



After the flood: Investigations of impacts to archaeological resources from the 2013 flood in southern Alberta

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2016 Flood mitigation excavations at EfPm-267, EePk-253, and EePj-103 (Margaret's Site) on the Bow River

Dan Meyer^{a*}, Kendra Kolomyja^a, Lindsay Amundsen-Meyer^a, and Lance Evans^b

^a Lifeways of Canada Limited, #105-809 Manning Road NE, Calgary, Alberta, Canada, T2E 7M9

^b Lunate Consulting

*corresponding author: meyer@lifewaysofcanada.com

ABSTRACT

In 2016, Alberta Culture and Tourism (ACT) commissioned excavations at archaeological sites EfPm-267 (in Quarry Park), EePk-253 (at McKinnon Flats), and EePj-103 (Margaret's Site), in response to the floods of 2013. All three sites are located on the Bow River in Calgary or in relatively close proximity to the east. These three sites were impacted by the 2013 floods, and are in imminent threat of further erosion and information loss. The three sites produced evidence of site occupations ranging from the Middle Precontact Period through to the Protohistoric and Historic Periods. Most significantly, excavation and radiocarbon dating at EePj-103 and EePk-253 indicate that both sites have evidence of terminal Late Period and/or Protohistoric Period occupations, likely representing portions of the same settlement pattern system on the Bow River at that time. The three sites excavated as part of 2016 southern Alberta flood investigation program along the Bow River have demonstrated the value of this program, and have identified avenues for future research and management.

KEYWORDS

Southern Alberta, Middle Precontact, Late Precontact, Protohistoric, Historic, Paskapoo Slopes Subphase, Pelican Lake projectile point, pottery, copper tinkler, stratified, magnetometry

1. Introduction

Since 2013, Alberta Culture and Tourism has commissioned several studies to assess impacts of the 2013 floods in southern Alberta on known and previously unrecorded archaeological sites. Two seasons of that work focused on excavations at significant sites on the Bow River. This report presents the results of excavation studies at archaeological sites EfPm-267 in the Quarry Park community of Calgary, EePk-253 at McKinnon Flats, and EePj-103 (Margaret's Site) in the vicinity of Carseland (Figure 1). All three of these sites were recorded or re-recorded as part of the initial flood impact programs commissioned by Alberta Culture and Tourism (Vivian 2014; Vivian and Amundsen-Meyer 2015). EePj-103 had previously been the focus of flood impact excavations in 2015 (Meyer, Amundsen-Meyer, Kolomyja, and Johan-

nesson 2016; Meyer, Kolomyja, and Amundsen-Meyer 2016; Meyer and Amundsen-Meyer 2017; Meyer et al. 2017). These three sites were impacted by the 2013 floods, and are in imminent threat of further erosion and information loss.

The 2016 studies were not meant to be exhaustive investigations of each site, but rather were intended to focus on the collection of baseline information that can be used to structure future management and research. The common goals of the archaeological assessment studies were: 1) to collect a sample of materials from portions of the sites that are under threat of being lost to future erosion; 2) to provide an understanding about the nature and contents of the cultural materials associated with the

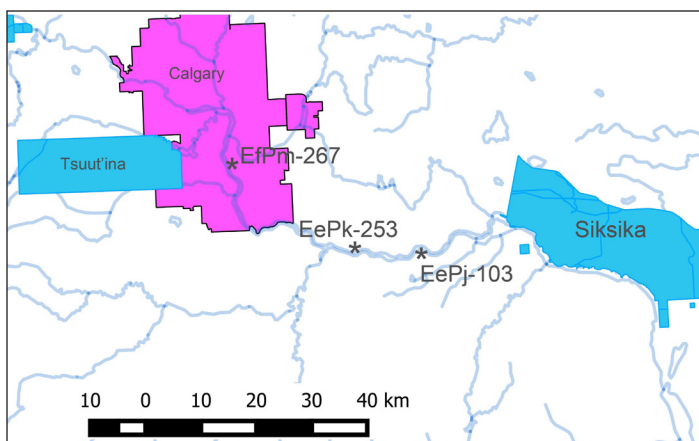


Figure 1. Location of sites EfPm-267 (Quarry Park), EePk-253 (McKinnon Flats), and EePj-103 (Margaret's Site).

sites, including numbers and types of cultural occupations; and 3) to recommend strategies that can be used to define future site management, including long-term preservation of the sites and site information.

2. EfPm-267 (Quarry Park)

EfPm-267 is on a terrace on the east side of the Bow River within the City of Calgary, in the Quarry Park neighborhood (Figure 2). This low terrace, approximately 5 metres above the Bow River to the west, has been heavily disturbed by modern industrial activity, but is now part of City park land. This landform was also heavily eroded by the 2013 flood. Staff of Lifeways of Canada Limited first recorded EfPm-267 in 2005 during an Historic Resources Impact Assessment (HRIA) of the proposed Quarry Park development (Vivian 2005). In the northwest corner of a large terrace on the east side of the Bow River, one backhoe test revealed evidence of a buried stone circle (Figure 3). Lifeways re-



Figure 2. View north of EfPm-267, the primary excavation block is located inside the fenced area.



Figure 3. The buried stone ring revealed by Brian Vivian at EfPm-267 in 2004.

visited EfPm-267 in 2013 as part of a baseline flood impact assessment of the Bow River within the City of Calgary (Vivian 2014). Vivian found that the 2013 flood had removed between 5 and 10 metres of the pre-flood terrace surface along an erosional cutbank approximately 80 metres in length, exposing these cultural materials approximately 130 metres southwest of the buried stone circle recorded in 2005. Throughout the length of the cutbank, a series of faint paleosols were observed to a depth of 100 centimetres below surface (bs) where basal river cobbles are present. Overall, cultural materials observed in the bank were relatively sparse; however, a well-defined, basin-shaped hearth (ash lens) was observed in the cutbank at a depth of 55 centimetres bs. Nearby, a large cobble, believed to represent part of a buried tipi ring, was observed at a depth of 75 centimetres bs.

One of the primary goals of the work program at EfPm-267 was to rescue the possible tipi ring observed eroding into the river in 2013. The fieldwork program was undertaken in several stages designed to provide an enhanced understanding of the site and to rescue important information threatened by erosion. These stages included reconnaissance and mapping of the cutbank, magnetometer survey, shovel testing (41 tests), phased excavation of 17 square metres, and detailed stratigraphic profiling. The high degree of contemporary disturbance at the site resulted in magnetometry data of limited utility, and unfortunately it appears as if the possible eroding buried ring, if present, has been removed by the river. The excavations did reveal that both the geological and cultural stratigraphy at EfPm-267 are very similar to that at EfPm-37, a buried tipi ring excavated in 2015 in Fish Creek Provincial Park (Meyer, Roe, Blakey, Foster, and Amundsen-Meyer 2016). As elsewhere

on the Bow River, the underlying basal deposits at EfPm-267 consist of post-glacial alluvial gravels. Within the main excavation block at EfPm-267, these gravels were encountered at depths between 180 and 195 centimetres bs. Above these gravels lies a series of fluvial silts broken by up to 11 buried “A” horizons to depths of up to 130 centimetres bs (Figure 4). Many of the paleosols are faint and not visible across the entire excavation block, and most are culturally sterile, or close to it. Testing and excavations produced an assemblage consisting of only 20 pieces of animal bone, one projectile point of Montana chert (likely Bowman), one quartzite scraper, one hammerstone, five cores, one tried cobble, 33 pieces of debitage, 45 pieces of fire-cracked rock (FCR), and two pieces of precontact pottery. However, previous testing and the 2016 excavation program provide ample evidence that EfPm-267 is a stratified precontact campsite with, minimally, three definable occupations.

The earliest of the precontact occupations is likely Middle Precontact Period, at an approximate average depth of 100 centimetres bs. Shovel testing suggests that the buried “A” soil horizon associated with this occupation is likely found across the site, and additional intact remains are probably associated with it. Above this, a Late Middle Period, Paskapoo Slopes Subphase occupation is indicated by the presence of a Bracken Point (Peck 2011) associated with other tools, a limited amount of FCR, and what appears to be the remnant of some type of stone feature. This occupation may have been associated with the buried ring that appears to have been completely removed in the 2013 flood. A third occupation level lies above the Paskapoo Slopes Subphase materials, and may date to either the Middle Period or Late Period. There is a possibility that the tipi ring, exposed during backhoe testing in 2005 near the back of the terrace, is associated with this occupation. Finally, a Late Period oc-

cupation at EfPm-267 is made clear by the recovery of two precontact potsherds. Unfortunately, their context appears disturbed.

Although the 2016 program at EfPm-267 failed to recover an intact stone circle along the cutbank, the work program and past efforts indicate that, despite the heavy disturbance and overall low artifact density in the areas investigated, EfPm-267 is a site of at least high local to regional significance. At least one extant buried ring is present at the site, and we believe that Vivian (2014) did observe the last remnants of a ring in the cutbank. Combined with a possible hearth feature area identified in the magnetometer survey, the scattering of artifacts across the site, and the intact series of paleosols observed across the landform, undisturbed buried rings or similar features may be present in the area. We recommended continued surveillance of EfPm-267 to identify any other eroding features.

3. EePk-253 (McKinnon Flats)

EePk-253 is located at McKinnon Flats just east of Calgary. The site was first recorded in 1971, as part of an archaeological survey program undertaken by University of Calgary students, and has since been revisited and re-recorded several times. The most recent of these was the reassessment in 2014 as part of the flood impact assessment program (Vivian and Amundsen-Meyer 2015). The 600-metre cutbank at the west end of the McKinnon Flats area was examined and significant amounts of cultural material were observed over 400 metres of the erosional exposure. The 2013 flood was believed to have removed up to 10 metres of material from the north bank at this point, and continued erosion is considered to be a significant danger to the site.

EePk-253 consists of two parts, a tipi ring area on a medial terrace to the northeast, and an eroded lower terrace area to the west where the impacts from the flood were observed. This lower, flood-impacted terrace area to the west was the sole focus of the 2016 program (Figure 5). The area is constrained by the riverbank to the south and a steep slope that rises to prairie level to the north. There are numerous sandstone outcrops on the slope face in this area and at least one ephemeral drainage extends onto this part of the terrace. This portion of the site extends nearly 400 metres lengthwise, based on 2014 observations, and is at most 30 metres wide, but more commonly, only a narrow 10-metre strip of land is left between the toe of the slope to the north and the cutbank. For practical purposes, the eastern and western ends of this landform are so eroded that, despite 2014 cutbank observations, only about a 220-metre length of landform is suitable for archaeological investigation.



Figure 4. View of EfPm-267 site stratigraphy as observed at the north end of the 2016 excavation block.



Figure 5. View southeast of the portion of EePk-253 tested and excavated in 2016.

The work program at EePk-253 was intended to provide an understanding of this deep, stratified site that has lost a substantial proportion of its area to the river. The fieldwork program at EePk-253 was undertaken in four stages including reconnaissance and mapping of the cutbank, a shovel testing and test unit program with 11 shovel tests and ultimately five dispersed 1-square-metre units to 300 centimetres bs, block excavations of 24.5 square metres to a maxi-

mum depth of 300 centimetres bs, and detailed stratigraphic profiling at five locations along the cutbank.

The basal deposits underlying EePk-253 are post-glacial, alluvial gravels, as at other sites on the Bow River. However, there are at least 4 metres of late Holocene deposits above these. The extreme depth of the sediments at EePk-253 is somewhat unusual given the relatively young age of the landform. In part, this reflects numerous river flood events in the past several hundred years, but there is a significant amount of colluvial deposition across the terrace landform, most notably towards the center and west end. The exposed sandstone formations on the slope face have significantly impacted the formation of the bench above the river. The drainage from prairie level has actually created an alluvial/debris fan formation, and in this area the terrace itself is 1 to 2 metres higher than at other points on the landform. The buildup of material on the bench alternates between colluvial sand and gravel and finer fluvial sand and silt deposits over the site area.

Excavations revealed a complex stratigraphic profile, with at least 22 thin buried “A” soil horizons separated by the fluvial silts, fluvial sands, and colluvium/slopewash (Figure 6). The excavations produced a total of 9,009 faunal remains, two pieces of shell, one bone tool, 17 pieces of

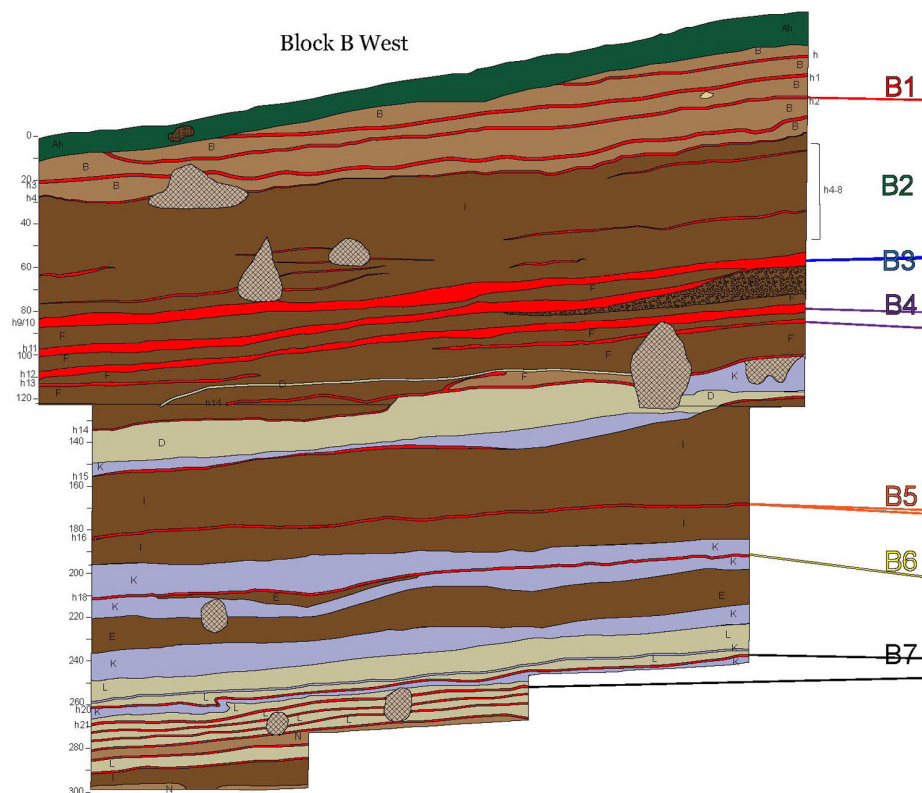


Figure 6. A sample of EePk-256 site stratigraphy from Excavation Block B. Red horizons are buried “A” horizons, blues are fluvial (river) silts, beige are fluvial sands, and medium and dark brown are colluvial sands from slopewash.

lithic debitage, seven stone tools, and nine pieces of FCR. The paleosols and artifacts are associated with up to seven defined cultural occupations spanning the last 600 years. No culturally diagnostic artifacts were recovered, but based on a series of 11 radiocarbon assays (Table 1), occupations span from the Late Period, circa the mid-to-late 1400s, through the terminal Late Period, and into the Protohistoric. Interestingly, the bone flesher tool recovered here is similar to a bone flesher recovered at EePj-103 (Figure 7). EePk-

253 also offers a substantial record of geomorphological processes along the river, and likely environmental/climate information in the area. The largest portion of the EePk-253 assemblage by far is the faunal material, almost all of it bison. The very small collection of lithic material and FCR indicates that, although the site was used frequently, the repeated occupations were of limited duration, consistent with a short-term activity such as a kill or processing event. There are no projectile points or other artifacts suggesting

Table 1. Radiocarbon results from EePk-253 samples collected under Permits 14-198 (Vivian and Amundsen-Meyer 2015) and 16-123 (Meyer et al. 2017) with high density probability ranges.

Identifier	Context	Depth (cm bs)	Sample	Conventional Radiocarbon Age (BP)	Traditional Calibration Date Range (95% Probability)	High Probability Density Range Method of Calibration (95.4 % Probability)	Percent Probability*
2014 Sample 4	In poorly-defined paleosol; likely Occupation A	040	Bone (EePk-253:56)	165 ± 15		AD 1668–1688 AD 1730–1782 AD 1797–1809 AD 1926–1948*	16.07 52.31 9.94 17.08
2014 Sample 6	In well-defined paleosol; Occupation A	050	Bone (EePk-253:58)	215 ± 15		AD 1650–1674 AD 1778–1799 AD 1941–1949*	36.57 52.00 6.82
2014 Sample 1	In well-defined paleosol; Possible Occupation A/P2 (depth due to additional colluvial sand deposit?)	080	Bone (EePk-253:53)	220 ± 15		AD 1649–1670 AD 1780–1798 AD 1944–1949	42.36 48.86 4.18
2014 Sample 7	In well-defined paleosol; likely Occupation B	100	Bone (EePk-253:59)	185 ± 15		AD 1665–1683 AD 1735–1787 AD 1792–1805 AD 1934–1949*	21.09 45.67 11.19 17.45
2016 Sample 1 (Beta-451867)	Block A Horizon 7 ; Occupation C	133	Bone (EePk-253:60)	200 ± 30	AD 1650–1685 AD 1730–1810 AD 1925–Post 1950	AD 1647–1688 AD 1730–1809 AD 1926–1949*	26.17 54.87 14.35
2014 Sample 3	Just above well-defined paleosol; possibly Occupation B?	150	Bone (EePk-253:55)	245 ± 15		AD 1644–1665 AD 1785–1794	82.26 13.14
2016 Sample 4 (Beta-451870)	Block A Horizon 18 (no occupation)	320	Charcoal	240 ± 30	AD 1640–1670 AD 1780–1800 AD 1940–Post 1950	AD 1526–1556 AD 1632–1681 AD 1738–1752 AD 1762–1803 AD 1937–1949*	5.63 53.96 1.40 29.77 4.65
2014 Sample 2	In well-defined paleosol, adjacent to possible hearth; Below Occupation D (Horizon 12/Block A)	250	Bone (EePk-253:54)	320 ± 15		AD 1496–1506 AD 1512–1601 AD 1616–1642	2.70 73.25 19.45
2016 Sample 2 (Beta-451868)	Block A Horizon 11; Occupation D	222–233	Bone (EePk-253:61)	340 ± 30	AD 1455–1645	AD 1470–1639	95.40
2016 Sample 3 (Beta-451869)	Block B Horizon 18; Occupation B6	280–290	Bone (EePk-253:62)	370 ± 30	AD 1445–1530 AD 1545–1635	AD 1447–1527 AD 1553–1633	54.83 40.57
2014 Sample 5	In well-defined paleosol; Block B Horizon 23?	300	Bone (EePk-253:57)	405 ± 15		AD 1443–1488 AD 1605–1606	95.16 0.24

* Probabilities are based on 2-sigma range for each calibrated radiocarbon age. The percentage sum is 95.4% for each as the derivative value of the percentage of the total area within the standard deviation curve. The 2-sigma deviation gives a 95.4% probability of accuracy for the calibrated date range. All ranges here were calculated using Calib 7.0.4 and standardized to 95.4% probability range.



Figure 7. Bone fleshing tools recovered from EePk-253 (left) and EePj-103 (right).

that the occupations represent primary kills. Rather, the assemblage is almost universally reflective of butchering/processing activities dispersed over the terrace. There may well have been campsite occupations on this terrace that have now been lost to erosion, but there is no remaining evidence of the western terrace being used as a campsite. The campsite associated with the EePk-253 processing areas was, and is, probably on the medial terrace to the east where tipi rings were previously recorded, and in the vicinity of EePk-286 further east.

Unfortunately, past flood events have taken a considerable toll on EePk-253 and likely have removed most of the western portion of the site; however, work to date has demonstrated that considerable remains are still present there. As it represents primarily bison processing site remains, that portion of the site has relatively little to offer in terms of significant stone tool or lithic debitage assemblages, or large assemblages of other items such as ceramics or trade items. Given its particular association with the terminal Late Precontact and Protohistoric Periods in southern Alberta, however, the site still has considerable value as a part of a settlement system from a poorly-understood period of Alberta's past. EePk-253 is of high regional archaeological significance with its deep stratigraphic record. The 2016 work program at EePk-253 needs to be followed-up with both continued monitoring of erosion and additional research in order to properly manage this significant site.

4. EePj-103 (Margaret's Site)

Site EePj-103, Margaret's Site, was first recorded in 2014, the second year of flood impact assessments of historic resources along the Bow River (Vivian and Amundsen-Meyer 2015). In this location, comparison of aerial photographs

indicated that the 2013 flood had removed about 5 metres of deposits from the terrace edge to the southwest, but upwards of 30 metres at the northeastern end. In 2015, Lifeways was commissioned to undertake test excavations at the site (Meyer, Amundsen-Meyer, Kolomyja, and Johansson 2016; Meyer, Kolomyja, and Amundsen-Meyer 2016; Meyer and Amundsen-Meyer 2017). These excavations revealed it to be a unique historic resource in southern Alberta with multiple occupations in a stratified site spanning Protohistoric-Early Historic Periods (see Meyer and Amundsen-Meyer 2017, for background history of land ownership).

Although the Historic Period remains at the site are interesting, one of the most fascinating things about EePj-103 is that the 2015 excavations revealed what appeared to be, possibly, the central hearth of a lodge feature associated with metal projectile points. Other Fur Trade era items recovered from the site included trade beads, glass, metal fragments, and a musket ball recovered from the bank in 2014. An earlier occupation at the site produced fragments of precontact pottery. Initially, the primary focus of the 2016 excavation program was to expand excavations at Block D, where the activity area, believed to be centered around a lodge's central hearth, was identified in 2015. Excavations were also to include a smaller expansion of Block C, north of Block D on the river bank (Figure 8). This area, immediately threatened by erosional activity, produced precontact pottery in 2015. The 2016 work at EePj-103 included magnetometer and ground-penetrating radar (GPR) survey, and the excavation of 42 square metres, expanding upon the previous year's work.

The geophysical studies (GPR and magnetic gradiometry) were undertaken prior to excavation by Lance Evans and crew of Lunate Consulting (Figure 9). GPR was used to attempt to identify Historic Period foundations reported by the landowners and any other historic features that may be present below the surface. The magnetic gradiometry program had as its goal to identify anomalies that may represent features such as hearths, which would help to target areas for excavation and identify potential activity areas and features throughout the site. In addition, given that metal artifacts were expected at EePj-103 at greater depths than could be identified during the 2015 metal detector survey, we hoped that the magnetic gradiometer might serve as a high-powered metal detector and identify locations where these metal artifacts may be present in the protohistoric occupation(s).

The GPR survey focused on two locations. The first is a large systematic survey block covering a roughly 50-by-

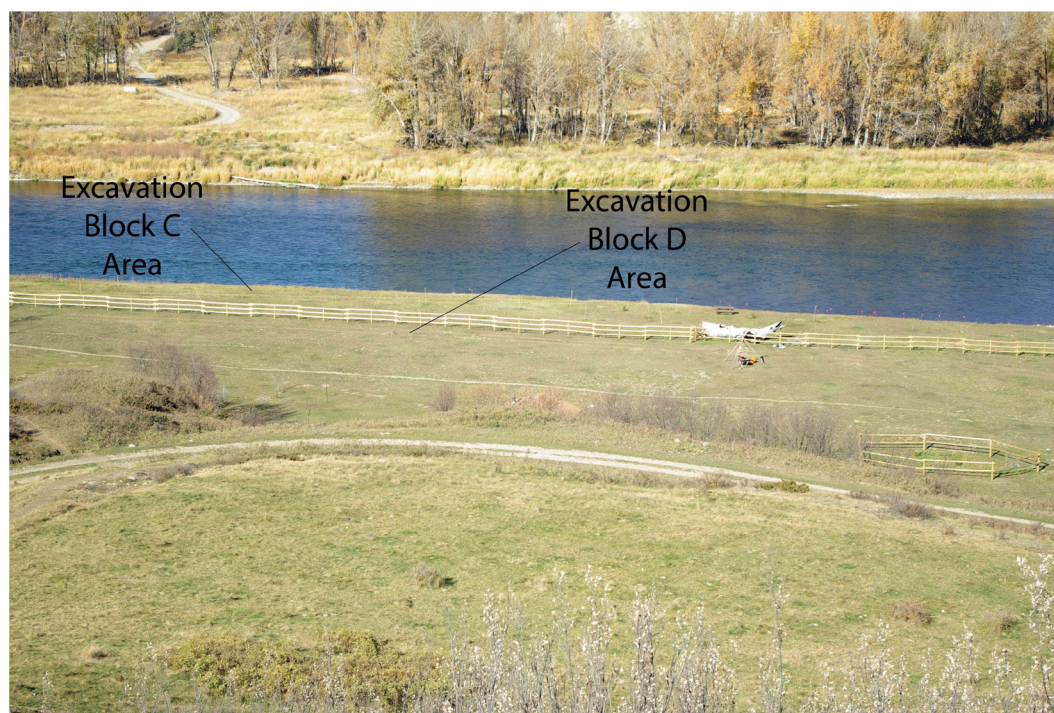


Figure 8. View north of excavation block locations at EePj-103.



Figure 9. Shalcey Dowkes undertaking magnetometry survey at EePj-103.

30-metre area reported by the landowners to contain cobble foundations visible prior to the 2013 flood event. Additional GPR lines were run around the remains of the stone foundations visible to the east, covering a roughly 20-by-20-metre area. GPR survey in the main block identified a series of eight features. Two of these roughly correspond with the locations of reported cobble foundations, and results suggest that three of these other features are likely structural, given their size, shape, and coherent outline. The magnetometry survey to the west provided additional information about possible historic features. Linear arrange-

ments of dipoles (a magnetic signature created by metal artifacts) suggested the presence of two rectangular features and two linear features. These features may represent, for example, a corral or fence from the Domburg ranch, as nails would have fallen to the ground as these structures decayed. Smaller series of radar data were also collected around the visible stone-lined cellar. Areas of disturbance that may indicate an extension to the structure or an immediately adjacent structure are present to the north and west, while a pipe or other metal, oblong object was identified immediately to the east.

In a survey area associated with excavation Block D, the magnetic gradiometer survey successfully identified a series of 17 hearth-like anomalies. A number of these were found to be spaced 6 to 8 metres apart, a distance suggested by Evans to be consistent with central hearths in lodges. In addition, the magnetic gradiometer survey identified a large number of dipoles indicative of the presence of metal. Several of these were found to be a result of modern interference, such as from the various fences present near the survey block. Several areas of concentrated dipoles are thought to result from significant Historic Period activity and/or refuse. Figure 10 illustrates the results of the magnetometer survey versus the excavation programs and 2015 shovel testing (see Meyer, Amundsen-Meyer, Kolomyja, and Johannesson 2016 for precise results of that testing). Overall, the magnetometry work was excellent and returned positive results when several of the test areas were excavated. Magnetometry illustrates great promise for future work at the site. Ground disturbances associated with 2015 excavation Block D, shovel test 45, and shovel test 43 are visible in the magnetometer survey. The 2016 excavation Block D expansion encountered features in the precise locations (seven and nine) indicated by the magnetometer survey: an obvious hearth feature at the larger black anomaly to the south, and a more subtle concentration of burnt bone at the less obvious anomaly to the north (see Meyer et al. 2017 for in-depth discussion of these features). Shovel test 43, just east of a large anomaly, produced FCR and bone in what is likely a protohistoric paleosol, consistent with the interpretation of a burned area nearby. Shovel test 45 was negative

and no adjacent anomalies were detected by magnetometer. Shovel test 47 was also positive with bone and FCR. It is not next to an identified anomaly, yet appears directly south of a more subtle anomaly, not unlike the one detected around a feature excavated in 2016. Unfortunately, positive shovel test 48 is obscured by a dipole. Concentrations of dipoles occur in the south and east near a modern cabin and picnic tables. Since no metal detector sweep was conducted prior to the geophysical work, it is likely that these concentrations of dipoles represent modern refuse, such as bottle caps and pop can tabs, from camping and picnics in the area. However, numerous small, metal fragments were recovered from excavations in Block D that do not appear in the magnetic gradiometry data.

The magnetic gradiometer survey in the area of excavation Block C again identified a series of hearth-like anomalies. One of these anomalies (22) was explored during the 2016 excavation program with positive results. In addition, four circular features, 5 to 6 metres in diameter, were identified. Each contained at least one hearth-like feature. Given the size and spacing of these circular anomalies, they may represent lodges. Figure 11 presents the results of the magnetometer survey versus the same 2015 excavation and shovel testing dataset. Note that the linear disturbance from the vehicle two-track through this area shows up well. The anomaly noted by the magnetometer survey to the east of 2015's excavation Block C did, in fact, turn out to be a large burn feature when Block C was expanded in 2016. In addition, we noted a general circular anomaly in this area. This

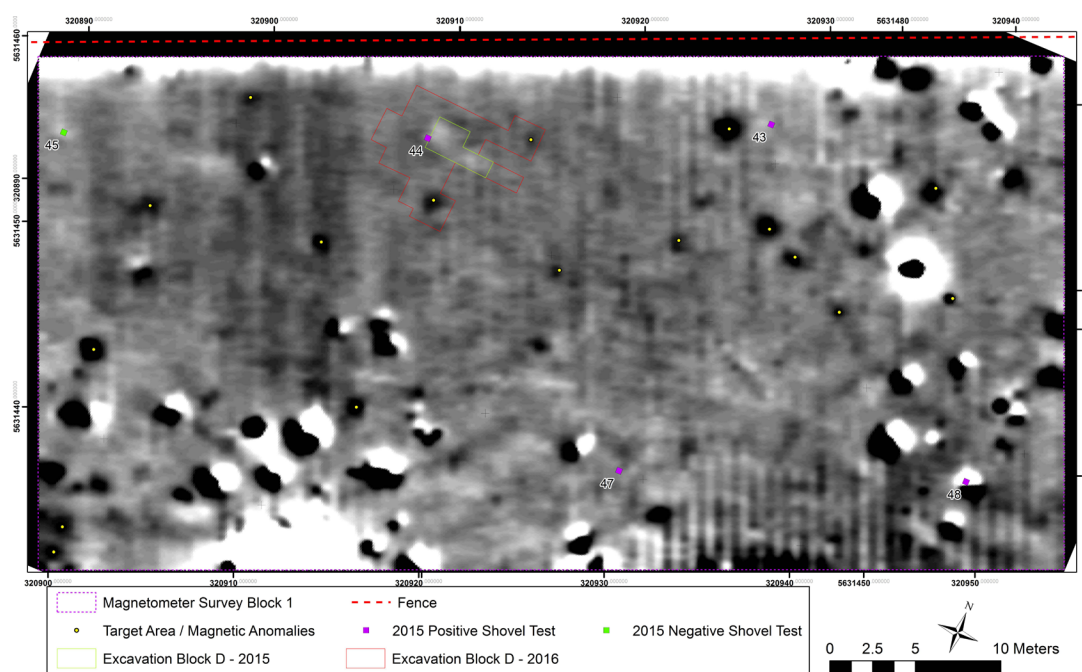


Figure 10. Results of magnetometry program in the vicinity of excavation Block D at EePj-103.

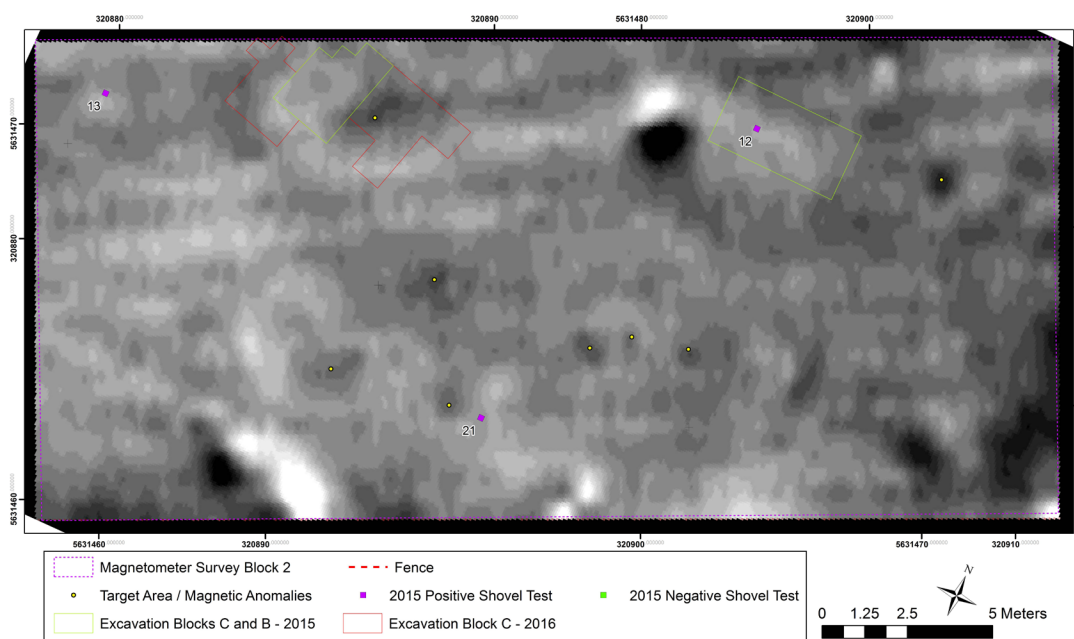


Figure 11. Results of magnetometry program in the vicinity of excavation Block C at EePj-103.

partially coincided with cobbles observed eroding from the bank at the northwest tip of excavation Block C, and interestingly, one small cobble appeared in alignment with this anomaly at the west side of the block, and another at the east side. Once again, the previous excavation Block B and C disturbances are visible in the magnetometry survey, as is shovel test 13. Shovel test 21 does not appear as clearly; this test produced a single bone fragment in 2015. Future excavation will be required to identify what these anomalies represent. Finally, concentrations of dipoles indicative of the presence of metal were again identified. The geophysical survey program produced excellent results regarding the presence of other possible buried features at the site, both protohistoric and historic.

While the geophysical testing program provided useful new information related to the reported and observed Historic Period features at the eastern end of the site, the focus of the 2016 excavation program related almost exclusively to the protohistoric occupations. All told, the 2016 excavation program collected 3,685 faunal remains, two pieces of shell, one bone tool, one copper tinkler (Figure 12), 28 other pieces of metal, 155 pieces of precontact-style pottery, 80 pieces of lithic debitage, three cores, 16 stone tools, and 29 pieces of FCR. Nine additional features were encountered, and results strongly indicate that a circular protohistoric lodge floor has been revealed.

Figure 13 provides a comprehensive map of Block D and all of the features and artifacts plotted during both 2015 and 2016 excavations. Although our initial interpretation



Figure 12. Copper cone tinkler recovered to the west of the central hearth at EePj-103.

was that the materials here represented a mixed component (Meyer, Amundsen-Meyer, Kolomyja, and Johannesson 2016), the patterning in the material suggests that, even if the paleosol here is mixed, the materials uncovered in Block D mainly represent a single occupation episode from a tipi lodge centered on hearth Feature 5. Despite efforts to provide firm evidence of a tipi lodge in the Block D area in the form of stones or pegs used to hold down the hide, we encountered no such incontrovertible evidence. While numerous cobbles were found in the form of manuports, none are suggestive of use as ring rocks. However, the information recovered establishes with a high degree of certainty that Feature 5 is indeed the central hearth of a lodge, likely occupied (as previously concluded) in the winter months (Mey-

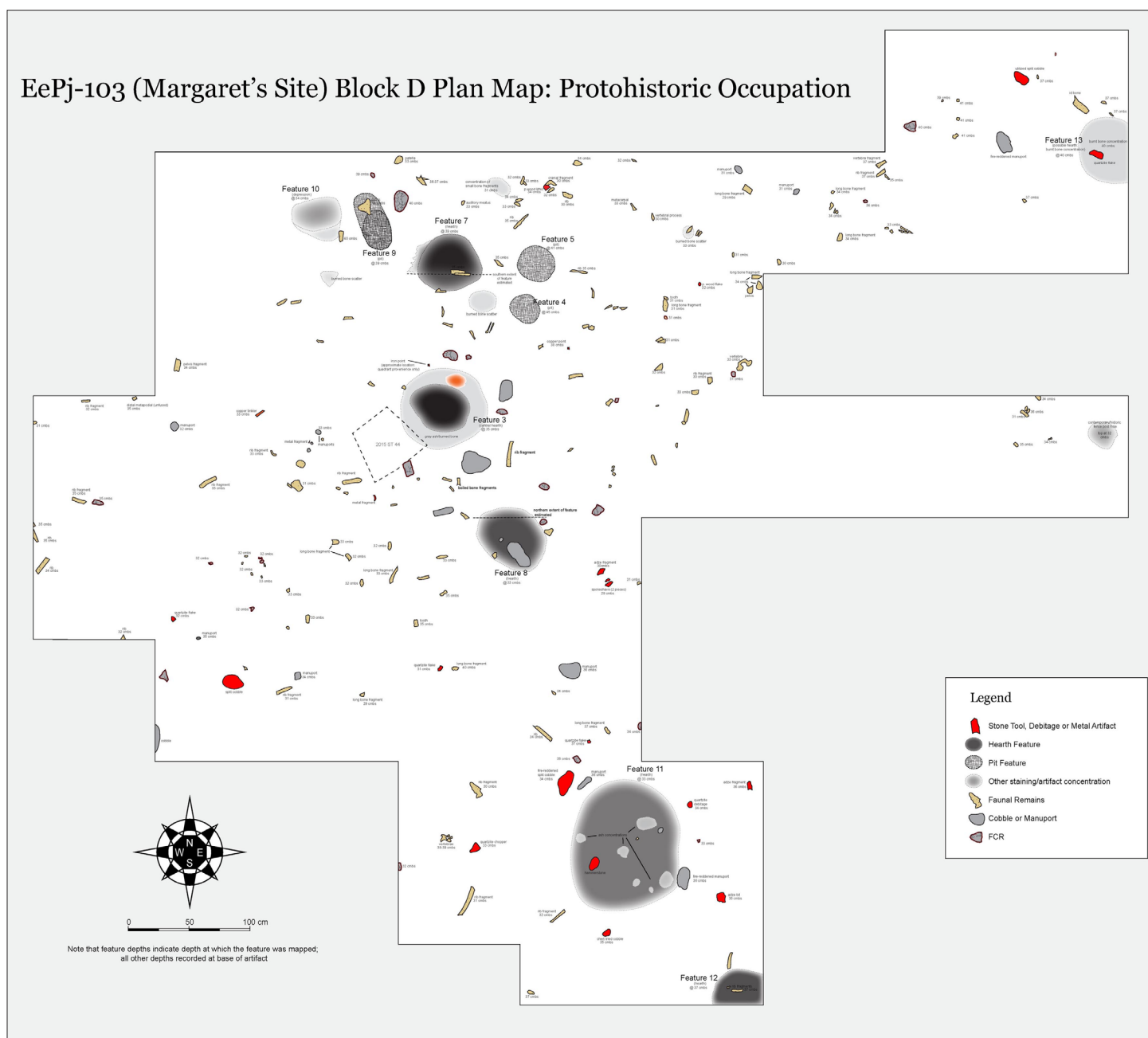


Figure 13. EePj-103, Block D plan map.

er, Amundsen-Meyer, Kolomyja, and Johannesson 2016; Meyer, Kolomyja, and Amundsen-Meyer 2016; Meyer and Amundsen-Meyer 2017).

This central hearth is surrounded by a cluster of satellite features, all of which seem to have functioned to a degree in food preparation and for heating. Interestingly, the amount of burned bone in the pits reused for refuse suggest that bone was probably being used as a fuel source alongside wood and possibly dung. It is unclear if this is due to diminishing supplies of other fuel types nearby at this time,

a preference for fire produced using bone as fuel, or simply another means of disposing of refuse. The fact that some of these activities are occurring inside a lodge is not surprising for a winter occupation.

The copper and iron projectile points and a spokeshave speak to weapon maintenance and production around this hearth, and the nearby copper tinkler suggests other domestic activities associated with clothing. We were particularly excited by this find, as we had recently recovered similar tinklers while undertaking excavation work at Fort George on

behalf of the Royal Alberta Museum (Meyer and Kolomyja 2017). It is clear that the distribution of metal fragments recovered in the block, interpreted to be refuse from tool production and/or possibly fragments of metal cookware or other tools, strongly cluster around the central hearth. The distributions of FCR, manuports, and other tools across the excavation block appear somewhat more dispersed. In the case of the FCR, this is likely related to the fact that stone boiling had been supplanted as an important technology for food preparation. For manuports and tools, it is likely a reflection that features and associated activity areas did not solely occur around the central hearth.

Looking at the general distribution of all plotted features and artifacts in Block D, clearly visible is a circular concentration of materials around the central hearth, with a relatively uniform density, that drops off dramatically, particularly to the northwest, west, south, and east. To the southeast the density drops but rapidly increases again in the vicinity of Feature 11. As only relatively large items were plotted in the field, we randomly generated points on a quadrant-by-quadrant basis to reflect the density of faunal materials recovered in the screen. As can be seen in Figure 14, the general circularity in the patterning of artifacts and drop off in density is apparent. These densities pick up again in the

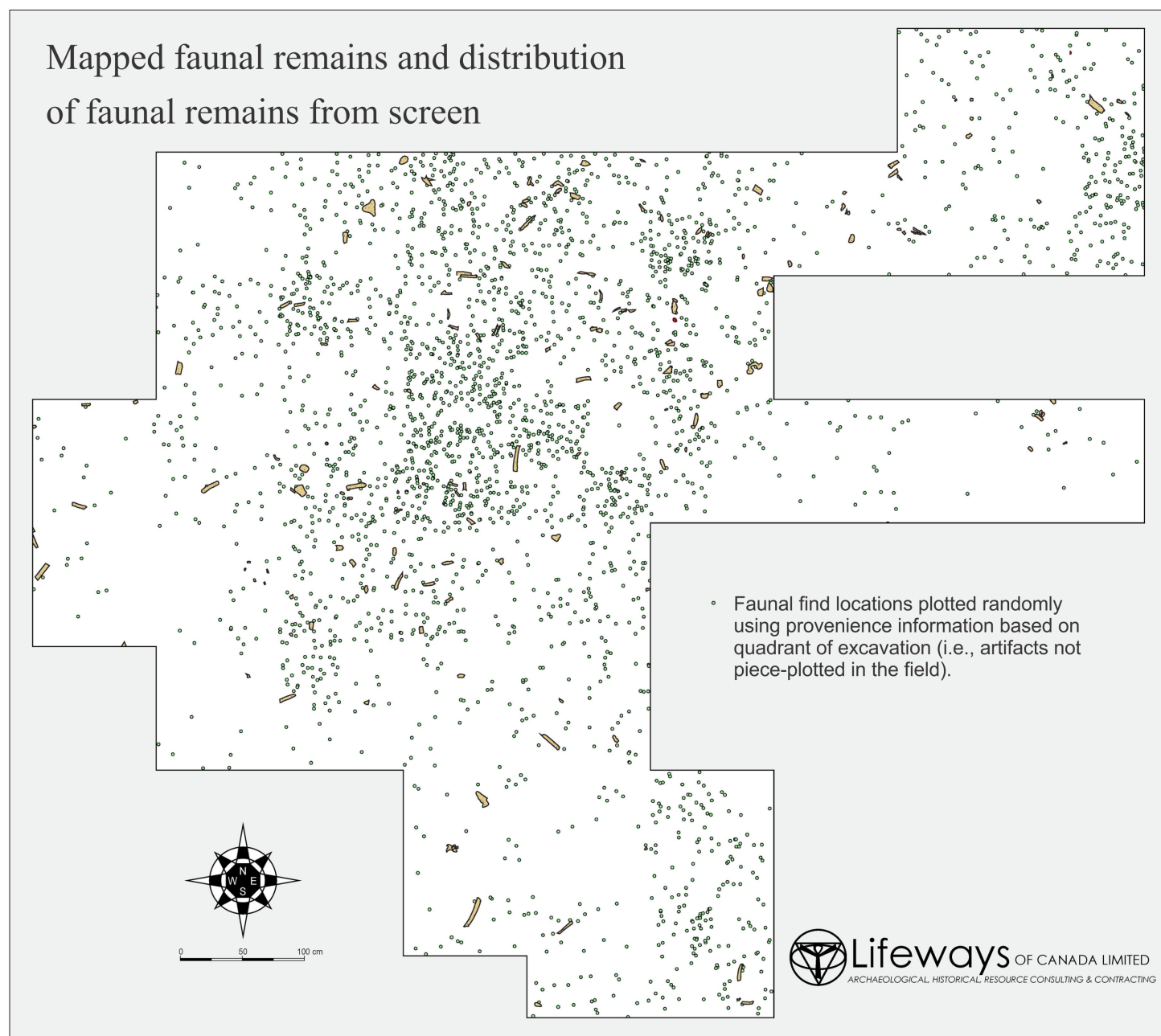


Figure 14. EePj-103, Block D, distribution of faunal remains.

vicinities of Features 11, 12, and 13, all interpreted to be external features. Assuming that the central hearth is in the approximate center of the lodge (one would expect it to be a little off-center), that the circular distribution seen in the materials is reflective of items dropped or otherwise discarded on the lodge interior, and that Feature 11 is external and not directly against the lodge, we can approximate the lodge diameter to be 5 to 6 metres. Expansion of Block D in the future might allow further refinement of this estimate.

Margaret's Site represents a stratified Protohistoric and Historic Period Site, with at least two components from each period. Radiocarbon dates from 2016 (Table 2) overlap the calibration curve in numerous places, as expected for recent dates, and provide no reason to believe that the earliest occupation is older than the terminal Late Precontact Period, and could just as likely rest firmly within the Protohistoric Period in the AD 1700s. This older occupation has been conclusively associated with Ethridge Ware pottery. In contrast to the 2015 results, we recovered direct evidence that flintknapping technologies were still in use during this early occupation. The later, clearly protohistoric occupation associated with metal projectile points, a cone tinkler, and possibly other trade goods, is associated with neither flintknapping technology nor pottery. The 5 to 6 metre diameter lodge floor is associated with this protohistoric occupation. Margaret's Site has great potential to inform reconstructions of protohistoric phases in southern Alberta. However, we believe that additional investigation is required at this site and others to clear up stratigraphic issues, provide greater information about the occupations/phases, and determine

their relationship to the Old Women's Phase, Nitsitapii groups, or others.

The 2016 program conclusively demonstrated the importance and uniqueness of Margaret's Site, and both the excavation and geophysical programs indicate that it has incredible potential to add to our understanding of both the Protohistoric and Early Historic Periods in Alberta. There are clearly many intact and very significant archaeological remains left underground at the site. The 2015–2016 work programs at EePj-103 need to be followed-up with both continued monitoring and additional research in order to properly manage this highly significant site.

5. Conclusions

The three sites excavated as part of the 2016 southern Alberta flood investigation program along the Bow River have demonstrated the value of this program, and have identified avenues for future research and management. While the salvage excavations at EfPm-267 (Quarry Park) did not result in the recovery of a buried tipi ring, they did confirm the significant depositional history of the site, and its potential value in our understanding of Middle Precontact cultures. Buried stone features are still present at the site despite previous surficial disturbances. EfPm-267, along with nearby EfPm-266 and others (like EfPm-37), have shown that the Bow River through Calgary continues to reveal unique records of the Middle Precontact Period in Alberta due to the association of buried, intact campsites with its remnant terrace landforms.

Table 2. Radiocarbon results from EePj-103 with high density probability ranges (Meyer et al. 2016).

Identifier	Context	Depth (cmbs)	Sample	Conventional Age (BP)	Traditional Calibration Date Range (95% Probability)	High Probability Density Range Method of Calibration (95.4% Probability)	Percent Probability*
Beta 451874	Occupation D, hearth Feature 1, Block B	60–70	charcoal	170±30	AD 1660–1695	AD 1659–1699	17.7
					AD 1725–1815	AD 1721–1818	51.6
					AD 1835–1880	AD 1832–1880	8.2
					AD 1915 to post 1950	AD 1916–post 1950	17.9
Beta 451871	Occupation D paleosol in vicinity of recovered ceramics, Block C (Unit 78 SW)	63	charred	80±30	AD 1685–1730	AD 1690–1730	70.5
					AD 1810–1925	AD 1810–1926	24.9
					post AD 1950		
Beta 451873	Occupation C/D, central hearth Feature 3, Block D	38–40	charcoal	160±30	AD 1665–1710	AD 1664–1706	17.0
					AD 1720–1890	AD 1719–1826	48.1
					AD 1910 to post 1950	AD 1832–1884	12.8
						AD 1914–post 1950	17.5
Beta 451872	Occupation C/D, pit Feature 4 near central hearth, Block D	45–75	charcoal	110±30	AD 1680–1765	AD 1745–1763	2.8
					AD 1800–1940	AD 1680–1739	27.1
					post AD 1950	AD 1802–1938	65.5

* Probabilities are based on 2-sigma range for each calibrated radiocarbon age. The percentage sum is 95.4% for each as the derivative value of the percentage of the total area within the standard deviation curve. The 2-sigma deviation gives a 95.4% probability of accuracy for the calibrated date range.

The Bow River downstream of Calgary stands in some contrast to this, as the 2015 and 2016 flood mitigation programs there have shown that at least some of the landforms, while of greater physical depth than many in Calgary, offer much less temporal depth. They offer glimpses into the terminal Late Precontact and Protohistoric Periods. These same periods, of course, are also represented on landforms in Calgary, as seen in the number of mixed-occupation protohistoric sites previously recorded there, and as seen in artifacts, such as the ceramics, recovered on the EfPm-267 and EfPm-37 landforms. However, in most Calgary examples, these more shallow occupations have been disturbed or are of less interpretive potential because occupations are mixed due to a different depositional system along the river in Calgary. The understanding of those mixed terminal Late Precontact and Protohistoric Period occupations in Calgary and the rest of southern Alberta, particularly the timing of technological and economic change (both domestic and trade), will best be studied through sites such as EePj-103 (Margaret's Site) and EePk-253 (McKinnon Flats).

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