EgRk-2 HUMAN REMAINS RECOVERY (1973)

Non-Permitted Investigations

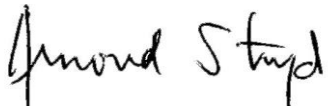
October 2017

Prepared by:
Arnoud Stryd, Ph.D., RPCA, Archaeologist, Independent Researcher,
Port Moody, B.C.
Owen Beattie, Ph.D., Physical Anthropologist, Independent Researcher,
Sidney, B.C.
Rudy Reimer, Ph.D., Archaeologist, Department of Archaeology, Simon Fraser University,
Burnaby, B.C.

Grant of License

I, Arnoud H. Stryd, confirm that I am the copyright owner of this report, and for good and valuable consideration I irrevocably grant a non-exclusive license to the Province of British Columbia, for a term equal to the life of the copyright commencing on the date of execution below, to make copies of the reports , including all appendices and photos, and to provide such copies to anyone, at the discretion of the Province, either at no charge or at the cost incurred by the Province in making and distributing the copies. All parties, except the party for whom the report was prepared, acknowledge that any use or interpretation of this report is at the sole risk and liability of the subsequent user(s).

Executed this 6th day of October, 2017 by



Signature of Copyright Owner

Abstract

This report describes the recovery and analysis of a partial human skeleton exposed in June of 1973 during road maintenance work at an unrecorded archaeological site (later recorded as EgRk-2) near Kelly Lake, southwest of Clinton, B.C. The discovery and results of analysis have not been previously reported. The undated remains are from a single individual, an adult female in her late 20's or older. She experienced a major crushing injury to her left thigh, possibly in later childhood or early adolescence, resulting in significant damage to the left femur. After the injury, she suffered from an associated chronic osteomyelitis of the left femur. Her overall dietary health, along with the fact her remains were buried at the time of death, suggests she retained her social status in spite of her injury and mobility issues, and that she was the recipient of at least periodic if not regular care and assistance.

Acknowledgments

The authors would like to thank Shannon Wood, Manager of the Archaeology Laboratories, Department of Archaeology, Simon Fraser University, for providing access to the human remains, and to Shannon Wood and Peter Locher, Technologist, Department of Archaeology, Simon Fraser University, for the high-quality photographs of the remains, some of which are included in this report. Dr. Andrew Hickok, independent bioarchaeologist, and physical anthropologist Dr. L. Elizabeth Doyle of Clare Research Associates, kindly provided their observations on the skeletal injury. In addition, we would like to thank Amec Foster Wheeler for providing office space, library access, and drafting personnel for this report. Robert MacNevin of Amec Foster Wheeler prepared the maps in this report.

Table of Contents

List of Tables

List of Figures

1.0 INTRODUCTION

In 1973 human remains were accidentally exposed during road maintenance work at an unrecorded archaeological site (later recorded as EgRk-2) near Kelly Lake southwest of Clinton, B.C. The remains came into the possession of Arnoud Stryd, then archaeologist at Cariboo College (now Thompson Rivers University) in Kamloops, and they eventually received an osteological analysis by Owen Beattie, then physical anthropologist at the University of Alberta in Edmonton. Although some information on the discovery of the human remains was submitted to the Heritage Conservation Branch (now Archaeology Branch) in 1981, no follow-up report was prepared on the discovery or the results of the analysis. This report describes the recovery of the remains and the analysis that was undertaken at that time, as well as some additional analyses conducted for this report.

2.0 BACKGROUND

2.1 Discovery of Human Remains and Deposition at Cariboo College

The human remains were accidentally exposed on June 6, 1973, by a Ministry of Highways crew during road maintenance work along the Kelly Lake Road near Kelly Lake southwest of Clinton, B.C. (Figure 1). The remains, from a single individual, were exposed by a bulldozer at a depth of about one meter along a low cut bank on the south side of the Kelly Lake Road, directly opposite the junction with the Jesmond Road (Figure 2).

The crew foreman notified the Royal Canadian Mounted Police (RCMP) detachment in Clinton, and the remains were examined by Coroner Dr. Frank Campbell, M.D. As was the common practise at the time, local First Nations and the provincial Heritage Conservation Branch were not notified of the discovery. Because Dr. Campbell deemed the remains to be archaeological rather than forensic in origin, the RCMP turned the remains over to Avis Choate, then the curator of the South Cariboo Historical Museum in Clinton (Choate 1973). Mrs. Choate visited the find location but did not see any additional human bones, artifacts, or other cultural material, nor did she observe a burial pit or other evidence for the original location of the remains (personal communication with Stryd, August 1973). Two days later (June 8, 1973), she wrote Stryd at Cariboo College, describing the discovery and offering to “transfere [sic] them to you at any time your Dept. wishes to take possession” (Choate 1973). Two months later, in August of 1973, Stryd met with Choate, recorded her recollection of the events around the discovery, took possession of the remains, and visited the find location. He examined the cut bank where the remains had been encountered, but also did not observe any additional human remains or evidence for a burial pit, cairn, box or other burial feature. The remains were accessioned by Cariboo College and given catalogue number CC-B12.

Included among the human remains turned over to Cariboo College was a modified deer antler tine. The tine undoubtedly came from the site but it is not clear if the tine was originally buried with the human remains, or just collected with the bones by the road crew.

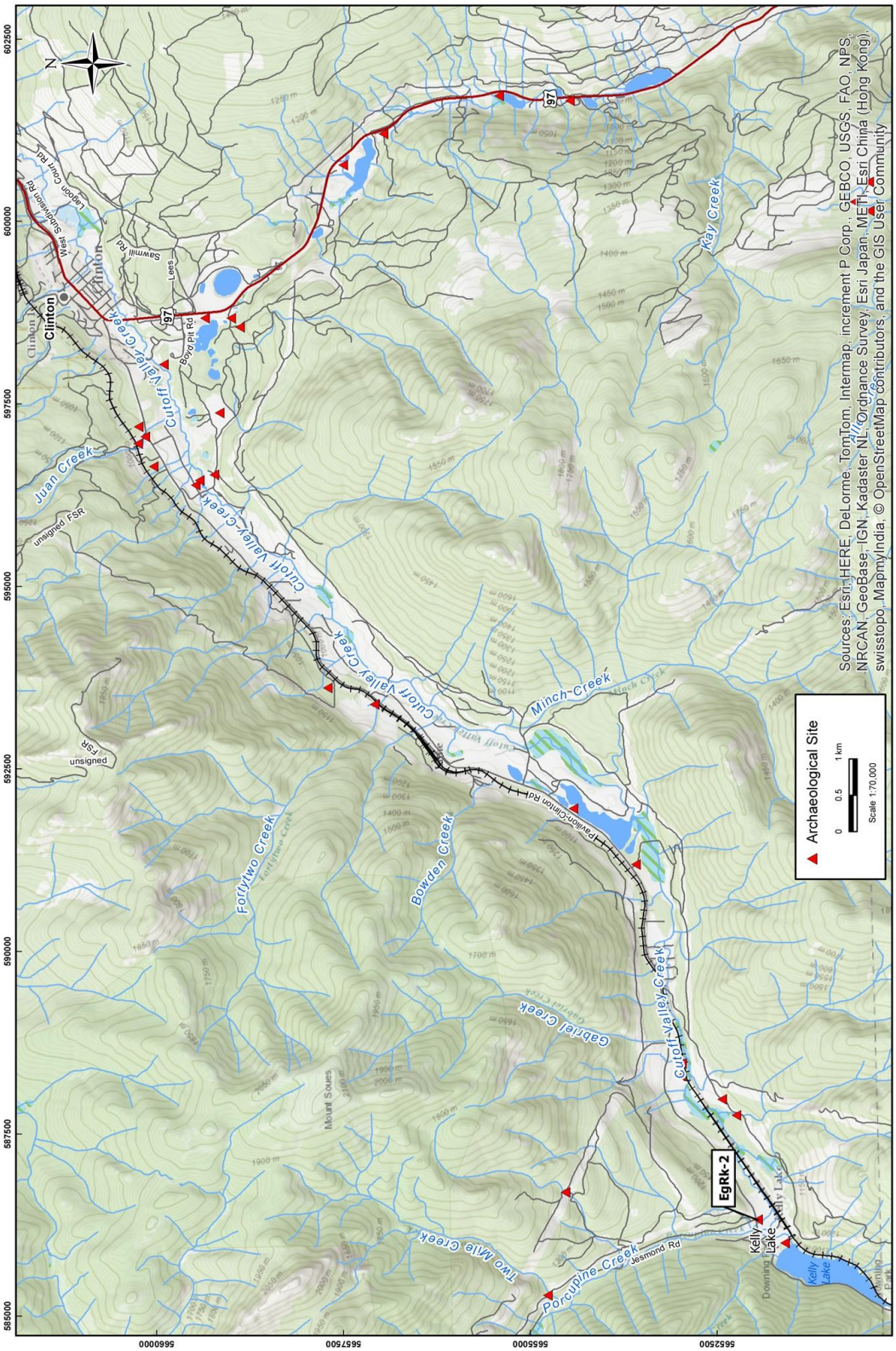


Figure 1 Location of EgRk-2 southwest of Clinton, BC

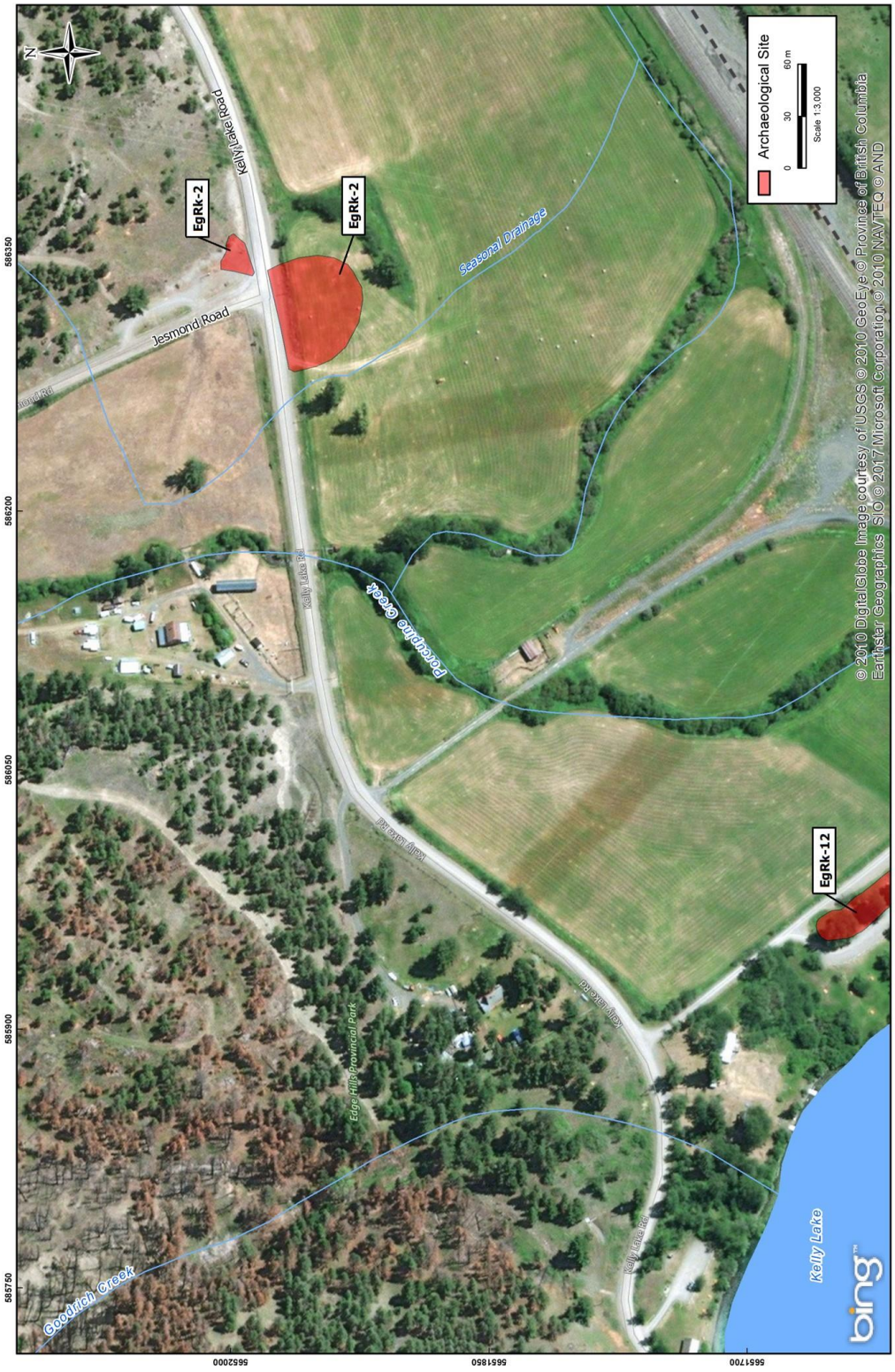


Figure 2 Detailed location of EgRk-2. Site boundary excludes cultural depressions and surface lithics between site polygon and Porcupine Creek.

2.2 Recording of Site EgRk-2

When the human remains were exposed in June of 1973, the find location had not been recorded as an archaeological site. Stryd briefly visited the location in August of that year. He observed scattered surface lithic detritus and several small cultural depressions, and made a sketch site map, but he did not register his findings with the Heritage Conservation Branch.

The site was formally recorded in May of the following year (1974) by Jean Bussey and Joyce May during an archaeological survey for proposed Department of Highway projects (Bussey and May 1974a; Bussey and May 1974b). The site was assigned registry number EgRk-2 by the Heritage Conservation Branch. Bussey and May observed surface chert debitage, fire-cracked rock, and a number of definite and possible small cultural depressions, including three pits along Porcupine Creek not observed by Stryd (and outside the site boundary as currently mapped by the Archaeology Branch – see Figure 2). Bussey and May did not know about the human remains exposed the year before, as they are not mentioned on the original site form.

In 1981, Stryd submitted the information he had noted in 1973 about the human remains discovery to the Heritage Conservation Branch, which was added to the EgRk-2 site form.

2.3 Transfer to Simon Fraser University

Because Cariboo College was a teaching rather than research institution, the human remains were stored but not studied while at Cariboo College. Stryd left Cariboo College in 1981. At that time he arranged transfer of the remains to the Archaeology Laboratories of the Department of Archaeology at Simon Fraser University (SFU). He also informed the Archaeology Branch of the original recovery and transfer to SFU, and this information was added to the EgRk-2 site form.

2.4 Osteological Analysis

Around the time of the transfer to SFU, Stryd approached physical anthropologist Owen Beattie about a possible osteological analysis of the remains. Stryd had observed that some of the bones were pathologically deformed, and thought that a formal osteological analysis might provide insight into the nature of the pathology and its effect on the person's life. Beattie agreed to carry out an osteological analysis at his laboratory at the University of Alberta.

2.5 Stable-Carbon Isotope Analysis

At about the same time, Stryd approached Dr. Brian Chisholm, then at the University of British Columbia, and a leading researcher on ancient diets using stable-carbon isotope analysis. Chisholm agreed to test the stable-carbon isotope ratio of the remains, and to deduce the probable role of marine and terrestrial protein in the diet of the individual. Chisholm provided a verbal report to Stryd on the result of his stable carbon isotopes analysis in February of 1983, and later included the result in a published paper (Lovell *et al*. 1986).

2.6 XRF Analysis

In October of 2016, Dr. Rudy Reimer of the Department of Archaeology at SFU examined the green stains on the left and right tibia, and the right fibula, using XRF analysis, at Stryd's request.

The green stains resembled what has often been called “copper stains.” The purpose of the analysis was to determine if the stains are the result of contact with copper, that is, from possible copper grave inclusions, and, if so, if the copper was of native or trade origin.

2.7 Follow Up Analysis and Reporting

Beattie sent a brief description of his analysis to Stryd in September of 1982, with the suggestion that the two prepare a paper for publication. However, by that date, Stryd was engaged in archaeological consulting rather than research, and he did not follow up on Beattie’s suggestion.

Beattie’s brief description remained in Stryd’s files over the years. In 2016, after Stryd retired from archaeological consulting and Beattie retired from academia, they reconnected and decided to make the results of the osteological analysis available through the preparation of this report. Access to the remains were kindly granted by Shannon Wood of SFU.

Beattie re-examined the human remains in considerable depth for this paper. Stryd reviewed the documents associated with the discovery, but he was not able to locate any notes or photographs. He did examine the plant material present on some of the bones, as well as the antler tine collected by the road crew. Furthermore, Stryd discussed the XRF results with Reimer, who agreed to submit a short description of his work for inclusion in this report, and he reviewed the stable-carbon isotope results with Chisholm, who thought there was no need for a formal review of the results, or for a new statement on the results of the analysis.

This report was written over several months in 2017. Amec Foster Wheeler, Stryd’s former employer, generously provided office space and mapping support for the report. SFU provided the photographs in this report. This report was distributed to local and regional First Nations and organizations: based on the Provincial Consultative Areas Database and other sources, the report was sent to High Bar First Nation (Llenlleney’ten), Whispering Pines/Clinton Indian Band (Pellt’iq’t), Bonaparte Indian Band, Pavilion First Nation (Ts’kw’aylaxw), Bridge River Indian Band (Xwisten), Fountain First Nation (Xaxli’p), St’at’imc Chiefs Council, Lillooet Tribal Council, Lillooet First Nation (Tit’q’et), Shuswap Nation Tribal Council, Tsilhqot’in National Government, and Neskonlith Indian Band. In addition, the report was submitted to the BC Archaeology Branch, where it will be available to researchers, possibly via the on-line Provincial Archaeological Report Library. The report also is on file at the SFU Archaeology Laboratories.

3.0 RESULTS

3.1 Description of EgRk-2

Site EgRk-2 is located in Cutoff Valley, a northeast-southwest valley in the Marble Range on the southern edge of the Fraser Plateau, about 15.2 km southwest of Clinton (Figure 1).The site is situated 530 m from the northeast end of Kelly Lake (Figure 2), which drains into the Fraser River, and 140 m east of Porcupine Creek, which drains into Kelly Lake.

Cutoff Valley is situated in the Ponderosa Pine-Bunchgrass biogeoclimatic zone, and vegetation on site (at time of last recording in 1981) included grasses and a few Douglas-firs, and poplar with scattered clumps of wild rose along the wetter southern margin of the knoll.

The site is situated at the junction of the Kelly Lake and Jesmond Roads, both paved secondary roads (Figure 2), but gravel roads in 1973. Most of the recorded site area is on the knoll immediately south of the Kelly Lake Road; in fact the Kelly Lake Road clips the northern edge of the knoll and site area. Archaeological material also is present on the other (north) side of the Kelly Lake Road, east of the Jesmond Road (Figure 2). EgRk-2 is situated in an area used and occupied traditionally by the Secwepemc and St'at'imc people (Teit 1906:201, 1909: 450; Dawson 1891:5, 40, 44; St'at'imc Chiefs Council 2017).

The site lies at an elevation of 1080 m above sea level, on a low flat-topped knoll 3 to 5 m above the adjacent cultivated fluvial terrain. The knoll consists of moraine deposits comprised of dark grey-brown silty sand and gravel.

EgRk-2 is a general activity, lithic scatter, cache pit and burial site, measuring 50 m N-S by 60 m E-W on the south side of Kelly Lake Road, and 10 m N-S by 30 m E-W on the north side of the Road. Site features include two surface (and possibly buried) scatters of primarily basalt debitage (one on the knoll, the other on the north side of Kelly Lake Road) and fire-cracked rock, seven definite and two possible cultural depressions thought to be cache (storage) pits, and two "slight depressions" that might be cache pits (Bussey and May 1974b). Three of the definite cache pits were located off the knoll along Porcupine Creek (and outside the site polygon as mapped by the Archaeology Branch – see Figure 2). Some chert flakes were observed by Stryd. Description of EgRk-2 as a "burial site" is based solely on the human remains recovered in 1973. No archaeological deposits or features were observed in the road cut on either side of Kelly Lake Road.

The site is on private property (current ownership not established). The area is part of the historical Billups Ranch. Bussey and May (1974b) report that there was an historical trail in Cutoff Valley, and that the Billups Ranch was once a stopping point for travellers on the trail. A map drawn in 1861 by Matthew Begbie shows a trail in Cutoff Valley, connecting Lillooet with Clinton via Pavilion Mountain (Begbie 1861).

No formed artifacts have been reported from the site, but horse bones (recent?), bone fragments (animal?), and the occasional historical object (from Billups Ranch?) were reported by Bussey and May (1974b).

3.2 Osteological Analysis

3.2.1 Remains

The human skeletal material is represented by 21 bones and bone fragments that are consistent in condition, preservation and anatomy as having come from a single individual, an adult female. In general, the condition of the bones is excellent, and fragmentation is probably due to the nature of the burial environment, as is the lack of the skull and vertebral column.

3.2.2 Analytical methods and criteria

The sex of the individual, the assessment of her age at time of death, and the estimation of her living stature were evaluated and established using anatomical and anthropological standards and procedures (Cox *et al*. 2008; Trotter 1970). Sex was determined by assessing pelvic

anatomy, while all of the skeletal features associated with growth and aging (*i.e.,* epiphyseal fusion) were used to estimate age at death. Other, more subjective criteria associated with age determination, specifically age-related onset of osteoarthritic changes, are difficult to assess. This is especially so in the vertebral column, pelvis, and lower limbs, due to the presence of a major crushing injury to the left femur that would have had an impact on the potential for early onset of osteoarthritis. The bones of the left leg demonstrate significant misalignment, robusticity, and arthritic changes resulting from the effects of this injury.

3.2.3 Bone Inventory and Descriptions

The following information on the human skeletal materials is primarily descriptive in nature, though some features that can provide a general sense of body size, muscularity, and overall health are specifically noted and detailed. Bone measurements are provided as a basis for estimating living stature, overall body size, strength, health, and for demonstrating anatomical changes associated with the significant injury to the left leg.

Clavicle, right

This complete bone is not strongly marked by musculature, and appears relatively lightly built. The medial epiphysis is completely fused.

Humerus, left

The head is missing postmortem as is most of the medial epicondyle. This lightly built bone has a small deltoid tuberosity and no septal aperture. The arthritic changes are slight to moderate.

-perimeter at deltoid	58 mm
-perimeter under deltoid	55 mm

Humerus, right

Only the distal one-third of the bone is present. The medial epicondyle is relatively large and well developed in comparison to the humerus morphology as a whole. Arthritic changes are slight to moderate, and there is no septal aperture.

Radius, left

This is a relatively small, complete bone that is somewhat more robust than the right radius. The proximal one-third of the interosseous crest is hypertrophied. Arthritic changes of the joint structures are slight to moderate.

-maximum length	224 mm
-head diameter	20 mm

Radius, right

This relatively small but complete and lightly built bone has slight to moderate arthritic changes of the joint structures.

-maximum length	224 mm
-head diameter	18 mm (estimate)

Ulna, right

The distal end (approximately one-eighth of the shaft length) is missing postmortem. Muscle markings are moderately developed. Arthritic changes of the proximal joint structures are slight to moderate.

Ribs, right

Three incomplete mid ribs with postmortem damage are present. Arthritic changes on the joint structures of the heads are slight.

Innominate, left

The iliac crest, ischial tuberosity, and the pubic bone are missing postmortem. Muscle markings are slight. There is a sacral tuberosity facet located superior to the auricular surface. This feature may be a response to asymmetrical forces experienced during walking and associated with the left femur injury described below. The superior rim of the acetabulum has a shallow crease that appears developmental in nature. Arthritic changes are slight to moderate in the acetabulum, and slight on the auricular surface. There is a slight preauricular sulcus, and the greater sciatic notch is moderately flaring.

Innominate, right

The pubic bone is missing postmortem along with some erosion of the ischium. Muscle markings are slight. A shallow indentation/crease that appears developmental in nature occurs at the superior part of the acetabulum, but is not as strongly expressed as in the left innominate. Arthritic changes are slight to moderate in the acetabulum, and slight on the auricular surface. There is a slight preauricular sulcus, and the greater sciatic notch is moderately flaring.

Femur, left

The bone is nearly complete and lacks only the greater trochanter and parts of the lateral condyle. The dominant feature of this femur is its deformity due to a severe antemortem crushing injury of the lower two-thirds of the bone. The resulting comminuted fracture of the shaft and angular fracture of the medial condyle have resulted in major bone changes and mal-union, producing extensive callus formation and what appears to be a chronic osteomyelitis (Figure 3).

Figure 3 Left femur with arrows pointing to deformity caused by antemortem crushing injury.

As it is 73 mm shorter than the normal right femur, and though this cannot be established with certainty, the fracture appears to have occurred before the maturation of the bone, and prior to the completion of growth in bone length achieved usually by the late teens to early 20's. The angular fracture of the medial condyle and the crushing of the epiphyseal region support the interpretation that growth was arrested when the injury healed at the distal growth plate. Bone shortening and cessation of growth of that section of bone is common in children and adolescents suffering crushing injuries that interfere with the epiphyseal cartilage (Salter, 1978). The resulting lower limb differences produced an asymmetrical distribution of forces during walking and other activities resulting in significant, though also subtle, variations in the right and left limb anatomy. For example, it is clear that weight transference during walking was primarily through the right leg, and is reflected in the platycnemic and pilastric indexes, which describe bone shape and robusticity that can be associated with the physical stresses applied to living bone.

Additional bone features produced by the injury include a number of ossified periosteal planes that are not clearly involucra, and a deep cavitation measuring 23 mm in diameter located on the posterior surface, three-quarters of the way down the shaft. Peripheral to this cavity are a number of drainage canals resulting from the chronic infection. The angular deformity of the condyles, when articulated with the left tibia, produces a very pronounced lateral deflection of the lower leg, a condition likely present during the life of the individual. The articular surface of the condyles demonstrates osteoarthritic changes, including pronounced lipping of the joint borders. There is no third trochanter. The subtrochanteric area is flattened front to back (platymeric). The pilastric index of 125.0 does not, in this instance, indicate a significant ridging of the posterior femur shaft. The osteomyelitis has effected major osseous changes along the linea aspera that have altered the normal morphology of this region of the bone.

-head diameter	40 mm
-subtrochanteric anterior-posterior	23 mm
-subtrochanteric medial-lateral	30 mm
-midshaft anterior-posterior	35 mm
-midshaft medial-lateral	28 mm
-maximum length	351 mm
-oblique length	328 mm
-platymeric index	76.7
-pilastric index	125.0

Femur, right

Though nearly complete, the bone does demonstrate some postmortem erosion of the greater trochanter and posterior parts of the condyles. There is no third trochanter and the subtrochanteric region is flattened front to back (platymeric).The linea aspera is very prominent (pilastric index of 142.9) and highly probably a result of compensatory development as a consequence of the injury to the left leg. Along the lateral surface of the midshaft is an area of subperiosteal ossification measuring 60 mm superiorly-inferiorly by 15 mm anteriorly-posteriorly. There is a slight swelling of the shaft evident along the lateral side of the gluteal tuberosity. Arthritic changes are slight on both the proximal and distal articular surfaces.

-head diameter	42 mm
-subtrochanteric anterior-posterior	22 mm
-subtrochanteric medial-lateral	28 mm
-midshaft anterior-posterior	30 mm
-midshaft medial-lateral	21 mm
-maximum length	424 mm
-oblique length	422 mm
-platymeric index	78.6
-pilastric index	142.9
-living stature estimate	158.8 cm (Trotter 1970)

Tibia, left

This slightly built bone is complete. The intercondylar eminences are very pronounced. There are bone spicules, small cavities, and a slight mounding of bone along the lateral and anterior shaft area near the fibular head articulation. These changes are related to the left femur injury. There is no squatting facet and the proximal and distal articular arthritic changes are moderate (*i.e.,* more pronounced than in the uninjured leg). The posterior and anterior surfaces of the distal end have green stains of unknown origin. The bone is very broad (platycnemic index of 104.6, hypereurycnemic) and differs markedly in morphology from the right tibia.

-nutrient foramen anterior-posterior	23 mm
-nutrient foramen medial-lateral	22 mm
-length	322 mm
-length with intercondylar eminences	330 mm
-platycnemic index	104.6

Tibia, right

The proximal end has post-mortem damage. In comparison to the left tibia the bone is slight to moderately built and very flat (platycnemic index of 62.5, platycnemic). There is a slight squatting facet. The lack of a facet on the left tibia suggest that when the right leg was flexed in a squatting posture the left leg remained partially or fully extended and non supportive. Arthritic changes of the proximal and distal articular surfaces are slight to moderate. Green staining of unknown origin is visible on the distal end of the bone (Figure 5).

-nutrient foramen anterior-posterior	32 mm
-nutrient foramen medial-lateral	20 mm
-platycnemic index	62.5

Fibula, left

The proximal one-third is missing post-mortem. Muscle attachments appear moderate in size. The distal one-third is bowed laterally, a feature likely due to postmortem change. Arthritic changes are slight.

Fibula, right

This complete bone also bows laterally along the distal one-third, a feature likely due to postmortem change. Some thickening of the shaft in this area may indicate an old and well-healed (possible green stick) fracture. Arthritic changes are slight. Green staining of unknown origin is visible on the distal end.

-maximum length	323 mm

Calcaneus, right

This bone is complete, but has some slight postmortem damage. Areas of green staining of unknown origin are visible. The anterior and middle talar articular surfaces are separate.

Bone fragments

Five small bone fragments (four flat bone surface fragments, plus one fragment with visible articular surface features that fit with the distal end of the left femur)

During the osteological examination of the remains, a number of bones were observed to have small areas of a thinly layered and dark brown-to-black material adhering to their surfaces. It is interpreted that this material may consist of desiccated muscle and other tissues preserved since the burial of the individual. Once soft tissues lose their moisture content, desiccated tissues can survive for many decades, and even longer, if the burial environment is relatively dry.

3.2.4 Sex, age and stature

Sex was determined by assessing pelvic anatomy, and indicated that these skeletal remains are from an adult female.

All of the skeletal features associated with growth and aging (i.e. epiphyseal fusion) indicate an age at death of approximately 20 years or more, with one feature, the fused medial epiphysis of the right clavicle, indicating an age at death of late 20's or more. The completed fusion of the medial epiphysis of the right clavicle, along with slight to moderate arthritic changes to her joints (even within the context of the major trauma to the left leg), are consistent with the other observations, and indicate that her likely age range is from late 20's to approximately 40 years.

An approximate living stature of 158.8 cm (5 feet, 2.5 inches) was calculated from the right femur length using formulae provided in Trotter (1970).

No anatomical features are present which could provide insight into the ancestral or kin association for this individual.

3.3 Stable Carbon Isotope Analysis

In February of 1983 Chisholm reported to Stryd a stable carbon isotope ratio of -16.74‰ for a small rib fragment from the recovered remains. The result was included in a table of stable isotope ratios for the B.C. Interior in Lovell *et al*. (1986). Chisholm interpreted the ratio as indicating a diet of 47% marine protein (presumably salmon) and 53% terrestrial protein (presumably ungulates) (personal communication to Stryd, February1983; Lovell *et al.* 1986; Chisholm 1986). Chisholm noted, however, that these percentages should be regarded as having an error range of +/- 10% (personal communication to Stryd, December 2016).

3.4 XRF Analysis

X-Ray Fluorescence (XRF) is a nondestructive technique that is well suited to the trace element analysis of almost any material. This analysis used a Bruker Tracer III-V+ portable XRF spectrometer. The system is equipped with a Peltier cooled Ag-free SiPIN, resolution ~175eV @ 5.9 KeV in an area of 12 mm. The tube's power supply is driven by a 40 kV 1mA with a range of 4 to 40 kV. For major and trace elements reported in Table 1, this analysis used no filter with instrument power settings at 40 kV and 1.7 micro amps with a vacuum system to aid in the analysis of light elements. These settings allow numerous X-rays to reach the sample, thus efficiently exciting elements from Na to U. All samples ran for a total of 200 seconds, ensuring accurate and precise calculation of elemental peak data.

The XRF analysis found no trace of copper on any of the three samples provided: left tibia, right tibia (Figure 4), and right fibula. Seven elements were detected in each sample: calcium (Ca), iron (Fe), manganese (Mn), phosphorous (P), sulfur (S), strontium (Sr), and zinc (Zn). One sample, Bone 2 (left tibia), had lower calcium and phosphorous levels that could suggest some dietary stress, illness or varying degree of preservation.

Table 1 XRF Data for all samples, all numbers are in raw photon counts.

Sample	Ca	Fe	Mn	P	S	Sr	Zn
Bone 1 (right fibula)	92288	1959	580	3803	508	1123	974
Bone 2 (left tibia)	61580	5575	786	1028	1494	1038	1197
Bone 3 (right tibia)	95019	1209	112	4329	783	1257	755

Figure 4 Green stain on right tibia examined by XRF analysis

3.5 Artifact Analysis

3.5.1 Antler Tine

Examination of the object included with the human remains confirmed that it was the distal end of a deer antler tine. The object measured 113 mm long, by 15 mm wide at the proximal end, tapering to a rounded tip at the distal end. Cut marks from a knife or other small-bladed tool on the proximal end of the object cover the entire outer cortical (hard) bone layer but are absent on the more porous trabecular core, showing that the tine tip was removed from the rest of the tine but first cutting through the hard outer cortical bone around the entire circumference of the tine, and then

snapping it off. There are no notches, tool marks or use marks on the other surfaces of the tine. A post-recovery break had been repaired with some type of clear glue. The tine was identified as deer based on size (Figure 5).

Figure 5 Deer antler tine collected with human remains

3.5.2 Plant Material Adhesions

Examination of the human remains revealed several small patches of modified plant material on the right femur and both tibia. Because it was not possible to identify the material without first removing samples from the bone, no formal analysis was carried out. Instead, the plant material was examined first with a 10X hand lens, and then with a Leica MZ6 microscope, under various powers ranging from 63X to 400X.

In total six patches were observed: one on the lateral epicondyle of the right femur (Figure 6), two on the distal medial surface of the left tibia (Figure 7), and three on the anterior ridge of the right tibia: two near the proximal end and one near the distal end. All are small, flat and irregularly shaped, with the largest measuring 8.5 x 6.0 mm. All are less than 1.0 mm thick.

Figure 6 Plant remains on lateral epicondyle of right femur.

The patches consist of an unidentified plant material. Some of the patches are fibrous whereas others appear to lack clearly-defined fibers, but they nevertheless may be of the same material, with the latter lacking differentiation due to weathering or compression. Two of the patches appear to consist of individual strands, each no more than 2 mm wide, possibly spun. The fibrous patches, as well as the patch with individual strands, resemble in colour and texture the bark found on sagebrush, though other plants such as Indian-hemp, clematis, or silverberry are possible.

The location of the patches suggest they are remnants of some kind of covering made of plant material of the lower legs and lower upper legs. They may be remnants of a mat used to cover or wrap the body as described by Teit (1900:328; 1906:269; 1909:592), but the individual strands (where present) appear to be too narrow for a mat. Big sagebrush was used traditionally for mats Turner *et al*., 1990:37), but none of the patches appear to consist of the kind of plants most commonly used for mats, such as tule/bulrush stems, cattail leaves, and reed grass stems (Teit 1900:

188-190; 1909:491); Turner *et al*., 1990: 37, 42). If not mat fragments the patches could be from clothing worn by the deceased: woven socks and thigh-high boots of sagebrush bark are described by Teit (1900:208, 212, 216-7; 1906:218; 1909:506), and sagebrush fabrics have been reported from graves in the Kamloops area (Smith 1900:408, 436-7).

Figure 7 Plant remains on distal medial surface of left tibia

4.0 DISCUSSION

In June of 1973 a road maintenance crew accidentally exposed the skeletal remains of an adult female. All bones appear to be from a single individual. Parts of the skeleton, notably the skull, mandible, scapulae, and much of the vertebral column, were not included in the recovered material. The reason for this is not clear. It seems unlikely that large bones such as the skull and both scapulae would not have been seen by the road crew, even in the disturbed context of the discovery. Furthermore, given some of the small bones that were collected, it also seems unlikely that the missing bones, particularly the scapulae and at least some of the vertebrae, would not have been gathered with the other bones had they been exposed. It is possible that the upper back part of the body, as represented by the skull, cervical vertebrae and scapulae, was not exposed by the road crew; and might still be at the site, behind the road cut. Alternatively, this

part of the body might have been exposed and removed earlier, possibly when the original road cut was made, leaving the rest of the body in place until exposed by road work in 1973.

4.1 Burial

The human remains were found in a disturbed context, and could be from a burial (body placed in a pit, then covered with earth) or surface disposal (body intentionally left on the ground surface, or person died alone and body not subsequently buried). Various forms of burial were practiced traditionally by the Secwepemc and St'at'imc people (Teit 1900:327-30; 1906:269-271; 1909:592-4), but surface disposal also was known among the Secwepemec people: Teit reports (1909: 592) that poor people and old people who had no powerful relatives were not buried; instead, their bodies were carried some distance and deposited on the ground, and the remains were then covered with a mat, and piled over with brush and sticks, or, where available, covered with bark and stones.

Although no evidence for a burial pit or grave marker such as a rock cairn were observed, it seems reasonable to conclude that the remains are in fact from an intentional burial rather than a surface disposal because of the overall good condition of the bones. A surface disposal would have been subject to considerable weathering, and as well as bone dispersal and gnawing by rodents and scavengers, for which there is no evidence.

4.2 Elapsed time since death

Establishing the elapsed time since death of human remains is characteristically challenging, especially in burial contexts reflecting an extended time period. The number of variables encountered in the burial environment (e.g. burial depth, soil makeup and pH level, moisture level, soil disturbance by insects, animals, and plants, soil disturbance due to environmental factors, and so on) means that narrowing down the period between burial and recovery can be, at best, only an approximation, and at worst, impossible.

It is not known when she died. The remains were not radiocarbon dated. No artifacts indicative of a specific time in the past (such as iron or glass items from the post-Contact period, or triangular arrow points from the late pre-Contact period) were apparently buried with the remains. However, the presence of plant material, possibly sagebrush-bark clothing, suggests that the burial is traditional, and probably dates to the 19th century or earlier, before European burial practices were widely adopted. The location is not close to any native settlement from the late-19th century or thereafter, further suggesting a mid-19th century date, or earlier.

During the osteological examination of the remains, a number of bones were observed to have small areas of a thinly layered and dark brown-to-black material adhering to their surfaces. This material may consist of desiccated muscle and other tissues preserved since burial, or possibly clothing worn by the individual. The presence of possible soft tissues does not necessarily support a short elapsed time period, as once soft tissues lose their moisture content, and the burial environment is relatively dry, these desiccated tissues can survive for many decades, or longer.

Similarly, the presence of plant material on some of the bones does not necessarily indicate a short elapsed time period. Uncharred plant material in the form of birch bark, seeds, wood fragments, conifer needles, cone fragments, leaves, and other macrofossils dating back many centuries have been found in dry archaeological contexts in the interior of British Columbia (e.g., Nicholas et al., 1997: 22, 36-38; Stryd 1973:402-405; Stryd 1981:101, 308).

4.3 Diet

There is no evidence in the skeletal remains for any dietary issues. Salmon made up 47% of her total protein consumption, a value at the low end of the range for aboriginal adults from the Thompson River drainage, which vary from 44 to 61% (Lovell et al 1986, Chisholm 1986). Her salmon consumption is notably lower than that for adults from the nearby Fraser River drainage, for example, Lillooet adults ranged from approximately 60 to 70% marine protein (Lovell et al 1986, Chisholm 1986). This overall difference between the two drainages reflects a greater reliance on salmon by Fraser drainage populations (Lovell et al 1986; Chisholm 1986). While it is possible that her lower salmon consumption is personal (maybe linked in some way to her physical disability) rather than a reflection of the community overall food supply, it seems more reasonable to conclude that this individual was part of a community focused more on the Thompson River plateau and its terrestrial resources than the Fraser River valley and its greater emphasis on fish.

4.4 Summary of the osteological findings

The skeletal materials are those from a single individual, an adult female in her late 20's or older (to approximately 40 years of age). She stood approximately 159 cm (5' 2.5") tall. Though her remains do not provide any convincing evidence for her cause of death, there are features providing indications of minor and major injuries that would have had an impact on her life, and potentially her live span.

She appears to have had a minor fracture of the right ankle area (the distal fibula) in childhood, but the break healed well.

The bones of the left leg demonstrate the effects of a major crushing injury to the lower two-thirds of the left thigh that is interpreted to have occurred in later childhood or early adolescence, resulting in permanent alignment and robusticity changes associated with the significant damage to the left femur. This injury also damaged the distal epiphysis of the left femur resulting in arrested growth and an angular deformity producing a pronounced lateral deflection of the lower leg. The foreshortened nature of the left femur is quite significant when compared to the normal right femur. After the injury, the individual suffered from an associated chronic osteomyelitis of the left femur for an extended period of time, though it is not possible to link this condition with her cause of death[1].

[1] It has been noted that injuries resulting in osteomyelitis often result in death within a narrower time frame than interpreted here (Andrew Hickok, personal communication with Stryd, April 2017), and if this is the case, then the nature of the injury caused a significant foreshortening of the fully mature adult femoral shaft due to fragmentation rather than a cessation of growth of an immature bone.

The consequences of the resulting lower limb differences (caused by growth arrest and chronic infection) produced an asymmetrical distribution of locomotory forces that is reflected clearly in the platycnemic and pilastric indices. Weight transference during walking was primarily through the right leg, and the well-developed pilaster of the right femur also indicates the dominance of that leg during locomotion. The lack of a squatting facet on the left tibia, but present in the right tibia, suggests that when the right leg was flexed in a supporting squatting posture, the left leg, even if flexion was possible, remained non-supportive.

She likely suffered various levels of pain and discomfort throughout her adult life due to the musculoskeletal damage of her injury, and as a result of the chronic infection of the left femur caused by the injury. However, given that the nature and extent of this injury would have had a major impact on her life, there is evidence that she experienced significant healing, and appears to have remained active during her lifetime.

4.5 Final Remarks

In conclusion, the presence of a massive crushing injury to her left femur, followed by months or years of bone remodeling and healing, linked with equally long periods of continual or recurring osteomyelitis, are testaments to the challenges confronting this individual throughout her life, and to the support of others (especially at the time of injury) that would have been necessary for her survival. What role, if any, these injuries played in the eventual cause of her death, perhaps up to two to three decades later, is unclear, and unknowable. What is clear from the bones is that, even given the seriousness of the injury and the physical limitations caused by pain and physical instability, she remained mobile to the extent that she showed the age-linked effects of an active lifestyle (arthritis) at the time of her death.

5.0 REFERENCES

Begbie, Matthew B.
1861 Sketch of trails from Lytton and Lillooet to Alexandria and the Cariboo District. Map on file, Royal British Columbia Museum, Victoria.

Bussey, Jean and Joyce May
1974a Summer 1974, Department of Highways Archaeological Survey, Summary, August 28, 1974. Report on file, Archaeology Branch, Victoria.

1974b EgRk-2 Site Form, dated May 27, 1974. On file, Archaeology Branch, Victoria.

Chisholm, B.S.
1986 Reconstruction of Prehistoric Diet in British Columbia Using Stable-Carbon Isotope Analysis. Ph.D. Dissertation, Department of Archaeology, Simon Fraser University, Burnaby.

Choate, Avis L.
1973 Letter on South Cariboo Historical Museum Society letterhead, dated June 8, 1973, addressed to Dept. Archaeology, Cariboo College, Kamloops, without subject line, regarding the June 6th recovery of human remains at the Kelly Lake Road - Jesmond Road junction and offer to transfer the remains to Cariboo College. Original letter on file, Archaeological Laboratories, Simon Fraser University, Burnaby.

Cox, M., A. Flavel, I. Hanson, J. Laver, and R. Wessing
2008 *The Scientific Investigation of Mass Graves*. Cambridge University Press, New York.

Dawson, George M.
1891 Notes on the Shuswap people of British Columbia. In *Proceedings and Transactions of the Royal Society of Canada*, 9(2): 3-44.

Lovell, N.C., B.S. Chisholm, D.E. Nelson and H.P. Schwarcz
1986 Prehistoric Salmon Consumption in Interior British Columbia. *Canadian Journal of Archaeology*, 10: 99-105.

Nicholas, George P., Michele Wollstonecroft, and Gladys Baptise
1997 Long-Term Secwepemc Plant Use: Initial Results of Archaeobotanical Investigations in the Interior Plateau. Archaeological Research Reports 2, Secwepemc Cultural Education Society-Simon Fraser University Program, Secwepemc Education Institute, Kamloops.

Salter, R.B.
1978 *Textbook of Disorders and Injuries of the Musculoskeletal System*, reprinted First Edition. Lippincott Williams and Wilkins, New York.

Smith, Harlan I.
1900 *Archaeology of the Thompson River Region, British Columbia*. Publications of the Jesup North Pacific Expedition, volume I, part VI, edited by Franz Boas. Memoir of the American Museum of Natural History, New York.

St'at'imc Chiefs Council
2017 Map of communities, St'at'imc Chiefs Council website, http://statimc.ca/about-us/communities.

Stryd, Arnoud H.
1973 The Later Prehistory of the Lillooet Area, British Columbia. Ph.D. Dissertation, Department of Archaeology, University of Calgary, Calgary.

1981 The 1980 Investigation of the Monte Creek Archaeological Site (EdQx-15). On file, Archaeology Branch, Victoria.

Teit, James A.
1900 *The Thompson Indians of British Columbia*. Publications of the Jesup North Pacific Expedition, volume I, part IV, edited by Franz Boas. Memoir of the American Museum of Natural History, New York.

1906 *The Lillooet Indians*. Publications of the Jesup North Pacific Expedition, volume II, part VI, edited by Franz Boas. Memoir of the American Museum of Natural History, New York.

1909 *The Shuswap*. Publications of the Jesup North Pacific Expedition, volume II, part VII, edited by Franz Boas. Memoir of the American Museum of Natural History, New York.

Trotter, M.
1970 Estimation of stature from intact limb bones. In: Stewart, T.D. (ed.), *Personal Identification in Mass Disasters*. National Museum of Natural History, Smithsonian Institution, Washington.

Turner, N.J., L.C. Thompson, T. Thompson, and A.Z. York
1990 *Thompson Ethnobotany: Knowledge and Usage of Plants by the Thompson Indians of British Columbia*. Royal British Columbia Museum, Victoria.