Archaeological Consulting

Archaeological Data Gap Analysis of the Quesnel Forest District, 2007.

Prepared by: Matrix Research Ltd.

Prepared for: Canadian Forest Products Ltd.

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Although many people and organizations provided the data necessary for the project, Matrix Research Ltd. alone is responsible for the accuracy of the final product.

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TABLE OF CONTENTS

CONTACTS ..... *i*

ACKNOWLEDGEMENTS ..... *ii*

CREDITS ..... *iii*

TABLE OF CONTENTS ..... *iv*

1.0 Introduction *5*
Map 1: Study Area Location 9

2.0 Background and Project Area *10*

2.1 The Study Area **10**

2.2 Biophysical Characteristics **10**
Biogeoclimatic Zones 10
Palaeoecology 12

2.3 Ethnography **13**
Carrier (Dakelh) Ethnography 13
Shuswap (Secwepemc) Ethnography 15
Chilcotin (Tsilqot'in) Ethnography 17

3.0 Previous Archaeological Research *19*

4.0 Methodology *22*

5.0 Archaeological Data and Gap Analysis *23*

5.1 Existing Archaeological Site Database **23**
Table 1: Summary of Archaeological Resource Types in the QFD. 25
Table 2: Summary of Single Component Archaeological Sites in the QFD 26
Table 3: Summary of Multiple Component Archaeological Sites in the QFD. 26

5.2 Existing Archaeological Survey Coverage **27**
Table 4: Summary of Survey Coverage & Results by Potential Class in the Study Area 29
Table 5: Summary of Survey Coverage & Results by Biogeoclimatic Zone. 30
Table 6: Summary of Survey Coverage & Results by Biogeoclimatic Subzones. 32
Map 2: Archaeological Assessment Coverage in Quesnel Forest District. 34
Map 3: Archaeological Site Distribution in Quesnel Forest District. 35
Map 4: Archaeological Site Distribution & Biogeoclimatic Zones in Quesnel Forest District. 36

5.3 Near Analysis **37**
Table 7: Summary of Riparian Classes in the QFD 37
Table 8: Trail distance interval 39

6.0 Summary and Recommendations *44*

6.1 Current Archaeological Data Gaps **44**

6.2 General Observations and Recommendations **46**

7.0 References Cited *48*

Appendix A: Glossary of Archaeological Terms

Appensix B: Heritage Inspection Permits Relating to Quesnel Forest District

Appendix C: Near Analysis Graphs and Table

1.0 INTRODUCTION

This gap analysis project was conducted at the request of Canadian Forest Products Ltd. The objective of the project was to take the information contained within a recently completed archaeological data inventory project (Heffner 2007) conducted in the Quesnel Forest District and summarize the data for the following purposes: 1) characterizing the current archaeological site inventory; 2) reviewing the effectiveness of the existing archaeological overview assessment model; and 3) identifying gaps in the current archaeological record (site and survey) that would affect future predictive modeling efforts.

Archaeological data inventories compile data resulting from past archaeological assessments and research, including the results of archaeological surveys and the sites that have been recorded. A total of five archaeological data inventories have been conducted in the Quesnel Forest District (Map 1). Weldwood of Canada Limited initiated an inventory project of this kind in three of their operating areas in 2004 that covered 34 BCGS 1:20,000 map sheets (McNeney 2004). In 2005, Canfor and the Nazko First Nation conducted a similar inventory project for 6 BCGS 1:20, 000 map sheets (Berkey 2005). In 2006, Nazko First Nation sponsored a project that added 10 more BCGS 1:20,000 map sheets (Anderson 2006) and Canfor initiated a data inventory project that added another 73 BCGS 1:20,000 map sheets (McNeney 2006).

In 2007, Canfor sponsored a data inventory project (Heffner 2007) for the remaining 78 BCGS 1:20, 000 map sheets in Quesnel Forest District that were not included, or only partially included, in the study areas of the previous inventories as well as all archaeological data accumulated during the 2006 field season. This project completed the archaeological data inventory for the Quesnel Forest District up to and including 2006 and represents the accumulated archaeological record of over thirty years of archaeological work in the region. In addition to compiling archaeological assessment information, the Quesnel Forest District heritage trail inventory was also updated and refined to include new trail data acquired during archival research at the National Archives in Ottawa and the Hudson's Bay Archives in Winnipeg. A detailed archaeological site database was also constructed that records a series of attributes for all recorded archaeological sites that relate to the position of the site relative to biophysical and cultural landscape features that will prove useful during future analyses related to predictive modeling.

Standards followed during this study include those contained in the *British Columbia Archaeological Impact Assessment Guidelines* (Archaeology Branch 1998) and the *British Columbia Archaeological Inventory Guidelines* (Archaeology Branch 2000).

Definitions

This study incorporates cultural heritage resource data. According to the *Heritage Conservation Act* (Province of British Columbia 1986), cultural heritage resources include both

protected and non-protected resources. This broad definition encompasses a wide variety of site categories such as archaeological and traditional use sites. An archaeological site is any geographical location that contains physical evidence of past human activity. Archaeological sites that predate 1846 AD are automatically protected by the *Heritage Conservation Act*. Examples include lithic scatters, cultural depressions, petroglyphs, and pictographs. Traditional use sites post-date 1846 AD and represent a resource category that has meaning in cultural tradition both conceptually (i.e. spiritually) and tangibly (i.e. through traditional physical activity). These resources are often representative of geographically defined areas that have traditionally been used by one or more contemporary groups of aboriginal people for one or more culturally significant activities, such as bathing pools and locations of significant events. Also included under this definition are resource gathering areas, such as post-1846 culturally modified tree (CMT) sites. For purposes here, cultural heritage resources will refer to historic sites and post-1846 CMT sites, resources that are not automatically protected under the *Heritage Conservation Act*.

This report refers to a variety of types of archaeological studies that differ in methodology, intent, and scope. An archaeological overview assessment (AOA) is an office review meant to determine the archaeological resource potential of a given area and involves research into natural and cultural factors affecting archaeological potential. Archaeological inventory studies (AISs) are generally extensive rather than intensive in scope and are field surveys designed to locate and record large numbers of archaeological sites over a wide area. Studies of this type conducted in the study area usually involved surface inspection and rarely involved subsurface inspection. Inventories have contributed numerous sites to the current database but the amount of detail is relatively sparse and the sites are usually not well-defined. Because inventories concentrated on high potential areas such as large lakes and streams, the current site inventory is heavily biased towards associations with these features. An archaeological impact assessment (AIA) can be defined as a detailed archaeological survey of a proposed development area where potential conflict between archaeological resources and a proposed development have been identified. Typically during AIAs, subsurface testing is implemented in order to identify any buried archaeological resources that may be present. A preliminary field reconnaissance (PFR), conversely, can be defined as a preliminary pedestrian survey of a proposed development area in order to collect biophysical data, determine archaeological potential, and recommend or perform an AIA, if deemed necessary. Both of these types of surveys have the potential to result in the discovery of archaeological sites. Surveys strictly for the purpose of locating culturally modified trees (CMTs) are usually done in the winter and do not have the same potential to result in the discovery of archaeological sites (other than CMTs) due to conditions of snow, frozen ground, or reduced visibility.

This study summarizes the results of archaeological surveys and assessments completed in the study area. This study does not address, evaluate, or comment on traditional aboriginal use of the area and should not be considered valid for that purpose.

Project Deliverables

Deliverables resulting from this study include this report and the current Quesnel Forest District archaeological site database. The site database and an electronic copy of this report in PDF format are contained on the CD located in the back cover of this report.

Use of Archaeological Data

Please note that archaeological site location information is contained in the archaeological site database. The Archaeology Branch has authority over access to this information in accordance with the Heritage Conservation Act. This information is provided to archaeologists, development proponents, and other concerned individuals on a need to know basis. The site information provided in these files is in agreement with the Third Party Access section of the Heritage Register Data Request Form. Under the terms of the data request submitted to the Archaeology Branch for this project, the archaeological site information can be used by Canadian Forest Products Ltd., other forest licensees, First Nations, and the Ministry of Forests and Range but cannot be distributed to any other third parties without the written permission of the Archaeology Branch. Copyright of digital site information belongs exclusively to the Province of British Columbia.

The database was compiled from archaeological site forms and permit reports for planning purposes and to serve as an overview of archaeological site information. It is not intended to amend or replace management recommendations provided in the original permit reports. Furthermore, the data includes only those archaeological sites that have been located and recorded by archaeologists; it does not indicate areas where further archaeological sites may be located. There are undoubtedly thousands of archaeological sites in the study area that have not yet been identified and recorded. References are provided throughout the database to ensure easy access to the results and recommendations of individual assessments.

Data Currency

It is important to note that the archaeological data summarized during this project changes through time as more assessments are conducted and sites are located or updated. The utility of a database of this type is enhanced by periodic updates as new data become available.

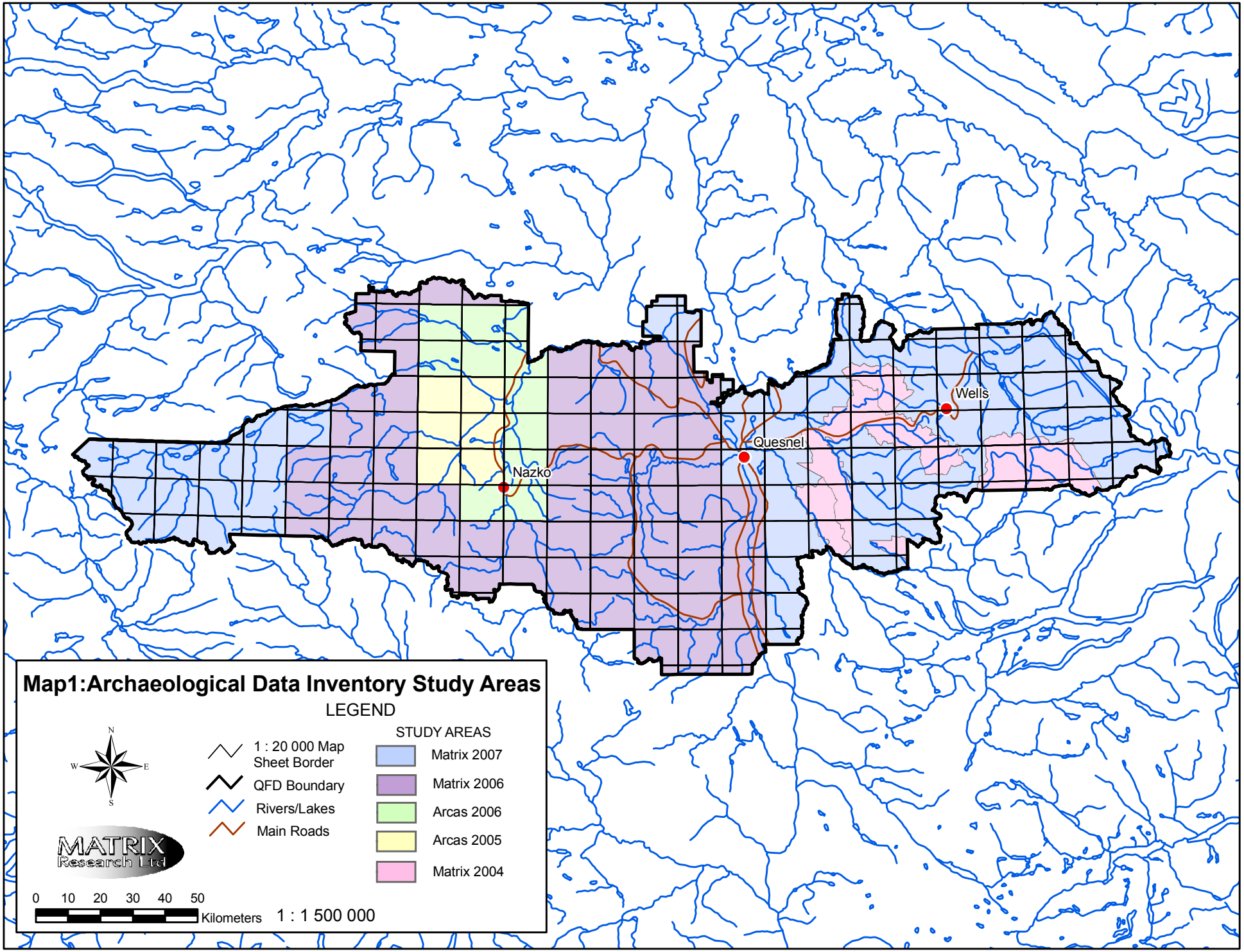
Archaeological site data contained in the database and summarized in this report is current as of March 2, 2007 (the date of the heritage data request response from the Archaeology

Branch). We also included data for archaeological sites recorded by Matrix Research Ltd. for which site forms had been submitted after March 2, 2007. These sites were included so that the data set would be as complete as possible.

Archaeological assessment data is complete up to and including the 2006 permit year. At the time of this project not all 2006 permit reports had been submitted to the Archaeology Branch but we contacted all archaeological consultants who conducted permitted archaeological work within the Quesnel Forest District and they kindly supplied us with the necessary information.

Data on cultural heritage resource sites are as current as the permit reports from which the data were compiled.

Heritage trail data are current to March 31, 2007. All maps containing trails that were obtained during the archival research component of the project have been mapped and are included in the trail layer. However, we are still awaiting delivery of microfiche copies ordered from the archives and were not in receipt of these items prior to the project deadline. As a result, there are trails that will need to be added to the trail layer at some time in the future.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2.0 BACKGROUND AND PROJECT AREA

2.1 The Study Area

The study area encompasses the entire Quesnel Forest District (Map 1). The Quesnel Forest District represents a land base of approximately 2,075,876 hectares.

2.2 Biophysical Characteristics

Ecological diversity and natural resource distribution played an important role in past human settlement patterns, subsistence orientations, seasonal rounds, and many other aspects of life. These important environmental variables changed through time with shifts in climate and through direct human intervention with the landscape (e.g., cultural burning). Although it is difficult to study rapid, short duration environmental changes, large scale, long term shifts in climate and vegetation are visible in the palaeoecological record. This section describes the physiography, climate, and ecology of the Quesnel Forest District. A summary of modern conditions is followed by a discussion of how these variables have changed through time.

Quesnel Forest District occupies the Interior Plateau physiographic region of central interior British Columbia. This region is characterized by an old, subdued relief landscape that is capped by thick deposits of glacial till (Pojar and Meidinger 1991). The forest district encompasses eight biogeoclimatic zones including; localized areas of Interior Cedar-Hemlock in the wet eastern portion; large tracts of Sub-Boreal Spruce throughout the Fraser Plateau and Fraser Basin; vast expanses of Sub-Boreal Pine-Spruce in the dry western reaches of the district; the Montane Spruce Zone in cool uplands across the Fraser Plateau; Interior Douglas-Fir in the warm southern valleys; the Engelmann Spruce – Subalpine Fir Zone in highland locations in the eastern and western portions of the Quesnel Forest District; and the Boreal Altai Fescue Alpine and Interior Mountain-Heather Alpine at high mountain elevations in the eastern and southwest portions. This ecological diversity results mainly from differential elevation and the orographic effects and climatic regimes of the Coast Mountains in the west and the Rocky Mountains in the east. Brief synopses of the biogeoclimatic zones are presented in order of the percentage of land area that each zone occupies within the Quesnel Forest District.

Biogeoclimatic Zones

Sub-Boreal Pine-Spruce (SBPS)

This biogeoclimatic zone covers portions of the rolling, high elevation Fraser and Nechako Plateaus at elevations ranging from 914 to 1219 m above sea level (asl) (Steen and Demarchi 1991). This zone dominates the Fraser River drainage system with its major tributary rivers the Blackwater River and the Chilcotin River. Climate is continental with cold, dry winters and cool, dry summers. Mean annual temperature ranges from 0.4 to 2.5° C while mean annual

precipitation is between 335 and 580 mm, with 30 to 50% falling in the winter as snow. This zone has a restricted range of tree species, with lodgepole pine and white spruce being the only two common types.

Sub-Boreal Spruce (SBS)

This biogeoclimatic zone covers parts of the rolling terrain of the Nechako Plateau, Fraser Plateau, and Fraser River Basin at elevations ranging from 488 to 1245 m asl (Meidinger *et al*. 1991). Climate is continental with harsh, snowy winters and warm, damp, short summers. Mean annual temperature ranges from 1.7 to 5° C while mean annual precipitation is between 439 and 1588 mm, with 25 to 50% falling in the winter as snow. This zone has a relatively high diversity of tree species. White spruce and subalpine fir are climax species, while lodgepole pine, Douglas-fir, paper birch, and trembling aspen occur during the seral stages of forest succession.

Montane Spruce (MS)

The Montane Spruce zone covers portions of the cool uplands near the northern limit of the Fraser Plateau at an elevation ranging from 1100 to 1500 m asl (Hope *et al*. 1991). The MS zone occurs in areas with a cool, continental climate that includes long, cold winters and warm, short summers. Precipitation is regionally variable within the Montane Spruce zone and ranges from 380 to 900 mm. The mean annual temperature is 0.5-4.7°C. Vegetation is heavily influenced by fire regimes and the dominant species include lodgepole pine, hybrid white spruce, and subalpine fir. The Montane Spruce zone occurs at elevations between the Engelmann Spruce – Subapline Fir Zone at higher elevations and the Interior Douglas Fir Zone at lower elevations. The MS zone contains unique combinations of vegetation species from each zone.

Engelmann Spruce - Subalpine Fir (ESSF)

This biogeoclimatic zone is widespread in southern British Columbia in steep, mountainous areas and in high plateau areas, at elevations ranging from 900 to 2300 m asl (Coupé *et al*. 1991). Climate is continental with long, cold winters and cool, short summers. Mean annual temperature ranges from –2 to 2°C while mean annual precipitation is highly variable by region, being between 400 and 2200 mm, with 50 to 70% falling in the winter as snow. This zone is the highest forested region in much of British Columbia. At high elevation if orms subalpine parkland located just below the Alpine Tundra zone. Engelmann spruce and subalpine fir are climax species, while lodgepole pine commonly occurs during the seral stages of forest succession.

Interior Cedar – Hemlock (ICH)

This biogeoclimatic zone is confined to the mountainous portions of southeastern British Columbia, at elevations between 400 and 1500 m, as well as to the west central part of the province, at elevations between 100 and 1000 m (Ketcheson *et al*. 1991). Climate in this zone is continental with cool, wet winters and warm, dry summers. Mean annual temperature ranges from 2 to 8.7°C while mean annual precipitation is 500 to 1200 mm, with 25 to 50% falling in the winter as snow. This zone has a high diversity of tree species. Climax stands consist predominantly of western red cedar and western hemlock but a variety of spruce species, grand fir, and subalpine fir are present in smaller numbers. Seral species vary widely with geography.

Interior Douglas Fir (IDF)

The Interior Douglas-Fir zone covers parts of the rolling hills and valley terrain of the Southern Interior Plateau at elevations ranging from 350 to 1450 m asl (Hope *et al*. 1991). Climate is continental with cool winters and warm, dry summers. Mean annual temperature ranges from 1.6 to 9.5 °C while mean annual precipitation ranges between 300 and 750 mm, with 25 to 50% falling in the winter as snow. This zone is often characterized by open canopy forests of lodgepole pine and Douglas-fir. Douglas-fir and Ponderosa pine appear as climax species while lodgepole pine, trembling aspen, and white spruce occur during seral stages of forest succession.

Alpine Tundra (AT)

The Alpine Tundra zone is confined to the high mountains in the western and far southeast portion of the Quesnel Forest District at elevations above approximately 2000 m (Pojar and Stewart 1991). This zone is characterized by windy and cold conditions with mean annual temperatures ranging from –4 to 0°C. The majority of precipitation falls as snow (70-80%) with an average annual range of 700 – 3000 mm. Upper reaches of the Alpine Tundra zone are treeless but the lower reaches contain subalpine fir, Engelmann Spruce, white spruce, mountain hemlock, and whitebark pine. A variety of shrubs, herbs, and lichens are found in this zone but much of the Alpine Tundra lacks vegetation. This zone has recently been separated into three discrete zones with two being present in the Quesnel Forest District: Boreal Altai Fescue Alpine and Interior Mountain-Heather Alpine.

Palaeoecology

Extensive glacial ice sheets over Central Interior British Columbia began receding by 12,000 years ago (Hodder *et al*. 2006) and by 9,500 years ago glaciers were no more extensive than they are today (Ryder and Clague 1989). Following deglaciation, regional climate and vegetation went through a number of transitional stages before reaching their modern

configurations. Hebda (1995) describes the Northern Interior Plateau as a transitional area prone to biotic shifts during slight changes in climate. For instance, under warmer, drier conditions the Interior Douglas Fir Zone could advance northward, while during cooler, drier times the Montane Spruce Zone or Engelmann Spruce-Subalpine Fir Zone could expand down slope and occupy larger portions of the Central Interior.

Palaeoecological information for the Quesnel Forest District comes from Pantage Lake (Hebda 1995), located 46 km northwest of Quesnel, and Fishpot Lake (Souther, Clague and Mathewes 1987), located 87 km west of Quesnel. Between 9,200 and 7,000 years ago vegetation appears to have been more open than at present, based on the large influx of pollen from grasses (*Poaceae*). Temperatures in this period were considerably higher than today, with a gradual cooling trend after 7,000 years ago. Increasing forestation between 8,000 and 7,000 years ago suggests a rise in moisture levels, which then stabilized and persisted throughout the Holocene. At around 5,000 years ago, a pronounced shift occurred with spruce becoming dominant over pine as the most common tree taxon. This change may signal a shift from an environment analogous to the SBPS to one more like the SBS conditions predominant at Pantage Lake today.

2.3 Ethnography

The study area falls within the traditional territories of twelve First Nations groups. Members of the Nazko First Nation, Lhtako Dene Nation, Saik'uz First Nation, Lhoosk'uz Dene Nation, Lheidli-Tenneh First Nation, and Ulkatcho First Nations, and Skin Tyee Nation are Carrier (**Dakelh**). Xats'ull (Soda Creek) First Nation and T'exelc First Nation (Williams Lake) are Shuswap (**Secwepemc**) while members of the Alexandria Indian Band (Esdilagh), Anaham Indian Band (Tl'etinqox-T'in), and Alexis Creek Indian Band (Tsi Del Del) are Chilcotin (**Tsilhqot'in**). Below are brief summaries of Dakelh, Secwepemc and Tsilhqot'in ethnographic patterns with discussions regarding how they may have conditioned the archaeological record in the Quesnel Forest District.

Carrier (Dakelh) Ethnography

The following brief review of Dakelh (Carrier) ethnography is taken from a number of sources including: Borden (1951, 1952), Cassidy & Cassidy (1980), Clark-Giesbrecht (1994), Cole and Lockner (1989), Duff (1952), Hudson (1983), Lamb (1970), Morice (1978), and Tobey (1981). Emphasis has been placed on material culture, seasonal round and subsistence strategies as they relate to activities that are most likely to have left physical evidence of past human use.

The Dakelh seasonal subsistence round involved the summer / fall aggregation of the group at selected fishing camps chosen for the availability of migrating salmon. Salmon runs varied considerably throughout Dakelh territories and required some groups to travel further than others. Nevertheless, reliance on this important food resource is characteristic of all groups in the region. Settlement near these locations involved several families who used the same fishing location each year. Berry gathering and preservation was also carried out at this time of year. A variety of berries were available and constituted an important food source. The winter and spring saw a dispersal of the group as food stores required additions or replenishment. Game and fresh water fish were now sought, usually at nearby lakes and streams and in the surrounding forests. Caribou, elk, moose, deer, goat and bear were among the large game animals taken. People also hunted groundhog (marmot), beaver, muskrat, lynx, and rabbit. These animals were hunted for furs and food. Late spring was the time when pine cambium was collected for an additional and sometimes necessary food source. Cambium collection creates identifiable scars on pine trees, where the bark has been stripped away in order to scrape the cambium from the tree for consumption. Evidence of tool marks on the scar, or on the bark surrounding the scar, are definite determiners of the cultural origin of the scar. This practice of cambium collection for a food source persisted well into the 1900s.

The Dakelh built a variety of above ground house types in addition to semi-subterranean dwellings (Morice 1978; Harmon 1957). These included summer and winter lodges, ceremonial lodges for feasting, fishing lodges and structures used for rites of passage. The largest of these, the ceremonial lodge, measured approximately 10 m by 15 m. The framework for the ceremonial lodge consisted of four corner posts and included a gabled roof. No excavation was required for a main foundation and evidence of postholes and central hearths are the primary features most likely to be found archaeologically for such structures. Remains of semi-subterranean pithouses are more commonly found in the archaeological record. These varied in size but averaged 7 m in width by 1 m in depth. These dwellings were constructed with log supporting beams to hold up the roof, which contained the entrance. The roof was covered with small logs, bark and earth. Small villages usually were composed of one to three or more house clusters. Daniel Harmon (1957) summarized Dakelh pithouse construction in this way:

> During the winter months many of the Carriers make their dwellings in the earth, in the following manner. They dig a hole in the ground to the depth of about two feet, from the opposite sides of which, they erect two considerable sticks, to support a ridge-pole. They then lay poles from the margin of the hole to the ridge-pole, until they have completely enclosed the dwelling, excepting a hole which is left near the top, which serves the double purpose of a door by which they enter, and leave the hut, upon an upright post, in which, notches are cut; and an opening for the smoke to pass off. The poles are made tight, by stopping the interstices with hay, or by covering them with bark; and dirt is then thrown over them, to a considerable thickness.

Food storage was accomplished through the use of cache pits. These were small circular holes dug into the ground, often along hunting trails, close to berry patches or in large numbers near village sites. The preferred location for cache pits was usually in easily excavated soils (sands, silts, loam, fine gravels). The pits were used for food storage and sometimes they were placed near distinctive trees or other physical features that could be easily relocated. The food was generally dried or smoked then placed into the pits layered between pieces of bark and covered with brush and earth until needed. Archaeologically, cache pits may be identified by small circular depressions varying in size and depth but averaging 1 to 2 meters in diameter and about 50 cm in depth. In historic times, the use of above ground caches was noted but this is thought to be a recent innovation (Morice 1978).

A wide variety of implements were used for hunting, fishing, and plant food gathering. Stone tools (projectile points, knives, scrapers, and flaking debris) are implements commonly recovered in archaeological contexts. During ethnographic and historic times, many kinds of traps, snares, and hunting blinds were used. Salmon was a heavily relied upon resource so many of these items were designed to aid in the procurement of fish stores for the winter season. Large weirs built across the mouths of lakes and rivers were used to catch salmon in slow moving currents. Where water was deeper and the currents were faster flowing, as is the case in major rivers, movable latticework traps were constructed along the shorelines. These were used in conjunction with basket traps at the top of narrow waterfalls where the migrating salmon could be caught as they attempted to jump the falls. Dip nets, leisters, and harpoons were used from rocky outcrops overlooking rapids where salmon gathered in large numbers. Many tools were made of wood, bark, and bone. Since the preservative qualities of these materials are poor, objects made of them are not commonly found in the archaeological record.

Shuswap (Secwepemc) Ethnography

The Xats'ull First Nation and the T'exelc First Nation are associated with the Secwepemc (Shuswap). The traditional territory of the Shuswap is broken down into seven divisions based on regional, cultural and social units. Specifically we will look at the Fraser River Division who occupied lands along the Fraser River and "…north of the head of the Fraser River…" according to Teit (1909:462).

The Secwepemc are members of the Interior Salish subgroup of the Salish language family, whose speakers occupy much of southern interior and coastal British Columbia. The following summary of Secwepemc ethnography is based on a number of primary sources, such as Boas (1891), Curtis (1911), Dawson (1891), Ray (1939), and Teit (1909, 1930) as well as recent syntheses from Alexander (1996, 1997) and Ignace (1998), who provided accounts of Secwepemc land use patterns and subsistence practices

The Secwepemc are characterized as a band level society with groups of related families forming the local band. Each band possessed territory that was shared equally among its members, except in the case of special inherited hunting, fishing, or gathering grounds, for which individuals controlled access. Each band occupied a major winter village. Decision-making within the band was a communal activity but leaders and spokespeople were often selected to represent households. Inter-tribal marriages were used to promote trade relations as well as expand hunting territories.

Winter villages were generally occupied from November to April, during which time people subsisted on stored foods, such as dried or smoked salmon, roots, berries, and meat, supplemented by fresh game. These villages were generally composed of numerous semi-subterranean pithouses and were usually located on flat terraces adjacent to the Fraser or other large rivers and lakes. Pithouses were built as described earlier but the main difference was in the scale of these constructions. Shuswap pithouses were large and more numerous, owing to the higher degree of sedentism allowed by the greater availability of storable food resources. Circular cedar bark lodges were also used at times in the winter. They were constructed over shallow pits in hollows that allowed some protection from the wind (Kennedy and Bouchard in Alexander, 1997).

Ice fishing on lakes occurred between early December and March (while the ice was thin enough to bore holes, but thick enough to support a person) in the Shuswap tradition as well. Individual men and women were observed ice fishing on day trips away from the winter village, most likely they set up small shelters over the holes in the ice while they were on the lake (Alexander 1997).

In the spring, people moved from the village to more temporary camps at resource gathering areas. Roots, tree cambium, and migrating waterfowl were some of the first food resources to become available. Trout fishing was also a major factor in the Fraser River Division's yearly subsistence pattern. Ignace (1998:206-207) has noted "large quantities of cutthroat and rainbow trout were caught with scoop nets at the outlets of manly lakes in the plateau between the Fraser and North Thompson rivers. This lake fishery, carried out from the time the first lakes were ice free in late March and continuing until late May, provided the first large harvests of fresh fish after the winter." During this time, and for the rest of the warm parts of the year, people occupied mat lodges constructed using an A-frame of poles covered with grass or reed mats, bark, or hide.

As summer approached a greater variety of foods became available and people moved to important resource gathering areas. Horses became an important mode of transportation, and as such, meadows and grassland areas became important for feed. Summer activities included the gathering of early berries, roots, and hunting and fishing. Salmon arrived in large numbers in August and became the focus of communal fishing efforts. Salmon was caught and eaten fresh,

was smoked and/or dried, and roe and oil were prepared for consumption. Late summer and early autumn were also important times for collecting berries and roots, and for hunting. Resources peaked in abundance and group activities were focused on obtaining and preserving enough food supplies for the impending winter season.

The Secwepemc made extensive use of fish traps, fences, weirs, and nets to obtain salmon. A reliance on plant resources also characterized Secwepemc subsistence. Some important root crops included balsam root (*Balsamorhiza sagittata*), cinquefoil (*Potentilla anserina*), wild onion (*Allium cernuum*), spring beauty (*Claytonia sessifolia*), dog-tooth violet (*Erythronium giganteum*), and camass (*Camassia esculenta*), among others. Root gathering involved the use of digging sticks and many root crops were roasted in pits that are often found in the archaeological record.

Chilcotin (Tsilqot'in) Ethnography

The following brief review of Tsilqot'in ethnography is taken from sources that include: Alexander (1996, 1997), Lane (1981). Emphasis has been placed on material culture, seasonal round and subsistence strategies as they relate to activities that are most likely to have left physical evidence of past human use. To avoid repetition, aspects of technology and seasonal round similar to those discussed above for the Carrier and Shuswap are not repeated here.

The Tsilqot'in are members of the Athapaskan language family. Ethnographically, Chilcotin society was organized into groups of families related through marriage and descent. The primary unit was the band, which functioned as a single unit. The Tsilqot'in camped together in villages during the winter months but the group divided in the spring, summer and fall months to hunt, fish, gather and trade as food stores required additions or replenishment.

Salmon runs varied considerably throughout Tsilhqot'in territories and required some groups to travel further than others to access this important resource. Settlement near fishing locations involved several families who used the same fishing location each year. Other than salmon (kokanee and sockeye), trout, whitefish and suckers were also caught. Fishing was usually achieved during spawning with the use of weirs placed in shallows of lakes and streams or with the use of gill nets.

Winter was usually spent near lakes where subsistence activities could concentrate on ice fishing, trapping and some hunting. After the spring thaw, fish, root crops and new plants provided important food sources, particularly during the spring floods that often prevented extensive travel for hunting. Late spring was also the time when pine cambium was collected for an additional and sometimes necessary food source. As May approached, groups dispersed again to hunt, gather plants, fish and pick berries as they became available. Hunting would often intensify in May and June. Some groups moved to the mountains in late June to hunt and collect

berries. A variety of berries (see Alexander 1996 for comprehensive list) became available in the summer and constituted an important food source at this time. Caribou were hunted in the forests to the northwest and in the mountains. In the middle of July the sockeye salmon started to spawn and people moved to fishing camps. At the end of the salmon run groups dispersed again to hunt and gather in preparation for the winter months. Some groups moved back to the mountains and would follow the game as it migrated to the lakes in the fall. Those who had returned to the lakes for fresh water fishing would often be waiting at ambush sites along the way. These ambush sites included game fences and traps set along game trails.

Many variables may have altered the seasonal round including: band location, relationships with neighbouring groups, individual needs and interests, weather and fish stocks. Caribou, elk, moose, deer, goat and bear were among the large game animals taken. People also hunted groundhog (marmot), beaver, muskrat, lynx, and rabbit. These animals were hunted for furs and food.

Historical records show that the Chilcotin wintered in pithouses like those described above. However, rectangular houses with a gabled roof were more prominent during the ethnographic period. These dwellings had ridge poles connected to end poles that supported the rafters and horizontal roof poles. Openings in the roof allowed smoke to escape. Summer camp structures consisted of bark, bough or mat shelters.

Food storage was accomplished through the use of cache pits, more temporary pole structures, as well as tree storage. Cache pits were small circular holes dug into the ground, often along hunting trails, close to berry patches or in large numbers near village sites. Dried fish, roots, meat and berries were stored in these pits at winter villages.

A wide variety of implements were used for hunting, fishing, and plant gathering. Stone tools (projectile points, knives, scrapers, and flaking debris) are implements commonly recovered in archaeological contexts. Please see above for general descriptions.

3.0 PREVIOUS ARCHAEOLOGICAL RESEARCH

The earliest archaeological research in the central interior was conducted by Borden in the 1950s, most notably at the Chinlac Site (GaSu-1) at the confluence of the Stuart and Nechako Rivers. Other early archaeological projects included surveys of the Fraser River (Duff 1952; Sneed 1970; Montgomery 1979), the West Road (Blackwater) River (Helmer 1975; Helmer and Wilson 1975); and excavations at Punchaw Lake (Fladmark 1976; Montgomery 1978). The first archaeological projects in the region to be motivated by cultural resource management considerations were conducted at Dragon Lake in the late 1970s (Brandon and Irvine 1979; German 1978; Lawhead 1980; Thomas 1977).

The vast majority of projects conducted within the study area, however, have mostly been prompted by the requirement for forest developers to conduct archaeological impact assessments (starting in 1995 under the *Forest Practices Code*, Section 17; Ministry of Forests 1995), or were large scale inventory studies conducted in the 1970s. Throughout the 1970s and 1980s various archaeological impact assessment surveys were conducted in the study area at the request of the Heritage Conservation Branch (Archaeology Division). These assessments were typically in response to referrals submitted to the Branch by various governmental land use and planning agencies.

Previous archaeological research in the study area falls into three main categories: archaeological overview assessments (AOAs), preliminary field reconnaissance surveys (PFRs), archaeological impact assessments (AIAs), and archaeological inventory studies (AISs). Other research projects that include the study area include regional overview assessments (Bussey and Alexander 1992), cultural heritage overviews (Alexander 1997), data gap analyses (Equinox 1997), and a GIS model of archaeological potential for the Quesnel Forest District (Arcas 1998).

Prior to the creation of an archaeological overview model for the forest district, site-specific archaeological overview assessments of forest development plans were conducted (Will and Rousseau 1995, Equinox and Arcas 1996). These studies included and summarized previous archaeological survey in the area and recommended surveys of areas with the greatest archaeological potential. Data gap analyses summarize previous archaeological survey, often with the aim of determining the amount of existing archaeological survey data that could be used for the development of archaeological predictive models. The GIS based predictive model for the Quesnel Forest District (Arcas 1998) examined archaeological site locations and previously surveyed areas and integrated biophysical (biogeoclimatic zone, hydrology, slope, elevation etc.) and ethnographic and historic variables to create four different archaeological potential classes for land area in the Quesnel Forest District.

Archaeological and cultural resource overviews for the Cariboo Forest Region have been completed by Bussey and Alexander (1992) and Alexander (1997). These comprehensive studies contain information on settlement and migration patterns, traditional activities, and

culturally significant natural resources. Ethnographic land use patterns and archaeological data were examined in relation to resource potential across the Cariboo Forest Region. Palaeoenvironmental and historic data were utilized to reconstruct subsistence strategies and land use. The results of these studies are important for understanding archaeological potential and site distribution within the Cariboo Forest Region. While integral to understanding archeological and cultural heritage potential, these studies are broad in scope and difficult to apply to specific development areas. Furthermore, the lack of direct ethnographic information for the study area necessitates the use of ethnographic analogies from neighbouring regions. Very little ethnographic information was available for the study area at the time of those studies; a situation that persists today.

Some of the earliest archaeological overview assessments in the Quesnel Forest District related to consolidated development plans and were undertaken in 1991 (Rousseau 1991) and 1994 (Merchant et al. 1994). Rousseau assessed a number of proposed timber harvesting blocks scheduled for development in the following five years. Site specific assignments of archaeological potential were based on a number of criteria including slope, vegetation cover, mobility, distance to significant resources (water, game, and plants), and proximity to previously recorded prehistoric and historic sites. Merchant et al. (1994) created a more encompassing predictive model applicable to a large area included within a Tree Farm License scheduled for development over the next five years. Predictions of heritage resource potential were based on a judgemental assessment of slope, aspect, proximity to water, proximity to prehistoric trails, ethnographic information, documented historic activities, and personal interviews.

Antiquus Archaeological Consultants Ltd. conducted an archaeological/heritage resource overview of the Quesnel Forest District in 1995. The initial stage of the resource overview involved plotting historic and prehistoric sites on to NTS and BCGS maps. Additional variables that contributed to the assessment of archaeological potential included proximity to hydrological resources, availability of open land (for camping, gathering plants, and hunting grazing ungulates), proximity to known traditional or historic Native camp sites or trails, and proximity to local events and activities. Individual timber harvesting areas were then assigned value ratings of archaeological potential after site specific assessments.

In 1996, Antiquus Archaeological Consultants Ltd. and Arcas Consulting Archaeologists Ltd. created a comprehensive predictive model for the Chilcotin Forest District, which borders the southwest portion of the Quesnel Forest District. Archaeological potential classes were ascribed to areas based on proximity to various classes of hydrological features, proximity to glacial landforms, and slope. Variables were weighted and buffer zones were defined around significant environmental and geographic features. Over 780 development areas were then assessed and the predictive model was reviewed.

In 1997, Equinox (1997) conducted a review of previous survey work in the Quesnel Forest District during a data gap analysis conducted for thirty-four forest districts. The aim was to determine the amount of existing archaeological survey data available for the development of archaeological predictive models applicable to entire forest districts. It was recommended that survey coverage of at least 1% land area be completed in each biogeoclimatic zone in the Quesnel Forest District to strengthen regional representation in the data. Of relevance here, Equinox found that the Interior Cedar - Hemlock zone and the Sub-Boreal Spruce zone were underrepresented in the district. In recommending additional coverage, the ICH was rated as a top priority, with the SBS following as a second priority. Other recommendations of the study included conducting further intensive survey in areas located more than 4 km from major rivers and lakeshores. The importance of amassing negative survey data and environmental correlates was also emphasized as a necessary step towards the creation of robust predictive models.

In 1997, Arcas undertook a comprehensive review of previous archaeological research in the forest district during the construction of the "GIS Modelling of Archaeological Potential: Quesnel Forest District" (QFD AOA; Arcas 1998). This model aimed to use a GIS based predictive model for the Quesnel Forest District that integrated biophysical (biogeoclimatic zone, hydrology, slope, elevation etc.), ethnographic, and historic variables in the creation of four different archaeological potential classes for the Quesnel Forest District. These classes are illustrated as buffer zones on overview maps. This undertaking also examined archaeological site locations and previously surveyed blocks. While one of the goals of the present study is to investigate the overall effectiveness of the GIS model within the study area, it is not deemed necessary to describe the model further for purposes here. Of note here are the data gaps identified and recommendations made in the QFD AOA (Arcas 1998, Sections 3.6 and 4.4, Volume 1). The QFD AOA report notes a lack of ethnographic, archaeological site, and accurate wildlife and stream class information, and recommends incorporating the following: new digital information, the results of AIAs, AOAs, and AISs, and data gathered from ground-truthing of biophysical features used in the model.

A detailed list of Heritage Inspection Permits (HIPs) issued by the Archaeology Branch that pertain to archaeological work conducted in the study area is located in Appendix B.

4.0 METHODOLOGY

Readers are referred to the report for the recently completed archaeological data inventory of the Quesnel Forest District (Heffner 2007) for information on the sources consulted and the methodology utilized while compiling the archaeological information that serves as the basis for the syntheses provided in the following sections.

5.0 ARCHAEOLOGICAL DATA AND GAP ANALYSIS

5.1 Existing Archaeological Site Database

As numerous archaeological sites are recorded over a large, geographically diverse area, it becomes necessary to store the information in a systematic and organized format. For archaeological data to be useful it must be easy to access and query. A well-planned and efficient data storage process facilitates successful research projects and cultural resource management studies. As a result, the archaeological record is better protected and a clearer understanding of the past is achieved. With these goals in mind the Archaeology Branch requires that archaeological sites be systematically recorded and coded into nine basic types (described below). For further details regarding site typology please refer to the *Archaeological Impact Assessment Guidelines* (Apland and Kenny 1998) and Appendix A of the *British Columbia Archaeological Site Inventory Form Guide* (Province of British Columbia 2006).

There are nine basic archaeological site types, each with subtype and descriptive categories to further refine the classification. These are described below.

Archaeological Site Typology

1. Ceremonial/Religious Feature: Painted, pecked, incised or carved designs on a rock, rock face or pole.
    Subtype
    Rock art or monument pole
        Descriptor
        Pictograph, petroglyph, crest pole, memorial pole, mortuary pole, pole

2. Cultural Material: A surface or subsurface occurrence of cultural or natural materials occurring as a by-product of human activity.
    Subtype
    Surface or subsurface
        Descriptor
        Faunal, floral, firebroken rock, lithics, plant fibre, quarry, shell midden, wet site, wood

3. Culturally Modified Tree: A tree that has been modified by cultural use.
    Subtype
    Aboriginally-logged, bark stripped, other modified tree
        Descriptor
        Canoe, barberchair stump, basin stump, felled, flat stump, log, notched, planked, undercut, sectioned, step stump, stump, tested, cambium stripped, girdled scar, large rectangular scar, other scar, tapered scar, arbourglyph, arbourgraph, blazed, burned, delimbed, kindling collection, knotted tree, marker, message, pitch collection, sap collection, totem pole

4. Earthwork Feature: A special purpose cultural feature, archaeologically manifested in earth mounding or other modification of earth surfaces.
        Descriptor
        Fortification, mound, trench embankment

5. Habitation Feature: A physical feature of cultural or natural origin utilized on a temporary or permanent basis for shelter or other significant social or ceremonial activity.

Subtype
Cultural depression

Descriptor
Housepit, mat lodge, menstrual lodge, plank house, sweat lodge; cave house, post mould, platform, refuge, rock shelter

6. Human Remains: The internment or other disposition of human remains.

Subtype
Petroform

Descriptor
Burial cairn; burial, burial box, cave, grave goods, grave house, ledge, platform, rock shelter, scattered, stone ring, talus, tree

7. Subsistence Feature: A cultural feature related to the collection, processing, or storage of food.

Subtype
Land mammal hunting, sea mammal, shellfish harvesting

Descriptor
Cache pit, roasting pit, steaming pit, hearth, bird hunting blind, bird net feature, fish drying rack, fishing weir, fish net stone feature, fish smokehouse, fish smoking rack, fish trap, trap drive, fence, surround, clamming station, clam garden

8. Transportation Feature: A linear modification of the earth's surface used for human travel from one geographic location to another, or transportation of watercraft.

Subtype
Petroform

Descriptor
Trail, canoe skid

9. Other Feature: A cultural feature not included in the previous subtypes or descriptors listed, or a culturally modified petroform such as a boulder alignment or cairn.

Subtype
Cultural depression, petroform

Descriptor
Functioned unassigned, boulder alignment, cairn

Current Archaeological Site Database in Quesnel Forest District

To date, 1262 prehistoric (pre-1846) archaeological sites have been recorded in the Quesnel Forest District. The most common types of sites are those containing subsistence features (e.g., cache pits) or cultural material (e.g., lithic scatters). Most sites contain only one type of archaeological resource but numerous sites consist of more than one type. The following tables (Tables 1, 2, and 3) summarize the archaeological sites and types of archaeological resources located within the Quesnel Forest District. The four pre-1846 trails recorded as archaeological sites are summarized elsewhere in this report and therefore the site total in the following tables is 1258.

Table 1 summarizes all documented archaeological resource types manifested in the Quesnel Forest District. Resource type refers to the archaeological materials or features found at each of the 1258 sites located within the forest district and not to individual sites. More than one resource type may be present at a single site. The frequencies in this table represent the number of times an archaeological resource type occurs in the current site database.

Table 1: Summary of Archaeological Resource Types in the QFD.

Site Types	N	Subtype	N	Descriptor	N
Ceremonial/Religious Feature	1	Rock Art	1	Pictograph	1
Cultural Material	1002	Subsurface	376	Lithics	364
				Firebroken Rock	3
				Faunal	7
				Shell Midden	2
		Surface	626	Lithics	623
				Firebroken Rock	2
				Quarry	1
Culturally Modified Tree	15	Bark Stripped	15	Cambium Stripped	15
Habitation Feature	42	Cultural Depression	40	Housepit	39
				Mat Lodge	1
		N/A	2	Platform	2
Human Remains	10	N/A	10	Burial	10
Subsistence Feature	288	Cultural Depression	280	Cache Pit	274
				Roasting pit	6
		Fishing	7	Fish Trap	2
				Fishing Weir	5
		N/A	1	Hearth	1
Other Feature	67	Cultural Depression	67	Function Unassigned	67
Total	**1425**	**Total**	**1425**	**Total**	**1425**

Table 2 summarizes all documented archaeological sites in the QFD that contain only one archaeological resource type and are referred to here as *single component* archaeological sites. The site types follow the site typology outlined earlier in this section

Table 3 summarizes all documented archaeological sites in the QFD that contain more than one archaeological resource type and are referred to here as *multiple component* archaeological sites. For this table we have organized the sites into what we feel are meaningful categories based on common associations and these are defined in the table.

Table 2: Summary of Single Component Archaeological Sites in the QFD.

Site Types	N	Subtype	N	Descriptor	N
Ceremonial/Religious Feature	1	Rock Art	1	Pictograph	1
Cultural Material	893	Subsurface	343	Lithics	340
				Firebroken Rock	2
				Faunal	1
		Surface	550	Lithics	548
				Firebroken Rock	1
				Quarry	1
Culturally Modified Tree	15	Bark stripped	15	Cambium Stripped	15
Habitation Feature	16	Cultural Depression	16	Housepit	16
Human Remains	2	N/A	2	Burial	2
Subsistence Feature	170	Cultural Depression	167	Cache Pit	165
				Roasting pit	2
		Fishing	3	Fish Trap	2
				Fishing Weir	1
Other Feature	22	Cultural Depression	22	Function Unassigned	22
Total	**1119**	**Total**	**1119**	**Total**	**1119**

Table 3: Summary of Multiple Component Archaeological Sites in the QFD.

Multicomponent Site Types	Included Types, Subtypes and Descriptors	N
Habitation Complex	All sites that contain Habitation Features (housepits, platforms, or mat lodges) as well as Subsistence Features (cache pits, roasting pits, hearths, fish weirs, etc.), or Other Features, or Cultural Material (lithics, faunal, shell midden, fire broken rock, etc.), or Human Remains.	26
Human Remains	All sites that contain Human Remains as well as Subsistence Features (cache pits, roasting pits, hearths, fish weirs, etc.), or Other Features, or Cultural Material (lithics, faunal, shell midden, fire broken rock, etc.), but not Habitation Features.	6
Cultural Material and Subsistence Complex	All sites that contain Subsistence Features (cache pits, roasting pits, hearths, fish weirs, etc.) as well as Cultural Material (lithics, faunal, shell midden, fire broken rock, etc.), or Other Features, but not Habitation Features or Human Remains.	81
Cultural Material Complex	All sites that contain more than one category of Cultural Material (lithics, faunal, shell midden, fire broken rock, etc.) but not Habitation Features, Human Remains, Subsistence Features, or Other Features.	6
Subsistence Feature Complex	All sites that contain more than one category of Subsistence Feature (cache pits, roasting pits, hearths, fish weirs, etc.) or Other Feature, but not Habitation Features, Human Remains, or Cultural Material.	20
Total		**139**

5.2 Existing Archaeological Survey Coverage

Approximately 5.38% (111,496 ha of 2,072,632 ha; 2952 development areas) of the study area has been surveyed during an archaeological impact assessment or preliminary field reconnaissance survey (Map 2). A total of 1258 archaeological sites have been recorded in the forest district (Map 3). Of these 1258 sites, approximately 60% were recorded during the large scale archaeological inventory projects of the 1970s and 1980s and the remaining 40% were recorded during archaeological impact assessments. The archaeological site database is dominated by cultural material sites (~70%). The frequency of certain site types may be a result of survey biases, and may not be representative of the overall archaeological record. The following sections describe the current site inventory and discuss some biases that are inherent in the different methods of data collection.

Archaeological Sites Found During Inventory Studies

The value of archaeological inventory studies for contributing to the archaeological database is well demonstrated by the fact that those surveys account for the discovery of over half of the sites that have been recorded to date in the study area, yet represent a fraction of the fieldwork.

Although archaeological inventory studies have contributed significant archaeological information to the current database they have also introduced considerable bias. Inventory fieldwork was mainly restricted to high potential areas with good archaeological visibility (e.g., Fraser River, Blackwater River and its major tributaries, large lakes) and nearly all of the inventory fieldwork occurred on the western plateau portions of the study area. Archaeological sites located during inventories are usually identified on the basis of surface inspection and rarely is subsurface testing employed to define site boundaries. As a result, multiple sites are often recorded in close proximity that may actually represent a single, large site. This is unlike impact assessments where subsurface testing is regularly employed to determine site boundaries. The number of sites recorded during inventory studies is thus artificially inflated and affects our impression of site density and distribution.

Archaeological inventories are a powerful tool for database building but they must be planned carefully and used effectively in order to contribute the kind of information that is currently lacking. The biases introduced by past inventories must be considered in any analysis of archaeological data in the study area.

Archaeological Sites Found During Impact Assessments

Prior to any discussion regarding these preliminary results of impact assessment survey coverage, it is important to note some of the difficulties and biases inherent in the data. Sample

sizes and design are worthy of consideration when using the results of AIA surveys and caution must be taken in any analysis. For example, blocks and boundary locations are ultimately determined by forestry considerations (e.g., timber value, feasibility and practicality for harvest) and archaeological survey locations for proposed forest developments do not represent a random sample. While block boundaries are often placed along natural divisions in the topography (i.e., terrace edges, ridge features), and therefore often coincide with archaeological site locations, riparian, and other forestry related issues also influence the extent of archaeological surveys. Additionally, forestry development areas are generally located some distance from major valleys and population centers and tend to be associated with a higher number of smaller hydrological features than would be expected by a random sample of the landscape.

Caution is warranted when reviewing the quality and intensity of survey results (i.e., detail of reporting, amount of survey coverage and level of survey: subsurface vs. surface inspection and/or AIA vs. PFR). Differences in methodology employed during impact assessments, are determined by professional judgement and not all consulting companies, or individual archaeologists, will perform the same survey in a given area. Heavy ground vegetation cover, such as is present in portions of the study area, alone can produce a large bias in the results. Unfortunately, it was not possible to reconstruct the intensity of the surveys performed in the study area as not all reports, particularly earlier ones, mention why an area was chosen for subsurface testing, where this testing occurred and sometimes even if testing occurred.

In spite of the biases inherent in the locations of archaeological survey, survey intensity, and area selection, this analysis incorporates archaeological data compiled over a significant time period (over 30 years). By determining where positive survey results most often occur in the survey coverage, we can begin to understand the predictive value of potential zones and, more specifically, certain biophysical features. This type of analysis leads to the identification of trends in the data. Below is a summary of the amount of area covered in relation to the potential classes of the 1998 AOA Model (Arcas 1998) and the results of surveys in these areas (Table 4). This model characterized the land base of the forest district into four potential zones, each occupying roughly a quarter of the total area.

Most of the archaeological impact assessment survey coverage to date falls within moderate and moderate-high potential zones. The reason these zones have received the most assessment coverage is because whenever proposed forest developments are located within a high potential zone the entire area requires an archaeological impact assessment, even if the overlap is slight. These areas often contain a higher percentage of potential zones other than high. Also, these numbers reflect ‘assessed’ area not ‘surveyed’ area. It would be nearly impossible to calculate actual area surveyed. Survey attention undoubtedly focused on the high potential portions of the areas being assessed. Nevertheless, these areas have been reviewed at

the discretion of archaeologists who freely make decisions over which portions of proposed development areas require survey.

The low potential zone is really the only relatively underrepresented potential zone according to this assessment. This is expected because it is often not feasible to survey areas where sites are not anticipated. While this is both reasonable and rational, there is an inherent bias in this selection process when assessing site distribution in the area. Testing assumptions made on where sites are not located would be an important addition to site distribution data for the area.

Table 4: Summary of Survey Coverage & Results by Potential Class in the Study Area

GIS Model Potential (Zone)	Portion of Study Area (ha)*	Percentage of Total Area (%)	Assessed Area (ha)**	Percentage of Zone Assessed (%)	Number of Archaeological Sites Found	Percentage of Archaeological Sites	Kvammes Gain
Class 4 (High)	428,769	20.97	22,306	5.20	1052	83.62	0.75
Class 3 (Moderate-High)	581,497	28.44	40,022	6.88	140	11.13	-1.56
Class 2 (Moderate)	527,436	25.79	32,992	6.26	55	4.37	-4.90
Class 1 (Low)	507,138	24.80	14,631	2.89	11	0.87	-27.51
Total	2,044,840	100	109,951	5.38	1258	99.99	N/A

* The total area encompassed by Quesnel Forest District is ~2,075,876 ha. The total area here reflects the area covered by the 4 archaeological potential class layers combined. The difference is the result of the potential classes not covering the whole forest district.
**Only archaeological impact assessment and preliminary field reconnaissance surveys are included in this calculation. Acrhaeological overview assessments, archaeological inventory surveys, and CMT surveys are excluded.

Kvamme's Gain Statistic

A review of Table 1 indicates that the high potential zone covers approximately 21% of the forest district land base and contains about 84% of the archaeological sites. A simple measure of the effectiveness of archaeological predictive models is Kvamme's Gain statistic (Brandt et al. 1992), which compares the percentage of land base occupied by a potential zone to the percentage of the archaeological site population that falls into that zone. An effective model defines a high potential zone that uses the least amount of area to contain the highest number of archaeological sites. The formula is as follows:

Kvamme's Gain = 1 – (%Area / %Sites)

The Kvamme's Gain for the high potential zone of the 1998 AOA Model would be 1 – (20.97 / 83.62) which is 0.75. This indicates that the model is relatively effective at determining high archaeological potential. A score of 1 would be the ideal, but next to impossible to achieve, result. Low potential zones should have a negative score and the larger the negative score the

more effective the model is at identifying low potential areas. The Kvamme's Gain scores for the other potential zones are located in Table 1. It should be noted here that the 1998 AOA Model was not created as a one potential zone model. It defined four potential zones (high, moderate-high, moderate, and low), each with recommendations for varying degrees of archaeological assessment intensity. As implemented by the District Manager, however, only proposed forestry developments that overlap with the high potential zone require an archaeological assessment.

Although the high potential zone of the current AOA model appears to perform fairly well, it is recognized that this may represent an example of circular logic. Because so much previous survey focused on identifying sites along major lakes and streams (high potential areas), it is no wonder that the percentage of the total site population that fall within those high potential areas is high. This could possibly be corrected by excluding any sites found during inventory projects and dealing only with sites found during impact assessments which, although a biased sample unto themselves, are considerably less biased than the sample resulting from inventories. Additionally, large areas that have received little or no archaeological survey and where few archaeological sites have been recorded can have a large effect on this type of measure because it compares static and dynamic variables.

Summary of Results by Biogeoclimatic Zone

Ecological diversity and natural resource distribution were significant factors in past human settlement patterns, seasonal rounds and subsistence activities as well as many other aspects of life. As Bussey and Alexander (1992) describe, various environmental units yield different resources considered culturally important. As part of this project, archaeological survey and site data were compiled and categorized according to biogeoclimatic zone (Map 4) and subzone in an attempt to isolate any trends in the data. The following tables summarize the amount of archaeological assessment survey coverage and previously recorded archaeological site frequency by biogeoclimatic zone (Table 5) and subzone (Table 6).

Table 5: Summary of Survey Coverage & Results by Biogeoclimatic Zone.

Biogeoclimatic Zone	Portion of Study Area (ha)	Pecentage of Study Area (%)	Assessed Area (ha)	Percentage of Zone Assessed (%)	Number of Archaeological Sites Found	Percentage of Archaeological Sites (%)
SBS	772,821	37.29	72,426	9.37	398	31.64
SBPS	635,627	30.67	31,130	4.90	821	65.26
MS	284,309	13.72	1,943	0.68	5	0.40
ICH	50,471	2.44	476	0.94	2	0.16
IDF	19,656	0.95	1,066	5.42	27	2.15
ESSF	261,481	12.62	4,455	1.67	2	0.16
IMA	31,384	1.51	0	0	1	0.08
BAFA	16,883	0.81	0	0	2	0.16
Total	**2,072,632**	**100.01**	**111,496**	**5.38**	**1258**	**100.01**

Only three biogeoclimatic zones have had adequate assessment coverage (defined here as >4% of zone); these are the SBS, SBPS, and IDF zones. These zones are productive forest areas and have received the most survey coverage during archaeological assessments as well as archaeological inventories. Interestingly, the vast majority of previously recorded archaeological sites are located within just two biogeoclimatic zones: SBPS (65.26% of sites) and SBS (31.64% of sites). The IDF zone contains 2.15% of sites, while all other zones contain less than 1%. The SBPS zone has approximately twice the number of sites that would be expected based on area alone, the IDF zone also has double the expected number of sites, and the SBS zone contains about the number that would be expected based on area alone. It should be kept in mind, however, that large numbers of these sites were recorded during inventories and, had the other zones received the same survey attention, these differences may not seem as dramatic. Nevertheless, it would appear that the SBPS, SBS, and IDF zones contain the highest archaeological site densities.

The following table (Table 6) takes this analysis a step further by considering biogeoclimatic subzones. Eight biogeoclimatic subzones have had adequate (>4%) assessment coverage; these are the SBSdw, SBSmc, SBSmh, SBSmw, SBSwk, SBPSdc, SBPSmk, and IDFdk subzones. Three subzones account for the majority of previously recorded archaeological sites. The SBPSdc subzone accounts for 47.46%, the SBSdw for 21.54%, and the SBPSmk for 13.75%. As noted earlier in the discussion of zones, these subzones are productive forest areas and have received the most survey coverage during archaeological assessments as well as archaeological inventories. None of the other subzones contain more than 5% of the sites. The SBPSdc subzone has approximately four times the number of sites that would be expected based on area alone, and the SBSdw and IDFdk subzones have about double the number of sites that would be expected based on area alone. The SBSmh and SBPSmk subzones have approximately the number of sites that would be expected. All other subzones contain fewer than the expected number of sites. Once again, past inventories have biased the sample and these summaries should be viewed with that in mind. Particularly in SBPSdc and SBSdw, which together account for 68.97% of previously recorded sites, these subzones occupy the lower elevations of the major river valleys of the western plateau (which significantly influences their potential) and these are the areas that have received much of the inventory attention.

Table 6: Summary of Survey Coverage & Results by Biogeoclimatic Subzones.

Biogeoclimatic Subzone	Portion of Study Area (ha)	Pecentage of Study Area (%)	Assessed Area (ha)	Percentage of Zone Assessed (%)	Number of Archaeological Sites Found	Percentage of Archaeological Sites (%)
SBSdk	721	0.03	0	0	0	0
SBSdw	275,104	13.27	29,494	10.72	271	21.54
SBSmc	140,605	6.78	7,843	5.58	16	1.27
SBSmh	74,974	3.62	3,102	4.14	53	4.21
SBSmw	135,797	6.55	21,812	16.06	40	3.18
SBSwk	145,620	7.03	10,175	6.99	18	1.43
SBPSdc	296,223	14.29	12,737	4.30	597	47.46
SBPSmc	104,570	5.05	1,479	1.41	51	4.05
SBPSmk	223,668	10.79	16,914	7.56	173	13.75
SBPSxc	11,166	0.54	0	0	0	0
ESSFxv	16,540	0.80	0	0	2	0.16
ESSFmv	1,074	0.05	0	0	0	0
ESSFwc	75,447	3.64	374	0.50	0	0
ESSFwcp	2,129	0.10	0	0	0	0
ESSFwcw	1,762	0.09	0	0	0	0
ESSFwk	164,529	7.94	4081	2.48	0	0
MSxv	284,309	13.72	1943	0.68	5	0.40
ICHmk	6,265	0.30	0	0	2	0.16
ICHwk	44,206	2.13	476	1.08	0	0
IDFdk	13,361	0.64	1,026	7.68	18	1.43
IDFxm	6,295	0.30	40	0.64	9	0.72
IMAun	2,436	0.12	0	0	0	0
IMAunp	28,948	1.40	0	0	1	0.08
BAFAunp	16,883	0.81	0	0	2	0.16
Totals	**2,072,632**	**99.99**	**111,496**	**5.38**	**1258**	**100.00**

Summary

To date, approximately 5.38% of the land base of the Quesnel Forest District has been surveyed during an archaeological impact assessment. The areas assessed, not surprisingly, are concentrated in the most productive and accessible forested zones. A total of 1258 pre-1846 archaeological sites (excluding pre-1846 trails) have been recorded in the forest district. About 40% of these sites were recorded during archaeological impact assessments and 60% during archaeological inventories. As noted above, considerable bias is present in the archaeological site data due to the focus of inventory studies on major stream valleys in the western portion of the forest district and the focus of forestry development in productive, accessible forested areas.

Major biogeoclimatic zones have been reasonably well sampled, with a couple of notable exceptions such as the less productive and less accessible Montane Spruce and Engelmann Spruce – Subalpine Fir zones and areas that are not forested, like the alpine zones BAFA and IMA. Three zones, in particular, stand out for their high archaeological site densities: SBS, SBPS, and IDF, which together account for 99.05% of previously recorded archaeological sites. Breaking this down further into biogeoclimatic subzones, four of the subzones (SBSdw, SBPSdc,

SBPSmk, and IDFdk) occupy 38.99% of the area but contain 84.18% of previously recorded archaeological sites. These subzones have received most of the archaeological survey attention (assessment and inventory) and these numbers are probably higher than would otherwise be the case with an unbiased sample, but nevertheless they are recognized as having higher archaeological site densities.

The 1998 AOA Model divides the forest district into four zones of archaeological potential. These zones, with the exception of the low potential zone, have been reasonably well sampled during archaeological assessments and the density of archaeological sites within each zone is proportionate to expected values. Kvamme's Gain statistic, which measures the effectiveness of a predictive model by comparing the amount of land base classified as high potential to the percentage of archaeological sites captured within that area, indicates that the current model is performing reasonably well with a score of 0.75 for the high potential zone. As noted earlier, though, this apparent success may represent self-fulfilling circular logic, in that surveys specifically targeting high potential areas will result in the recording of large numbers of archaeological sites that will make the model look more effective than it may actually be. There may be utility in excluding sites recorded during inventories from future analyses of this nature. It is also suggested that the model could be significantly improved if it treated different portions of the forest district separately rather than treating it as a homogeneous area.

MAP 2: ARCHAEOLOGICAL ASSESSMENT COVERAGE IN QUESNEL FOREST DISTRICT

N
W E
S

1:800,000

MATRIX Research Ltd

Map Produced by Deanna Windsor
April 5, 2007

LEGEND

- QFD Boundary
- Rivers/Lakes
- Recorded Trail
- City/Town
- Parks
- Assessed Areas
- Archaeological Site
- Cultural Heritage Resource
- Private Lot

0 4 8 16 24 32 40 Kilometers

MAP 3 : ARCHAEOLOGICAL SITE DISTRIBUTION IN QUESNEL FOREST DISTRICT 2007

N

W E

S

1:800,000

MATRIX Research Ltd

Map Produced by Deanna Windsor
April 16, 2007

LEGEND

- QFD Boundary
- Rivers/Lakes
- Recorded Trail
- City/Town
- Archaeological Site

0 4 8 16 24 32 40 Kilometers

MAP 4 : ARCHAEOLOGICAL SITE DISTRIBUTION AND
BIOGEOCLIMATIC ZONES IN QUESNEL FOREST DISTRICT

N
W E
S

1:800,000

MATRIX Research Ltd

Map Produced by Deanna Windsor
April 16, 2007

LEGEND

QFD Boundary

Recorded Trail

Archaeological Sites

BIOGEOCLIMATIC ZONES

- BAFA
- ESSF
- ICH
- IDF
- IMA
- MS
- SBPS
- SBS

0 4.5 9 18 27 36 45 Kilometers

5.3 Near Analysis

The distribution of archaeological sites in the Quesnel Forest District is influenced by a variety of physiographic features utilized by past cultures. A series of "near analyses" were performed to assess the degree to which specific classes of hydrological features influenced site location. In addition to hydrological features, "near analyses" were performed on recorded trail corridors to determine the correlation between archaeological site and trail locations. These variables were chosen based on an evaluation of biophysical and cultural features deemed as having the most predictive potential. This type of analysis also facilitates an evaluation of appropriate buffer sizes of archaeological potential around physiographic features and trail corridors (Arcas 1998).

A database of all previously recorded archaeological sites in the Quesnel Forest District was utilized to conduct the "near analyses". The database contains site specific information on the distance from a given site to each class of hydrological feature as defined by the Ministry of Forests (1995). The riparian classes assessed in the current study are outlined in the following table:

Table 7: Summary of Riparian Classes in the QFD

		Classification	Description
Class	Stream Riparian	**S1 stream**	Fish stream with stream width >20 m
		S2 stream	Fish stream with stream width >5 – 20 m
		S3 stream	Fish stream with stream width 1.5 – 5 m
		S4 stream	Fish stream with stream width <1.5 m
		S5 stream	Non-fish stream with average channel width >3 m
		S6 stream	Non-fish stream with average channel width <3 m
	Wetland Riparian*	**W1 wetland**	Simple wetland >5 ha in size
		W3 wetland	Simple wetland 1-5 ha in size
		W5 wetland	Wetland complex (a series of wetlands linked by wildlife transportation corridors to form larger wetland habitat units)
	Lake Riparian**	**L1 lake**	Lake size > 5ha
		L3 lake	Lake size 1-5 ha
		NC lake	Lake size <1 ha

* W2 and W4 wetlands are associated with biogeoclimatic zones that are rare in or absent from the Quesnel Forest District and were not included in the current analysis.
** L2 and L4 lakes are associated with biogeoclimatic zones that are rare in or absent from the Quesnel Forest District and were not included in the current analysis.

For the purposes of the current analysis, pre-1846 culturally modified tree sites (n=15) and all post-1846 cultural heritage resource sites were excluded. The location of CMT sites is largely determined by the temporal and spatial availability of young pine stands. CMT sites, therefore, may be found in any stand of trees regardless of distance from water, slope, or any other criteria commonly used to determine archaeological potential. The distribution of post-1846 sites is influenced by a variety of historical factors and variables that are beyond the scope of the

current predictive model in the Quesnel Forest District. In addition, recorded trails were treated as features that potentially influenced site location; as such, trail sites were excluded from the archaeological site database. All sites assessed in the current "near analyses" can be represented by single points or discrete polygons.

The current analysis incorporates information on all hydrological features and trails located within 1000 m of each archaeological site. A primary association is defined as the relationship between a site and its closest adjacent hydrological feature or trail (Arcas 1998). For example, an S1 stream was only considered to be in primary association with an archaeological site if no other hydrological features occurred at a closer distance to the site. Secondary association is defined as the relationship between the archaeological site and its next closest feature.

A total of 1243 archaeological sites were included in the current analysis (1262 pre-1846 archaeological sites minus 15 pre-1846 CMT sites and four pre-1846 trail sites). The initial stage of the "near analysis" evaluated all 1243 archaeological sites while subsequent stages involved the evaluation of major site types independently. Different site types are expected to exhibit different site location patterns, which justified their independent assessments. The major site types considered in the current analysis are lithic (surface and subsurface), cache pit, habitation (housepit and platform sites), and unclassified cultural depressions. Burial sites, roasting pits, and faunal sites did not occur in a high enough frequency to be of utility for the current analysis.

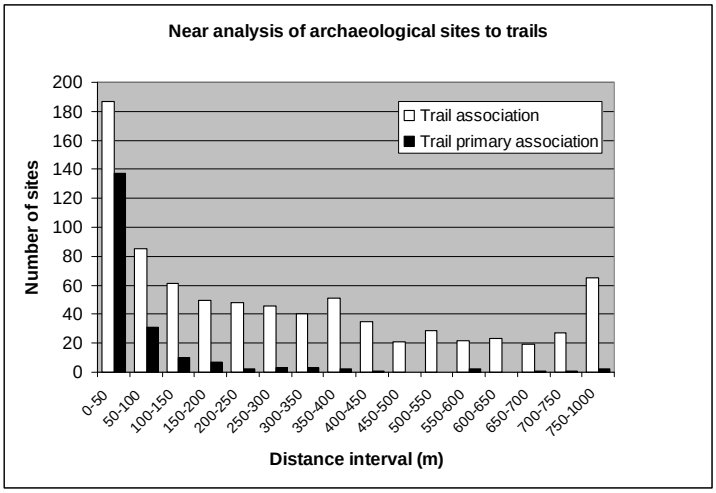
Multi-component sites were included in the "near analysis" of each site type that was recorded on a site inventory form. For example, a site containing three components (lithics, cache pits, and housepits, etc.) was included in three separate "near analyses" (of lithics, cache pits, and habitation sites).

Included below is an example of a table and graph produced during the "near analysis". All other remaining graphs for each hydrological feature and each site type are attached in Appendix C. Five "near analyses" were conducted, including the "near analysis" of: total sites, lithic sites, cache pit sites, habitation sites, and unassigned cultural depression sites. The results of each separate "near analysis" are depicted on one page in Appendix C that consists of 13 graphs. The first twelve graphs in each series portray information on the distance from archaeological sites to hydrological features (trails excluded). The final graph in each series depicts an analysis of trails, in which the determination of primary association accounted for both trails and hydrological features. Trails were excluded from the initial twelve graphs in each series to permit an assessment of the ideal buffer width around various classes of hydrological features.

Table 8: Trail distance interval

(raw and primary association)

Distance Interval	Trail association	Trail primary association
0-50	187	137
50-100	85	31
100-150	61	10
150-200	50	7
200-250	48	2
250-300	46	3
300-350	40	3
350-400	51	2
400-450	35	1
450-500	21	0
500-550	29	0
550-600	22	2
600-650	23	0
650-700	19	1
700-750	27	1
750-1000	65	2



The column labeled “Trail association” in the table above includes all archaeological sites located within a given distance interval from a recorded trail. The column labeled “Trail primary association” includes all archaeological sites within the distance intervals that were not located in closer proximity to any other feature (S1 stream, W3 wetland, L1 lake, etc.). A pronounced disparity between the bars representing “trail association” and those representing “trail primary association” in the accompanying figure, indicate that although archaeological sites are located within a given distance to a feature, other features exist in closer proximity to the site and are most likely a stronger determinant of site location. For example, although the table above indicates that 51 sites occur within 350 – 400 m of a recorded trail, only two are in primary association. This leaves 49 sites that lie closer to another physiographic feature which probably played a more significant role in the determination of that site location. Conversely, if the bars within a given distance interval are similar in their height (as occurs in L1 lakes), the distribution of archaeological sites found in that distance interval is most likely determined predominantly by that feature.

The following is a brief synopsis of trends visible in the “near analysis” graphs (see Appendix C).

Near analysis: Total

A total of 1243 archaeological sites were included in the initial stage of the current analysis. As predicted, large lakes (L1) and fish-producing streams (S1-S4) exhibit a relatively strong negative correlation between site frequency and increasing distance from the hydrological feature. A large number of sites fall within 250 m of smaller water bodies but are of primary association with other features. An unexpectedly high frequency of sites is associated with W5 wetlands and S4 streams. Although this suggests that these features are more important for predicting site potential than L3 lakes, S2 streams, and S3 streams, the comparatively high number of these smaller hydrological features in the Quesnel Forest District may explain the occurrence of many sites associated with them.

By reading the patterns of site frequency, one can determine at what distance from a feature the frequency of sites drops to a marginal level. Generally, site frequency significantly declines after 250 m from a feature although different hydrological classes exhibit different patterns. The frequency of sites around S1 and S4 streams, as well as L1 lakes declines only after 300 m while smaller water bodies (S5 streams, S6 streams, W1 wetlands, and L3 lakes) exhibit a decline after 200 m. The establishment of appropriate buffer widths is therefore dependent on the type of hydrological feature.

In a number of cases, the disparity between those bars representing an association, and those representing a primary association, was great. To further elucidate the role of multiple

hydrological features in relatively close proximity to an archaeological site, a table was created. All sites in primary association with (and within 250 m of) each hydrological class was determined. These sites were then further analyzed to determine secondary association (the next closest feature within 250 m). The table indicates that a high proportion of sites are located within 250 m of two or more hydrological features. Large water bodies appear to influence site distribution regardless of secondary association with other water bodies but smaller streams, wetlands, and lakes may have been especially attractive at their confluences with other small water bodies.

The remaining "near analyses" of site types are limited to an investigation of primary associations due to small sample sizes which limited the utility of a comparison between general association and primary association.

Near analysis: Lithic sites

The majority of sites in the Quesnel Forest District are composed of surface and subsurface lithics and it is expected that lithic site distribution heavily influences total site distribution. A pattern similar to that of total distribution is visible in the strong negative correlation between site frequency and increasing distance from large lakes and fish-producing streams. A sharp drop-off in site frequency is apparent from S4 to S5 and S6 streams. Regardless of water body size, almost all riparian classes exhibit a left skewed curve of site frequency that levels off after approximately 250 m.

Though the number of archaeological sites markedly declines after 250 m, when totaled, a significant number of sites are located at great distances from hydrological features. A total of 111 prehistoric archaeological sites in the Quesnel Forest District are located over 250 m from any recorded water body. Of these, 26 sites are within 250 m of a recorded trail. Three main explanations remain for those sites that lack any apparent association with a physiographic or cultural feature. The resolution of current maps may be insufficient to detect small topographic features and water bodies that exist or once existed on the landscape (eg. palaeoshorelines). Alternatively, patterns of ancient behaviour may remain entirely unpredictable in terms of their association with natural resources and landscape features. Lastly, other variables that account for the site location may be unknown and currently unaccounted for.

As with total site distribution, the bulk of lithic sites are associated with S1-S4 streams and L1 lakes. Much of the efforts of early archaeological inventories were spent surveying near the shorelines of these water bodies and this sampling bias still heavily influences the current state of archaeological knowledge in the region.

The frequency of lithic sites associated with W5 wetlands and S4 streams is again, unexpectedly high. Narrow streams may have been attractive during seasonal fish runs and wetland complexes may have been attractive during waterfowl migrations. At present, these

ecological explanations cannot be separated from a sampling bias owing to the disproportionately large number of S4 streams and W5 wetlands in the Quesnel Forest District.

Near analysis: Cache pit sites

The analysis of cache pit site distribution reveals a strong correlation with L1 lakes and a weaker but significant correlation with S1-S4 streams. Given the function of cache pits for food storage (particularly fish), this pattern is expected. Relatively high frequencies also occur in close proximity to trails and W5 wetlands. Of particular interest are a number of cache pit sites that are located 400 m or more from the nearest hydrological feature. Very few of these sites are associated with trails and an explanation for their location remains unknown.

Near analysis: Habitation sites

The sample size of housepit and platform sites is small and, therefore, information gleaned from site distribution is limited. A large proportion of recorded housepits and platform sites are located within 150 m of fish-producing streams and L1 lakes. The occurrence of a few of these habitation sites beyond 150 m from S1 to S4 streams may be explained by site location on terraces or other flat terrain more distant from shorelines. A relatively high frequency of sites was found in association with S6 streams but further analysis highlighted one of the drawbacks to the reliance on primary association in "near analysis". All housepit sites found within 150 m of S6 streams were located in the immediate vicinity of a larger water body. Despite their primary association, site location was most likely determined by a more significant hydrological feature in the immediate area. As an example, a habitation site located at the confluence of lake and a small S6 stream may be physically closer to the stream despite the presumed primary importance of the lake in determining site location. This problem may be more acute in the association of archaeological sites and trails. An initial assessment of site distribution and trail location suggests a strong correlation (over 431 prehistoric archaeological sites in the Quesnel Forest District are located within 250 m of a recorded trail). However, trails paralleling major streams may heavily skew the analysis of primary association. In the event that a trail follows a terrace feature that parallels a stream course, all sites located further inland from the trail will produce an apparent primary association with the trail feature despite a more plausible primary association with the hydrological resource.

Near analysis: Unclassified cultural depression sites

It is probable that many unclassified cultural depression sites include those depressions that are intermediate in size between the expected circumference of a cache pit and housepit feature. A subjective assessment of site distribution patterns of unclassified cultural depression

sites suggests a closer affinity to the patterns visible among cache pit sites. The strength of this assessment is limited by small sample sizes among this site type.

The majority of unclassified cultural depressions are associated with L1 lakes with a smaller but significant number associated with S1-S4 streams. As with cache pits, a relatively high number of unclassified depression sites (n=11) are located within 100 m of a recorded trail.

"Near analyses" provide valuable information on the relative strength of correlations between the location of physiographic features and archaeological sites. When properly incorporated, this information can improve the efficiency of predictive models and refine our understanding of archaeological site distribution. Caution must be exercised in the acceptance of primary associations as determinants of site location. Secondary associations may exert an equal or stronger influence of site distribution.

6.0 SUMMARY AND RECOMMENDATIONS

6.1 Current Archaeological Data Gaps

A significant detail articulated during this gap analysis is the degree of sampling and survey bias in the existing archaeological site inventory. We are fortunate that numerous large scale inventory projects have been conducted in the forest district over the years, resulting in a large inventory of archaeological sites but we must exercise caution when interpreting these sites and applying the site data to predictive modeling. While known site locations alone are not the only indicators of archaeological resource potential and past land use patterns for any given area, they are critical for a detailed and complete analysis. Some of the problems with using site distribution data for an analysis on the resource potential of an area have been discussed in this report. Problems with the biases inherent in the archaeological site inventory can be addressed in two ways: 1) by acquiring archaeological data for undersampled low potential areas, and 2) by acquiring archaeological data for undersampled high potential areas. Undersampled low potential areas are located throughout the forest district, while undersampled high potential areas are concentrated in the extreme eastern and western reaches of the district.

The study area contains several ecological zones and portions of major regional drainage systems. A current data gap is the lack of regional syntheses of archaeological potential and site distribution. In this report we have analyzed the density of previously recorded archaeological sites within various biogeoclimatic zones and subzones and have identified trends that need further exploration (i.e., high densities in SBPS vs. low densities in ESSF). The differences indicate that biogeoclimatic zones are a useful division and can be fruitfully applied to predictive modeling. Recommendations for the study area have therefore been constructed and are intended to serve as a catalyst for research that will provide a greater understanding of archaeological resources in the various regions. Very little is known about the archaeological resources of many areas east of the Fraser River as well as in the extreme western portion of the forest district. Future problem-oriented research could contribute considerably to our knowledge of those areas and improve the efficiency of archaeological assessments of forestry developments.

Future Research Recommendations

Archaeological inventory studies are the ideal means by which we can fill gaps in the archaeological record. Inventory studies can be designed with a variety of research goals in mind, such as acquiring baseline archaeological information for regions where little archaeological work has been conducted or where few sites have been recorded, testing overview models, or for other explicit purposes. Given the scant archaeological database in many of the biogeoclimatic zones, archaeological inventory studies could be applied with

considerable effectiveness. The following inventory types are recommended:

- Sample underrepresented biogeoclimatic zones and portions of the forest district.

The vast ecological variation in the study area, and general region, is likely contributing more substantially to archaeological site potential than is currently understood. Presently, some biogeoclimatic zones of the study area are underrepresented in terms of archaeological survey coverage (see Table 5).

- Sample underrepresented major drainages of the study area.

While other areas of the forest district have seen extensive survey (inventories included) along major drainages, many portion of the district have not. These areas are a logical place to initiate archaeological inventories, especially when considering that few archaeological impact assessments have been conducted near these features in the study area. Major drainages are natural corridors and are often associated with travel routes. For example, the current archaeological site inventory for the Blackwater River and its tributaries is many times that of the Fraser, Quesnel, or Cottonwood Rivers. It is recognized that these areas are probably not a priority for forestry operations, but the results of these studies would increase our understanding of archaeological potential, and site density and distribution for other areas of higher priority in terms of forest development.

- Target locations that are most likely to contain diverse types of archaeological sites.

The majority of archaeological sites recorded to date in the study area are lithic scatters. Other site types occur less frequently. An inventory designed to target locations likely to contain other types of archaeological sites would make a large contribution to the record whether those types of sites are found or not.

- Sample areas considered least likely to contain archaeological sites.

It is recognized that negative results are important to the overall understanding of site distribution. Areas classified as low archaeological potential in the GIS model for the Quesnel Forest District are underrepresented in the study area. Random sampling of these areas would contribute greatly to closing this data gap.

- Detailed archaeological investigation of selected sites.

Archaeological sites located during impact assessments are generally investigated only to the extent necessary to delineate their physical boundaries, gather basic information about their contents, and formulate management recommendations. This level of investigation does not allow problem-oriented research or the collection of more detailed site information that would allow a better understanding of past land use patterns in the region. Because little is known about the archaeology in many portions of the study area, a well-designed investigation project would provide invaluable data that would aid in the interpretation of other sites.

- Annual update and review of the database.

It is recommended that archaeological survey and site data be updated annually as additional assessments are completed. This information will not only be useful for planning purposes but also for updating overview models.

In addressing data gaps and future model review, the 1998 AOA report stated: "*As new information becomes available and data gaps are addressed, it is important that the model of archaeological potential is revised and improved."* (Arcas, 1998: 70). The results of this review of archaeological survey and data gaps suggest that the model can be effectively updated but that further investigation into current data gaps would improve the effectiveness of any revised model. The recommendations provided above are intended to fill gaps in the current archaeological database so that these revisions and improvements can be made.

6.2 General Observations and Recommendations

The following are some general observations and recommendations that have been made over the years concerning the existing AOA model. Most of these observations constitute minor problems whereas a few represent some major inadequacies that need to be addressed when the model is revised. Many are due to the quality of digital mapping information available at the time the model was produced, some are inherent in the model itself, while others are due to how the model has been administered after its production.

- The model uses inappropriate buffer widths (in some cases 100 m around large lakes [e.g., Tzenzaicut Lake] vs. 250 m around small streams [e.g., tributaries of Tzenzaicut Lake] that flow into those large lakes).
- Stream buffers that do not account for wet meadow margins.

- Stream buffers that do not account for escarpments or terraces located considerable distances from the streams.
- Sites are modeled collectively and not individually as site types.
- Stream buffers along small mapped streams that do not exist on the ground (most pronounced in eastern portions of Quesnel Forest District.
- Pixelation along edges of potential zones that creates millions of polygons.
- There is no way to determine attributes determined by the model in assigning high potential. This produces a black box effect. Ideally, the layers should be queriable so that the basis for the potential assignment is known.
- The model has never been updated. There is a considerable amount of new data (digital map information [e.g., PEM] as well as archaeological data) available or forthcoming that would improve the model considerably.
- There are too many potential zones. For resource management purposes there should be a single high potential layer.
- The model does not incorporate negative survey results.
- The model misses many small wetlands that have demonstratedly high archaeological potential.
- The model should be thoroughly reviewed using orthophotos to prevent / correct numerous problems (missed features, misfit buffers, etc.)

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APPENDIX A

Glossary of Archaeological Terms

ABORIGINAL ; INDIGENOUS: Pertaining to the original occupants of a given region.

A-HORIZON: the uppermost, often dark-coloured natural level in a soil profile characterized by roots, humus, and a lack of clay, iron, carbonates and soluble salts which have leached to lower levels.

ARCHAEOLOGY: The science concerned with the recovery, analysis, description and explanation of the remains of past human cultures.

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA): A study undertaken for a proposed development project to determine whether it will adversely affect archaeological remains.

ARCHAEOLOGICAL SURVEY OR SITE INVENTORY: Examination of a locality for evidence of past human activity and the recording of that evidence to produce an inventory of sites in that locality.

ARTIFACT: Any manually portable product of human workmanship. In its broadest sense includes tools, weapons, ceremonial items, art objects, all industrial waste, and all floral and faunal remains modified by human activity.

BARK-STRIPPED TREE: A tree which has had bark removed by First Nations people for a number of possible purposes (i.e. fibre, food, medicine)

BASALT: A fine-grained volcanic rock used for the manufacture of chipped stone artifacts. Colour ranges from black to grey; texture granular to glass like.

B-HORIZON: That natural level within a soil profile which directly underlies the surficial A-horizon and which contains the clay, iron oxides and carbonates which have leached down from it.

BIFACE: A stone artifact flaked on both sides.

BORDEN NUMBER: A standardized number consisting of four letters and one number assigned to each archaeological site which identifies it and denotes its general location in Canada.

BORDEN SYSTEM: A code of 4 letters and a number used to designate archaeological sites in Canada (e.g. GtRx 7; FlJr 10 etc.). Proposed by Charles E. Borden, University of British Columbia, in 1954. The alphabetic prefix refers a block of l0 minutes by l0 minutes within a grid system which covers all of Canada south of 62 N latitude. The numerical suffix indicates the site within this block in numerical order of registration.

CACHE: A deliberate store of equipment, food, furs or other resources placed in, or on the ground (perhaps protected by a rock CAIRN), or raised above the ground on a platform.

CACHEPIT: Small circular depressions (usually less than 3 m) that were used to store food.

CHALCEDONY: A semi-translucent silicate (quartz) rock with a wax-like luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Commonly called agate.

CHERT: A mainly opaque, fairly granular, silicate rock with a dull shiny luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Varieties include jasper and flint.

CONCHOIDAL FLAKE: A type of spall resulting from the fracture of fine-grained, or glassy rocks. Characterized by a bulb of percussion, striking platform remnant, and extremely sharp edges. A

predictable fracture pattern that allows the manufacture of predetermined tools from these materials.

CONTACT: The time of first prolonged direct contact between First Nations peoples and Europeans, which in the Cariboo occurred during the early 1800s with the establishment of fur trade forts at Kamloops and Alexandria. The term is synonymous with the Historic period which is characterized by contemporary written works.

CONTEXT: The spatial relationships of archaeological items and samples within a site. "Primary Context" refers to materials found in their original position; "Secondary Context" refers to materials which have been displaced and redeposited by disturbance factors; "Geological Context" is the relationship of the archaeological finds to geological strata.

CONCENTRATION: A notable accumulation of archaeological materials in a small area, such as a "concentration of flakes" etc.

CORE: (1) A blocky nucleus of stone from which flakes or blades have been removed (see MICROBLADE CORE). (2) A column or lineal sample of materials obtained by "coring" the ground, trees, etc.

CORTEX: The naturally weathered outer surface of a pebble.

CULTURE: The distinctive lifeway – including language, technology, sustenance, social organization, customs, beliefs and rituals – practiced by a people. This term can also be used to refer to the culture of particular groups of people at a particular point in time. In an archaeological context, the term culture refers to materials or objects of human origin, in contrast to natural.

CULTURAL DEPOSIT: Sediments and materials laid down by, or heavily modified by, human activity.

CULTURAL DEPRESSION: A pit excavated by people into natural sediments. Pits have been excavated for a variety of reasons including: houses (pithouses, house pit), food storage (cache, cache pit), food cooking (roasting pit, berry trenches, hearth) and burials.

CULTURALLY MODIFIED TREE (CMT): A tree that had been intentionally altered in some way. In the interior of British Columbia, CMTs are usually characterized by bark-stripped trees, that is, trees that have had the bark removed to access the cambium for eating, for extracting tree sap, for manufacture, or for medicinal purposes, by First Nations people. Blazed trees may also be referred to as CMTs.

CULTURE SEQUENCE: The chronological succession of cultural traits, phases or traditions in a local area.

CULTURE TYPE: A chronologically limited cultural unit within a local culture sequence, characterized by sufficient descriptive traits to set it apart from all other units. A phase is generally represented by 2 or more components in several sites and is the basic classification of archaeological "cultures".

DACITE: Volcanic rock (or lava) that contains 62% to 69% silica and moderate a mounts of sodium and potassium. Dacite is a variety of basalt.

DATUM: A fixed reference point on an archaeological site from which measurements are taken.

DEBITAGE: Waste by-products from tool manufacture.

DETRITUS: Waste by-products from tool manufacture. Most frequently applied to chips and fragments resulting from stone flaking.

DISTURBANCE: A cultural deposit is said to be disturbed when the original sequence of deposition has been altered or upset by post-depositional factors. Agents of disturbance include natural forces such as stream or wind erosion, plant or animal activity, land-slides etc.; and cultural forces such as later excavations.

ETHNOGRAPHIC ANALOGY: Interpretation of archaeological remains by comparison to historical cultures.

ETHNOGRAPHY: That aspect of cultural anthropology concerned with the descriptive documentation of living cultures. In the Cariboo this is based on First Nations testimony and participant observation.

ETHNO-HISTORY: The study of ethnographic cultures through historical records.

ETHNOLOGY: The aspect of cultural anthropology concerned with the comparative and processional analysis of ethnographic cultures.

FAUNAL REMAINS: Bones and other animal parts found in archaeological sites. Important in the reconstruction of past ecosystems and cultural subsistence patterns (see: MICROFAUNAL REMAINS).

FEATURE: A non-portable product of human workmanship. Usually clusters of associated objects; pit houses, hearths, cache pits, cooking ovens etc.

FLAKE: A fragment removed from a core or nucleus of cryptocrystaline or fine-grained rock by percussion or pressure. May be used as a tool with no further deliberate modification, may be RETOUCHED, or may serve as a PREFORM for further reduction.

FLINT: A microcrystaline silicate rock similar to CHERT, used for the manufacture of flaked stone tools. Colour most commonly grey, honey-brown, or black.

GROUND STONE: Stone artifacts shaped by sawing, grinding, and/or polishing with abrasive materials (e.g. "ground slate knives", "polished soapstone pendants" etc.).

HEARTH: A fireplace, often circular and may be unlined, rock or clay-lined, or rock-filled. Minimally consists of fire-altered rock and charcoal.

HISTORIC ARCHAEOLOGY: The archaeological investigation of POST-CONTACT sites.

HISTORIC PERIOD: The time after European contact or the beginning of written recording.

HORIZON: Layers typical of the soil profile in a particular region.

HOUSE-PIT: An aboriginally excavated house floor. See PITHOUSE.

IN SITU: Archaeological items are said to be "in situ" when they are found in the location where they were last deposited.

LITHIC: Of/or pertaining to stone. A lithic artifact is one manufactured from stone.

LITHIC INDUSTRY: That part of an archaeological artifact assemblage manufactured of stone.

LITHIC SCATTER: An archaeological site consisting of two or more stone artifacts.

LITHIC TECHNOLOGY: The process of manufacturing tools, etc. from stone. Most frequently refers to stone flaking.

LOCALITY: A very large site or site-area composed of 2 or more concentrations or clusterings of cultural remains.

MATRIX: An inclusive term for the natural and cultural sediments of an archaeological site .

MICROFAUNAL REMAINS: Very small animal remains, such as rodent bones, tiny bone fragments, insects, small molluscs, etc., discovered in an archaeological site.

MIDDEN: A deposit of camp refuse associated with human occupational sites. Most frequently refers to coastal SHELL-MIDDENS.

MUNSELL COLOUR CODE: A system of describing colours by a code of letters and numbers defining "hue", "value" and "chroma". Important in accurately describing the colours of archaeological soils and sediments.

OBSIDIAN: Natural volcanic glass. Colour ranges from nearly translucent through black, red and green. A favourable raw material for the manufacture of flaked stone tools.

PALEOSOL: "Old Soil." Buried soil horizons indicative of past soil conditions different from that presently prevailing.

PETROGLYPH: Pictures, symbols, or other artwork pecked, carved or incised on natural rock surfaces.

PICTOGRAPH: Aboriginally painted designs on natural rock surfaces. Red ochre is the most frequently used pigment and natural or abstract designs may be represented.

PITHOUSE: A semi-subterranean "earth-lodge" winter dwelling. Usually consisted of an earth-covered log framework roof over a circular to rectangular excavation. The archaeological feature is called a housepit.

POST-CONTACT PERIOD (Also "Historic Period"): Refers to the period following the first arrival of Europeans.

PRE-CONTACT: Refers to the period before the first arrival of Europeans in a given area.

PREHISTORIC: The period prior to written records for any given area. In North America synonymous with PRE-CONTACT.

PRELIMINARY FIEL RECONNAISSANCE (PFR): A study undertaken for a proposed development project to determine whether it will adversely affect archaeological remains.

PROJECTILE POINT: An inclusive term for arrow, spear or dart-points. Characterized by a symmetrical point, a relatively thin cross-section and some element to allow attachment to the projectile shaft. Flaked stone projectile points are usually classified by their outline form: triangular, leaf-shaped, lanceolate, stemmed, corner-notched, and side-notched.

PROVENIENCE: The horizontal and/or vertical position of an object in relation to a set of spatial co-ordinates.

QUARTZ CRYSTAL: Pure silicate rock-crystal. Usually perfectly clear with six crystal surfaces. May be used as a raw material for lithic tool manufacture.

RETOUCH: The removal of small secondary flakes along the edge of a lithic artifact to improve or alter the cutting properties of that edge. Retouch flaking may be BIFACIAL or UNIFACIAL.

RETOUCHED FLAKE: A stone flake which has had one or more edges modified by the deliberate removal of secondary chips.

ROCK-SHELTER: A shallow cave or rock overhang large enough to have allowed human occupancy at some time.

SCRAPER: A tool presumably used in scraping, scouring, or planing functions. Most frequently refers to flaked stone artifacts with one or more steep UNIFACIALLY RETOUCHED edge(s).

SETTLEMENT PATTERN: The spatial distribution of cultural activities across a landscape at a given moment in time.

SHOVEL-SCREENING: A rapid excavation procedure in which the site matrix is shovelled directly through a screen (usually 1/4" mesh).

SHOVEL TEST: a small scale, generally informal test excavation to ascertain the nature of the deposits, to determine the presence or absence of an archaeological site, or to delimit the boundaries of a known site.

SITE: Any location with detectable evidence of past human activity. Includes HABITATION SITES, KILL-SITES, QUARRY SITES, ROCK-ART sites, BURIAL sites, etc.

SITE SURVEY: The process of searching for and describing archaeological sites in a given area.

SOIL-SAMPLE: A quantity of soil, site matrix, or sediments collected for physical, or chemical analysis.

STORAGE-PIT (Also called CACHE-PITS): Typically circular excavations usually less than 3 m in diameter assumed to have aboriginally functioned as storage "cellars".

STRATA: Depositional units or layers of sediment distinguished by composition or appearance. (Singular: "stratum").

STRATIGRAPHY: The study of various deposits, built up over time, which form delineated layers (such as ash, charcoal or crushed shell) in the earth walls of a pit.

SURVEY(ING): (1) In Archaeology, the process of locating archaeological sites. (2) More generally, the process of mapping and measuring points on the ground surface.

SURVEY AREA: The region within which archaeological sites are to be located.

TOOL: An artifact that has been intentionally modified or formed for a specific purpose (i.e. projectile point, knife, scraper).

TYPE: A distinctive formal artifact class restricted in space and time, e.g. the "Folsom Point" is a projectile point "type".

TYPOLOGY: The classification of artifacts according to analytical criteria, to determine and define significant trends or variations in time and space.

UNIFACE: A stone artifact flaked only on one surface.

USE-WEAR: Polish, striations, breakage, or minor flaking which develop on a tool's edge during use. Microscopic examination and study of the wear may indicate the past function of tools.

WETLAND: Areas of land that are inundated by surface water or ground water sufficient to support the growth and reproduction of vegetative and aquatic life.

WORKED: Having chips, flakes, scratches or other evidence of deliberate modification on stone, bone, antler, shell, etc.

ZOOARCHAEOLOGY: The study of faunal remains found in archaeological sites and their cultural significance.

APPENDIX B

Heritage Inspection Permits Relating to Quesnel Forest District

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
1970-014		Paul Donahue	Excavations at Algatcho andTezli in Central Interior.
1970-024		Paul Sneed	A.S.A.B. Cariboo Survey.
1971-001		Paul Donahue	Excavations at Tezli,BC (FgSd 1)
1971-030		Donald N. Abbott	Wasa Lake Site, Bowron Lake & Provincial Parks
1975-004		Paul Sneed	Morice L.;Fraser Plateau; L.; Atlin L. between Pine and Lina Creeks; Blackwater Drainage; Babine Lake; Necahko Area
1976-005		Paul Sneed	Skook's Landing; Atlin Lake;Nazko-Kluskus Arch. Survey; Babine Lake; Cariboo Skeena
1977-017		Bjorn Simonsen	Kitseguecla/Skeena (GgSw 5); NE Gulf of Georgia;Ladysmith (DfRw 3); Bear Cove/Hardy Bay; Site DhRq 21; Lower Fraser Valley; Harrison-Lillooet R. Valley; Dragon Lake (EfRo 4);Cariboo Skeena; Nazko-Kluskus
1978-007		John McMurdo	Nazko #2; Quesnel; Cariboo; Omineca-Peace; Skeena; Nazko-Kluskus; Machmell R.; Owikeno L.
1978-009		Stephen Lawhead	Salvage Archaeology Project: Cache Creek (EePh 3), Williams Lake (FaPm 14,15,16), Mountie Site (DkSf 26), Saltspring Island (DeRu 42), Baezaeko (PfSa 4),(PfRx 9,10, Fir Is.,Fort St. James (GcSb 7)
1979-006		John McMurdo	AIA - Cariboo/Skeena/Omineca Peace;Graham Island (QCI)
1979-013		Rick Blacklaws	AIA - MacKenzie Grease Trail
1979-015		Stephen Lawhead	Salvage Arch. Project - BC
1979-022		Pam Montgomery	Quesnel: Blackwater Drainage Study
1981-025	Inspection	Brian Apland	AIA – Willison to Kelly Lake 500 kV Transmission Line
1982-018	Investigation	Irvine, S.	Excavations: Kwong Sang Wing Montgomery, P.Bldg. and Lot 7 in Barkerville
1983-016	Inspection	Richard P. Brolly	Highways Surveys
1983-034		Ian R. Wilson	Blackwater River
1984-020		Rick Blacklaws	Quesnel & Vanderhoof (Hwys)
1986-011		Ian R. Wilson	Mackenzie Trail;Fraser R.-Punchaw L.;Tsacha L.-Blackwater & Natincko R.; Kluskoil L.; Eliguk L.; Gatcho Lake
1986-011B	Inventory	Ian R. Wilson	Heritage Resource Inventory Alexander Mackenzie Heritage Trail: Lower Blackwater - Natineko River; Titetown Lake – Kluskoil Lake; Eliguk Lake – Gatcho Lake
1986-012	Inspection	A. Joanne Curtin	AIA: Quesnel Hospital
1988-038	Inspection	Ian R. Wilson	HRIA FhRv 2, Gillies Crossing Tourist Resort
1988-066	Inspection	Arnoud Stryd	HRIA Hwys Williams Lake and Quesnel
1989-039	Inspection	Jean Bussey	AIA Proposed Bridge Const. at Blackwater and Euchiniko River Bridge, Quesnel
1989-106	Inspection	Ian R. Wilson	Arch. Invent. and Subsurf. Testing, Titetown Lake in Vicinity of Alexander Mackenzie Heritage Trail
1991-054	Inspection	Robert J. Muir	AIA Weldwood of Canada Ltd. Timber Harvesting Blocks near Wells, BC
1991-068	Inspection	Jean Bussey	AIA and inventory of MoTH Projects within Williams Lake, McBride & Quesnel Districts
1992-019	Inspection	Ian R. Wilson	AIA of 7 proposed loops of existing Westcoast Energy Pipeline between Fort St. John & Vancouver
1992-053	Inspection	Michael Rousseau	AIA Weldwood of Canada Ltd. Cutblocks near Wells, BC
1992-054	Inspection	Michael Rousseau	AIA West Fraser Mills Ltd. Cutblocks near Wells, BC

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
1992-057	Inspection	Jean Bussey	AIA and Inventory, Prince George/Cariboo Region, highways
1992-071	Inspection	Michael Rousseau	AIA MOF, Quesnel District's Small Business Enterprise Program Cutblocks TSL 44538, A32385 and A32386
1993-067	Inspection	Jean Bussey	AIA of four MOTH projects in the Central and North Cariboo Highway Districts.
1993-078	Inspection	Arne K. Carlson	AIA Baezaeko Bridge and Nazko Road realignment
1993-096	Inspection	Jeff Bailey	AIA, Quesnel-Barkerville Corridor
1993-097	Inspection	Michael Rousseau	AIA, Weldwood of Canada, Quesnel-Barkerville
1993-111	Inspection	Robert J. Muir	AIA Quesnel Gold River Project
1993-131	Inspection	Ian R. Wilson	AIA of 4 proposed pipeline loops, 150 Mile House and McLeod Lake
1994-056	Inspection	Peter S. Merchant	AIA of harvest blocks and access roads proposed within Weldwood of Canada, TFL #5, north of Quesnel, BC
1994-103	Inspection	Jeff Bailey	AIA of Min. of Forests Small Bus. Forest Enter. Program dev., Quesnel Forest District.
1994-110	Inspection	Michael Rousseau	AIA of various West Fraser Mill Ltd's cutblocks &associated activities in Quesnel F.D., CP19U, CP21U, CP22U, CP225 near Pelican L. and confluence of the Blackwater and Euchiniko River
1995-052	Inspection	D. Geordie Howe	AIA of Woodlot near Quesnel
1995-076	Inspection	Martin Handly	AIA for MOF (SBFEP operations), Quesnel Forest District
1995-080	Inspection	Ian C. Franck	AIA Quesnel Forest District
1995-103	Inspection	D. Geordie Howe	AIA of Tolko Industries Ltd's operations in the Quesnel Forest District
1995-105	Inspection	Arnoud Stryd	AIA MOF forestry development areas within Quesnel Forest District
1995-106	Inspection	D. Geordie Howe	AIA West Fraser Mills' operations in the Quesnel Forest District
1995-121	Inspection	D. Geordie Howe	AIA Forestry activities by Weldwood within Cutting Permit 449, Quesnel Forest District
1995-193	Inspection	Richard Gilbert	AIA of the proposed extension of range land, within District Lot 2743, Coast Dist, Range 4, containing archaeological site FiSa9
1995-195	Investigation	Ian R. Wilson	Emergency impact management, FeRo-16, Australian Creek area
1995-210	Inspection	D. Geordie Howe	AIA of Slocan Forest Products Ltd;'s forestry operations for FL A20005, cutting permits 437 and 96U-2.
1995-230	Inspection	D. Geordie Howe	AIA Quesnel River and South Interconnector Highway
1995-250	Inspection	D. Geordie Howe	AIA C&C Wood Products proposed forest operations near Tzenzaicut Lake
1996-001	Inspection	Lindsay Oliver	AIA east of Pentataenkut Lake, Cariboo Land District
1996-069	Inspection	Arnoud Stryd	AIA of forestry operations within Quesnel Forest District by C&C Wood Products Ltd, West Fraser Mills Ltd, Slocan Forest Products Ltd, Ministry of Forest QFD, Tolko Industries, Welswood of Canada Ltd, Canadian Forest Products Ltd, and others
1996-087	Inspection	Sheila J. Minni	AIA proposed MOF forestry operations, Quesnel Forest District
1996-103	Inspection	Lindsay Oliver	AIA of proposed subdivision located between Puntchesakut Lake and Tiltzarone Lakes

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
1996-106	Inspection	D. Geordie Howe	AIA for a proposed property subdivision and firehall construction located in Cariboo District at Ten Mile Lake, BC
1996-163	Inspection	Michael Rousseau	AIA of proposed forestry ops by Weldwood of Canada Ltd, Quesnel FD
1996-164	Inspection	Peter S. Merchant	AIA for West Fraser Mills Ltd.'s proposed harvesting blocks and access roads in the Pelican Lake, Batnuni Lake and Blackwater River areas, Quesnel Forest District.
1996-196	Inspection	Michael Rousseau	AIA of proposed 96/97 forestry ops by Riverside Forest Products Ltd., Chilcotin Forest District.
1996-248	Inspection	Peter S. Merchant	AIA for construction of West Fraser Mills Ltd's Cutting Permits CP 033-70 & 033-71, Forest Licence A20005, Quesnel FD
1996-301	Inspection	Lindsay Oliver	AIA for a proposed housing subdivision within DL's 3985, 8905 and 9505, Cariboo Land District, west side of Puntchesakut Lake
1997-019	Inspection	Dan Weinberger	AIA for a proposed housing subdivision within District Lot 9511, Cariboo District, except Plan 29013, located south of Puntataenkut Lake.
1997-115	Inspection	Karen Preckel	AIA of forestry operations in the Quesnel Forest District proposed by C&C Wood Products Ltd., West Fraser Mills Ltd., Ministry of Forests, Slocan Forest Products Ltd., Tolko Industries, Weldwood of Canada Ltd., Canadian Forest Products Ltd., and other licencees.
1997-217	Inspection	Sheila J. Minni	AIA of proposed forestry developments for TSL A45241, A47641, A51126, A50819 and A51121, Quesnel Forest District.
1997-218	Inspection	Peter S. Merchant	AIA of proposed 1997 forestry operations and related development activities by Canadian Forest Products Ltd., Tolko Industries, West Fraser Mills Ltd., and other licencees in the Quesnel Forest District.
1997-220	Inspection	Peter S. Merchant	AIA of Tolko Industries, Quest Wood Division's proposed forestry developments in CP22U-6, located in the Quesnel Forest District.
1997-223	Inspection	Ian C. Franck	AIA of Canadian Forest Products Ltd., Clear Lake Division proposed forestry developments in FL A20009, CP 206-1, CP 220-1 and CP 222-1, located in the Quesnel Forest District.
1997-244	Inspection	Susan Woods	Archaeological inventory within the Lhtako Band's asserted traditional territory.
1997-327	Inspection	Susan Woods	AIA of the Ministry of Transportation and Highways' proposed developments for the Gook Road right-of-way and Gook Road/Hydraulic Road interchange, and portions of Dragon Lake Indian Reserve No. 3, located on the west side of Dragon Lake near Quesnel.
1998-068	Inspection	Karen Preckel	AIA of forestry operations in the Quesnel Forest District proposed by C&C Wood Products Ltd., West Fraser Mills Ltd., Ministry of Forests (Quesnel District), Slocan Forest Products Ltd., Tolko Industries, Weldwood of Canada Ltd., Canadian Forest Products Ltd., and other licencees as may be specified.
1998-149	Inspection	Dan Weinberger	AIA of forestry operations proposed by Weldwood of Canada Ltd., Williams Lake Operations throughout the asserted traditional territories of the Williams Lake (Sugarcane) and Soda Creek First Nations within portions of the Williams Lake, Horsefly, Quesnel and 100 Mile House Forest Districts.
1998-155	Inspection	Alison Biely	AIA of proposed recreational and residential development, including timber harvesting, on Lot 1, DL 3383, Cariboo District, Plan 25555 and Lot 2, DL 3383, Cariboo District, Plan 7964 located at Marmot Lake, near Nazko.
1998-191	Inspection	Michael Will	AIA of proposed Weldwood of Canada Ltd.'s (Quesnel Operations) within those portions of the asserted traditional territories of the Kluskus Indian Band, Nazko Band, Lheit-lit'en Nation and Saik'uz First Nation which occur within the Quesnel Forest District.

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
1999-002	Inspection	Kevin Twohig	AIA of proposed forestry operations for Cariboo Forest Consultants Ltd. within Woodlot 806 in the Quesnel Forest
1999-119	Inspection	Marianne Berkey	AIA of forestry developments proposed by C&C Wood Products Ltd., Slocan Forest Products Ltd., Tolko Industries Ltd. - Quest Wood Division, Weldwood of Canada Ltd., West Fraser Mills Ltd.and others, within Quesnel Forest District.
1999-134	Inspection	Normand A.E. Canuel	AIA for a proposed subdivision of District Lot 5440, Lot 2, Plan 26767, Cariboo Land District, located near Dragon Lake.
1999-156	Inspection	Ian C. Franck	Archaeological impact assessment of proposed forestry developments by Tolko Industries, Private Woodlot Licensees (W.L. 1052 and 1053), and other licensees or operators, within Quesnel Forest District.
1999-333	Inspection	Bruce F. Ball	Archaeological impact assessment of Cariboo Forest Consultants Ltd.'s proposed developments, including WL 561 and WL 1642 CPA Block 1, located in the Quesnel Forest District.
1999-342	Inspection	Dan Weinberger	Archaeological impact assessment of a proposed 40 acre cattle feed lot within Lot 1291, Cariboo District, near Pelican Lake, northwest of Quesnel, B.C. Archaeological sites FiRv 1, 2, 3, 9 and FhRv 1 are recorded within or adjacent to the study area.
2000-083	Inspection	Darryl Bereziuk	Archaeological impact assessment of proposed forestry developments managed by Cariboo Forest Consultants Ltd., within the Quesnel Forest District on the east side of the Nazko River.
2000-118	Inspection	Marianne Berkey	Archaeological assessments for timber sales and other forestry operations proposed by Canadian Forest Products Ltd., Jackpine Forest Products Ltd., Slocan Forest Products Ltd., Weldwood of Canada Ltd., West Fraser Mills Ltd., and other forestry licensees, within the Quesnel Forest District.
2000-121	Inspection	Normand A.E. Canuel	Archaeological impact assessment of proposed forestry developments by Canadian Forest Products and other licensees within the Quesnel Forest District
2000-134	i\Inspection	Robert Muir	Archaeological impact assessment of proposed Ministry of Forests, Tolko Industries, Slocan Forest Products, Canadian Forest Products Ltd., and other unidentified licensees proposed forestry operations within the Quesnel Forest District.
2000-300	Inspection	Richard Gilbert	Archaeological impact assessment of proposed forestry operations within Timber Sale Licences: A55573, A55827, A56040 and A56041, located in the Quesnel Forest District; A63788 and A63789, located in the Horsefly Forest District, and; A56385 (Blocks 6 to 9), located in the Williams Lake Forest District.
2000-303	Inspection	Marianne Berkey	Archaeological impact assessment of the proposed International Wayside Gold Mines Ltd.'s Cariboo Gold Project located in the Quesnel Highlands, south of Jack of Clubs Lake near Wells.
2000-305	Investigation	Marianne Berkey	Systematic data recovery at archaeological site FfRo 23 at the intersection of Gook and Hydraulic roads (Dragon Lake IR 3), near Quesnel BC
2000-392	Inspection	Jeff Bailey	Archaeological impact assessment of the Ministry of Transportation and Highways' new bridge crossing of the Cottonwood River, realignment of Highway 97, and ancillary developments located approximately 13 km north of the Barkerville Hwy 26 Junction in Quesnel in central B.C.
2001-071	Inspection	Robert Muir	Archaeological impact assessment of proposed forestry operations by Ministry of Forests, Tolko Industries, Slocan Forest Products, Chiltech Forestry, Jackpine Engineered Forest Products, C & C Wood Products, and possible other licencees, within the Quesnel Forest District.

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
2001-093	Inspection	Normand A.E. Canuel	Archaeological impact assessment of Fred Bartells' proposed subdivision of Lot 1, District Lot 5440, CLD Plan 22493, Cariboo Land District, located on the east side of Dragon Lake near Quesnel.
2001-113	Inspection	Ian Wilson	Archaeological inventory and impact assessment of the proposed Paris Pit gravel pit development for MoTH, Northern Region located aproximately 30km southeast of Quesnel.
2001-131	Inspection	Marianne Berkey	Archaeological assessments for forestry developments proposed by Tolko Industries, Jackpine Forest Products Ltd., Slocan Forest Products Ltd., Weldwood of Canada Ltd., West Fraser Mills Ltd., and possible other forestry licensees, within the Quesnel Forest District.
2001-137	Inspection	Normand A.E. Canuel	Archaeological impact assessment of proposed forestry developments by Weldwood Canada Ltd and possible other licensees within the Quesnel Forest District.
2001-238	Inspection	Richard Gilbert	Archaeological impact assessment of proposed forestry operations for Woodlot 533, south of the City of Quesnel, NTS Map Sheet 93 B/16, Quesnel Forest District.
2001-254	Inspection	Walter Kowal	Archaeological impact assessments of proposed forestry developments in the Quesnel Forest District on behalf of Cariboo Forest Consultants Ltd
2001-258	Inspection	Walter Kowal	Archaeological impact assessment of West Fraser Mills Ltd.'s proposed forestry developments for the Quesnel Forest District.
2001-291	Inspection	Ian C. Franck	Archaeological impact assessment of proposed forestry operations by Ministry of Forests, Tolko Industries, Slocan Group, C & C Wood Products, Weldwood of Canada Ltd, and possible other unidentified licensees within the Quesnel Forest District.
2001-376	Inspection	Bruce Ball	Archaeological Impact Assessments on behalf of Paradigm Logging Ltd. in the Hill Lake and Narcosli Creek areas of the Quesnel Forest District.
2002-065	Inspection	Marianne Berkey	Archaeological impact assessments for forestry developments proposed by Weldwood of Canada Ltd., West Fraser Mills Ltd., and possible other forestry licensees, within the Quesnel and Prince George Forest Districts.
2002-069	Inspection	Ty Heffner	Archaeological impact assessment of proposed forestry developments by Tolko Industries Ltd, and possible other licencees, within the Quesnel Forest District.
2002-138	Inspection	Dan P. Weinberger	Archaeological impact assessment of proposed forestry developments on behalf of Riverside Forest Products Ltd. within portions of the Quesnel Forest District lying east of the Nazko River and west of Wells, BC.
2002-178	Inspection	Richard P. Brolly	Archaeological inventory and impact assessment of Westcoast Energy Inc.'s proposed looping of the Southern Mainline natural gas pipeline system, including ancillary and temporary facilities adjacent or near the existing pipeline right-of-way in the general vicinity of Alexandria, 150 Mile House, Lone Butte, and Savona, in the south-central interior of British Columbia.
2002-181	Inspection	Bruce Ball	Archaeological impact assessment of West Fraser Mills Ltd.'s proposed forestry developments for the Quesnel Forest District.
2002-182	Inspection	Ian C. Franck	Archaeological impact assessment of proposed forestry operations by Tolko Industries and possible other licencees within the Quesnel Forest District.
2002-185	Inspection	Bruce Ball	Archaeological impact assessment of Cariboo Forest Consultants Ltd.'s proposed forestry developments in the Quesnel Forest Districts.

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
2002-198	Inspection	Richard Gilbert	Archaeological impact assessment of forest development activities as requested by Westroad Resource Consultants Ltd. and their clients within 1:20,00 scale mapsheets 93A.071, 93A072, 93A.081, 93A.082, 93B.001 to 93B.100, 93G.01 to 93G.029, 93G.031 to 93G.033, 93H.001 to 93H.003, 93H.011 to 93H.013, and 93H.021 to 93H.023, in the Quesnel Forest District, north-central BC.
2002-230	Inspection	Joanne E. Green	Archaeological impact assessment of proposed forestry operations by Tolko Industries in Blocks CP 45, Block 2 (Ramsey Creek), CP 650 Blocks 1 to 4 and 6 to 8 and access roads (Blackwater River), CP 640 Block 2 (Tripp Creek) and CP 513 Block 1 (Baker Creek) all within the Quesnel Forest District.
2002-394	Inspection	Dan P. Weinberger	Archaeological impact assessment of Montane Forest Consultants Ltd.'s proposed forestry developments in an area in the vicinity of Tingley Creek, Quesnel Forest District, shown in a map attached to the permit application.
2003-070	Inspection	Marianne Berkey	Archaeological impact assessment of forestry developments proposed by West Fraser Mills Ltd., and possibly other proponents, to be identified, in the Quesnel and Prince George Forest Districts, BC
2003-106	Inspection	Ty Heffner	Archaeological impact assessment of proposed forestry developments by Tolko Industries Ltd (Quest Wood Division), and possible other proponents, within the Quesnel Forest District.
2003-114	Inspection	Ty Heffner	Archaeological impact assessment of Slocan Forest Products Ltd.'s proposed forestry developments within their operating areas in the Quesnel Forest District
2003-132	Inspection	Simon P. Kaltenrieder	Archaeological impact assessment of forestry developments proposed under the Ministry of Forests Small Business Forest Enterprise Program for the Quesnel Forest District.
2003-134	Inspection	Susan McNeney	Archaeological impact assessment of forestry developments proposed by Weldwood of Canada Ltd within the Prince George and Quesnel Forest Districts.
2003-139	Inspection	Ian C. Franck	Archaeological impact assessment of proposed forestry operations by Tolko Industries (Quest Wood Division), C & C Wood Products Ltd. and possible other licencees within the Quesnel Forest District.
2003-189	Inspection	Dan P. Weinberger	Archaeological impact assessment of Riverside Forest Products Ltd.'s proposed forestry developments within the Quesnel Forest District.
2003-220	Inspection	Richard Gilbert	Archaeological impact assessment of the proposed expansion of the College of New Caledonia North Cariboo Community Campus located on the remainder of Parcel A, District Lots 51, 77 and 710, Cariboo Land District, Plan 34959, within the City of Quesnel.
2003-322	Inspection	Susan McNeney	Archaeological impact assessment of The Ministry of Transportation's proposed relignment of a portion of the Nazko Highway, locally known as "Dunn's Corner" within the Cariboo Highway District.and located aproximately 46 km west from Quesnel, BC,
2003-330	Inspection	Dan P. Weinberger	Archaeological impact assessment of McFarlane Meadows Nature Tours Ltd.'s prosposed developments, including construction of 9 buildings, on a 6.5 ha commercial and recreational permit and lease located approximately 23 km SSW of Nazko, BC

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

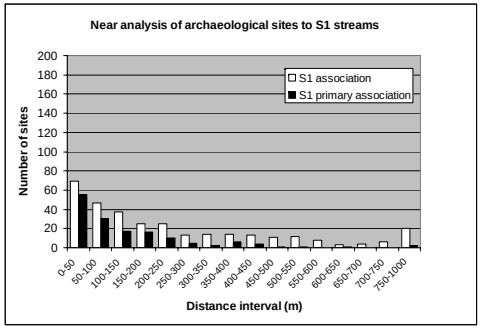
Permit Number	Permit Type	Permittee	Description
2004-074	Inspection	Marianne Berkey	Archaeological impact assessment of proposed forestry developments by West Fraser Mills Ltd., Jackpine Forest Products Ltd., and possible other licencees within the Prince George and Quesnel Forest Districts.
2004-077	Inspection	Ty Heffner	Archaeological impact assessment of proposed forestry developments by Tolko Industries Ltd (Quest Wood Division), and possible other proponents, within the Quesnel Forest District.
2004-078	Inspection	Dan P. Weinberger	Archaeological impact assessments for forestry operations within the Quesnel Forest District as proposed by Riverside Forest Products Ltd. and other proponents as may be identified.
2004-082	Inspection	Ty Heffner	Archaeological impact assessment of Slocan Forest Products Ltd.'s proposed forestry developments within their operating areas in the Quesnel Forest District
2004-104	Inspection	Susan McNeney	Archaeological impact assessment of forestry developments proposed by Weldwood of Canada Ltd within the Prince George and Quesnel Forest Districts.
2004-144	Inspection	Simon P. Kaltenrieder	Archaeological impact assessment of forestry developments proposed under the Ministry of Forests, B.C. Timber Sales, for the Quesnel Forest District.
2004-159	Inspection	Hugh K. Middleton	Archaeological impact assessment of forestry developments proposed by West Chilcotin Forest Products Ltd. operating within the Chilcotin, Vanderhoof and Quesnel Forest Districts.
2004-172	Investigation	Ty Heffner	Systematic data recovery from archaeological site FfRs 55, prior to the Ministry of Transportation's proposed realignment, and ancillary developments, of a portion of Nazko Road #59 in the vicinity of "Dunn's Corner", located aproximately 46 km west of Quesnel, BC near District Lot 9513 and within the Cariboo Highway District
2004-388	Inspection	Dan P. Weinberger	Archaeological impact assessment for development of the proposed Redwater Creek Bottling Plant and Well Site, and ancillary developments, located west of Nazko along Redwater Creek, between District Lots 9908 and 2144, Cariboo District
2004-414	Alteration	Wes Wiebe	Alterations by Ministry of Transportation to archaeological site FeRm-11 during erosion repair and road construction along the Quesnel Hydraulic Road near the confluence of the Quesnel River and Twyler Creek.
2005-078	Inspection	D. Geordie Howe	Archaeological impact assessments for proposed forestry developments and forest health activities for West Fraser Mills Ltd. within the Quesnel and Prince George Forest Districts.
2005-084	Inspection	Ty Heffner	Archaeological impact assessment of proposed forestry developments by Tolko Industries Ltd., Quest Wood Division, and possible other operators or licensees, operating within the Quesnel Forest District.
2005-103	Inspection	Susan McNeney	Archaeological impact assessment of forestry developments proposed by West Fraser Mills Ltd. within the Prince George and Quesnel Forest Districts.
2005-116	Inspection	Susan McNeney	Archaeological impact assessment of forestry developments proposed by the Ministry of Forests, BC Timber Sales, within the Quesnel Forest District
2005-166	Inspection	Dan P. Weinberger	Archaeological impact assessment of forestry developments that may be proposed by Riverside Forest Products Ltd.,and possibly other licencees, within the Quesnel Forest District.
2005-177	Inspection	Hugh K. Middleton	Archaeological impact assessment of forestry developments proposed by West Chilcotin Forest Products Ltd. under licences held by Yun Ka Whu'Ten Holdings Ltd. within portions of the Chilcotin, Vanderhoof and Quesnel Forest Districts.

Heritage Inspection Permits Relating to Work Conducted in the Quesnel Forest District.

Permit Number	Permit Type	Permittee	Description
2005-194	Inspection	Ty Heffner	Archaeological impact assessment of Canadian Forest Products Ltd.'s proposed forestry developments within their operating areas in the Quesnel Forest District
2005-237	Inspection	Ty Heffner	Archaeological impact assessments of the Ministry of Transportation's proposed projects in the North Cariboo Service Area of the Cariboo Highway District, roughly centred in the vicinity of Quesnel, BC.
2005-267	Inspection	Dan P. Weinberger	Archaeological impact assessments of as yet unspecified transportation and highway related projects and ancillary developments which may be proposed by the Ministry of Transportation within their Southern Interior Region of BC.
2005-335	Inspection	Ty Heffner	Archaeological inventory within the eastern portion of the Itcha Ilgachuz Provincial Park, BC within map sheets 93 C/10, 11, 14 & 15.
2005-398	Alteration	Gerry Grant	Possible alterations by Ministry of Forests and Range to: a) archaeological site FdRr 1 from proposed construction activities at and near the Tzenzaicut Lake Recreation Site including regravelling of Tzenzaicut Lake access road, construction of a road pullout, replacement of an existing fenceline, and construction of an information kiosk, and; b) archaeological site FdRr 13 from regravelling of the same access road; all activities located on the west side of Tzenzaicut Lake within the Quesnel Forest District.
2006-002	Inspection	Susan McNeney	Archaeological impact assessments of proposed Placer Leases 404890-404896, located 35 km SE of Quesnel, on behalf of Rical Mining Ltd., Cariboo Mining Division
2006-104	Inspection	Ty Heffner	Archaeological impact assessment of forestry developments proposed by Tolko Industries in the Central Cariboo, Chilcotin, Quesnel and 100 Mile House Forest Districts
2006-110	Inspection	Ty Heffner	Archaeological impact assessment of forestry developments proposed by West Fraser Mills Ltd. in the Quesnel and Prince George Forest Districts.
2006-114	Inspection	D. Geordie Howe	Archaeological impact assessment of forestry developments proposed by West Fraser Mills Ltd. and possible other timber harvesting operators, to be identified, in the Quesnel and Prince George Forest Districts.
2006-116	Inspection	Susan McNeney	Archaeological impact assessment of forestry developments proposed by BC Timber Sales another other as yet unidentified licencees and forestry tenure holders in the Quesnel Forest District.
2006-165	Inspection	Ty Heffner	Archaeological impact assessment for Kluskus Management Holdings Ltd.'s proposed forestry operations in Supply Block A of the Quesnel Forest District.
2006-168	Inspection	Ty Heffner	Archaeological impact assessment for Canadian Forest Products in the Quesnel Forest District

APPENDIX C

Near Analysis Charts and Table



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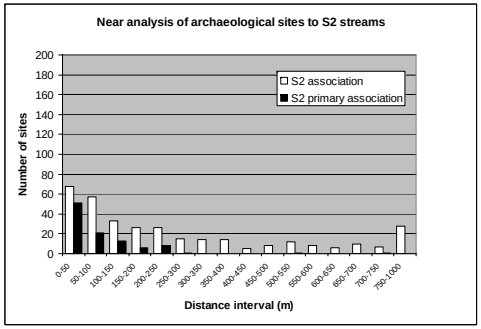

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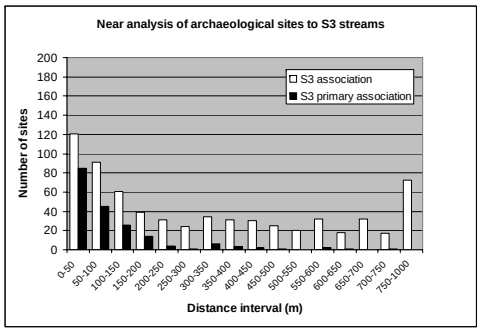

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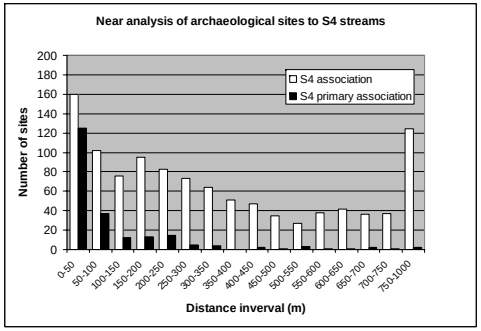

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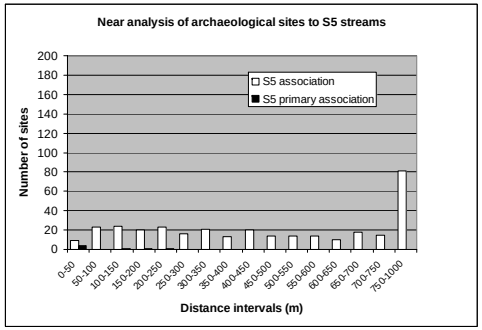

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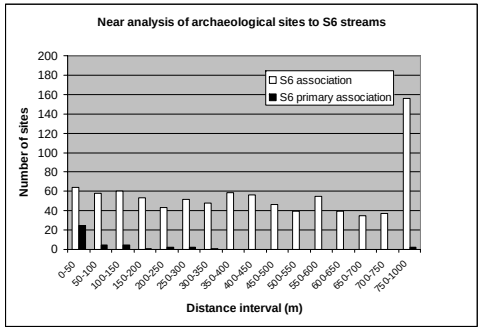

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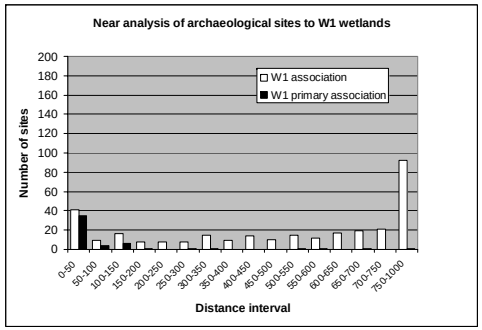

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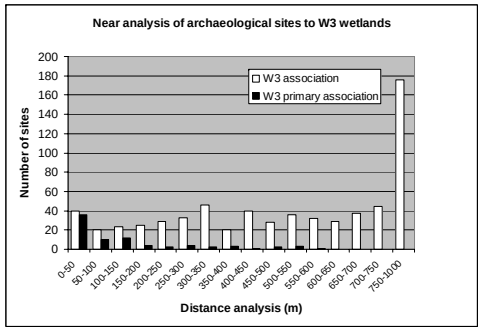

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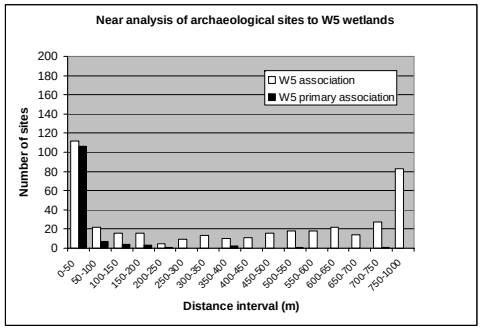

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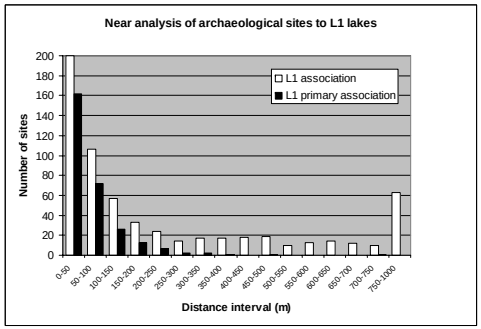

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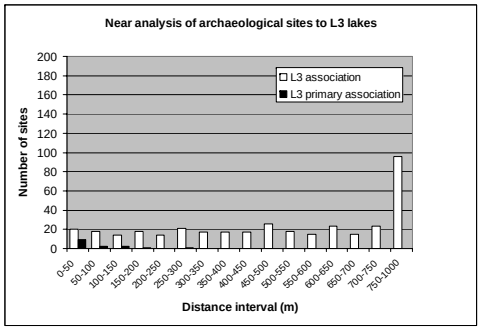

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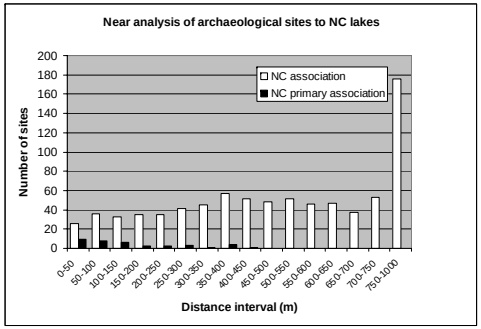

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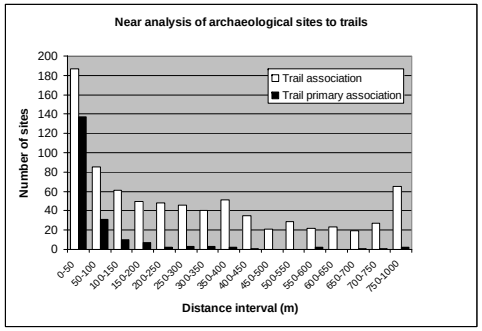

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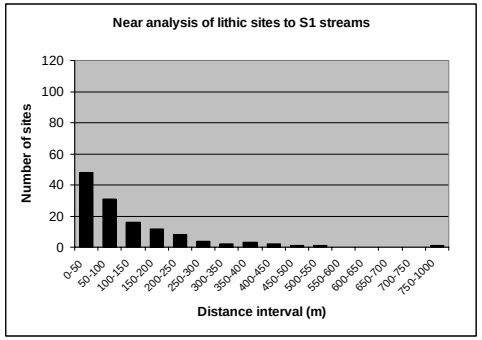
Figures 1-13: Near analysis of archaeological sites to hydrological and trail features in the Quesnel Forest District

Table 1: Summary of Primary and Secondary Association Analysis by Hydrological Feature

Feature	Number of Archaeological Sites Found in Primary Association	Secondary Association												
		S1	S2	S3	S4	S5	S6	W1	W3	W5	L1	L3	NC	No association
S1 Classified Stream	128		3	11	22	7	0	1	8	0	4	2	8	62
S2 Classified Stream	99	2		6	13	8	1	0	2	1	9	3	6	48
S3 Classified Stream	174	3	3		38	25	25	3	7	7	13	2	5	43
S4 Classified Stream	202	14	1	24		0	81	4	9	4	14	4	12	35
S5 Classified Stream	7	2	2	3	0		0	0	0	0	0	0	0	0
S6 Classified Stream	38	4	0	13	20	0		0	0	0	0	0	0	1
W1 Classified Wetland	41	0	0	8	17	0	0		0	0	7	1	6	9
W3 Classified Wetland	64	3	6	5	12	0	0	0		1	8	13	6	10
W5 Classified Wetland	121	3	6	32	18	1	0	0	1		24	14	11	11
L1 Classified Lake	280	9	50	21	57	1	3	10	12	16		0	1	100
L3 Classified Lake	14	0	1	2	6	0	0	0	0	1	0		0	4
NC Lake	27	8	2	3	2	0	0	1	1	2	0	0		8



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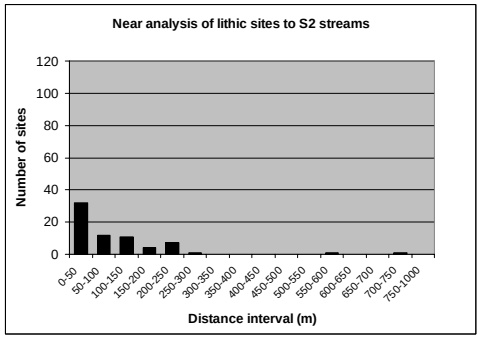

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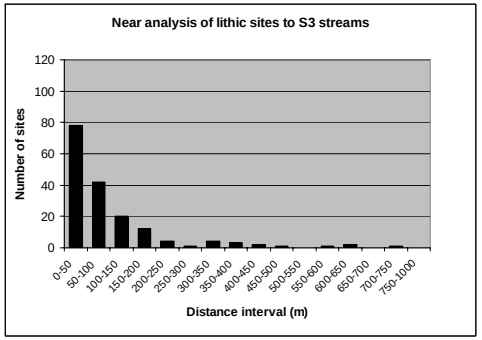

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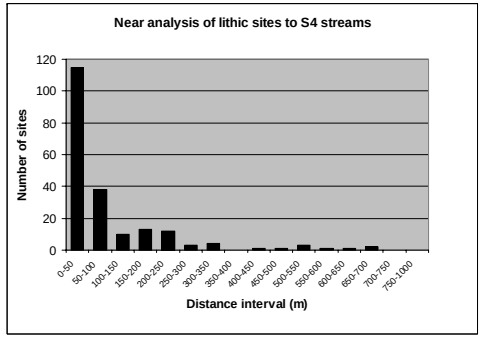

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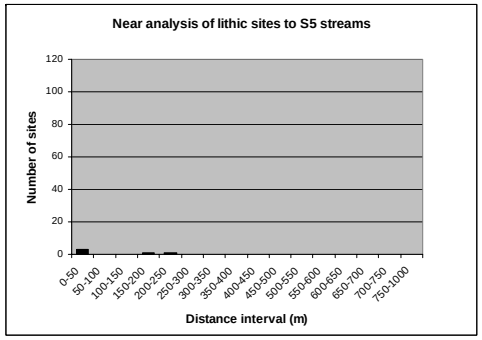

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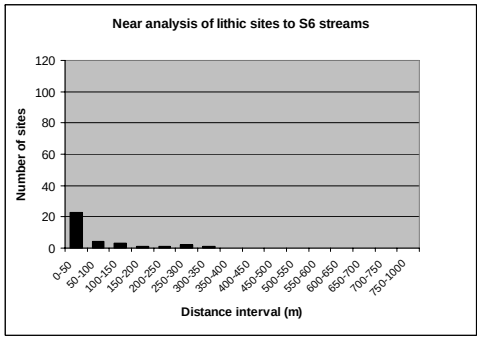

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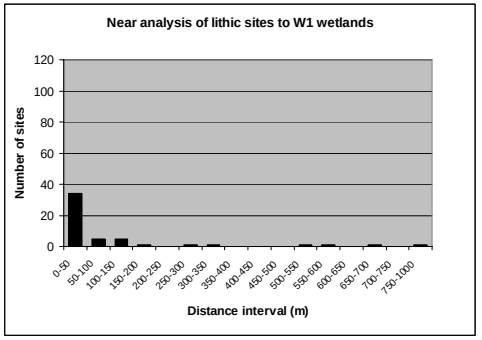

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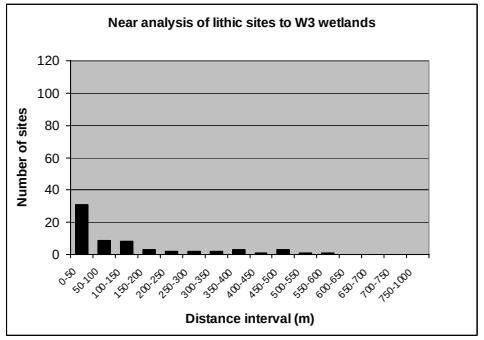

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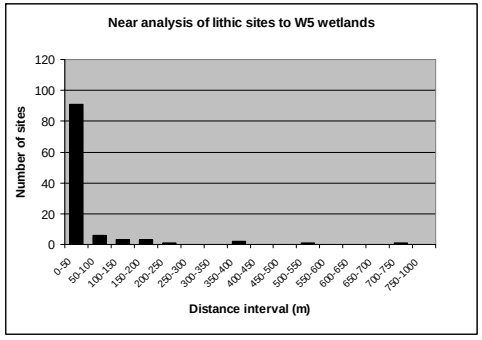

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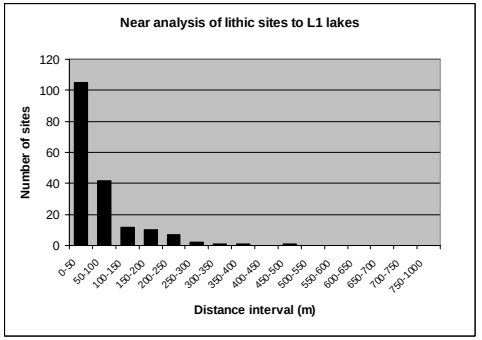

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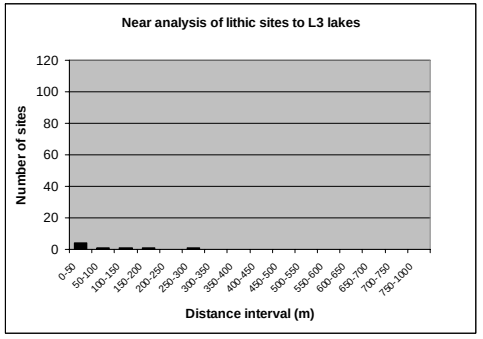

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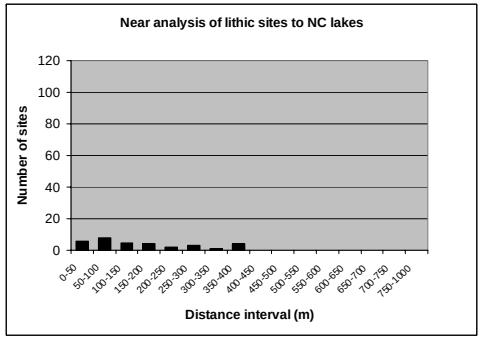

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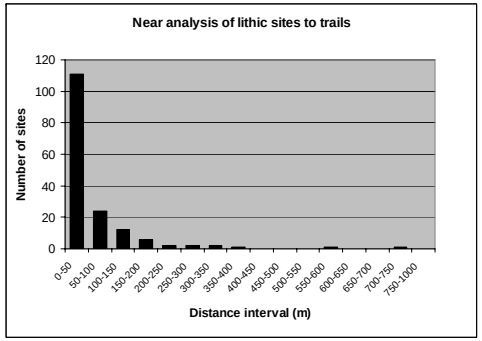
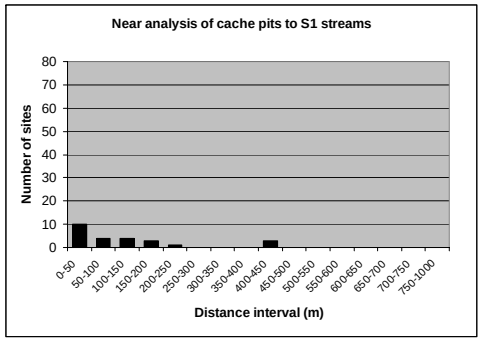


26

Figures 14-26: Near analysis of lithic sites to hydrological and trail features in the Quesnel Forest District



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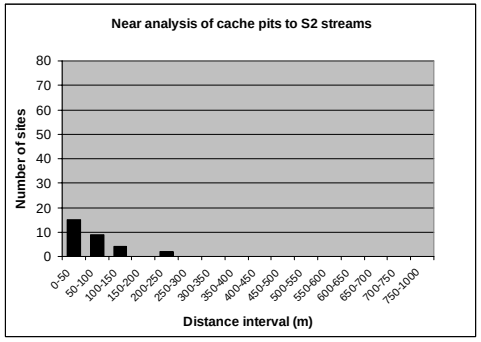

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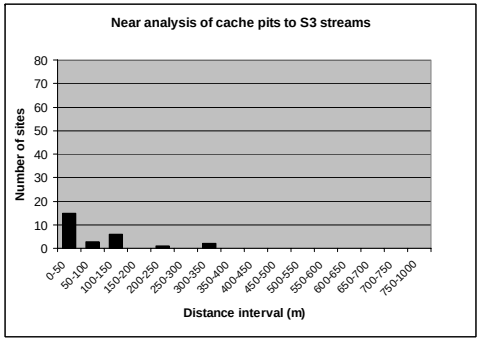

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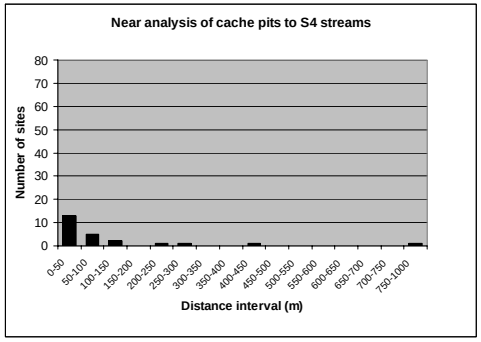

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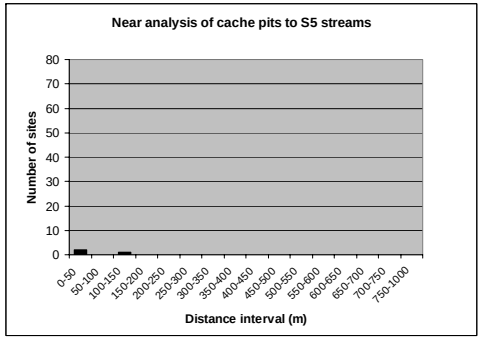

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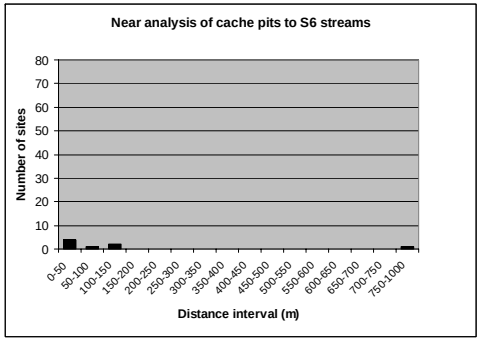

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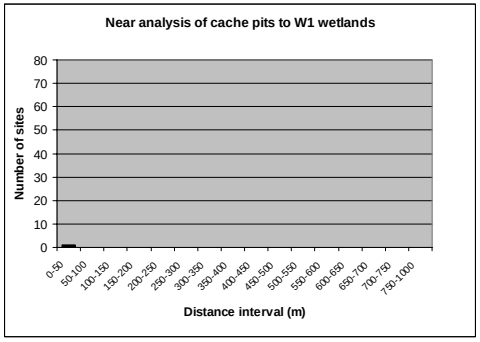

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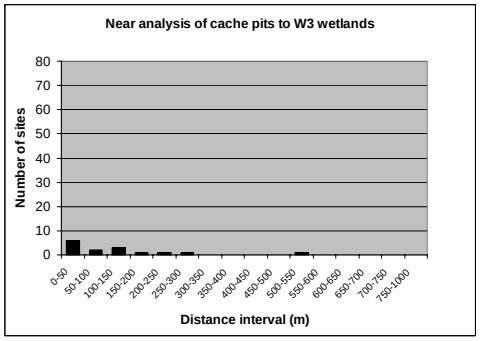

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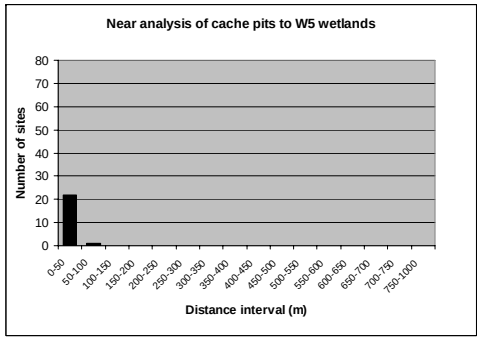

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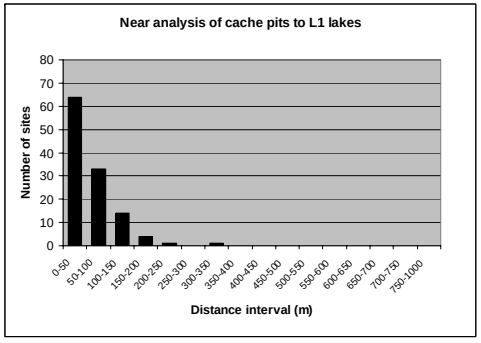

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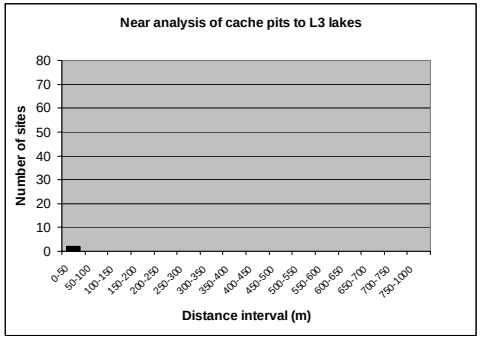

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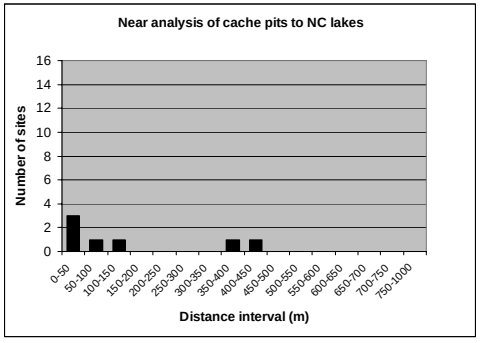

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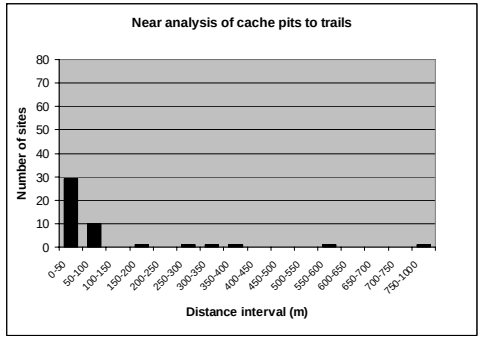
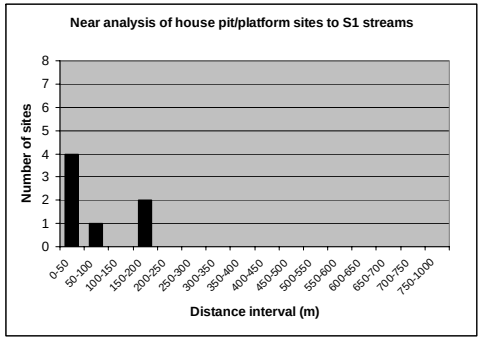


39

Figures 27-39: Near analysis of cache pit sites to hydrological and trail features in the Quesnel Forest District



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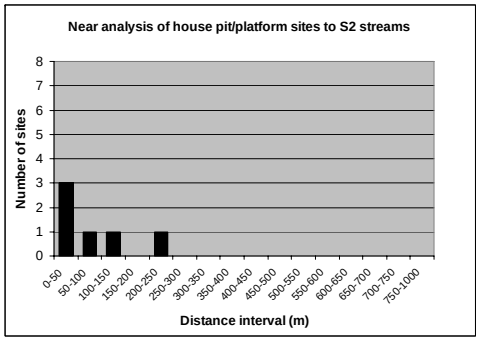

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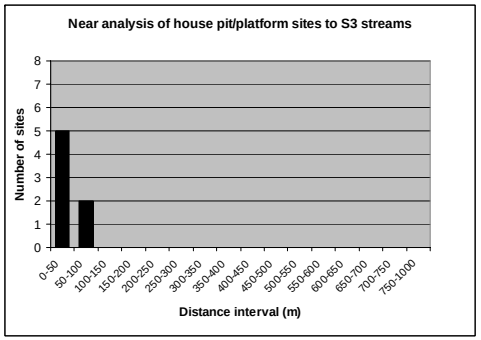

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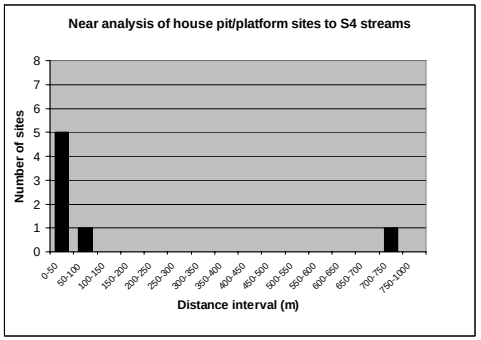

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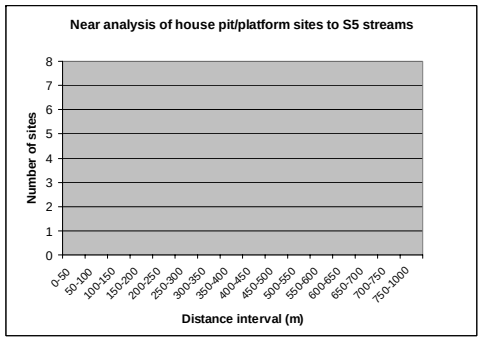

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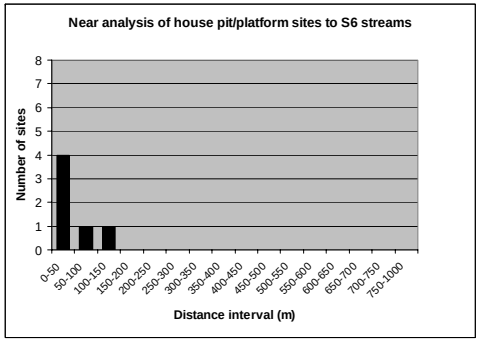

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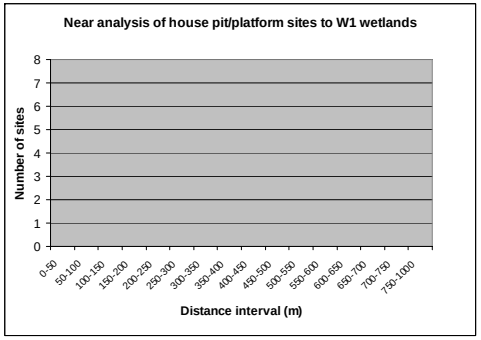

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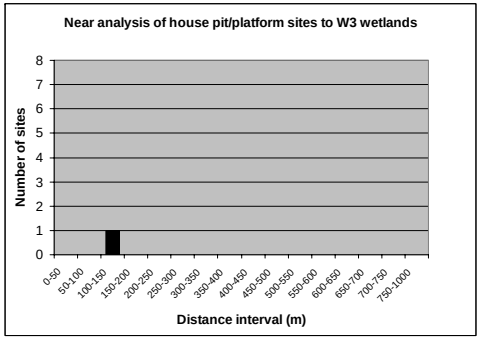

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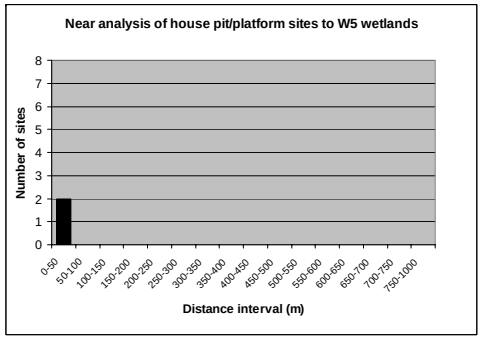

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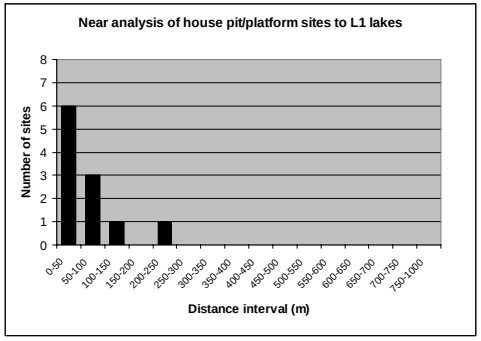

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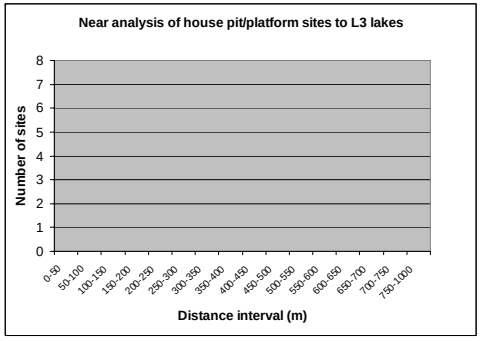

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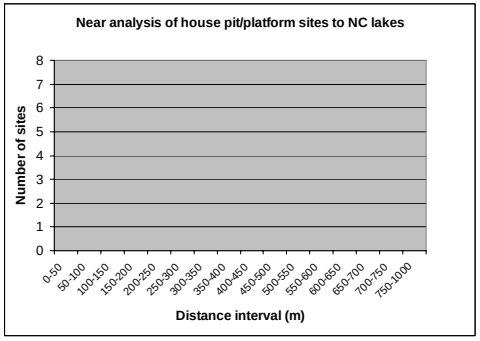

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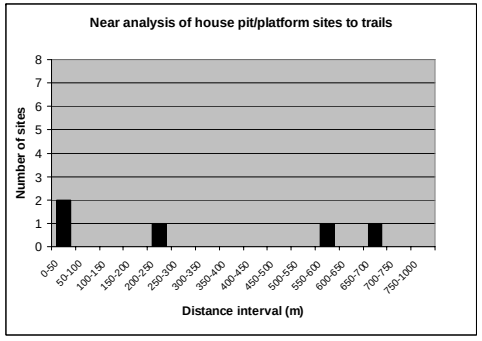
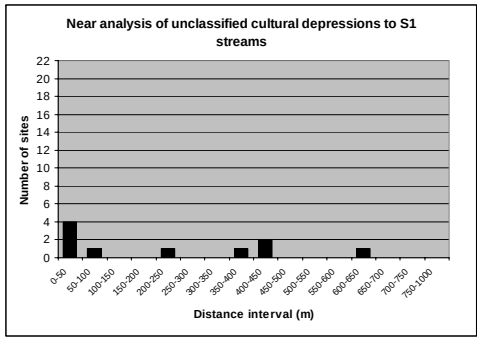


52

Figures 40-52: Near analysis of habitation sites to hydrological and trail features in the Quesnel Forest District



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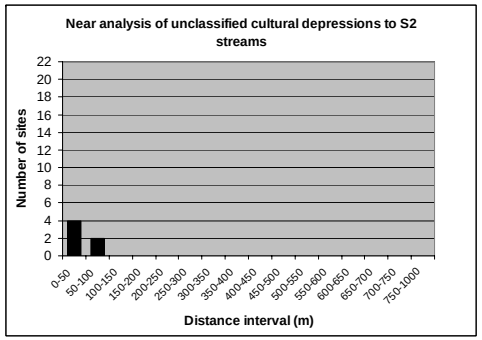

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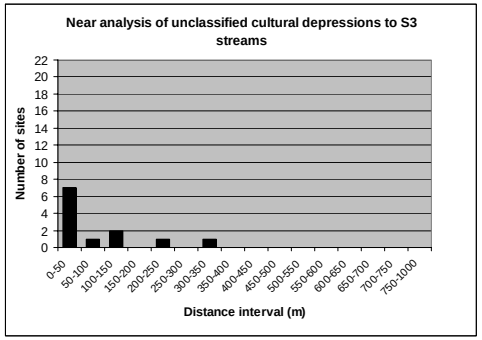

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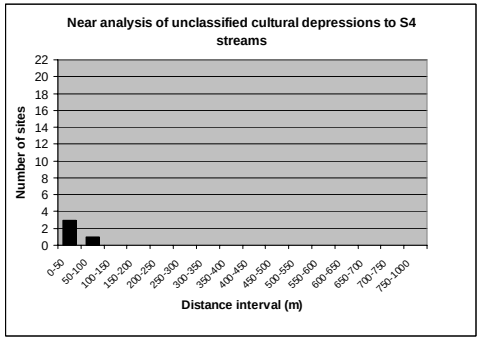

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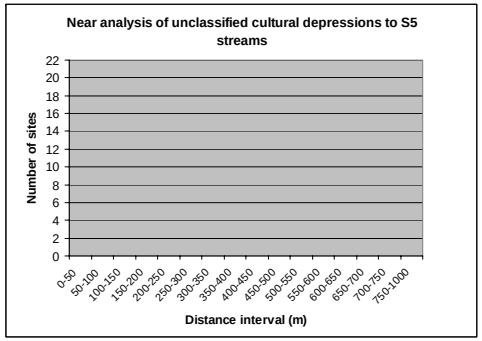

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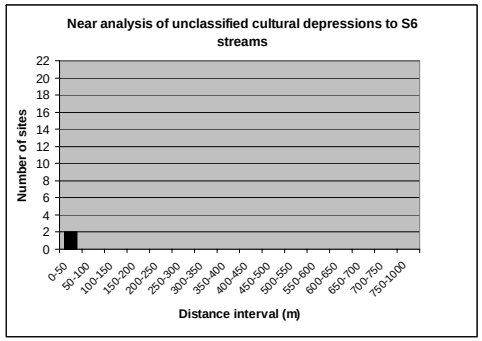

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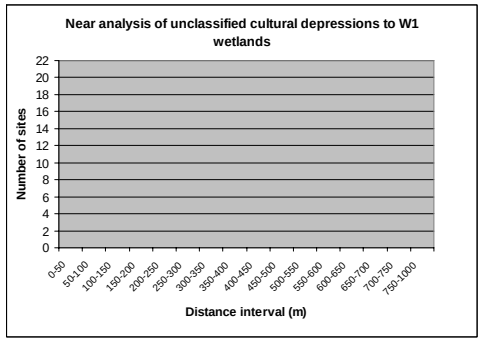

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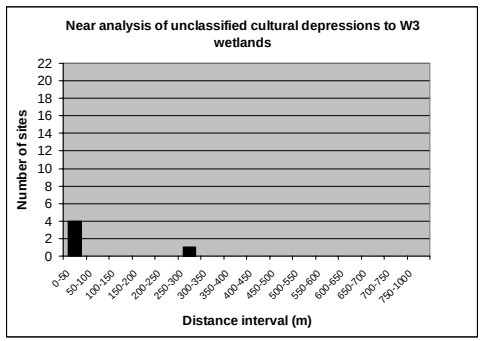

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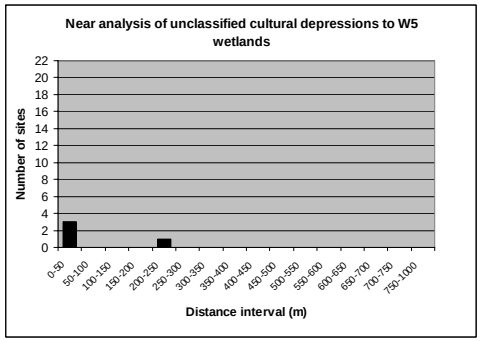

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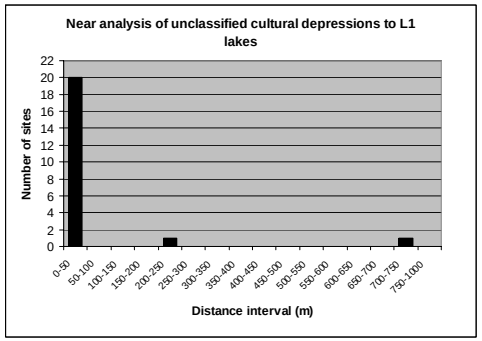

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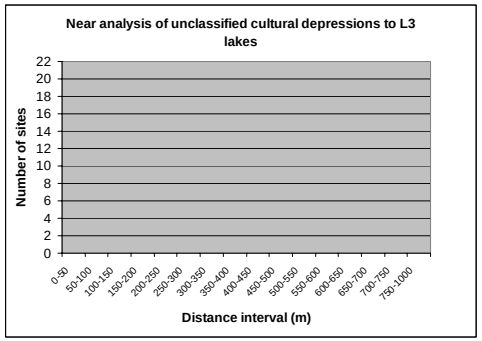

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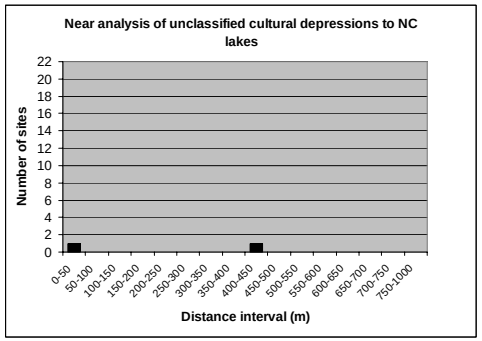

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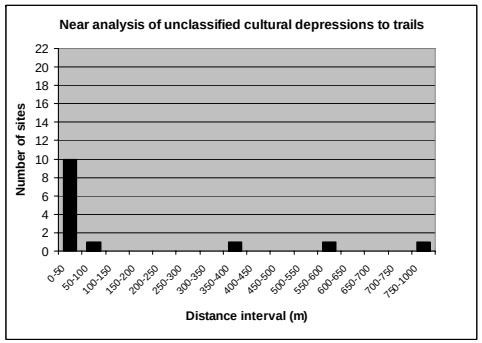

65

Figures 53-65: Near analysis of unclassified cultural depression sites to hydrological and trail features in the Quesnel Forest District


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