



## **Rare Chipmunks and Pocket Gophers: The Role of Museums in Conserving Species at Risk**

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Museum collections and associated research programs play an important role in conserving biodiversity and species at risk. Taxonomic specialists study natural history collections and use their findings to compile distributional atlases and range maps based on specimen locality data; to develop identification keys for wildlife biologists; and to provide taxonomic expertise on species or subspecies that appear in official lists of species at risk, such as B.C.'s Red and Blue lists. The Red and Blue lists are B.C.'s official lists of vertebrate species populations that are considered at risk.

To date, 50,000 records of British Columbian mammal specimens, housed in various museums across North America, have been pulled together and entered into a database. The data are being used to generate computer range maps and assist various management agencies in their conservation efforts. For example, this information was essential when the Conservation Data Centre of the Ministry of Environment, Lands and Parks did its recent assessment of mammals at risk and developed the current Red Blue lists.

As the RBCM's mammal curator, my work over the years has increasingly focused on mammals at risk. Since the late 1980s I have been working on a series of handbooks that will revise the out-of-print *Mammals of British Columbia* handbook. A spin-off from my research on the mammal handbooks is the development of an identification key for B.C.'s 80 species of small mammals.

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The most challenging and rewarding work for me is providing expertise on mammalian taxonomy. I've recently been researching several rodents from the Kootenay region, as part of *Living Landscapes* project involving the Ministry of Environment, Lands and Parks, Columbia Basin Fish and Wildlife Compensation Program, Mark Fraker from Terramar Consulting and the Royal British Columbia Museum. This project illustrates the role of museum research in conserving species at risk.

Three species of chipmunks - Red-tailed Chipmunk (*Tamias ruficaudus*), Least Chipmunk (*Tamias minimus*) and Yellow Pine Chipmunk (*Tamias amoenus*), and the Northern Pocket Gopher (*Thomomys talpoides*), inhabit the southern Columbia and southern Rocky mountains. The major river valleys and mountain ranges have fragmented these species into a number of isolated subspecies or races. Five are considered at risk with two subspecies of the Least Chipmunk (*T. m. oreocetes*, *T. m. selkirki*), two subspecies of Red-tailed Chipmunk (*T. r. ruficaudus*, *T. r. simulans*) and a subspecies of the Northern Pocket Gopher (*T. t. segregatus*) appearing on B.C.'s Red List.

Conservation and management of the chipmunks has been hindered by the inability of biologists to identify historical museum specimens and live animals captured in the field, and uncertainty about the taxonomic validity of the named subspecies. Although the three chipmunk species are generally separated by elevation in the Kootenays, their distributions overlap in narrow zones where similarities in size and fur colour make identifications difficult.

Our research has shown that they can be unequivocally identified by the size and shape of the male and female genital bones. Samples of voucher specimens identified from genital bones, and historical museum specimens identified from x-rays that reveal genital bones, are being used to develop criteria from fur colour and body measurements to identify live animals in the field. Besides its use in identification, genital bone morphology has proven to be an important taxonomic character in chipmunks, and we are using it along with fur colour and skull morphology to evaluate the various chipmunk taxa in the Kootenays.

The Selkirk Mountains race (*T. r. simulans*) and Rocky Mountains race (*T. r. ruficaudus*) of the Red-tailed Chipmunk appear to be strongly differentiated in fur colour, skull and genital bone morphology, and habitat. Moreover, our recent field

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surveys and an assessment of historical museum specimens from the Kootenays has revealed that the Red-tailed Chipmunk is absent from the Purcell Mountains, thus the two subspecies are highly isolated in British Columbia. All the evidence suggests that they should be classified as full species.

Taxonomic problems are also associated with two Red-listed subspecies of the Least Chipmunk: the Selkirk race (*T. m. selkirki*), an alpine subspecies endemic to the Purcell Mountains, and the Timberline race (*T. m. oreocetes*), a subspecies race found in the extreme southern Rocky Mountains of Canada and the northern United States. *T. m. selkirki* was discovered at the Paradise Mine area during the RBCM's 1944 field trip to the Purcells. In 1946, Ian McTaggart-Cowan formally described and named this isolated population as a new subspecies based on only five specimens. It still occurs at the Paradise Mine site, and we have now found it at several nearby locations. *T. m. oreocetes* was described and named by the eminent mammalogist C. Hart Merriam in 1897 from a few specimens taken in Montana. Its range in western Canada, and its taxonomic relationships with other Canadian forms of the Least Chipmunk, has been contentious. Preliminary analyses indicate that both the *selkirki* and *oreocetes* subspecies are very distinct taxonomically. These high-alpine races that are separated by lowland forest and the Rocky Mountain trench have probably been isolated from one another, as well as the northern forms of the Least Chipmunk, since the last glaciation.

Our research has produced the tools for identifying these chipmunk taxa in the field and confirmed that they are distinct taxonomic or evolutionary units that warrant preservation. To what extent they are really at risk is another issue. More inventory work is needed to determine their precise distributions in B.C. Similarly their habitat requirements, and the impact of habitat disturbances such as mining or logging, are largely unknown.

The Northern Pocket Gopher is a small burrowing rodent found throughout most of western North America including the southern interior of British Columbia. It is notoriously variable with more than 50 subspecies described – although many taxonomists have dismissed this taxonomy as a example of excessive naming. In 1954 Walter Johnstone, a prominent naturalist from Cranbrook, published a taxonomic revision of British Columbian forms in which he recognized six races including a new subspecies, *T. t. segregatus*, that is restricted to the Wynndel area on the east side of Creston Valley: his taxonomy was largely descriptive. Recent inventories by Mark Fraker con

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firm that this race still occupies a 10 km<sup>2</sup> area on the east side of the Kootenay River, and because of its small isolated range it was placed on B.C.'s Red List.

My quantitative evaluation using samples of historical specimens and recent voucher specimens indicates that the Wynndel race differs in fur colour and skull morphology from pocket gophers on the west side of the Kootenay River (i.e., subspecies *T. t. medius*), which is evidently a major barrier for this animal. However, the Wynndel form closely resembles a nearby race in the southern Purcells: *T. t. saturatus*. Preliminary results suggest that *T. t. segregatus* may not be a valid subspecies that warrants special management for conservation, but simply a local variant of *T. t. saturatus* – a widespread race that is considered Not at Risk.

The recent provincial list of species at risk includes 49 mammalian taxa (22 species and 27 subspecies). Many taxonomic and identification problems are associated with these taxa. It is generally assumed that the taxonomy of North American mammals is “state of the art”. However, the current taxonomy is often weak based on subjective methods and inadequate sample sizes. Many of the mammalian subspecies on the Red Blue lists are a legacy of taxonomic research done 50 to 100 years ago, and their validity as distinct units that should be protected and conserved is unknown. The RBCM's recent *Living Landscapes* research project in the Kootenays demonstrates that there are no quick answers; and that resolving these taxonomic problems will require a considerable investment of time and resources.

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