Recent Research on Four Sites Spanning 13,000 years from Southwestern New Brunswick, Canada.

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Introduction

During a 19-week period (July 14 – December 8, 2011), the authors undertook a research and mitigation project on four Pre-Contact archaeological sites in the vicinity of Pennfield, in southwestern New Brunswick (NB). Prior work in the area had identified a group of four artifacts on a site later designated BgDq-38 (AMEC 2011). The following year consulting archaeologists identified two additional areas of artifact concentrations designated BgDq-39 and BgDp-4 (Stantec 2010). A fourth site (BgDq-40) was identified when a single flake was recovered during testing of a large terrace along a small stream (Figure 1). These sites range in date from the Paleoindian to the Late Maritime Woodland periods, with the Paleoindian sites being the first *in situ* deposits to be identified in NB (Suttie & Nicholas 2012).

Figure 1 - Location of four sites mentioned in text and excavated in 2011, note new Route 1 alignment under construction (Imagery: DigitalGlobe 2012).

Due to the significance of two of the sites (BgDq-38 and BgDp-4) *Archaeological Services* and the *Department of Transportation*, along with *Dexter Construction Ltd*., in direct consultation with First Nations representatives, were able to come to an agreement whereby these sites would be avoided and preserved intact. A consequence of the identification of these sites late in the Route 1 Gateway Project was that a large and costly drainage feature had already been constructed very close to BgDq-39, BgDq-38 and BgDp-4. The agreement that was reached allowed the *Department of Transportation* and *Dexter Construction Ltd.* to retain the use of this drainage structure and put the maximum allowable bend into the highway in order to avoid BgDq-38 and BgDp-4. A portion of BgDq-39 would be impacted using this revised alignment, however; given that the site was suspected as being more recent (Stantec 2011), the decision was made to undertake a complete mitigation of the areas to be impacted at BgDq-39.

Figure 2 - Panorama of excavations underway at BgDq-39, a Terminal Archaic - Early Maritime Woodland period occupation site dating to between 3850 - 2200 BP.

Dexter Construction Ltd. proposed to construct an additional drainage feature in the area of BgDq-40. BgDq-40 was reported as a single find spot of a flake of Ramah chert. *Archaeological Services* staff archaeologists recommended additional work at the site to confirm the suspected Late Maritime Woodland period age and determine whether the site could be mitigated.

BgDq-39

Site BgDq-39 was suspected to lead to the largest excavations from the outset; consulting archaeologists had previously spent considerable effort in delineating this site using shovel testing at 5 m intervals (Stantec 2011). Using the results of this grid, *Archaeological Services* identified the area of largest artifact concentration and established a buffer around all outlying artifacts.

Each of these outlying positive testpits were then tested using a 2.5 m grid to further refine the extent of cultural material on the site. This done, an excavation was established on all areas where cultural material was believed to be present. Using this approach, the excavations extended to over 224 m^2 (Figure 2). At the completion of this grid, the adjacent areas were excavated and further chased until no additional cultural material was recovered (Figure 3).

These excavations recovered a total of 5,417 artifacts and samples. Subsequent analysis of the excavated assemblage and samples has provided eleven radiocarbon dates that have permitted direct associations for diagnostics and features spanning the entire period of occupation (ca. 3850 – 2200 Cal BP).

Analysis of faunal remains and protein residues recovered from artifacts have produced evidence of catfish, deer, bear, and considerable processing of seed grasses associated with over 300 abraders recovered from the site. Phytoliths recovered from two ground stone axes on the site indicate that they may have been last used to chop or process a tree species of pine (Cummings *et. al.* 2012).

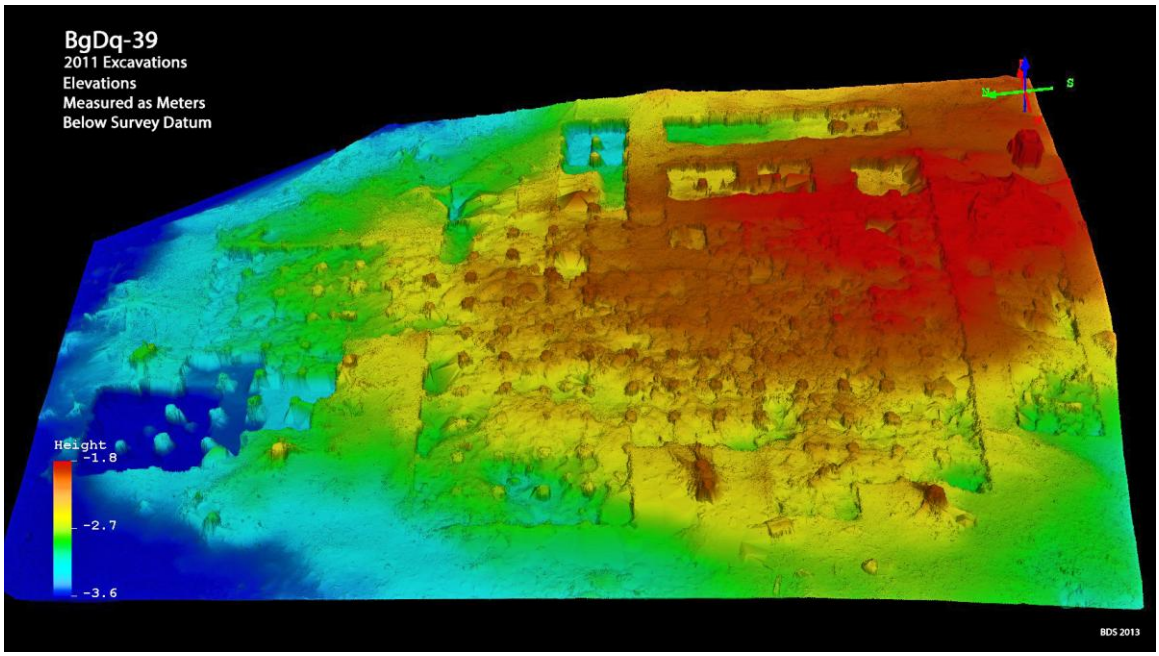

Figure 3 – High definition surface LIDAR scan of BgDq-39 excavations, with Terminal Archaic period occupation levels exposed, majority of occupation is on the crest of the slope (orange and yellow) rather than the top of the hill (red) (Image: B. Suttie 2013).

Figure 4 - Representative Formal Tools dating to between 3850 - 2200 Cal BP.

BgDq-40

At this site, where previous testing had found a single flake, a 2 m x 2 m excavation unit was excavated adjacent to the initial positive test unit. This 2 m x 2 m excavation unit produced in excess of 2,400 artifacts (Figure 8) and samples including formal tools, lithic debitage, bone tools, decorated animal bone fragments and other faunal remains (deer, bear and rabbit) (Figure 5). The detailed analysis of this assemblage is currently underway, but all analyses to date suggest that this is a relatively short-term encampment occupied during the Late Maritime Woodland period, dating to between 522 and 642 Cal BP (or 1308 - 1428 Cal AD) at 2 Sigma.

Figure 5 - Representative Formalized Artifacts from BgDq-40, dating to ca. 600 Cal BP.

BgDq-38

The impetus of the 2011 excavations around Pennfield was the discovery of four initial surface finds in 2009 by *AMEC Earth and Environmental Ltd.* from a location which subsequently came to be registered under the Borden number "BgDq-38" (AMEC 2011). The initial observations of the site, as well as supplementary observations by *Stantec Consulting* in 2010 suggested that the site was previously disturbed by earth moving equipment and likely represented a Paleoindian occupation of the area (Stantec 2011).

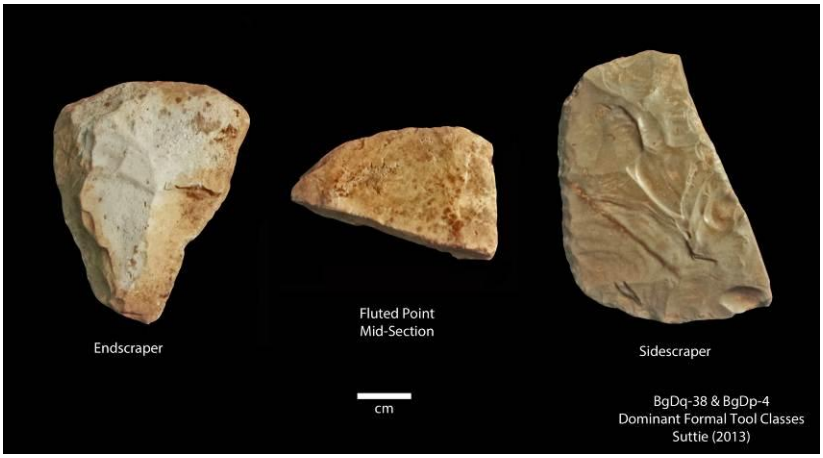

Figure 6 - Representative Formal Tools from BgDq-38 and BgDp-4, attributed to the Paleoindian Period.

Figure 7 - Excavations and screening of disturbed sediments underway on BgDq-38 in 2011.

During discussions in late 2010 and early 2011 leading to the decision to protect BgDq-38 and BgDp-4 by realigning the highway, *Archaeological Services* received repeated suggestions from First Nations that while the site was to be avoided, that targeted research at the Paleoindian sites should be undertaken to verify the initial age attribution and contextualize the finds. A secondary recommendation was to begin the process of developing a long-term research and management plan for the sites.

Excavations at BgDq-38 (Figure 7) have thus far produced evidence of significant historic period disturbance associated with the clearing of part of the site for a parking area to service a planned hobby farm in 1995. The 2011 excavations were able to delineate this disturbance and demonstrate that *in situ* Paleoindian period components are still present in discreet areas of the site.

The Paleoindian sites have thus far produced fragments of 7 fluted points, numerous side and endscrapers, and a large volume of debitage; a large percentage of which is exotic to southwestern New Brunswick. Based on the morphology of the fluted points it is believed that the occupation likely dates to ca. 12,900 – 12,500 Cal BP

(Lothrup *et. al*. 2011; Speiss *et. al.* 2012). Work is currently underway to refine the dating of the site, which at present has been bracketed by dates of soil (above) and organics (below) the Paleoindian components to between 13,000 – 9,700 uncal BP.

BgDp-4

BgDp-4 was identified in 2010 while additional testing was being conducted in the area of BgDq-38. The additional testing was conducted in response to a requirement by *Archaeological Services* to assess similar landforms to BgDq-38 adjacent to the initial site. This testing of the area produced a single positive test pit which contained a number of flakes of Munsungun-like chert; which was interpreted as being evidence of the site being similar-aged to BgDq-38 which also had a large amount of Munsungun-like chert lithics recovered from the surface (Stantec 2011).

In 2011, *Archaeological Services* undertook the excavation of eighteen 1 m x 1 m units at BgDp-4. These excavations resulted in over 280 artifacts from the site. These excavations revealed that the majority of this site is undisturbed (except by evidence of bioturbation and cryoturbation), and likely represents a Paleoindian or Late Paleoindian occupation. BgDp-4 is believed to be a single technological and temporal component; a spurred endscraper from the site produced a positive response for the presence of bear proteins (Cummings et. al. 2012).

Detailed analysis of the BgDp-4, BgDq-38, BgDq-39 and BgDq-40 assemblages is underway; the technical aspects of the project have been reported (Suttie & Nicholas 2012), but the results of the detailed analysis will be reported in the Final Analytical Report, which is slated for release in 2014. The forensic approach to artifact collection and processing on these sites has allowed for the preservation of critical direct evidence

about what, specifically, artifacts were used for. Three-dimensional photogrammetry, involving tens of thousands of photographs, along with high-density surface LIDAR scanning has allowed us to build an extremely realistic and accurate 3D model of all excavation layers and artifact provenience (Figure 7).

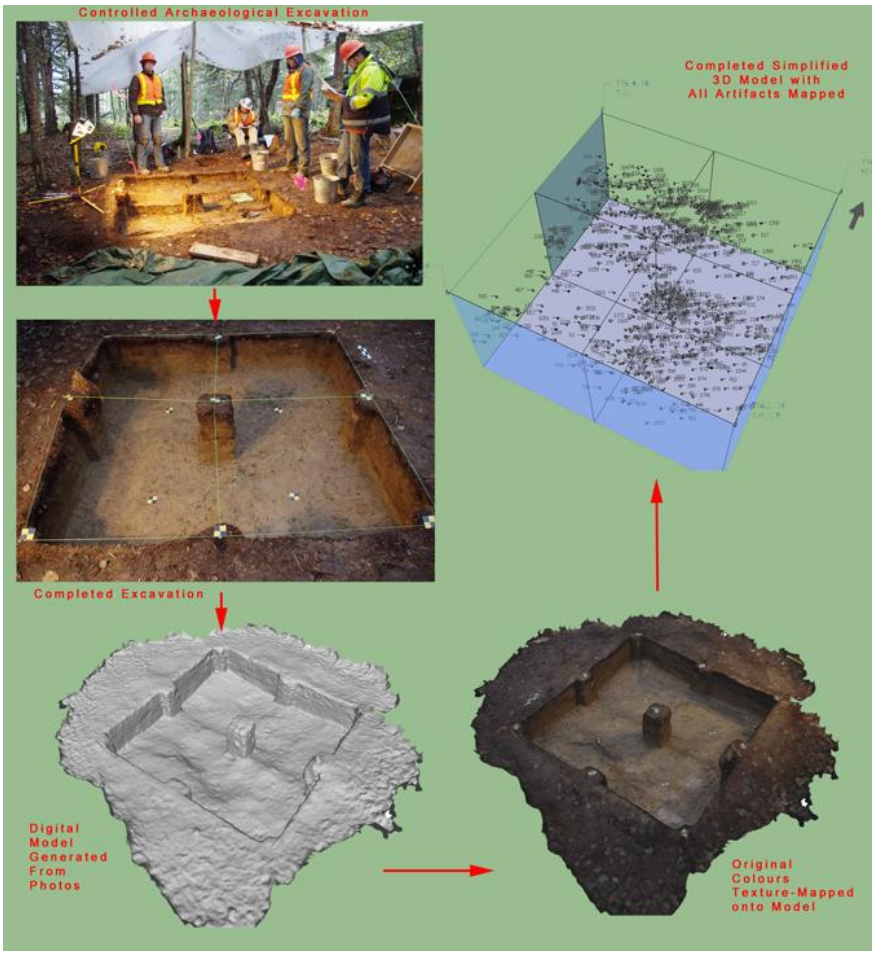

Figure 8 - Integration of Photogrammetry, 3D Scanning and Detailed Finds Mapping used on all sites in the Pennfield Area, in this instance showing ca. 2,400 artifacts mapped and collected from BgDq-40 (Image: B. Suttie 2012).

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