11 SUMMARY AND DISCUSSION

This analysis has presented some compelling evidence that two distinct sizes of dogs did exist prehistorically on the Northwest Coast. This evidence includes:

1) relatively high coefficients of variation (CV) in the total dog sample for many elements and also for male and female subsamples of crania and mandibles, suggesting that more than one taxonomic group is represented.

2) sexual dimorphism for the total sample is significantly greater (at 9 %) than the 2-6% expected within breeds of dogs or wild canid populations, again suggesting that more than one breed or type is represented.

3) there are significant differences between the means of the subsamples created by dividing the total sample at the mean of the total length for essentially every element examined, suggesting that each of the subsamples could have been drawn from discrete populations.

4) discriminant analysis comparison with other regional data sets of crania suggests that the sample of Northwest Coast small dogs, in particular, is quite homogeneous.

5) the almost equal representation of both sexes in the samples of type 1 (small) crania and mandibles suggests that deliberate husbandry of the small dogs was being practice

6) in contrast, the extremely high proportion of males in the samples of (large) type 2 crania and mandibles suggests that the number of breeding age females of this type may have been artificially (i.e. culturally) depressed, perhaps as a strategy for population control.

7) modern experimental evidence suggests that a valid genetic basis would have existed for keeping wool dogs from interbreeding with village dogs, as the economically valuable long, thick fur would not be inherited by F1 hybrid crosses between the two types.

Of all these points, the difference in sex ratios evident in the cranium and mandible samples of the two types lends the strongest support to the hypothesis that the small dogs were indeed wool dogs. The sex ratios suggest the small dogs were being deliberately bred, at least during the most recent part of their history, and as such would constitute a true breed. This suggests that the two dog types defined osteologically in this study could represent the wool dog and village dog as they were described in journal reports from the early historic period.

It is also apparent from this analysis that not only did a small dog exist as a distinct type prehistorically, but it existed throughout prehistoric times for as far back as can be determined. This has important cultural implications if the small dog represents the wool dog for all of its history. We cannot say for sure at this point that the small dog was always a long-haired dog. The long thick fur described in ethnohistoric accounts may have been the result of a specific genetic mutation that arose spontaneously at some point in the history of the small dogs, as "spitz" type dogs are known in both short and long haired varieties (Fogle 1995; Wilcox and Walkowicz 1989). The distinctive pricked ears, curled tail and double coat, however, appear to be suites of characters that occur together. Most spitz-type dogs of known antiquity are seldom truly large. This suggests that while the small dog may not always have been long haired, it was probably always a "spitz" type rather than "dingo" (or pariah) type. Perhaps a study of the osteological features of caudal vertebrae in dogs with curled vs. non-curled tails will reveal characteristics that could be used to identify skeletal remains of spitz dogs.

However, the issue of whether size is dependent or independent of coat type not withstanding, the time span of at least 4,000 years for the existence of a small dog suggests a

possible origin date for the wool dog as a distinct breed that predates the Locarno Beach/Marpole period (1,400- 3,000 years bp) suggested by Schulting (1994).

While I have presented what I think is rather compelling evidence in favour of the small dog being the wool dog, it is admittedly chronologically biased due to the paucity of complete skulls from older sites. The preponderance of female crania and mandibles that constitute the evidence for deliberate breeding is found almost exclusively in the Gulf of Georgia deposits (1400 bp to contact period). This means that the strongest evidence for actual husbandry (approximately equal sex ratios) may only be confidently applied to this most recent period and even then may be true only for certain sites. Additional intact crania and mandibles that are more than 1400 years old (i.e. from Marpole, Locarno and Charles age deposits) are needed for further analysis.

Geographically, the small dog and the large dog appear to have co-existed throughout Coast Salish territory and some neighbouring areas for most of their recorded history. In all cases except one, measurable adult remains of the small dog are found in equal or larger numbers than the larger dog. This introduces the possibility that the small dog may have been the original type in this area and remained the dominant type for at least 4,000 years.

Compared to other prehistoric dogs, the Northwest Coast small dog was clearly as small as early Jomon period dogs from Japan, early Jaguar Cave dogs from Idaho and Basketmaker dogs from the U.S. southwest. However, the large type 2 dog does not appear to have been as large as early dogs in Europe or late large dogs in the U.S. southwest and was clearly smaller that an Australian dingo. Both dog types were well-proportioned, robust animals. The small dog averaged 44 cm (17.5 inches) at the shoulder and the large dog 52 cm (20.5 inches).

Many questions pertaining to the pattern of dog remains from the Northwest Coast are still unanswered. What is the maximum geographic range of small dogs on the Northwest Coast and in the Interior? How old is the oldest small dog? Can we find any conclusive evidence for culling of immature females of the large type that might indicate deliberate population control measures? What about burial and/or disposal practices: do they differ for large and small types (or between sexes) and do they change over time? Do combined human/dog burials more often contain large or small dogs; do they more often contain male dogs or females? Does the evidence for husbandry exist only in a few sites or is it widely distributed? How far back in time does the evidence for husbandry extend? What size are the oldest known dog remains in British Columbia, such as those reported from Namu between 4,000 and 7,000 years ago (Cannon 1991:11) or from Blue Jackets Creek on the Queen Charlotte Islands dated 4,000 to 5,000 years ago (Severs 1974:198 cited in Cybulski 1992)?

With all of these issues left to be addressed, it is imperative that all prehistoric canid material from the Northwest Coast be thoroughly reported in the future, for both adult and immature remains. This is especially important to keep in mind for small assemblages which contain few dog remains: even small samples may contribute critical data to the overall pattern and should be reported in detail. It would also be worthwhile to re-evaluate previously excavated dog remains that could not be included in this study. In addition, chronological issues clearly cannot be addressed adequately until significant remains are dated directly.

I have included a summary table which lists the osteometric characteristics used to define each of the two types for all elements in the hopes that this will encourage future reporting of measurements. In this table, the range of overlap between the two types has been removed, so if the measurement of a particular to-be-classified element falls within one of the ranges given, there is a good probability that it belongs to that type. This table should be particularly useful for quickly assessing intact Northwest Coast material and for comparison to other regional canid samples. For example, it is clear from this table that the three dogs previously reported from the 1991 and 1994 excavations at the B.C. interior site of Monte Creek (EdQx 43), dated at ca. 4,000 b.p. (Wilson et al. 1995:74), all fall within the "small" dog range even though one individual appeared significantly larger than the other two during the initial analysis (e.g. greatest length (GL) measurements of the humerus of the three dogs were 133, 131 and 149 mm; and of the putative wolf, 209 mm). This again suggests that small dogs were a common early type and confirms the time depth of known small dogs to at least 4,000 years in British Columbia.

It must be emphasized that this analysis is only

a beginning. While it constitutes an important database to which future skeletal material can be compared and appended, there is much more work to be done. Once the sample size of Northwest Coast dogs has been substantially increased, other analysis methods may be possible - perhaps ones that suggest different conclusions than those presented here. With continued analysis, in time some of the questions left unresolved by this study may be answered.

Recommended analysis methods for future studies

Dog remains have been treated rather inconsistently and often quite briefly in archaeological faunal reports for this area and a few comments in regards to this are perhaps appropriate. While I have been as guilty as others of under-reporting dog data in the past, I recommend that henceforth dog remains be reported in a similar manner as human remains, preferably in a separate section of the report. Dogs are not known to have been eaten in this area (except perhaps in ceremonial contexts (Barnett 1955) and cannot therefore be considered subsistence items. I have found that the use of a "non-subsistence fauna" category is a very useful way to partition the analysis and reporting of faunal remains, because it effectively removes dogs (in all their complexity) from bone counts of obvious food/utility items. This category can also include obviously intrusive taxa such as small rodents,amphibians, and reptiles (e.g. Wilson and Crockford 1994; Wilson et al. 1995)

As is done for human remains, the dog assemblage from every site needs to be fully described *osteologically* (for pathologies, injuries, age, tooth wear, number of individuals, taphonomic condition, etc.) and *osteometrically* (all adult, and perhaps some juvenile material (such as deciduous teeth) as well, measured according to standard references). It is not enough to describe and measure only intact crania and mandibles: all intact elements, including vertebrae and metapodials, should be measured.

Temporal and horizontal distribution of remains within the site should be presented as precisely as possible. This is problematic, of course, if excavators are not familiar enough with dog skeletal remains to recognize isolated and/or small numbers of associated elements in the field, photograph them, and record the provenience in field notes and on level bags. In the report, photographs should be included of all burials or otherwise associated material *in situ*. Photographs of intact crania or elements with pathologies or injuries would also be useful. It would be extremely useful if significant finds, such as complete or partial burials or any remains suspected of having some antiquity, could be dated directly.by AMS techniques

While Crellin (1994), for example, addressed nearly all of these aspects in his report on the cultural significance of the dog remains from Keatley Creek in the central interior of British Columbia, measurement data were not reported because they were deemed "not culturally informative". This is an unfortunate shortcoming to an otherwise excellent report, because it means the Keatley Creek dogs cannot be compared osteometrically to other dogs without further analysis.

I believe we might eventually come to a better understanding about the nature of the complex relationship between indigenous dogs and people on the Northwest Coast if in-depth reporting of dog remains becomes standard practice, even for small assemblages.

Table 11-1. Selected osteometric characteristics of Northwest Coast dogs. Any range of overlap between designated types has been removed. Measurements from von den Driesch 1976.

	Type 1: "small" dog range (mm)	Type 2: "large" dog range (mm)
Skull measurements (mm)		
#1	146-173	176-203
#2	140-162	164-188
#12	59-73	76-87
#13	73-86	89-98
#15B	76-85	90-99
#23	56-60	64-71
#34	56-58	65-69
Mandible measurements (mm)		
#1	103-128	135-151
#4	85-112	113-132
#6	87-113	118-131
#7	64-74	76-84
#17	17-20	25-27
#19	18-21	26-27
Vertebrae measurements (mm)		
Cervical 1 (LAd)	12-14	15-17
Cervical 2 (LCDd)	37-44	45-52
Cervical 3 (PL)	21-24	25-30
Cervical 4 (PL)	20-22	24-27
Cervical 5 (PL)	18-20	21-25
Cervical 6 (PL)	16-18	19-21
Cervical 7 (PL)	16-18	19-20
Thoracic 3 (PL)	15-15.5	16.5-17
Thoracic 12 (PL)	17-19	20.5-21
Thoracic 13 (PL)	19-21.5	22.5-24
Lumbar 1 (PL)	20-22	23.5-26
Lumbar 2 (PL)	22-24	25-28
Lumbar 3 (PL)	22-24.5	25.5-28
Lumbar 4 (PL)	22-25	26.5-29
Lumbar 5 (PL)	21-25	26.5-28
Lumbar 6 (PL)	22-24.5	25.5-28
Lumbar 7 (PL)	18-19.5	20.5-23
Sacrum (PL)	30-32.5	33.5-38

	Small dog range (mm)	Large dog range (mm)
Front limb elements (mm)		
Scapula (HS)	101-126	129-142
Humerus (GL)	137-151	153-179
Ulna (GL)	140-167	170-203
Radius (GL)	123-141	145-156
Metacarpal II (GL)	38-49	50-58
Metacarpal III (GL)	44-58	59-69
Metacarpal IV (GL)	45-58	59.5-70
Metacarpal V (GL)	41-49.5	50.5-60
Hind limb elements (mm)		
Femur (GL)	142-164	167-182
Tibia (GL)	139-158	159-177
Fibula (GL)	135-148	154-157
Calcaneus (GL)	35-40.5	41.5-51
Talus (GL)	21-24	25-27
Metatarsal II (GL)	49-58	59-68
Metatarsal III (GL)	55-66.5	68-75
Metatarsal IV (GL)	58-68	69-78
Metatarsal V (GL)	48-59	60-67

Type 1 "small" dog shoulder height estimate:
35-50 cm (average 44.0 cm)
[14-19.5 in (average 17.5 in)]

Type 2 "large" dog shoulder height estimate:
47-59 cm (average 52.0 cm)
[18-23 in (average 20.5 in)]