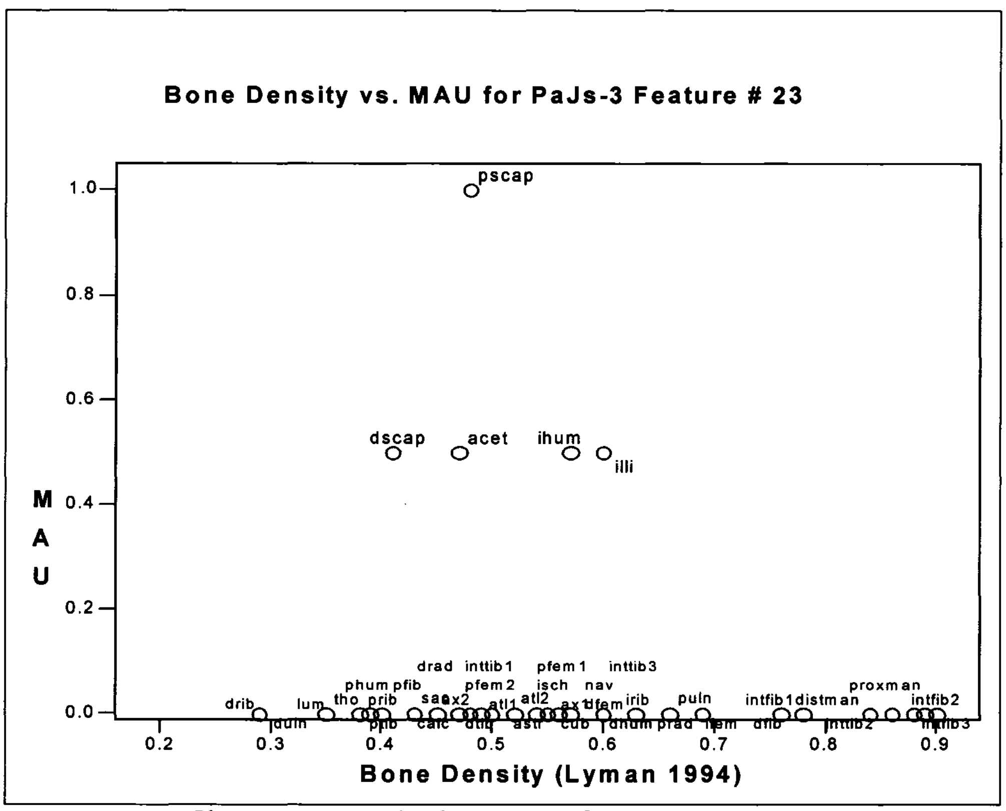

Figure 6.96. Bone density vs. MAU for PaJs-3 Feature 23.

PaJs-3 Feature #24: (Tent Ring)

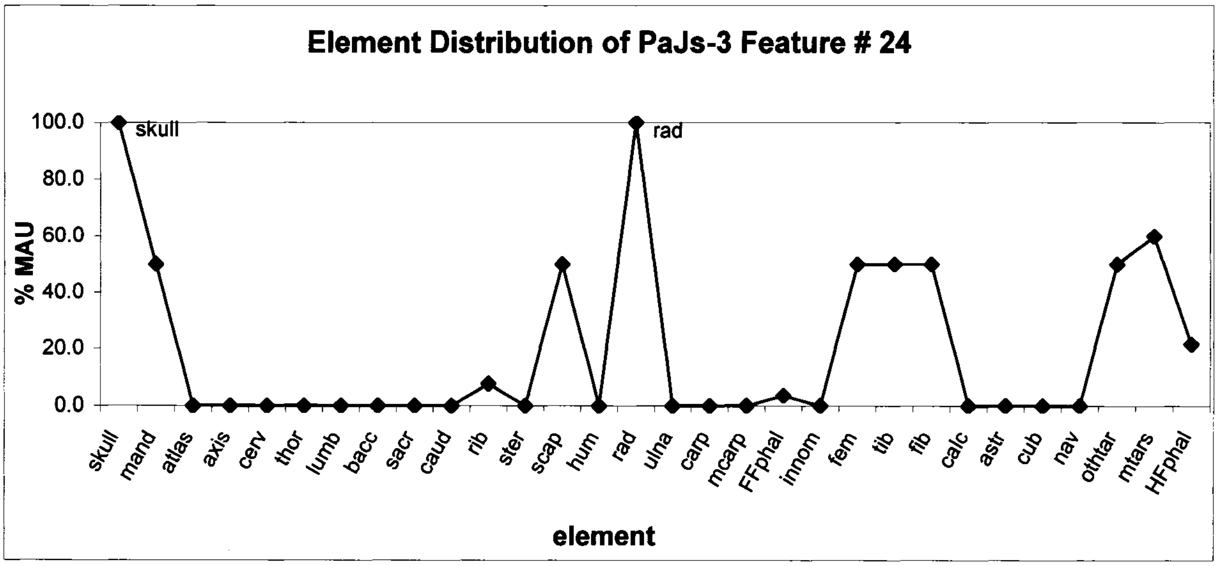

Figure 6.97. Element distribution for PaJs-3 Feature 24.

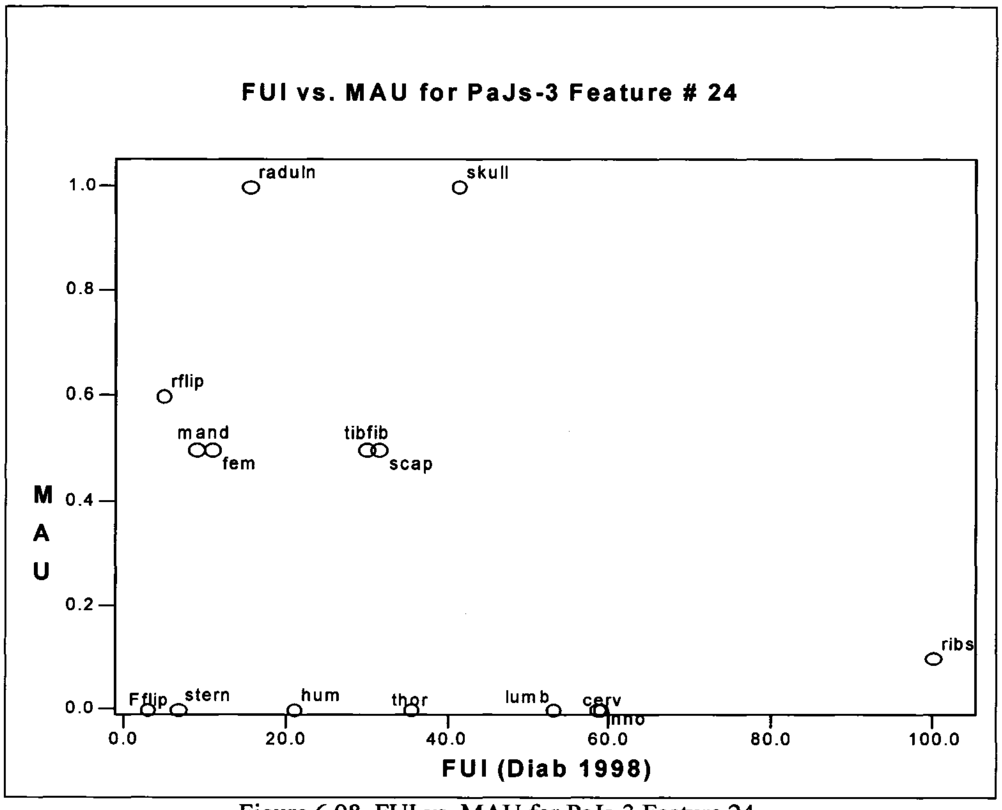

Figure 6.98. FUI vs. MAU for PaJs-3 Feature 24.

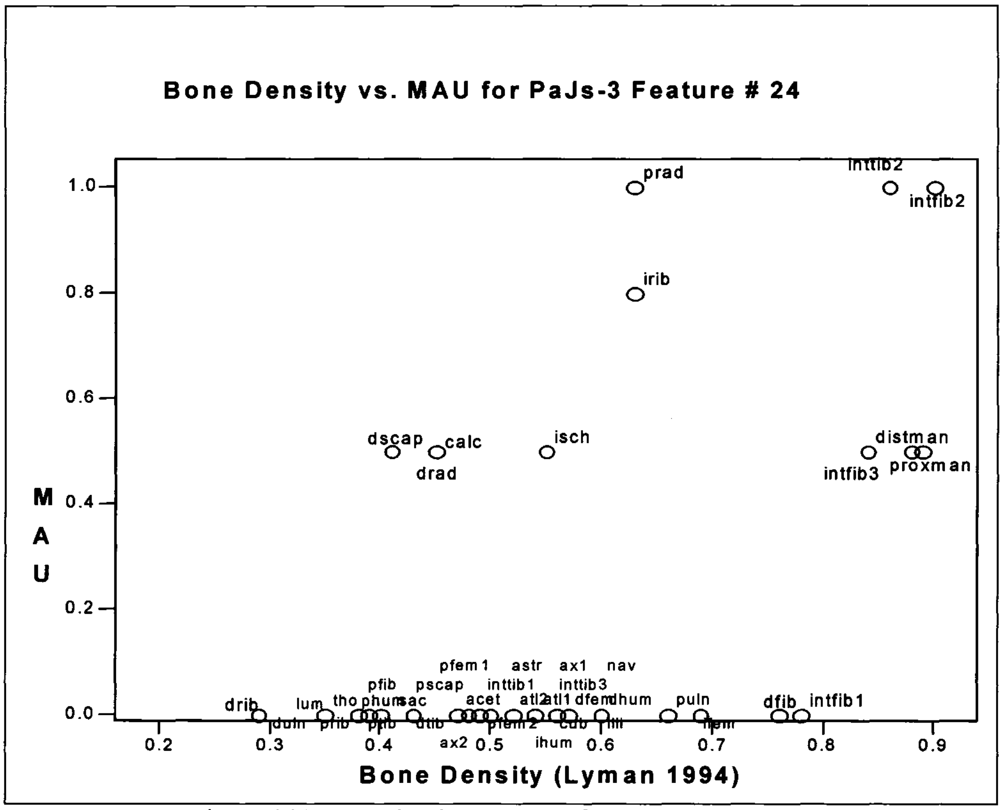

Figure 6.99. Bone density vs. MAU for PaJs-3 Feature 24.

PaJs-3 All Features

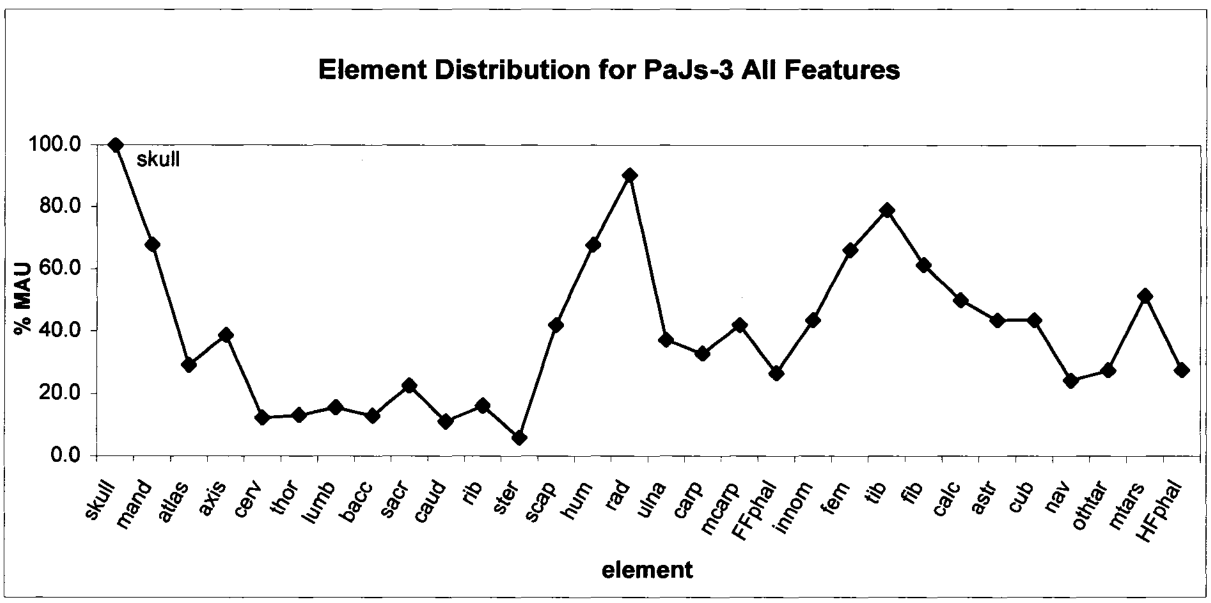

Figure 6.100. Element distribution for site PaJs-3.

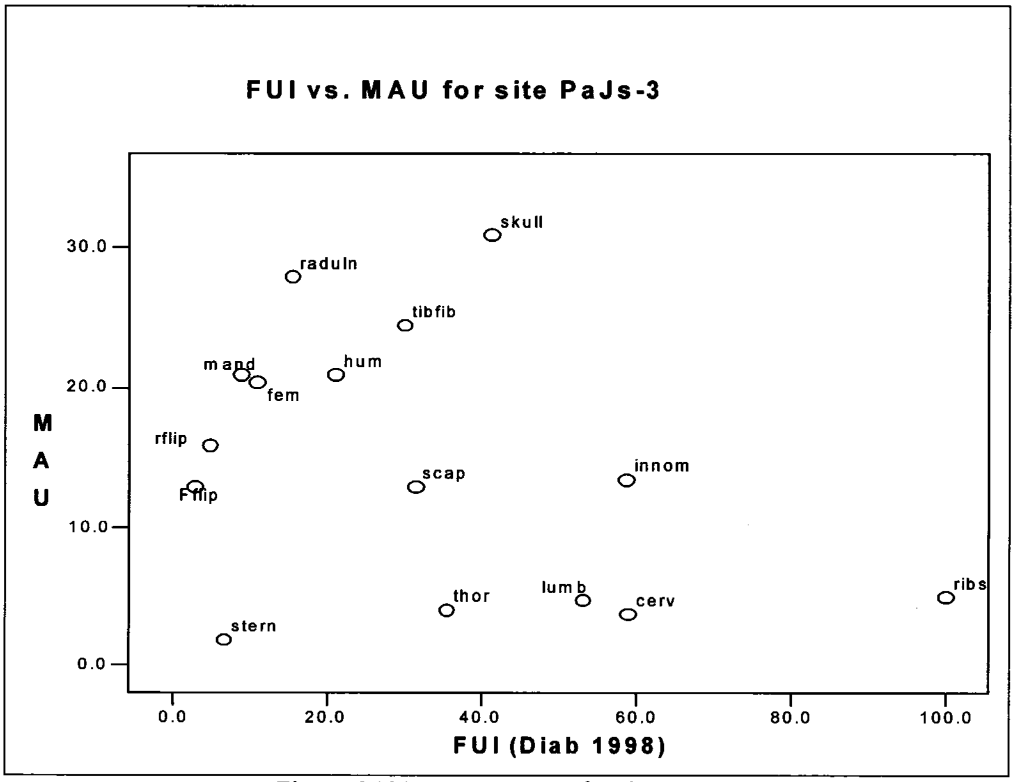

Figure 6.101. FUI vs. MAU for site PaJs-3.

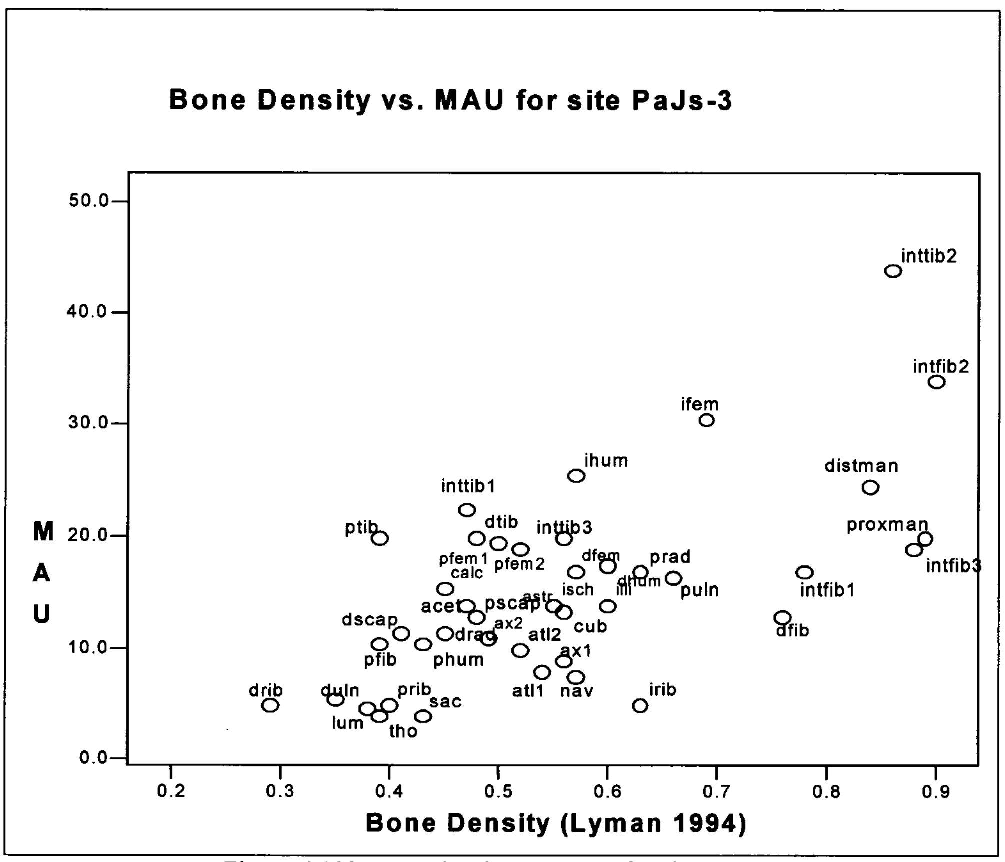

Figure 6.102. Bone density vs. MAU for site PaJs-3.

6.4. Analysis of PaJs-3

Table 6.3 provides NISP and MNI values for PaJs-3 while table 6.4 summarizes the Spearman's rho values.

Table 6.3. NISP and MNI values for PaJs-3.

Feature	NISP	MNI
PaJs-3-QA	276	3
PaJs-3-QB	399	4
PaJs-3-S/QA	568	8
PaJs-3-TRB	1127	3
PaJs-3-TRC	134	2
PaJs-3-KA	31	2
PaJs-3-NHG	16	1
PaJs-3-6	37	1
PaJs-3-7	10	1
PaJs-3-9	37	1
PaJs-3-10	41	2
PaJs-3-11	354	5
PaJs-3-12	235	3
PaJs-3-13	8	1
PaJs-3-14	20	1
PaJs-3-15	29	1
PaJs-3-16	20	1
PaJs-3-17	67	2
PaJs-3-18	23	2
PaJs-3-19	34	1
PaJs-3-20	763	10
PaJs-3-21	899	12
PaJs-3-22	49	2
PaJs-3-23	23	2
PaJs-3-24	59	2
PaJs-3 (all features aggregated)	5259	30

Table 6.4. Spearman's rho values for FUI and bone density graphs for PaJs-3.

Feature	FUI	Bone Density
PaJs-3-QA	r_s = - .248 (p =.373)	r_s = .281 (p =.071)
PaJs-3-QB	r_s = - .593 (p=.020)	r_s = .339 (p =.028)
PaJs-3-S/QA	r_s = .098 (p=.728)	r_s = .295 (p =.058)
PaJs-3-TRB	r_s = - .039 (p=.891)	r_s = .410 (p =.007)
PaJs-3-TRC	r_s = - .172 (p=.539)	r_s = .434 (p =.004)
PaJs-3-KA	r_s = - .088 (p=.756)	r_s = - .042 (p =.793)
PaJs-3-NGH	r_s = .047 (p=.867)	r_s = .222 (p =.157)
PaJs-3-6	r_s = - .097 (p=.730)	r_s = .075 (p =.638)
PaJs-3-7	r_s = - .254 (p=.362)	r_s = .265 (p =.091)
PaJs-3-9	r_s = - .579 (p=.024)	r_s = .022 (p =.888)
PaJs-3-10	r_s = - .270 (p=.330)	r_s = .339 (p =.030)
PaJs-3-11	r_s = - .462 (p=.083)	r_s = - .036 (p =.819)
PaJs-3-12	r_s = - .343 (p=.210)	r_s = .301 (p =.053)
PaJs-3-13	r_s = - .116 (p=.681)	r_s = .308 (p =.047)
PaJs-3-14	r_s = - .560 (p=.030)	r_s = - .027 (p =.867)
PaJs-3-15	r_s = .081 (p=.775)	r_s = .273 (p =.080)
PaJs-3-16	r_s = .099 (p=.726)	r_s = .151 (p =.341)
PaJs-3-17	r_s = - .307 (p=.266)	r_s = .192 (p =.224)
PaJs-3-18	r_s = - .110 (p=.696)	r_s = - .085 (p =.591)
PaJs-3-19	r_s = - .085 (p=.763)	r_s = .174 (p =.271)
PaJs-3-20	r_s = - .316 (p=.251)	r_s = .412 (p =.007)
PaJs-3-21	r_s = - .226 (p=.418)	r_s = .346 (p =.025)
PaJs-3-22	r_s = - .075 (p=.791)	r_s = .075 (p =.639)
PaJs-3-23	r_s = - .158 (p=.575)	r_s = - .075 (p =.635)
PaJs-3-24	r_s = - .207 (p=.458)	r_s = .397 (p =.009)
PaJs-3 (all features aggregated)	r_s = - .213 (p=.446)	r_s = .574 (p =.000)

6.4.1. Element distribution for PaJs-3

The element distribution for PaJs-3 is much more varied than in PaJs-13. Peaks tend to be skewed and in some cases binary with peaks at head and flipper elements.

Feature QA, QB, and S/QA have been identified as sod features. Features QA and S/QA had an abundance of head and rear flipper elements with little (see S/QA Figure

6.31) or no (see QA Figure 6.25) vertebrae, while Feature QB had an abundance of metacarpals and metatarsals, with smaller amounts of mandibles, fibulae and radii (Figure 6.28). For QA and S/QA, the simplest explanation would follow Stanford's (1976) rationale that head and limb elements are expected at residential camps since they are economically valuable. The little amounts of vertebrae may be a result of the presence of dogs, or the fact that vertebrae are not considered choice portions as seen with Clyde River Inuit. Feature QB is particularly strange since the most abundant elements found were podials. This may be due to cultural factors, such as tool production, or toys for children. Unfortunately, there are no density values for either metacarpals or metatarsals and Diab (1998) does not have any data on utility or Iñupiut preferences for podials.

Features TRB to Feature #24 (Feature KA will be discussed separately) have been identified as tent rings. The material recovered from these features is much less than in PaJs-13, with an overall NISP (from ALL features in PaJs-3) of 5259. As a result, some features have very little data. The graphs for these features do not present any explicit trend, and in some features only one or two elements were represented.

Features TRB, TRC, 6, 9, 11, 12, 17, 20, 21, 22 and 24 all produced interpretable graphs while Features NHG (test pit), 7, 10, 13, 14, 15, 16, 18, 19, and 23 produced unclear utility and bone density graphs.

Of the features that provided relatively clear utility scatterplot, TRB, TRC, 6, 9, 12, 17, 21, and 24 had head and limb elements as the most abundant elements. Radius, ulna, humerus and tibula-fibula were also well represented in these features. These patterns correlate to economic utility, and would be expected to be present in residential camps.

Vertebrae are very under-represented in these features except for Feature 6, which has a stable representation of lumbar vertebrae.

Feature 9 has a high frequency of calcaneus bones. The calcaneus has a relatively high density that may explain its high abundance in this feature, although most of the other features have little or no calcaneus bones represented. The calcaneus may be present as a 'rider' having stayed articulated to the rear flipper.

Features 12 and 17 have a relatively high abundance of bacculae represented at approximately 50% for Feature 12, and 60% for Feature 17. Nowhere in the literature was there mention of use (for tools), utility, or taste preference for this particular bone.

The cuboid is the most abundant element in Feature 11, followed by rear flipper and head elements. Since there is a high frequency of rear flipper elements, it would be acceptable to suggest that the cuboid may have arrived as a 'rider'. The cuboid also has a relatively high density and may be present due to its resistance to taphonomic processes.

Feature 20 is abundant in front and rear flipper elements, with less of an abundance of head elements.

The sacrum is over-represented, especially in comparison to other vertebrae in Feature 22. The sacrum may have stayed articulated to the lumbar vertebrae, and could be present as a 'rider'.

Feature KA has been described as being a possible *karigi* (Savelle and Wenzel, 2003). Mostly bacculae and humeri bones are represented in feature KA. Other elements represented are scapulae, ulna-radii, innominate, and calcaneus. Feature KA does not make much sense when compared to the ceremonial *karigi* at PaJs-13 where only economically prime elements were represented in the assemblage. There are no head elements associated with KA, and the presence of the bacculae as the most abundant element suggests possible cultural or ceremonial possibilities. In conclusion, there does not seem to be enough evidence to classify PaJs-3 KA as a *kairgi* based solely on seal elements.

For PaJs-3 as a whole, the distribution of elements is consistent with utility. There is a high abundance of head elements, and both the front and rear flippers are well represented. There is an overall under-representation of vertebrae elements, which may reflect the presence of dogs at the site, or taste preferences among the occupants.

6.4.2. FUI vs. MAU and FUI vs. bone density for PaJs-3

Sod Features QA, and QB have negative correlations with FUI while S/QA has a slightly positive correlation with r_s values ranging from - .593 to .098. Only QB has a strong negative correlation of r_s = - .593 and in turn a strong positive bone density correlation with an r_s value of .339 (see Figures 6.29 and 6.30). It is therefore plausible to interpret the faunal assemblage at QB being attributed to taphonomy rather than utility. Feature QA has a negative correlation with FUI and a positive correlation with bone density. Although these correlations are not very significant, they are enough to suggest that taphonomy is the cause of the assemblage from Feature QA as well.

Feature S/Q had a less clear pattern with a very weak positive correlation with FUI, and a positive correlation with bone density. Since the correlation is 'more positive' with bone density, it could be argued that taphonomy is the dominant factor shaping the assemblage in S/QA.

Features TRB, TRC, 12, 17, 20, 21, and 24 exemplify the same pattern as was seen for PaJs-13. These features all have a negative correlation with FUI and a clear positive correlation with bone density (see Figures 6.36, 6.39, 6.63, 6.78, 6.87, 6.90, and 6.99). For FUI, the r_s value ranges from -.343 to –0.39 while bone density bears r_s values from .192 to .434. It would be therefore reasonable to interpret the assemblages from these features are a result of taphonomic processes.

Feature 6, 9, and 22 had element distributions a little varied although more or less consistent with Stanford's (1976) general categorization of economically viable elements. These features however produced FUI and bone density graphs too scattered to rely on correlative relationships (see Figures 6.48, 6.54, 6.93). It is therefore impossible to pinpoint the cause of the assemblages from these features, and external factors such as dogs, taste preferences, or storage can also be attributing to the faunal record here.

Feature 11 bears a strong negative correlation with FUI, and a weak negative correlation with bone density (Figures 6.59 and 6.60). From the element distribution graph (see Figure 6.58) it would seem that the pattern reflected is one of economic utility, excluding the abundance of the cuboid bone. It is therefore surprising to see a strong negative correlation with FUI (i.e. r_s = - .462). Furthermore, Feature 11 is dominated by the cuboid, followed by the fibula, both having relatively high densities. The weakly negative correlation with density (r_s = -.036) is also surprising. It would therefore seem that external factors are dominating the nature of the faunal material from Feature 11.

The *karigi*, Feature KA, presents weakly negative correlations with both FUI and bone density (see Figures 5.41 and 5.42). The baccula has no measured FUI or density value, so is not included in either of the graphs. To interpret KA as a result of either FUI or bone density is too difficult based on the weak correlations (r_s = -.088 for FUI and r_s = -.042 for bone density) and thus if KA is a *karigi,* then the patterns seen may be the result of cultural factors.

Features NHG, 7, 10, 13, 14, 15, 16, 18, 19 and 23 all contained too little information to produce coherent graphs. The FUI and bone density scatter plots produced did not give any strong correlations and the few that did were based a small number of elements recovered from those features (see Table 6.3). No conclusions based on these correlations were possible, and the lack of material may be due to the nature of the site (i.e. tent rings are more exposed to natural elements and animals than semi-subterranean features) or due to shorter occupancy of the site. It is also possible that consumption of food was done mostly outside of the tents leaving little or no faunal material associated with the feature itself.

Site PaJs-3 as a whole produced a negative correlation with FUI and a strongly positive correlation with bone density (see Figures 6.101 and 6.102). Despite the smaller sample size, and the absence of clear data from several sites, the assemblages from PaJs-3 seem to be the result of taphonomic processes. There is definite evidence of external variables playing a role in shaping the seal assemblage at this site.

6.5. PaJs-4: Fall whaling camp

PaJs-4 Feature #1

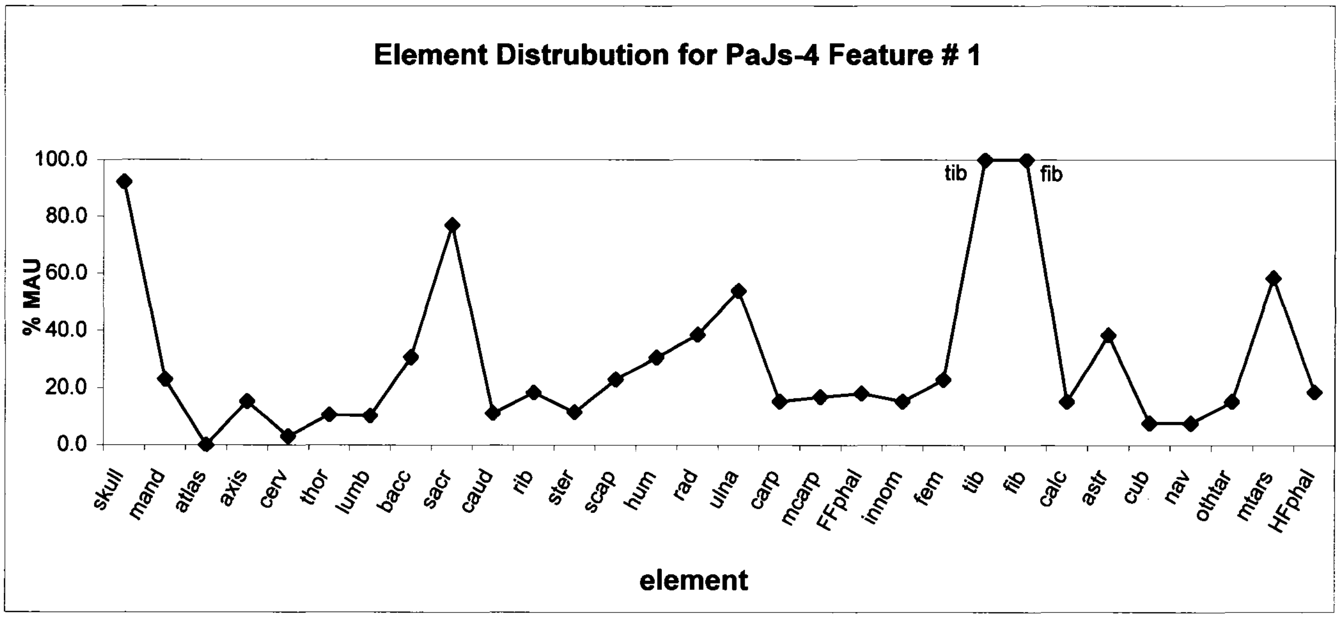

Figure 6.103. Element distribution for PaJs-4 Feature 1.

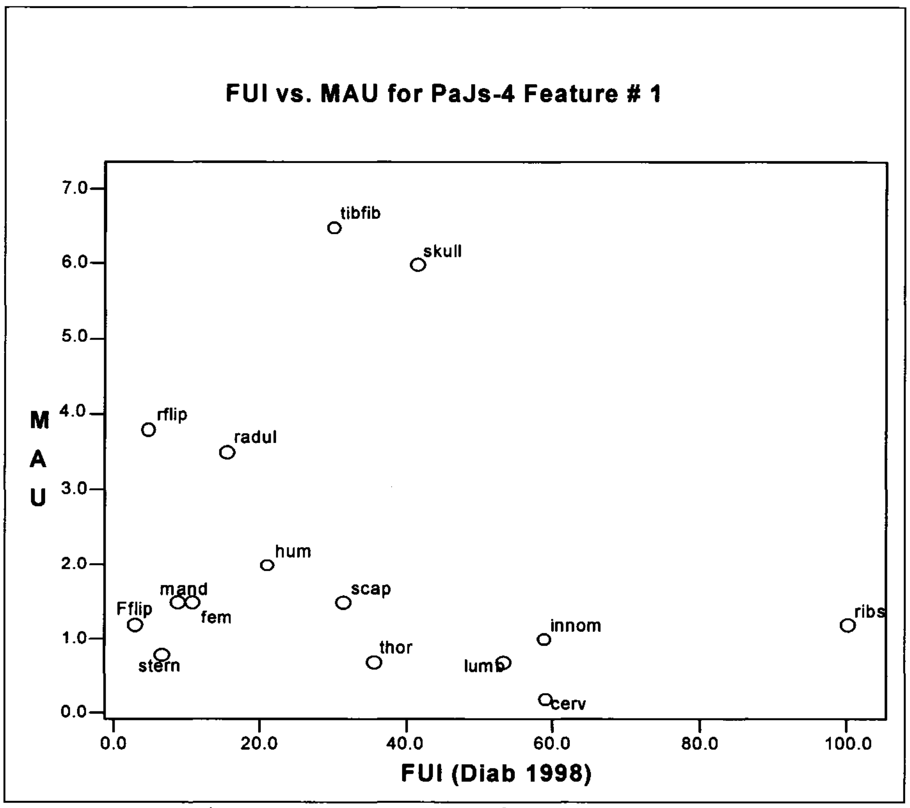

Figure 6.104. FUI vs. MAU for PaJs-4 Feature 1.

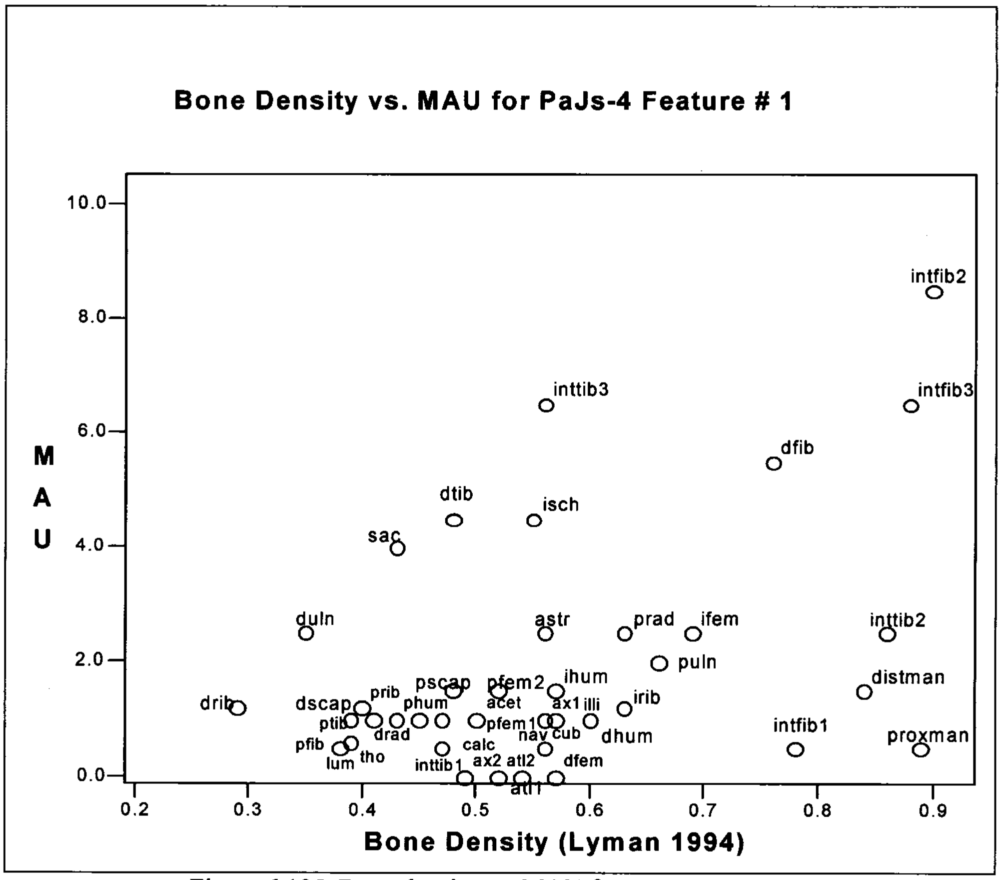

Figure 6.105. Bone density vs. MAU for PaJs-4 Feature 1.

PaJs-4 Feature #2

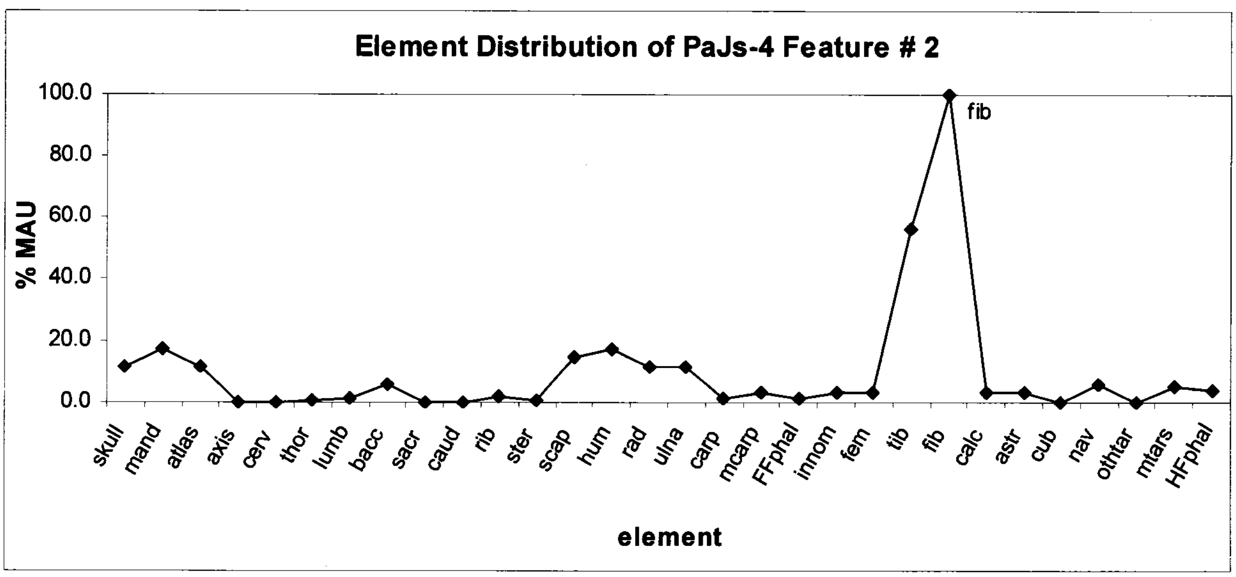

Figure 6.106. Element distribution for PaJs-4 Feature 2.

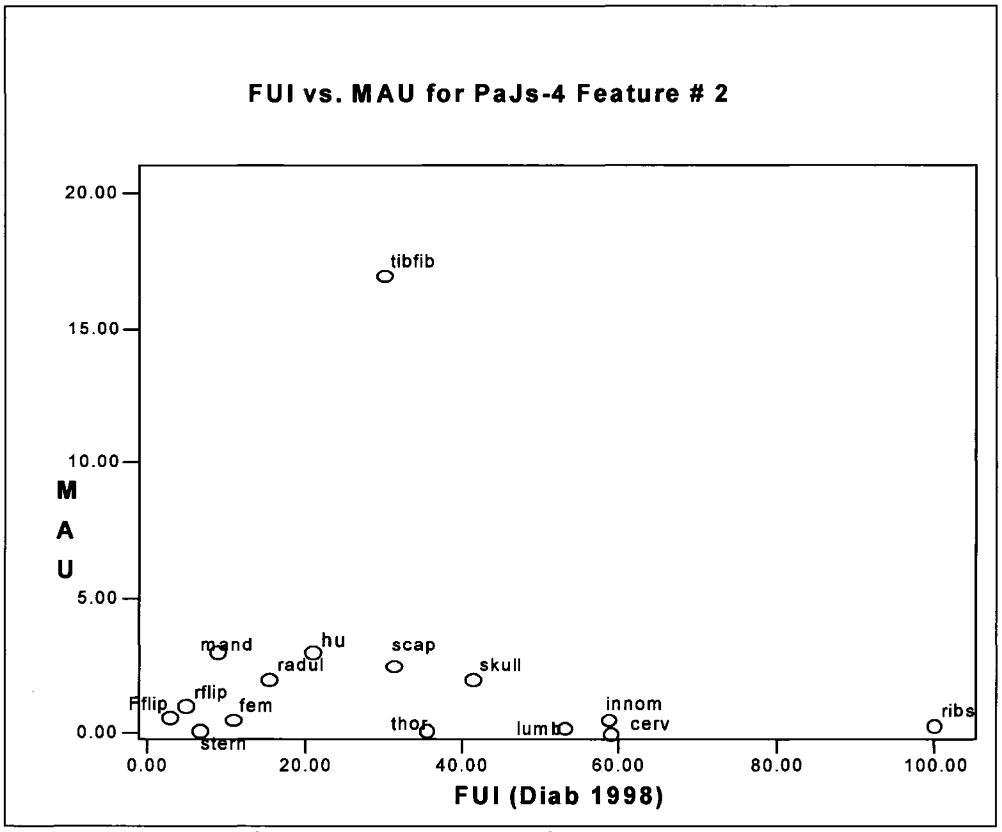

Figure 6.107. FUI vs. MAU for PaJs-4 Feature 2.

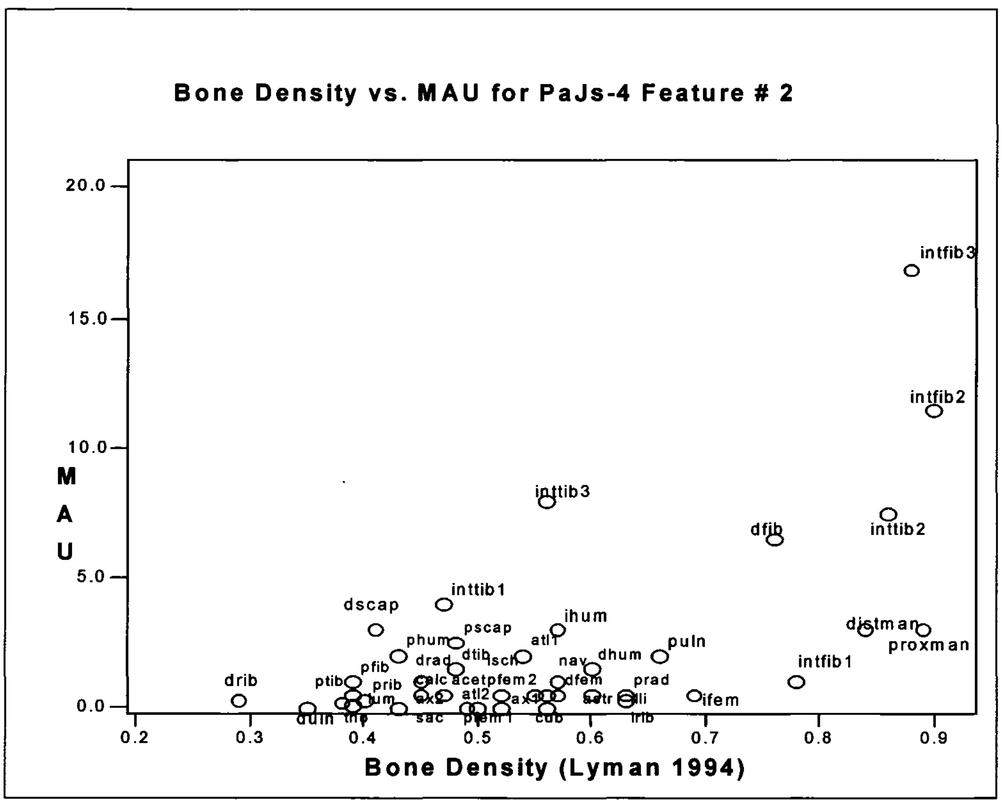

Figure 6.108. Bone density vs. MAU for PaJs-4 Feature 2.

PaJs-4 Feature #3

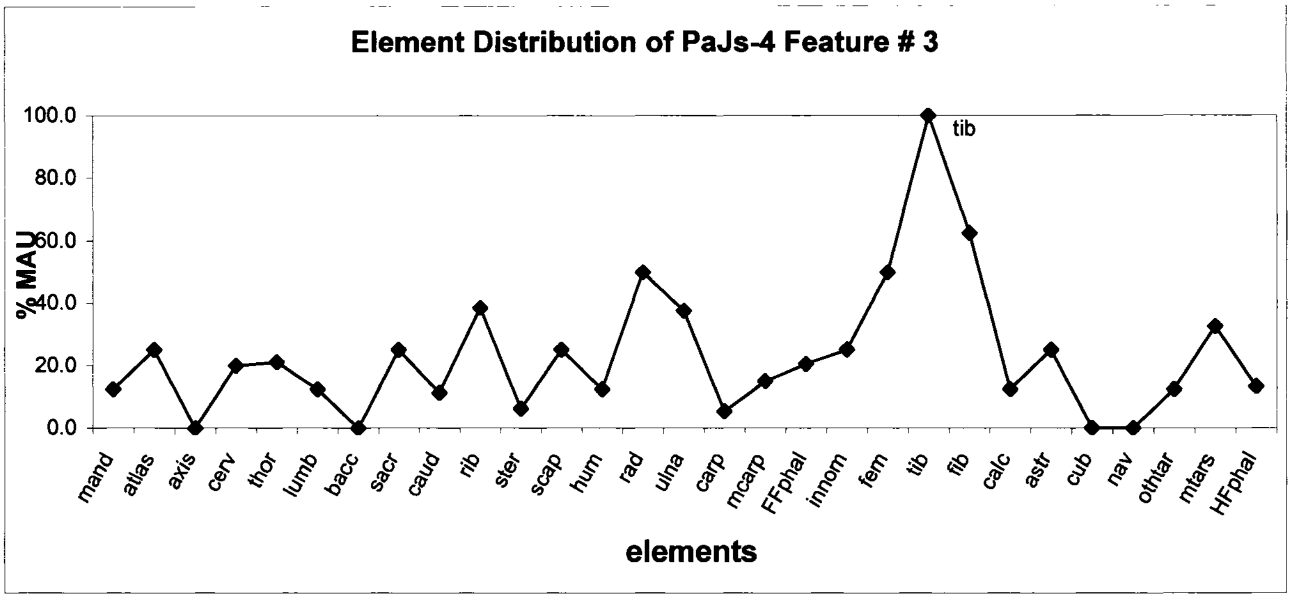

Figure 6.109. Element distribution for PaJs-4 Feature 3.

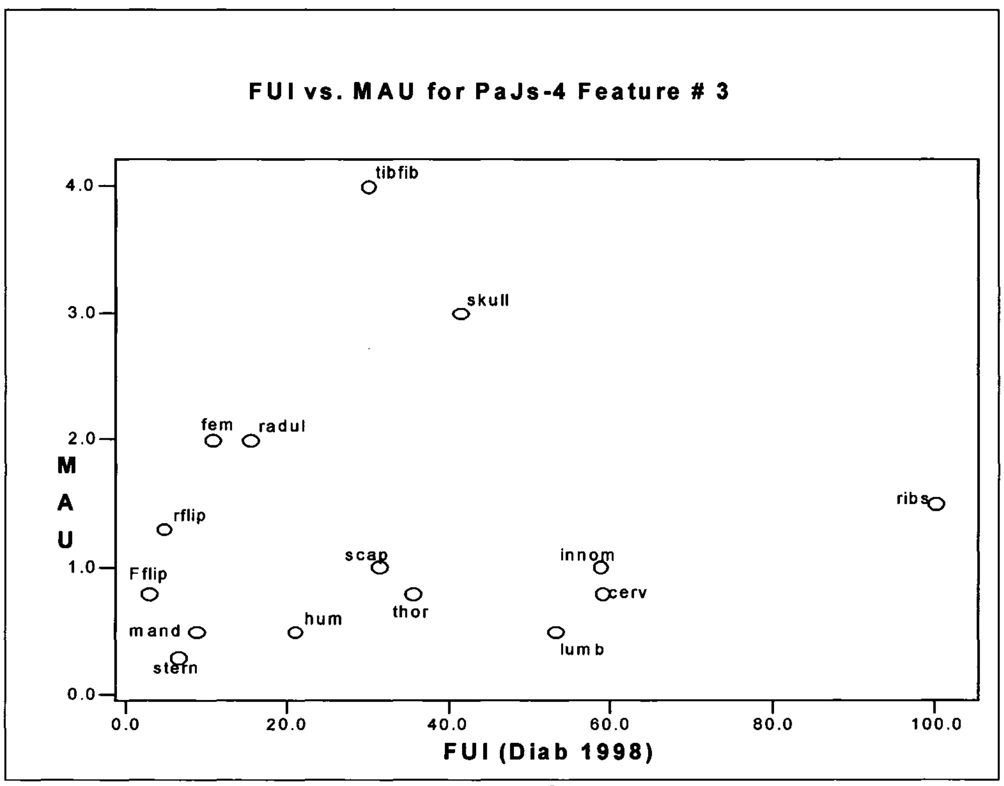

Figure 6.110. FUI vs. MAU for PaJs-4 Feature 3.

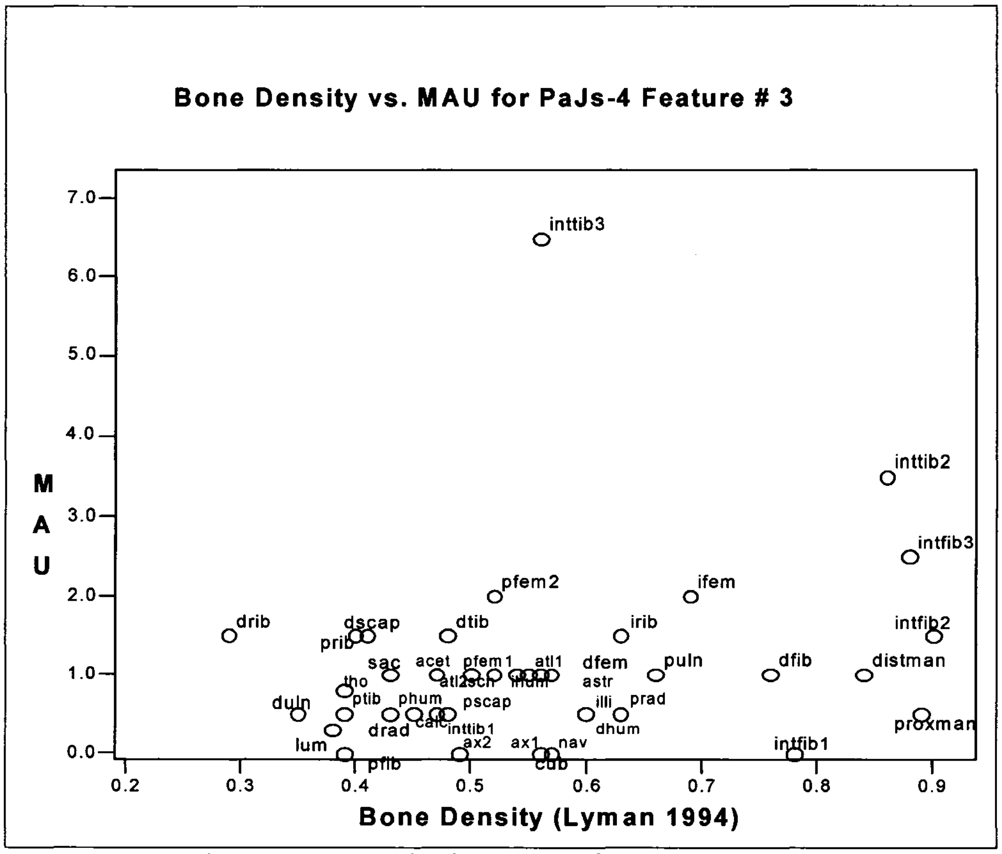

Figure 6.111. Bone density vs. MAU for PaJs-4 Feature 3.

PaJs-4 Feature #4

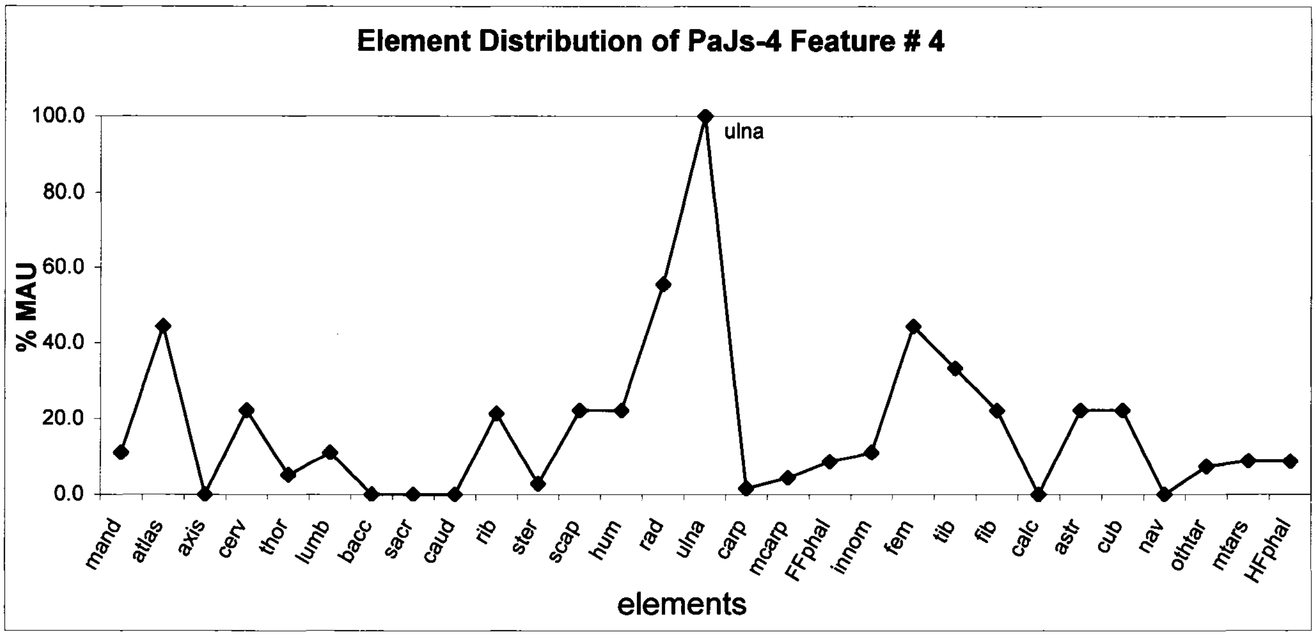

Figure 6.112. Element distribution for PaJs-4 Feature 4.

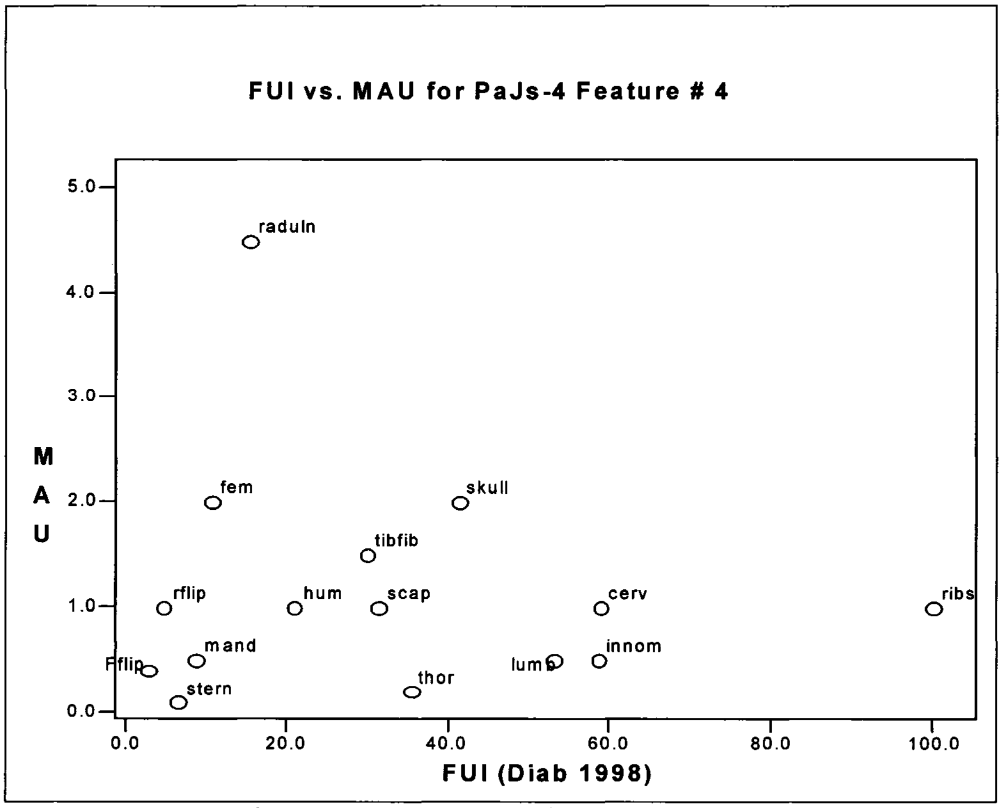

Figure 6.113. FUI vs. MAU for PaJs-4 Feature 4.

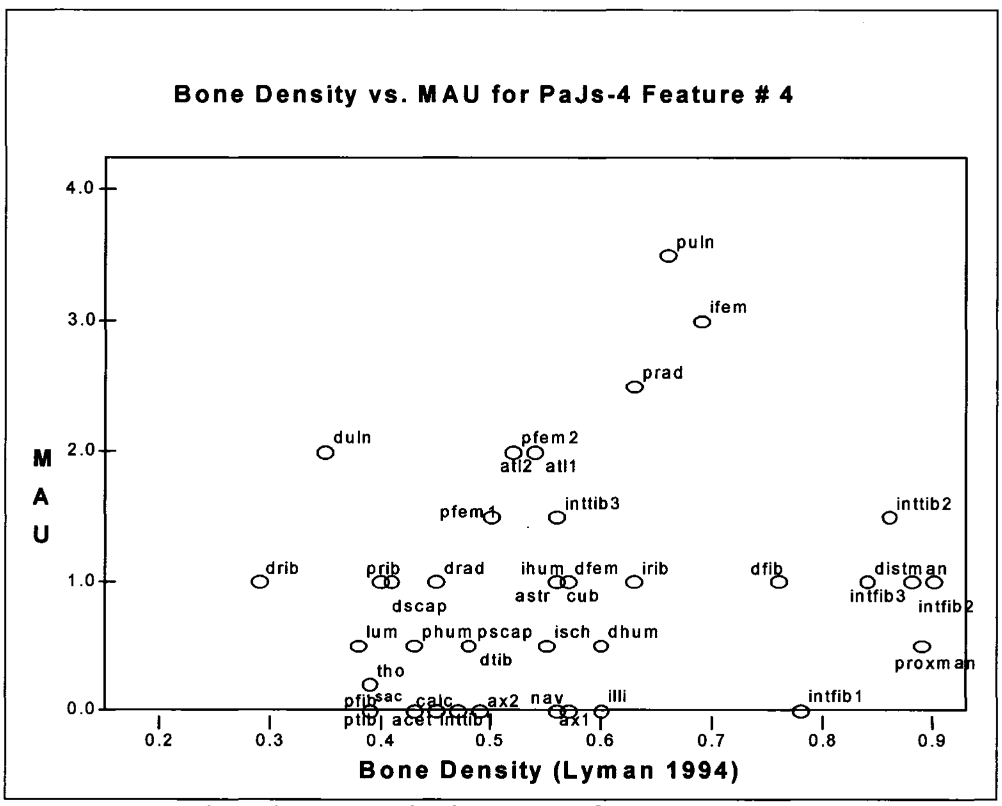

Figure 6.114. Bone density vs. MAU for PaJs-4 Feature 4.

PaJs-4 Feature # 5

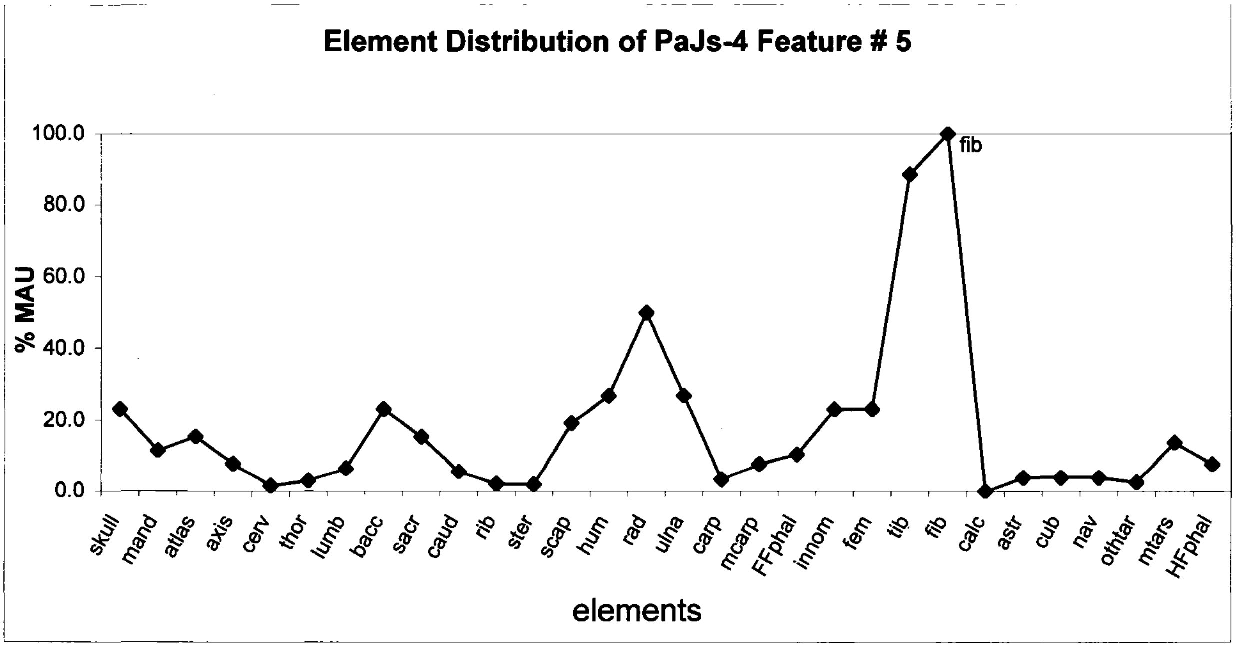

Figure 6.115. Element distribution for PaJs-4 Feature 5.

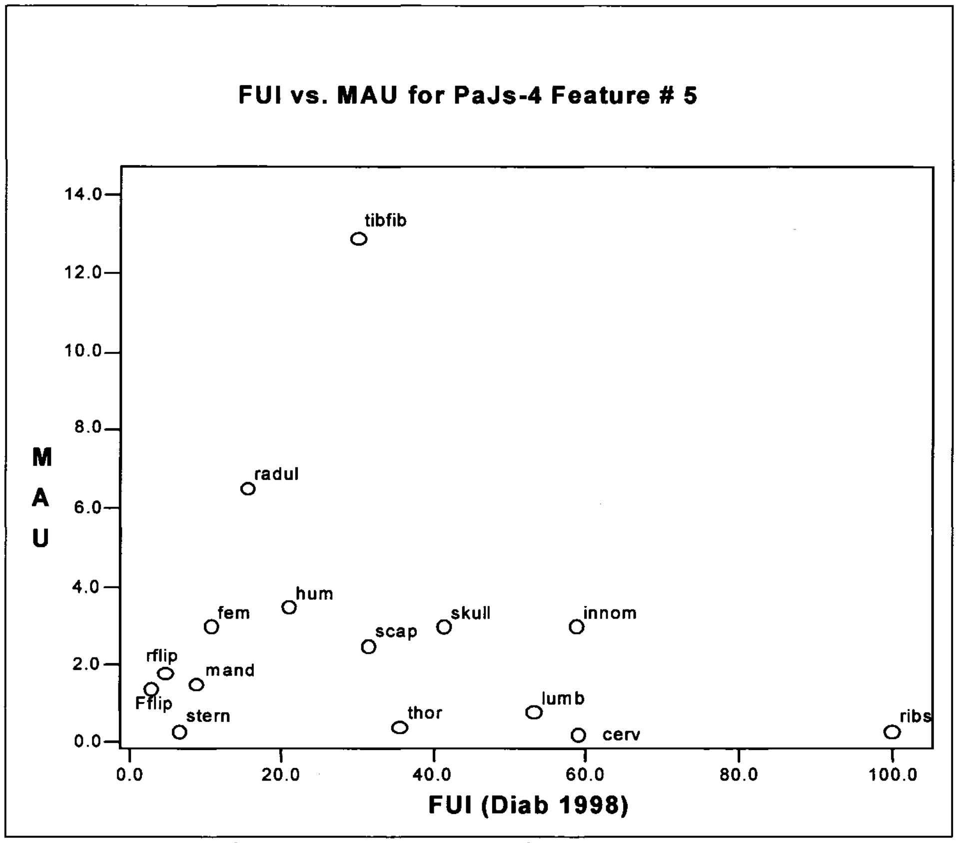

Figure 6.116. FUI vs. MAU for PaJs-4 Feature 5.

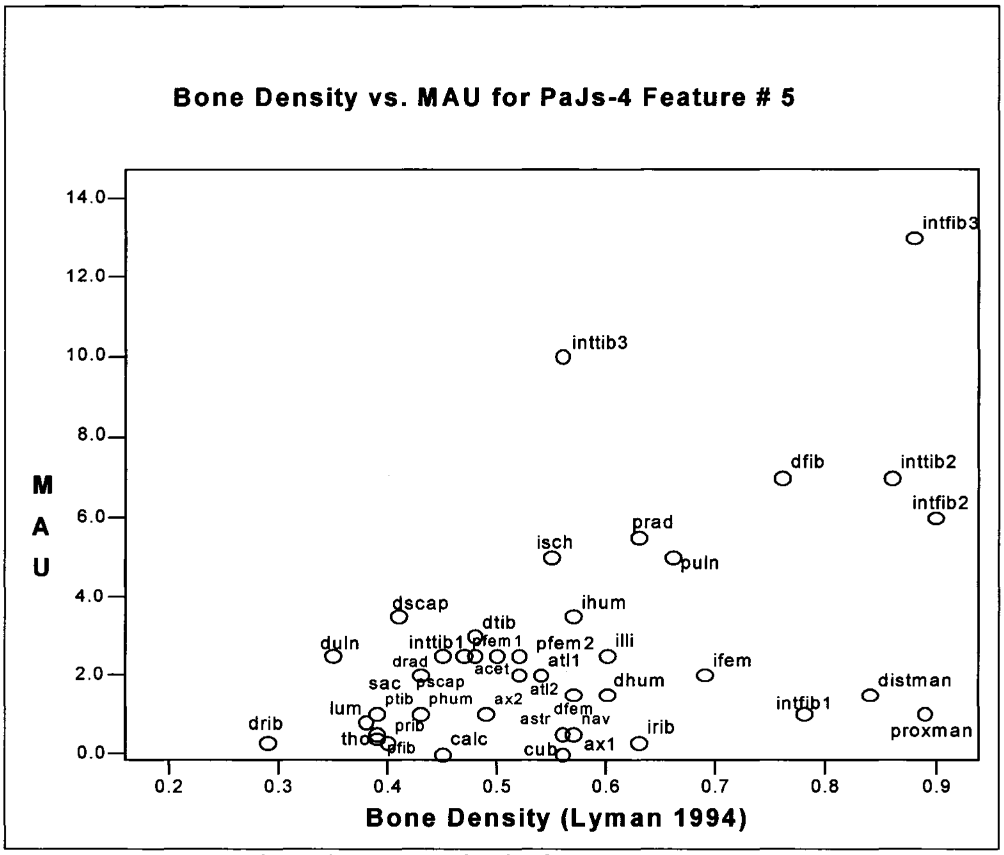

Figure 6.117. Bone density for PaJs-4 Feature 5.

PaJs-4 Feature #6

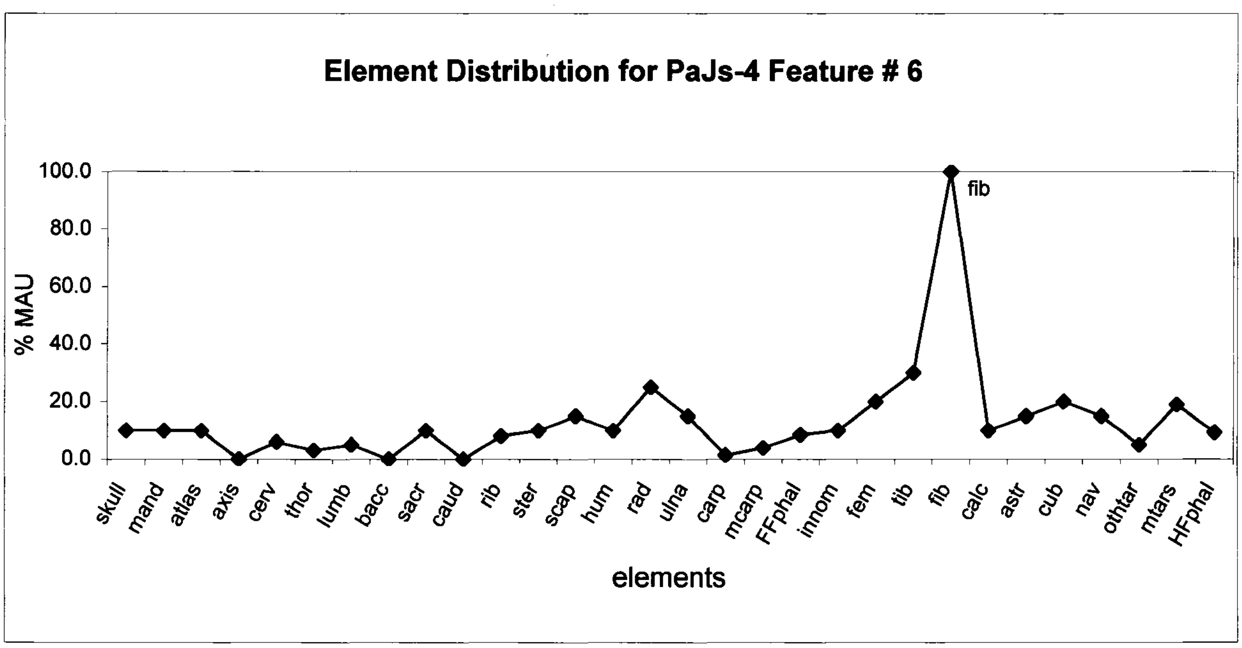

Figure 6.118. Element distribution for PaJs-4 Feature 6.

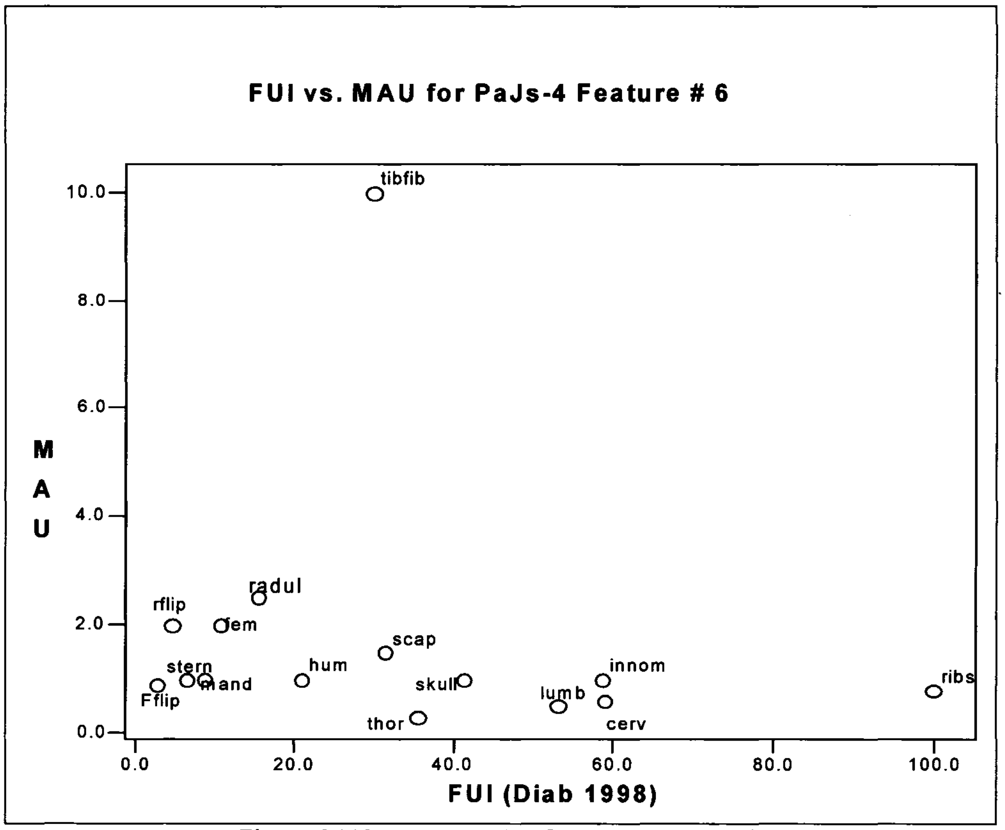

Figure 6.119. FUI vs. MAU for PaJs-4 Feature 6.

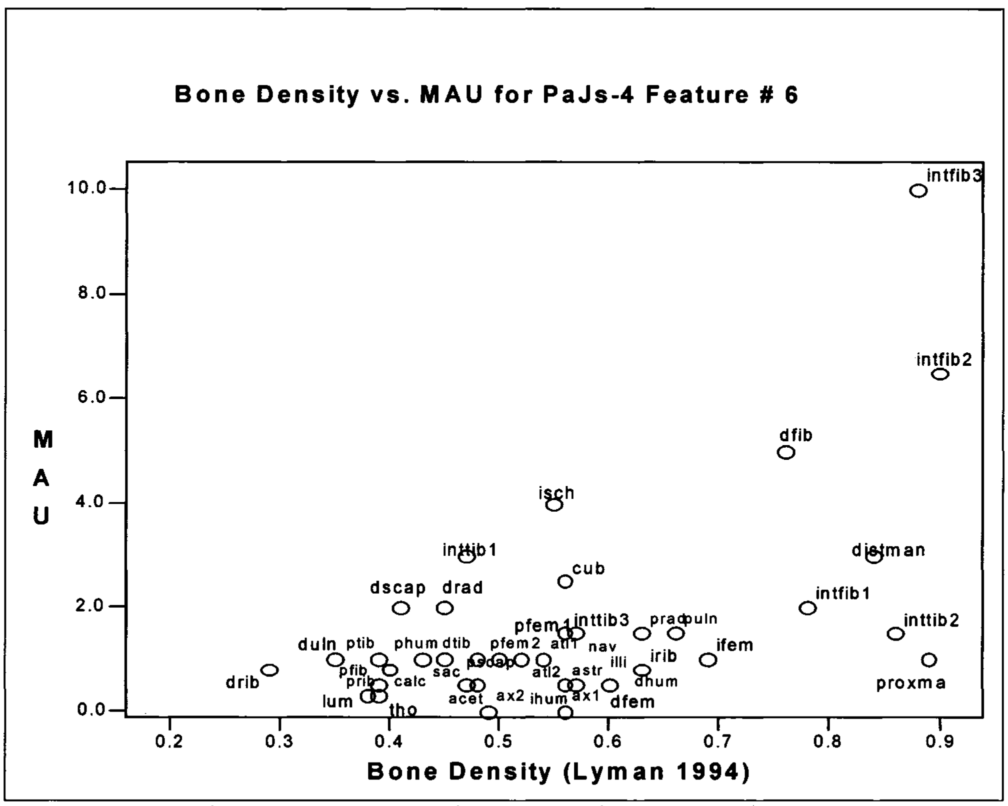

Figure 6.120. Bone density vs. MAU for PaJs-4 Feature 6.

PaJs-4 Feature #7

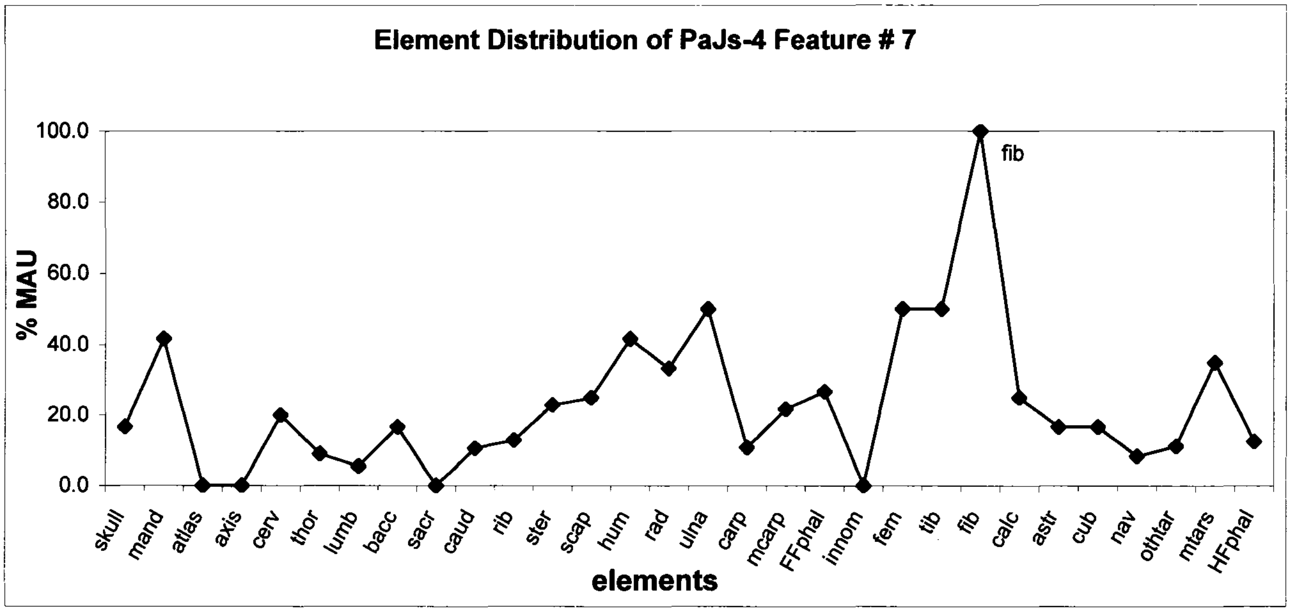

Figure 6.121. Element distribution for PaJs-4 Feature 7.

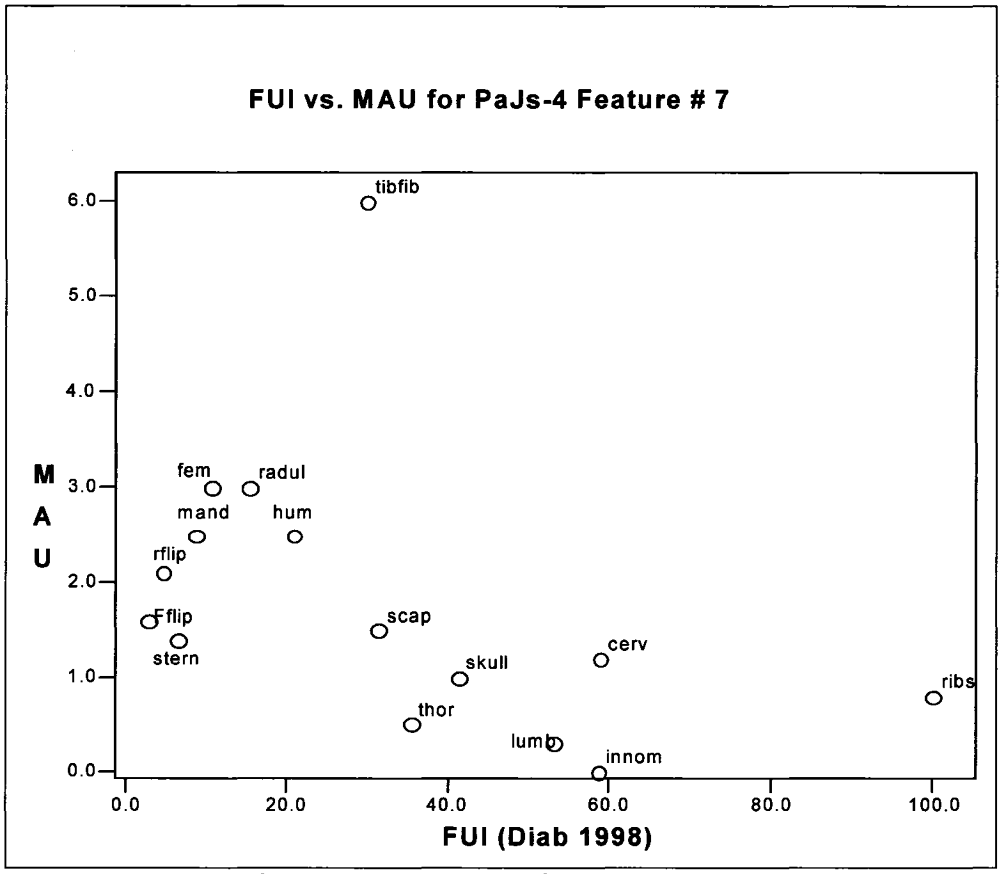

Figure 6.122. FUI vs. MUI for PaJs-4 Feature 7.

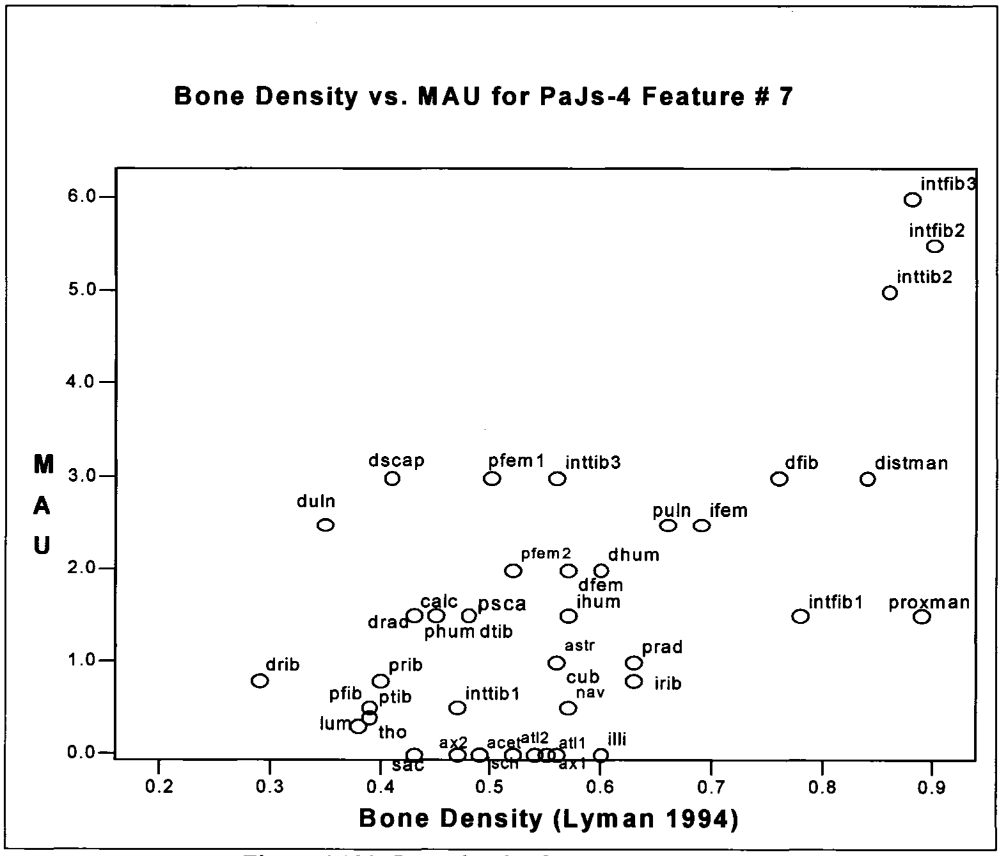

Figure 6.123. Bone density for PaJs-4 Feature 7.

PaJs-4 Feature #8

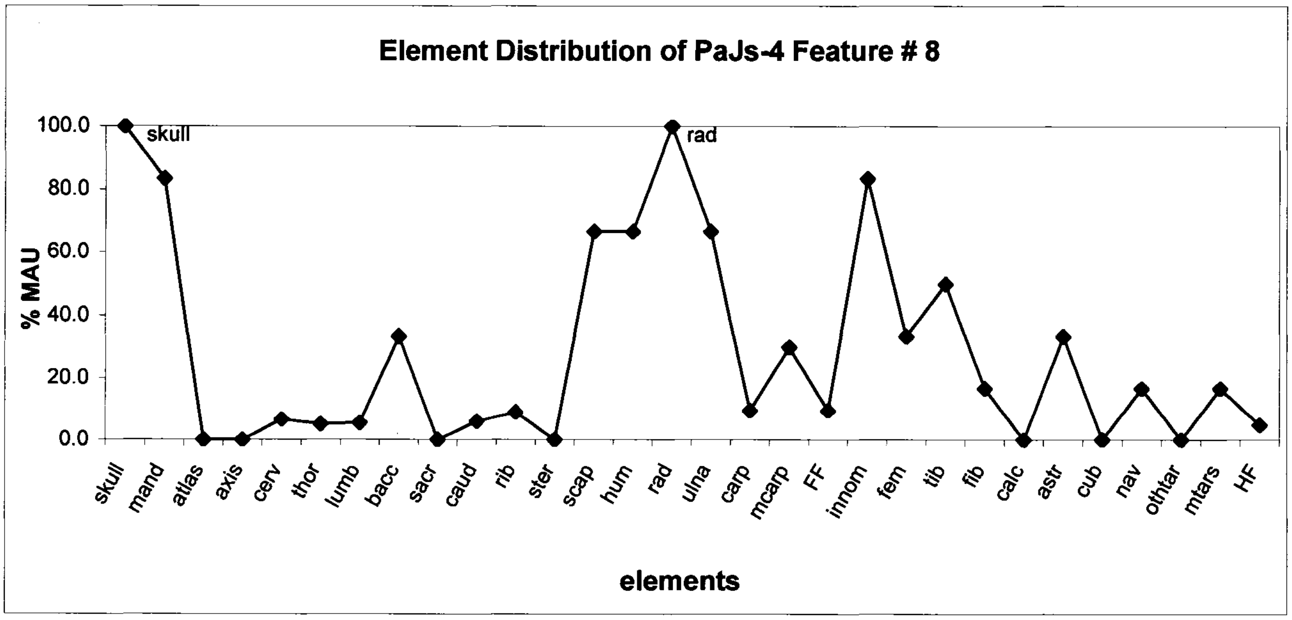

Figure 6.124. Element distribution for PaJs-4 Feature 8.

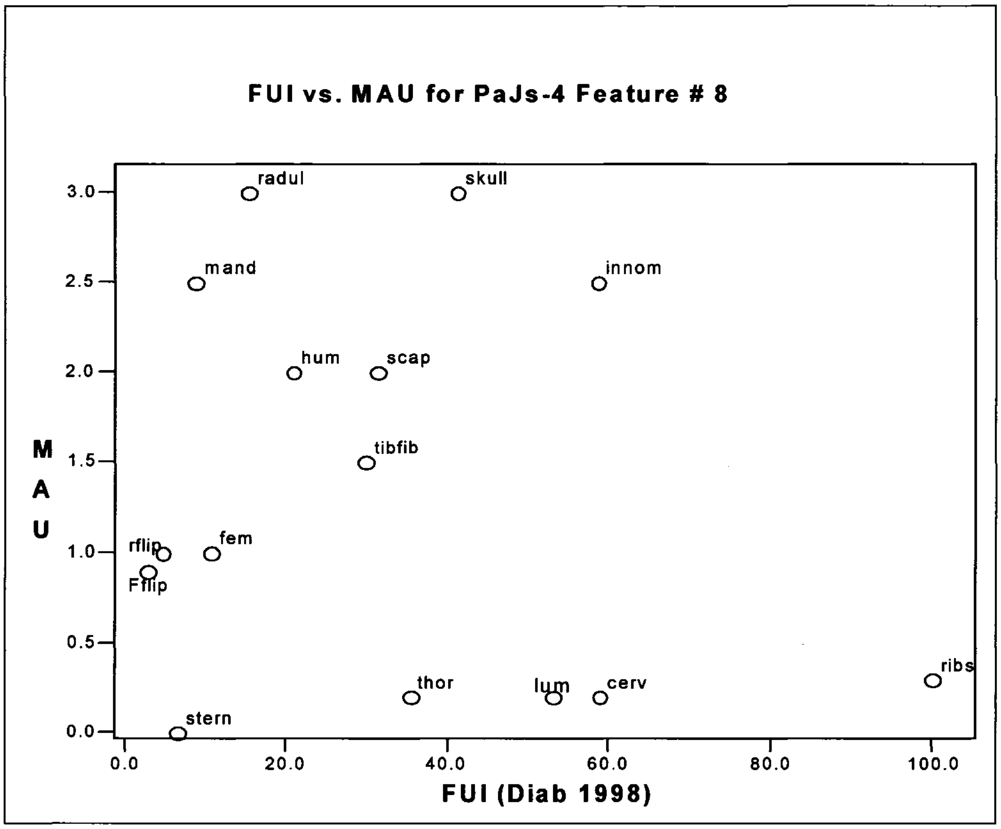

Figure 6.125. FUI vs. MAU for PaJs-4 Feature 8.

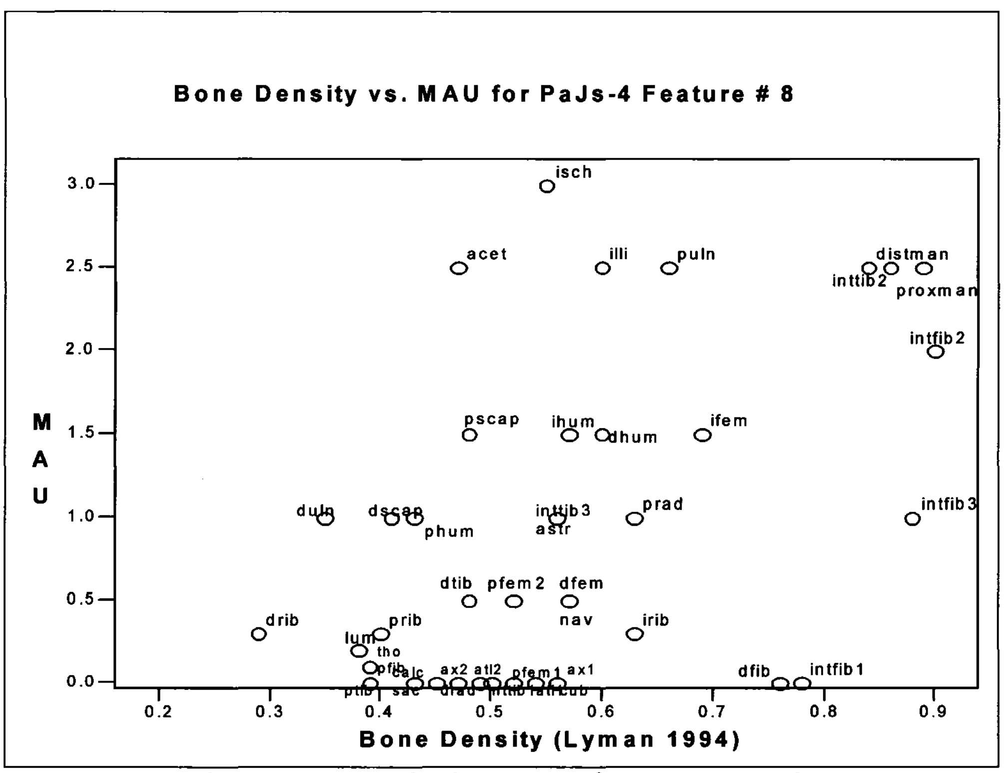

Figure 6.126. Bone density vs. MAU for PaJs-4 Feature 8.

PaJs-4 Feature #9

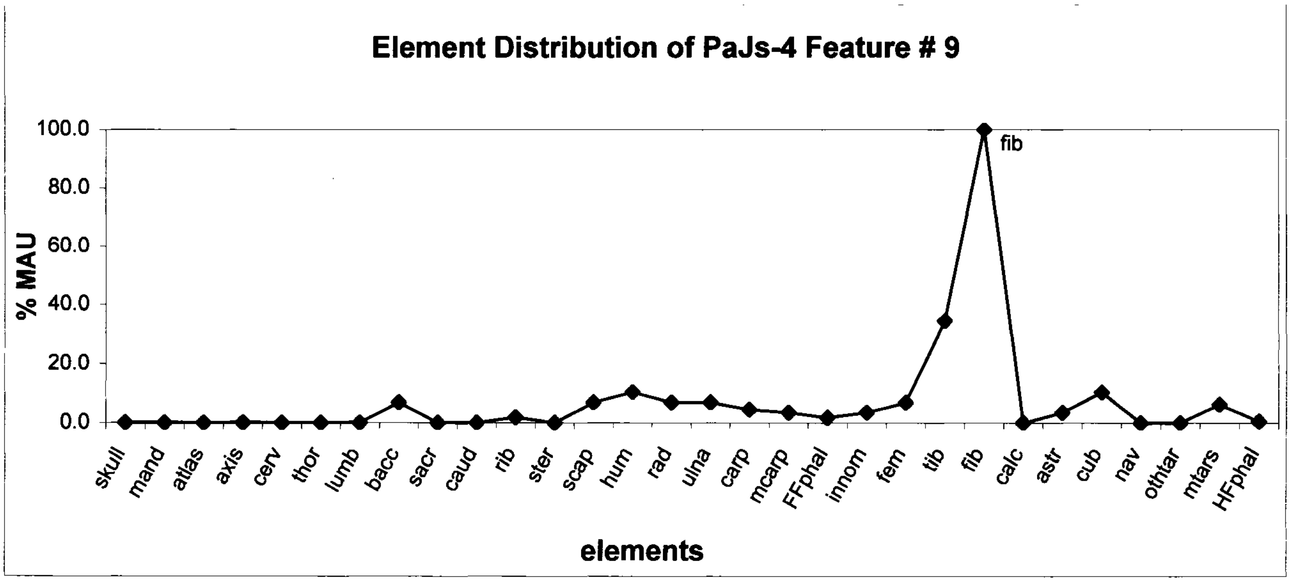

Figure 6.127. Element distribution for PaJs-4 Feature 9.

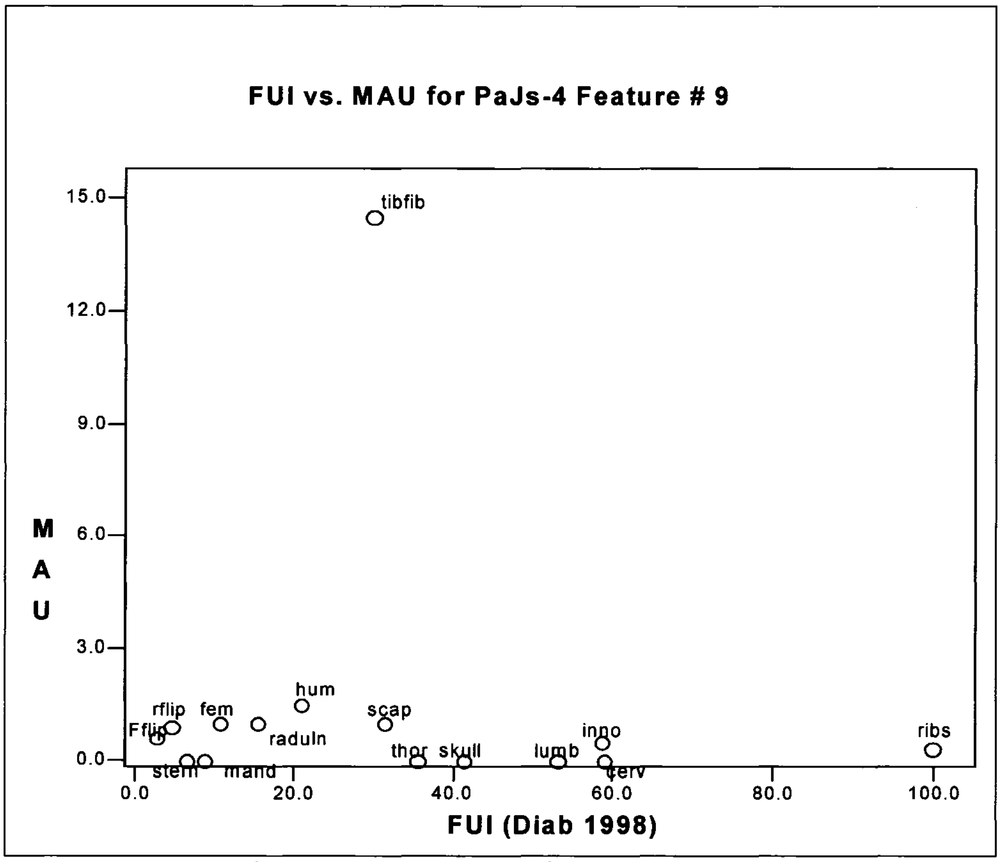

Figure 6.128. FUI vs. MAU for PaJs-4 Feature 9.

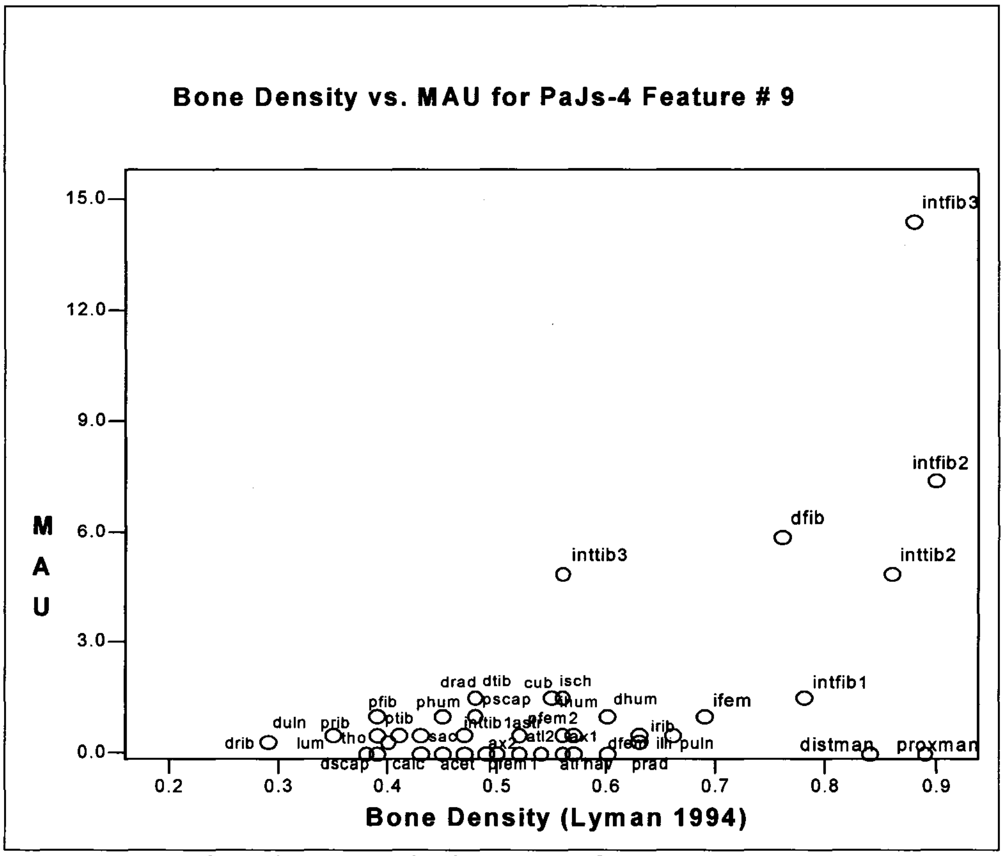

Figure 6.129. Bone density vs. MAU for PaJs-4 Feature 9.

PaJs-4 Feature #10

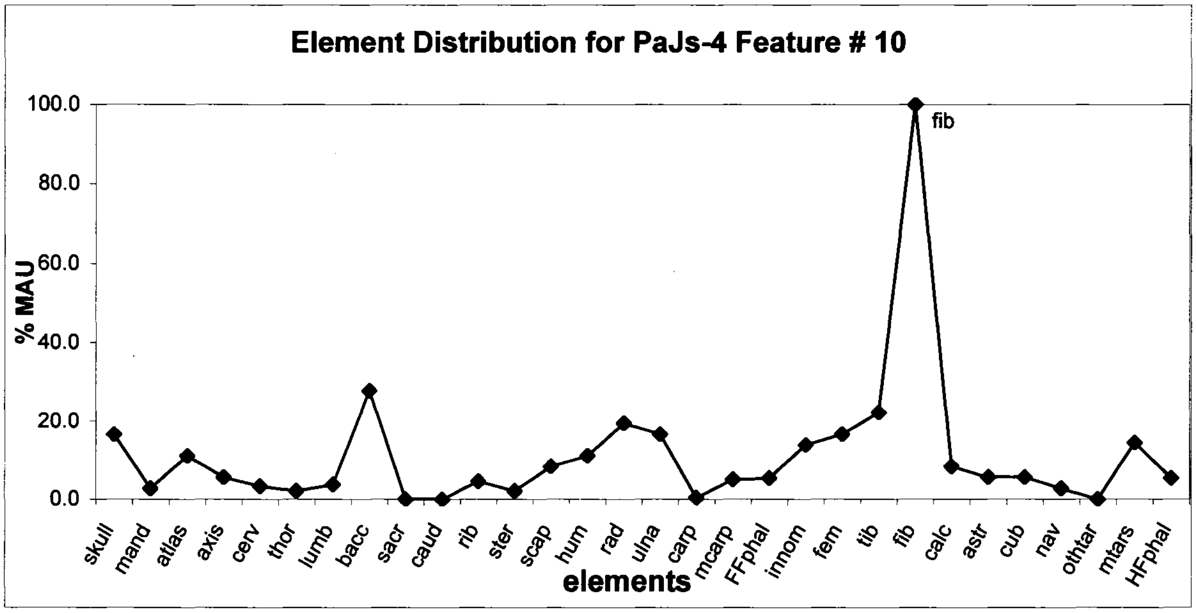

Figure 6.130. Element distribution for PaJs-4 Feature 10.

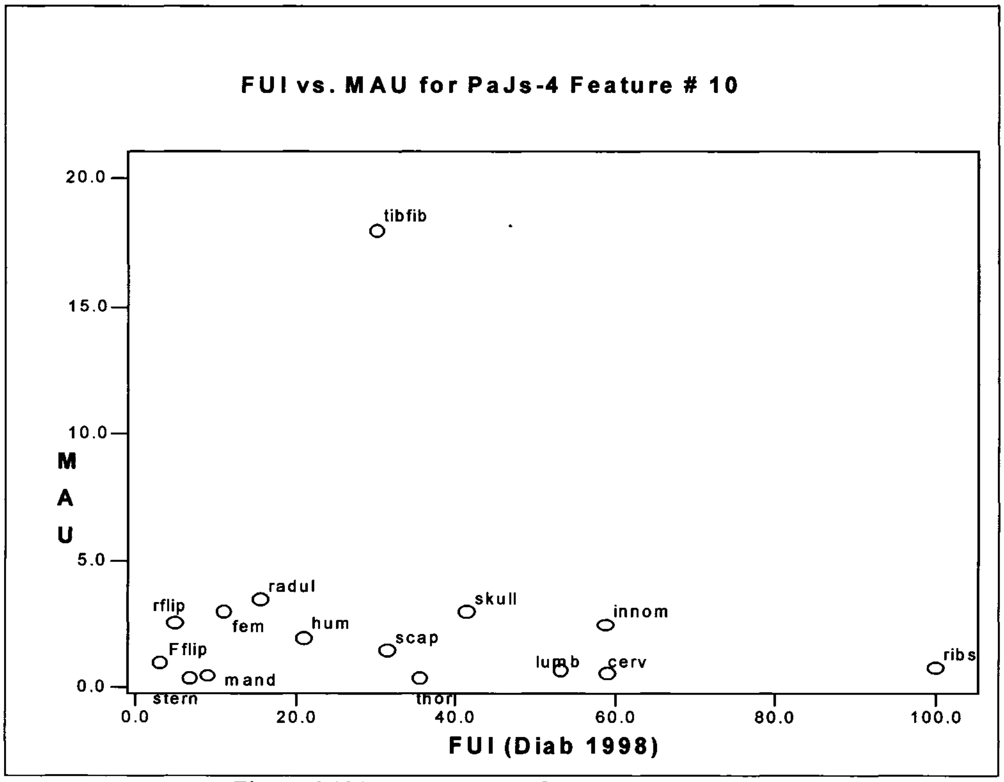

Figure 6.131. FUI vs. MAU for PaJs-4 Feature 10.

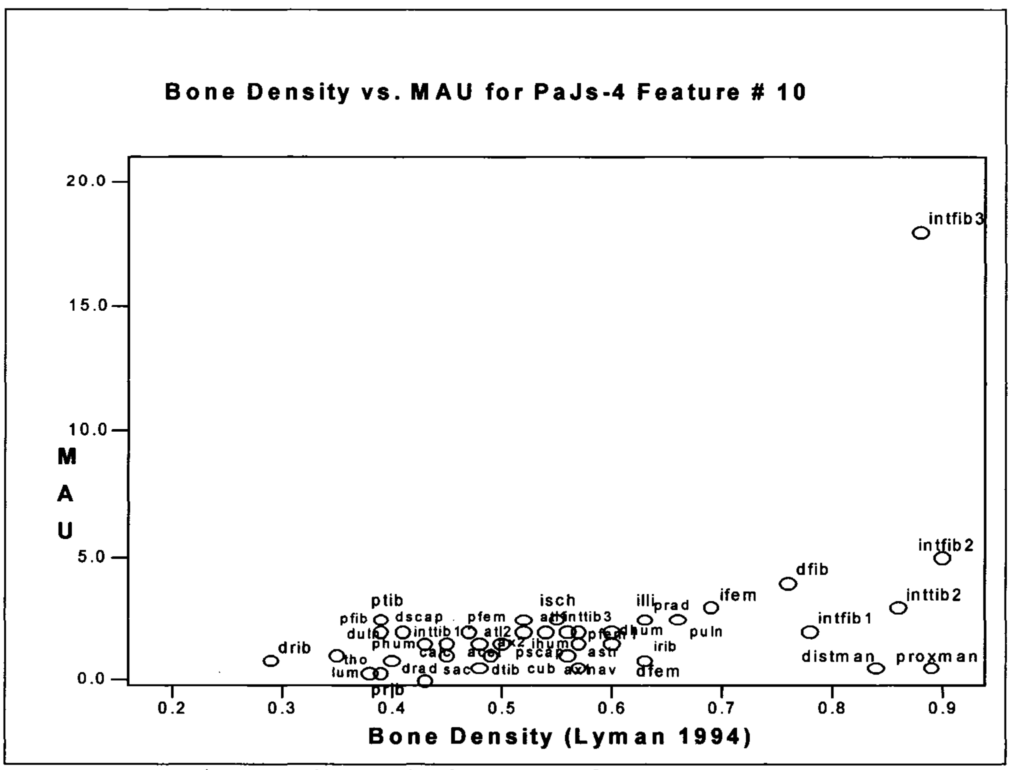

Figure 6.132. Bone density vs. MAU for PaJs-4 Feature 10.

PaJs-4 Feature #11

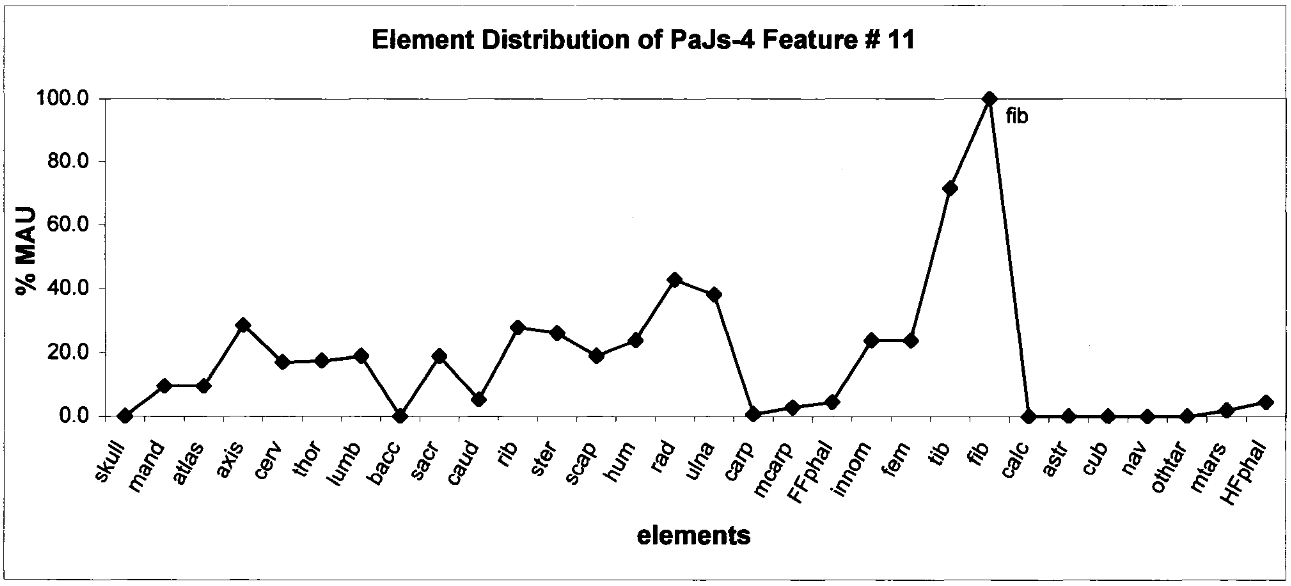

Figure 6.133. Element distribution for PaJs-4 Feature 11.

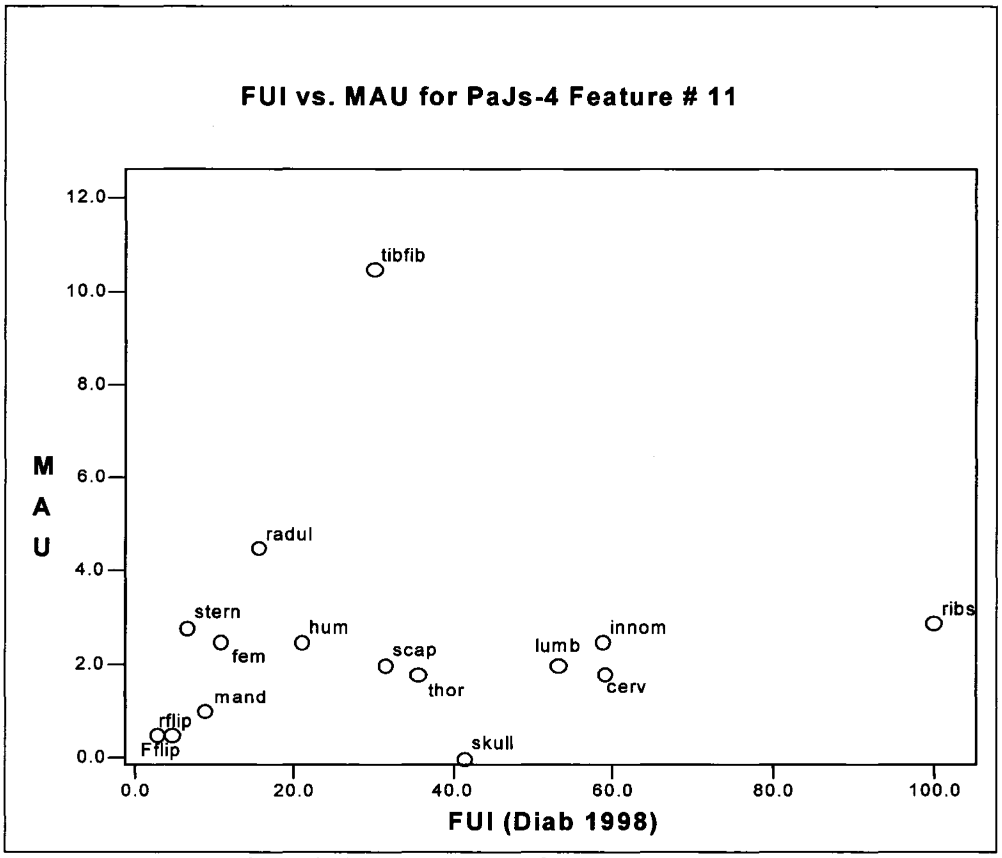

Figure 6.134. FUI vs. MAU for PaJs-4 Feature 11.

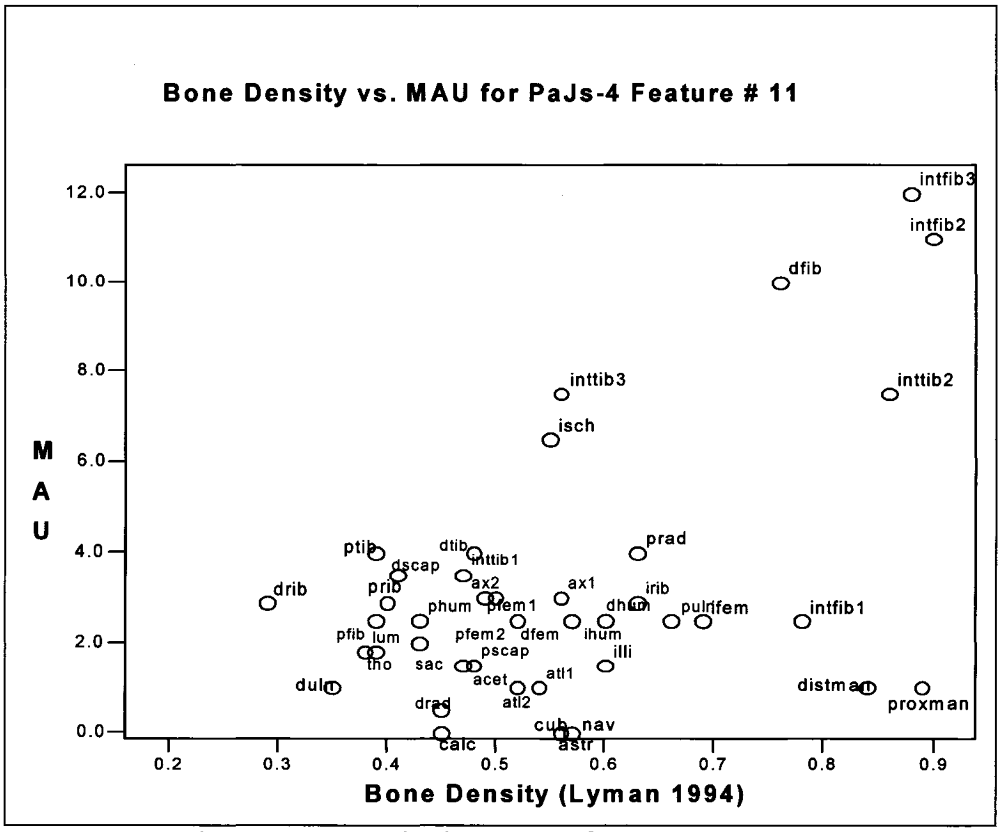

Figure 6.135. Bone density vs. MAU for PaJs-4 Feature 11.

PaJs-4 Feature #12 (Karigi)

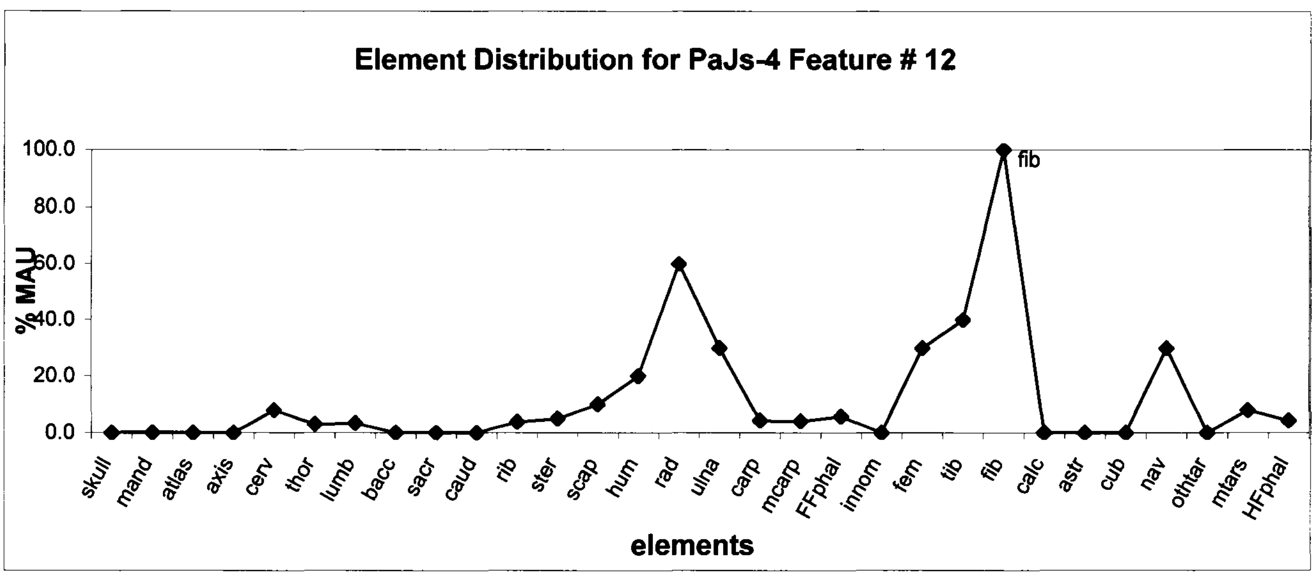

Figure 6.136. Element distribution for PaJs-4 Feature 12.

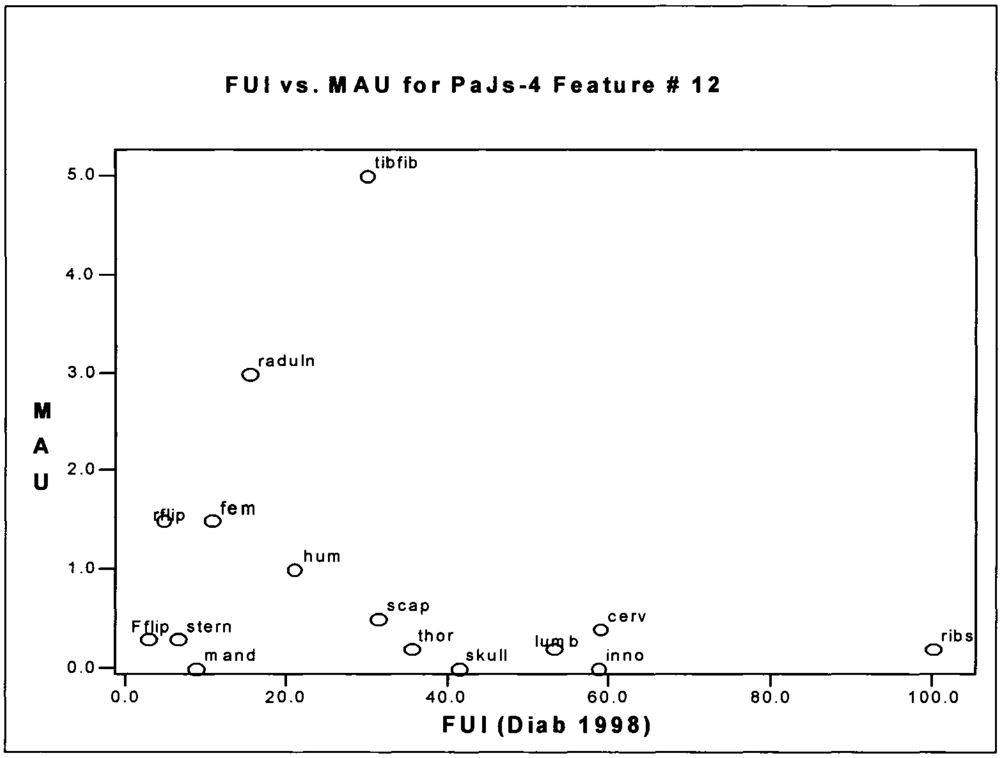

Figure 6.137. FUI vs. MAU for PaJs-4 Feature 12.

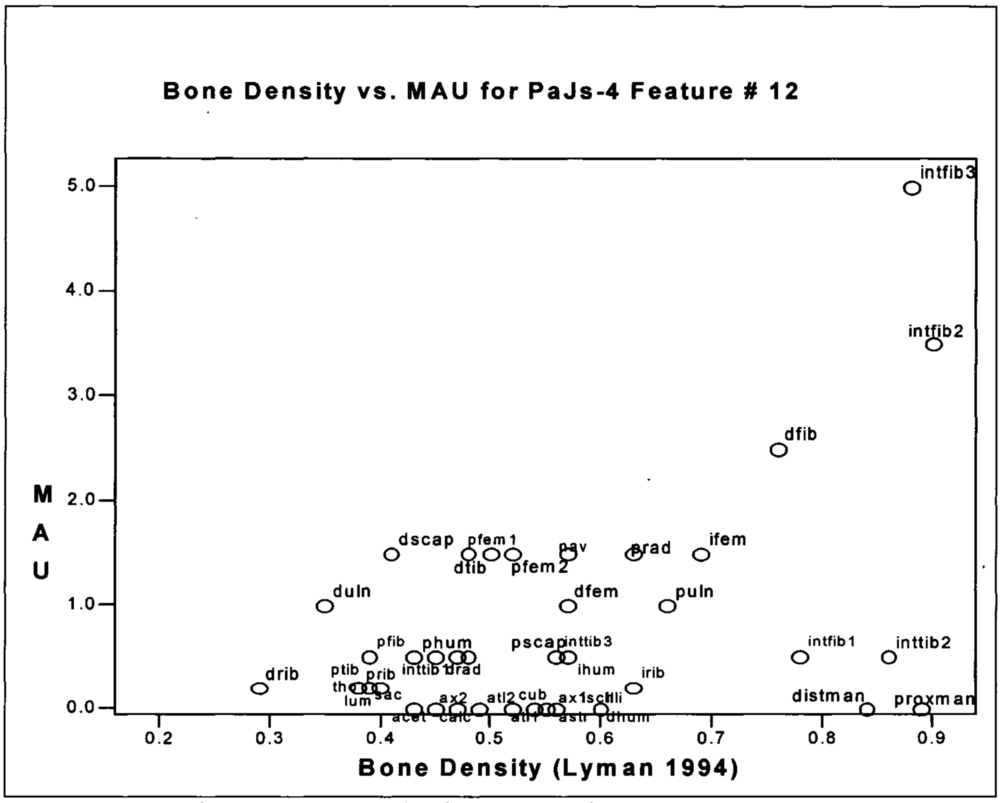

Figure 6.138. Bone density vs. MAU for PaJs-4 Feature 12.

PaJs-4 ALL Features

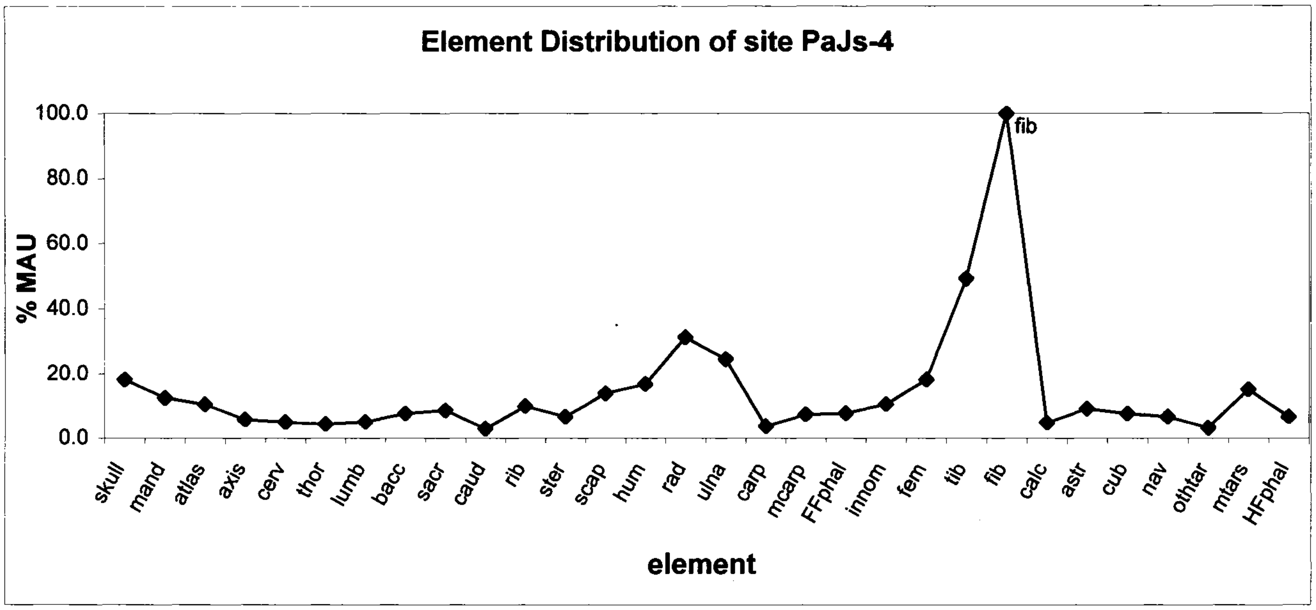

Figure 6.139. Element distribution for site PaJs-4.

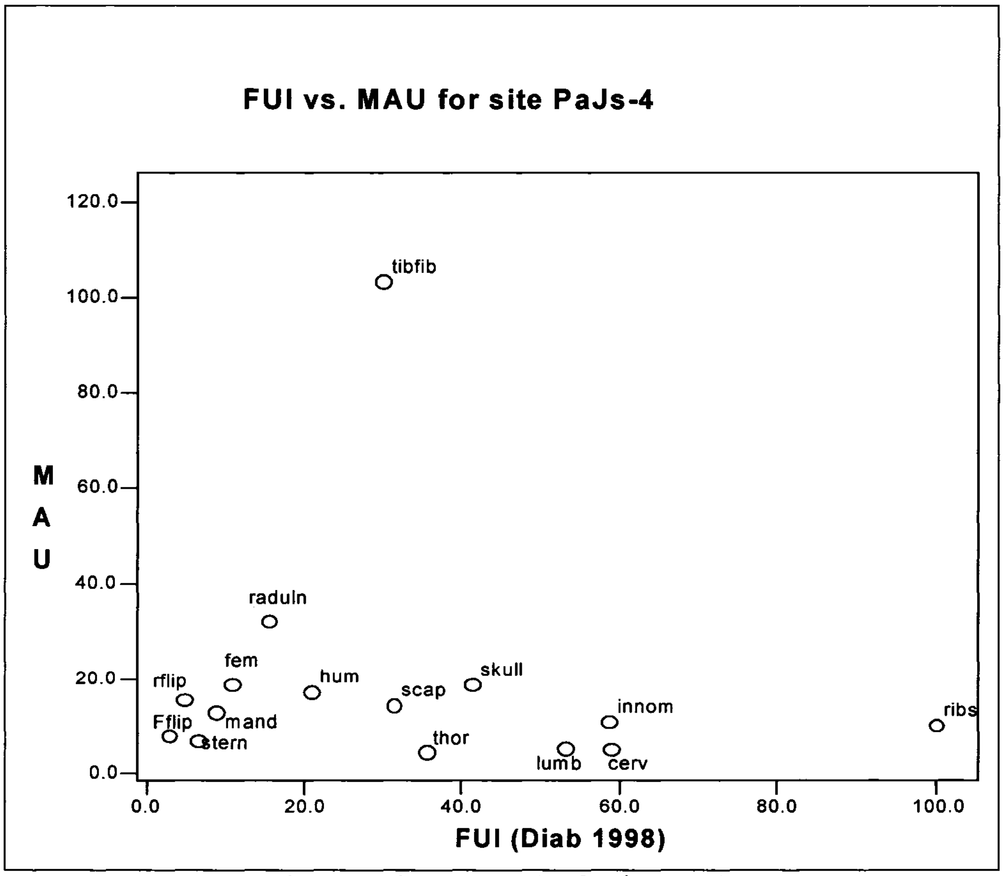

Figure 6.140. FUI vs. MAU for site PaJs-4.

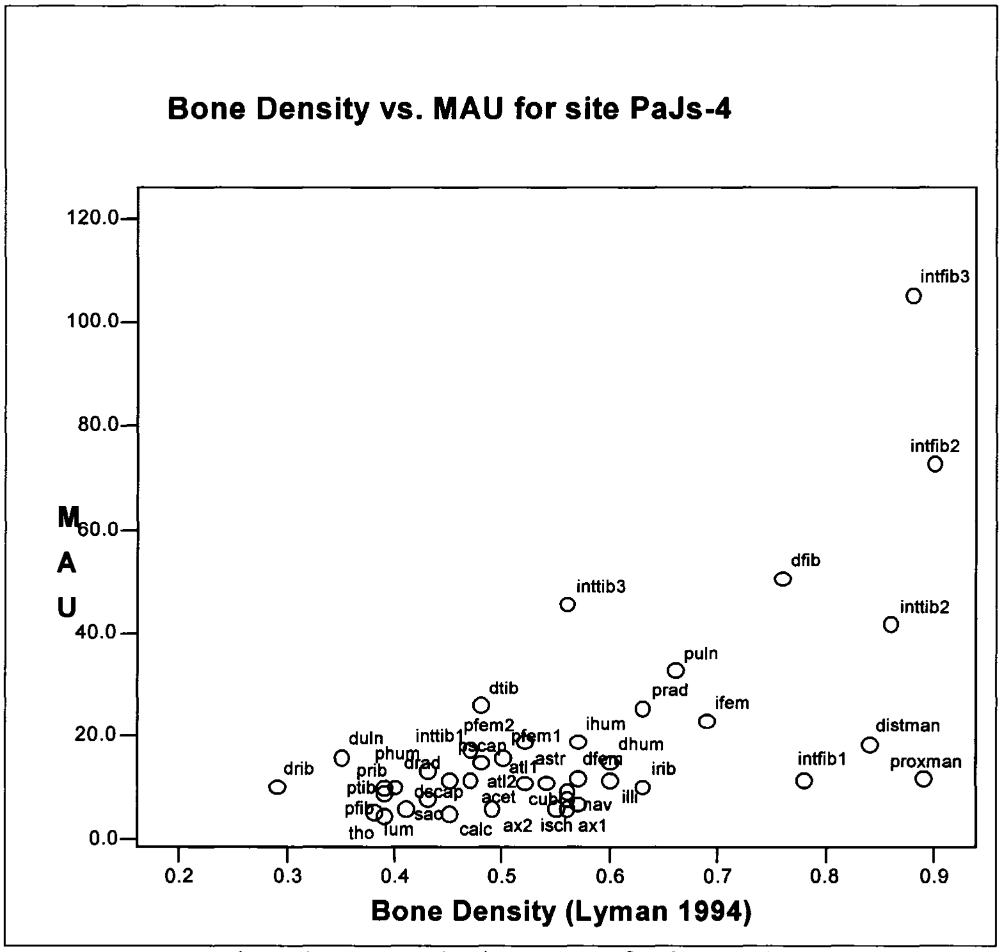

Figure 6.141. Bone density vs. MAU for site PaJs-4.

6.6. Analysis of PaJs-4:

Table 6.5 gives NISP and MNI values derived for PaJs-4 while Table 6.6 provides Spearman's rho values.

Table 6.5. NISP and MNI values for PaJs-4

Feature	NISP	MNI
PaJs-4-1	614	8
PaJs-4-2	243	18
PaJs-4-3	313	5
PaJs-4-4	219	5
PaJs-4-5	452	16
PaJs-4-6	396	11
PaJs-4-7	456	7
PaJs-4-8	298	4
PaJs-4-9	190	16
PaJs-4-10	398	20
PaJs-4-11	450	12
PaJs-4-12	120	6
PaJs-4 (all features aggregated)	4,149	104

Table 6.6. Spearman's rho values for FUI and bone density graphs for PaJs-4.

Feature	FUI	Bone Density
PaJs-4-1	r_s = - .355 (p =.193)	r_s = .263 (p =.093)
PaJs-4-2	r_s = - .332 (p =.227)	r_s = .471 (p =.002)
PaJs-4-3	r_s = .164 (p =.559)	r_s = .207 (p =.188)
PaJs-4-4	r_s = .132 (p =.640)	r_s = .269 (p =.085)
PaJs-4-5	r_s = - .201 (p =.473)	r_s = .360 (p =.019)
PaJs-4-6	r_s = - .453 (p =.090)	r_s = .389 (p =.011)
PaJs-4-7	r_s = - .633 (p =.011)	r_s = .428 (p =.005)
PaJs-4-8	r_s = - .059 (p =.834)	r_s = .429 (p =.005)
PaJs-4-9	r_s = - .278 (p =.316)	r_s = .286 (p =.066)
PaJs-4-10	r_s = - .088 (p =.756)	r_s = .397 (p =.009)
PaJs-4-11	r_s = .176 (p =.530)	r_s = .181 (p =.251)
PaJs-4-12	r_s = - .377 (p =.166)	r_s = .158 (p =.318)
PaJs-4 (all features aggregated)	r_s = - .265 (p =.341)	r_s = .550 (p =.000)

6.6.1. Element distribution for PaJs-4

PaJs-4 is a fall whaling camp with all twelve features identified as qarmats. Feature 12 has also been identified as a *karigi* (Savelle and Wenzel 2003). In total, an NISP of 4149 ringed seal comprise the data for this site (see Table 6.5).

All of the features in PaJs-4 displayed incredible consistency with its most abundant elements as fibulae or ulna-radii, with few head elements represented except for Features 1 and 8.

Features 1 and 8 are consistent with Stanford's (1976) suggestion of choice seal elements. Although Feature 1 has a significant abundance of sacrae, the remaining vertebrae are once again under-represented (see Figure 6.103. Feature 8 is also under-represented by vertebrae elements and also comprises of a fair amount of podials (see Figure 6.124). Again, the podials are easily explained by the possibility of the entire flipper remaining articulated during transport.

Features 2 and 9 have a particular pattern in which only fibula is highly represented at 100% frequency, with no other element represented over 20% (Figures 6.106 and 6.127). Vertebrae are absent from Features 2 and 9, and only minor amounts of scapulae, humeri, and ulna-radii are present. It seems as though only choice elements are present in these features. As Savelle (1984) has discussed, the upper trunk of the seal was commonly removed before storage, and perhaps these features reflect consumption of stored food. Features 2 and 9 may also represent *karigit*.

Features 3, 4, 5, 7, 10 and 11 are very similar in that they are abundant in both front and rear flippers with varying amounts of head and vertebrae elements. These parts are all economically important.

According to Savelle and Wenzel (2003), Feature 12 at PaJs-4 represents a *karigi*. The elements represented at Feature 12 are front and rear flippers. The pattern seen in Figure 6.136 suggests only prime elements are present in this feature, except for an unusual amount of navicular bones. The navicular has a relatively high bone density and may have been originally present as a 'rider'. Aside from the navicular, Feature 12 seems to support the evidence of representing a *karigi*.

Site PaJs-4 as a whole tends to bear the same pattern as a *karigi*. Figure 6.139 presents a site predominated by fibulae, with smaller amounts of front flipper elements, and an even lesser representation of head elements. PaJs-4 is difficult to interpret. It seems as though only prime elements are introduced into the site. Diab (1998) suggests that the tibio-fibula is the most popular portion of the seal based on taste preferences of the Inũpiut, and may therefore be another plausible consideration for PaJs-4.

One clear pattern that is reappearing in PaJs-4 is the under-representation of vertebrae elements. This may indicate a village consuming mostly stored food.

6.6.2. FUI vs. MAU and bone density vs. MAU for PaJs-4

Features 1, 2, 5, 6, 7, 8, 9 and 10 presents negative correlations with FUI. The r_s value ranges from strongly negative correlations of r_s = - .633 to weakly negative correlations of r_s = - .059 (see Figures 6.104, 6.107, 6.116, 6.119, 6.122, 6.125, 6.128 and 6.131) (also see Table 6.6 for correlative data). Furthermore, these features all have positive correlations with bone density with r_s values ranging from .263 to .471 (see Figures 6.105, 6.108, 6.117, 6.120, 6.123, 6.126, 6.129 and 6.132). By comparing the patterns displayed by the FUI and bone density graphs, it is obvious that taphonomy is the dominant factor shaping the faunal record in these features.

Features 3, 4 and 11 are all weakly positively correlated with FUI and bone density (see Figures 6.110, 6.111, 6.113, 6.114, 6.134 and 6.135). Although front and rear flippers are in abundance, these features seem to have scattered element distribution patterns. For FUI, the r_s values range from .132 to .176, whereas the bone density r_s values range from .181 to .269. These values are too similar to dictate true correlations with either FUI or bone density and external factors cannot be ruled out.

For the *karigi*, Feature 12, there is a negative correlation with FUI (r_s = - .377) and a positive correlation with bone density (r_s = .158) (see Figures 6.137 and 6.138). The latter value is not significant enough to draw concise conclusions. However, the significant negative correlation with FUI suggests that bone density is the dominating factor.

PaJs-4 displays a consistent pattern seen amongst PaJs-13 and PaJs-3. PaJs-4 has a negative correlation with FUI (r_s = -.265) and a strong positive correlation with bone density (r_s = .550) (see Figures 6.140 and 6.141). It is therefore acceptable to conclude that once again taphonomy is the major factor shaping the faunal record at this site.

6.7. Discussion

The objective of this study was to determine the nature of seal remains from three seasonally different Thule sites in Hazard Inlet, Somerset Island. The first goal was to determine if the assemblages from the sites were a result of differential butchering and transport, taphonomic processes, or if external factors could be affecting the assemblages. The above discussions considered variability within each site in an attempt to explain differences observed between the features. The data presented confirmed the presence of ceremonial features at PaJs-13 and PaJs-4, and suggested a *karigi* at PaJs-3.

Tables 6.7 and 6.8 provide data comparing the three sites.

Table 6.7. Summary of NISP and MNI values for all three sites.

Bone Counts	PaJs-13	PaJs-3	PaJs-4
NISP	25, 841	5,259	4,149
MNI	245	30	104

Table 6.8. Summary of Spearman's rho values for the three sites.

Site	FUI	Bone Density
PaJs-13	r_s = .111 (p=.694)	r_s = .333 (p =.031)
PaJs-3	r_s = - .213 (p=.446)	r_s = .574 (p =.000)
PaJs-4	r_s = - .265 (p =.341)	r_s = .550 (p =.000)

PaJs-13 had element distribution patterns dominated by front and rear flippers. Some features had better than average representation of head elements, and the sacrum was dominant in at least two of the features. Feature 5 had clear indication of choice elements being introduced into this feature, and alongside other evidence presented by Savelle and Habu (2004), Feature 5 was defined as a *karigi*. The element distribution patterns suggested economic explanations based on Stanford's (1976) categorization of elements expected at residential sites.

The FUI and bone density graphs posed a different scenario for PaJs-13. Overall, it was found that PaJs-13 was negatively correlated with FUI and positively correlated with bone density. This would lead to conclude that taphonomy was the main factor responsible for shaping the faunal record at PaJs-13. External factors were suggested based on evidence from some of the features. The under-representation of vertebrae suggested the presence of dogs, and the over-representation of some unexpected elements, such as the sacrum, may indicate taste preferences or the presence of 'riders'.

PaJs-3, the summer/early fall camp, consisted of three sod features, and 22 tent rings. Immediately, it was evident that PaJs-3 was much more variable in its element distribution than PaJs-13. PaJs-3 also suffered from sampling variability with some features containing very few seal bones (refer to Table 6.3). Essentially, 5259 seal specimens were unevenly distributed across 25 features. As a result, the data from many features created incoherent patterns for FUI and bone density graphs. In turn, it was impossible to deduce a reliable explanation for these features.

The features that did contain enough data to produce readable patterns were also quite variable. Podials, and bacculae reappeared in several features as abundant elements, especially within the identified *karigi*. Head elements, front, and rear flippers were also well represented.

The FUI and bone density graphs were also variable. The general overall pattern of PaJs-3 followed PaJs-13 in that bone density was determined to be the dominant factor.

PaJs-4, the fall whaling camp, resembled PaJs-13 and PaJs-3 in that almost all of the features were positively correlated with bone density. Fibula tended to be the most abundant element, and was sometimes very over-represented when compared to the other elements. One important pattern observed with PaJs-4 was the general lack of head and vertebrae elements. Like PaJs-13, the *karigi* at PaJs-4 presented an element distribution graph exhibiting a recognizable pattern of only prime elements being present.

The second objective of the thesis was to determine if seasonal differences in the data on utility, FUI and external factors (i.e. presence of dogs, food storage, and taste preference) could be detected.

Based on the FUI and bone density analysis, there is strong evidence to conclude that taphonomy was the dominant factor shaping the assemblages at all three sites. All three sites bear strong positive correlation with bone density, and weak or negative correlation with FUI.

Seasonal differences affecting FUI and bone density graphs do exist between the sites. Whitridge (1992) has described PaJs-13 as having 'better than average preservation,' and the present study found PaJs-13 to be the 'least' correlated with bone density while PaJs-3 was the 'most' correlated. If considering length of occupation, tent rings are occupied for a lesser amount of time and produce less sod coverage than semi-subterranean features. It is therefore expected that summer/fall camps would be more susceptible to weathering agents than winter village camps.

Considering food preferences, it is difficult to assess whether or not there are seasonal differences. It may be that preferences change depending on season, with fatter portions preferred during the cold winter months. This is only speculation, and it is almost impossible to know if the faunal assemblages would record such variability. Cultural needs can also introduce further variability. We know from ethnographic accounts that seal blubber was used as oil for lamps that were continually lit throughout the winter months (Balikci 1970). Seal bladders were used as water containers, and skins were used for clothing, tents, and kayaks (Balikci 1970). Seasonal needs may alter which elements are more valuable when considering cultural uses as well as nutritional needs.

Food storage is another important factor that may create seasonal differences in the faunal assemblage. As previously mentioned, Park (1989) discussed summer storage of seals and Savelle (1984) mentioned that the upper trunk was commonly removed before storage. If food was processed in the summer for storage, than there should be an abundance of upper trunk elements in the summer site. If the stored food would have been consumed in the fall, then there should be a lack of head elements. This pattern generally exists where PaJs-3 has an abundance of head elements and the fall camp (PaJs-4) has almost no head elements. It is therefore possible that the fall camp was consuming stored seal.

The lack of vertebrae in all three sites may be due to the presence of dogs. It is possible that vertebrae were fed to the dogs. Further excavation of these sites may find an area where dogs were kept coinciding with an abundance of vertebrae elements.

Lastly, Park's analysis resulted in attributing the variability of the seal assemblages from Porden Point to differences in procurement locations. This would undoubtedly cause skews in all of the patterns produced in this thesis. Although the analysis presented in the present study used statistical values to draw conclusions, it is by no means ignoring outside cultural and natural variables that may alter the assemblages.

Overall, it can be concluded that taphonomy is a major factor controlling the seal assemblages at Hazard Inlet. The element distribution graphs suggested economic explanations although the FUI scatter plots gave no clear evidence of butchering and transport decisions. Other factors, namely dogs, food preference, and storage can also have an effect on the assemblages. Seasonal differences can be attributed to the nature of the site where camps are more exposed to weathering than winter sites. Moreover, seasonal needs for certain parts of the seal may also contribute to elemental representation such as oil for lamps in winter.

Chapter 7: Conclusion

Little detailed analysis has been done concentrating on the nature of seal remains from seasonally different Thule sites in the Canadian Arctic. This thesis was an exploratory approach to determine the main factors shaping the seal assemblages from Hazard Inlet, Somerset Island. Moreover, very few analyses have used a sample size of over 30,000 seal specimens to achieve such interpretations.

Differences within each site were detected by analyzing each feature separately. This procedure allowed recognition of ceremonial features.

Ultimately, it was concluded that taphonomy was the leading factor shaping the faunal record at PaJs-13, PaJs-3 and PaJs-4. Seasonal differences were detected by the degree of correlation with bone density, and also by the element distribution patterns. It is a possibility that the season of the site allowed differing degrees of preservation. Outside factors such as taste preferences, the presence of dogs, and differential transport and butchering practices, especially for storage, were also considered. It was clear that although the analytical data concluded that bone density dominated the nature of the assemblages, there was reason to consider external factors.

An important observation arises from the exploratory nature of this project. Relying on only one analytical variable may provide differing conclusions. It was exemplified that using even two analytical variables, FUI and bone density, fully explaining the nature of the seal remains was still at times obscure.

Since the 1970's, the advancement of utility indices and bone density studies has enabled zooarchaeologists to use advanced analytical methods to explain faunal remains. Utility and bone density are two crucial analytical steps in understanding the faunal record. New zooarchaeological and ethnoarchaeological approaches are providing more rank order indices on variables such as storage, meat drying, and taste preferences (e.g. Park 1989, Diab 1998, Friesen 2001). It is therefore vital for the analyst to try and understand, identify and test as many variables as possible before making any conclusive remarks.

Appendix 1: Abbreviations

Abbreviations used in Element Distribution graphs:

skull – skull
mand – mandible
atlas – atlas
axis – axis
cerv – cervical 3-7
thor – thoracic
lumb – lumbar
bacc – baccula
sacr – sacrum
caud – caudal
rib – rib
ster – sternum
scap – scapula
hum – humerus
rad – radius
ulna – ulna
carp – carpals
mcarp – metacarpals
FF – front flipper (phalanges)
innom – innominate
fem – femur
tib – tibia
fib – fibula
calc – calcaneus
astr – astragalus
cub – cuboid
nav – navicular
othtar – other tarsals
mtars – metatarsals
HF – hind flipper (phalanges)

Abbreviations used in FUI graphs:

skull - skull
mand – mandibles
cerv – cervical
thor – thoracic
lumb – lumbar
ribs – ribs
stern – sternum
scap – scapula
hum – humerus
raduln – radius-ulna
Fflip – front flipper (carpals, metacarpals, phalanges)
innom – innominate
fem - femur
tibfib – tibio-fibula
rflip – rear flipper (tarsals, metatarsals, phalanges)

Abbreviations used in Bone Density graphs:

proxman – proximal mandible
distman – distal mandible
atl – atlas
ax – axis
th – thoracic
lu – lumbar
sc – sacrum
irib –rib shaft
pscap – proximal scapula
dscap – distal scapula
phum – proximal humerus
ihum – huemrus shaft
dhum – distal humerus
prad – proximal radius
drad – distal radius
puln – proximal ulna
duln – distal ulna
innominate:
- acet - acetabulum
- illi - illium
- isch - ischium

pfem – proximal femur
ifem – femur shaft
dfem – distal femur
ptib – proximal tibia
inttib – tibia shaft
dtib – distal tibia
pfib – proximal fibula
intfib – fibula shaft
dfib – distal fibula
calc – calcaneus
astr – astraglus
cub – cuboid
nav – navicular

Appendix 2: FUI and Bone Density Values

PaJs-13-1

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	18	1	18.0	N/A	Skull	18R, 16L	18	41.34
Mandible						bulla			
prox	DN6	58	2	29.0	0.89	Mandible	22R, 23L	23	8.81
dist	DN2	45	2	22.5	0.84				
Atlas	AT1	22	1	22.0	0.54	Atlas	22	22	N/A
	AT2	22	1	22.0	0.52				
Axis	AX1	9	1	9.0	0.56	Axis	9	9	N/A
	AX2	9	1	9.0	0.49				
Cervical	N/A	30	5	6.0	N/A	Cervical	30	6	58.95
Thoracic	TH1	94	13	7.2	0.39	Thoracic	94	8	35.48
Lumbar	LUI	36	6	6.0	0.38	Lumbar	36	6	53.12
Baccula	N/A	2	1	2.0	N/A	Baccula	2	2	N/A
Sacrum	SC1	28	1	28.0	0.43	Sacrum	28	28	N/A
Caudal	N/A	28	11	2.5	N/A	Caudal	28	3	
Rib									
prox	RI1	160	26	6.2	0.40	Ribs	160	7	100.00
int	RI4	160	26	6.2	0.63				
dist	RI5	160	26	6.2	0.29				
Sternum	N/A	42	8	5.3	N/A	Sternum	42	6	6.58
Scapula									
prox	SP2	58	2	29.0	0.48	Scapula	30R, 28L	30	31.37
dist	SP5	58	2	29.0	0.41				
Humerus									
prox	HU1	37	2	18.5	0.43	Humerus	26R, 18L	26	20.95
int	HU3	49	2	24.5	0.57				
dist	HU5	41	2	20.5	0.60				
Radius									
prox	RA1	52	2	26.0	0.63	Radius	25R, 37L	37	
dist	RA5	26	2	13.0	0.45	Ulna	32R, 26L	32	
Ulna						(Rad+Ulna)		37	15.45
prox	UL2	58	2	29.0	0.66				
dist	UL3	23	2	11.5	0.35				
Carpal	N/A	46	14	3.3	N/A	Carpals	46	4	N/A
Metacarpal	N/A	62	10	6.2	N/A	Metacarpals	62	7	N/A
Front Flipper	N/A	91	28	3.3	N/A	FF phal	91	4	N/A
FF phalange						Front flipper		7	2.86
Innominate									
acetabulum	AC1	52	2	26.0	0.47	Innominate	25R, 27L	27	58.68
illium	IL1	52	2	26.0	0.60				
ischium	IS3	52	2	26.0	0.55				
Femur									
prox	FE1	42	2	21.0	0.50	Femur	21R, 18L	21	10.81
prox	FE3	39	2	19.5	0.52				
int	FE4	50	2	25.0	0.69				

dist	FE6	38	2	19.0	0.57				
Tibia									
prox	TI1	35	2	17.5	0.39	Tibia	19R, 20L	20	
int	TI2	35	2	17.5	0.47	Fibia	23R, 15L	23	
int	TI3	77	2	38.5	0.86	Tibio-Fibula		23	29.97
int	TI4	38	2	19.0	0.56				
dist	TI5	38	2	19.0	0.48				
Fibula									
prox	FI1	19	2	9.5	0.39				
int	FI2	19	2	9.5	0.78				
int	FI3	39	2	19.5	0.90				
int	FI4	42	2	21.0	0.88				
dist	FI5	49	2	24.5	0.76				
Calcaneus	CA2	23	2	11.5	0.45	Calcaneous	15R, 8L	15	N/A
Astragalus	AS3	17	2	8.5	0.56	Astragalus	11R, 6L	11	N/A
Cuboid	CU1	16	2	8.0	0.56	Cuboid	6R, 10L	10	N/A
Navicular	NA1	16	2	8.0	0.57	Navicular	8R, 8L	8	N/A
Other Tarsal	N/A	21	6	3.5	N/A	Oth. Tarsal	21	4	N/A
Metatarsal	N/A	161	10	16.1	N/A	Metatarsals	161	17	N/A
HF						phalanges	200	8	N/A
HF phalange	N/A	200	28	7.1	N/A	Rear Flipper		17	4.76

PaJs-13-2

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	30	1	30.0	N/A	Skull	30R, 21L	30	41.34
Mandible						bulla			
prox	DN6	54	2	27.0	0.89	Mandible	29R, 20L	29	8.81
dist	DN2	49	2	24.5	0.84				
Atlas	AT1	24	1	24.0	0.54	Atlas	24	24	N/A
	AT2	24	1	24.0	0.52				
Axis	AX1	35	1	35.0	0.56	Axis	35	35	N/A
	AX2	35	1	35.0	0.49				
Cervical	N/A	95	5	19.0	N/A	Cervical	95	19	58.95
Thoracic	TH1	278	13	21.4	0.39	Thoracic	278	22	35.48
Lumbar	LUI	98	6	16.3	0.38	Lumbar	98	17	53.12
Baccula	N/A	3	1	3.0	N/A	Baccula	3	3	N/A
Sacrum	SC1	49	1	49.0	0.43	Sacrum	49	49	N/A
Caudal	N/A	126	11	11.5	N/A	Caudal	126	12	N/A
Rib									
prox	RI1	481	26	18.5	0.40	Ribs	481	19	100.00
int	RI4	481	26	18.5	0.63				
dist	RI5	481	26	18.5	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	78	2	39.0	0.48	Scapula	45R, 35L	45	31.37
dist	SP5	78	2	39.0	0.41				

Humerus									
prox	HU1	70	2	35.0	0.43	Humerus	34R, 44L	44	20.95
int	HU3	93	2	46.5	0.57				
dist	HU5	76	2	38.0	0.60				
Radius									
prox	RA1	73	2	36.5	0.63	Radius	40R, 37L	40	
dist	RA5	47	2	23.5	0.45	Ulna	28R, 30L	30	
Ulna						(Rad+Ulna)		40	15.45
prox	UL2	56	2	28.0	0.66				
dist	UL3	31	2	15.5	0.35				
Carpal	N/A	85	14	6.1	N/A	Carpals	85	7	N/A
Metacarpal	N/A	151	10	15.1	N/A	Metacarpals	151	16	N/A
Front Flipper	N/A	223	28	8.0	N/A	FF phal	228	8	N/A
FF phalange						Front flipper			2.86
Innominate									
acetabulum	AC1	83	2	41.5	0.47	Innominate	42R, 41L	42	58.68
illium	IL1	81	2	40.5	0.60				
ischium	IS3	96	2	48.0	0.55				
Femur									
prox	FE1	73	2	36.5	0.50	Femur	35R, 47L	47	10.81
prox	FE3	80	2	40.0	0.52				
int	FE4	80	2	40.0	0.69				
dist	FE6	78	2	39.0	0.57				
Tibia									
prox	TI1	85	2	42.5	0.39	Tibia	46R, 41L	46	
int	TI2	85	2	42.5	0.47	Fibia	43R, 59L	59	
int	TI3	113	2	56.5	0.86	Tibio-Fibula		59	29.97
int	TI4	76	2	38.0	0.56				
dist	TI5	66	2	33.0	0.48				
Fibula									
prox	FI1	22	2	11.0	0.39				
int	FI2	89	2	44.5	0.78				
int	FI3	100	2	50.0	0.90				
int	FI4	99	2	49.5	0.88				
dist	FI5	68	2	34.0	0.76				
Calcaneus	CA2	35	2	17.5	0.45	Calcaneous	11R, 24L	24	
Astragalus	AS3	44	2	22.0	0.56	Astragalus	18R, 26L	26	
Cuboid	CU1	32	2	16.0	0.56	Cuboid	15R, 17L	17	
Navicular	NA1	38	2	19.0	0.57	Navicular	20R, 17L	20	
Other Tarsal	N/A	92	6	15.3	N/A	Oth. Tarsal	92	16	
Metatarsal	N/A	159	10	15.9	N/A	Metatarsals	159	16	
HF						phalanges	325	12	
HF phalange	N/A	325	28	11.6	N/A	Rear Flipper		26	4.76

PaJs-13-3

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	49	1	49.0	0.54	Atlas	49	49	N/A
	AT2	49	1	49.0	0.52				
Axis	AX1	40	1	40.0	0.56	Axis	41	41	N/A
	AX2	40	1	40.0	0.49				
Cervical	N/A	157	5	31.4	N/A	Cervical	157	32	58.95
Thoracic	TH1	346	13	26.6	0.39	Thoracic	346	27	35.48
Lumbar	LUI	169	6	28.2	0.38	Lumbar	169	29	53.12
Baccula	N/A	3	1	3.0	N/A	Baccula	3	3	N/A
Sacrum	SC1	29	1	29.0	0.43	Sacrum	29	29	N/A
Caudal	N/A	151	11	13.7	N/A	Caudal	151	14	N/A
Rib									
prox	RI1	716	26	27.5	0.40	Ribs	716	28	100.00
int	RI4	716	26	27.5	0.63				
dist	RI5	716	26	27.5	0.29				
Sternum	N/A	17	8	2.1	N/A	Sternum	17	3	6.58
Scapula									
prox	SP2	77	2	38.5	0.48	Scapula	30R, 47L	47	31.37
dist	SP5	57	2	28.5	0.41				
Humerus									
prox	HU1	48	2	24.0	0.43	Humerus	46R, 40L	46	20.95
int	HU3	48	2	24.0	0.57				
dist	HU5	56	2	28.0	0.60				
Radius									
prox	RA1	36	2	18.0	0.63	Radius	63L	63	
dist	RA5	13	2	6.5	0.45	Ulna	4R, 3L	4	
Ulna						(Rad+Ulna)		63	15.45
prox	UL2	7	2	3.5	0.66				
dist	UL3	7	2	3.5	0.35				
Carpal	N/A	200	14	14.3	N/A	Carpals	200	15	N/A
Metacarpal	N/A	205	10	20.5	N/A	Metacarpals	205	21	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper			2.86
Innominate									
acetabulum	AC1	100	2	50.0	0.47	Innominate	45R, 53L	53	58.68
illium	IL1	52	2	26.0	0.60				
ischium	IS3	52	2	26.0	0.55				
Femur									
prox	FE1	104	2	52.0	0.50	Femur	43R, 20L	43	10.81
prox	FE3	37	2	18.5	0.52				
int	FE4	54	2	27.0	0.69				
dist	FE6	63	2	31.5	0.57				

Tibia									
prox	TI1	57	2	28.5	0.39	Tibia	45R, 52L	52	
int	TI2	65	2	32.5	0.47	Fibia	5R, 58L	58	
int	TI3	69	2	34.5	0.86	Tibio-Fibula		58	29.97
int	TI4	62	2	31.0	0.56				
dist	TI5	85	2	42.5	0.48				
Fibula									
prox	FI1	12	2	6.0	0.39				
int	FI2	58	2	29.0	0.78				
int	FI3	81	2	40.5	0.90				
int	FI4	73	2	36.5	0.88				
dist	FI5	89	2	44.5	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1R	1	
Astragalus	AS3	4	2	2.0	0.56	Astragalus	2R, 2L	2	
Cuboid	CU1	49	2	24.5	0.56	Cuboid	25R, 24L	25	
Navicular	NA1	60	2	30.0	0.57	Navicular	35R, 25L	35	
Other Tarsal	N/A	116	6	19.3	N/A	Oth. Tarsal	116	20	
Metatarsal	N/A	384	10	38.4	N/A	Metatarsals	384	39	
HF						phalanges	16	1	
HF phalange	N/A	16	28	0.6	N/A	Rear Flipper	16	1	4.76

PaJs-13-4

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	32	1	32.0	0.54	Atlas	32	32	N/A
	AT2	32	1	32.0	0.52				
Axis	AX1	36	1	36.0	0.56	Axis	39	39	N/A
	AX2	36	1	36.0	0.49				
Cervical	N/A	132	5	26.4	N/A	Cervical	132	27	58.95
Thoracic	TH1	269	13	20.7	0.39	Thoracic	269	21	35.48
Lumbar	LUI	94	6	15.7	0.38	Lumbar	94	16	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	12	1	12.0	0.43	Sacrum	12	12	N/A
Caudal	N/A	63	11	5.7	N/A	Caudal	63	6	N/A
Rib									
prox	RI1	267	26	10.3	0.40	Ribs	268	11	100.00
int	RI4	267	26	10.3	0.63				
dist	RI5	267	26	10.3	0.29				
Sternum	N/A	21	8	2.6	N/A	Sternum	21	3	6.58
Scapula									
prox	SP2	70	2	35.0	0.48	Scapula	35R, 35L	35	31.37
dist	SP5	51	2	25.5	0.41				
Humerus									

prox	HU1	85	2	42.5	0.43	Humerus	57R, 61L	61	20.95
int	HU3	112	2	56.0	0.57				
dist	HU5	102	2	51.0	0.60				
Radius									
prox	RA1	71	2	35.5	0.63	Radius	33R, 52L	52	
dist	RA5	36	2	18.0	0.45	Ulna	41R, 40L	41	
Ulna						(Rad+Ulna)		52	15.45
prox	UL2	100	2	50.0	0.66				
dist	UL3	21	2	10.5	0.35				
Carpal	N/A	94	14	6.7	N/A	Carpals	94	7	N/A
Metacarpal	N/A	177	10	17.7	N/A	Metacarpals	177	18	N/A
Front Flipper	N/A	271	28	9.7	N/A	FF phal	271	10	N/A
FF phalange						Front flipper			2.86
Innominate									
acetabulum	AC1	106	2	53.0	0.47	Innominate	47R, 59L	59	58.68
illium	IL1	106	2	53.0	0.60				
ischium	IS3	29	2	14.5	0.55				
Femur									
prox	FE1	65	2	32.5	0.50	Femur	45R, 36L	45	10.81
prox	FE3	59	2	29.5	0.52				
int	FE4	80	2	40.0	0.69				
dist	FE6	50	2	25.0	0.57				
Tibia									
prox	TI1	46	2	23.0	0.39	Tibia	45R, 60L	60	
int	TI2	38	2	19.0	0.47	Fibia	35R, 60L	60	
int	TI3	35	2	17.5	0.86	Tibio-Fibula		60	29.97
int	TI4	35	2	17.5	0.56				
dist	TI5	26	2	13.0	0.48				
Fibula									
prox	FI1	43	2	21.5	0.39				
int	FI2	87	2	43.5	0.78				
int	FI3	82	2	41.0	0.90				
int	FI4	91	2	45.5	0.88				
dist	FI5	42	2	21.0	0.76				
Calcaneus	CA2	46	2	23.0	0.45	Calcaneous	21R, 25L	25	
Astragalus	AS3	3	2	1.5	0.56	Astragalus	3	2	
Cuboid	CU1	35	2	17.5	0.56	Cuboid	16R, 19L	19	
Navicular	NA1	42	2	21.0	0.57	Navicular	19R, 23L	23	
Other Tarsal	N/A	38	6	6.3	N/A	Oth. Tarsal	38	7	
Metatarsal	N/A	320	10	32.0	N/A	Metatarsals	320	32	
HF						phalanges			
HF phalange	N/A	444	28	15.9	N/A	Rear Flipper	444	16	4.76

PaJs-13-5

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	4	1	4.0	N/A	Skull	4R, 4L	4	41.34
Mandible						bulla			
prox	DN6	9	2	4.5	0.89	Mandible	5R, 5L	5	8.81
dist	DN2	8	2	4.0	0.84				
Atlas	AT1	7	1	7.0	0.54	Atlas	7	7	N/A
	AT2	7	1	7.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	7	5	1.4	N/A	Cervical	7	2	58.95
Thoracic	TH1	25	13	1.9	0.39	Thoracic	25	2	35.48
Lumbar	LUI	10	6	1.7	0.38	Lumbar	10	2	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	2	11	0.2	N/A	Caudal	2	1	N/A
Rib									
prox	RI1	58	26	2.2	0.40	Ribs	58	3	100.00
int	RI4	58	26	2.2	0.63				
dist	RI5	58	26	2.2	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	15	2	7.5	0.48	Scapula	4R, 11L	11	31.37
dist	SP5	12	2	6.0	0.41				
Humerus									
prox	HU1	25	2	12.5	0.43	Humerus	22R, 11L	22	20.95
int	HU3	30	2	15.0	0.57				
dist	HU5	30	2	15.0	0.60				
Radius									
prox	RA1	24	2	12.0	0.63	Radius	16R, 14L	16	
dist	RA5	3	2	1.5	0.45	Ulna	14R, 17L	17	
Ulna						(Rad+Ulna)		17	15.45
prox	UL2	31	2	15.5	0.66				
dist	UL3	11	2	5.5	0.35				
Carpal	N/A	13	14	0.9	N/A	Carpals	13	1	N/A
Metacarpal	N/A	18	10	1.8	N/A	Metacarpals	18	2	N/A
Front Flipper	N/A	91	28	3.3	N/A	FF phal	91	4	N/A
FF phalange						Front flipper			2.86
Innominate									
acetabulum	AC1	12	2	6.0	0.47	Innominate	5R, 7L	7	58.68
illium	IL1	12	2	6.0	0.60				
ischium	IS3	3	2	1.5	0.55				
Femur									
prox	FE1	18	2	9.0	0.50	Femur	11R, 16L	16	10.81
prox	FE3	12	2	6.0	0.52				
int	FE4	23	2	11.5	0.69				
dist	FE6	25	2	12.5	0.57				

Tibia									
prox	TI1	11	2	5.5	0.39	Tibia	11R, 9L	11	
int	TI2	18	2	9.0	0.47	Fibia	18R, 18L	18	
int	TI3	15	2	7.5	0.86	Tibio-Fibula		18	29.97
int	TI4	18	2	9.0	0.56				
dist	TI5	12	2	6.0	0.48				
Fibula									
prox	FI1	4	2	2.0	0.39				
int	FI2	15	2	7.5	0.78				
int	FI3	20	2	10.0	0.90				
int	FI4	41	2	20.5	0.88				
dist	FI5	12	2	6.0	0.76				
Calcaneus	CA2	14	2	7.0	0.45	Calcaneous	5R, 9L	9	
Astragalus	AS3	11	2	5.5	0.56	Astragalus	7R, 4L	7	
Cuboid	CU1	12	2	6.0	0.56	Cuboid	9R, 3L	9	
Navicular	NA1	12	2	6.0	0.57	Navicular	9R, 3L	9	
Other Tarsal	N/A	11	6	1.8	N/A	Oth. Tarsal	11	2	
Metatarsal	N/A	42	10	4.2	N/A	Metatarsals	42	5	
HF						phalanges			
HF phalange	N/A	51	28	1.8	N/A	Rear Flipper	51	2	4.76

PaJs-13-6

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	3	1	3.0	N/A	Skull	3R, 1L	3	41.34
Mandible						bulla			
prox	DN6	11	2	5.5	0.89	Mandible	6R, 7L	7	8.81
dist	DN2	11	2	5.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	6	5	1.2	N/A	Cervical	6	2	58.95
Thoracic	TH1	13	13	1.0	0.39	Thoracic	13	1	35.48
Lumbar	LUI	9	6	1.5	0.38	Lumbar	9	2	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	2	1	2.0	0.43	Sacrum	2	2	N/A
Caudal	N/A	4	11	0.4	N/A	Caudal	4	1	N/A
Rib									
prox	RI1	37	26	1.4	0.40	Ribs	38	2	100.00
int	RI4	37	26	1.4	0.63				
dist	RI5	37	26	1.4	0.29				
Sternum	N/A	4	8	0.5	N/A	Sternum	4	1	6.58
Scapula									
prox	SP2	8	2	4.0	0.48	Scapula	6R, 2L	6	31.37
dist	SP5	4	2	2.0	0.41				
Humerus									

prox	HU1	10	2	5.0	0.43	Humerus	8R, 9L	9	20.95
int	HU3	13	2	6.5	0.57				
dist	HU5	9	2	4.5	0.60				
Radius									
prox	RA1	12	2	6.0	0.63	Radius	8R, 10L	10	
dist	RA5	0	2	0.0	0.45	Ulna	7R, 7L	7	
Ulna						(Rad+Ulna)		10	15.45
prox	UL2	13	2	6.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	6	14	0.4	N/A	Carpals	6	1	N/A
Metacarpal	N/A	22	10	2.2	N/A	Metacarpals	22	3	N/A
Front Flipper	N/A	45	28	1.6	N/A	FF phal			N/A
FF phalange						Front flipper	45	2	2.86
Innominate									
acetabulum	AC1	4	2	2.0	0.47	Innominate	3R, 2L	3	58.68
illium	IL1	4	2	2.0	0.60				
ischium	IS3	2	2	1.0	0.55				
Femur									
prox	FE1	10	2	5.0	0.50	Femur	8R, 6L	8	10.81
prox	FE3	12	2	6.0	0.52				
int	FE4	11	2	5.5	0.69				
dist	FE6	11	2	5.5	0.57				
Tibia									
prox	TI1	4	2	2.0	0.39	Tibia	5R, 4L	5	
int	TI2	5	2	2.5	0.47	Fibia	6R, 3L	6	
int	TI3	7	2	3.5	0.86	Tibio-Fibula		6	29.97
int	TI4	6	2	3.0	0.56				
dist	TI5	6	2	3.0	0.48				
Fibula									
prox	FI1	3	2	1.5	0.39				
int	FI2	5	2	2.5	0.78				
int	FI3	6	2	3.0	0.90				
int	FI4	7	2	3.5	0.88				
dist	FI5	5	2	2.5	0.76				
Calcaneus	CA2	9	2	4.5	0.45	Calcaneous	3R, 6L	6	
Astragalus	AS3	2	2	1.0	0.56	Astragalus	1R, 1L	1	
Cuboid	CU1	6	2	3.0	0.56	Cuboid	1R, 5L	5	
Navicular	NA1	2	2	1.0	0.57	Navicular	1R, 1L	1	
Other Tarsal	N/A	1	6	0.2	N/A	Oth. Tarsal	1	1	
Metatarsal	N/A	27	10	2.7	N/A	Metatarsals	27	3	
HF						phalanges			
HF phalange	N/A	37	28	1.3	N/A	Rear Flipper	37	2	4.76

PaJs-13-10

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R, 1L	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1R	1	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	2	2	N/A
	AT2	2	1	2.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	2	5	0.4	N/A	Cervical	2	1	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	N/A
Rib									
prox	RI1	16	26	0.6	0.40	Ribs	16	1	100.00
int	RI4	16	26	0.6	0.63				
dist	RI5	16	26	0.6	0.29				
Sternum	N/A	2	8	0.3	N/A	Sternum	2	1	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	3	2	1.5	0.43	Humerus	2R, 1L	2	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	2	2	1.0	0.60				
Radius									
prox	RA1	4	2	2.0	0.63	Radius	3R, 1L	3	
dist	RA5	0	2	0.0	0.45	Ulna	2R, 2L	2	
Ulna						(Rad+Ulna)		3	15.45
prox	UL2	4	2	2.0	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	2	28	0.1	N/A	FF phal			N/A
FF phalange						Front flipper	2	1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	1	2	0.5	0.55				
Femur									
prox	FE1	1	2	0.5	0.50	Femur	1R, 2L	2	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	1	2	0.5	0.69				
dist	FE6	2	2	1.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	1L	1	
int	TI2	0	2	0.0	0.47	Fibia	2R, 1L	2	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		2	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	2	2	1.0	0.90				
int	FI4	1	2	0.5	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1R	1	
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1R	1	
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	
Other Tarsal	N/A	1	6	0.2	N/A	Oth. Tarsal	1	1	
Metatarsal	N/A	6	10	0.6	N/A	Metatarsals	6	1	
HF						phalanges			
HF phalange	N/A	3	28	0.1	N/A	Rear Flipper	3	1	4.76

PaJs-13

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	53	1	53.0	N/A	Skull	53R, 40L	53	41.34
Mandible						bulla			
prox	DN6	108	2	54.0	0.89	Mandible	65R, 45L	65	8.81
dist	DN2	108	2	54.0	0.84				
Atlas	AT1	134	1	134.0	0.54	Atlas	135	135	N/A
	AT2	134	1	134.0	0.52				
Axis	AX1	110	1	110.0	0.56	Axis	110	110	N/A
	AX2	110	1	110.0	0.49				
Cervical	N/A	398	5	79.6	N/A	Cervical	398	80	58.95
Thoracic	TH1	1180	13	90.8	0.39	Thoracic	1180	91	35.48
Lumbar	LUI	390	6	65.0	0.38	Lumbar	390	65	53.12
Baccula	N/A	9	1	9.0	N/A	Baccula	9	9	N/A
Sacrum	SC1	100	1	100.0	0.43	Sacrum	100	100	N/A
Caudal	N/A	341	11	31.0	N/A	Caudal	341	31	N/A
Rib									
prox	RI1	1710	26	65.8	0.40	Ribs	1710	66	100.00
int	RI4	1710	26	65.8	0.63				
dist	RI5	1710	26	65.8	0.29				
Sternum	N/A	172	8	21.5	N/A	Sternum	172	22	6.58
Scapula									
prox	SP2	229	2	114.5	0.48	Scapula	120R, 110L	120	31.37
dist	SP5	203	2	101.5	0.41				
Humerus									

prox	HU1	279	2	139.5	0.43	Humerus	191R, 169L	191	20.95
int	HU3	347	2	173.5	0.57				
dist	HU5	324	2	162.0	0.60				
Radius									
prox	RA1	274	2	137.0	0.63	Radius	105R, 212L	212	
dist	RA5	59	2	29.5	0.45	Ulna	123R, 120L	123	
Ulna						(Rad+Ulna)		212	15.45
prox	UL2	251	2	125.5	0.66				
dist	UL3	49	2	24.5	0.35				
Carpal	N/A	444	14	31.7	N/A	Carpals	444	32	N/A
Metacarpal	N/A	625	10	62.5	N/A	Metacarpals	625	63	N/A
Front Flipper	N/A	721	28	25.8	N/A	FF phal			N/A
FF phalange						Front flipper	721	26	2.86
Innominate									
acetabulum	AC1	357	2	178.5	0.47	Innominate	166R, 187L	187	58.68
illium	IL1	357	2	178.5	0.60				
ischium	IS3	219	2	109.5	0.55				
Femur									
prox	FE1	323	2	161.5	0.50	Femur	153R, 143L	153	10.81
prox	FE3	296	2	148.0	0.52				
int	FE4	286	2	143.0	0.69				
dist	FE6	283	2	141.5	0.57				
Tibia									
prox	TI1	289	2	144.5	0.39	Tibia	154R, 171L	171	
int	TI2	302	2	151.0	0.47	Fibia	125R, 245L	245	
int	TI3	308	2	154.0	0.86	Tibio-Fibula		245	29.97
int	TI4	311	2	155.5	0.56				
dist	TI5	286	2	143.0	0.48				
Fibula									
prox	FI1	100	2	50.0	0.39				
int	FI2	258	2	129.0	0.78				
int	FI3	291	2	145.5	0.90				
int	FI4	384	2	192.0	0.88				
dist	FI5	257	2	128.5	0.76				
Calcaneus	CA2	123	2	61.5	0.45	Calcaneous	56R, 67L	67	
Astragalus	AS3	125	2	62.5	0.56	Astragalus	64R, 60L	64	
Cuboid	CU1	154	2	77.0	0.56	Cuboid	73R, 78L	78	
Navicular	NA1	171	2	85.5	0.57	Navicular	93R, 77L	93	
Other Tarsal	N/A	259	6	43.2	N/A	Oth. Tarsal	259	44	
Metatarsal	N/A	1107	10	110.7	N/A	Metatarsals	1107	111	
HF						phalanges			
HF phalange	N/A	1071	28	38.3	N/A	Rear Flipper	1071	39	4.76

PaJs-3-QA

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	2	1	2.0	N/A	Skull	1R, 2L	2	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	3	1	3.0	0.54	Atlas	3	3	N/A
	AT2	3	1	3.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	5	26	0.2	0.40	Ribs	5	1	100.00
int	RI4	5	26	0.2	0.63				
dist	RI5	5	26	0.2	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	2	2	1.0	0.48	Scapula	1R, 1L	1	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	1R, 1L	1	20.95
int	HU3	2	2	1.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	2R, 1L	2	
dist	RA5	1	2	0.5	0.45	Ulna	2R, 1L	2	
Ulna						(Rad+Ulna)		2	15.45
prox	UL2	2	2	1.0	0.66				
dist	UL3	1	2	0.5	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	2	10	0.2	N/A	Metacarpals	2	1	N/A
Front Flipper	N/A	20	28	0.7	N/A	FF phal	20	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	1	2	0.5	0.47	Innominate	1R	1	58.68
illium	IL1	1	2	0.5	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	4	2	2.0	0.50	Femur	3R, 2L	3	10.81
prox	FE3	4	2	2.0	0.52				
int	FE4	4	2	2.0	0.69				
dist	FE6	2	2	1.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	1R, 1L	1	
int	TI2	1	2	0.5	0.47	Fibia	1R, 2L	2	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		2	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	1	2	0.5	0.78				
int	FI3	2	2	1.0	0.90				
int	FI4	3	2	1.5	0.88				
dist	FI5	1	2	0.5	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1L	1	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	4	6	0.7	N/A	Oth. Tarsal	4	1	N/A
Metatarsal	N/A	6	10	0.6	N/A	Metatarsals	6	1	N/A
HF						phalanges	13		N/A
HF phalange	N/A	13	28	0.5	N/A	Rear Flipper		1	4.76

PaJs-3-QB

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1	1	41.34
Mandible						bulla			
prox	DN6	3	2	1.5	0.89	Mandible	3R, 1L	3	8.81
dist	DN2	3	2	1.5	0.84				
Atlas	AT1	1	1	1.0	0.54	Atlas	1	1	N/A
	AT2	1	1	1.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	3	5	0.6	N/A	Cervical	3	1	58.95
Thoracic	TH1	7	13	0.5	0.39	Thoracic	7	1	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	2	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	5	11	0.5	N/A	Caudal	5	1	
Rib									
prox	RI1	7	26	0.3	0.40	Ribs	7	1	100.00
int	RI4	7	26	0.3	0.63				
dist	RI5	7	26	0.3	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									

prox	HU1	2	2	1.0	0.43	Humerus	2L	2	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	2R, 1L	2	
dist	RA5	0	2	0.0	0.45	Ulna	2L	2	
Ulna						(Rad+Ulna)		2	15.45
prox	UL2	1	2	0.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	16	14	1.1	N/A	Carpals	16	2	N/A
Metacarpal	N/A	37	10	3.7	N/A	Metacarpals	37	4	N/A
Front Flipper	N/A	67	28	2.4	N/A	FF phal	67	3	N/A
FF phalange						Front flipper		4	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	2	2	1.0	0.50	Femur	2	2	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	1R, 2L	2	
int	TI2	0	2	0.0	0.47	Fibia	1R, 3L	3	
int	TI3	1	2	0.5	0.86	Tibio-Fibula		3	29.97
int	TI4	2	2	1.0	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	4	2	2.0	0.78				
int	FI3	3	2	1.5	0.90				
int	FI4	1	2	0.5	0.88				
dist	FI5	1	2	0.5	0.76				
Calcaneus	CA2	3	2	1.5	0.45	Calcaneous	2R, 1L	2	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	2R	2	N/A
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1L	1	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	N/A
Other Tarsal	N/A	4	6	0.7	N/A	Oth. Tarsal	4	1	N/A
Metatarsal	N/A	27	10	2.7	N/A	Metatarsals	27	3	N/A
HF						phalanges	34	2	N/A
HF phalange	N/A	34	28	1.2	N/A	Rear Flipper		3	4.76

PaJs-3-S/QA

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	6	1	6.0	N/A	Skull	6R, 2L	6	41.34

Mandible							bulla			
	prox	DN6	3	2	1.5	0.89	Mandible	2R, 1L	2	8.81
	dist	DN2	3	2	1.5	0.84				
Atlas		AT1	2	1	2.0	0.54	Atlas	2	2	N/A
		AT2	2	1	2.0	0.52				
Axis		AX1	4	1	4.0	0.56	Axis	8	8	N/A
		AX2	4	1	4.0	0.49				
Cervical		N/A	8	5	1.6	N/A	Cervical	8	2	58.95
Thoracic		TH1	20	13	1.5	0.39	Thoracic	20	2	35.48
Lumbar		LUI	5	6	0.8	0.38	Lumbar	5	1	53.12
Baccula		N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum		SC1	0	1	0.0	0.43	Sacrum	2	2	N/A
Caudal		N/A	1	11	0.1	N/A	Caudal	1	1	
Rib										
	prox	RI1	42	26	1.6	0.40	Ribs	43	2	100.00
	int	RI4	42	26	1.6	0.63				
	dist	RI5	42	26	1.6	0.29				
Sternum		N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula										
	prox	SP2	4	2	2.0	0.48	Scapula	4L	4	31.37
	dist	SP5	3	2	1.5	0.41				
Humerus										
	prox	HU1	0	2	0.0	0.43	Humerus	1R, 1L	1	20.95
	int	HU3	0	2	0.0	0.57				
	dist	HU5	2	2	1.0	0.60				
Radius										
	prox	RA1	1	2	0.5	0.63	Radius	1R, 1L	1	
	dist	RA5	1	2	0.5	0.45	Ulna	1R, 2L	2	
Ulna							(Rad+Ulna)		2	15.45
	prox	UL2	3	2	1.5	0.66				
	dist	UL3	0	2	0.0	0.35				
Carpal		N/A	29	14	2.1	N/A	Carpals	29	2	N/A
Metacarpal		N/A	19	10	1.9	N/A	Metacarpals	19	2	N/A
Front Flipper		N/A	25	28	0.9	N/A	FF phal	25	1	N/A
FF phalange							Front flipper		2	2.86
Innominate										
	acetabulum	AC1	3	2	1.5	0.47	Innominate	2R, 1L	2	58.68
	illium	IL1	3	2	1.5	0.60				
	ischium	IS3	1	2	0.5	0.55				
Femur										
	prox	FE1	8	2	4.0	0.50	Femur	4R, 2L	4	10.81
	prox	FE3	5	2	2.5	0.52				
	int	FE4	4	2	2.0	0.69				
	dist	FE6	5	2	2.5	0.57				
Tibia										
	prox	TI1	3	2	1.5	0.39	Tibia	3R, 3L	3	
	int	TI2	3	2	1.5	0.47	Fibia	3R, 6L	6	
	int	TI3	4	2	2.0	0.86	Tibio-Fibula		6	29.97
	int	TI4	3	2	1.5	0.56				
	dist	TI5	4	2	2.0	0.48				

Fibula									
prox	FI1	3	2	1.5	0.39				
int	FI2	6	2	3.0	0.78				
int	FI3	5	2	2.5	0.90				
int	FI4	7	2	3.5	0.88				
dist	FI5	4	2	2.0	0.76				
Calcaneus	CA2	3	2	1.5	0.45	Calcaneous	2R, 1L	2	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	1R, 1L	1	N/A
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1R	1	N/A
Navicular	NA1	2	2	1.0	0.57	Navicular	1R, 1L	1	N/A
Other Tarsal	N/A	6	6	1.0	N/A	Oth. Tarsal	6	1	N/A
Metatarsal	N/A	11	10	1.1	N/A	Metatarsals	11	2	N/A
HF						phalanges	17	1	N/A
HF phalange	N/A	17	28	0.6	N/A	Rear Flipper		2	4.76

PaJs-3-TRB

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R, 1L	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1R, 1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	3	13	0.2	0.39	Thoracic	3	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	18	26	0.7	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1R	1	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	1	2	0.5	0.43	Humerus	1R, 1L	1	20.95
int	HU3	2	2	1.0	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R, 3L	3	
dist	RA5	1	2	0.5	0.45	Ulna	0	0	

Ulna						(Rad+Ulna)		3	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		0	2.86
Innominate									
acetabulum	AC1	2	2	1.0	0.47	Innominate	2L	2	58.68
illium	IL1	2	2	1.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	2L	2	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	2	2	1.0	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	2	2	1.0	0.39	Tibia	3R	3	
int	TI2	1	2	0.5	0.47	Fibia	3R	3	
int	TI3	2	2	1.0	0.86	Tibio-Fibula		3	29.97
int	TI4	1	2	0.5	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	2	2	1.0	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	3	2	1.5	0.90				
int	FI4	2	2	1.0	0.88				
dist	FI5	1	2	0.5	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	1	10	0.1	N/A	Metatarsals	1	1	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		1	4.76

PaJs-3-TRC

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1L	1	41.34
Mandible						bulla			
prox	DN6	2	2	1.0	0.89	Mandible	2R	2	8.81
dist	DN2	3	2	1.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A

		AX2	0	1	0.0	0.49				
Cervical		N/A	2	5	0.4	N/A	Cervical	2	1	58.95
Thoracic		TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar		LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula		N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum		SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal		N/A	0	11	0.0	N/A	Caudal	0	0	
Rib										
	prox	RI1	1	26	0.0	0.40	Ribs	2	1	100.00
	int	RI4	1	26	0.0	0.63				
	dist	RI5	1	26	0.0	0.29				
Sternum		N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula										
	prox	SP2	2	2	1.0	0.48	Scapula	1R, 1L	1	31.37
	dist	SP5	0	2	0.0	0.41				
Humerus										
	prox	HU1	0	2	0.0	0.43	Humerus	1R, 1L	1	20.95
	int	HU3	2	2	1.0	0.57				
	dist	HU5	0	2	0.0	0.60				
Radius										
	prox	RA1	1	2	0.5	0.63	Radius	1R, 2L	2	
	dist	RA5	1	2	0.5	0.45	Ulna	2L	2	
Ulna							(Rad+Ulna)		2	15.45
	prox	UL2	0	2	0.0	0.66				
	dist	UL3	2	2	1.0	0.35				
Carpal		N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal		N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper		N/A	2	28	0.1	N/A	FF phal	2	1	N/A
FF phalange							Front flipper		1	2.86
Innominate										
	acetabulum	AC1	1	2	0.5	0.47	Innominate	1	1	58.68
	illium	IL1	1	2	0.5	0.60				
	ischium	IS3	0	2	0.0	0.55				
Femur										
	prox	FE1	0	2	0.0	0.50	Femur	2R	2	10.81
	prox	FE3	0	2	0.0	0.52				
	int	FE4	4	2	2.0	0.69				
	dist	FE6	0	2	0.0	0.57				
Tibia										
	prox	TI1	0	2	0.0	0.39	Tibia	1R, 1L	1	
	int	TI2	1	2	0.5	0.47	Fibia	1R, 1L	1	
	int	TI3	3	2	1.5	0.86	Tibio-Fibula		1	29.97
	int	TI4	0	2	0.0	0.56				
	dist	TI5	0	2	0.0	0.48				
Fibula										
	prox	FI1	0	2	0.0	0.39				
	int	FI2	0	2	0.0	0.78				
	int	FI3	2	2	1.0	0.90				
	int	FI4	2	2	1.0	0.88				
	dist	FI5	1	2	0.5	0.76				

Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1L	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1L	1	N/A
Other Tarsal	N/A	1	6	0.2	N/A	Oth. Tarsal	1	1	N/A
Metatarsal	N/A	7	10	0.7	N/A	Metatarsals	7	1	N/A
HF						phalanges	5	1	N/A
HF phalange	N/A	5	28	0.2	N/A	Rear Flipper		1	4.76

PaJs-3-KA

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	4	13	0.3	0.39	Thoracic	4	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	2	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	1	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	5	26	0.2	0.63				
dist	RI5	1	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1L	1	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	2L	2	20.95
int	HU3	4	2	2.0	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1L	1	
dist	RA5	0	2	0.0	0.45	Ulna	1L	1	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	2	28	0.1	N/A	FF phal	2	1	N/A

FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	2	2	1.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1R	1	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		1	4.76

PaJs-3-NHG

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A

Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	4	26	0.2	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	1	2	0.5	0.43	Humerus	1R	1	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	0	0	
dist	RA5	0	2	0.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		0	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		0	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	2	2	1.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	1L	1	
int	TI2	1	2	0.5	0.47	Fibia	0	0	
int	TI3	1	2	0.5	0.86	Tibio-Fibula		1	29.97
int	TI4	1	2	0.5	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A

HF						phalanges			N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper	0	0	4.76

PaJs-3-6

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1R	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	1	1	1.0	0.54	Atlas	1	1	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	1	1	1.0	0.56	Axis	1	1	N/A
	AX2	1	1	1.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	3	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	2	26	0.1	0.40	Ribs	3	1	100.00
int	RI4	8	26	0.3	0.63				
dist	RI5	2	26	0.1	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1L	1	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	1R	1	
dist	RA5	0	2	0.0	0.45	Ulna	1R	1	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper	N/A	5	28	0.2	N/A	FF phal	5	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	1	2	0.5	0.47	Innominate	1L	1	58.68
illium	IL1	1	2	0.5	0.60				
ischium	IS3	1	2	0.5	0.55				
Femur									

prox	FE1	0	2	0.0	0.50	Femur	1L	1	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	1	2	0.5	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A
HF						phalanges	2	1	N/A
HF phalange	N/A	2	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-3-7

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI
Head	N/A	0	1	0.0	N/A	Skull	0	0
Mandible						bulla		
prox	DN6	0	2	0.0	0.89	Mandible	0	0
dist	DN2	0	2	0.0	0.84			
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0
	AT2	0	1	0.0	0.52			
Axis	AX1	0	1	0.0	0.56	Axis	0	0
	AX2	0	1	0.0	0.49			
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0
Rib								
prox	RI1	0	26	0.0	0.40	Ribs	1	1
int	RI4	3	26	0.1	0.63			
dist	RI5	0	26	0.0	0.29			
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0

Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0
dist	SP5	0	2	0.0	0.41			
Humerus								
prox	HU1	0	2	0.0	0.43	Humerus	0	0
int	HU3	0	2	0.0	0.57			
dist	HU5	0	2	0.0	0.60			
Radius								
prox	RA1	0	2	0.0	0.63	Radius	0	0
dist	RA5	0	2	0.0	0.45	Ulna	0	0
Ulna						(Rad+Ulna)		0
prox	UL2	0	2	0.0	0.66			
dist	UL3	0	2	0.0	0.35			
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0
FF phalange						Front flipper		0
Innominate								
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0
illium	IL1	0	2	0.0	0.60			
ischium	IS3	0	2	0.0	0.55			
Femur								
prox	FE1	0	2	0.0	0.50	Femur	0	0
prox	FE3	0	2	0.0	0.52			
int	FE4	0	2	0.0	0.69			
dist	FE6	0	2	0.0	0.57			
Tibia								
prox	TI1	0	2	0.0	0.39	Tibia	1	1
int	TI2	0	2	0.0	0.47	Fibia	0	0
int	TI3	1	2	0.5	0.86	Tibio-Fibula		0
int	TI4	0	2	0.0	0.56			
dist	TI5	0	2	0.0	0.48			
Fibula								
prox	FI1	0	2	0.0	0.39			
int	FI2	0	2	0.0	0.78			
int	FI3	0	2	0.0	0.90			
int	FI4	0	2	0.0	0.88			
dist	FI5	0	2	0.0	0.76			
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0
HF						phalanges	5	1
HF phalange	N/A	5	28	0.2	N/A	Rear Flipper		1

PaJs-3-9

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	1	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	1	26	0.0	0.63				
dist	RI5	1	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1L	1	
dist	RA5	0	2	0.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper	N/A	2	28	0.1	N/A	FF phal	2	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	1L	1	
int	TI2	0	2	0.0	0.47	Fibia	1L	1	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1	1	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	2	10	0.2	N/A	Metatarsals	2	1	N/A
HF						phalanges	3	1	N/A
HF phalange	N/A	3	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-3-10

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	9	26	0.3	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									

prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	2L	2	
dist	RA5	0	2	0.0	0.45	Ulna	1R, 1L	1	
Ulna						(Rad+Ulna)		2	15.45
prox	UL2	1	2	0.5	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper	N/A	2	28	0.1	N/A	FF phal	2	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	1	1	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	1	2	0.5	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	3	10	0.3	N/A	Metatarsals	3	1	N/A
HF						phalanges	5	1	N/A
HF phalange	N/A	5	28	0.2	N/A	Rear Flipper		1	4.76

PaJs-3-11

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	4	1	4.0	N/A	Skull	4R, 1L	4	41.34
Mandible						bulla			
prox	DN6	2	2	1.0	0.89	Mandible	3L	3	8.81
dist	DN2	2	2	1.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	1	1	N/A
	AX2	1	1	1.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	17	11	1.5	N/A	Caudal	17	2	
Rib									
prox	RI1	8	26	0.3	0.40	Ribs	8	1	100.00
int	RI4	8	26	0.3	0.63				
dist	RI5	8	26	0.3	0.29				
Sternum	N/A	2	8	0.3	N/A	Sternum	2	1	6.58
Scapula									
prox	SP2		2	0.0	0.48	Scapula	1	1	31.37
dist	SP5	1	2	0.5	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R, 4L	4	
dist	RA5	4	2	2.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		4	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	26	14	1.9	N/A	Carpals	26	2	N/A
Metacarpal	N/A	20	10	2.0	N/A	Metacarpals	20	2	N/A
Front Flipper	N/A	27	28	1.0	N/A	FF phal	27	1	N/A
FF phalange						Front flipper		2	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	2	2	1.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	1	1	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	1	2	0.5	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	2	2	1.0	0.39	Tibia	1R, 2L	2	
int	TI2	2	2	1.0	0.47	Fibia	1R, 1L	1	
int	TI3	1	2	0.5	0.86	Tibio-Fibula		2	29.97
int	TI4	1	2	0.5	0.56				
dist	TI5	2	2	1.0	0.48				
Fibula									
prox	FI1	2	2	1.0	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	9	2	4.5	0.45	Calcaneous	5R, 4L	5	N/A
Astragalus	AS3	9	2	4.5	0.56	Astragalus	5R, 4L	5	N/A
Cuboid	CU1	10	2	5.0	0.56	Cuboid	5R, 5L	5	N/A
Navicular	NA1	2	2	1.0	0.57	Navicular	2R	2	N/A
Other Tarsal	N/A	14	6	2.3	N/A	Oth. Tarsal	14	3	N/A
Metatarsal	N/A	32	10	3.2	N/A	Metatarsals	32	4	N/A
HF						phalanges	19	1	N/A
HF phalange	N/A	19	28	0.7	N/A	Rear Flipper		5	4.76

PaJs-13-12

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1L	1	41.34
Mandible						bulla			
prox	DN6	3	2	1.5	0.89	Mandible	3R	3	8.81
dist	DN2	3	2	1.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	2	13	0.2	0.39	Thoracic	2	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	11	26	0.4	0.40	Ribs	11	1	100.00
int	RI4	11	26	0.4	0.63				
dist	RI5	11	26	0.4	0.29				
Sternum	N/A	1	8	0.1	N/A	Sternum	1	1	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1R, 2L	2	31.37
dist	SP5	3	2	1.5	0.41				
Humerus									

prox	HU1	0	2	0.0	0.43	Humerus	1R, 2L	2	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	3	2	1.5	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	2R, 1L	2	
dist	RA5	1	2	0.5	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		2	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	9	10	0.9	N/A	Metacarpals	9	1	N/A
Front Flipper	N/A	15	28	0.5	N/A	FF phal	15	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	5	2	2.5	0.55				
Femur									
prox	FE1	1	2	0.5	0.50	Femur	1	1	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	2R, 1L	2	
int	TI2	1	2	0.5	0.47	Fibia	3R, 1L	3	
int	TI3	2	2	1.0	0.86	Tibio-Fibula		3	29.97
int	TI4	2	2	1.0	0.56				
dist	TI5	2	2	1.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	2	2	1.0	0.90				
int	FI4	3	2	1.5	0.88				
dist	FI5	1	2	0.5	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	2	2	1.0	0.56	Cuboid	2L	2	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1L	1	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	15	10	1.5	N/A	Metatarsals	15	2	N/A
HF						phalanges	20	1	N/A
HF phalange	N/A	20	28	0.7	N/A	Rear Flipper		2	4.76

PaJs-3-13

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	3	26	0.1	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	1R	1	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R	1	
dist	RA5	0	2	0.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		0	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	1R	1	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	1	2	0.5	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		0	4.76

PaJs-3-14

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	3	26	0.1	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									

prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	1R	1	
dist	RA5	1	2	0.5	0.45	Ulna	1R	1	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	1	2	0.5	0.66				
dist	UL3	1	2	0.5	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1L	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	3	6	0.5	N/A	Oth. Tarsal	3	1	N/A
Metatarsal	N/A	1	10	0.1	N/A	Metatarsals	1	1	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		1	4.76

PaJs-3-15

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	8	26	0.3	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R	1	
dist	RA5	0	2	0.0	0.45	Ulna	1R	1	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	1	2	0.5	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		0	2.86
Innominate									
acetabulum	AC1	2	2	1.0	0.47	Innominate	1R, 1L	1	58.68
illium	IL1	2	2	1.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	2	10	0.2	N/A	Metatarsals	2	1	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		1	4.76

PaJs-3-16

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1L bulla	1	41.34
Mandible									
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	7	26	0.3	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									

prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	0	0	
dist	RA5	0	2	0.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		0	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	1	2	0.5	0.50	Femur	1R	1	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	1	2	0.5	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	1L	1	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	1	2	0.5	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A
HF						phalanges	2	1	N/A
HF phalange	N/A	2	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-3-17

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R	1	41.34

Mandible							bulla			
	prox	DN6	3	2	1.5	0.89	Mandible	1R, 2L	2	8.81
	dist	DN2	3	2	1.5	0.84				
Atlas		AT1	0	1	0.0	0.54	Atlas	0	0	N/A
		AT2	0	1	0.0	0.52				
Axis		AX1	0	1	0.0	0.56	Axis	0	0	N/A
		AX2	0	1	0.0	0.49				
Cervical		N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic		TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar		LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula		N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum		SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal		N/A	0	11	0.0	N/A	Caudal	0	0	
Rib										
	prox	RI1	2	26	0.1	0.40	Ribs	2	1	100.00
	int	RI4	2	26	0.1	0.63				
	dist	RI5	2	26	0.1	0.29				
Sternum		N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula										
	prox	SP2	2	2	1.0	0.48	Scapula	2R	2	31.37
	dist	SP5	0	2	0.0	0.41				
Humerus										
	prox	HU1	0	2	0.0	0.43	Humerus	1L	1	20.95
	int	HU3	1	2	0.5	0.57				
	dist	HU5	0	2	0.0	0.60				
Radius										
	prox	RA1	2	2	1.0	0.63	Radius	2L	2	
	dist	RA5	1	2	0.5	0.45	Ulna	1R	1	
Ulna							(Rad+Ulna)		2	15.45
	prox	UL2	1	2	0.5	0.66				
	dist	UL3	1	2	0.5	0.35				
Carpal		N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal		N/A	1	10	0.1	N/A	Metacarpals	1	1	N/A
Front Flipper		N/A	1	28	0.0	N/A	FF phal	1	1	N/A
FF phalange							Front flipper		1	2.86
Innominate										
	acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
	illium	IL1	0	2	0.0	0.60				
	ischium	IS3	0	2	0.0	0.55				
Femur										
	prox	FE1	1	2	0.5	0.50	Femur	2L	2	10.81
	prox	FE3	2	2	1.0	0.52				
	int	FE4	2	2	1.0	0.69				
	dist	FE6	1	2	0.5	0.57				
Tibia										
	prox	TI1	0	2	0.0	0.39	Tibia	1R, 1L	1	
	int	TI2	0	2	0.0	0.47	Fibia	0	0	
	int	TI3	2	2	1.0	0.86	Tibio-Fibula		1	29.97
	int	TI4	0	2	0.0	0.56				
	dist	TI5	0	2	0.0	0.48				

Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1L	1	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1L	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	5	10	0.5	N/A	Metatarsals	5	1	N/A
HF						phalanges	6	1	N/A
HF phalange	N/A	6	28	0.2	N/A	Rear Flipper		1	4.76

PaJs-3-18

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1	1	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
int	RI4	9	26	0.3	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
dist	SP5	0	2	0.0	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	2R, 1L	2	
dist	RA5	0	2	0.0	0.45	Ulna	1R	1	

Ulna						(Rad+Ulna)		2	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	1	2	0.5	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange						Front flipper		0	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	3	10	0.3	N/A	Metatarsals	3	1	N/A
HF						phalanges	3	1	N/A
HF phalange	N/A	3	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-3-19

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1L	1	41.34
Mandible							bulla		
prox	DN6	1	2	0.5	0.89	Mandible	1	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A

		AX2	0	1	0.0	0.49				
Cervical		N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic		TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar		LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula		N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum		SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal		N/A	2	11	0.2	N/A	Caudal	2	1	
Rib										
	prox	RI1	0	26	0.0	0.40	Ribs	1	1	100.00
	int	RI4	11	26	0.4	0.63				
	dist	RI5	0	26	0.0	0.29				
Sternum		N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula										
	prox	SP2	0	2	0.0	0.48	Scapula	0	0	31.37
	dist	SP5	0	2	0.0	0.41				
Humerus										
	prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
	int	HU3	0	2	0.0	0.57				
	dist	HU5	0	2	0.0	0.60				
Radius										
	prox	RA1	0	2	0.0	0.63	Radius	0	0	
	dist	RA5	0	2	0.0	0.45	Ulna	1	1	
Ulna							(Rad+Ulna)		1	15.45
	prox	UL2	0	2	0.0	0.66				
	dist	UL3	1	2	0.5	0.35				
Carpal		N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal		N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper		N/A	0	28	0.0	N/A	FF phal	0	0	N/A
FF phalange							Front flipper		0	2.86
Innominate										
	acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
	illium	IL1	0	2	0.0	0.60				
	ischium	IS3	0	2	0.0	0.55				
Femur										
	prox	FE1	0	2	0.0	0.50	Femur	1R, 1L	1	10.81
	prox	FE3	0	2	0.0	0.52				
	int	FE4	2	2	1.0	0.69				
	dist	FE6	1	2	0.5	0.57				
Tibia										
	prox	TI1	0	2	0.0	0.39	Tibia	0	0	
	int	TI2	0	2	0.0	0.47	Fibia	0	0	
	int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
	int	TI4	0	2	0.0	0.56				
	dist	TI5	0	2	0.0	0.48				
Fibula										
	prox	FI1	0	2	0.0	0.39				
	int	FI2	0	2	0.0	0.78				
	int	FI3	0	2	0.0	0.90				
	int	FI4	0	2	0.0	0.88				
	dist	FI5	0	2	0.0	0.76				

Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	0	10	0.0	N/A	Metatarsals	0	0	N/A
HF						phalanges	0	0	N/A
HF phalange	N/A	0	28	0.0	N/A	Rear Flipper		0	4.76

PaJs-3-20

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R, 1L	1	41.34
Mandible						bulla			
prox	DN6	6	2	3.0	0.89	Mandible	3R, 3L	3	8.81
dist	DN2	6	2	3.0	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	3	3	N/A
	AT2	3	1	3.0	0.52				
Axis	AX1	2	1	2.0	0.56	Axis	2	2	N/A
	AX2	3	1	3.0	0.49				
Cervical	N/A	4	5	0.8	N/A	Cervical	4	1	58.95
Thoracic	TH1	10	13	0.8	0.39	Thoracic	10	1	35.48
Lumbar	LUI	10	6	1.7	0.38	Lumbar	10	2	53.12
Baccula	N/A	2	1	2.0	N/A	Baccula	2	2	N/A
Sacrum	SC1	2	1	2.0	0.43	Sacrum	3	3	N/A
Caudal	N/A	3	11	0.3	N/A	Caudal	3	1	
Rib									
prox	RI1	23	26	0.9	0.40	Ribs	23	1	100.00
int	RI4	23	26	0.9	0.63				
dist	RI5	23	26	0.9	0.29				
Sternum	N/A	1	8	0.1	N/A	Sternum	2	1	6.58
Scapula									
prox	SP2	4	2	2.0	0.48	Scapula	1R, 3L	3	31.37
dist	SP5	6	2	3.0	0.41				
Humerus									
prox	HU1	5	2	2.5	0.43	Humerus	3R, 6L	6	20.95
int	HU3	8	2	4.0	0.57				
dist	HU5	9	2	4.5	0.60				
Radius									
prox	RA1	11	2	5.5	0.63	Radius	8R, 7L	8	
dist	RA5	7	2	3.5	0.45	Ulna	1R, 4L	4	
Ulna						(Rad+Ulna)		8	15.45
prox	UL2	4	2	2.0	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	29	14	2.1	N/A	Carpals	29	3	N/A
Metacarpal	N/A	8	10	0.8	N/A	Metacarpals	8	1	N/A
Front Flipper	N/A	35	28	1.3	N/A	FF phal	35	2	N/A

FF phalange						Front flipper		3	2.86
Innominate									
acetabulum	AC1	5	2	2.5	0.47	Innominate	2R, 3L	3	58.68
illium	IL1	5	2	2.5	0.60				
ischium	IS3	21	2	10.5	0.55				
Femur									
prox	FE1	9	2	4.5	0.50	Femur	4R, 6L	6	10.81
prox	FE3	8	2	4.0	0.52				
int	FE4	16	2	8.0	0.69				
dist	FE6	9	2	4.5	0.57				
Tibia									
prox	TI1	15	2	7.5	0.39	Tibia	10R, 10L	10	
int	TI2	15	2	7.5	0.47	Fibia	4R, 5L	5	
int	TI3	29	2	14.5	0.86	Tibio-Fibula		10	29.97
int	TI4	16	2	8.0	0.56				
dist	TI5	18	2	9.0	0.48				
Fibula									
prox	FI1	4	2	2.0	0.39				
int	FI2	7	2	3.5	0.78				
int	FI3	22	2	11.0	0.90				
int	FI4	9	2	4.5	0.88				
dist	FI5	6	2	3.0	0.76				
Calcaneus	CA2	6	2	3.0	0.45	Calcaneous	2R, 4L	4	N/A
Astragalus	AS3	3	2	1.5	0.56	Astragalus	3R	3	N/A
Cuboid	CU1	5	2	2.5	0.56	Cuboid	4R, 1L	4	N/A
Navicular	NA1	2	2	1.0	0.57	Navicular	2L	2	N/A
Other Tarsal	N/A	9	6	1.5	N/A	Oth. Tarsal	9	2	N/A
Metatarsal	N/A	25	10	2.5	N/A	Metatarsals	25	3	N/A
HF						phalanges	30	2	N/A
HF phalange	N/A	30	28	1.1	N/A	Rear Flipper		4	4.76

PaJs-3-21

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	6	1	6.0	N/A	Skull	4R, 6L	6	41.34
Mandible						bulla			
prox	DN6	9	2	4.5	0.89	Mandible	4R, 7L	7	8.81
dist	DN2	13	2	6.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	2	1	2.0	0.56	Axis	3	3	N/A
	AX2	3	1	3.0	0.49				
Cervical	N/A	6	5	1.2	N/A	Cervical	6	2	58.95
Thoracic	TH1	6	13	0.5	0.39	Thoracic	6	1	35.48
Lumbar	LUI	6	6	1.0	0.38	Lumbar	7	2	53.12
Baccula	N/A	2	1	2.0	N/A	Baccula	2	2	N/A
Sacrum	SC1	4	1	4.0	0.43	Sacrum	4	4	N/A

Caudal	N/A	4	11	0.4	N/A	Caudal	4	1	
Rib									
prox	RI1	28	26	1.1	0.40	Ribs	28	2	100.00
int	RI4	28	26	1.1	0.63				
dist	RI5	28	26	1.1	0.29				
Sternum	N/A	10	8	1.3	N/A	Sternum	10	2	6.58
Scapula									
prox	SP2	12	2	6.0	0.48	Scapula	7R, 5L	7	31.37
dist	SP5	8	2	4.0	0.41				
Humerus									
prox	HU1	10	2	5.0	0.43	Humerus	12R, 12L	12	20.95
int	HU3	26	2	13.0	0.57				
dist	HU5	16	2	8.0	0.60				
Radius									
prox	RA1	6	2	3.0	0.63	Radius	4R, 8L	8	
dist	RA5	4	2	2.0	0.45	Ulna	4R, 3L	4	
Ulna						(Rad+Ulna)		8	15.45
prox	UL2	9	2	4.5	0.66				
dist	UL3	3	2	1.5	0.35				
Carpal	N/A	29	14	2.1	N/A	Carpals	29	3	N/A
Metacarpal	N/A	36	10	3.6	N/A	Metacarpals	36	4	N/A
Front Flipper	N/A	31	28	1.1	N/A	FF phal	31	2	N/A
FF phalange						Front flipper		4	2.86
Innominate									
acetabulum	AC1	12	2	6.0	0.47	Innominate	4R, 8L	8	58.68
illium	IL1	12	2	6.0	0.60				
ischium	IS3	31	2	15.5	0.55				
Femur									
prox	FE1	11	2	5.5	0.50	Femur	6R, 9L	9	10.81
prox	FE3	13	2	6.5	0.52				
int	FE4	19	2	9.5	0.69				
dist	FE6	12	2	6.0	0.57				
Tibia									
prox	TI1	13	2	6.5	0.39	Tibia	8R, 6L	8	
int	TI2	14	2	7.0	0.47	Fibia	4R, 2L	4	
int	TI3	25	2	12.5	0.86	Tibio-Fibula		8	29.97
int	TI4	11	2	5.5	0.56				
dist	TI5	10	2	5.0	0.48				
Fibula									
prox	FI1	4	2	2.0	0.39				
int	FI2	7	2	3.5	0.78				
int	FI3	16	2	8.0	0.90				
int	FI4	4	2	2.0	0.88				
dist	FI5	4	2	2.0	0.76				
Calcaneus	CA2	7	2	3.5	0.45	Calcaneous	4R, 3L	4	N/A
Astragalus	AS3	7	2	3.5	0.56	Astragalus	4R, 3L	4	N/A
Cuboid	CU1	7	2	3.5	0.56	Cuboid	5R, 2L	5	N/A
Navicular	NA1	6	2	3.0	0.57	Navicular	3R, 3L	3	N/A
Other Tarsal	N/A	10	6	1.7	N/A	Oth. Tarsal	10	2	N/A
Metatarsal	N/A	26	10	2.6	N/A	Metatarsals	26	3	N/A

HF						phalanges	65	3	N/A
HF phalange	N/A	65	28	2.3	N/A	Rear Flipper		5	4.76

PaJs-3-22

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	2	13	0.2	0.39	Thoracic	2	1	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	2	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	1	1	1.0	0.43	Sacrum	2	2	N/A
Caudal	N/A	1	11	0.1	N/A	Caudal	1	1	
Rib									
prox	RI1	1	26	0.0	0.40	Ribs	2	1	100.00
int	RI4	3	26	0.1	0.63				
dist	RI5	1	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	1R, 1L	1	31.37
dist	SP5	2	2	1.0	0.41				
Humerus									
prox	HU1	2	2	1.0	0.43	Humerus	2R	2	20.95
int	HU3	2	2	1.0	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R	1	
dist	RA5	1	2	0.5	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	2	14	0.1	N/A	Carpals	2	1	N/A
Metacarpal	N/A	3	10	0.3	N/A	Metacarpals	3	1	N/A
Front Flipper	N/A	2	28	0.1	N/A	FF phal	2	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									

prox	FE1	1	2	0.5	0.50	Femur	1R, 1L	1	10.81
prox	FE3	2	2	1.0	0.52				
int	FE4	2	2	1.0	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	1L	1	
int	TI2	1	2	0.5	0.47	Fibia	1R	1	
int	TI3	2	2	1.0	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	1	2	0.5	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1R	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	3	10	0.3	N/A	Metatarsals	3	1	N/A
HF						phalanges	6	1	N/A
HF phalange	N/A	6	28	0.2	N/A	Rear Flipper		1	4.76

PaJs-3-23

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	0	26	0.0	0.40	Ribs	0	0	100.00
int	RI4	0	26	0.0	0.63				
dist	RI5	0	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58

Scapula									
prox	SP2	2	2	1.0	0.48	Scapula	2L	2	31.37
dist	SP5	1	2	0.5	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	1R	1	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	0	2	0.0	0.63	Radius	0	0	
dist	RA5	0	2	0.0	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		0	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	6	14	0.4	N/A	Carpals	6	1	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	3	28	0.1	N/A	FF phal	3	1	N/A
FF phalange						Front flipper			2.86
Innominate									
acetabulum	AC1	1	2	0.5	0.47	Innominate	1R	1	58.68
illium	IL1	1	2	0.5	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	0	0	
int	TI2	0	2	0.0	0.47	Fibia	0	0	
int	TI3	0	2	0.0	0.86	Tibio-Fibula		0	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	0	2	0.0	0.90				
int	FI4	0	2	0.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	2	10	0.2	N/A	Metatarsals	2	1	N/A
HF						phalanges	3	1	N/A
HF phalange	N/A	3	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-3-24

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1L	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	1	26	0.0	0.40	Ribs	2	1	100.00
int	RI4	20	26	0.8	0.63				
dist	RI5	1	26	0.0	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	0	2	0.0	0.48	Scapula	1	1	31.37
dist	SP5	1	2	0.5	0.41				
Humerus									
prox	HU1	0	2	0.0	0.43	Humerus	0	0	20.95
int	HU3	0	2	0.0	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	2R	2	
dist	RA5	1	2	0.5	0.45	Ulna	0	0	
Ulna						(Rad+Ulna)		2	15.45
prox	UL2	0	2	0.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	0	14	0.0	N/A	Carpals	0	0	N/A
Metacarpal	N/A	0	10	0.0	N/A	Metacarpals	0	0	N/A
Front Flipper	N/A	1	28	0.0	N/A	FF phal	1	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	1	2	0.5	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	0	0	10.81
prox	FE3	0	2	0.0	0.52				
int	FE4	0	2	0.0	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	1R	1	
int	TI2	0	2	0.0	0.47	Fibia	1L	1	
int	TI3	2	2	1.0	0.86	Tibio-Fibula		1	29.97
int	TI4	0	2	0.0	0.56				
dist	TI5	0	2	0.0	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	2	2	1.0	0.90				
int	FI4	1	2	0.5	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1R	1	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	3	10	0.3	N/A	Metatarsals	3	1	N/A
HF						phalanges	6	1	N/A
HF phalange	N/A	6	28	0.2	N/A	Rear Flipper		1	4.76

PaJs-3

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	19	1	19.0	N/A	Skull	19R, 12L	19	41.34
Mandible						bulla			
prox	DN6	40	2	20.0	0.89	Mandible	16R, 26L	26	8.81
dist	DN2	49	2	24.5	0.84				
Atlas	AT1	8	1	8.0	0.54	Atlas	9	9	N/A
	AT2	10	1	10.0	0.52				
Axis	AX1	9	1	9.0	0.56	Axis	12	12	N/A
	AX2	11	1	11.0	0.49				
Cervical	N/A	19	5	3.8	N/A	Cervical	19	4	58.95
Thoracic	TH1	52	13	4.0	0.39	Thoracic	53	5	35.48
Lumbar	LUI	28	6	4.7	0.38	Lumbar	29	5	53.12
Baccula	N/A	4	1	4.0	N/A	Baccula	4	4	N/A
Sacrum	SC1	4	1	4.0	0.43	Sacrum	7	7	N/A
Caudal	N/A	37	11	3.4	N/A	Caudal	38	4	
Rib									
prox	RI1	130	26	5.0	0.40	Ribs	130	0	100.00
int	RI4	130	26	5.0	0.63				
dist	RI5	130	26	5.0	0.29				
Sternum	N/A	14	8	1.8	N/A	Sternum	15	2	6.58
Scapula									
prox	SP2	26	2	13.0	0.48	Scapula	10R, 16L	16	31.37
dist	SP5	23	2	11.5	0.41				
Humerus									

prox	HU1	21	2	10.5	0.43	Humerus	19R, 23L	23	20.95
int	HU3	51	2	25.5	0.57				
dist	HU5	35	2	17.5	0.60				
Radius									
prox	RA1	34	2	17.0	0.63	Radius	30R, 26L	30	
dist	RA5	23	2	11.5	0.45	Ulna	10R, 13L	13	
Ulna						(Rad+Ulna)		30	15.45
prox	UL2	33	2	16.5	0.66				
dist	UL3	11	2	5.5	0.35				
Carpal	N/A	142	14	10.1	N/A	Carpals	142	11	N/A
Metacarpal	N/A	130	10	13.0	N/A	Metacarpals	130	13	N/A
Front Flipper	N/A	230	28	8.2	N/A	FF phal	230	9	N/A
FF phalange						Front flipper		13	2.86
Innominate									
acetabulum	AC1	28	2	14.0	0.47	Innominate	11R, 16L	16	58.68
illium	IL1	28	2	14.0	0.60				
ischium	IS3	28	2	14.0	0.55				
Femur									
prox	FE1	39	2	19.5	0.50	Femur	18R, 23L	23	10.81
prox	FE3	38	2	19.0	0.52				
int	FE4	61	2	30.5	0.69				
dist	FE6	34	2	17.0	0.57				
Tibia									
prox	TI1	40	2	20.0	0.39	Tibia	23R, 26L	26	
int	TI2	45	2	22.5	0.47	Fibia	19R, 19L	19	
int	TI3	88	2	44.0	0.86	Tibio-Fibula		26	29.97
int	TI4	40	2	20.0	0.56				
dist	TI5	40	2	20.0	0.48				
Fibula									
prox	FI1	21	2	10.5	0.39				
int	FI2	34	2	17.0	0.78				
int	FI3	68	2	34.0	0.90				
int	FI4	38	2	19.0	0.88				
dist	FI5	26	2	13.0	0.76				
Calcaneus	CA2	31	2	15.5	0.45	Calcaneous	17R, 14L	17	N/A
Astragalus	AS3	27	2	13.5	0.56	Astragalus	16R, 11L	16	N/A
Cuboid	CU1	27	2	13.5	0.56	Cuboid	15R, 12L	15	N/A
Navicular	NA1	15	2	7.5	0.57	Navicular	7R, 8L	8	N/A
Other Tarsal	N/A	51	6	8.5	N/A	Oth. Tarsal	51	9	N/A
Metatarsal	N/A	159	10	15.9	N/A	Metatarsals	159	16	N/A
HF						phalanges	239	9	N/A
HF phalange	N/A	239	28	8.5	N/A	Rear Flipper		17	4.76

PaJs-4-1

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	6	1	6.0	N/A	Skull	6R, 4L	6	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	2R, 1L	2	8.81
dist	DN2	3	2	1.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	1	1	1.0	0.56	Axis	1	1	N/A
	AX2		1	0.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	8	13	0.6	0.39	Thoracic	9	1	35.48
Lumbar	LUI	3	6	0.5	0.38	Lumbar	4	1	53.12
Baccula	N/A	2	1	2.0	N/A	Baccula	2	2	N/A
Sacrum	SC1	4	1	4.0	0.43	Sacrum	5	5	N/A
Caudal	N/A	8	11	0.7	N/A	Caudal	8	1	
Rib									
prox	RI1	31	26	1.2	0.40	Ribs	31	2	100.00
int	RI4	31	26	1.2	0.63				
dist	RI5	31	26	1.2	0.29				
Sternum	N/A	6	8	0.8	N/A	Sternum	6	1	6.58
Scapula									
prox	SP2	3	2	1.5	0.48	Scapula	3L	3	31.37
dist	SP5	2	2	1.0	0.41				
Humerus									
prox	HU1	2	2	1.0	0.43	Humerus	2R, 2L	2	20.95
int	HU3	3	2	1.5	0.57				
dist	HU5	2	2	1.0	0.60				
Radius									
prox	RA1	5	2	2.5	0.63	Radius	5L	5	
dist	RA5	2	2	1.0	0.45	Ulna	3R, 4L	4	
Ulna						(Rad+Ulna)		5	15.45
prox	UL2	4	2	2.0	0.66				
dist	UL3	5	2	2.5	0.35				
Carpal	N/A	14	14	1.0	N/A	Carpals	14	1	N/A
Metacarpal	N/A	11	10	1.1	N/A	Metacarpals	11	2	N/A
Front Flipper	N/A	33	28	1.2	N/A	FF phal	33	2	N/A
FF phalange						Front flipper		2	2.86
Innominate									
acetabulum	AC1	2	2	1.0	0.47	Innominate	1R, 1L	1	58.68
illium	IL1	2	2	1.0	0.60				
ischium	IS3	9	2	4.5	0.55				
Femur									
prox	FE1	2	2	1.0	0.50	Femur	2R, 1L	2	10.81
prox	FE3	3	2	1.5	0.52				
int	FE4	5	2	2.5	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	2	2	1.0	0.39	Tibia	8R, 5L	8	
int	TI2	1	2	0.5	0.47	Fibia	6R, 7L	7	
int	TI3	5	2	2.5	0.86	Tibio-Fibula		8	29.97
int	TI4	13	2	6.5	0.56				
dist	TI5	9	2	4.5	0.48				
Fibula									
prox	FI1	2	2	1.0	0.39				
int	FI2	1	2	0.5	0.78				
int	FI3	17	2	8.5	0.90				
int	FI4	13	2	6.5	0.88				
dist	FI5	11	2	5.5	0.76				
Calcanous	CA2	2	2	1.0	0.45	Calcaneous	2L	2	N/A
Astragalus	AS3	5	2	2.5	0.56	Astragalus	5L	5	N/A
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1L	1	N/A
Navicular	NA1	2	2	1.0	0.57	Navicular	2L	2	N/A
Other Tarsal	N/A	6	6	1.0	N/A	Oth. Tarsal	6	1	N/A
Metatarsal	N/A	38	10	3.8	N/A	Metatarsals	38	4	N/A
HF						phalanges	34	2	N/A
HF phalange	N/A	34	28	1.2	N/A	Rear Flipper		5	4.76

PaJs-4-2

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	2	1	2.0	N/A	Skull	2R, 2L	2	41.34
Mandible						bulla			
prox	DN6	6	2	3.0	0.89	Mandible	2R, 4L	4	8.81
dist	DN2	6	2	3.0	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	2	2	N/A
	AT2		1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	1	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	8	26	0.3	0.40	Ribs	8	1	100.00
int	RI4	8	26	0.3	0.63				
dist	RI5	8	26	0.3	0.29				
Sternum	N/A	1	8	0.1	N/A	Sternum	1	1	6.58
Scapula									
prox	SP2	5	2	2.5	0.48	Scapula	2R, 3L	3	31.37
dist	SP5	6	2	3.0	0.41				
Humerus									

prox	HU1	4	2	2.0	0.43	Humerus	4R, 2L	4	20.95
int	HU3	6	2	3.0	0.57				
dist	HU5	3	2	1.5	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	3R, 1L	3	
dist	RA5	2	2	1.0	0.45	Ulna	2R, 2L	2	
Ulna						(Rad+Ulna)		3	15.45
prox	UL2	4	2	2.0	0.66				
dist	UL3	0	2	0.0	0.35				
Carpal	N/A	3	14	0.2	N/A	Carpals	3	1	N/A
Metacarpal	N/A	6	10	0.6	N/A	Metacarpals	6	1	N/A
Front Flipper	N/A	7	28	0.3	N/A	FF phal	7	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	1	2	0.5	0.47	Innominate	1R	1	58.68
illium	IL1	1	2	0.5	0.60				
ischium	IS3	1	2	0.5	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	1R	1	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	1	2	0.5	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	9R, 10L	10	
int	TI2	8	2	4.0	0.47	Fibia	16R, 18L	18	
int	TI3	15	2	7.5	0.86	Tibio-Fibula		18	29.97
int	TI4	16	2	8.0	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	2	2	1.0	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	23	2	11.5	0.90				
int	FI4	34	2	17.0	0.88				
dist	FI5	13	2	6.5	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1R	1	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1R	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	2	2	1.0	0.57	Navicular	2R	2	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	9	10	0.9	N/A	Metatarsals	9	1	N/A
HF						phalanges	17	1	N/A
HF phalange	N/A	17	28	0.6	N/A	Rear Flipper		2	4.76

PaJs-4-3

Element		Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head		N/A	2	1	2.0	N/A	Skull bulla	1R, 2L	2	41.34
Mandible										
	prox	DN6	1	2	0.5	0.89	Mandible	1R	1	8.81
	dist	DN2	2	2	1.0	0.84				
Atlas		AT1	1	1	1.0	0.54	Atlas	1	1	N/A
		AT2	1	1	1.0	0.52				
Axis		AX1	0	1	0.0	0.56	Axis	0	0	N/A
		AX2	0	1	0.0	0.49				
Cervical		N/A	4	5	0.8	N/A	Cervical	4	1	58.95
Thoracic		TH1	11	13	0.8	0.39	Thoracic	11	1	35.48
Lumbar		LUI	2	6	0.3	0.38	Lumbar	3	1	53.12
Baccula		N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum		SC1	1	1	1.0	0.43	Sacrum	1	1	N/A
Caudal		N/A	5	11	0.5	N/A	Caudal	5	1	
Rib										
	prox	RI1	40	26	1.5	0.40	Ribs	40	2	100.00
	int	RI4	40	26	1.5	0.63				
	dist	RI5	40	26	1.5	0.29				
Sternum		N/A	2	8	0.3	N/A	Sternum	2	1	6.58
Scapula										
	prox	SP2	1	2	0.5	0.48	Scapula	1R, 1L	1	31.37
	dist	SP5	3	2	1.5	0.41				
Humerus										
	prox	HU1	1	2	0.5	0.43	Humerus	1R	1	20.95
	int	HU3	2	2	1.0	0.57				
	dist	HU5	1	2	0.5	0.60				
Radius										
	prox	RA1	1	2	0.5	0.63	Radius	4R	4	
	dist	RA5	1	2	0.5	0.45	Ulna	3	3	
Ulna							(Rad+Ulna)		4	15.45
	prox	UL2	2	2	1.0	0.66				
	dist	UL3	1	2	0.5	0.35				
Carpal		N/A	3	14	0.2	N/A	Carpals	3	1	N/A
Metacarpal		N/A	6	10	0.6	N/A	Metacarpals	6	1	N/A
Front Flipper		N/A	23	28	0.8	N/A	FF phal	23	1	N/A
FF phalange							Front flipper		1	2.86
Innominate										
	acetabulum	AC1	2	2	1.0	0.47	Innominate	1R, 1L	1	58.68
	illium	IL1	1	2	0.5	0.60				
	ischium	IS3	2	2	1.0	0.55				
Femur										
	prox	FE1	2	2	1.0	0.50	Femur	3R, 1L	3	10.81
	prox	FE3	4	2	2.0	0.52				
	int	FE4	4	2	2.0	0.69				
	dist	FE6	2	2	1.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	5R, 3L	5	
int	TI2	1	2	0.5	0.47	Fibia	5L	5	
int	TI3	7	2	3.5	0.86	Tibio-Fibula		5	29.97
int	TI4	13	2	6.5	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	3	2	1.5	0.90				
int	FI4	5	2	2.5	0.88				
dist	FI5	2	2	1.0	0.76				
Calcaneus	CA2	1	2	0.5	0.45	Calcaneous	1L	1	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	2L	2	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	3	6	0.5	N/A	Oth. Tarsal	3	1	N/A
Metatarsal	N/A	13	10	1.3	N/A	Metatarsals	13	2	N/A
HF						phalanges	15	1	N/A
HF phalange	N/A	15	28	0.5	N/A	Rear Flipper		2	4.76

PaJs-4-4

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1R, 1L	1	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1R	1	8.81
dist	DN2	2	2	1.0	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	2	2	N/A
	AT2	2	1	2.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	5	5	1.0	N/A	Cervical	5	1	58.95
Thoracic	TH1	3	13	0.2	0.39	Thoracic	3	1	35.48
Lumbar	LUI	3	6	0.5	0.38	Lumbar	3	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	25	26	1.0	0.40	Ribs	25	1	100.00
int	RI4	25	26	1.0	0.63				
dist	RI5	25	26	1.0	0.29				
Sternum	N/A	1	8	0.1	N/A	Sternum	1	1	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1R, 1L	1	31.37
dist	SP5	2	2	1.0	0.41				
Humerus									

prox	HU1	1	2	0.5	0.43	Humerus	1R, 1L	1	20.95
int	HU3	2	2	1.0	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	5	2	2.5	0.63	Radius	5R	5	
dist	RA5	2	2	1.0	0.45	Ulna	5R, 4L	5	
Ulna						(Rad+Ulna)		10	15.45
prox	UL2	7	2	3.5	0.66				
dist	UL3	4	2	2.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	2	10	0.2	N/A	Metacarpals	2	1	N/A
Front Flipper	N/A	11	28	0.4	N/A	FF phal	11	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	1	2	0.5	0.55				
Femur									
prox	FE1	3	2	1.5	0.50	Femur	1R, 3L	3	10.81
prox	FE3	4	2	2.0	0.52				
int	FE4	6	2	3.0	0.69				
dist	FE6	2	2	1.0	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	2R, 1L	2	
int	TI2	0	2	0.0	0.47	Fibia	1R, 1L	1	
int	TI3	3	2	1.5	0.86	Tibio-Fibula		2	29.97
int	TI4	3	2	1.5	0.56				
dist	TI5	1	2	0.5	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	2	2	1.0	0.90				
int	FI4	2	2	1.0	0.88				
dist	FI5	2	2	1.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	2R	2	N/A
Cuboid	CU1	2	2	1.0	0.56	Cuboid	2L	2	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	2	6	0.3	N/A	Oth. Tarsal	2	1	N/A
Metatarsal	N/A	4	10	0.4	N/A	Metatarsals	4	1	N/A
HF						phalanges	11	1	N/A
HF phalange	N/A	11	28	0.4	N/A	Rear Flipper		2	4.76

PaJs-4-5

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	3	1	3.0	N/A	Skull	3L	3	41.34
Mandible						bulla			
prox	DN6	2	2	1.0	0.89	Mandible	1R, 2L	2	8.81
dist	DN2	3	2	1.5	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	2	2	N/A
	AT2	2	1	2.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	1	1	N/A
	AX2	1	1	1.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	5	13	0.4	0.39	Thoracic	5	1	35.48
Lumbar	LUI	5	6	0.8	0.38	Lumbar	5	1	53.12
Baccula	N/A	3	1	3.0	N/A	Baccula	3	3	N/A
Sacrum	SC1	2	1	2.0	0.43	Sacrum	2	2	N/A
Caudal	N/A	8	11	0.7	N/A	Caudal	8	1	
Rib									
prox	RI1	7	26	0.3	0.40	Ribs	7	7	100.00
int	RI4	7	26	0.3	0.63				
dist	RI5	7	26	0.3	0.29				
Sternum	N/A	2	8	0.3	N/A	Sternum	2	2	6.58
Scapula									
prox	SP2	5	2	2.5	0.48	Scapula	3R, 2L	3	31.37
dist	SP5	7	2	3.5	0.41				
Humerus									
prox	HU1	2	2	1.0	0.43	Humerus	2R, 5L	5	20.95
int	HU3	7	2	3.5	0.57				
dist	HU5	3	2	1.5	0.60				
Radius									
prox	RA1	11	2	5.5	0.63	Radius	9R, 4L	9	
dist	RA5	5	2	2.5	0.45	Ulna	2R, 5L	5	
Ulna						(Rad+Ulna)		9	15.45
prox	UL2	10	2	5.0	0.66				
dist	UL3	5	2	2.5	0.35				
Carpal	N/A	6	14	0.4	N/A	Carpals	6	1	N/A
Metacarpal	N/A	10	10	1.0	N/A	Metacarpals	10	1	N/A
Front Flipper	N/A	38	28	1.4	N/A	FF phal	38	2	N/A
FF phalange						Front flipper		2	2.86
Innominate									
acetabulum	AC1	5	2	2.5	0.47	Innominate	4R, 2L	4	58.68
illium	IL1	5	2	2.5	0.60				
ischium	IS3	10	2	5.0	0.55				
Femur									
prox	FE1	5	2	2.5	0.50	Femur	2R, 4L	4	10.81
prox	FE3	5	2	2.5	0.52				
int	FE4	4	2	2.0	0.69				
dist	FE6	3	2	1.5	0.57				

Tibia									
prox	TI1	2	2	1.0	0.39	Tibia	16R, 7L	16	
int	TI2	5	2	2.5	0.47	Fibia	14R, 12L	14	
int	TI3	14	2	7.0	0.86	Tibio-Fibula		16	29.97
int	TI4	20	2	10.0	0.56				
dist	TI5	6	2	3.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	2	2	1.0	0.78				
int	FI3	12	2	6.0	0.90				
int	FI4	26	2	13.0	0.88				
dist	FI5	14	2	7.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1R	1	N/A
Cuboid	CU1	1	2	0.5	0.56	Cuboid	1L	1	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	N/A
Other Tarsal	N/A	2	6	0.3	N/A	Oth. Tarsal	2	1	N/A
Metatarsal	N/A	18	10	1.8	N/A	Metatarsals	18	2	N/A
HF						phalanges	28	1	N/A
HF phalange	N/A	28	28	1.0	N/A	Rear Flipper		2	4.76

PaJs-4-6

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1	1	41.34
Mandible						bulla			
prox	DN6	2	2	1.0	0.89	Mandible	1R, 1L	1	8.81
dist	DN2	6	2	3.0	0.84				
Atlas	AT1	1	1	1.0	0.54	Atlas	1	1	N/A
	AT2	1	1	1.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	3	5	0.6	N/A	Cervical	3	1	58.95
Thoracic	TH1	4	13	0.3	0.39	Thoracic	4	1	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	3	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	1	1	1.0	0.43	Sacrum	1	1	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	21	26	0.8	0.40	Ribs	21	1	100.00
int	RI4	21	26	0.8	0.63				
dist	RI5	21	26	0.8	0.29				
Sternum	N/A	7	8	0.9	N/A	Sternum	8	1	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	2R, 1L	2	31.37
dist	SP5	4	2	2.0	0.41				
Humerus									

prox	HU1	2	2	1.0	0.43	Humerus	2L	2	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	1	2	0.5	0.60				
Radius									
prox	RA1	3	2	1.5	0.63	Radius	2R, 3L	3	
dist	RA5	4	2	2.0	0.45	Ulna	1R, 2L	2	
Ulna						(Rad+Ulna)		3	15.45
prox	UL2	3	2	1.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	2	14	0.1	N/A	Carpals	2	1	N/A
Metacarpal	N/A	4	10	0.4	N/A	Metacarpals	4	1	N/A
Front Flipper	N/A	24	28	0.9	N/A	FF phal	24	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	1	2	0.5	0.47	Innominate	1R, 1L	1	58.68
illium	IL1	1	2	0.5	0.60				
ischium	IS3	8	2	4.0	0.55				
Femur									
prox	FE1	2	2	1.0	0.50	Femur	1R, 1L	1	10.81
prox	FE3	2	2	1.0	0.52				
int	FE4	2	2	1.0	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	2	2	1.0	0.39	Tibia	6R	6	
int	TI2	6	2	3.0	0.47	Fibia	11R, 9L	11	
int	TI3	3	2	1.5	0.86	Tibio-Fibula		11	29.97
int	TI4	3	2	1.5	0.56				
dist	TI5	2	2	1.0	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	4	2	2.0	0.78				
int	FI3	13	2	6.5	0.90				
int	FI4	20	2	10.0	0.88				
dist	FI5	10	2	5.0	0.76				
Calcaneus	CA2	2	2	1.0	0.45	Calcaneous	2R	2	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1R	1	N/A
Cuboid	CU1	5	2	2.5	0.56	Cuboid	4L	4	N/A
Navicular	NA1	3	2	1.5	0.57	Navicular	3L	3	N/A
Other Tarsal	N/A	3	6	0.5	N/A	Oth. Tarsal	3	1	N/A
Metatarsal	N/A	19	10	1.9	N/A	Metatarsals	19	2	N/A
HF						phalanges	26	1	N/A
HF phalange	N/A	26	28	0.9	N/A	Rear Flipper		4	4.76

PaJs-4-7

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	1	1	1.0	N/A	Skull	1L	1	41.34
Mandible						bulla			
prox	DN6	3	2	1.5	0.89	Mandible	2R, 3L	3	8.81
dist	DN2	6	2	3.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	6	5	1.2	N/A	Cervical	6	2	58.95
Thoracic	TH1	5	13	0.4	0.39	Thoracic	7	1	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	2	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	5	11	0.5	N/A	Caudal	7	1	
Rib									
prox	RI1	20	26	0.8	0.40	Ribs	20	1	100.00
int	RI4	20	26	0.8	0.63				
dist	RI5	20	26	0.8	0.29				
Sternum	N/A	11	8	1.4	N/A	Sternum	11	2	6.58
Scapula									
prox	SP2	3	2	1.5	0.48	Scapula	2R, 1L	2	31.37
dist	SP5	6	2	3.0	0.41				
Humerus									
prox	HU1	3	2	1.5	0.43	Humerus	1R, 4L	4	20.95
int	HU3	3	2	1.5	0.57				
dist	HU5	4	2	2.0	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	3R, 1L	3	
dist	RA5	3	2	1.5	0.45	Ulna	5R, 1L	5	
Ulna						(Rad+Ulna)		5	15.45
prox	UL2	5	2	2.5	0.66				
dist	UL3	5	2	2.5	0.35				
Carpal	N/A	9	14	0.6	N/A	Carpals	9	1	N/A
Metacarpal	N/A	13	10	1.3	N/A	Metacarpals	13	2	N/A
Front Flipper	N/A	45	28	1.6	N/A	FF phal	45	2	N/A
FF phalange						Front flipper		2	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	6	2	3.0	0.50	Femur	4R, 2L	4	10.81
prox	FE3	4	2	2.0	0.52				
int	FE4	5	2	2.5	0.69				
dist	FE6	4	2	2.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	3R, 3L	3	
int	TI2	1	2	0.5	0.47	Fibia	5R, 7L	7	
int	TI3	10	2	5.0	0.86	Tibio-Fibula		7	29.97
int	TI4	6	2	3.0	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	3	2	1.5	0.78				
int	FI3	11	2	5.5	0.90				
int	FI4	12	2	6.0	0.88				
dist	FI5	6	2	3.0	0.76				
Calcaneus	CA2	3	2	1.5	0.45	Calcaneous	2R, 1L	2	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	2L	2	N/A
Cuboid	CU1	2	2	1.0	0.56	Cuboid	2R	2	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	N/A
Other Tarsal	N/A	4	6	0.7	N/A	Oth. Tarsal	4	1	N/A
Metatarsal	N/A	21	10	2.1	N/A	Metatarsals	21	3	N/A
HF						phalanges	21	1	N/A
HF phalange	N/A	21	28	0.8	N/A	Rear Flipper		3	4.76

PaJs-4-8

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	2	1	2.0	N/A	Skull	2R, 1L	2	41.34
Mandible						bulla			
prox	DN6	5	2	2.5	0.89	Mandible	4R, 1L	4	8.81
dist	DN2	5	2	2.5	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	1	5	0.2	N/A	Cervical	1	1	58.95
Thoracic	TH1	1	13	0.1	0.39	Thoracic	2	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	2	11	0.2	N/A	Caudal	2	1	
Rib									
prox	RI1	7	26	0.3	0.40	Ribs	7	1	100.00
int	RI4	7	26	0.3	0.63				
dist	RI5	7	26	0.3	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	3	2	1.5	0.48	Scapula	1R, 3L	3	31.37
dist	SP5	2	2	1.0	0.41				
Humerus									

prox	HU1	2	2	1.0	0.43	Humerus	1R, 3L	3	20.95
int	HU3	3	2	1.5	0.57				
dist	HU5	3	2	1.5	0.60				
Radius									
prox	RA1	2	2	1.0	0.63	Radius	4R, 2L	4	
dist	RA5	0	2	0.0	0.45	Ulna	2R, 2L	2	
Ulna						(Rad+Ulna)		4	15.45
prox	UL2	5	2	2.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	4	14	0.3	N/A	Carpals	4	1	N/A
Metacarpal	N/A	9	10	0.9	N/A	Metacarpals	9	1	N/A
Front Flipper	N/A	8	28	0.3	N/A	FF phal	8	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	5	2	2.5	0.47	Innominate	2R, 3L	3	58.68
illium	IL1	5	2	2.5	0.60				
ischium	IS3	6	2	3.0	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	2R	2	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	3	2	1.5	0.69				
dist	FE6	1	2	0.5	0.57				
Tibia									
prox	TI1	0	2	0.0	0.39	Tibia	2R, 1L	2	
int	TI2	0	2	0.0	0.47	Fibia	1L	1	
int	TI3	5	2	2.5	0.86	Tibio-Fibula		2	29.97
int	TI4	2	2	1.0	0.56				
dist	TI5	1	2	0.5	0.48				
Fibula									
prox	FI1	0	2	0.0	0.39				
int	FI2	0	2	0.0	0.78				
int	FI3	4	2	2.0	0.90				
int	FI4	2	2	1.0	0.88				
dist	FI5	0	2	0.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	1R, 1L	1	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	5	10	0.5	N/A	Metatarsals	5	1	N/A
HF						phalanges	4	1	N/A
HF phalange	N/A	4	28	0.1	N/A	Rear Flipper		1	4.76

PaJs-4-9

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	0	5	0.0	N/A	Cervical	0	0	58.95
Thoracic	TH1	0	13	0.0	0.39	Thoracic	0	0	35.48
Lumbar	LUI	0	6	0.0	0.38	Lumbar	0	0	53.12
Baccula	N/A	1	1	1.0	N/A	Baccula	1	1	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	7	26	0.3	0.40	Ribs	7	1	100.00
int	RI4	7	26	0.3	0.63				
dist	RI5	7	26	0.3	0.29				
Sternum	N/A	0	8	0.0	N/A	Sternum	0	0	6.58
Scapula									
prox	SP2	2	2	1.0	0.48	Scapula	2R	2	31.37
dist	SP5	1	2	0.5	0.41				
Humerus									
prox	HU1	1	2	0.5	0.43	Humerus	1R, 2L	2	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	2	2	1.0	0.60				
Radius									
prox	RA1	1	2	0.5	0.63	Radius	1R, 1L	1	
dist	RA5	2	2	1.0	0.45	Ulna	1R, 1L	1	
Ulna						(Rad+Ulna)		1	15.45
prox	UL2	1	2	0.5	0.66				
dist	UL3	1	2	0.5	0.35				
Carpal	N/A	9	14	0.6	N/A	Carpals	9	1	N/A
Metacarpal	N/A	5	10	0.5	N/A	Metacarpals	5	1	N/A
Front Flipper	N/A	7	28	0.3	N/A	FF phal	7	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	1	1	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	3	2	1.5	0.55				
Femur									
prox	FE1	0	2	0.0	0.50	Femur	2R	2	10.81
prox	FE3	1	2	0.5	0.52				
int	FE4	2	2	1.0	0.69				
dist	FE6	0	2	0.0	0.57				

Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	5R, 5L	5	
int	TI2	1	2	0.5	0.47	Fibia	13R, 16L	16	
int	TI3	10	2	5.0	0.86	Tibio-Fibula		16	29.97
int	TI4	10	2	5.0	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	2	2	1.0	0.39				
int	FI2	3	2	1.5	0.78				
int	FI3	15	2	7.5	0.90				
int	FI4	29	2	14.5	0.88				
dist	FI5	12	2	6.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	1	2	0.5	0.56	Astragalus	1R	1	N/A
Cuboid	CU1	3	2	1.5	0.56	Cuboid	1R, 2L	2	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	9	10	0.9	N/A	Metatarsals	9	1	N/A
HF						phalanges	2	1	N/A
HF phalange	N/A	2	28	0.1	N/A	Rear Flipper		2	4.76

PaJs-4-10

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	2	1	2.0	N/A	Skull	2R, 1L	2	41.34
Mandible						bulla			
prox	DN6	1	2	0.5	0.89	Mandible	1R	1	8.81
dist	DN2	1	2	0.5	0.84				
Atlas	AT1	2	1	2.0	0.54	Atlas	2	2	N/A
	AT2	2	1	2.0	0.52				
Axis	AX1	1	1	1.0	0.56	Axis	1	1	N/A
	AX2	1	1	1.0	0.49				
Cervical	N/A	3	5	0.6	N/A	Cervical	3	1	58.95
Thoracic	TH1	4	13	0.3	0.39	Thoracic	5	1	35.48
Lumbar	LUI	2	6	0.3	0.38	Lumbar	4	1	53.12
Baccula	N/A	5	1	5.0	N/A	Baccula	5	5	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	20	26	0.8	0.40	Ribs	21	1	100.00
int	RI4	20	26	0.8	0.63				
dist	RI5	20	26	0.8	0.29				
Sternum	N/A	2	8	0.3	N/A	Sternum	3	1	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1R, 2L	2	31.37
dist	SP5	4	2	2.0	0.41				
Humerus									

prox	HU1	3	2	1.5	0.43	Humerus	4R	4	20.95
int	HU3	4	2	2.0	0.57				
dist	HU5	3	2	1.5	0.60				
Radius									
prox	RA1	5	2	2.5	0.63	Radius	7R	7	
dist	RA5	2	2	1.0	0.45	Ulna	2R, 4L	4	
Ulna						(Rad+Ulna)		7	15.45
prox	UL2	5	2	2.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	9	10	0.9	N/A	Metacarpals	9	1	N/A
Front Flipper	N/A	27	28	1.0	N/A	FF phal	27	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	4	2	2.0	0.47	Innominate	5L	5	58.68
illium	IL1	4	2	2.0	0.60				
ischium	IS3	5	2	2.5	0.55				
Femur									
prox	FE1	3	2	1.5	0.50	Femur	3R, 3L	3	10.81
prox	FE3	5	2	2.5	0.52				
int	FE4	6	2	3.0	0.69				
dist	FE6	3	2	1.5	0.57				
Tibia									
prox	TI1	5	2	2.5	0.39	Tibia	3R, 5L	5	
int	TI2	4	2	2.0	0.47	Fibia	16R, 20L	20	
int	TI3	6	2	3.0	0.86	Tibio-Fibula		20	29.97
int	TI4	4	2	2.0	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	4	2	2.0	0.39				
int	FI2	4	2	2.0	0.78				
int	FI3	10	2	5.0	0.90				
int	FI4	36	2	18.0	0.88				
dist	FI5	8	2	4.0	0.76				
Calcaneus	CA2	3	2	1.5	0.45	Calcaneous	2R, 1L	2	N/A
Astragalus	AS3	2	2	1.0	0.56	Astragalus	2L	2	N/A
Cuboid	CU1	2	2	1.0	0.56	Cuboid	1R, 1L	1	N/A
Navicular	NA1	1	2	0.5	0.57	Navicular	1R	1	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	26	10	2.6	N/A	Metatarsals	26	3	N/A
HF						phalanges	27	1	N/A
HF phalange	N/A	27	28	1.0	N/A	Rear Flipper		3	4.76

PaJs-4-11

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	2	2	1.0	0.89	Mandible	2L	2	8.81
dist	DN2	2	2	1.0	0.84				
Atlas	AT1	1	1	1.0	0.54	Atlas	1	1	N/A
	AT2	1	1	1.0	0.52				
Axis	AX1	3	1	3.0	0.56	Axis	3	3	N/A
	AX2	3	1	3.0	0.49				
Cervical	N/A	9	5	1.8	N/A	Cervical	9	2	58.95
Thoracic	TH1	24	13	1.8	0.39	Thoracic	24	2	35.48
Lumbar	LUI	11	6	1.8	0.38	Lumbar	12	2	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	2	1	2.0	0.43	Sacrum	2	2	N/A
Caudal	N/A	6	11	0.5	N/A	Caudal	6	1	
Rib									
prox	RI1	76	26	2.9	0.40	Ribs	76	3	100.00
int	RI4	76	26	2.9	0.63				
dist	RI5	76	26	2.9	0.29				
Sternum	N/A	22	8	2.8	N/A	Sternum	22	3	6.58
Scapula									
prox	SP2	3	2	1.5	0.48	Scapula	1R, 3L	3	31.37
dist	SP5	7	2	3.5	0.41				
Humerus									
prox	HU1	5	2	2.5	0.43	Humerus	3R, 2L	3	20.95
int	HU3	5	2	2.5	0.57				
dist	HU5	5	2	2.5	0.60				
Radius									
prox	RA1	8	2	4.0	0.63	Radius	4R, 5L	5	
dist	RA5	1	2	0.5	0.45	Ulna	4R, 4L	4	
Ulna						(Rad+Ulna)		5	15.45
prox	UL2	5	2	2.5	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	1	14	0.1	N/A	Carpals	1	1	N/A
Metacarpal	N/A	3	10	0.3	N/A	Metacarpals	3	1	N/A
Front Flipper	N/A	13	28	0.5	N/A	FF phal	13	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	3	2	1.5	0.47	Innominate	2R, 3L	3	58.68
illium	IL1	3	2	1.5	0.60				
ischium	IS3	13	2	6.5	0.55				
Femur									
prox	FE1	6	2	3.0	0.50	Femur	1R, 4L	4	10.81
prox	FE3	5	2	2.5	0.52				
int	FE4	5	2	2.5	0.69				
dist	FE6	5	2	2.5	0.57				

Tibia									
prox	TI1	8	2	4.0	0.39	Tibia	6R, 9L	9	
int	TI2	7	2	3.5	0.47	Fibia	9R, 12L	12	
int	TI3	15	2	7.5	0.86	Tibio-Fibula		12	29.97
int	TI4	15	2	7.5	0.56				
dist	TI5	8	2	4.0	0.48				
Fibula									
prox	FI1	5	2	2.5	0.39				
int	FI2	5	2	2.5	0.78				
int	FI3	22	2	11.0	0.90				
int	FI4	24	2	12.0	0.88				
dist	FI5	20	2	10.0	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	0	2	0.0	0.57	Navicular	0	0	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	2	10	0.2	N/A	Metatarsals	2	1	N/A
HF						phalanges	13	1	N/A
HF phalange	N/A	13	28	0.5	N/A	Rear Flipper		1	4.76

PaJs-4-12

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	0	1	0.0	N/A	Skull	0	0	41.34
Mandible						bulla			
prox	DN6	0	2	0.0	0.89	Mandible	0	0	8.81
dist	DN2	0	2	0.0	0.84				
Atlas	AT1	0	1	0.0	0.54	Atlas	0	0	N/A
	AT2	0	1	0.0	0.52				
Axis	AX1	0	1	0.0	0.56	Axis	0	0	N/A
	AX2	0	1	0.0	0.49				
Cervical	N/A	2	5	0.4	N/A	Cervical	2	1	58.95
Thoracic	TH1	2	13	0.2	0.39	Thoracic	2	1	35.48
Lumbar	LUI	1	6	0.2	0.38	Lumbar	1	1	53.12
Baccula	N/A	0	1	0.0	N/A	Baccula	0	0	N/A
Sacrum	SC1	0	1	0.0	0.43	Sacrum	0	0	N/A
Caudal	N/A	0	11	0.0	N/A	Caudal	0	0	
Rib									
prox	RI1	5	26	0.2	0.40	Ribs	5	1	100.00
int	RI4	5	26	0.2	0.63				
dist	RI5	5	26	0.2	0.29				
Sternum	N/A	2	8	0.3	N/A	Sternum	2	1	6.58
Scapula									
prox	SP2	1	2	0.5	0.48	Scapula	1R	1	31.37
dist	SP5	3	2	1.5	0.41				
Humerus									

prox	HU1	1	2	0.5	0.43	Humerus	1R, 1L	1	20.95
int	HU3	1	2	0.5	0.57				
dist	HU5	0	2	0.0	0.60				
Radius									
prox	RA1	3	2	1.5	0.63	Radius	2R, 4L	4	
dist	RA5	1	2	0.5	0.45	Ulna	1R, 2L	2	
Ulna						(Rad+Ulna)		4	15.45
prox	UL2	2	2	1.0	0.66				
dist	UL3	2	2	1.0	0.35				
Carpal	N/A	3	14	0.2	N/A	Carpals	3	1	N/A
Metacarpal	N/A	2	10	0.2	N/A	Metacarpals	2	1	N/A
Front Flipper	N/A	8	28	0.3	N/A	FF phal	8	1	N/A
FF phalange						Front flipper		1	2.86
Innominate									
acetabulum	AC1	0	2	0.0	0.47	Innominate	0	0	58.68
illium	IL1	0	2	0.0	0.60				
ischium	IS3	0	2	0.0	0.55				
Femur									
prox	FE1	3	2	1.5	0.50	Femur	3L	3	10.81
prox	FE3	3	2	1.5	0.52				
int	FE4	3	2	1.5	0.69				
dist	FE6	2	2	1.0	0.57				
Tibia									
prox	TI1	1	2	0.5	0.39	Tibia	2R, 2L	2	
int	TI2	1	2	0.5	0.47	Fibia	6R, 4L	6	
int	TI3	1	2	0.5	0.86	Tibio-Fibula		6	29.97
int	TI4	1	2	0.5	0.56				
dist	TI5	3	2	1.5	0.48				
Fibula									
prox	FI1	1	2	0.5	0.39				
int	FI2	1	2	0.5	0.78				
int	FI3	7	2	3.5	0.90				
int	FI4	10	2	5.0	0.88				
dist	FI5	5	2	2.5	0.76				
Calcaneus	CA2	0	2	0.0	0.45	Calcaneous	0	0	N/A
Astragalus	AS3	0	2	0.0	0.56	Astragalus	0	0	N/A
Cuboid	CU1	0	2	0.0	0.56	Cuboid	0	0	N/A
Navicular	NA1	3	2	1.5	0.57	Navicular	2R, 1L	2	N/A
Other Tarsal	N/A	0	6	0.0	N/A	Oth. Tarsal	0	0	N/A
Metatarsal	N/A	4	10	0.4	N/A	Metatarsals	4	1	N/A
HF						phalanges	6	1	N/A
HF phalange	N/A	6	28	0.2	N/A	Rear Flipper		2	4.76

PaJs-4

Element	Scan Site (Lyman 1994)	MNE	Elements per complete skeleton	MAU	Bone Density (Lyman 1995)	Element	MNE	MNI	%MUI Ringed Seal (Diab 1998)
Head	N/A	10	1	10.0	N/A	Skull	9R, 10L	10	41.34
Mandible						bulla			
prox	DN6	24	2	12.0	0.89	Mandible	14R, 12L	14	8.81
dist	DN2	37	2	18.5	0.84				
Atlas	AT1	11	1	11.0	0.54	Atlas	11	11	N/A
	AT2	11	1	11.0	0.52				
Axis	AX1	6	1	6.0	0.56	Axis	6	6	N/A
	AX2	6	1	6.0	0.49				
Cervical	N/A	26	5	5.2	N/A	Cervical	26	6	58.95
Thoracic	TH1	60	13	4.6	0.39	Thoracic	60	5	35.48
Lumbar	LUI	32	6	5.3	0.38	Lumbar	32	6	53.12
Baccula	N/A	8	1	8.0	N/A	Baccula	8	8	N/A
Sacrum	SC1	8	1	8.0	0.43	Sacrum	9	9	N/A
Caudal	N/A	34	11	3.1	N/A	Caudal	34	4	
Rib									
prox	RI1	268	26	10.3	0.40	Ribs	268	11	100.00
int	RI4	268	26	10.3	0.63				
dist	RI5	268	26	10.3	0.29				
Sternum	N/A	56	8	7.0	N/A	Sternum	56	7	6.58
Scapula									
prox	SP2	30	2	15.0	0.48	Scapula	14R, 15L	15	31.37
dist	SP5	12	2	6.0	0.41				
Humerus									
prox	HU1	27	2	13.5	0.43	Humerus	16R, 19L	19	20.95
int	HU3	38	2	19.0	0.57				
dist	HU5	30	2	15.0	0.60				
Radius									
prox	RA1	51	2	25.5	0.63	Radius	43R, 22L	43	
dist	RA5	23	2	11.5	0.45	Ulna	24R, 27L	27	
Ulna						(Rad+Ulna)		43	15.45
prox	UL2	66	2	33.0	0.66				
dist	UL3	32	2	16.0	0.35				
Carpal	N/A	55	14	3.9	N/A	Carpals	55	4	N/A
Metacarpal	N/A	77	10	7.7	N/A	Metacarpals	77	8	N/A
Front Flipper	N/A	228	28	8.1	N/A	FF phal	228	9	N/A
FF phalange						Front flipper		9	2.86
Innominate									
acetabulum	AC1	23	2	11.5	0.47	Innominate	10R, 12L	12	58.68
illium	IL1	23	2	11.5	0.60				
ischium	IS3	12	2	6.0	0.55				
Femur									
prox	FE1	32	2	16.0	0.50	Femur	19R, 19L	19	10.81
prox	FE3	38	2	19.0	0.52				
int	FE4	46	2	23.0	0.69				
dist	FE6	24	2	12.0	0.57				

Tibia									
prox	TI1	20	2	10.0	0.39	Tibia	57R, 45L	57	
int	TI2	35	2	17.5	0.47	Fibia	98R, 109L	109	
int	TI3	84	2	42.0	0.86	Tibio-Fibula		109	29.97
int	TI4	92	2	46.0	0.56				
dist	TI5	52	2	26.0	0.48				
Fibula									
prox	FI1	18	2	9.0	0.39				
int	FI2	23	2	11.5	0.78				
int	FI3	146	2	73.0	0.90				
int	FI4	211	2	105.5	0.88				
dist	FI5	102	2	51.0	0.76				
Calcaneus	CA2	10	2	5.0	0.45	Calcaneous	5R, 5L	5	N/A
Astragalus	AS3	19	2	9.5	0.56	Astragalus	7R, 12L	12	N/A
Cuboid	CU1	16	2	8.0	0.56	Cuboid	5R, 11L	11	N/A
Navicular	NA1	14	2	7.0	0.57	Navicular	8R, 6L	8	N/A
Other Tarsal	N/A	20	6	3.3	N/A	Oth. Tarsal	20	4	N/A
Metatarsal	N/A	158	10	15.8	N/A	Metatarsals	158	16	N/A
HF						phalanges	195	7	N/A
HF phalange	N/A	195	28	7.0	N/A	Rear Flipper		16	4.76

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