



Assessment of 2013 Flood Damage to Historic Resources
at Blackfoot Crossing Historical Park: Phase 1

by

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Executive Summary

Phase 1 of an ongoing assessment of damage to historic resources at Blackfoot Crossing Historical Park (BCHP) was conducted during the spring of 2015 by members of the University of Calgary Archaeological Field School and Program for Public Archaeology. All assessments were conducted using visual surface inspection only. No damage was recorded at EePf-1, the Cluny Fortified Village site or at any of the other surface features encountered during the reconnaissance.

The flood deposited approximately eight centimetres of silt onto the terrace on which EePf-1 and the other surface features are situated but caused no other visible impact to those resources.

Approximately 1.7 hectares of BCHP property was lost during the 2013 flood due to north cutbank erosion. Erosion of the north cutbank here is active and ongoing, representing a continuing threat to historic resources within the park.

An inspection of the north cutbank of the Bow River within the confines of BCHP revealed eight previously unknown historic resources. These include two hearths, in situ mammal bone finds, a circular cobble feature, quartzite cores, fire broken rock, and a possible paleontological find.

Reconnaissance of grassland surfaces to the west and north of EePf-1 revealed the presence of seven new historic resources. These include several pits, a ditch enclosed mound, an historic period artifact scatter eroding from an actively used trail, and a recent concentration of at least five sweat lodges.

Phase 2 of the assessment will be conducted during the fall of 2015 by the University of Calgary Reconnaissance and Survey class. Surface inspection will continue and subsurface testing using 40x40x40 cm test pits will be conducted in the grassland and brush areas west of EePf-1 closest to the present cutbank of the Bow River.

Recommendations:

1. Relocate features recorded by Forbis outside the fortifications of EePf-1 using a differential GPS system and more intensive survey to relocate the features recorded by Forbis outside the fortifications.
2. Deep testing along the river boundary of BCHP to assess the nature of the remaining resources there. Mitigative excavation of any significant resources in that area should be conducted to lessen the impact of further erosion.
3. The newly noted features on the BCHP floodplain should be subjected to subsurface testing to assess their significance.
4. Reconnaissance and survey along the entire Bow River in the Nation to assess the level of damage incurred to historical resources (comments from Siksika visitors suggests that damage to historic resources is extensive in the area).

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1 Introduction

The catastrophic flood of 2013 caused a great deal of damage and suffering on the Siksika First Nation. The first concern of all was to alleviate the immediate impacts on the people and their homes. The 2013 University of Calgary archaeological field school helped with that effort by sponsoring a pancake breakfast in nearby Strathmore to raise funds for the distressed. The task of rebuilding the affected communities and lives continues as governments and nongovernmental organizations extend their efforts onto the Nation.

For University of Calgary archaeologists, it became appropriate to consider the impact of the flood on historic resources at Blackfoot Crossing Historical Park (BCHP), the locus of the University of Calgary archaeological field school and public archaeology program. Inspection of the Cluny Fortified Village site during the fall of 2013 revealed no damage to the site itself, although a layer of silt some six to eight cm in thickness was added to the surface. Further exploration of the BCHP property was encouraged by BCHP and by Alberta Culture. Consequently, Phase 1 of a reconnaissance and survey of cutbanks and land surfaces impacted by the 2013 Bow River flood was conducted within Blackfoot Crossing Historical Park (BCHP) by the University of Calgary archaeological field school and public archaeology program during the spring of 2015. Phase 1 consisted entirely of a surface inspection of those areas of the cutbank accessible by foot and of selected areas within BCHP. Phase 2 will consist of subsurface testing of selected areas within BCHP and will be conducted by the University of Calgary reconnaissance and survey class during the fall of 2015.

2 Methods

2.1 BCHP Cutbank Area Loss

Bank loss was estimated through comparison of 2012 Google Earth satellite imagery with 2013 post-flood LiDAR data of the area provided by the Government of Alberta via Alberta Culture. The Google Earth image was saved as a JPEG, converted to TIFF, imported into ArcMap and georeferenced to LiDAR coverage. A polygon created by selecting vertices along the top of the 2012 bank from between points A and B. After removing the satellite layer, building of the polygon continued based on a layer of slope data calculated from the LiDAR DEM that highlights the edge of the bank. Vertices were continued from a point coinciding with Point B along the eroded bank line back to a point coinciding with point A and the polygon was completed (199 vertices). The area of polygon then calculated using Calculate Geometry within the attribute table while in an ArcMap edit session.

2.2 BCHP Cutbank Survey

A visual inspection of those areas of the Bow River cutbank accessible by foot was initiated and completed on 19 May, 2015. The survey was initiated at 12U 0368826 5626877 and terminated at 12U 0369131 5626974 (Figure 2). Much of the cutbank is overgrown with very poor surface visibility (Plates 1 and 2). Eight findspots were noted along the cutbank and their locations were recorded using a hand-held GPS device; (error factor ranged between 5 and 8 m). Much of the cutbank in this area continues to be actively eroded.

2.3 BCHP Surface Reconnaissance

In furtherance of the flood damage assessment survey and at the request of BCHP officials, a reconnaissance for surface features east and west of the fortifications was

conducted to guide equipment movement as the nature trails in the area are re-established this summer. The reconnaissance consisted of visual inspection only of selected grassland areas and trails where equipment might be expected to move and was conducted on 25 May and 17 June, 2015. Efforts were also made to relocate features recorded by Forbis (1977) outside the fortification structures of EePf-1.

The locations of surface features recorded by Forbis' earlier investigation were compared with the results of the 2015 survey and the 2013 LiDAR survey by importing and georeferencing Forbis' (1977:18) map. That imported map was set it as a transparent layer over LiDAR data. The LiDAR DEM described above was used to calculate a slope layer which highlights small areas of relief or depression. Additionally included are the 2015 hand-GPS points of surface features in the vicinity of the main earthworks, both those identified by Forbis and others not included in his report. Given GPS error in the 5-8 m range, some of the offsets from both Forbis map and nearby features visible in the LiDAR data are to be expected but others require further investigation.

3 Results

3.1 Cutbank Area Loss (Figure 1)

We estimate a total loss of 1.7 ha of BCHP property along the north bank of the Bow River between Point A (12U 368772 5626842) and Point B (12U 369597 5626644).

3.2 Phase 1 Cutbank Survey (Figure 2)

Findspot 1: 12U 368880 5626904 (Plate 3). A large bovid first phalanx and a large quartzite core were noted in the talus slope of the cutbank. No visible Ah_b was noted in the cutbank and no in situ artifacts were noted here.

Findspot 2: 12U 368902 5626906. An isolated spirally fractured large mammal bone fragment was noted in the talus slope of the cutbank. No visible Ah_b was noted in the cutbank and no in situ artifacts were noted here.

Findspot 3: 12U 368960 5626932 (Plates 4 and 5). An ash/charcoal lens was noted in the lower of two horizontal buried soil horizons. Samples were taken for future radiocarbon dating and paleobotanical analysis. A large mammal rib fragment was noted in the talus slope of the cutbank.

Findspot 4: 12U 369012 5626943. A large bovid left ulna and a spirally fractured large bovid right distal radius were noted in the talus slope of the cutbank. A buried Ah soil horizon was noted in the cutbank profile at this location but no materials were noted in situ there.

Findspot 5: 12U 369007 5626965 (Plate 6). A spirally fractured and possibly utilized large mammal bone fragment was noted in situ in the cutbank here at 1.15 m below the present surface—this specimen was collected. Also noted at 1.75 m below the present surface was a large mammal skull fragment in situ at the interface between the overlying silt deposits and the underlying sand and gravel deposits. This specimen may be paleontological and was collected. The hand-held GPS location recorded during 2015 places this findspot well off the cutbank on Figure 2. This is inaccurate as the materials were noted within the cutbank itself.

Findspot 6: 12U .369078 5626961. A large bovid first phalanx was noted in the talus slope of the cutbank. No visible Ah_b was noted in the cutbank and no in situ artifacts were noted here.

Findspot 7:12U 368977 5626942. An ash/charcoal lens was noted in the cutbank at 1.15 m below surface. Samples were taken for future radiocarbon dating and paleobotanical analysis.

Findspot 8: 12U 368827 5626880 (Plate 7). A small stone circle about 1.25 m in diameter with associated firebroken rock and quartzite cores. The circle rests on the surface of a collapsed cutbank.

Three large pit-shaped soil changes were noted in the cut bank wall, as well (Plate 8). These soil features occur at 5 m intervals and are about 1.5 m by 1 m in horizontal and vertical extent respectively.

3.3 Surface Reconnaissance

3.3.1 Forbis Features in Relation to LiDAR GPS Relocation Data (Figure 3)

Forbis's Features 15–19 and 22–27 (1977: Figure 4 and p. 32) were relocated. Forbis's Features 20 and 21 could not be located in dense brush that could not be cleared under the present mandate. Three additional pits and two mounds were encountered and noted as findspots.

The 2015 hand-held GPS locations for F-15, F-16, F-17 coincide with reasonably well surface disturbances in the LiDAR data and with the Forbis map, although F-15 and F-16 are both offset to the northwest from their locations on the Forbis map.

The GPS location of F-18 coincides with a prominent surface depression in the LiDAR data and with its location as marked the Forbis map.

The GPS point for F-19 is located over 18 m away from the F-19 label on the Forbis map but is adjacent to a small mound in the LiDAR data. This could be due to GPS error, an

error in the Forbis map, or a mistaken identification during 2015 of a feature not noted by Forbis compounded by a failure to relocate Forbis's Feature 19.

GPS point F-22 is located over 14 m away from the F-22 drawn on Forbis map and is located near F-20 on Forbis map. This could be due to GPS error or a mistaken identification of Feature 20 as F-22 compounded by a failure to relocate Feature 22.

GPS point F-23 coincides with F-23 on the Forbis map and is adjacent to both a small rise and a small depression in the LiDAR data.

GPS points F-24, 25, 26, and 27 appear to coincide with their locations on the Forbis map and with a series of shallow pits and mounds in the LiDAR data.

3.3.2 New BCHP Surface Findspots (Figure 2)

Findspot 9: 12U 369050 5627036. A low earthen mound ringed by a shallow ditch.

Findspot 9 is immediately adjacent to a mound in the LiDAR data.

Findspot 10: 12U 368956 5627101. A keyhole shaped pit about five m in diameter and 1 m in depth. The LiDAR image indicates that the GPS point for Findspot 10 is located immediately adjacent to a small pit surrounded by a slightly elevated area (spoil?). The possible spoil pile was not noted during the 2015 reconnaissance, possible due to the very thick brush in which the findspot is located.

Findspot 11: 12U 369127 562711. A shallow pit approximately 5 m in diameter and 50 cm in depth. The LiDAR image indicates that the GPS point for Findspot 11 is located in a slight depression in the LiDAR data.

Findspot 12: 12U 369120 5627177. A shallow pit approximately 6 m in diameter and 50 cm in depth. The LiDAR image accurately suggests that this findspot is located along the edge of a large swale but no discrete surface feature is evidence there.

Findspot 13: 12U 369118 5627217. A low ridge mound east of F-19. The location and nature of this feature is confirmed by the LiDAR image.

In addition, two findspots indicating historic and contemporary occupation were noted.

Findspot 14: 12U 369196 5627366. A scatter of historic materials (metal, glass) in the trail leading up to the BCHIP interpretive centre. The GPS point Findspot 14 is located along in the path on the north side of the foot-bridge site north of the main earthworks; no other surface feature is evident other than the path.

Findspot 15: This is an area in which the remains of at least five contemporary sweat lodges are present. The area is within the area circumscribed by the following UTM coordinates: 12U368849 5626951, 12U 368867 5626976, 12U 368844 5626987, 12U 368882 5626932. No surface features are visible in the LiDAR data.

In addition to the findspots, three scatters of cobbles were noted along the spoil from the cutbank. These cobbles are unlikely to have been deposited by the flood of 2013 and are too highly placed to be a natural part of the river gravels. They most probably represent disturbed cultural deposits, possibly similar to Findspot 8, but this cannot be confirmed.

4 Recommendations

A total of 15 new findspots within the confines of Blackfoot Crossing Historical Park (Figure 2). Of these, eight are located along the present actively eroding cutbank of the Bow River. Seven of the resources are located on the flood plain of BCHIP and were not negatively impacted by the flood although they were further covered by about eight cm of silt.

We recommend using a differential GPS system and more intensive survey to relocate the features recorded by Forbis outside the fortifications. While most of the hand-held locations recorded during the 2015 survey coincide reasonably well with those indicated by Forbis, others do not. Future historical resource management efforts require accurate relocation of these features.

We recommend further deep testing along the river boundary of BCHP to assess the nature of the remaining resources there. Mitigative excavation of any significant resources in that area should be conducted to lessen the impact of further erosion.

The newly noted features on the BCHP floodplain should be subjected to subsurface testing to assess their significance. These features should be monitored on an ongoing basis.

Anecdotal evidence from Siksika visitors to the University of Calgary excavations at the Cluny Fortified Village site suggests that damage to historic resources is extensive all along the course of the Bow River through the Nation. This evidence should be followed up with a formal reconnaissance and survey effort along the Bow River in the Nation to assess the level of damage incurred.

5 References Cited

Forbis, Richard G. 1977 *Cluny: An Ancient Fortified Village in Alberta*. Occasional Papers No. 4. Department of Archaeology. The University of Calgary. Calgary.

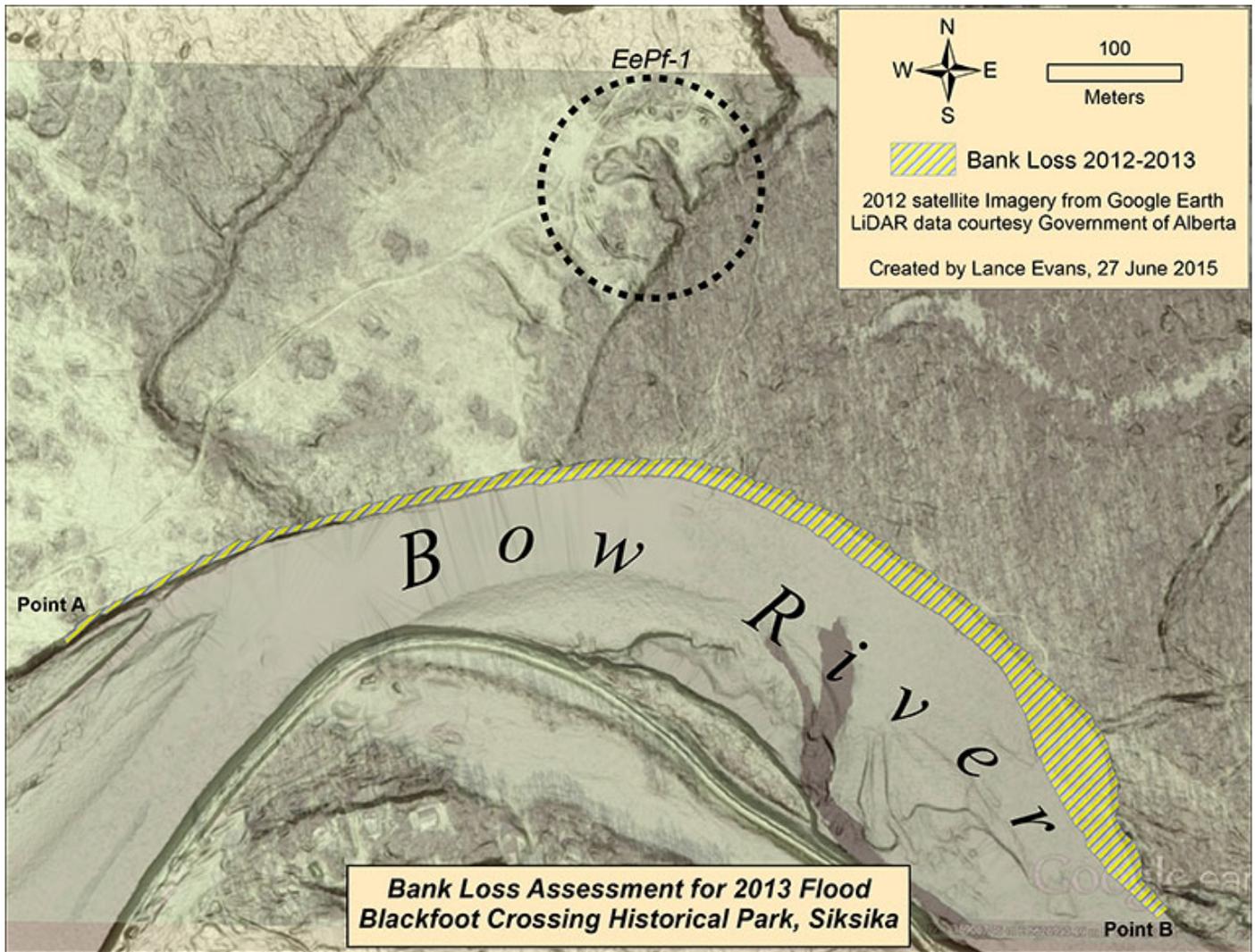


Figure 1. Bank loss in BCHP between 2012 and 2013.



Figure 2. All findspots and features noted during Phase 1 of the 2015 University of Calgary flood damage assessment survey.



Figure 3. Relationship between Forbis's mapped locations of features and those recorded during the 2015 University of Calgary survey.



Plate 1. Bow River looking west near western boundary of Blackfoot Crossing Historical Park (20150519). Note the low river level.



Plate 2. Looking east along the cutbank from the western boundary of BCHP (20150519). Much of the cutbank is overgrown or inaccessible by foot. The BCHP interpretive centre is visible in the background.



Plate 3. Findspot 1. A single large bovid first phalanx and a large quartzite core were found in the collapsed cutbank material. The first phalanx was located at the base of the scale stick and the core is visible in the lower right area of the photograph.



Plate 4. Findspot 3. A charcoal and ash lens (possible hearth) was noted in the cutbank at about 1 m below the present surface. A distant view showing the cutbank.



Plate 5. Findspot 3. Close view of the charcoal/ash lens.



Plate 6. Findspot 5. Two bone fragments were noted in the cutbank, one at 1.15 m below surface (indicated by Tatyanna Ewald's pointing finger and the second at the interface between the sandy, pebbly stratum immediately below overlying silty deposits (ca. 1.75 m bs immediately left of the scale stick).



Plate 7. Findspot 8. A circular arrangement of cobbles with associated FBR and quartzite cores on the collapsed surface of the cutbank.



Plate 8. One of a series of three patterned matrix changes in the cutbank at approximately 5 metre intervals.