Archaeological Research investigations at Site GiSq-004 located at Nilkitkwa Lake in the north-central interior of BC

Permit Report 2010-254

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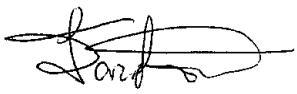

Prepared for:

Lake Babine Nation Treaty Office
Burns Lake, BC

Archaeology Branch
Ministry of Forests, Lands and Natural Resource Operations
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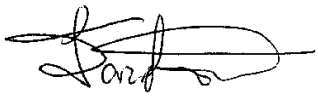

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Acknowledgements

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Credits

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Introduction

Over the last decade the University of Northern British Columbia has partnered with a number of First Nation communities in delivering a unique community-based field school. In this field school university students take field methods courses alongside members of the partner First Nations community, and all receive university credits. In early 2010 the Lake Babine Nation (LBN) signed a Memorandum of Understanding with the university, to collaborate on long-term research and training to the benefit of both parties. The LBN indicated that training and research in archaeology is a high priority for them, which resulted in the organization and delivery of this project.

The crew comprised of fifteen students, six from UNBC, three from other post-secondary institutions in BC, six from the LBN and two instructors. The GiSq-4 site was chosen after consultation with LBN community, who indicated that archaeological research at this site is a high priority for them.

Project Goals

A primary goal of the project is to provide practical training in archaeological field methods to UNBC students and Lake Babine Nation community members. This involved a limited programme of shovel testing, excavation and mapping. In addition, the field school places a strong emphasis on the value of Traditional Knowledge and its integration with archaeology.

The primary research goal of the project was to investigate the nature of the site at GiSq-4, in order to continue building a basic culture history framework for the region. This involves an attempt to: discern the chronology; integrate known Traditional Use in the area; identify any stone tool types and raw materials; recover any data relating to subsistence; and to possibly identify the nature of a small sample of cultural depressions. In addition, the horizontal and vertical distribution of recovered cultural material may ultimately aid in understanding site function. This research could not be carried out on existing collections due to the extremely limited number of such collections obtained in research-based projects in the region. In addition, members of the LBN (Fort Babine Band in particular) possess much knowledge of their ancestors' use of the site in recent history and the community as a whole was and continues to be very supportive of this project. Given the time and resource constraints, the 2010 project is envisioned as an exploratory one. Future work is planned at the site in partnership with the LBN.

Specific goals for the shovel tests and excavations included: a) identify the depth and extent of deposits containing cultural material, b) assess the integrity of the deposits, and c) collect any evidence that may yield information on chronology (i.e. Radiocarbon samples). Disturbances to the site have been noted (Mohs 1974, Arcas 2000c) but the actual extent of the disturbance is unknown. That said the site had not previously been subject to any intense sub-surface data recovery so the limited excavation component was

the first such exploration at the site. The extent of areas subjected to shovel testing and excavation was dependent on time constraints.

Significance of Project.

In terms of archaeology, the north central interior remains one of the most poorly understood regions in British Columbia. In comparison with the southern and coastal parts of the province, this region has had very few research based archaeology projects. As a result, even a basic culture history framework has yet to be established. This short project was the first exploratory step of a longer-term project at the site and region, which will attempt to shed some light on the chronology and nature of land use in this region, and it will contribute to a further understanding of Aboriginal history in this part of the province. The site has great ethnic significance to the Lake Babine Nation; many members have family ties to the village that was in existence until recent times. Until the 20th century First Nations communities maintained a number of fish weirs at this location, to take advantage of the many riverine resources such as various species of salmon that pass through this narrow corridor. The site is also of scientific significance based the results of the project (see below).

Study Area

The Nilkitkwa site (GiSq-4) traditionally known as Wu'dat, is located on the east bank of the Babine River approximately 3 km south of the confluence of the Nilkitkwa and Babine Rivers, and just downstream of Nilkitkwa Lake (Figure 1). The site can be accessed via forestry roads that are still active. Much of the recorded site falls within a property currently maintained by Fisheries and Oceans Canada (DFO) through a lease with the Province of British Columbia. At present the DFO facility operates a fish counting fence, to monitor anadromous species that migrate upstream toward the Babine Lake watershed during the summer and fall. The site has been subject to a fair amount of historic disturbance through the construction of access roads, buildings and other infrastructure that form the core facilities of the DFO compound.

Environmental setting

The site is located within the Sub-Boreal Interior Ecoprovince of the Interior Plateau physiographic region, within the Babine Upland Ecosection of the Fraser Basin Ecoregion (Demarchi *et al.* 1990; Medinger and Pojar 1991). The area is characterized by rolling upland with large lakes in the intervening depressions (Demarchi *et al.* 1990). The western portion of the region consists of lower elevations that fall within the Sub-Boreal Spruce biogeoclimatic zone, while to the east, higher elevations fall within the Engelman Spruce-Subalpine Fir biogeoclimatic zone.

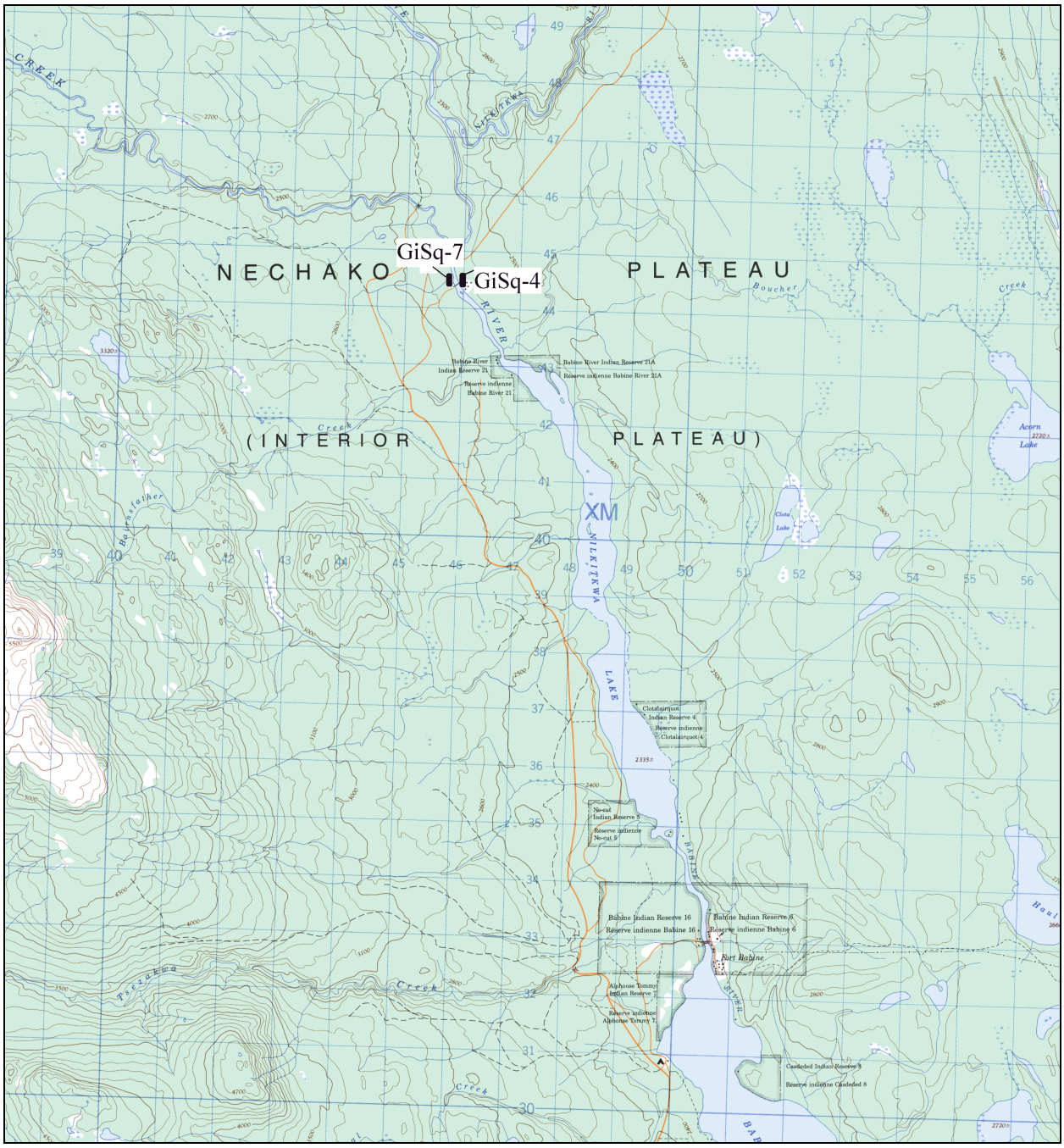

Figure 1. Location of site (GiSq-4), Babine River. NTS Map Sheet 93M/7 (1990). 1:50,000 scale.

Glacial stratigraphy in the region is fairly complex, the result of multiple glacial advance and retreat events during the Late Pleistocene (Plouffe 2000; Ryder and Clague 1989; Stumpf *et al.* 2004). During the Late Wisconsinan (Fraser) Glaciation at least three major phases of glacial advance are proposed, which when combined with the general topography of the region, has resulted in regional and localized depositional regimes (Stumpf *et al.* 2000). In general deglaciation resulted in the deposition of fine-grained proglacial lake sediments as well as glaciofluvial sand and gravels in other settings (Stumpf *et al.* 2004), all of which lay over folded and faulted Mesozoic volcanic and sedimentary rock (Ryder 1978). Except for a number of higher elevation locales, the region would have been deglaciated by 9,000 BP.

Little palaeoenvironmental work has been carried out in this region but studies conducted in adjacent areas suggest the early post-glacial vegetation was influenced by the Hypsithermal period. Warmer and drier conditions prevailed between 10,000 – 7,000 BP, followed by an increase in moisture between 7,000 – 4,500 BP. Climate again became cooler and moister than today between 4,500 – 3,000 BP, and the present climatic regime was established by 3,500 BP (Hebda 1986; Mathewes 1985). There is also tantalizing evidence that this region supported large fauna such as mammoth and bison at approximately 34,000 BP, prior to the advent of the Fraser Glaciation (Harrington *et al.* 1975; Harrington *et al.* 1996). Pollen studies cited in the same reports suggest a shrub tundra environment.

Cultural Setting

The site is located within the asserted traditional territory of the Fort Babine Band, who form part of the larger Nat'oot'en Nation (Lake Babine Nation). They are one of the many sub-divisions of the Carrier, a northern Athapaskan linguistic group who traditionally inhabited the north central Interior of British Columbia. The Carrier refer to themselves as *Dakhel,* "people who travel by boat in the morning" (Furniss 1993) or *Dene* "people" (Morice 1895).

Some Carrier groups such as the Babine were organized in matrilineal clans, modeled possibly after the Gitxsan (Tobey 1981). The various Houses participated in competitive potlatching and they also had some level of hierarchical authority. Bishop (1987) argues that the Babine Carrier and others adopted this form of socio-political organization after the advent of the fur trade. Through inter-marriage with the Tsimshian and Gitxsan, Carrier individuals amalgamated wealth and status and became significant players in the fur trade. Over time, this led to the abandonment of the more egalitarian mobile hunter-fisher-gatherers that tends to typify the Carrier as a whole. Although a reasonable theory, this notion has not been tested. No one (academically) knows whether or not some form of hierarchical organization developed amongst the Nat'oot'en prior to the Fur Trade. Trade and intermarriage must have occurred for some time so it is entirely possible that changes to Nat'oot'en social organization happened before the Fur Trade. The work at GiSq-004 may eventually shed some light on this.

In general Carrier peoples were fairly mobile hunter fisher gatherers who took advantage of seasonally available resources, shifting residency as required (Fladmark 2009). Given the large area inhabited by the Carrier, the nature and availability of resources varied from one locality to another. A wide variety of plant and animal resources were procured for nutritional, medicinal, and a host of other needs such as raw materials, individual tastes, or for ritual purposes. Where available, however, salmon formed a key component of the diet, and some (Kobrinksy 1973) have argued that the location of Carrier settlements was based upon the availability of salmon. This is a broad assumption, but it seems logical that at least *some* Carrier settlements were located close to salmon fishing, processing, and storage areas.

On the other hand, Nat'oot'en subsistence in particular may have been strongly anchored in the salmon economy, given the availability of this resource within the Babine watershed. The Nilkitkwa fishery was a major pillar in the Nat'oot'en subsistence economy with surplus salmon forming a key part of the seasonal adaptation. As with ethnographically better-documented coastal peoples in British Columbia, during the summer and fall the Nat'oot'en and neighbouring communities harvested and processed large volumes of sockeye salmon in particular, for storage over the winter and for trade purposes (Rabnett 2000). Although many other fish were harvested and consumed, storage of large quantities of smoked salmon in bark-lined pits allowed the Nat'oot'en perhaps a higher degree of winter sedentism than is traditionally seen in Carrier groups.

Salmon were captured during the late summer and fall using portable tools such as harpoons, gaffs, rakes, and nets, as well as with larger installations such as weirs, scaffolds, and traps (Tobey 1981). Subterranean storage pits were commonly used and they can still be observed in many parts of the interior. Other fish were also taken such as trout and whitefish, particularly during the winter. In the spring families left the winter dwellings and moved up into higher elevations to take advantage of resources in those areas (Hudson 1983). In the Nilkitkwa area a number of complex weirs were constructed and operated by various clans. At least four weirs are known to have existed although there may have been others. At Wu'dat the Tsayu or Beaver Clan operated a weir that stretched across the Babine River. Further upstream the Laksamasyu or Grouse Clan also operated a weir, and still further south the Gilserhu or Frog Clan operated a weir that partially spanned the shallow river. Closer to the outlet of Babine Lake the Laksamasyu operated another weir (Hackler 1958; cf. Rabnett 2000). Based on a 1905 map by Indian Agent R.E Loring, Harris (2001:82) suggests that there were at least seven weirs, and that most of them were operated by particular families. All of these weirs were associated with nearby smokehouses for processing, and the corridor just to the north of the outlet at Babine Lake was informally known as "Smokehouse Alley" (Fred Williams, personal communication 2010). Today the Babine watershed sockeye fishery encompasses some 90% of the salmon returning into the Skeena River (Takagi and Smith 1973), and there is no reason to suggest that this was not true historically. This would have potentially given the Nat'oot'en clans and associated communities access to hundreds of thousands of sockeye fish passing through the weir complexes every year.

In 1904 the Department of Marine and Fisheries began an effort to dismantle the fish weirs (or barricades) as a result of pressure from cannery operators further downstream on the Skeena. This eventually led to the acrimonious "Barricade Conflict" that resulted in the removal of the fish weirs in this area (Harris 2001). Of note though, Fisheries representative Hans Helgerson visited Wu'dat in 1904 and was highly impressed with the aboriginal weirs at this area. He describes the barricade as "constructed of an immense quantity of materials and on scientific principles" (Helgerson 1906; cf. Harris 2001:96). He also noted that the fishers were catching 500 to 600 salmon daily, even though it was close to the end of the annual run. At any rate these descriptions indicate that the Babine River/Nilkitkwa Lake corridor was a highly productive zone for salmon harvesting and processing in antiquity. Moreover, that the communities in this area had the technology and social organization to harvest and process very large quantities of salmon. This should be reflected in the archaeology of the area.

Trade was carried out through the use of watercraft but also through the extensive trails that existed in the region. The famed Grease Trails have been noted in many parts of the province, where highly desired eulachon grease and obsidian were brought in from coastal areas into the interior. South of the Nilkitkwa site Morice (1906) noted the presence of trail leading from Hazelton, first along the Skeena River and then overland to Ft. Babine, and subsequently eastward to Takla Lake. The portion from Ft Babine to Takla is still known as the Takla (Grease) Trail (Wilson 2001) to local inhabitants.

Modern History

Daniel Harmon was the first European to visit the area in 1806, and he estimated a significant population of 2000 people in villages around Babine Lake. (Lamb 1957). The Aboriginal communities in the area, however, were more impacted with the arrival of the European based trading companies. As a means to further gain foothold in the area's fur trade operations the North West Company established Ft. Fraser in Fraser Lake, and Ft. St. James on the Southwest shores of Stuart Lake in 1806 (McClellan 1981). The Hudson's Bay Company in turn established operations at Fort Kilmars (or Old Fort), a trading post on the north shore of Babine Lake in 1822, and then subsequently moved to the Ft. Babine location in 1836 (McClellan 1981; Tobey 1981). The two companies merged in 1821, allowing the Hudson's Bay Company to operate at Ft. Fraser and Ft. St. James. This allowed Carrier and other aboriginal peoples to acquire western metal goods such as knives, traps and firearms.

Previous Archaeological Work

The culture history of the north central interior of British Columbia remains amongst the most poorly known in the province. This area (the Babine Valley) has had virtually no substantial archaeological exploration, save for a number of impact assessments, inventories and overviews. Previous investigations include research-oriented inventories (Borden 1951; Mohs 1974, 1975; Mohs and Mohs 1976; Rafferty

1975; Richards 1981) and impact assessments (Carlson and Bussey 1990; Arcas 2000c; Simonsen 1984; Wilson 2001, plus others). Prior to the current project, no archaeological excavations have ever been undertaken in this area. Investigations in adjacent areas (Ames 1979; Coupland 1988; Donahue 1977) have been minimal, but indicate human presence as early as 5,000 BP.

Mohs led a survey as part of an inventory of archaeological sites mostly within 50-100m of the shoreline of Babine Lake/Nilkitkwa Lake, an endeavour that took place over three consecutive field seasons (Mohs 1974; 1975; Mohs and Mohs 1976). A number and a variety of sites were recorded during the project, including pictographs, sites with surface features and artifacts, one rock shelter and a lithic quarry. Mohs also visited GiSq-4 during 1974 and he described it as being "incredibly large," with over 1100 surface features, including house depressions (Mohs 1974). He later opined that this site and Ft. Babine are probably the oldest in the region, although he realized that the latter had undergone extensive disturbance processes in historic times.

The site GiSq-4was first noted by George MacDonald in 1966 and officially recorded by Mohs (1974) with information provided by Charlie McDonald, Rosie Mitchell and her mother. Mohs (1974b) categorized the site as a "large fishing camp, smokehouse, cache pit site." Although he noted 8 rectangular habitation depressions on the site survey form, they do not appear on his hand drawn map (see below). In this surface survey Mohs noted over 100 cache pit features (although in the permit report he states that there are over 1100 surface features, probably more accurate), along with chipping detritus, retouched flakes and one projectile point. Our LBN partners verified Mohs' note that aboriginal fishing weirs were destroyed at this location and replaced at some point with the current fence maintained by DFO (see also Harris 2001). This particular corridor along the Nilkitkwa and towards Babine Lake was known around the region as "Smokehouse Alley," for its dense number of family fishing camps and smoke houses. Today anglers and sport fishers can be seen in large numbers in the area during the late summer. Clearly this area had, and continues to have a high density of an easily available resource (fish), making it an ideal location for a village as well as for processing/storing food and other necessities.

Arcas (2000c) conducted the previous most recent work within the site, an AIA commissioned by DFO for a proposed new road into the area. They put in a number of shovel tests, some of which were positive, and recorded a number of CMTs and cultural depressions. Although this work was done further away from the heart of site and away from the water, the density of sub-surface materials recovered and the number of surface features attests to the notion that this is a relatively large site, unusual in this part of the province. It is apparent that the archaeologists felt that this is a highly significant site, a notion that we strongly support after the 2010 field season. In addition to the house depressions, culturally modified trees, sub-surface artifact densities and wide spread distribution of cultural depressions, there are also human burials within this location. During the winter of 1999/2000 road-clearing activities inadvertently disinterred human remains at the site. No human remains were encountered in the current project.

Methods

Datum, Grid and Surface Inspection

Site preparation began on July 9 and 10 when the crew visited the GiSq-4 to drop off equipment and construct tripods for the screens. Work began at the site on July 12 with the establishment of a site datum (Grid 0N/0W) at 55º 25' 35" latitude, and 126º 41' 39" longitude, 721 m elevation. A 1.5m piece of steel rebar was driven into the ground with a heavy mallet at this location, and the area was tagged with flagging tape. The datum location was chosen because it is higher in elevation than the rest of the site, and also because of relatively good lines of sight to other mapping stations. A total station was subsequently used to map out a small portion of the overall site, as well as the shovel tests and excavation units. Once the datum and grid were set up a systematic surface survey was conducted in Area A (Figure 2). The fairly dense vegetation obscured surface visibility and although a number of cultural depressions were noted, no other cultural materials were found. Given the size of the site (Arcas (2000) estimates the site to be 7 hectares, but it could be much larger), a complete topographic map could not be completed in 2010; however, that will remain a priority in future work.

After a general survey and examination of the site, we decided to concentrate the field season's activities in two areas: Area A (the "processing area), with a high density of cultural depressions, and Area B, a relatively flat area adjacent to the bank of the river (Figure 2). Locations for shovel tests were selected based on general terrain features, and by the proximity to cultural features. The area in which the house depressions are located was not tested during this project; it will be the subject of investigation in future years.

Shovel Tests

All shovel tests were conducted in Area A due to the very high density of cultural depressions. No shovel tests were conducted within any cultural depression. A total of 18 shovel tests were conducted, of which 7 were positive (Table 1). One shovel test was aborted after the testers hit a very large boulder immediately below the surface.

All material from the 30 cm X 30 cm shovel tests was screened through 1/4" mesh, and we attempted to test to a minimum of 35 – 40 cm dbs (see Appendix A). Locations for shovel tests were selected judgmentally, based on general topography and proximity to cultural features. This portion of the project was a training exercise, but it also served to identify potential areas for more intensive sub-surface investigation.

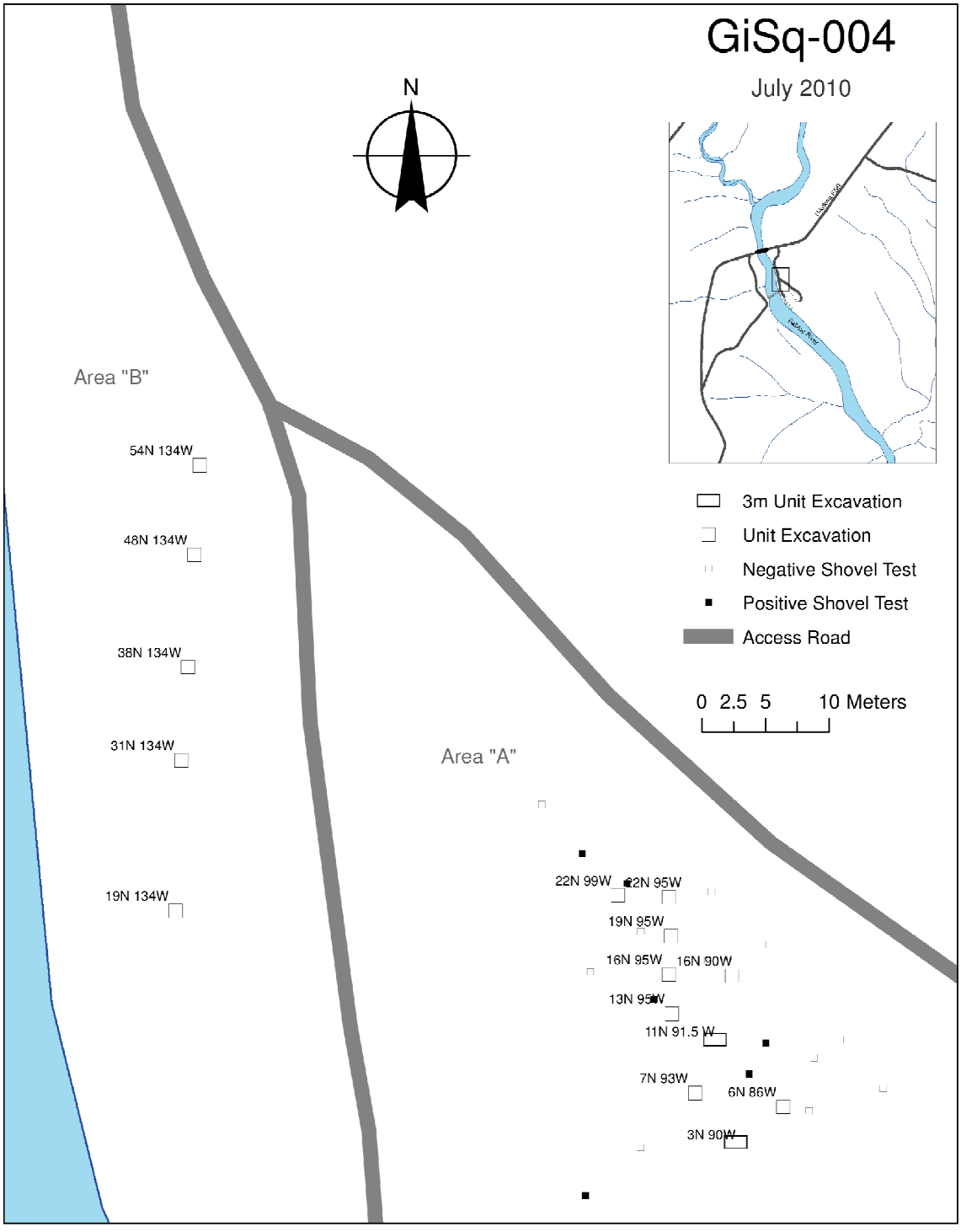

Figure 2. GiSq-004. Locations of shovel tests and excavation units.

Shovel test number	Result	Cultural Material
1	Negative	
2	Negative	
3	Positive	2 dacite flakes
4	Positive	1 dacite flake
5	Positive	1 dacite flake
6	Negative	
7	Negative	
8	Negative	
9	Negative	
10	Negative	
11	Aborted	
12	Negative	
13	Positive	2 dacite, 1 obsidian flakes
14	Negative	
15	Positive	1 chert flake fragment
16	Positive	1 obsidian flake
17	Negative	
18	Positive	1 dacite flake fragment

Table 1. Shovel tests at GiSq-4, Area A

Excavation Units

Areas with positive shovel tests and areas with other notable surface features were selected for 1m X 1m excavation units. Units were excavated in 10cm arbitrary levels with careful attention to natural layering. At the end of each level the excavators took notes and recorded sediment descriptions and any cultural material found within. All matrix removed during the shovel tests and excavations was screened through 1/4" mesh hardware, with the exception of the two cultural depressions, where 1/8" mesh hardware was used. Level bags were used to collect all cultural material other than artifacts, which were bagged separately (see below).

In all 14 1m X 1m units and two 2 1m X 3m trenches (within Cultural Depressions) were excavated. All 1m X 1m units were excavated to 70cm dbs with three exceptions; one unit (22N 95W) was excavated to 1m dbs to observe the stratigraphy; 19N 134W was closed at 40cm dbs as a very compacted and sterile silt layer was encountered; 48N 134W was closed at 20cm dbs as there was not enough time to go any further at the end of the project. With the exception of the latter, all units were excavated to a depth to where there were *at least* two sterile levels. In area A nine 1m X 1m units were excavated to sterile along with two cultural depressions (below). In Area B five 1m X 1m units were excavated to sterile with one exception (above).

With a very small number of exceptions all of the cultural material was recovered within the first 40cm dbs, and the vast majority was recovered within the first 20cm dbs. Most of the artifacts were found in association of the dark humic layer that seems to be present throughout the site. It is very likely that this layer is largely the result of anthropogenic causes also noted by Arcas (2000). The horizontal extent of this layer suggests that intensive activities involving organic materials took place here, for example processing and/or discard of fish, meat and plant resources. Curiously the dark organic layer was not as thick in Area B but it is present. Below this organic layer are sterile glaciofluvial sediments. At the end of the excavation all units were backfilled and all screens were removed and transported back to Prince George.

Soil samples were collected in all excavation units. A one-litre constant volume sample (CVS) was collected in each distinct layer in every excavation unit. At some point in future these samples will be subject to floatation and further analyses.

Excavation Unit	Area	Levels Excavated
22 N 99W	A	10
23N 95W	A	7
16N 95W	A	7
13N 95W	A	7
16N 90W	A	7
19N 95W	A	7
7N 93W	A	7
7N 94W	A	7
6N 86W	A	7
19N 134W	B	4
38N 134W	B	7
54N 134W	B	7
48N 134W	B	2
31N 134W	B	7
CD 1 11N 91.5W (3m X1m)	A	
CD 2 3N 90W (3m X 1m)	A	

Table 2. Excavation units (1m X 1m) in Areas A and B. Each unit is denoted by its NE corner.

Stratigraphy

The littermat ranges in thickness from 3 to 12 cm and is matted, usually contains some FCR fragments, and is followed by a thin, woody carbon layer. The dark/black organic loam layer, often containing charcoal, FCR, and rounded gravel, underlies the littermat. Ranging in thickness from 2-20cm, almost all artifacts recovered in Area A were associated with this layer. This overlies a 10-40cm thick layer consisting of sandy silt, with little to no organics. It is generally well sorted with 20-50% rounded gravel

ranging in size from pea gravel to large cobbles. A 20-50cm thick layer of silty sand follows this, with coarser sand grains than in the previous layer. This horizon is more poorly sorted and it has a high inclusion of gravel, ranging in size from pebbles to boulders. In Area B the stratigraphic profile is similar in some ways to that of Area A, except that beneath the littermat the dark organic layer ranges in thickness from 2-12cm. The layers beneath this contain a much higher density of silt than seen in Area A; this is to be expected as Area B is adjacent to the river bank and has likely seen more periodic flood deposits than other parts of the site.

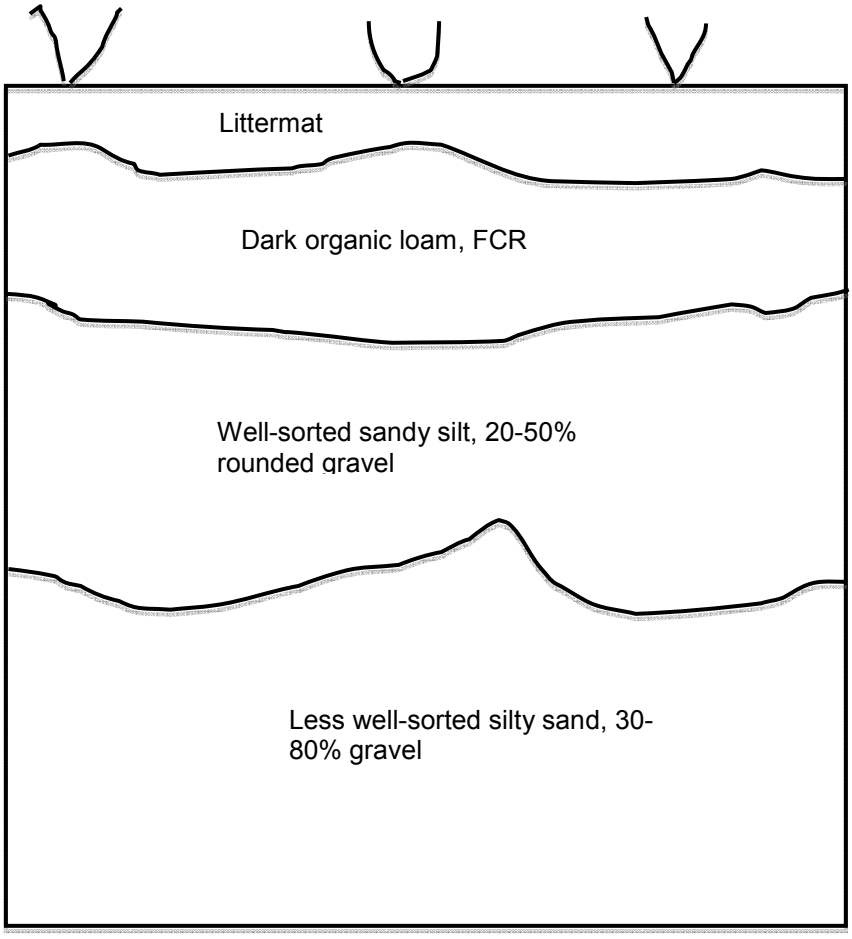

Figure 3. Typical stratigraphic profile for Area A.

Cultural Depressions

Two cultural depressions were excavated during the course of the project. In both cases the 1 m X 3 m (essentially three contiguous 1 m X 1 m units) trench was placed in the depression so that it would capture two opposite rims and run through the center of the depression (see Figure 4). The goal in each case was to capture a stratigraphic representation of the entire depression, from rim to rim. One of these, CD 1 (11N 91.5W on Figure 2) is a large circular depression about 2.5 m in diameter, and about 1m deep prior to excavation. At the outset this seemed to be a roasting pit, judging by its size and depth. It was excavated to the bottom of the cultural sediments, at 1.1m dbs. The stratigraphic profile clearly shows that this depression is not natural, and it contains a thick layer of the organic matter. The matrix in this depression was very dense with Fire Cracked Rock, although there was less charcoal than expected. No macro organic remains were found but soils samples were collected for later analysis. Our interpretation is that this could have functioned as an earth oven at one time, but after its last use it was backfilled with discarded FCR and sediment. A couple of artifacts were found within this unit.

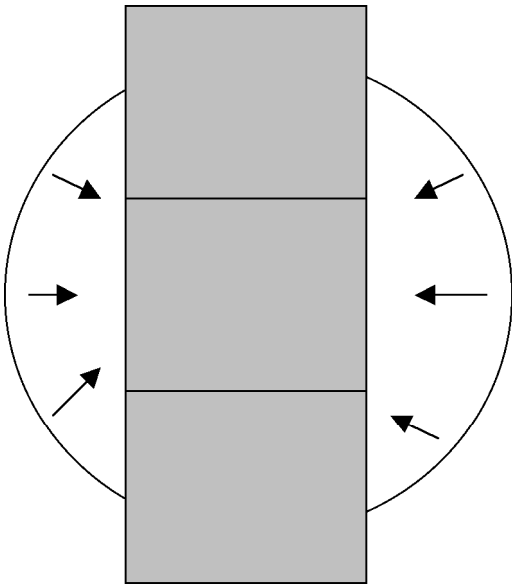

Figure 4. 3m X 1m Trench across cultural depression (sloping), extending beyond two rims

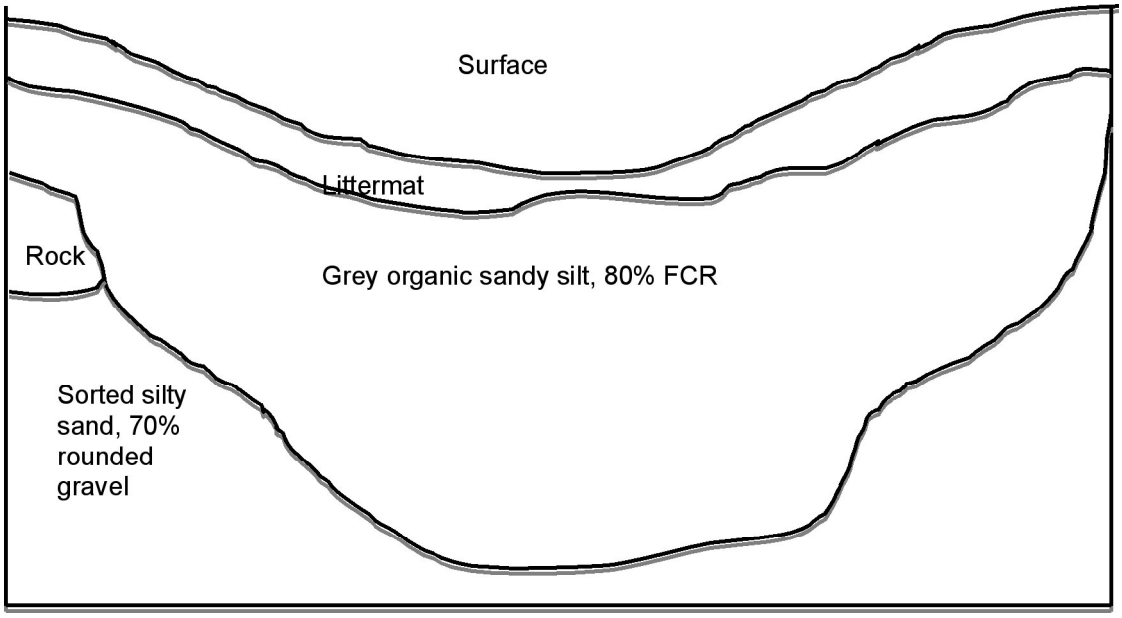

Figure 5. South wall profile, CD 1. (Not to scale)

The littermat in CD 1 (Figure 5) varies from 6-12 cm in thickness, and overlays the actual pit, which is filled with highly organically imbued sandy silt. This matrix is very dense with Fire Cracked Rock, up to 80% of the matrix in some levels consist of FCR. The dark loam layer is not represented in the south profile as it cuts through the center of the depression, however, the dark layer is very visible in the north profile, which intersects the edge of the depression. This area is clearly dug into the surrounding natural layer, the silty sand horizon as seen in the other excavation units.

On the other hand CD 2 (marked 3N 90W on Figure 2) is more irregular, approximating an oval shape. This pit had clearly been excavated into the natural sediments but it was quite shallow and it contained some large boulders. Prior to excavation the depression is about 30 cm deep, and we excavated it to 90 cm dbs. The actual pit extends to approximately 50 cm dbs (see Figure 6). The littermat here is between 8-12 cm in thickness, followed by the actual pit, which consists of the organic sandy silt interbedded with a layer of dark loam. This overlays a thick layer of the dark loam that seems to have some large boulders intentionally placed within. This is all cut into the unaltered silty sand layer. The function of this feature is unknown, however, soil samples were collected for future analyses.

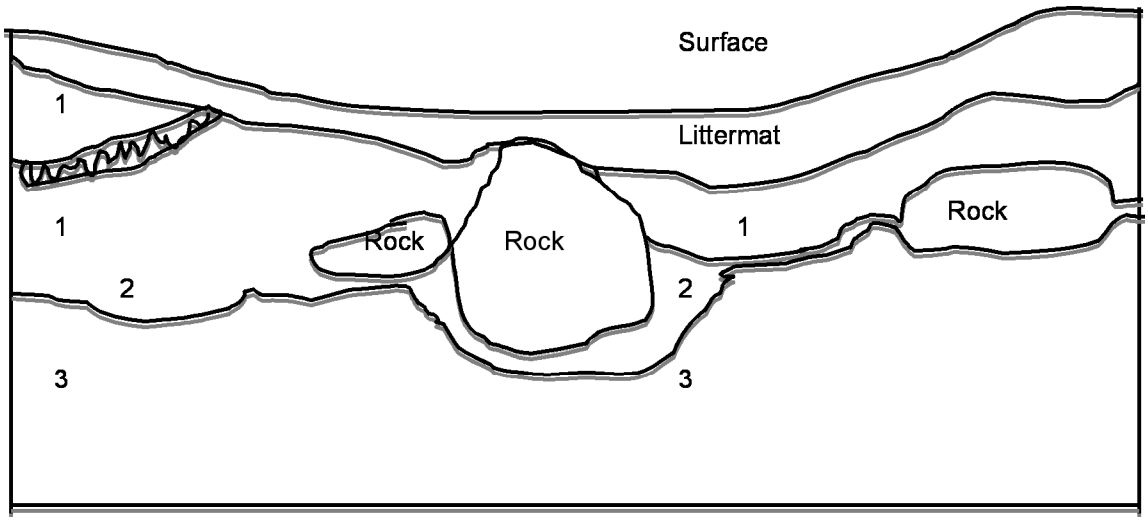

Figure 6. South wall profile, CD 2 (Not to scale). Key: 1=Grey silty sand, heavily organic 2= Black organic loam 3= Silty sand, with 70% rounded gravel

Analysis

Chronology

A number of radiocarbon samples were collected during the excavation phase of the project. Great care was taken to reduce the possibility of contamination, especially with charcoal samples. Of the samples collected, nine were chosen for radiocarbon assay using the AMS method.

The charcoal samples were submitted to the Radiocarbon Laboratory at the Université Laval (ULA), which works in partnership with the Center for Applied Isotope Studies at the University of Georgia (UGAMS), so each sample is identified with two lab numbers (Table 3).

As can be seen in Table 3, the assays reveal a temporal spread of approximately 1300 years (calibrated). There is a cluster of dates between approximately 1200-1300 BP, and six of the nine dates fall between roughly 1000 – 1300 BP. In terms of areal distribution the dates do not reveal any pattern with one possible exception. The two samples from Area B (UGAMS 9741 and UGAMS 9742) produced the oldest and third oldest dates from the site while Area A yielded a larger range. The latter yielded dates ranging from 1293 ± 7 to 136 ± 107 BP. The two cultural depressions revealed very different age ranges (1230 ± 34 to 1105 ± 36 BP for CD 1, and 144 ± 119 to 136 ± 107 BP for CD 2). It is likely that CD 2 was used within the most recent habitation or use at the site, but CD 1 is more complex due to the possible reuse and refilling activities discussed above. Other dates in Area A range from 1230 ± 34 to 769 ± 19 BP).

Sample number	Material	Radiocarbon date	Calibrated date*	Calibrated range
UGAMS-9725/ULA 2711	Charcoal	865 ± 20	769 ± 19	AD 1162 - 1200
UGAMS 9726/ULA2712	Charcoal	1170 ± 20	1105 ± 36	AD 809 - 881
UGAMS 9727/ULA 2713	Charcoal	1250 ± 20	1213 ± 32	AD 705 - 769
UGAMS 9737/ULA 2733	Charcoal	1355 ± 20	1293 ± 7	AD 650 - 664
UGAMS 9738/ULA 2734	Charcoal	145 ± 20	136 ± 107	AD 1707 - 1921
UGAMS 9739/ULA 2735	Charcoal	160 ± 20	144 ± 119	AD 1687 - 1925
UGAMS 9740/ULA 2736	Charcoal	1280 ± 20	1230 ± 34	AD 686 - 754
UGAMS 9741/ULA 2737	Charcoal	1360 ± 20	1295 ± 6	AD 649 - 661
UGAMS 9742/ULA 2738	Charcoal	1315 ± 20	1256 ± 29	AD 665 - 723

Table 3. Radiocarbon dates

* Calibration on one sigma (68%) on CalPal2007-Online (Cologne Radiocarbon Calibration & Palaeoclimate Research Package).

2012 Danzeglocke, U., Jöris, O., Weninger, B. CalPal-2007online http://www.calpal-online.de/, accessed 2012-02-22.

Clearly, the site has a deep antiquity that stretches back to over one millennium. The cluster of older dates reveals that the site was in use well before European contact, and support oral histories that indicate Lake Babine Nation ancestors occupied it until the early part of the twentieth century. That said it is also apparent that in terms of archaeology we are only beginning to understand the long-term Aboriginal history of this area. What remains unclear at this point is the spatio-temporal relationship between the area where the house depressions are situated, and the rest of the site. Given the size of the site, it seems likely that: spatio-temporal use of the various areas at the site and the nature of the activities over time, have resulted in a complex archaeological record. Future endeavours at the site will focus on further understanding the areal use of the site over time.

Artifacts

Thirty-five artifacts were recovered during the 2010 excavation, and most of these were classified as ‘retouched flakes” (Table 4). An impressive variety of raw materials is reflected in the artifacts and debitage (see below) ranging from a number of igneous toolstones, including obsidian, to chert and other sedimentary types. A small number of projectile points were also recovered from Area B, as was one microblade core. Detailed descriptions follow.

Artifact No. (GiSq-4:)	Description	Dimensions (max. length x width x thickness) mm	Raw material	Area of recovery
33	Point	29 x 19 x 3	Dacite	B
14	Triangular Point	30 x 14 x 4	Rhyolite	B
29	Stemmed point	73 x 24 x 7 Stem length: 20	Dacite	B
4	Point tip	19 x 10 x 3	Dacite	A
13	Point medial fragment	27 x 31 x 8	Dacite	B
8	Biface fragment	13 x 8 x 3	Dacite	B
11	Biface fragment	26 x 31 x 10	Dacite	B
7	Biface fragment	28 x 31 x 4	Dacite	B
2	Scraper	43 x 29 x 7	Dacite	A
18	Retouched flake	48 x 24 x 5	Dacite	B
16	Retouched flake	27 x 14 x 3	Obsidian	B
25	Retouched flake	22 x 16x x 3	Dacite	B
26	Retouched flake	55 x 21 x 6	Dacite cobble	B
27	Retouched flake	21 x 18 x 3	Dacite	B
30	Retouched flake	13 x 13 x 3	Dacite	B
34	Retouched flake	35 x 34 x 14	Dacite	B
35	Retouched flake	24 x 23 x 4	Chert	B
23	Retouched flake	24 x 14 x 3	Andesite	B
10	Retouched flake	20 x 17 x 2	Dacite	B
5	Retouched flake	37 x 20 x 9	Dacite	B
1	Retouched flake	27 x 19 x 4	Andesite	A
19	Retouched flake	45 x 21 x 5	Dacite	B
20	Retouched flake	44 x 35 x 7	Rhyolite	B
21	Retouched flake	33 x 27 x 8	Dacite	B
22	Retouched flake	28 x 36 x 8	Dacite	B
9	Retouched flake - heated	21 x 15 x 9	Chert	B
12	Retouched flake - heated	42 x 24 x 7	Dacite	B
17	Retouched flake - heated	71 x 23 x 20	Andesite	B
6	Retouched flake - heated	43 x 36 x 5	Dacite	B
28	Notch	33 x 23 x 6	Dacite	B
24	Notch	22 x 23 x 9	Andesite	B
32	Retouched FCR	99 x 52 x 17	Coarse igneous	B
31	Retouched FCR	46 x 23 x 8	Coarse igneous	B
15	Microblade core	35 x 19 x 14	Chert	B
3	Tabular scraper	59 x 41 x 14	Dacite	A

Table 4. Artifact descriptions and dimensions

Figure 7. Complete projectile points (Left to right: GiSq-4:14; GiSq-4:33)

Three complete projectile points were recovered, GiSq-4: 14, GiSq-4: 33 and GiSq-4:29). Artifact 14 is a small point with a straight base. It is fairly thin and it has marginal retouch and some pressure flakes around the entire margins. It appears to be made on a thin flake, with most of the retouch being of a non-invasive character. The one exception to this is at the base on one face, where a large flake has been removed apparently in an effort to thin the base for hafting. Artifact 33 is triangular in shape and quite thin. It would have served effectively as a projectile point as is, but it could also be a preform for a side notched point. These points have been found at other sites in the interior but few workers have discussed them beyond basic description. Watson (2011) documents eleven triangular points in the collection from Punchaw Lake, including one that resembles artifact 33. Both of these points are of a size that would be ideal for hafting onto fishing spears or even arrows, although this is admittedly speculation.

Figure 8. Stemmed point (GiSq-4:29)

One stemmed point was recovered in Area B during unit wall cleaning. This appears to be a complete point, although it displays a slight longitudinal curvature. There

are very few flake scars that are the result of pressure flaking, rather this raw material seems to have constrained the knapper to percussion flaking. This is reflected in the centre mass that characterizes on face of the point. In general such points have been found in southern interior sites and have been classified to the Shuswap Horizon (Richards and Rousseau 1987). Once thought to be temporally diagnostic, these points occur from the Middle Period to the Kamloops Horizon, or roughly 7,500 BP – 200 BP (Matson and Magne 2007:85; Magne and Matson 2008:279). With such a widespread recurrence, they are clearly not indicators of constrained chronological use.

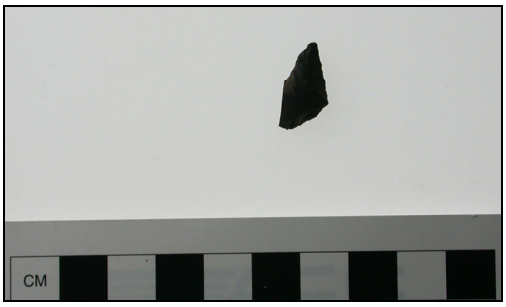

Figure 9. Projectile point tip (GiSq-4:4)

One small tip fragment of a projectile point was recovered from a unit in Area A. the point tip is bifacially flaked and it is very thin with sharp edges. It is possible that this piece was used as a hand-held awl or drill after it broke.

Figure 10. Projectile point medial segment (GiSq-4:13)

One medial section of a bifacially reduced projectile point was recovered in Area B. Manufactured on dacite, the medial fragment shows a transverse break at the top and bottom. Such breakages are common during biface manufacture, especially with tougher raw materials. This piece may have been in the process of manufacture and does not have any other diagnostic characteristics.

Figure 11. Biface fragments (left to right: GiSq-4:8; GiSq4:7; GiSq-4:11)

Three biface fragments were recovered. These are pieces that exhibit bifacial flaking but they cannot be classified within any specific tool category. One of these (GiSq 4:8) appears to be an edge fragment from a biface. Manufactured on dacite, the artifact is too small to interpret any further. GiSq-4:7 is a thin flake fragment that has bifacial retouch around some of its perimeter. As the platform is missing, it is difficult to orientate the piece. The worked edge is quite sharp, however and this would make a good cutting implement. The third artifact (GiSq-4:11) is the base of a bigger piece; it is rounded and quite thick. This is an early stage biface as reflected in the width to thickness ratio. This is an igneous material and it is tougher than the other raw materials in this collection. It displays numerous step fractures in the bifacial retouch as well as a lateral snap that likely led to the piece being discarded.

Figure 12. Microblade core. Arrows indicate direction of flake scars on fluted surface (GiSq-4:15, fluted surface view)

One microblade core was recovered, made on a fine-grained chert (Figures 12, 13 and 14). This is a thick flake whose striking platform is still partially visible, and indicates that it was struck for the purpose of creating a microblade core. The core is incomplete, as it seems to have been broken along the longest axis, also removing much of the fluted surface. The remaining lateral edge exhibits flaking that is consistent with core shaping and isolation of the striking platform and fluted surface. The fluted surface has also been impacted through removal of a large flake on the adjacent lateral edge so

that the full length of the microblade scars cannot be measured. It is clear, however, that at least two microblades were removed, and several smaller scars reflect use of a "punch" to create an appropriate surface for microblade removal. Several step fractures are visible on the fluted surface and given their size and regularity, it is difficult to see this as a result of freehand percussion, again supporting the use of a punch.

Figure 13. Microblade core. Platform view. Vertical bar indicates location of fluted surface

At least one flake scar on the platform may reflect a rejuvenation attempt through tablet removal as described by Mobley (1991) for the "Campus Core" type. Some of the flake removals on the lateral edge may also be the result of rejuvenation attempts but in the end, it appears that the core broke in half, either unintentionally or intentionally due to some unknown reason.

Figure 14. Microblade core. Side view. Vertical bar indicates fluted surface

Microblade cores are present on many archaeological sites in the interior of the province and they were also once thought to be strong indicators of chronology. Matson and Magne (2007) show that microblades are widespread through time, and they continue until fairly recent times in Carrier sites. For example at the protohistoric site of Ulkatcho Donahue (1973) recovered a microblade core and seven microblades from the upper deposits of a house. Likewise Borden's (1952) project at protohistoric Chinlac resulted in the recovery of a microblade core fragment (Magne and Matson 1987). The presence of a microblade core at GiSq-4 then should not be too surprising, given the date range established so far with the radiocarbon dating (see above).

Figure 15. Scraper with residue (GiSq-4:2). Dorsal surface.

One of the most interesting artifacts recovered is an end scraper made on igneous material. The ventral face exhibits evidence to heat exposure with reddened and blackened bands. This tool has been finely shaped through the use of both bifacial and unifacial flaking, mostly the latter.

Figure 16. Scraper with residue (GiSq-4:2). Ventral surface, with pockets of residue in circle highlight
The base has been thinned indicating that it could have been, or it was hafted.

Of great interest, the scraper has some milky gray residues still adhering to the working surfaces of the tool. There are small areas with residues on the scraping edge of the tool as well but the ventral surface has a larger amount. The residue appears to be remnant of a sap-like material (e.g. pine resin) but this is speculation. In the near future a sample will be sent away for elemental composition analysis to ascertain the nature of this residue. Scrapers with macroscopic residue are rare in archaeological sites in British Columbia, so it will be interesting to see if the residual matter can be identified.

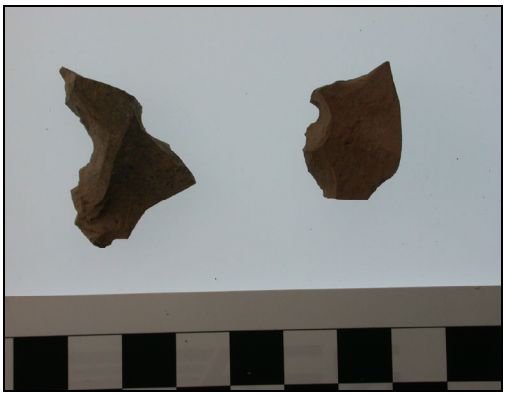

Figure 17. Notches (Left to right: GiSq-4:28, GiSq-4:24).

Two small notches were recovered, and both represent opportunistic modification of flakes. It is difficult to tell if they were parts of larger pieces that broke or if they were used in their present form. In their present form, both could be used effectively as hand-held tools.

Figure 18. Retouched flakes (Top left to right: GiSq-4:18, GiSq-4:16, GiSq-4:25, GiSq-4:26. Bottom left to right: GiSq-4:27, GiSq-4:30, GiSq-4:34, GiSq-4:35)

Figure 19. Retouched flakes (Top left to right: GiSq-4:23, GiSq-4:10, GiSq-4:5, GiSq-4:1. Bottom left to right: GiSq-4:19, GiSq-4:20, GiSq-4:21, GiSq-4:22)

The largest category of artifact type is Retouched Flakes (Figs. 18 and 19). Almost half of the artifacts recovered are classified to this category and they consist of flake and flake fragments of various shapes, sizes and raw materials, and all have been retouched on one or more edges. The nature of the retouch varies from minimal to invasive, and mostly unifacial. Most of these were likely expedient tools used for a variety of tasks. This is not entirely unexpected as simple flakes and retouched flakes offer great utility for a number of tasks. This is especially significant if much processing of various resources was taking place, as would be predicted in a site such as this. The diversity of forms and edge angles suggest a number of tasks were performed with these implements, such as cutting, scraping, sawing and more (Rahemtulla 2006).

Figure 20. Heat exposed retouched flakes (Clockwise from top left: GiSq-4:9, GiSq-4:12, GiSq-4:6, GiSq-4:17).

A number of retouched flakes indicate exposure to heat. This is reflected in the discolouration that is characteristic of heat exposure to certain types of rocks. These are generally fine-grained tool stones that exhibit multiple colours of red and black on their surfaces. In all cases the flaking occurred prior to heat exposure.

Figure 21. Retouched FCR. (Left to right: GiSq-4:32, GiSq-4:31)

In contrast with the heat exposed retouched flakes, two pieces are fire cracked rock that have been retouched *after* heat exposure. These are fairly coarse-grained materials that would not normally be chosen for knapping, however, they may have been suitable for use as a heat source. The larger of the two pieces (artifact 32) is almost 100mm along its longest axis, making it one of the largest artifacts recovered in the current project. The piece exhibits signs of fracture caused through extensive heat on a large cobble. Following this, the toolmaker removed a series of large flakes along the edge of the cortical surface. The smaller piece exhibits similar characteristics.

The use of fire-cracked rock as tools is not widely documented ethnographically or archaeologically. These are the first such pieces ever noted by the author. On the other hand the use of such materials should not be surprising. Given that FCR comes in a wide variety of forms and edge angles, many pieces should be usable in a number of tasks. This is an expedient technology that was more than likely used everywhere there was a large amount of FCR. Unfortunately, it is difficult to know if FCR was used for any tasks unless there are signs of visible tool creation such as with these pieces.

Figure 22. Tabular scraper. (GiSq-4:3)

One piece is identified as a tabular scraper (Figure 22). This is a tabular piece that has been intentionally broken in half transversely through percussive force. The point of impact is still visible at the mid-line left margin on the piece on the right. Following this, one piece has been retouched with a very steep angle to give a strong scraping edge. This is an unusual edge angle for a scraper and its use is unknown.

Debitage

A significant amount of debitage was recovered at the site, mostly from Area B (Tables 6, 7 and 8). Classification of rock types is difficult without microscopic observation of the inner texture and mineral make up of the sample, or without some geophysical analyses. In the present case such time was not available, however, more detailed analyses of the raw materials and reduction strategies represented, are planned for the future. Here we present a very general breakdown of raw material groups with the caveat that there may be some errors in classification. Based on macroscopic visual assessment, there appears to be at least six different raw material types. Raw materials were classed into four major categories: igneous, obsidian, quartz and miscellaneous.

The igneous group consists mainly of dacite but there is also a fair amount of andesite and possibly rhyolite as well. Most of this material is fairly fine-grained and produces defined conchoidal fractures with smooth surfaces and sharp cutting edges. Based on exterior colours and textures there appears to be four to five distinct sources represented, although this notion needs to be properly tested with elemental analysis. Obsidian is an igneous rock but it is separated as a category here due to the common belief within archaeology, that this material may have been treated differently than other raw materials. A small amount of milky quartz is also represented, along with an even smaller amount of quartz crystal debitage. The miscellaneous category comprises various other raw materials such as a small number of quartzite pieces, as well as others that

Unit	Level	Flakes (#)	Weight (g)	Igneous	Obsidian	Quartz	Misc
23N 95W		0					
22N 99W	1	8	11.2	8			
	2	1	4.0	1			
19N 95W	1	1	0.2		1		
	2	1	0.2	1			
16N 95W	2	1	0.2	1			
16N 90W	3	1	0.5	1			
13N 95W	2	3	3.2	3			
	3	2	4.2	2			
	5	1	0.1	1			
7N 94W	1	2	0.5	2			
	2	1	0.3				1
	3	7	0.7	7			
7N 93W	2	2	0.5	2			
	3	54	19.0	52			2
6N 86W	3	1	0.1	1			
CD 1	1	2	0.1	2			
	3	1	0.2	1			
	4	7	0.7	4	2		
	5	1	0.5	1			
	6	5	0.7	3	2		
	7	3	1.3	3			
	8	1	0.1		1		
	9	4	2.1	4			
	Wall	1	1.8	1			
CD 2	1	1	0.1	1			
	2	2	0.3	2			
	3	11	2.3	11			
	4	5	0.9	4			1
	5	18	9.7	18			
	6	18	7.3	17			1
	7	3	0.7	3			
	8	3	1.8	3			
	9	1	0.1		1		
Total		173	75.6	161	7		5

Table 6. Debitage profile for Area A.

Unit	Level	Flakes (#)	Weight (g)	Igneous	Obsidian	Quartz	Misc.
54N 134W	1	4	3.8	2	1		1
	2	67	54.2	60	6	1	
	3	208	119.9	171	36		1
	4	67	25.2	60	6	1	
48N 134W	1	52	32.6	50	2		
	2	204	106.7	196	6		2
	3	332	159.9	325	4		3
	4	207	93.7	202	1		4
	5	33	16.6	25			8
	6	13	9.0	13			
38N 134W	1	51	19.8	50			1
	2	315	111.6	263	10	27	15
	3	246	119.8	223	3	13	7
	4	32	14.4	29	2	1	
	5	8	2.4	6	1	1	
	6	2	1.3	1	1		
	7	1	0.4	1			
31N 134W	1	31	16.1	29	2		
	2	652	275.1	556	74	12	10
19N 134W	1	81	19.9	73	3	5	
	2	155	63.0	144	11		
	3	43	20.5	42	1		
	4	3	1.2	2	1		
Total		2807	1287.1	2523	171	61	52

Table 7. Debitage profile for Area B

could not be ascertained. Much of the debitage was recovered from individual unit layers in Area B. For example some 10cm levels yielded over 700 flakes in a 1m x1m unit.

Flakes (#)	Weight (g)	Igneous	Obsidian	Quartz	Misc.
2,990	**1369.4**	**2667**	**180**	**61**	**57**

Table 8. Debitage profile for entire site (includes shovel tests)

A detailed flake analysis is currently underway, however, initial observations suggest that most of the knapping at this site is related to core reduction, with a lesser amount of tool production (Rahemtulla 2006). It appears that raw materials were imported into the site in the form of cores and manipulated for the production of flakes. Some of these were retouched into various tools but many flakes could have been used without any further modification. Very few core fragments of any raw material were recovered, which could be due to complete reduction of raw materials to small pieces of debitage, or that cores were transported for further use elsewhere. A number of biface reduction flakes were also noted, indicating that some tool production was indeed taking place at the site.

Spatial distribution of lithic material

	Area A	Area B
Artifacts (%)	**11.4**	**88.6**
Debitage (%)	**5.8**	**94.2**

Table 9. Spatial distribution of lithic material in the two site areas

There is a clear difference in stone tool density between Area A and Area B (Table 9). The vast majority of artifacts and debitage was recovered in Area B. Intuitively this makes sense, as Area A contains dozens of cultural depressions, and in terms of activities was likely more of a processing area rather than a place of intensive stone reduction. On the other hand the portion of Area B sampled is on a high bank of the river and has less topography. This is more likely a knapping area, away from the cache pits and roasting pits. Curiously, the two artifacts identified as scrapers were recovered in Area A, and these artifacts are normally associated with processing activities.

Artifact Summary

Despite the relatively small sample of artifacts there is a diversity of forms, which would be expected in a village/processing area. It is equally not surprising that the most common type of stone tool is the retouched flake, as these expedient tools can be produced very quickly for use on a wide range of tasks. Unmodified debitage is also very useful in a number of tasks and this category is often ignored as a potential tool source (Rahemtulla 2006). Curiously missing are the larger tools that might be used in wood working, such as larger cores or choppers. This is most likely a function of sampling as a very small area of the site has been tested. Also missing are any bone or antler tools, which were traditionally used for fishing and hunting implements at other interior sites

such as Punchaw Lake (Fladmark 1976). This is likely due to lack of preservation of organic materials (see below).

The range of raw materials attests to the notion that many different sources of tool stone were known, and that they were accessed directly or through trade. The extent and locations of these sources remains unknown, but research on sourcing with the use of XRF may be pursued in the future. Suffice it to say that some of these raw materials (e.g. obsidian) may originate from distant sources.

Fauna

A small amount of fauna was recovered, however, it is very fragmentary and difficult to identify. A small number of salmon vertebrae were recovered just below the littermat in one area, and a couple of fragments from a large mammal (most likely moose) were recovered also close to the surface in CD1. The rest of the fauna are very small intrusive mammals, whose elements are very fragmentary. It is apparent that there are preservation issues at this location, not an uncommon characteristic in interior sites.

Summary and Conclusion

The project has been successful in achieving its primary research goal, to investigate the nature of the site at GiSq-4, in order to continue building a basic culture history for the region. Although a small part of the site was tested, new data has led to information on site chronology, stone artifact types, features, and the general distribution of artifacts.

Areas tested reveal little or no sub-surface disturbances indicating that the deposits are intact. In general cultural materials tend to have shallow vertical distribution as is common in interior sites, except within features such as cultural depressions. Future work will focus on other parts of the site, notably the house depressions. Given the size of the site the mapping project is still under way. In future years the actual site boundaries will be delineated and complete topographic mapping will follow.

The project has also been successful in training a number of post-secondary students and members of the Lake Babine Nation. Many of the community participants are descendents of the last aboriginal families that lived at the site in the early 20th century. In future years it is hoped that there will more integration of oral histories with the archaeological work.

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Appendix A
GiSq-004
Shovel test log

ST 1
0-3 cm Littermat
3-8 cm Dark, organic loam, 30% rounded gravel, FCR
8-50 cm Silty sand, 60% grounded gravel

ST 2
0-3 cm Littermat, FCR, 50% rounded gravel
3-14 cm Dark, organic loam, FCR, 30% rounded gravel
14-54 cm Silty sand, 60% rounded gravel, including some cobbles

ST 3
0-4 cm Littermat, 40% rounded gravel
4-21 cm Dark organic loam, 15% rounded gravel, FCR
21-38 cm Sandy silt, 35% cobbles, rounded gravel
38-54 cm Silty sand, 55% rounded gravel, cobbles

ST 4
0-13 cm Littermat
13-18 cm Dark organic layer, FCR, 40%
18-52 cm Silty sand, 30-45% rounded gravel

ST 5
0-8 cm Littermat, FCR
8-18 cm Dark organic loam, FCR
18-36 cm Sandy silt, 30% rounded gravel
36-38 cm Silty sand, 45% rounded gravel, FCR

ST 6
0-10 cm Littermat, FCR, 60% rounded gravel
10-20 cm Dark organic loam, FCR
20-44 cm Sandy silt, FCR, 45% cobbles

ST 7
0-10cm Littermat
10-17 cm Dark organic layer, FCR, 15% rounded gravel
17-42 cm Sandy silt, 60% rounded gravel
Small charcoal flecks between 13-42 cm

ST 8
0-13 cm Littermat
13-16 cm Ash/silt, dark organic matter, FCR, cobbles

16-50 cm Silty sand, 55% rounded gravel

ST 9
0-10 cm Littermat, FCR, 30% angular gravel
10-19 cm Dark organic matter, 30% cobbles
19-39 cm Silty sand, large FCR, 30% rounded gravel, some cobbles, boulders

ST 10
0-7 cm Littermat
7-14 cm Dark organic loam, FCR
14-45 cm Silty sand, 75% rounded gravel

ST 11
0-6 cm Littermat, FCR
Aborted at 6 cm dbs due to large boulder/bedrock

ST 12
0-6 cm littermat, FCR
6-10 cm Dark organic loam, 20% rounded gravel
10-45 cm Silty sand, 75% rounded gravel

ST 13
0-10 cm Littermat, 40% rounded gravel
10-20 cm Dark organic loam, FCR, 20% rounded gravel
20-43 cm Sandy silt, 40% rounded gravel
43-54 cm Silty sand, 35% cobbles, gravel

ST 14
0-7 cm Littermat, FCR
7-16 cm Dark organic loam, FCR, 15% rounded gravel
11-32 cm Sandy silt, 65% rounded gravel, including some cobbles
32-52 cm Silty sand, 80% rounded gravel, FCR

ST 15
0-6 cm Littermat, FCR
6-11 cm Dark organic loam, FCR, 20% rounded gravel
11-45 cm Silty sand, some FCR, rounded gravel
45-48 cm Finer silty sand, more orange colour

ST 16
0-8 cm Littermat, FCR, charcoal, 5% rounded gravel
8-19 cm Dark organic loam, FCR, 20% rounded gravel
19-28 cm Dark sandy silt, some charcoal, 20% rounded gravel, 20% FCR
28-30 cm Brown sandy silt, 5% rounded gravel

ST 17
0-9 cm Littermat
9-15 cm Dark organic loam, 15% rounded gravel
15-32 cm Silty sand, 60% rounded gravel, some FCR
Large boulders/bedrock at 32 cm dbs

ST 18
0-9 cm Littermat, FCR
9-12cm Dark organic loam, FCR
12-31 cm Silty sand, 70% rounded gravel, FCR
Large boulder at 31 cm dbs