

## British Columbia Technical Working Group on Indian Residential Schools (BC TWG IRS)

### What is ZooMS?

**ZooMS** stands for Zooarchaeology by Mass Spectrometry, a technique used to study archaeological bones. It analyzes a specific protein found in bone—collagen—and detects differences within collagen's smaller chemical building blocks called peptides. Evolutionary differences between species have led to distinct patterns in the collagen of different animals, and these differences can be detected using mass spectrometry, which maps the chemical "fingerprint" of collagen. **ZooMS** has broad value in archaeology for identifying animal bones, especially when the shape of a bone fragment alone does not provide enough information for identification with a comparative collection of reference skeletons. **ZooMS** is destructive, but requires a very small amount of bone material which often can be collected using a small abrasive rubbing stick.

Sample collection is relatively simple and doesn't require much experience or equipment, but the **ZooMS** analysis itself needs specialized instruments and a dedicated lab. In Canada, there are only a few labs that offer ZooMS analysis, though the field is growing. Compared to DNA analysis, ZooMS is faster and less expensive, though it still requires skilled technicians to interpret the results. The findings, which indicate which animal a bone belongs to, are straightforward and can be understood by anyone.

### What Role Can ZooMS Play in Identifying Missing Children?

The search for children who disappeared from residential schools can include the discovery of remains that might be from Ancestors. **ZooMS** offers a fast, inexpensive, accurate, and minimally destructive method to determine whether bones are from humans or not, as long as the bones still preserve collagen. **ZooMS** cannot identify anything about the human individuals, only that a bone was from a human or another kind of animal. If search teams encounter bones, **ZooMS** can be a helpful tool in identifying their origin.

**ZooMS** relies on bone material because it analyzes collagen, the main protein found in animal bones. Samples that are too small, too degraded, or have been exposed to temperatures above 200-300°C are not suitable for analysis with **ZooMS**.

### What Are the Challenges of ZooMS Analysis?

**ZooMS** is transforming zooarchaeology by allowing more accurate identification of bones that were previously unidentifiable – often the majority of bones found in heritage landscapes. A key concern for IRS search teams is whether a bone is human. The main challenge of **ZooMS** is its limited availability as a commercial service. In Canada, there is currently only one institution (UBC) that offers this service, and its capacity is limited. A recent survey of Indigenous communities in B.C. indicates that there is considerable interest in this method for IRS work and beyond.