Trace element geochemistry of moose teeth apatite and possible links with increased incidence of incisorform fracture in Cape Breton Highlands moose

M.Clough[1], A.L.Netite[2], and M. Zentilli[1]
1. Department of Earth Sciences, Dalhousie University, Halifax, NS B3H 3I5, Canada <mclough@dal.ca>, <zentilli@dal.ca> ¶ 2. Manager, Wildlife Resources, Nova Scotia Department of Natural Resources, 136 Exhibition Street, Kentville, NS B4N 4E5, Canada <netteal@gov.ns.ca>

Ungulates in the wild are normally free from periodontal disease. Yet, moose (*Alces alces andersoni*) in the Cape Breton Highlands (CBH) of Nova Scotia have displayed an increased incidence of incisorform macro- and micro-fractures, which may have an effect on moose longevity. This condition appears to be rare, as it has only been formally documented in the literature in Alaskan moose (*Alces alces gigas*) and somewhat differently (tooth wear rather than breakage) in Manitoban moose (*Alces alces andersoni*), and remains unexplained.

We have selected suites of broken and healthy teeth from the CBH and compared them with moose teeth from Shelburne County, Nova Scotia, where no incidence of broken incisorform teeth has been documented. Fracture patterns in teeth, and especially tooth enamel (hydroxy-apatite) were studied under the petrographic microscope and the electron microprobe. Enamel was carefully separated and 15 representative samples were analyzed chemically by inductively coupled plasma mass spectrometry (ICP-MS).

Samples from the problematic CBH area are significantly depleted in Ba, Sr, Zn, Co, and Ga in comparison with those of the control area, and some of these deficiencies have been associated with dental disease in animals elsewhere. Samples from the CBH were divided arbitrarily into two groups: A)

those collected north of the CBH National Park, and B) those collected south of the Park. In each case, they were separated with respect of their perceived low, medium, and high degree of fracturing.

Within the CBH the results are not always consistent. A) North of the Park increased degree of fracturing correlates positively with contents of Cd, Mn, Nb, Rb, Sr, Y, Zr, Sn, and Bi, and negatively with Al, Cu, Ti, Zn, Mg, As, Th, and U., B) South of the Park increased degree of fracturing correlates positively with Ba, Mn, Sr, Mg, Se, As, Y, Th, and U, and negatively with Al, Cr, Cu, Ga, and Sn. Undoubtedly the number of samples is so far insufficient to draw useful conclusions, yet these are the first data available for moose teeth in the region, and raise interesting questions.

The results are being analyzed spatially with respect to geographic, geological and geochemical databases, and considered in terms of natural and anthropogenic factors, such as acidic precipitation, chemicals used to control budworm infestation, and vehicle pollution, among others.