# Forensic DNA-Typing of Bighorn Sheep in the Province of Alberta

**DENISE K. PATTERSON**, Alberta Sustainable Resource Development, Fish and Wildlife Forensic Laboratory, 6909-116 Street, Edmonton, AB T6H 4P2, Canada
**HOLLY ARCHIBALD**, Alberta Sustainable Resource Development, Fish and Wildlife Forensic Laboratory, 6909-116 Street, Edmonton, AB T6H 4P2, Canada
**RICHARD M. JOBIN,**[1] Alberta Sustainable Resource Development, Fish and Wildlife Forensic Laboratory, 6909-116 Street, Edmonton, AB T6H 4P2, Canada

***Abstract:*** Rocky Mountain bighorn sheep (*Ovis canadensis*) are highly prized big game animals in North America and Alberta has produced many top scoring sheep. The high value hunters and naturalists place on this relatively scarce resource makes effective protection and management of bighorn sheep a necessity. In addition, the species occupies only a small fraction of its former range. Protection of bighorn sheep through enforcement of wildlife statutes presents many challenges. Poaching of wild sheep usually takes place in remote locations with few if any witnesses and wildlife officers typically have large territories to patrol, making direct detection of a poaching incident very unlikely. However, forensic DNA-typing enables officers to link wildlife offenders to illegal kill sites even when only trace amounts of biological material are present. We validated DNA-typing tests and databases for forensic use in protecting bighorn sheep. Fourteen short tandem repeat loci and 1 sex-typing locus were amplified in 3 multiplexed reactions via the polymerase chain reaction (PCR). Resulting DNA fragments were resolved using capillary electrophoresis. Populations of sheep from southern (south of Bow River) to central (Smoky River) Alberta appropriate for use as forensic databases for bighorn sheep in Alberta. Generally, populations south of the Athabasca River had higher levels of heterozygosity than north of the river. Flanking sequence tag (FST) values, a measure of population differentiation, increased with increasing geographic distance. These data, and knowing that the northern populations are near the range limits for the species, support the hypothesis that northern populations represent "founder populations". Furthermore, evidence suggests that the Athabasca River acts as a barrier to gene flow in this species. Our data have been used in conviction of offenders who illegally took bighorn sheep in Alberta and also may be useful for sheep management.

***BIENN. SYMP. NORTH. WILD SHEEP AND GOAT COUNC. 15: 2006***

***Key words:*** Alberta, bighorn sheep, DNA-typing, forensic, *Ovis canadensis*, PCR, poaching.

[1] *E-mail: rick.jobin@gov.ab.ca*