
Archaeological Overview Assessment of the Squamish Forest District

TECHNICAL REPORT

Submitted to:

The Ministry of Forests, Squamish Forest District

and

Archaeology Branch, Ministry of Small Business, Tourism and Culture

(Permits 1997-85, 1997-112, 1997-119)

In-SHUCK-ch/N'Quat'qua

Lil'wat Nation

Musqueam Band

Sto:lo Nation Canada

Squamish Nation

(Permit 1996-12)

Tseil-Waututh First Nation

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Management Summary

In January of 1996 Millennia Research was contracted to conduct an Archaeological Overview Assessment (AOA) of the Squamish Forest District (Archaeology Branch Permits 1997-085, 1997-112, 1997-119; Squamish Nation Permit 1996-12). In conjunction with Timberline Forestry Consultants, Millennia produced a model and a series of 1:20,000 scale potential maps which delineate areas of archaeological potential within the boundaries of the Squamish Forest District.

The model used to produce the potential polygons for each site type (habitation, rock art, sub-alpine camp and culturally modified tree [CMT]) was based upon sets of variables which were determined to be consistent for a particular site type (i.e. habitation sites are likely to be located close to water on a relatively flat piece of land etc.). All variables for each site-type model were loaded into the GIS and, using TRIM data, topographic and elevation information, the GIS produced maps which detail polygons of high and moderate potential. Low potential areas are considered to be all those not differentiated as moderate or high.

Following the application of the original model, base-line data in the form of recorded (at the Archaeology Branch) and known (to the First Nations) sites were used to test the model. Initial analysis revealed that a majority of the recorded and known sites were not being caught in archaeological potential polygons. Consequently, model variable parameters were adjusted and reapplied in order to ensure that the majority of known sites were caught and also to increase the chance that similar, unrecorded sites would be caught.

In-field testing of the model revealed that the GIS generated potential maps closely predicted the landscape and delineate areas of archaeological potential. However, the field tests provided some data upon which refinements for individual models were made. Particularly it was shown that the slope from TRIM maps was too generalized for the Rock Art Model and therefore this model was abandoned.

The Squamish AOA has resulted in a series of maps which delineate areas of archaeological potential. The final maps are labelled as high, medium or low potential.

It is recommended that all areas identified as high potential for archaeological sites be subject to an AIA and areas of moderate potential a RECCE. Although not required, it is strongly recommended that RECCEs be conducted under an Archaeology Branch permit so as to maintain a standard methodological approach and quality results. Minimum methodological requirements for both AIAs and RECCEs are presented in the recommendations section of this report.

Areas defined as high or moderate potential for CMTs only can be subjected to an CMT Inventory as opposed to an AIA or RECCE. CMT inventories can be conducted by forestry personnel and/or First Nations individuals trained in CMT identification and recording.

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INTRODUCTION

In January of 1996, The Ministry of Forests (Squamish Forest District) contracted Millennia Research to conduct an Archaeological Overview Assessment (AOA) of the Squamish Forest District. Millennia Research subcontracted Timberline Forestry Consultants to provide their GIS expertise. Summaries of ethnographic sources, archaeological research, historical records, and resource localities in the Squamish Forest District were commissioned as part of the project. These and other data were analyzed and used to create a predictive model. A GIS system was used to apply the model and produce archaeological potential maps at a 1:20,000 scale.

The Squamish Forest District is located in south-western British Columbia (see Figure 1) and encompasses portions of five First Nations territories. Discussions were initiated with the Musqueam Nation, the Lil'wat Nation (Mount Currie Band), the Squamish Nation, the Tsleil-Waututh Nation (Burrard Band), the In-SHUCK-ch/N'Quatqua Treaty Task Group, and the Sto:lo Nation at the commencement of this project. Meetings were held with all but the Tsleil-Waututh Nation.

The purpose of the archaeological overview is to predict site potential within the Forest District to determine where further archaeological work is required so that archaeological interests might be taken into account in the Forest District planning process. Archaeological predictive modelling is a means of focusing limited archaeological management resources on locations that are believed to have the greatest potential for cultural and archaeological significance.

A large part of the Squamish Forest District has never been examined by archaeologists for archaeological/heritage values, and it was therefore necessary to base some of the present predictions on data collected from similar environmental contexts elsewhere in the vicinity. A broad range of information sources were consulted, including published and unpublished archaeological, ethnographic, historical, archival, geological, geomorphological, biophysical, and palaeoenvironmental literature. In addition, the First Nations whose territories encompass portions of the Forest District provided guidance and information which assisted with the research and modelling process. Although predictive modelling can assist in the planning process by attempting to focus archaeological efforts it is no substitute for strict inventory and should not be used as such.

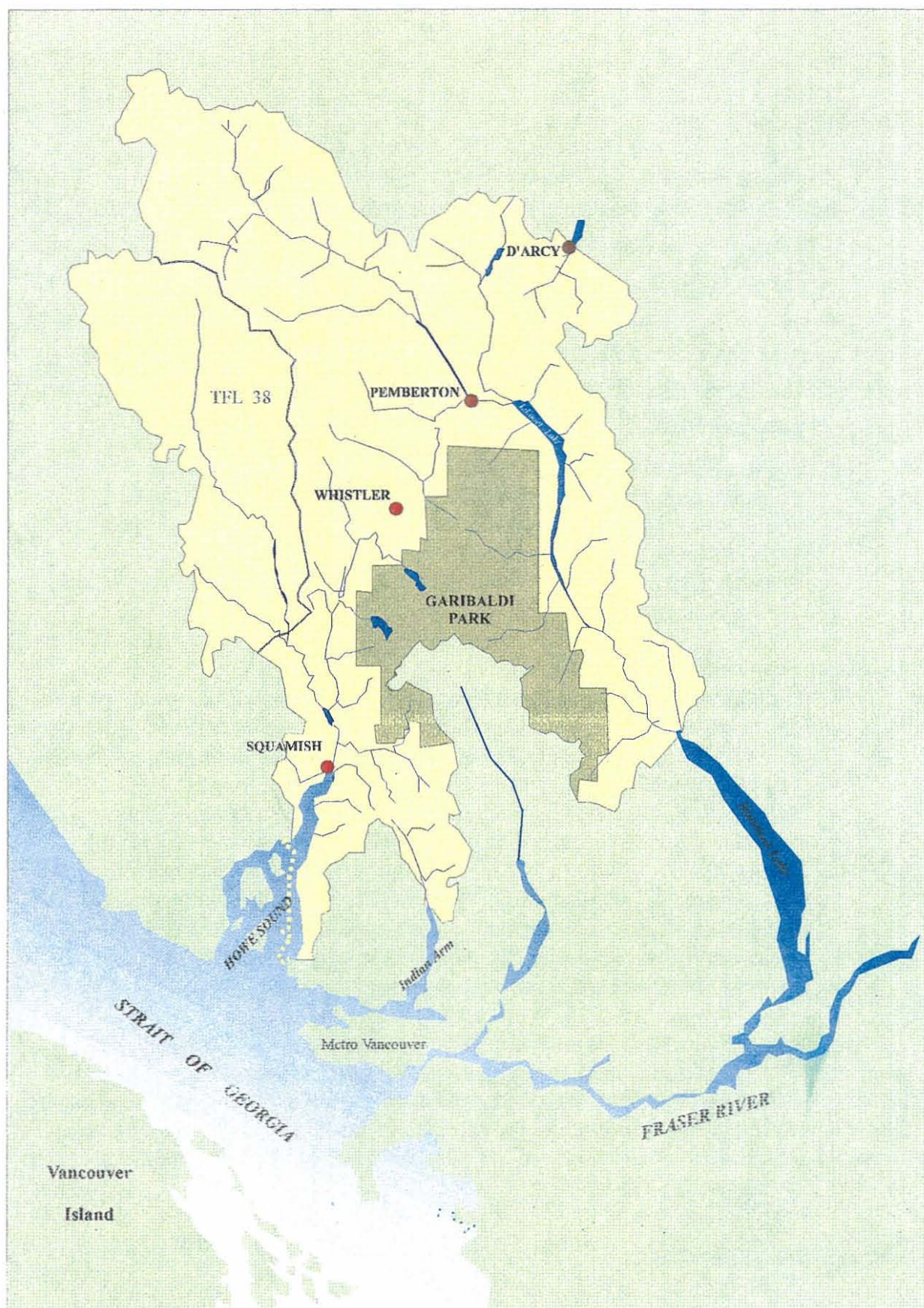


Figure 1. The Squamish Forest District.

Relevant Legislation

According to the *British Columbia Forest Practices Code Act* (1994) and the *Ministry of Small Business, Tourism and Culture and Ministry of Forests Protocol Agreement on the Management of Cultural Heritage Resources* (1997), cultural heritage resources are recognized as integral components of Provincial lands. The *Protocol Agreement* states that “cultural heritage resources will be managed so that their inherent values are protected, maintained, or enhanced according to the principles of integrated resource management” (Section 3.3). These statements comply with, and are subject to the *Heritage Conservation Act* (1994), section 6, which states:

- Archaeological sites within the province of British Columbia, whether on private or public lands, are protected by the *Heritage Conservation Act* (the *Act*);
- It is against the law to damage, desecrate or alter an archaeological site in British Columbia unless under a permit issued by the Archaeology Branch;
- Sites which date prior to 1846 are automatically protected under the *Act*; and;
- Certain sites such as burials and rock art are protected regardless of age.

Penalties under the *Act*

- **Individuals** who knowingly or unknowingly disturb an archaeological site are in contravention of the *Act* and are subject “to a fine of not more than \$50,000 or to imprisonment for a term of not more than 2 years or to both. (the *Act* Section 31(3)(a) 1995:47).
- **Corporations** who knowingly or unknowingly disturb an archaeological site are subject to a fine of not more than \$1,000,000”(the *Act* Section 31(3)(a),(b) 1995:47).
- Furthermore, the *Act* (section 31.(4) 1995: 47) states that “if a corporation commits an offence under this Act, an **employee, officer, director or agent of the corporation** who authorized, permitted or acquiesced in the offence also commits the offence and is liable [to the penalties outlined above]”.

The **Archaeology Branch**, which is part of the B.C. Ministry of Small Business, Tourism and Culture is responsible for administering the *Act*. The Archaeology Branch is located in Victoria, B.C. and should be contacted for further information regarding the *Act*. A copy of the *Act* is included in Appendix 2 of this report. The *Act* is also included in the *British Columbia Archaeological Impact Assessment Guidelines* copies of which are available from the Branch upon request

Information Confidentiality

When gathering cultural heritage information for an archaeological overview assessment, several confidentiality issues must be addressed. Knowledge concerning the location and nature of cultural heritage sites is considered very sensitive and many First

Nations groups are reluctant to release it. However, because a successful AOA depends largely on the amount of detailed information we are able to access, consultation with First Nations is essential. Due to the reluctance on the part of First Nations to release culturally sensitive information, confidentiality clauses must be established so that any information the First Nations are willing to provide is not indiscriminately disseminated. In an effort to provide some information confidentiality, known and recorded (at the Archaeology Branch) site locations along with other types of traditional use information have been plotted on a map layer available for 'view-only' purposes at the Ministry of Forests office.

While it is necessary for licencees and other developers to know the general location of archaeological sites in development areas so that they may avoid impact to those sites, they do not need to know site details. The district manager will have a copy of site locations (identified by Borden number) plotted on 1:20,000 map sheets so that developers might be apprised of the presence of archaeological sites in their development areas. If developers wish to obtain more details concerning site type and use they will have to make an information request through the Archaeology Branch or, in the case of known but unrecorded (at the Branch) sites, with the appropriate First Nation(s).

This type of confidentiality clause is supported by section 3.0.3 of the *Heritage Conservation Act* (Appendix 2) which states that confidentiality regarding cultural heritage can be respected:

3.0.

(3) **Despite the Freedom of Information and Protection of Privacy Act**, the minister may refuse to disclose information in the Provincial heritage register or other information in the administration of this Act or the Museum Act if any of the following apply:

- (a) disclosure of the information could, in the opinion of the minister, result in damage to or interfere with the conservation of a heritage site or heritage object.
- (b) disclosure of the information would violate an agreement made under section 3.1;
- (c) anthropological information that is of traditional social, spiritual or other cultural importance to a living community

(i) was obtained under conditions of confidentiality, or

(ii) is confidential at the request of representatives of the community whose heritage is represented by the information.

(4) The inspection of information in the Provincial heritage register is subject to reasonable conditions the minister may impose and, without limiting the generality of the foregoing, the minister may require payment of a prescribed fee to inspect the information (emphasis added).

Furthermore, the Act states that :

3.3 If, with respect to any matter affecting the conservation of a heritage site or heritage object referred to in section 6(2), there is a conflict between this Act and any other Act, this Act prevails.

For more information regarding these and other aspects of the *Heritage Conservation Act* please contact the Archaeology Branch, Ministry of Small Business and Tourism.

Project Team

Millennia Research

Millennia Research is a firm specializing in archaeological and ethnographic consulting. Formed in 1984, the firm has provided professional expertise to First Nations, private forest and oil sector companies, Federal and Provincial government ministries and smaller companies and developers. Some of our areas of expertise include: archaeological overview assessments; archaeological impact assessments; culturally modified tree research; waterlogged "wet site" research; GIS applications; tradition use site inventories; archaeological impact assessments, and management of large-scale archaeological inventories.

Millennia Research currently has 14 professional employees and support staff. We maintain Revenue Canada accounts, Worker's Compensation coverage, and extensive liability insurance.

Timberline Forest Inventory Consultants Ltd.

Timberline Forest Inventory Consultants Ltd. is a Canadian based forestry consulting firm specializing in forest resource inventory. The company commenced

operation in 1971 with the initial emphasis on providing high quality timber cruising data for valuation and planning purposes. The need to assist forestry clients in improving their T.F.L. inventory data bases was recognized in the late 1970's and the firm began major re-inventory projects for a number of interior B.C. T.F.L. holders.

Extensive capabilities to process and analyze forest inventory data were developed during the 1980's, including a major commitment to Unix based work station technology which is now an industry standard. Service bureau functionality in terms of cruise compilation, log profile prediction, and timber supply analysis, was established during this period.

A significant expansion occurred in 1985 with the acquisition of Timberline's mapping affiliate Aero Geometrics Ltd., which is a major supplier of digital and conventional map products to the forestry, mining, and engineering industries and to a variety of government agencies. Aero Geometrics is now the second largest supplier of digital base maps to the B.C. Ministry of Lands, Parks and Environment under the T.R.I.M. Project.

The introduction of workstation based Arc/Info GIS capability was initiated in 1987 and a long term commitment was made to support and develop applications within this environment. The mapping division has experienced tremendous growth over the last 6 years as the demand for GIS services has increased. Since 1987, the number of GIS workstations (Arc/Info software operating on SunSPARC stations) has increased to 15, with network connections to the other workgroups within the company. Timberline has extensive practical experience with database design, digital mapping, and data analysis gained over the past ten years in short and long-term projects.

Increasing levels of responsibility from clients in north central B.C. and Alberta culminated in the establishment of offices in Prince George and Edmonton in 1982 and 1990 respectively. These offices maintain a full complement of staff and equipment to support their local client base.

An ever increasing demand for mapping, growth and yield, and resource analysis expertise led to the acquisition of additional analysis staff and the opening of the Victoria office in February 1993.

Timberline currently employs a staff of approximately 100 computer professionals, foresters, forestry technicians, geographics, and photogrammetrists.

Report Format

The following document constitutes the technical report as required by the terms of reference for the Squamish Forest District AOA. This report is intended to provide a detailed technical and background summary for the Squamish AOA. Attempts have been made to ensure that this report is as clear and understandable as possible, however a shorter report has been prepared which summarizes this larger, technical document in lay terms and should be consulted if a brief overview of the project is required.

Proceeding this introduction, a summary of study objectives and limitations are presented followed by a description of meetings and discussions held with each of the First Nations whose territories encompass portions of the Squamish Forest District. The Study Area section presents a biophysical, paleogeographical and paleoenvironmental summary of the Forest District. This section is intended to provide a physical context for model building.

The Ethnographic Background section is a summary of available literature concerning the lifeways of the First Nations within the Forest District. Descriptions of First Nations lifeways are arranged by linguistic division as that is how they are organized in the literature. It should be noted that the ethnographic section is simply a summary of literature and does not necessarily reflect the manner in which contemporary First Nations peoples would describe their ancestor's lifeways and history.

The *History of Archaeological Research in the Study Area* section provides a brief description of the cultural sequences archaeologists have compiled over the last several decades. These cultural sequences represent archaeological interpretations of population shifts and culture change for the province. Following the culture history section is a description of previous archaeological work summarized by drainage area. The next or, Archaeological Correlates section is intended to correlate the environmental, ethnographic and archaeological information with geographic region. The correlates section is vital to model building as it provides the background upon which site location predictions can be made.

The Modelling Methodology section outlines the manner in which the predictive model was developed and implemented. This section contains the technical descriptions of the GIS along with an overview of the different layers developed for the AOA. In addition, the methodology used for the field testing of the model is presented.

The Evaluation and Discussion portion of the report is intended to provide a summary of the results of the AOA and a discussion of those results.

Finally, the Recommendations section provides recommendations for further archaeological studies, justification for that work and guidelines for in-field testing of the model.

Terminology

This technical report is intended to provide a detailed summary of all the information used to formulate and apply the archaeological potential model for the Squamish AOA. Many of the following sections contain terms which are specific to particular fields of study such as geomorphology, biology and archaeology. While we have made every attempt to ensure that the following report is readable, it is occasionally necessary to include technical terms, the definitions of which may not be widely known. Such technical terms are included in the Glossary included in Appendix 3 of this report. The shorter summary report which accompanies this technical report is written in lay terms and should be consulted if one is interested in gaining a broad rather than detailed understanding of the project.

Study Objectives and Limitations

The primary objectives of an AOA are to:

- summarize available information regarding site types and distribution within a given study area
- develop a predictive model based on the known information; and finally;
- using the predictive model, delineate areas of archaeological potential so that archaeological resource management can be incorporated into forestry planning processes.

The AOA process is a relatively new one and as such has a number of limitations. These limitations are outlined and discussed in detail below.

Predictive Modeling in Cultural Resource Management

The concept of “predictive modelling” has been hotly debated in the archaeological community for a number of years, and many published papers discuss the merits and limitations of its application (DeBloois 1985; Kohler 1985; Mierendorf et al. n.d.). Much of the controversy seems to stem from different interpretations of what a predictive model is, and what it can (and cannot) do. **Predictive modelling does not necessarily imply the**

use of so-called “objective” statistical techniques to determine where archaeological sites will be found. In the simplest sense, a predictive model can entail observing patterns of known archaeological sites across the landscape, and using that information to intuitively suggest where other sites will be found. Years of archaeological survey have provided a fairly substantial body of information on site locations in some parts of the province (at least in certain environmental zones), and some site distribution patterns can be identified. This information, together with knowledge shared by First Nations people and others, ethnographic documents, historical accounts and other data, can provide a good general understanding of what types of archaeological sites are likely to exist in a given area, where they may be found, and why they are there.

The sophistication of a predictive model is dependent on the quantity and quality of available data. For most parts of the province, we do not know enough about site distributions to successfully employ complex statistical models. However, simple non-mathematical modelling often can be effective for identifying particularly sensitive areas, allowing further investigation prior to land-altering development. Subsequent sampling and in-field “ground truthing” is required to test the hypotheses used to create the model, and to provide both positive and negative data that can help to refine it. This is particularly true for forested environments, where site visibility, poor preservation of organic materials, and a limited body of detailed archaeological and ethnographic data are constraining factors.

In summary, site location modelling is a means of focusing limited archaeological management resources on locations that are believed to have the greatest cultural and archaeological significance. Modelling can be an effective resource management tool, and can help to ensure the protection of many archaeological sites. It is not, however, a substitution for field survey. **Models predict the potential for sites to be present in a given area, but field investigations are required to actually locate and record the sites.** No model can account for the locations of all sites or even all site types, because to do so requires not only an understanding of the complex cultural activities that produce the sites, but also detailed knowledge of post-depositional processes that affect site preservation, the various site location methodologies used by different archaeologists, and different interpretations of existing site distribution data (Kohler 1985). Some archaeological sites will be missed by any sampling method, and some of them may be destroyed by development. This limitation is inherent in modelling and overview assessments, and it cannot be avoided without complete survey of all potential development zones — a goal that would, at this time, be impossible to achieve.

Some other limitations of this study and similar overview assessments are listed below, but others could be added.

1. Many of the inferences made about pre-contact aboriginal sites are based upon ethnographic documents that were produced by non-aboriginal ethnographers with a somewhat limited understanding of indigenous cultures;
2. Both the documentary and archaeological records represent only a fraction of the cultural systems they seek to describe and explain;
3. The time allowed for this study is insufficient to permit an exhaustive review of the literature or adequate First Nations consultation. This is a common problem with cultural resource management work and, while it is understandable in practical terms, it nevertheless limits the completeness of the product. A complete heritage overview assessment requires many months, or years, of research and consultation;
4. Archaeological overview assessments are preliminary studies which are subject to review and revision;
5. Many of the data that are valuable for predicting archaeological site potential (e.g., detailed palaeoenvironmental syntheses, fish habitat data, and terrain maps) do not exist for large areas of the province and therefore are not available for modelling purposes;
6. There is no standard method for archaeological modelling in British Columbia, and several consulting firms are operating under similar, but somewhat variable research designs. The consequences in terms of compatibility of data are yet to be determined, and;
7. Definitions and boundaries of what constitutes 'meaningful consultation' are not clearly outlined at the outset of many AOA projects. Consequently, the type of consultation required for an archaeological project is overshadowed by First Nations concerns regarding wider issues such as information confidentiality, aboriginal rights, and MoF/First Nations relations - issues which we, as archaeologists are not prepared, nor able to, deal with. Much of the initial discussion time for the present project was centred around establishing a relationship within which consultation could occur. An outline of what

Millennia Research considers to be stages of archaeologically oriented consultation is presented in the 'First Nations Discussion' section of this report.

The Present Study

With the above methodological limitations in mind, this study uses available lines of evidence to predict, as accurately as possible, which areas of the Squamish Forest District are most likely to contain archaeological concerns, so that more detailed investigations can be focused on those areas prior to development.

The research design aimed to evaluate the Forest District in terms of the probability that archaeological sites would be present, preserved, and could be located in the field. The assessment was focused on archaeological sites, (i.e., places with physical evidence of human occupation or use), and it did not include a traditional land use component although the data from traditional land use studies undertaken in previous years was accessed.

Many aboriginal activities did not leave physical evidence of their occurrence, and much of the material culture that was left behind has not been preserved. Therefore, the material evidence that we may find in the archaeological record provides only a glimpse of the true nature of past cultural systems. A detailed ethnoarchaeological/traditional land use study could contribute greatly to our understanding of pre-contact occupation and use of the study area.

DISCUSSIONS WITH THE FIRST NATIONS

The following section outlines the manner in which First Nations were contacted and also includes a summary of some of the common themes which emerged during those meetings.

Archaeological Consultation

As discussions with the First Nations continue, it has become apparent that conflicting views regarding the definition of consultation exist. Although it is not possible for Millennia Research to define consultation in a comprehensive sense, we feel it is necessary to outline the process we envisioned for the Squamish AOA. To clarify: the consultation process during the Squamish AOA was guided by the following processes of introduction, discussion and collaboration.

1. **Introduction** - First Nations with interests in the Squamish Forest District were contacted by Millennia research via phone and letter on April 29, 1996. The letter (see Appendix One) outlined the AOA as proposed by Millennia Research and included a company profile, a list of references and a request to meet with representatives of the First Nations to discuss the project further. Following this letter, phone calls were made in an attempt to organize meetings with the First Nations.
2. **Discussion** - Throughout the last several months meetings have been held with all but one of the First Nations whose territories encompass portions of the Forest District. These meetings constituted a face-to-face introduction to the project. Discussion at these meetings has centred around project objectives, limitations, expectations and procedures.
3. **Collaboration** - For the Squamish AOA, consultation in an archaeological sense requires discussions centred around specific cultural heritage in a given territory.

Common Themes

During the course of discussions with First Nations for the Squamish AOA several common themes emerged. It should be noted that the majority of consultation time was spent in only three (Lil'wat, In-SHUCK-ch and Squamish) of the six First Nations with interests in the Squamish Forest District. Tseil-watulth First Nation did not respond to our phone calls or requests for meetings nor did they comment on drafts of this report. One meeting was held with Leona Sparrow of the Museqeam Nation and one with Heather Myles at Sto:lo Nation Canada.

The following is a list of common concerns which were brought up at various meetings with the First Nations whose territories encompass portions of the Squamish Forest District.¹

- **AOAs are too site specific** and require that archaeological sites be separated from other kinds of cultural land uses. First Nations representatives stated that AOAs should be conducted in conjunction with, or following Traditional Use Studies.
- **AOAs should be contracted out to First Nations** who would then sub-contract archaeologists for the necessary technical support. There was some concern that a great deal of money was being given to archaeologists when the archaeological sites they are studying and attempting to locate are under the traditional jurisdiction of the First Nations. First Nations representatives expressed their desire to chose, or at the very least, recommend an archaeologist to work in their territory.
- **AOAs do not provide enough time or funding for field testing** of potential models and maps.
- **Potential models are built on a very general basis and do not take into account culturally specific land-use practices** for the different First Nations whose territories encompass portions of the Forest District.
- Many **First Nations** representatives expressed their frustration regarding the referral process for AOAs and other MoF management procedures. These representatives stated that since many First Nations do not, at this time, have the financial and staffing resources available to deal with the Forestry and other industry referrals, they **do not feel able to fully participate in resource management in their traditional territories.**
- **The level of consultation by archaeologists in First Nations communities is inadequate.** Many of the First Nations representatives stated that an established relationship between the archaeologists and the communities they are working with was essential if an AOA was to have any credibility or acceptance among First Nations peoples.

¹ It should be noted that the proceeding summary has been compiled by the author and as such should not be taken as representative of all the concerns each First Nation has about the Squamish AOA or the AOA process in general.

PROPOSED PROJECT

The Squamish Forest District has requested the following Archaeological Overview Assessment so that they can address archaeological concerns in their planning and management processes. Development aspects which may impact archaeological resources are discussed below as are the potential impacts those developments may have on the physical condition of various kinds of archaeological sites.

Proposed Developments and Potential Impacts to Archaeological Sites

Mackie and Eldridge (1992:82-85) present a good summary of potential land-altering impacts associated with timber harvesting and related development activities. Relevant sections of their discussion are repeated below. Also discussed below are some natural factors which can lead to the destruction of archaeological sites. It should be noted however, that the AOA commissioned by the Squamish Forest District is intended to assist with land-use management planning of all types within the mandate and physical boundaries of the Forest District, not just harvesting and associated silvicultural activities.

Logging

Different logging methods can create varying levels of disturbance to archaeological sites, although logging itself is often less destructive than associated developments such as road building, landing construction and even silviculture. Since all logging methods will destroy culturally modified trees, this discussion is most pertinent with regard to buried or surficial archaeological deposits and features.

Hand falling has little effect on archaeological deposits, and it may indeed be less destructive than windfalls, which can turn up sediments containing cultural deposits. Heavy equipment used in mechanical falling, in contrast, may severely impact the ground and any archaeological sites or features lying on or near the surface.

Yarding techniques have more potential for impact than falling techniques, depending on topographic and weather considerations. Helicopter logging is by far the least harmful to archaeological sites, but this method is not always feasible.

Standard high-lead yarding may reduce the potential for damage to archaeological sites by lifting logs at least partially clear of the ground. The use of a carriage to increase clearance is beneficial, and a high-lead system is generally preferable to a low-lead.

However, the use of heavy equipment at landing areas associated with this yarding technique can significantly disturb any archaeological sites present. Grapple yarding can add an additional source of surficial disturbance through the use of a backspar to traverse areas without roads.

Skidders can cause severe ground disturbance, and even horse skidding can cause some surficial damage to archaeological sites. However, this problem — and those associated with many other yarding techniques — can be mitigated by restricting operations in archaeologically-sensitive areas to winter, when the ground is frozen and preferably covered with snow.

Access Roads

Logging roads, particularly mainlines, pose one of the most serious threats to archaeological sites because they often cover large areas, and they tend to follow subdued terrain which was generally favoured for past human use. Road building produces severe disturbance to the ground, and can completely destroy archaeological sites very quickly. Eldridge (1989) also showed that road locations tend to correspond more closely with CMT locations than a random sample from nearby areas. This suggests that ease of access may have been an important factor in aboriginal logging and forest harvesting — an inference that has been supported by recent studies conducted by Millennia Research (Bailey 1996).

Mackie and Eldridge (1992) also point out that a potential indirect adverse effect of road construction is increased public access to archaeological sites. Site vandalism is a serious concern in many regions of British Columbia, and it is an issue of great importance to many First Nations.

Ancillary Developments

Associated land-altering developments, such as log landings and sorting grounds can impact archaeological sites through terrain levelling and heavy equipment traffic. In addition, landing sites tend to correspond with flat or more subdued terrain, which has a higher potential for archaeological sites.

Reforestation

Reforestation techniques may be second only to road construction in their potential to damage archaeological deposits. Slash piling using bulldozers and skidders can severely disturb the ground, as does stump removal. Scarification has obvious negative implications for archaeological sites, as it is specifically designed to disturb the ground surface. Tree planting, thinning and pruning, in contrast, should have relatively little effect on archaeological sites.

Natural Factors Leading to the Degradation or Destruction of Archaeological Sites

Avalanching

Archaeological sites in high alpine areas may be partially or completely destroyed by avalanches; however it may be possible that some artifacts would be located at the bases of avalanche chutes.

Landslides

Landslides are likely to effect sites in steep areas where terrain stability is variable or unstable. Landslides of particular note include talus slopes, especially those consisting of uniform cobbles and smaller stones rather than big boulders. The talus slopes consisting of uniform cobbles have been found to contain burials. Talus slopes are likely to destroy archaeological sites, and any archaeological materials remaining after being covered by a talus slope will be virtually undetectable until disturbed. Some landslides, especially those composed of a matrix of muddy or silty deposits, can create anaerobic environments highly conducive for organic preservation. The Ozette site in Washington is an excellent example. Four plank houses in a village at Ozette were suddenly and completely covered by a mudslide approximately 500 years B.P., and a great number of organic artifacts including basketry, rope, and wooden tools were preserved and excavated by archaeologists between 1970 and 1981 (Wessen 1990:412).

Contemporary and Ancient Glacial Action

Glacial Action is common in zones immediately surrounding the perimeters of contemporary glaciers. Advance and retreat of glaciers results in a scouring of landscape which will virtually destroy any archaeological sites. Although contemporary glacial action is important to consider, especially in the Squamish Forest District where high

mountains are abundant, ancient Glacio-fluvial action will have caused the degradation and undoubtedly, the loss of some very old archaeological sites.

Throughout the last several millennia there have been episodes of wide-spread glaciation and deglaciation. Scientists theorize that a drop in mean temperature caused glaciers to form over much of North America and forced people to live in areas where there was no ice (the Northwest Coast in particular). As the ice retreated, people were able to live in a wider variety of environments. However, as the huge ice sheets melted, the run-off created massive lakes and many rivers. People would have lived along these water bodies in order to hunt and gather food and other resources. Thus it is likely that really old sites will be found on ancient lake and river terraces dating back to the period of deglaciation. Although people would have lived along lake shores and river banks, the swiftly melting glaciers would have caused new water bodies to form and old ones to change course. This change in water volume and route is called glacio-fluvial action (meaning glacier river). It is likely that many sites left behind by people camping along lakes and rivers would have been washed away or buried in successive layers of riverine deposits.

Flooding and Spring Run-off

Flooding and spring run-off are major causes of archaeological site destruction and degradation. High seasonal run-off from swiftly melting mountain snowpack can cause stream bank erosion, landslides and floods. Any archaeological sites located near seasonal stream beds, major rivers, streams, and flood plains are subject to water erosion.

STUDY AREA

Introduction

The following section is intended to provide both a biophysical and biogeoclimatic summary of the Squamish Forest District. The province of B.C. is divided into areas of homogenous macro-climate areas called biogeoclimatic zones. Each zone has a particular series of climatic conditions which facilitate the growth and establishment of certain plant, animal and insect species. There are five such zones included in the Squamish Forest District and each are summarized below (see Figure 2).

Biogeoclimatic zone classifications are very important to archaeological predictive modelling because they assist archaeologists in predicting where people in the past may have lived or travelled in pursuit of certain types of faunal or floral resources.

Paleogeographical descriptions focus on the terrain and changes over time in the general topography and landscape of an area. For archaeologists, knowledge of paleogeographical information is essential as changes in terrain and sea level not only affected where people could live they also determine, to a large extent, where sites will or will not be preserved.

The Squamish Forest District encompasses a broad geographic area with a number of distinct biophysical zones (Krajina 1969). The following is a brief description of the biophysical context as it pertains to the distribution of resources, as well as the location and preservation of archaeological and heritage features in the study area.

Present Biophysical Context

The Squamish Forest District (Figure 1), is located in the southwest corner of the province, and straddles the coastal and interior zones of British Columbia. The southern boundary of the Forest District is at the entrance of Howe Sound and the head of Indian Arm. The District skirts the north end of Pitt River and its tributaries but dips southeast to include the north end of Harrison Lake. The Forest District's eastern extent runs parallel to the Lillooet Valley, encompasses Duffy Lake, and the western end of Anderson Lake. Birkenhead Lake Park, the Cascade Range and Monmouth Mountain make up the northern bounds of the Forest District. The western limit juts west to include Clendenning Creek, Elaho River and its tributaries, and cuts through the Garibaldi Highlands south to Howe Sound.

The Squamish Forest District is located within the generalized boundaries of the Coast Mountain physiographic region (Valentine et al. 1978). The terrain of the Coast Mountains is generally steep and rugged, the result of intrusive igneous rocks and mountain glaciation (Valentine et al. 1978). Within the mountain ranges, thick drift deposits are restricted to the margins of major valleys, floors and adjacent hillsides. On most slopes there are extensive bedrock outcrops and accumulations of rubbly colluvium. Floodplains, and in some valleys, river terraces, are situated in the central part of valley floors. Relatively gentle mountain slopes may have a thin till mantle. Avalanching is the dominant geomorphic process operating today on the steep slopes at the intermediate and high elevations. Nivation, solifluction and other periglacial processes are locally important in the alpine areas of the district. Neoglacial moraines occur adjacent to the existing glacier that feeds the tributaries of the Lillooet River, and in alpine areas near Pemberton (Valentine et al. 1978).

Biogeoclimatic Zones

Topography and soil landscape is combined with characteristic vegetation and animal data to form general biogeoclimatic classifications. Each forested zone correlates to a broadly homogenous macro-climate and is characterized and usually named by one or more dominant tree species. Each zone can be broken down into subzones made up of several floral and faunal communities. The following discussion is limited to the broader characteristics of zones and subzones within the study area.

Fourteen biogeoclimatic zones have been identified in British Columbia (Meidinger and Pojar 1991), five of which are represented in the Squamish Forest District. These zones include: Coastal Western Hemlock (CWH), Mountain Hemlock (MH), Alpine Tundra (AT) Engelmann Spruce-Subalpine Fir (ESSF) and Interior Douglas-fir (IDF) (Figure 2).

The forests of the **Coastal Western Hemlock zone (CWH)** are dominated by western hemlock (*Tsuga heterophylla*) and Pacific silver or amabilis fir (*Abies amabilis*). Other tree species that are commonly found in this biogeoclimatic zone include Douglas-fir (*Pseudotsuga menziesii*), western red-cedar (*Thuja plicata*), and Sitka spruce (*Picea sitchensis*). Stands of Douglas-fir are found in dry areas, while western red-cedar and spruce are found in moist areas, especially in floodplains.

The CWH zone has great diversity and abundance of animal habitat (Meidinger and Pojar 1991). Black-tailed Deer, Black Bear, Grizzly Bear and Grey Wolf are the most common large mammals. The marine environment, and rocky outcrops provide nesting habitat and protection for many species of colony-nesting marine birds. Howe Sound and low tidal islets are haul-out areas for many seal species. Mountain Goat occupy rugged aspects of the alpine areas.

Many large and small rivers cross this zone with large and small riparian areas. A great majority of the streams are used for spawning by salmon. These fish provide food for the two bear species, Otter, Mink, Merganser, Common Goldeneye and Bald Eagle and many species of gulls. Wetlands are occupied by many amphibians (salamanders, frogs and toads), as well as Garter snakes and water-birds.

Within the Squamish Forest District, the **Englemann Spruce-Subalpine Fir (ESSF)** zone lies north of Lillooet River. The zone lies below the Alpine Tundra Zone in the eastern side of the Coast Mountains. The ESSF occurs predominately in mountainous terrain which is often steep and rugged. The zone has a relatively cold, moist, and snowy continental climate. Englemann spruce and subalpine fir are the dominant climax tree species. Lodgepole pine is a widespread seral species after fire, and it frequently dominates in the driest regions of the zone. Amabilis fir is also present in areas adjacent to the coast mountains. Subalpine meadows contain a large variety of herbaceous species including valerian and helebore.

Ungulates such as moose, mountain goat, caribou and mule deer are found throughout the zone while the Rocky Mountain elk and Bighorn sheep, White-tailed deer and Stone sheep are more restricted. The ESSF is favoured Grizzly bear habitat. Riparian areas are not as productive as in other zones although some ducks and amphibians are found in swift flowing water.

The **Interior Douglas-fir (IDF)** zone is located in the lower to mid-elevations of southern valleys and in the interior plateau region of the Province. An 'arm' of the IDF extends to Lillooet Lake from the north-east. In this zone Douglas-fir dominates the forests, but lodgepole pine (*Pinus contorta*) is also common, being an important post-fire successional species. Other vegetation found in the forest understory of this zone includes soapberry (*Shepherdia canadensis*), bearberry (*Arctostaphylos uva-ursi*), and grasses such as bluegrass (*Calamagrostis rubescens*). As a result of the topographic variety and great diversity of overstory vegetation. The IDF zone has a wide range of habitat niches for

many species of wildlife. Douglas-fir forests serve as winter range for many ungulates, and there is a diverse complement of birds and small mammals in the southern parts of the zone.

The grasslands support a different group of wildlife species. Mountain sheep, mule and White-tailed deer graze these areas in spring, and these habitats are often selected by moose and deer as calving areas. Common at lower elevations are badger, mice and snakes. Duck species breed in the lakes and ponds of the lower elevation grasslands. Marshes and larger lakes such as Lilloet Lake are important staging and-breeding grounds for a great variety of water-birds.

The **Mountain Hemlock (MH)** and **Alpine Tundra (AT)** biogeoclimatic zones are found at higher elevations along the coast and in the Coast Mountain Range. The Mountain Hemlock zone is composed of forests of mountain hemlock (*Tsuga mertensiana*) and amabilis fir, with varying amounts of yellow-cedar (*Chamaecyparis nootkatensis*). At higher elevations where snow cover remains into the growing season, parkland vegetation regimes, consisting of sedges and mountain heather, are commonplace. These zones support fewer wildlife species. Large mammal use of these zones is typically restricted to subalpine parklands, or avalanche tracks and south-facing rock outcrops. The oldgrowth forests of the Mountain Hemlock zone provide habitat for birds that eat bark- or wood-boring insects, conifer seeds or other birds and small mammals. There are likely no reptiles and only a few amphibians in this zone.

The **Alpine Tundra** biogeoclimatic zone is found in severe mountain climate conditions which prohibit tree growth. AT vegetation consists of dwarf shrub species, and a variety of herbs, mosses and lichens.

Palaeogeography

The present-day topography of the study area has been formed and altered through epochs of geological processes. This section will concentrate on the Late Pleistocene (ca 100,000 y.a. - 10,000 y.a.) and Holocene (ca 10,000 y.a. - present) processes which are believed to coincide with human habitation of the area. Biotic variability within this region is the result of fluctuating climatic conditions, influenced by the region's physiography (Hebda 1995:56).

The coastal portion of the study area is situated in the Inner Coast Zone of the mainland and is characterized by steep-walled channels or fjords. At the peak of the Lake

Wisconsin, the area was covered by as much as 2 km of glacial ice. Isolated glacial ice sheets persisted in this region until between ca. 11,000 to 10,000 BP (Clague et al. 1982:600).

The Lillooet Valley is part of a major geological trough in which the present physiography was created in the Tertiary and Quaternary Epochs. During this time numerous drainages and glacial ice sheets cut through both the Coastal Mountain and Cascade Ranges, and deposited vast amounts of sediment into both the low-lying troughs and the sea.

Initial deglaciation (ca. 13,000 BP) resulted in a rise in mean sea-level to about 200 m higher than present. During glaciation, glacial ice sheets receded northwest up the Strait of Georgia and to the east. Isostatic rebound following the glacial retreat caused the re-emergence of submerged coastal lowlands (Clague et al. 1982:600) so that by ca. 8000 years ago sea-levels were 12 metres lower than present. Sea-levels stabilized at that level from ca. 8400 to 7300 BP. Approximately 7000 to 7500 year ago a marine transgression resulted in a rise of relative sea level causing land aggradation until 5500-5000 BP when sea-levels were slightly lower than present. Investigations suggest that sea-levels did not rise above modern levels during the late Holocene (Clague et al. 1982:603).

Palaeoclimate and Palaeoecology: Models

Since the 1940's there has been increasing research on climate during the Holocene. Much of this research has involved palaeoenvironmental reconstructions. Early work in this area was conducted by Hansen (1947), which resulted in a model for both climatic and vegetational change over time. It was first determined through Heusser's research that substantial climatic changes occurred over the course of the Holocene.

Subsequent work by Heusser (1960) resulted in the development of a palaeoclimatic sequence based upon radiocarbon dates from both coastal and adjacent areas within British Columbia. The Holocene was determined by Heusser, and later by Mathewes (1985), as a period which can be sub-divided into four distinct intervals. The earliest is the Late-Glacial, a phase characterized by a cooler and drier climate than is currently present in the region (Heusser 1960, Mathewes 1985). This interval was suggested by Mathewes (1985) to occur prior to 12,000 BP (Before Present). This Late

Glacial was succeeded by the Early Post-Glacial an interval characterized by a cool and moist climate, however one which was considerably warmer than the Late-Glacial stage.

The Early Post-Glacial lasted for approximately two thousand years (between 12,000 and 10,500 BP) (Mathewes 1985) and was followed by an interval referred to as the Hypsithermal. The Hypsithermal interval spanned the mid-Holocene however, Heusser did not provide precise dates nor did he indicate whether the period was relatively drier or wetter than the Early-Post glacial (Hebda 1995). Mathewes (1985) refers to the period which extends from approximately 10,000 BP to 7,000 BP as the "xerothermic", and notes that the climate was both warmer and drier than it is today. Analysis of pollen data from this interval has indicated an increase in Douglas-fir pollen, which, in turn, indicates climatic warming.

Climatic warming began at approximately 10,000 BP, peaking by ca. 7500 to 6,500 BP (Heusser 1960, Mathewes 1985). Based on evidence for the expansion of certain tree species, forest encroachment and rising lake levels, it was determined that the climate became cooler and moister after 7000 BP (Mathewes 1985) during the Late Post-glacial, a phase characterized by a cooler and moister climates. Changes to both forest dominants and peatland are noted within the palaeogeological record during this phase, modern climatic conditions seem to have developed by about 4500-3000 BP.

Effects of Palaeoenvironmental Change on the Archaeological Record

Changes in palaeoenvironments and palaeolandscapes have important implications for the way we look for and interpret archaeological sites. Models of aboriginal seasonal rounds and land-use based strictly on modern, well established ecosystems may not apply to the early Holocene.

The climatic fluctuations characteristic of much of the Holocene likely influenced the availability and abundance of both terrestrial and aquatic resources. This, in turn, would have influenced timing and nature of seasonal food and technological pursuit (cf. Fladmark 1975). For example, traditionally-important tree species such as cedar became established in parts of the study area only after 6000 BP. This should be reflected archaeologically by changes in material culture, site types, and site locations after this date. Similarly, the tree line would have been much lower at the time of deglaciation (ca. 11,500 years ago) and probably during various subsequent cool climatic episodes.

During these intervals, the rich root and animal resources of the subalpine would also have occurred at these lower elevations.

Catastrophic events such as floods, landslides, volcanic eruptions and earthquakes also will have affected human land use patterns and the archaeological record. Natural disasters may have made certain preferred localities uninhabitable, while destroying earlier archaeological sites.

Sea-level fluctuations caused swift shoreline changes. As those people inhabiting the coastal zone would have relied heavily upon the sea, and thus settled near it, sea-level movement would result in the frequent movement of camps causing limited periods of occupation. This constant relocation suggests that the density of cultural materials prior to ca. 8400 BP would be very low and thus difficult to locate. As sea levels stabilized, people were more likely to return to live at the same places, thus site density on well established terraces would be high. Such stabilization occurred from ca. 8400 - 7400 years ago. At this time sea levels were higher than present, so one would expect to find archaeological sites dating back to this period on terraces or ancient beach ridges which may be substantial distances back from the modern shoreline.

A second era of sea level stabilization began approximately 5000 years ago and continues to the present day thus, one would expect to encounter sites along the modern shoreline as well.

Clearly, it is important to have a general understanding of the relationship between past environments and cultural land use in order to confidently predict the locations of archaeological sites. Thus the influence of changing climatic conditions on forest margin migrations and associated economically-important plant and animal resources was considered when rating archaeological site potential, as was the influence of changing sea levels and geomorphological processes on site location, density and preservation.

Modern Alterations to the Environment

Though paleogeomorphological and paleoclimatic changes must be considered when attempting to predict where archaeological sites might be found or preserved, modern alterations to the environment which might effect site location and preservation must also be considered.

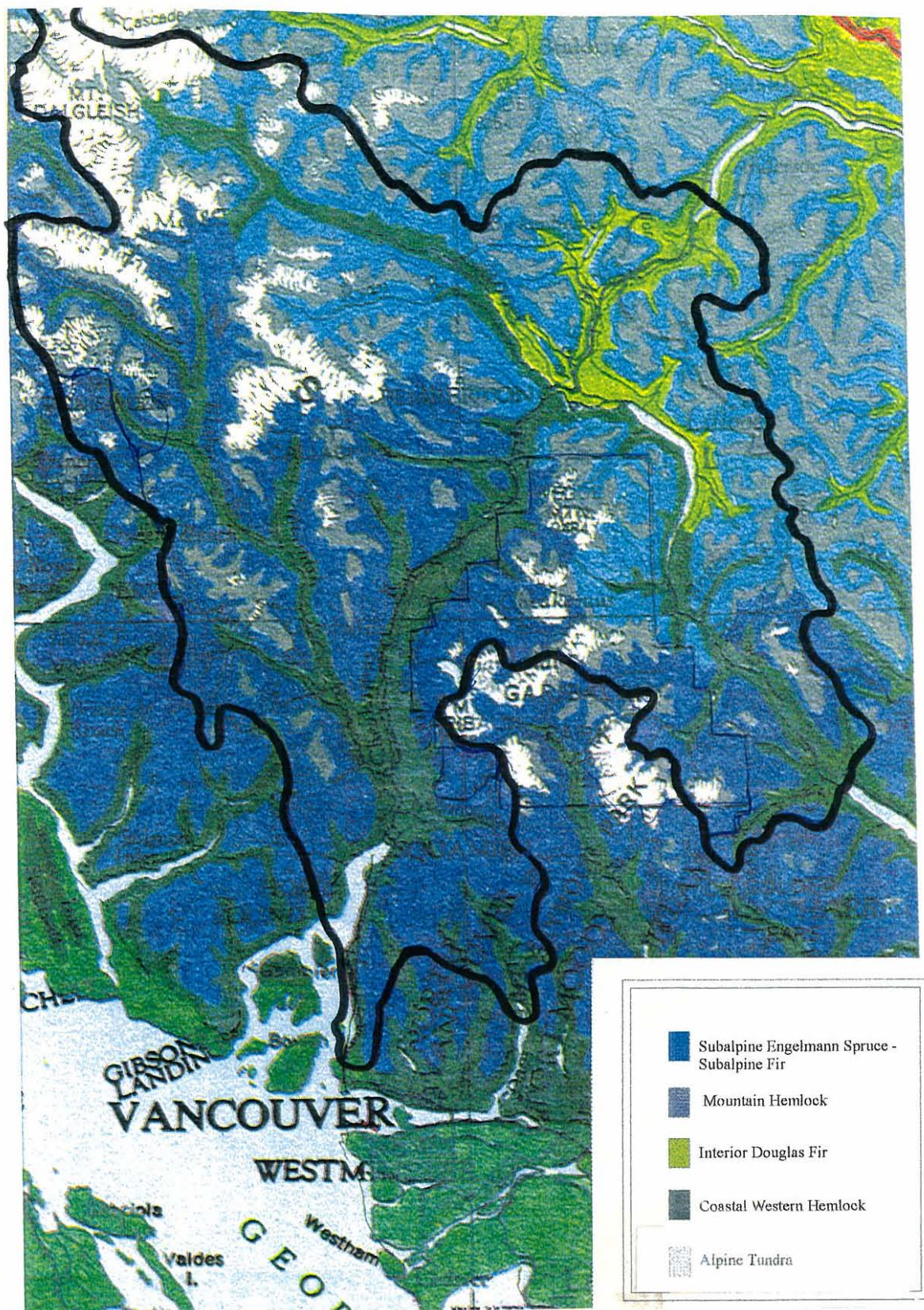


Figure 2. Biogeoclimatic zones within the Squamish Forest District.

Throughout the Squamish Forest District, both the topography and vegetation have been impacted and altered by human (largely industrial) activities following Euro-Canadian settlement of the area in the early nineteenth century (Sneed and Smith 1977a, 1977b). Some of these activities include:

- the systematic exploitation of natural resources;
- the flooding of valleys for hydroelectric projects;
- the establishment of a farming industry with land clearance, tillage, and domestic herds;
- the construction of railways and modern transportation systems;
- increasing population and urbanization in the Pemberton and Squamish Valleys.

Unfortunately these impacts to the natural environment will also effect the integrity of cultural deposits. Those areas that have been seriously disturbed or flooded will have very little evidence left of human occupation prior to the historic era. Consequently those areas which likely had high site density are now considered low potential as most sites which existed in the area have been destroyed by modern developments (eg. downtown Squamish).

SQUAMISH AOA METHODOLOGY

Currently, no standard methodological approach exists for conducting an archaeological overview assessment in the Province of British Columbia and, given the size and variability of the province, such standardization may not be feasible. However, the *Archaeology Branch, Ministry of Small Business, Tourism and Culture* has provided a basic set of *Guidelines* for archaeological overview assessments which Millennia has attempted to adhere to during the Squamish AOA (see **Appendix 4**). The following section details the methodology developed for the Squamish AOA and includes a description of potential zones, a detailed summary of how the model was developed and applied, a list of the map-base products, and finally a description of how the potential maps should be applied to development plans.

MODELLING METHODOLOGY

The following section outlines the steps Millennia Research and Timberline Forest Inventory Consultants took to produce the final model used in potential mapping. The criteria for Datasets I and II are described in detail below.

Predictive Modelling

Millennia Research and our associates have used two different methods for previous potential maps; judgmental hand-drafted polygons, and GIS modelling using logistic regression. For the first method, data was compiled from many sources and transferred by hand onto 1:50,000 hard copy topographic maps. Following that step, polygons were judgementally created along with a database of associated variables and expected site types. Finally, the hand-drawn polygons were digitized from the 1:50,000 hard copies and the final product was plotted from the GIS.

The second method involved using GIS to score variables (such as slope and distance to shorelines) in a raster-based model of small cells. A set of known site locations and known non-site locations was exported to a statistical package for comparing variables and creating a logistic regression model. The model was then applied to the GIS to create a probability surface, which was then ranked into high-to-low classes. Plotted colour maps with site potential shown in graduated colours constituted the final product. Like the method employed for the Squamish AOA, a separate predictive model

was necessary for each site type. Although this method has the potential to create sophisticated and powerful models, all too often it was limited by software bugs and data translation problems.

For the present study, we used a simpler method of creating GIS models than logistic regression. We created simple models that mimicked our judgmental methods of hand-drawing polygons. Consequently, each predicted site type, or group of related or co-occurring site types, needed its own model.

Definitions of High, Medium and Low Potential

For the purposes of the Squamish Archaeological Overview Assessment, models were developed in an attempt to indicate where archaeological sites are most likely (HIGH POTENTIAL), moderately likely (MODERATE POTENTIAL), and least likely (LOW POTENTIAL) to occur. High potential areas are expected to yield a higher number of sites than moderate potential areas while low potential areas are expected to yield the least number of sites overall. **It must be noted that a “low” potential rating does not mean that such areas contain no archaeological sites, nor that aboriginal people never or even seldom used these lands. Low ratings are assigned to areas where a variety of factors suggest that material remains of past human activities (archaeological sites) will seldom have been preserved.**

It should also be noted that these three potential ratings should be considered relative but not based on site density as density varies both spatially and temporally; high potential should not be confused with high density as some of what may have been considered the highest density areas now have the lowest potential (e.g. downtown Vancouver).

GIS Layers and Coverage

For the final report we will be producing maps using the TRIM 1:20,000 mapping base. Some 73 1:20,000 BCGS map sheets cover the Squamish Forest District. As both TRIM and forest inventory mapping exists for the entire district, we used data from both in our model.

Modelling inputs and their sources consisted of:

- base hydrological features which were used for buffering and calculating proximities from known and potential site locations to potable water, and major water features;
- TRIM Digital Elevation Model which were used to calculate slope, aspect, and elevation;
- MOF forest inventory data were used to determine the presence of old-growth forest, subalpine parkland, and swamp;
- Biogeoclimatic data refined the sub-alpine parkland designation; and;
- Terrain mapping (as available) was used for determining areas where archaeological sites are unlikely to be preserved (avalanche tracks, debris flows, active channelling, etc) and where they may be more likely to have been preserved (fluvial fans, eskers, etc).

A scale of 1:20,000 will be the presentation scale for the final hard copy versions of the maps. The second phase of the GIS portion of this AOA involved further refinement of the model for specific areas by incorporating field work results.

Datasets I and II are presented in ArcInfo export data format for the final product. All work will be done within ArcInfo, minimising data conversion problems.

Dataset I

Dataset I, as outlined in the terms of reference for the Squamish AOA contract, consists of archaeological potential polygons with linked attributes. These polygons were generated using the models described below.

For 'Dataset I' we used a simple method of determining archaeological potential polygon boundaries. Potential models were based on observations of archaeological site and environmental correlations; certain types of sites are normally associated with certain environmental zones therefore site location predictions were based upon correlations between known archaeological sites and environmental zones (see Archaeological Correlates section - this report).

For example, the habitation site model is as follows:

SLOPE	OCEAN/LAKE BUFFER	RIVER BUFFER	ELEVATION	CLASS
<30%**	100		<1000m	HIGH
<30%		100	<1000m	HIGH
<30%	100-300		<1000m	MOD
<30%		1000	<1000m	MOD
<5%		1000		NULL*
<30%		0-100	<1000	HIGH

*Flood plain areas with an area greater than 50 hectares and a slope of less than 5% within a 1000 metre buffer of major rivers (>20m wide) will be classified as NULL.

**<30% = <16°

The first, or SLOPE, column refers to the terrain of the land. Those areas with a slope of less than 10% (6°) are considered to be relatively level while those areas with a slope of 30% (17°) are considered gently sloped. Terrain with a slope of 60% (32°) or more is considered difficult to climb while slope of 100% (45°) is too steep to climb.

The second and third, or OCEAN/LAKE BUFFER and RIVER BUFFER columns refer to an area from the edge of a body of water to 100m (or other distance) from any point on shore. The ELEVATION column refers to areas which are located a given distance above sea level (in this case it is less than 1000 metres). Finally, CLASS refers to the rating a given area will receive if it meets all the criteria in the row as read from left to right. For example if there is a piece of land which is relatively flat (SLOPE = <30%), located less than 100m from a body of water (OCEAN/LAKE or RIVER BUFFER =100m), is situated at an elevation of less than 1000 metres above sea level (ELEVATION = <1000m) that area will be identified as HIGH potential. Conversely, if an area is relatively flat but is located only within 1000m of a river at an elevation of less than 1000m below sea level, it will be considered of moderate potential. The other models are designed to be read the same way though they contain variables specific to each site type.

It should be noted that the modelling process is, by necessity, extremely flexible. The models Millennia has developed will be applied to the information loaded into the GIS and areas where sites are most likely (HIGH POTENTIAL) and moderately likely (MODERATE POTENTIAL) to occur will be plotted. If additional knowledge contributed by the First Nations contradicted the potential maps, the First Nations

knowledge was considered paramount and the model or potential map adjusted accordingly. Low potential areas are considered to be all the remaining areas not plotted as high or moderate.

In addition, areas which are identified by First Nations as being significant but are not "caught" in the GIS modelling process were digitized separately as high potential and associated with a file which will indicate whether further information is available and, if so, how it may be accessed.

Site Types and Models

For the Squamish AOA we have come up with four models. It proved to be of great advantage to restrict the number of models to a bare minimum, given the costs of producing each model and map and the resulting complexity if many models were portrayed simultaneously. With the four models developed we attempted to predict the locales of the following site types (see Table 1, Table 2, Table 3, Table 4):

Habitation sites - these can range from small camp-sites to large villages.

Culturally Modified Trees (CMTs) - CMTs are defined as trees which exhibit scarring from bark stripping, plank removal, or other aboriginal logging activities. CMTs can occur in clusters or singly and are often associated with trails and other site types.

Sub-Alpine camps - these sites can vary in size though they are often small and difficult to locate as they tend to represent temporary habitation. These sites likely occur in association with traditional use sites, particularly plant harvesting areas.

Rock Art sites - these sites include both petroglyphs (figures, symbols or shapes pecked or grooved into the rock) and pictographs (rock paintings).

Table 1. Culturally Modified Tree (CMT) Model

FC* SPECIES	FC AGE (yrs.)	FC HEIGHT (m)	SLOPE	OCEAN/LAKE/RIVER BUFFER (m)	CLASS
Pl, Pa	>140	>20	<30%	N/A	HIGH
Pl, Pa	>140	>20	<40%	N/A	MOD
CW,CY	>140	>20	<70%	0-300	HIGH
CW,CY	>140	>20	<70%	300-1000	MOD

* FC=Forest Cover Pl=Lodgepole pine
 Pa=Whitebark pine CW=Western Red Cedar
 CY=Yellow Cedar

Table 2. Habitation Model

SLOPE	OCEAN/LAKE BUFFER	RIVER BUFFER	ELEVATION	CLASS
<30%	100		<1000	HIGH
<30%		100	<1000	HIGH
<30%	100-300		<1000	MOD
<30%		100-1000	<1000	MOD
<5		1000		NULL*

* Flood plain areas with an area greater than 50 ha. and a continuous slope of less than 5% within a 1000 metre buffer of major rivers (>20 metres wide) will be classified as NULL.

Table 3. Rock Art Model

SLOPE	OCEAN/LAKE/RIVER BUFFER (m)	CLASS
>70%	100	HIGH

Table 4. Sub-Alpine Camp Model

SLOPE	FC SPECIES	BGC CLASS	WATER BUFFER *	ELEVATION (m)	CLASS
<10%	Pa				HIGH
<10%		ESSF	30		HIGH
<10%		ESSF	30-100		MOD
<10%		MHwh	30		HIGH
<10%		MHwh	30-100		MOD
<10%	PI		30	>1000	HIGH
<10%	PI		30-100	>1000	MOD
<10%	ALPINE FOREST		30	<1500	HIGH
<10%	ALPINE FOREST		30-100	<1500	MOD

* Lakes/Rivers/Streams/Swamps

Dataset II

Millennia Research used the Canadian Heritage Information Network (CHIN) database of archaeological sites to obtain a subset of the sites within the study area. CHIN data was extracted and translated into dBase format. The locational information of this database, transferred to NAD83 was compared to the Archaeology Branch GIS database of site locations digitised from their 1:50,000 inventory maps. Locations which differed substantially in the two databases were corrected with reference to the original site forms. Detailed results from the comparison of the various archaeological site locational data set are presented in the "Modelling Results" section of this report. This corrected subset was used to create the 'Dataset II', and to aid in polygon definition and potential rating. Dataset II results will be printed out on the anecdotal information layer described below.

Anecdotal Information Layer

Anecdotal information gathered from documentary research and First Nation consultation was digitized as a separate layer, as requested in the Terms of Reference. This layer includes trail routes, known but unrecorded sites (i.e. not recorded at the Archaeology Branch), place names which indicate some type of resource use (fishing stations, hunting camps etc.), and other areas where activities likely to result in archaeological remains are reported ethnographically.

The anecdotal information layer also includes archaeological sites recorded as points, arches (lines) and polygons. All sites in this coverage have been checked against the original site forms and their placement corrected as necessary. As noted in the information confidentiality discussion in this report, the anecdotal layer will be printed out for 'view-only' purposes and will have no site specific information printed on the hard-copy map. Sites recorded at the Archaeology Branch will be plotted on the hard-copy map and indicated by a Borden number. Known but unrecorded (at the Archaeology Branch) sites will also be plotted and each separate site indicated by a number.

Field work Methodology

The primary objectives of the field work for the overview assessment were to:

1. Assess the ability of the GIS based computer modelling to predict the landscape and assign appropriate potential ratings;
2. Conduct preliminary ground truthing survey of the archaeological potential zones delineated on potential maps produced for the Squamish Forest District and;
3. Collect field data in order to refine predictive models to better reflect archaeological resource distributions as indicated by field work results.

The archaeological survey attempted to sample different potential zones within a range of biogeoclimatic and topographical areas including sub-alpine, lake shore, and major river valleys. To narrow the scope of the fieldwork, two to three 1:20,000 potential-map sheets were chosen for each of the three First Nations traditional territories to be surveyed. These sheets were selected in consultation with the First Nations involved.

Crews consisted of a Millennia Research staff member and one or more individuals from the First Nations. Millennia staff were responsible for observing the general nature of the landscape and comparing it to the potential maps. Particular attention was given to low potential areas where micro-topographic features such as small terraces might be located.

When possible, survey focused on harvested areas and access roads located within low or moderate potential zones. Crews stopped and examined sections of road cut banks at regular intervals (every 1.5 km) as they proceeded to harvested areas. At each 1.5 km interval, while the road cuts were being examined for cultural remains, Millennia crew members were responsible for observing the general nature of the landscape and

comparing it to the potential maps. At this time, the crew chief made an assessment as to how accurately the potential map judged the archaeological potential of the immediate landscape. If the crew chief wished to suggest a change to the GIS based assessment, notes describing the landscape and justification for such a change (based on the existing model variables) were required. Notes regarding the results of each interval survey were kept and the area surveyed tied in to a mapped feature. If cultural remains were noted eroding from cut-banks between 1.5 km stop points, the crew stopped, recorded those materials and tied them into mapped features for future reference and reporting.

Crews proceeded to predetermined cut blocks to conduct further survey. Using compass and hipchain, at least one traverse was conducted along a selected harvest area boundary. Where possible this traverse extended from one corner of the cut area and along the edge of the block for at least 100 metres. During this traverse, one person navigated and the remaining crew members meandered near the traverse line looking for surface exposures of archaeological materials. Archaeological remains located on the surface were described and their general location tied in to the traverse. Depending upon the harvesting technique, the crew looked for evidence of culturally modified trees (CMTs) in stumps and felled tree sections. If the block had been recently harvested (no later than 6 months previously), the crew was to survey the road within the block boundaries by either walking or driving the road, stopping every 250 metres and meandering at least 10 metres off each side of the road into the harvested areas themselves.

At least one traverse was conducted from the periphery of harvested areas into forested zones in order to search for undisturbed cultural deposits and CMTs. This traverse followed a compass bearing perpendicular to a harvested area boundary for a minimum of 100m, a change of bearing for a minimum of 100m, and a final bearing change back to the edge of the harvested area. All traverse starts and routes were tied-in to cut block boundaries. During this traverse, one person ran the compass line and navigated, while the remaining crew members meandered near the traverse line examining trees and areas judged to have potential for cultural remains. Shovel tests were judgementally placed in areas outside harvest area boundaries where apparently undisturbed soils were present. All traverses were tied into mapped features.

Within forested areas, surface exposures were examined for archaeological materials, including structural remains, lithic scatters, rock art sites, and historic refuse. Areas judged to possess moderate to high archaeological potential (which may not be

identified as such on the potential map) were to be tested for subsurface deposits. Shovel tests measuring no more than 50x50 cm were placed in these areas and the matrices trowelled through or screened through 1/4 inch mesh. Shovel tests which were located in intact cultural deposits were to be excavated in 10cm levels. Notes regarding the content of each shovel test were kept. All shovel tests were mapped in relation to traverse lines.

In areas of survey where there are no, or scarce logging activities (sub-alpine zone), crews were to focus on areas identified as moderate potential and/or the areas included in the "purple" buffer zone around major sources of water such as high alpine lakes. Since no previously surveyed datums were likely to exist and access to these areas was to be by helicopter, crews were to record their general position using a GPS or by triangulation onto the 1:20,000 potential map. In the sub-alpine areas crews were to survey at least 200m along a lake shore and run at least one transect perpendicular to the lake shore or along a feeder creek for at least 150m. Shovel tests were to be placed judgmental in areas deemed to have potential for sub-surface deposits.

Several areas were chosen for survey by the First Nations. Some of these areas fall within the high potential zones of the Squamish AOA model. Survey methodology for these areas was to mirror that described above for the sub-alpine areas. In areas where there are no lakes or water features one member of the crew established one or more angled traverse(s) of at least 100m from a mapped feature while the remaining crew members meandered near the line.

Where culturally modified trees (CMT) were located they were recorded according to Level 2 standards.

When archaeological remains were found, sufficient testing was carried out to determine the nature and approximate boundaries of the site. A brief analysis of cultural material found was to be carried out in the field. Formed artifacts were to be drawn to scale and photographed. All cultural material was reburied at the site.

British Columbia Site Inventory Forms will be completed for each site recorded, and site maps were drafted prior to submission to the Squamish Forest District and the First Nations.

DOCUMENTARY RESEARCH RESULTS

The following section presents a summary of the results of documentary research and includes a description of ethnographic information, archaeological correlates, and previous archaeology for the cultural and linguistic areas within the Squamish Forest District. Information gathered during the documentary research stage of this study has been used in the development and application of the model set out in this report.

Ethnographic Literature Review

The study area encompasses all or part of the traditional territories of a number of Coast Salish and Interior Salish First Nations. The ethnographic discussion below concentrates on those First Nations whose traditional territories comprise portions of the Squamish Forest District. **The purpose of this discussion is to review ethnographic data on subsistence economies, seasonal rounds, settlement patterns, and structure types, as they relate to archaeological site distribution patterns and does not represent a comprehensive summary of the cultures discussed herein.** The summary which follows relies heavily on ethnographic work dating from the mid-twentieth century, supplemented by accounts of late eighteenth century explorers and early nineteenth century fur-traders. Thus, this discussion is written primarily in the past tense, since much of it refers to cultural practices as they were recorded at or shortly after contact. Many of these traditional practices continue to be integral to the present day cultures of the First Nations discussed here.

Linguistic and Cultural Classifications

Efforts by anthropologists to classify the First Nations of British Columbia began as early as the 1840's. Past approaches have focused primarily on observed similarities of culture type and language (see Suttles 1990b:5-13). The current anthropological classifications of the First Nations groups in British Columbia are based on linguistic relationships. First Nations who speak languages considered to be remotely related are grouped into broad categories called *Phyla*. Each *Phylum* is divided further into *Families* which are groups of languages considered to be genetically related. *Branches* are subdivisions of *Families* while *Dialects* are considered "different although mutually intelligible versions of a single language" (Thompson and Kincade 1990:30). There are five First Nations whose territories encompass portions of the Squamish Forest District. Linguistically, those First Nations are grouped as indicated in Table 5 below.

Larger linguistic groups tend to share common cultural traits, resulting in similar physical manifestations of those traits in the form of archaeological evidence (sites). Thus, the following ethnographic review discusses the overall subsistence economies, settlement patterns, structure and other feature types typical of all groups within the Family and/or Dialect divisions. This ethnographic review focuses on those First Nations whose territories encompass portions of the Squamish Forest District, however it should be recognized that the large linguistically based Salish Phylum within which those groups fall include other First Nations not discussed here.

**Table 5. Linguistic Divisions of First Nations in the Squamish Forest District.
(From Thompson and Kincade 1990).**

LINGUISTIC DIVISION				Contemporary Cultural Affiliation ²
Phylum	Branch	Family	Dialect	
Salishan				
	Central Coast Salish			
		Squamish		
				Squamish Nation
		Halq'emylem		
			Upriver Halq'emylem	
				Sto:lo Nation Canada
			Downriver Halq'emylem	
				Musqueam Band
				Tseil-Waututh First Nation (Burrard)
	Interior Salish			
		L/luet (Lillooet)		
			Upper L/luet	
			L/luet (Lower Lillooet)	
				Lil'wat First Nation (Mt. Currie Band)
				In-SHUCK-ch/ N'Quatqua (includes the Douglas Band)

² Please note that although linguistic and cultural groupings tend to overlap, the linguistic divisions outline above do not necessarily represent the First Nations interpretations of their own cultural relations.

Central Coast Salish

The Central Coast Salish occupied a diverse ecological environment which included a broad array of animal and vegetal food resources. In describing the variability within Central Coast Salish territories, Suttles (1987:47) wrote:

The environmental setting of Native culture was characterized by four significant features: 1) variety of types of food, including sprouts, roots, berries, shellfish, fishes, waterfowl, land and sea mammals; 2) local variation in the occurrence of these types due to irregular shorelines, broken topography, difference between fresh and salt water, local differences in temperature and precipitation; 3) seasonal variation in vegetal foods and anadromous fishes; 4) fluctuations from year to year in part due to the regular cycles of different populations of fish, in part due to less predictable changes, as in weather.

Material culture and settlement patterns within the Central Coast Salish land use area may vary to reflect the factors outlined above. In addition, it must be emphasized that the success of resource exploitation depended on the complex relationship which existed between resource variability; food-gathering and storage techniques; and the social system which provided the organization and motivation for subsistence activities and exchange protocols (Suttles 1987).

Squamish

The Squamish are both a linguistically and culturally distinct group. Squamish is a homogeneous language that was spoken by the First Nations living in the vicinity of Howe Sound and its drainages (Suttles 1990). The earliest written account of the Squamish is by Captain Vancouver and dates to the late 18th Century (Vancouver 1798 cited in Hill-Tout 1978:29). The primary ethnographic sources for the Squamish include: Barnett (1955), Bouchard and Turner (1976), Hill-Tout (1978), Kennedy and Bouchard (1976a, 1976b), Matthews (1955), and Suttles (1990b).

Squamish Traditional Territory

The traditional territory of the Squamish people includes the southern portion of the Elaho River Valley, the Squamish River drainages (with the possible exception of the Upper Cheakamus, which may have been L̓l̓wet territory), the whole of Howe Sound, and Burrard Inlet (Barnett 1955). It has been argued that the area around Burrard Inlet was not occupied by Squamish speakers until the time of white settlement in Vancouver about the mid 1800's (Duff 1952:27; Hill-Tout 1978:28). According to Hill-Tout (whose informants were Musqueam) the early inhabitants of Burrard Inlet, False Creek and

English Bay were not Squamish, but were related to the Fraser River groups, and were likely Halq'emylem speakers (Hill-Tout 1978:29).

Squamish Subsistence Economies and Seasonal Rounds

Fish and Beach Resources

Fish, particularly salmon, likely constituted the majority of fresh food in spring and summer, and stored food during the winter. The origins and the regularity of salmon runs are well documented in Squamish oral tradition. Behaviour regarding the proper treatment and taboos associated with salmon resources is also well documented. Four species of salmon: spring, coho, pink and chum, frequented the waters in Squamish territory. Sockeye salmon, found in large numbers in the Fraser River, were very rarely seen in the rivers and streams used by Squamish peoples (Kennedy and Bouchard 1976a:9).

The first run of spring salmon, in early July, was generally not exploited because it coincided with high water levels. Kennedy and Bouchard (1976a) note that by mid-July, spring salmon were available in the Squamish River, the Capilano River (*Xwemelch'etsten*), Seymour Creek (*Ch'ich'elxwikw*), Lynn Creek (*Xa7elcha*) and the numerous other coastal streams of Howe Sound and Burrard Inlet with the exception of McCay Creek (*Tl'alhma7elkw*). In late August coho were available in Schoonover Creek, *Smalutsin*, *Ch'ekchkeks* (a small stream up the Squamish), and a stream in Lion's Bay (*P'ap'k'*). In addition, coho could be found until late March in a small lake along the Cheakamus River near what is now the Cheakamus Station of the B.C. Railway. The last species to spawn was the chum or 'dog' salmon, which entered fresh water during October or November. Around Brackendale, at a place called *Siyich'em* (meaning 'full'), it was said that the river was so full of chum it was possible to cross on their backs (Kennedy and Bouchard 1976a).

The best salmon-fishing sites on the Squamish River, that is, those places where water conditions were suitable for dip-netting were owned by individuals, and such sites could be used by others if the run was sufficient. Ownership was recognized by common consent, but all streams entering the Squamish were considered communal property (Kennedy and Bouchard 1976a:73). An account by Kennedy and Bouchard (1976a) states that Edward Joseph owned a place called *Ktin*, "pool in river", situated on the west bank

of the Squamish River, just below *Upeniwa*. Another site, *Kw'ich'tenam* near McNab creek and Woodfibre is cited as "fish cutting place".

Many species of trout were also available in local waters and were heavily utilized by the Squamish. Cut-throat trout were plentiful near the mouths of the tributaries of the Squamish and Cheakamus Rivers during October. Steelhead trout spawned in numerous creeks including Seymour and Lynn Creeks, and the Capilano and Cheakamus Rivers but were said to avoid McKay Creek. Steelhead were especially plentiful in a large pool in the Squamish River near *Sp'ep'a7k*, (the Tantalus) and also spawned in West Bay, (*Smelakw'a*), a small bay in West Vancouver east of Sandy Cove. Dolly Varden were caught amidst the log jams in the Squamish River. Rainbow trout were also taken; this species had specific taboos and associations with power due to their ochre-like colouring. (Kennedy and Bouchard 1976a).

Among the largest of the fish species utilized by the Squamish was sturgeon. These were taken in the waters near Point Grey (*Elksen*), and English Bay (*Iyelshen*). The people established temporary settlements at False Creek (*Senakw*) during the summer months from which they could access these fishing grounds. All parts of the fish were utilized including the spinal cord, which was eaten raw.

The smaller fish species which were economically important to the Squamish included herring, eulachon and smelt. Herring spawned during March in Horseshoe Bay (*Ch'axay*), and Shannon Bay (*Kwtsa7stsutsin*), as well as Coal Harbour and other small well-sheltered bays around Howe Sound and Burrard Inlet (Kennedy and Bouchard 1976a). Herring were caught with a long rake which was drawn through schools of small fish from the side of a canoe. Eulachon were also obtained in early spring, between late April and the end of May (Duff 1952:70; Suttles 1955:21,23). Eulachon taken in the Squamish River and the Fraser River were an important source of fresh food but were not utilized as a source of oil (Barnett 1955:31). Smelt were taken during the summer near Point Grey. Jericho Beach, *Iyalmexw* and English Bay are recorded as spawning areas (Kennedy and Bouchard 1976a:27).

A variety of "cod fish" were utilized, including Pacific tom-cod which was found in abundance in Burrard Inlet. Perch were available in all the local waters of the Squamish; some species were available year round in the shallow waters of Burrard Inlet and Howe Sound (Kennedy and Bouchard 1976a). Rockfish were also occasionally taken. Red cod, ("red snapper") were plentiful in Alberta Bay (*Kelatsten*). During January and February,

lingcod deposit eggs around Anvil Island, (*Lhaxwem*) and Defence Island. Three species of sole were plentiful in the shallow water around False Creek, Capilano, the mouth of Seymour Creek and at the head of Indian Arm (*Selilwetulh*).

Those species not commonly utilized included shark which was known but not taken by the Squamish. Dog fish were not economically important until non-Native industries were developed for the extraction of liver oil. This is also true of skate, which was sold to merchants in Vancouver, but was not normally caught by the Squamish.

Trout, and salmon that were still in salt water, were caught with a stinging nettle or kelp line fitted with a small bone hook. Two hooks were used, a small bone gorge hook and a composite hook (Kennedy and Bouchard 1976a:42). Hook and line fishing was used for mooching (stationary fishing) and for trolling. Salmon, steelhead, trout, cod and possibly sturgeon were procured with a two pronged harpoon. The spear used to procure trout and cod was similar to the salmon harpoon but lacked the detachable head common to the harpoon. After the introduction of iron, gaff hooks were used to catch all types of salmon, trout and sturgeon.

Dip-nets were owned by those groups claiming fishing sites. Dip-nets facilitated the catching of large numbers of salmon and were either round or triangular in shape. The smaller triangular net was used to take eulachon or smelt at *K'iyaxanaych* near the mouth of the Squamish River (Kennedy and Bouchard 1976a:56). Set-nets and drift-nets, were used to catch salmon and steelhead on the Squamish River, after their non-Native introduction. Drift-nets were introduced in areas where currents were too strong for the use of traditional methods. Kennedy and Bouchard (1976a) name three places where drift-nets were used extensively; below *Upeniwa*, below *Pukwayusem*, and at *Kwela7en* about four or five miles upriver from the mouth. The set net was more effectively in deep "back eddy" pools on the downriver side of a point of land. Drift- or set-nets do not appear to have been used on the Cheakamus River (Kennedy and Bouchard 1976a).

All species of fish could be cut into steaks and boiled when desired for immediate consumption. Rocks were heated in a fire and were removed with hardwood thongs, and placed in another container that was filled with water. The fish was added to the boiling water, cooler rocks were replaced with red-hot ones to maintain the boil. Cedar root baskets, kerfed wood boxes, or a wooden troughs were all used for boiling.

Salmon and trout were barbecued or roasted. Barbecuing sticks were single or forked about four or five feet in length, and made of red-cedar or vine-maple. The barbecuing sticks were then placed around the fire at angles that would best facilitate even cooking. Split sticks were used for larger sized fish. Cedar spreaders were slatted horizontally through the fish and a split stick. Salmon backbones were barbecued by piling them horizontally in the split stick. For barbecuing the heads of chum, coho or spring salmon, the heads were lanced on single sticks, halved and piled in split sticks similar to the backbones, or 'butterflied' and placed between the split sticks (Kennedy and Bouchard 1976a:82). Smaller fish were cleaned and skewered on a single barbecuing stick. Very small fish such as herring, eulachons and smelts could be barbecued by piecing the body of several fish with a single barbecue stick. Salmon were also roasted on green wood grills directly above a fire.

Mammal Resources

Both elk and deer were important food resources. However, deer was likely the most frequently hunted land mammal species. Major deer hunting grounds were found throughout the Squamish River Valley, on Anvil, Bowen, Keats and Gambier Islands and at White Beach on the mainland. Deer meat could be smoke-dried for winter storage but most was eaten fresh. The meat was either boiled, cooked in an earth oven or on a spit over a fire. Fat was rendered for a variety of uses, and marrow was eaten as a delicacy. Deer hide was processed for clothing, sinew for thread, and antler for tools, game pieces, etc. (Hill-Tout 1978; Barnett 1955).

Mountain goat hunting took place in late fall and early winter, before the rutting season. *P'uyam* and *Kiyaya7kep* on the Squamish River were noted for their abundance of mountain goats. McNab Creek near Woodfibre and Deeks Creek in Howe Sound are also recorded as goat hunting areas (Kennedy and Bouchard 1976b). Notably *Tswilx*, a mountain range up the Squamish River valley, although named after a goat-hunter, was not frequented for this purpose.

Mountain goat meat could be boiled, eaten fresh, or smoke-dried in the same manner as deer meat. Goat fat was rendered in the same way as black bear tallow and used for the same purposes. Spoons were made of goat horn; the horn was soaked in water, split and shaped (Hill-Tout 1978). Goat hunting was considered difficult, due in part to the mountainous terrain inhabited by this species, and the skins, wool, horn and products made from them were highly valued.

Black bear meat was eaten fresh by the Squamish but was not stored. Bear fat was rendered and made into cakes to be eaten later as a condiment, used in the hair, or with paint as a cosmetic and as protection against the cold. The hides were made into blankets. Grizzly bears were both feared and respected and rarely hunted in pre-contact times.

Small mammals such as hare was snared or shot, and the flesh boiled and eaten. Muskrats were economically important to the Squamish only after the arrival of Europeans, after which they were trapped for their pelts. Species not hunted for food included: wolf, mink, otter, skunk, cougar, bobcat and lynx (Kennedy and Bouchard 1976b).

Domesticated dogs were in use among the Coast Salish peoples. They were important in hunting and their hair was used in the manufacture of blankets in conjunction with mountain goat wool. Ethnographic sources describe a 'wool dog' which had ceased to exist as a distinct breed by the mid-19th Century. A description of these dogs has been provided by Suttles (1990:461): "a small to medium-sized Pomeranian-like, non-barking animal, generally white, with a thick, compact coat that was shorn with a knife in the spring".

Bird Resources

A total of twenty birds species were utilized by the Squamish, a number of these were sought only for their feathers. Among the species used for food were red throated loons, geese, grebes and ducks. Many were taken only in the winter. Point Atkinson, *Skiwitsut*, is named as place plentiful in surf scooters. Ducks were taken here during December through March. Grouse were hunted in the spring around Horseshoe Bay, and at *St'k'iil* in West Vancouver. Blue grouse formed a large percentage of the fowl eaten by Squamish people. Ruffed grouse was available in open forests during the spring. Gulls were eaten as were their eggs. The little 'Seagull Islands' at the upper end of Howe Sound were named areas for gathering gull eggs.

Birds were often hunted at night from canoes, where a small fire was used to attract them close enough to spear. The duck spear is described as a long pole, ten to twenty feet in length, with a hafted trident end made of hard wood and later replaced by iron (Kennedy and Bouchard 1976b). Boas also recorded a specific arrow type used for shooting birds. Informants to Kennedy and Bouchard (1976b) did not recall this arrow in particular, but agreed that detachable arrows were used for shooting birds. The Squamish

apparently did not use nets over the water or on land to trap birds (Kennedy and Bouchard 1976b:105). However, ambushes were staged where vegetation formed canopies or natural nets over sloughs and small lakes as the vegetation impeded the birds' escape.

Blue herons were eaten only during times of food scarcity. Sandhill cranes were rare and were not utilized. Eagles were not hunted but their feathers were prized by dancers. The bald eagle also figures prominently in Squamish mythology. Common loons were associated with medicine and figure prominently in Squamish mythology, they were not trapped or hunted. Neither owls or ravens were used as sources of food. Owls were associated with the spirits of the dead and the raven, prominent as a trickster figure in Native mythology, was often associated with "news".

Plant Resources

The Squamish had access to a variety of plant foods including berries and fruits, edible greens, tree cambium, and roots. The most important fruits and berries were the red elderberries, salal berries, blueberries, wild crab-apples, salmonberries, and trailing blackberries. Utilized wild greens included: horsetail, lady fern, fireweed, blackcap, cow-parsnip and arrow-grass. Edible roots included: skunk cabbage, blue camas, chocolate lily, bracken fern, licorice fern, wild carrot, arrow-head and wild onion. Red alder was the only type of tree cambium eaten. Several berry species were eaten fresh, as were berry shoots, bush stems, leaf stalks, and cambium. Many plant foods had to be cooked prior to consumption or in preparation for winter storage. Plant foods prepared for winter were dried in cakes (berries) or were cooked and stored under water (elderberries). Turner notes that family or villages did not have exclusive "ownership" of plant food-gathering or root-digging grounds; these areas were accessible to all the Squamish people (in Bouchard and Turner 1976:132). Plants for medicinal purposes were administered as infusion teas, applied externally as salves or taken in the sweathouse or steambath.

Yew wood was gathered for its resiliency, and strength. It was used to make wedges, bows harpoon heads and spear shafts (Bouchard and Turner 1976:38). Oceanspray wood (ironwood) was used for digging sticks, arrows and needles. Paddles, spindle whorls and bark beaters were made of broad-leafed maple wood. Douglas-fir was used for canoe poles, harpoon shafts, and gaff-hook and dip net handles. Binding, wrapping and basketry was often done with bark strips of western birch and bitter cherry. The stem fibres of stinging nettle were twisted into twine; leaves of the cattail were made into mats; and the down of the fireweed plant was woven into blankets.

Squamish Settlement Patterns

Traditional Squamish settlement patterns included four main residential groups which fluctuated seasonally. These groups consisted of the family, household, local group, and winter village. The family, which occupied one section of the large winter house, is recognized as the smallest economic and social unit and is described in many texts as a "nuclear family"; however this make-up was likely more flexible than that term implies. The household consisted of several kin-related groups that co-operated both economically and socially. Within a household, those individuals that claimed descent from a notable ancestor possessed ascribed status. High status individuals had rights to resources, names, and ceremonial activities and regalia. The household of an established kin group and several dependent households made up the local group, which has also been identified in the literature as "clan" and "sept". During the summer, the household would disperse to various fishing, gathering, or hunting sites, many of which were controlled or owned by families. A winter village contained a number of these local groups in one location.

There were a number of Squamish winter villages lining the rivers at the head of Howe Sound. Villages were concentrated along the Squamish River from its mouth (*stamas*), farther north (*xexeos*, *kcte'*, *sie:tcam*) to Brackendale (*peokwitcan*) and to the junction of the Cheakamus and Squamish Rivers (*takta :qmai*). Barnett (1955) was informed of a village on the Cheakamus (*tciakmic*) three miles north of the confluence. Above the confluence on the Squamish were six villages the northern most of which was *puyam* at IR #7. During the summer months the three northern villages were located at Jericho Beach, inside False Creek Bay, and around the area now occupied by the Granville Street Bridge (Barnett 1955). Other summer camps were at Capilano Creek near North Vancouver, at English Bay, and at Port Moody. The winter village at the head of Howe Sound (*stamas*) remained populated during the summer and was a common resort for many 'houses' in the spring when eulachon were running (Barnett 1955:31).

An incomplete list of 93 Squamish villages and place names is also provided by Hill-Tout (1978:30-31). Hill-Tout's research indicates that the most extensive settlements were along the Squamish River and lined the banks to thirty miles north of its mouth. Each village or *okwumuq* contained fifty to several hundred people.

Squamish Structure Types

Plank Houses

Squamish houses were large (20 x 7 m), plank shed-roofed dwellings used throughout the year. The floors of the house were levelled but not excavated as were houses in more northern regions. Although accounts are variable, Hill-Tout (1978:32) was informed that houses were known to have carved totems and houseposts. Barnett (1955) described a house in which the vertical binding poles were carved where they projected above the eaves. Barnett (1955) also described houses with tunnels leading to adjoining subterranean rooms. These presumably were for defensive retreat. Two unornamented, rectangular doors were located at the front and rear of the house at opposite corners; family areas, each with a fire, were partitioned off for privacy. The houses were generally oriented so that the front of the house faced the water.

Sweat structures

Sweat lodges were normally small, wood framed structures and were commonly located near a stream or other body of water. A hearth used to heat the stones, was situated outside the lodge. Red hot stones were carried from the hearth and placed in a depression in the centre of the lodge. Water was poured over the stones to create steam. Sweat lodges were used for ceremonial cleansing as well as for curing minor ailments.

Female Puberty, Menstrual Huts

With the onset of menses girls were secluded in one section of the plank house. Partitions were set up around her bed platform, she was to see no one other than an attendant. The seclusion lasted four to sixteen days.

Squamish - Other Feature Types

Roasting and Storage Pits

Outdoor roasting pits were used by the Squamish for cooking and preliminary processing including drying of some meat and fish. These pits varied in size depending upon the quantity of food to be processed. While generally circular, some roasting pits were more trough-like in shape. Roasting was also frequently done inside the house (Matthews 1955).

Fishing Structures and Features

Fish Weirs: these features, both with and without traps, were built in streams and across rivers to catch salmon, trout and sturgeon. The term for the Cheakamus River, *Ch'yakmish*, is derived from *chi'yak*, "fish-weir" and is translated as "fish weir place". One informant to Kennedy and Bouchard (1976a) stated that though weirs were used on the Cheakamus, they were not used on the Squamish River. Barnett (1955) contains brief information on a fish dam. He described it as built of stone straight across a stream, with the upstream face slanting so that the current pressed against it. It would appear that weirs were not built on the dams.

Rock Corrals: after salmon were dip-netted or harpooned, they were thrown into rock corrals built in shallow, calm water near the fishing site. The salmon were left in the corral for two days to allow their flesh to soften in preparation for processing (Kennedy and Bouchard 1976a).

Fish Pounds: these were wooden structures constructed of stakes driven into shallow waters where tidal action aided in the capture of larger fish species. One in particular was located near what is now Granville Island. This location was alluded to in Barnett (1955) and was associated with Squamish and Musqueam fishers.

Drying Racks: these were structures built for the purpose of drying fish for winter storage. They consisted of a framework of poles to which a number of parallel poles were suspended to hold the fish. The roof was made from cedar planks or layers of brush. Drying racks are normally associated with fishing sites and processing stations.

Smoke Houses: these structures were typically cedar shed-roofed buildings (Duff 1952:50) built for smoke drying food for storage. Commonly however, smoking was done inside the residential houses (Kennedy and Bouchard 1976a; Matthews 1955).

Storage Houses: dried salmon were placed in storehouses (Duff 1952:67). These structures were made of planks, usually measuring about 1.5 m by 2.4 m. Storage houses were commonly placed in the branches of large trees, and were accessed by notched pole ladders. Having above-ground storage kept the contents dry and kept pests from spoiling the goods. Families owned storage structures, typically located downriver from fishing sites, and often left fish there throughout the winter.

Hunting Features

Little information is available regarding hunting features. Birds and some mammals were stalked using blinds along shores or known animal trails. However, the specific locations of these areas are unknown. Dead fall traps and snares were recalled by some informants, but not in any detail regarding construction (Kennedy and Bouchard 1976b).

Forest Product Harvesting

Western red cedar was the most important tree species in the Squamish economy. Many other plants were employed on a limited basis for their wood, fibrous barks or stems, and as dyes or paints. However, western red cedar wood and fibre was used for almost everything else including: canoes, house-boards, shakes, eating utensils, and fire-drills. The Coast Salish canoe type used for saltwater fishing and hunting was the style most commonly used by the Musqueam. A version of this type was used by the Squamish. Yellow cedar was occasionally used for bows and paddles and the inner bark was used for weaving (Bouchard and Turner 1976). Cedar bark fibre (from yellow and western red) was used for tinder and for making canoe bailers, clothing, blankets and mats. Cedar twigs or withes were made into rope, the roots for basketry, and the boughs for bedding and collecting herring spawn. White or silver fir boughs were used on the floor of the sweathouse and for medicinal steambaths. Balsam fir sap, white pine, western hemlock, and Sitka spruce were used for medicinal purposes (Bouchard and Turner 1976). Douglas-fir was used for fuel, harpoons, and nets (Bouchard and Turner 1976:35).

Sacred Sites and Burials

Squamish burial practices usually involved the use of square burial boxes (Barnett 1955:217). The box was taken to a designated place, commonly on a nearby island and occasionally set upon logs or planks to raise it off the ground. More often it was elevated on a low scaffold and a shed was built over it. The Squamish were also known to do the same with extended bodies without boxes (Barnett 1955:217).

Mainland (Upriver and Downriver) Halq'emylem

The following is a description of settlement patterns, subsistence strategies and feature types typical of Mainland Halq'emylem groups. The Mainland Halq'emylem include among others the Sto:lo Nation Canada member Bands, and the Musqueam and Tseil-wat-ulth (Burrard) First Nations. For organizational purposes, the following description centres on a summary of those traits found throughout the Mainland Halq'emylem linguistic area and includes in that general discussion specific information regarding First Nations within the Upper Halq'emylem (the Sto:lo) and the Downriver Halq'emylem (the Musqueam and Burrard) linguistic areas.

Downriver Halq'emylem

A number of historic and ethnographic sources describe the Downriver and Upriver Halq'emylem groups along the Lower Fraser River. The earliest account of the Mainland Halq'emylem is the 1808 journal of Simon Fraser (Lamb 1960) in which he described their lifeways and material culture. Later 19th-century accounts of these people are found in the records of fur traders, notably Work (Elliot 1912), and MacMillan and McDonald (1827-1830). Relevant documents from the mid-19th century include Wilson (1866) and Brown (1873-1876). Early ethnographic records of the Mainland Halq'emylem include the works of Boas (1894) and Hill-Tout (1978). Recent ethnographies of the Stó:lo were written by Duff (1952); and Suttles (1955, 1990a, b).

The Downriver Halq'emylem are Coast Salish groups found from Burrard Inlet inland to the source of the Pitt Lake tributaries to the confluence of the Stave and Fraser Rivers, near Fort Langley (Suttles 1990b:455). The Downriver Halq'emylem consisted of the Musqueam, the Tsawwassen, the Tsleil-Waututh, the Saleelwat, the Coquitlam, the Nickomekl, the Kwantlen, and the Katzie. Of these groups, the Tsleil-Waututh (Burrard) people and the Musqueam have traditional lands within the Squamish Forest District.

Tseil-Waututh Nation (Burrard) Territory

Ethnographic and contemporary sources indicate that Tseil-Waututh traditional territory includes the eastern shores of Howe Sound, to Garibaldi Lake, east to Pitt River and south near Port Moody. The whole of Burrard Inlet, Indian Arm, Indian and Seymour Rivers and their tributaries, are the major water ways within Tseil-Waututh traditional territory.

Very little ethnographic information deals specifically with the Tseil-Waututh Band. It is inferred that Burrard subsistence economies, seasonal rounds, settlement patterns, and structure types are similar to other Halq'emylem groups of the Fraser River.

Musqueam Territory

The Musqueam traditional territory includes all of outer Burrard Inlet, the north half of inner Burrard Inlet to Port Moody, east of Indian Arm and its feeder streams to Meslilloet Creek, west to Howe Sound north of Anvil Island.

Barnett (1955) was informed of three villages on the southern shore of Point Grey. Steveston, Coquitlam, Capilano Creek, Port Moody and Indian Arm were said to be the camping places for the Musqueam.

Upriver Halq'emylem

The Sto:lo First Nations

Upriver Halq'emylem is spoken by those who lived above the Stave River. These groups have been known ethnographically as the Upper Sto:lo (Duff 1952) which translates as "people of the river". The Fraser Delta and Lower Fraser Valley were inhabited by Coast Salish peoples who spoke dialects of the Halq'emylem (Halkomelem) language (Mohs 1994; Suttles 1990b).

General Halq'emylem Ethnographic Description

Halq'emylem Subsistence Economies and Seasonal Rounds

The traditional subsistence economies of the Mainland (includes both Upriver and Downriver) Halq'emylem have been described in detail by Duff (1952:62-74) and Suttles (1955:21-27, 1990b:444-445). Other sources on Halq'emylem natural resource procurement strategies are found in Arcas Consulting Archaeologists Ltd. (1995:10-15), Hanson (1973:53-57) and Mason (1993:20-26).

Fish Resources

The most important and abundant fish resources of the Halq'emylem were the five salmon species: Chinook or spring salmon, sockeye, coho, pink, and chum or dog salmon. The larger Chinook salmon could be harvested from spring break-up until the end of October, with the main spawning run lasting from mid-July to late September. Sockeye

began spawning in mid-June, peaked in August, and dropped off by late September. Pink salmon were caught in August, chum from mid-September to December, and coho during the fall and winter months (Duff 1952; Alexander in Rousseau *et al.* 1994:18).

These species differed in their spawning migratory patterns and feeding habits. Chinook salmon were available in the Fraser River and the larger spawning streams, and several groups (Wells 1987:133) travelled there to fish. Salmon of some species ran in nearly every tributary river and stream; while in smaller streams only one or two salmon species are seasonally abundant for a short duration (Suttles 1990b:24-25). Traditionally most of the Chinook salmon caught in the peak spawning runs were dried for storage, while sockeye was commonly processed for oil (Duff 1952:62; Hanson 1973:37).

Kokanee, a landlocked sockeye salmon, were found in several lakes but seem to have been largely ignored as a food source by the Stó:lo (Wells 1987:133). Other species that were commonly eaten include cutthroat trout and Dolly Varden char which spawn in May and June. Trout and steelhead were caught with harpoons, line and fishhook, nets, and weirs. In the spring hazel brush weirs (*kw'et'(xwel)*) were built in small streams to catch trout (Duff 1952:70; Wells 1987:107).

Mammal Resources

Hunting was an essential subsistence activity, though it was considered secondary to fishing. Both large and small game mammals were hunted and trapped for food, furs and hides, and other by-products. Ungulates provided several products other than meat, including babiche, hide for clothing and shelter, and bone and antler for tools and ornamentation (Alexander in Rousseau *et al.* 1994:15). Mule or blacktail deer were seasonally available in the forested and parkland zones along drainages and lakes (Alexander in Rousseau *et al.* 1994:15; Duff 1952:70). Deer were commonly hunted either by individuals or small co-operative groups in the winter and early spring months. Elk or wapiti were also hunted. At higher elevations in the open rocky terrain of the Coastal Mountains, or at lower elevations near water sources in the summer months, mountain goats were killed for meat, fur, and horns. The American black bear was killed for meat and fur, and occasionally the grizzly was hunted for its hide (Wells 1987:62).

Small to medium-sized mammals that were hunted for food and other materials include snowshoe hare, the hoary or whistling marmot, the yellow-bellied marmot, the mountain beaver, and beaver. These species were hunted throughout the year on a casual

encounter basis. After the establishment of the fur trade, the beaver was systematically exploited for pelts. Other mammals that were hunted for non-food purposes such as skin or hides, include cougar, bobcat, lynx, wolf, wolverine, coyote, martin (*Martes americana*), ermine, mink, fisher, muskrat, porcupine, and racoon (Duff 1952:71; Cowan and Guiget 1973).

Both large and small mammals were hunted with the bow and arrow, thrusting spears, harpoons and clubs. Snares and pitfall or deadfall traps were placed along known game trails and habitats to catch game mammals. Drives were employed to hunt deer, which could be either driven into lakes or netted.

Bird Resources

Several bird species were also hunted, including Canada geese and ducks which were present in large numbers during the spring and fall migrations. In May, waterfowl provided an important food resource at a time when large game mammals were still relatively scarce and lean from the winter, and when stored winter food stocks were depleted. Other bird species that were killed for food include cranes, robins, bluejays, and crows (Duff 1952:72). Grouse were hunted throughout the year. Birds were usually killed with bow and arrow, snares, or nets. Although Duff (1952) indicates what species were utilized by the Sto:lo he does not indicate where these species were found.

Plant Resources

A number of plant species were seasonally or continuously exploited by the Katzie and the Stó:lo groups for food, medicine, clothing, building materials and other objects, and for ceremonial purposes. Duff (1952:73) notes that the most important root plant was the bracken fern, and two species of "wild potato" - camas and Wapato. Camas was obtained from downriver, either from the Katzie or the Musqueam. Other root plants exploited were wild onions, wild carrot, tiger lily, and spring sunflower. The roots of these plants were dug out by women with digging implements made of wood, bone, or horn, and cooked before being stored. Bracken fern and wild potatoes were boiled or roasted in hot ashes, while bulbs could be eaten raw (Duff 1952).

Edible wild fruits consisted of a number of berry plants. Huckleberry species that were traditionally picked include blue huckleberry, grey huckleberry, and red huckleberry. Other berries used as food resources included: salmonberry, thimbleberry, wild blackberry, blackcap, salal, juneberry, elderberry, and Oregon grape. These berries were picked

during the summer months, and were either consumed fresh or processed for storage. Some berries, such as juneberries, elderberries, and Oregon grapes were dried or crushed and dried. Saskatoons and soapberry were obtained through trade with the Nlaka'pamux (ethnographically known as the 'Thompson Indians') (Duff 1952:74). Pacific crab apples, common throughout the area, were collected in the late fall and eaten fresh or traded to the Nlaka'pamux.

Plant shoots, nuts, and lichens were also eaten by the Stó:lo. The shoots of salmonberry and thimbleberry, and the stalks of cow-parsnip were collected in the spring months and eaten raw. Hazelnuts were collected in September and stored to ripen. These were eaten without further processing. Beard moss (actually a lichen) was collected from trees in the higher elevations, and was boiled and made into "moss bread" (Duff 1952:74).

Several tree species were known to have been exploited by the Mainland Halq'emylem (Suttles 1990a:24). The most important tree species in the Lower Fraser River was the western red-cedar. Cedar wood was used for planks, house posts, beams, carved monuments, canoes, boxes, and a number of ceremonial implements. Cedar bark, roots, and boughs were also collected. Other important tree species which were utilized include western hemlock, Douglas-fir, yellow-cedar or cypress, red alder, and yew.

This summary of the ethnographic Mainland Halq'emylem subsistence economies clearly indicates that these people made use of a broad range of natural resources throughout their territories. These patterns of resource utilization are dependent upon the seasonality, location, and density of the resources themselves, and archaeological site locations are expected to correspond with many of these activity areas.

Halq'emylem - Trade

River travel among the Stó:lo and other neighbouring ethnic groups was facilitated by the use of three canoe types, powered either by paddles, poles, or cedar-bark sails (Duff 1952:51-53). Intra-Stó:lo trade was characterized by the exchange of rare or needed items; goods from the coast were exchanged for items from the interior. With other downriver Stó:lo groups the Tait exchanged dried salmon for wild potatoes, clams, cranberries, and sealskins. The Stó:lo exchanged cedar canoes, dried salmon, reed mats, dentalium and abalone shells, cedar root baskets, and goat wool blankets with the Nlaka'pamux for, among other things, dried saskatoon berries and Indian hemp (*Apocynum cannabinum*, used to make nets).

Halq'emylem Settlement Patterns

Site types and their associated structures and features would generally reflect the aggregation-dispersal pattern based on seasonal subsistence economies as well as the calendar of important social and ceremonial events. The semi-sedentary Halq'emylem settlement system revolved around large permanent winter villages, which housed the seasonal aggregation of several households and their dependants. Winter villages were commonly occupied between the months of January and March (Hill Tout 1978:118). They were typically situated in protected locations on the Fraser River and its major tributaries (Alexander in Rousseau *et al.* 1994). The main winter ceremonies, such as the spirit dance, and other inter-group social events were conducted in these large village sites.

In the spring, residents dispersed to exploit seasonally available resources. Generally, the house posts and beams were left at the village site, while the planks were taken to the spring and summer camp sites. Winter villages may have been frequently revisited throughout the year to store goods, and they may have been permanent residences for the elderly, the very young and the infirm.

Resource procurement sites (i.e., fishing locations, kill sites, wood-working stations, plant gathering areas, quarries, etc.) were established wherever specific resources were obtained, and they could be either near or distant from villages or basecamps. The summer months were characterized by the aggregation of people at favourable fishing locations along the Fraser and its tributaries. Not much is known about the nature of Halq'emylem, and in particular Stó:lo, summer dwellings but there are some suggestions that plank houses or temporary mat structures were used (Duff 1952:50; Wells 1987:35). Mason (1993:21) infers that the type of dwelling used depended on the location of the resource procurement sites and the duration of site occupation. Fall months were characterized by the dispersal of groups to extract various resources; autumn sites were similar to those used in the summer. At fishing grounds it is presumed that plank houses and temporary mat lodges were built, while mat lodges were used at hunting and gathering camps (Mason 1993:22). Similarly, sacred sites are also found throughout the landscape; their locations varied according to their purpose (see Mohs 1994).

Halq'emylem Structure Types

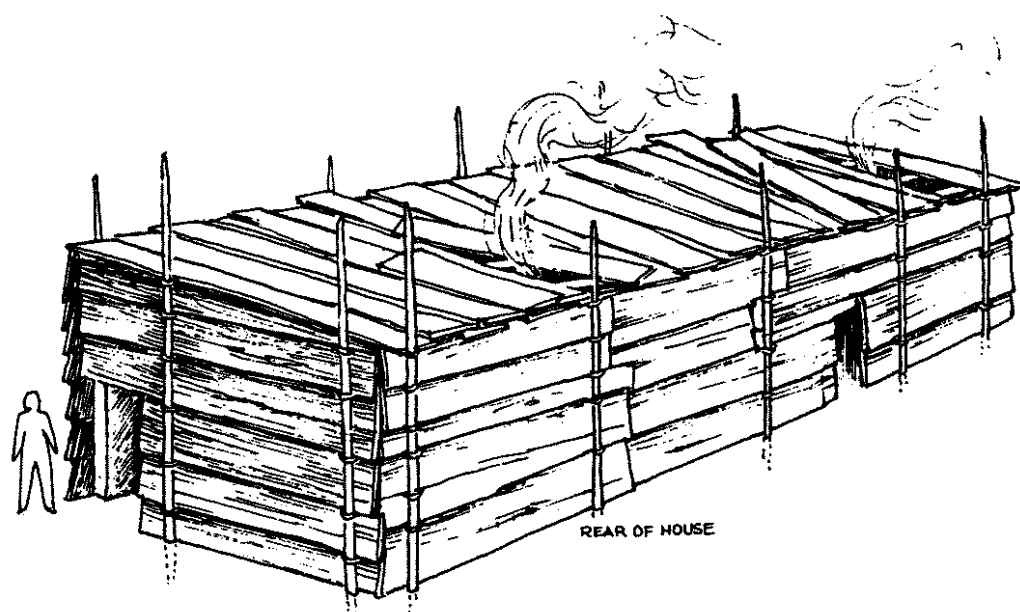
Plank Longhouses

The Coast Salish peoples along the Fraser River lived in above-ground rectangular cedar plank structures known as longhouses (*lalem*), which featured a permanent framework of posts and beams that was covered by removable planking on the walls and shed roof (Duff 1952:47-49; Suttles 1990b:462) (see Figure 4). They were generally built parallel to a river bank or lake shore with the roof sloping to the rear. The house posts were often decorated with carved and painted images. Decorated house fronts were observed on the lower Fraser River by Simon Fraser at the turn of the 19th century (Lamb 1960:103-104; Wilson 1866:287-288). The plank house was the common winter residence for the Halq'emylem downriver from the Squamish and Scowlitz (Duff 1952:46, 49).

Depending upon the terrain, a plank house may extend considerably in length. In 1808, in the vicinity of Langley, Simon Fraser observed such a large plank house structure in a Salish village. He wrote:

The whole range, which is 640 feet [195m] long by 60 [18.3m] broad, is under one roof. The front is 18 feet [5.5m] high, and the covering is slanting. All the apartments, which are separated in portions, are square, excepting the Chief's which is 90 feet long. In this room the posts or pillars are nearly 3 feet [in] diameter at the base, and diminish gradually to the top. In one of these posts is an oval opening answering the purpose of a door, thro' which to crawl in and out. Above on the outside, are carved a human figure large as life, and there are other figures in imitation of beasts and birds. These buildings have no flooring. The fires are in the centre, and the smoke goes out an opening at [the] top. (Lamb 1960:103-104).

The internal partitions between family units consisted of temporary mat screens, as described by Hill Tout for the Chehalis (1978:117). These partitions could be removed during the winter dancing season. The segmented longhouse was used for major social and ceremonial gatherings in both the summer and winter months.



WALL PLANKS WERE SLUNG BETWEEN PAIRS
OF POLES SET INTO GROUND.

Figure 4. Illustration of Coast Salish Plank house from H. Stewart (1984:64).

The plank houses of the Musqueam were of the shed type (Barnett 1955:53). The rest of the structure was the same as that of the Squamish except that there were doors at the back corners through the partition between every two families. Corner posts and the front ends of roof timbers were often carved (Suttles 1987:125; Barnett 1955:54). There was some painting on the house fronts.

Pithouses

Winter pithouse dwellings (*skemel*) were used by the Upper Stó:lo groups. These dwellings were also known by the Chinook jargon term “keekwilee”. These structures seem to have been used in the coldest winter months. According to Hill-Tout (1978:118) the Chehalis spent the months of January through March in pithouses, and presumably so did other Upper Stó:lo groups. Pithouses were circular in shape, and size varied with the number of residents but generally for the Chehalis they measured 25 to 30 feet. Estimates for household size for the neighbouring Nlaka’pamux ranged from 15 to 30 individuals (Alexander in Rousseau *et al.* 1994; Boas 1891:81; Teit 1900:192). The superstructure of a pithouse consisted of a framework supported by four posts and covered with earth. Around the outer wall were sleeping platforms, measuring about 1.8 m wide and 1.2 m high, and each family sleeping unit was separated by screen partitions (Alexander in Rousseau *et al.* 1994). In the centre of the structure was the main hearth which was used for cooking and providing warmth; an entrance/smoke hole was located in the centre of the roof.

There has been a debate concerning the use of pithouses among the Stó:lo. Smith (1947:256) inferred that these structures were not used in the vicinity of Yale until the mid-19th century. Her knowledge of the ethnographic use of pithouses by the Líl’uet, and southwards through Harrison Lake district led Smith (1947:266) to postulate a separate north-south “strip” for pithouses. However, Duff (1952:46, 47) contends that there is no such patterning, and that pithouses were used by the Tait, Pilalt, Chehalis, and the Scowlitz as normal winter dwellings. A similar critique of Smith’s Halq’emylem pithouse hypothesis is also found in Suttles (1957:157-161). The use of pithouse structures by Halq’emylem groups below the Squamish and the Scowlitz were less common, although the Downriver Halq’emylem had a few excavated refuges for times of war and extreme winter weather (Barnett 1944, 1955:53, 55).

Barnett (1955) describes subterranean house construction by the Musqueam, but notes that at the time only three subterranean houses were recalled by his informant, who does not specify their location.

Sweat Houses

Duff (1952:50) observes that sweat bathing was used as a means of ceremonial purification and as a remedy for various minor ailments. The sweat house was used by both males and females and was common throughout Coast Salish territory. The house itself consisted of a frame made of bent maple saplings, with the floor and framework covered with fir and balsam-fir boughs. The door was covered by a mat or boughs, and the inner walls were lined with maple leaves which, when moistened by steam, made an air-tight covering. The structure was covered with cedar bark or earth. Inside, a pit was dug in the floor to contain stones that were heated in a fire near the sweat house. Some sweat houses were designed to accommodate only a single person, but larger ones were also used.

Female Puberty, Menstrual, and Birthing Huts

During puberty rites and menstruation, females were secluded in simple small shelters built near to the habitation site (Duff 1952:50; Hill-Tout 1978:104, 106). These were temporary structures made of a bent sapling frame, covered by cedar bark, boughs or earth. Temporary birthing huts were also built in a similar plan to the puberty/menstruation shelters.

Halq'emylem - Other Feature Types

Roasting and Storage Pits

Roasting pits and storage or cache pits consist of circular depressions, measuring between 0.9 m and 5.0 m in diameter, and from 0.3 m to 1.8 m in depth (Alexander in Rousseau *et al.* 1994:13). Roasting pits were generally located away from occupation sites, close to water and near root digging grounds. Storage pits were located both at occupation sites, and near resource procurement localities, such as fishing stations and plant collecting areas (Alexander in Rousseau *et al.* 1994:13).

Fishing Structures and Features

At fishing locations along major rivers and their tributaries, various structures were built to harvest, process and store fish. These structures included:

Fish Weirs: these features, with or without traps, were built in streams and across some rivers to catch salmon, trout and sturgeon (Duff 1952:67, 69-70, 70). For example, the Musqueam sturgeon trap was a kind of tidal pound from which fish could be drawn out at low tide (Suttles 1987:21).

Drying Racks: were structures built to dry the fish. They consisted of a framework of poles upon which a number of parallel poles were suspended to hold the fish. A roof was made from cedar planks or layers of brush. Duff (1952:66) observed that the roof protected the fish from precipitation, and provided the required shade for the drying process. These structures were built on high rocky points to catch the prevailing wind.

Smoke Houses: were built to smoke fish. These structures typically were cedar shed-roofed buildings (Duff 1952:50).

Storage Houses: dried salmon were placed in storehouses (Duff 1952:67). These structures were made of planks, usually measuring about 1.5 m by 2.4 m. Storage houses were commonly placed in the branches of large trees, and were accessed by notched pole ladders. Some storehouses were elevated above the ground on poles. Having above-ground storage kept the contents dry and kept pests from spoiling the goods. Families from downriver owned storage structures at the fishing locations, and often left fish there through the winter.

Hunting Features

Traditional hunting techniques for terrestrial game varied according to the species, nature and season in which these activities occurred. As described above, individual kills with bow and arrows were common, and deer were driven into nets or bodies of water to be dispatched. Pitfall or deadfall traps were used to catch bear and deer (Duff 1952:71).

Pitfall traps consisted of a hole, measuring about 1 m wide, 1.5 m long, and 1.5 m deep, excavated in a game trail. On the floor of the trap were sharpened stakes or two crutched sticks that were long enough to hold the trapped animal off the ground. The hole was camouflaged with crossed sticks, bark, leaves and earth, and would collapse under the animal.

Forest Product Harvesting

Wood and fibre from various tree species was used to produce a wide variety of large and small utilitarian items. Cedar was an especially important species and bark stripped from living trees was used to make everything from rope to clothing. Wood planks removed from standing trees were used for, among other things, house construction and bentwood boxes, while felled trees were either split entirely into planks or carved into canoes.

The Coast Salish canoe type was used for saltwater fishing and hunting and was the style most commonly used by the Musqueam. A version of this type was used by the Squamish.

Sacred Sites and Places

Sacred sites are scattered across the landscape, and their locations are very difficult to predict. This discussion is a synthesis of the research of Stó:lo sacred geography by Mohs (1987, 1990, 1994). Mohs (1994:192-200) identifies nine sacred site types from his interviews of Stó:lo elders:

Transformer Sites: are locations that are attributed to, or associated with, the deeds and actions of the deity Xa:l and other transformers. These sites tend to be located near known ancestral villages, most of which have been recorded as archaeological sites. The Stó:lo refer to these places as “stone people”, and some sites consist of boulders or formations which represent individuals that have been transformed into stone. Other sites consist of discrete features in the bedrock.

Spirit Residences: consist of sites or localities which are believed to be inhabited by supernatural forces or spirits. This category includes a wide range of natural features, including small lakes, small river pools, stagnant ponds, caves, knolls and rock formations.

Ceremonial Sites: are sites which are associated with formal ceremonial/ritualistic activities, particularly winter spirit dancing. These sites range from large plank longhouses

to ritual bathing pools, sweathouse sites, and locations associated with ceremonial burnings. Hill-Tout (1978:54) was told by Squamish informants that ritual bathing, particularly after the death of a relative or during female puberty rites, was performed in streams that were not frequented by salmon.

Traditional Landmarks: this category consists of spiritual sites represented by geographical features, including boulders, caves, cliff faces, pools, and occasionally longhouse sites and pithouse sites. These sites are associated with particular significant aspects of Stó:lo culture or cultural historical events. Mohs (1994:196) mentions the pithouse settlement site of Sxwoxwiymelh, which translates as 'a lot of people died at once', which is associated with the smallpox epidemic of 1806.

Spirit Questing Sites: these sites are associated with personal vision quests, power quests, and puberty rites, or are repository locations for the ceremonial regalia of dancers. Most of these sites are found in remote locations in the mountains, secluded sections of drainages, caves, or in association with transformer sites.

Legendary and Mythological Locations: are sites relating to important legends, events, and/or individuals of Stó:lo folklore. This site category ranges in nature, form and geographical distribution.

Burial Sites: consist of box burials, mortuary houses, tree burials, and interment sites. Throughout Stó:lo territory, the use of family burial boxes made of cedar seems to be universal. After an individual died, the body was wrapped in a blanket or cedar bark and placed in a burial box. Single burial boxes or mortuary structures that contained two or more family boxes were characteristically elevated above the ground, either in trees or by posts (Duff 1952:49-50).

Traditional Resource Localities: consist of sites and locations where materials used for ceremonial and ritualistic activities were procured. These sites are scattered throughout the landscape, and include quarry sites from which body paint or crystals were procured, as well as spots where medicinal plants are found.

Other Sacred Sites: consist of astronomical sites, medicinal pools and springs, and sacred rock sites, including several pictograph and petroglyph sites.

Trails

The major ethnographic transportation routes were rivers and their tributaries. River travel was facilitated by the use of canoes, powered either by paddles, poles, or cedar-bark sails (Duff 1952:51-53).

A trail route connected the upper end of Pitt Lake to Harrison Lake to the east (Arcas Consulting Archaeologists Ltd. 1995:15). According to one Katzie elder, Jimmie Charlie, this route went from the head of Pitt Lake over to Harrison Lake. People from Harrison Lake left their canoes at Pitt Lake, and walked through the mountains. This may be the overland route between these two lakes described by Suttles (1955:13) and used by the Douglas Líluet people (see below).

Interior Salish

Líluet

Much of the ethnographic information on the Líluet comes from James Teit, who in 1906, published his summary findings of the Jessup North Pacific Expedition work. While Teit's work was in press, Charles Hill-Tout published a report on the ethnology of the *StlatlumH*³ of B.C. Boas comments in Teit (1906:292) that Hill-Tout's report (1978) is in some ways supplemental to Teit's work. Other contributions on the Líluet include: ethnographic and subsistence information in Kennedy and Bouchard (1975), Bouchard and Kennedy (1977), Zacharias and Maas (1995) and Hudson (1994). Place name maps and trail information were obtained directly from the Mount Currie Band.

The traditional territory of the Líluet can be divided into two geographical and ecological sub-areas. This division can also be made along distinctive linguistic and cultural groupings, known as the Upper Líluet (SLa'emux) and Lower Líluet (Líluet) (Teit 1906:195-196). The following discussion provides a general summary of Líluet ethnographic traits focusing on the Lower Líluet who are referred to throughout as the Lower Líluet, or where the description applies to both Upper and Lower divisions, simply as the Líluet.

³*StlatlumH* is Hill-Tout's transcription of the name the Thomson and Shuswap call the Upper Líluet, as explained by Boas in Teit (1906:292)

The Lower Lillooet (*Liluet*)

The Lower *Liluet* consists of two groups, the *Liluet-o'l* or *Lil'wat*, (at Mount Currie) whom Teit calls the Pemberton Band, and the *Nku'tcin* (at Port Douglas), whom Teit refers to as the *Liluet River Band*. *Liluet-o'l* traditional territories extended along the upper reaches of the Squamish River and other streams entering Howe Sound, and include all the head waters of the Upper Lillooet River and beyond to sources and eastern branches of the streams running into Jervis Inlet. Northerly, they extend towards the Upper Bridge River to beyond Blackwater Lake. The *Nku'tcin* traditional territory covers a large area from Upper Harrison Lake to the Little Lillooet Lake. Teit wrote:

Their hunting-territory covers the country some little distance to the east, where they come in contact with the Thompson Indians. On the west it extends some fifty miles into the Coast mountains, to the head of the Mamquum and other streams flowing into Howe Sound; and to the south, at least as far as the heads of Pitt and Stave Lakes, and on both sides of Harrison Lake for from twenty to twenty-five miles down. [Teit 1906:196]

Hill-Tout (1978:102-103) and Teit (1906:196-197) recorded eight *Nku'tcin* (Douglas) villages that were found along the Lillooet River and northern shores of Harrison Lake. These *Liluet* First Nations have a geographic proximity to the Squamish, Mainland Halq'emylem and Nlaka'pamux and their cultures have been influenced by these groups (Hill-Tout 1978; Teit 1906).

Hill-Tout (1978:102) noted that prior to the gold rush, the Halq'emylem controlled the entire Harrison Lake and the southern part of the Lillooet River. The Halq'emylem villages south of Port Douglas were subsequently abandoned, and the Halq'emylem people centred in the village of Chehalis. The establishment of Port Douglas resulted in an influx of *Liluet* into the north Harrison Lake area. Hill-Tout (1978:102) stated that all the former Halq'emylem villages on the shores of Harrison Lake as far as *cqomluks* "are now numbered among the *Liluet*".

Liluet Subsistence Economy and Seasonal Round

The *Liluet* were hunter-gatherers, and exploited the abundant natural resources within their traditional territory. Fishing, hunting, and plant resource gathering were the main components of the subsistence economy. Sneed and Smith (1977a:7) note that the Lower *Liluet* exploited a vast territory extending westwards fifty miles into the Coast

Mountains, southwards down Harrison Lake on both banks for 25 miles, and eastwards to the crest of the mountains dividing the Lillooet River watershed from the Fraser River.

Fish Resources

Salmon fishing was the most important part of the Lower L̓iluet subsistence economy (Teit 1906:227). The fish were caught with large nets in the lakes and bag nets were used in the rivers (Sneed and Smith 1977a:9-10). Teit (1906:227) recorded that the Nku'tcin (Douglas) had salmon fishing grounds at Skookumchuck Rapids, and others were situated on the lower Lillooet River. The Nku'tcin employed bag nets to catch salmon. In small streams, fish weirs, spears, and traps were used to harvest fish. Due to the moist climate, the Lower L̓iluet dried the harvested salmon in sheds with smudge fires (Teit 1906:228).

Animal Resources

Hunting methods of the Lower L̓iluet were similar to those of the Mainland Halq'emylem (Sneed and Smith 1977a:9) and the Nlaka'pamux (Teit 1906:224). Large terrestrial game mammals utilized include blacktail deer, mountain goat, and bighorn sheep. These species provided meat, hides, sinew, antler, horn and bone. Black bear was also hunted for meat and hides. The Lower L̓iluet also exploited a number of smaller mammals, including the hoary marmot, beaver, rabbit, hare, rock rabbit, squirrel, and racoon. Seals were hunted in Harrison Lake and some of the coastal inlets to which the Lower L̓iluet had access (Teit 1906:225). Other mammals taken for their hides or skins include wolverine, coyote, marten, mink, fox, wolf, lynx, otter, fishers, weasel and muskrat. Porcupine was hunted for meat and quills. Grizzly bear and cougar were used for their hides and claws (Teit 1906:225). The hunting technology used by the Lower L̓iluet consisted of bow and arrow, spears, harpoons, snares, and deadfall and pitfall traps. Teit (1906:226) mentions that the Lower L̓iluet sometimes used pitfall traps for deer, a method that may have been introduced from the Halq'emylem. In some instances, trained hunting dogs were used to drive game, such as deer.

Plant Resources

Lower L̓iluet gathered a large number of plant resources (Sneed and Smith 1977a:8-9; Teit 1906:222-223). Food plants include: roots, berries, stalks, and bark. The rhizomes of bracken fern and the bulbs of rice root and tiger lily were collected using digging sticks, and processed in earth ovens (Teit 1906:223). Important berry plants

included salmonberry, huckleberries, thimbleberry, wild rose, raspberry, and Oregon grape (Teit 1906:222). Berries were eaten fresh, or dried and made into cakes. Other plants were harvested for their edible stalks and greens, and the inner bark or cambium of trees such as poplar and alder was collected as food as were hazel nuts (Teit 1906:222-223).

Trade

In August and September the Nku'tcin travelled to the Fraser River to trade with the Upper Líluet and Nlaka'pamux groups (Sneed and Smith 1977a:11-12). In return for items such as dentalium and other mollusc shells, dyed and un-dyed cedar bark, yew wood, vine-maple wood or yellow cedar wood, mule deer hides, hazel nuts, dried huckleberries, fish oil, goat hair blankets, and sometimes slaves, they received Indian hemp, dried saskatoon berries, soapberries, chokecherries, dried meat and grease, and dressed skins from the Interior Salishan groups. To trade with the Stó:lo, the Nku'tcin travelled by water to the outlet of the Fraser River, or the Stó:lo would travel up Harrison Lake to the outlet of the Lillooet River (Sneed and Smith 1977a:12). The Stó:lo received saskatoon berries, soapberries, goat hair and skins, Indian hemp, and marmot robes in return for mule deer hides, wapiti hides, dentalium shells, other mollusc shells, and occasionally cedar dug-out canoes. Other materials, such as obsidian and quartz crystal, were likely traded as well.

Liluet Settlement Patterns

Liluet settlements reflected seasonal dispersal and aggregation of families based on the availability of natural resources. The settlement pattern has been described in Sneed and Smith (1977a:7-8). In the winter months, from November to February, they lived in winter village sites. The Nku'tcin (Douglas) had plank dwellings, while the Líluet-ol (Mount Currie) had both semi-subterranean pithouses and plank houses. Between March and May, people moved out of their winter villages and travelled to various resource localities. Spring dwellings consisted of simple mat lodges. During the summer months (June to August), the Líluet moved to their fishing and berry picking grounds, living in temporary structures. The major salmon runs ended between September and October. After processing and storing berries and salmon, the Líluet hunted and trapped game. Towards the end of the fall, they moved back to their winter village sites.

Liluet Structure Types

Plank Houses

Both Hill-Tout (1978:108) and Teit (1906:213) noted that the plank houses used by the Liluet were constructed “after the manner of the Coast tribes”, a reference to their Mainland Halq’emylem neighbours. There seem to have been slight distinctions between the construction of plank housing of the Liluet-ol (Mount Currie) and the Nku’tcin (Douglas) on the lower Lillooet River. These structures were called *tcituq* by the Liluet (Hill-Tout 1978:108). Teit (1906:214) recorded that the plank houses of the Nku’tcin “are said to have been exactly the same in construction as those obtaining among the Lower Fraser Indians [Stó:lo].” It seems that this distinction may be based on the use of a gabled roof (Liluet-ol) and shed-roof (Nku’tcin) houses. These structures could accommodate as many as eight or more family units, being either square or rectangular in plan. The plank houses measured on average between 10.0 m to 20.0 m in length and 2.0 m to 3.0 m in height at the eaves (Teit 1906:213). The interior arrangement consisted of spaces for each nuclear family unit, measuring about 3.0 m wide, separated by wooden partitions (see Teit 1906:213-214 for construction details). Hill-Tout (1978:108) observed that the Liluet did not perform communal ceremonial dances within these plank houses as did the Halq’emylem.

Pithouses

Pithouses, called *ecitken*, were more commonly used by the Upper Liluet peoples and Fraser Liluet as winter residences (Hill-Tout 1978:108; Kennedy and Bouchard 1975, Teit 1906:212-213) (see Figure 5). The structures were very similar in plan and construction to those of the Nlaka’pamux, being mostly round. The Liluet-ol, however, are known to have used both the round version and rectangular or square pithouses. The superstructure was covered with cedar bark and earth (Teit 1906:213).

Summer Lodge

In the summer months the Liluet built above-ground lodges or half lodges. These structures were square or “oblong” in plan, built of cedar, black pine or spruce bark (Teit 1906:215).

Hunting Lodge

There were two types of hunting lodge built by the Liluet. At temporary single occupation campsites they used bark and brush shelters. At hunting camp sites that were frequently occupied, permanent lodges were erected. These consisted of log walls as high as 1.0 m, which were chinked with moss and grass (Teit 1906:215).

Female Puberty, Menstruation, and Birthing Huts

Female puberty huts were constructed with four fir trees erected in a conical structure. In the interior the branches were cut off, while on the exterior the outer branches were either tied together or interwoven, and the spaces filled with small branches or bark. A hole was dug in the centre of the floor. Every fifteen to thirty days the hut was either shifted to a new location, or a new puberty hut built on the old site (Hill-Tout 1978:112; Teit 1906:264). Hill-Tout (1978) did not describe the construction of either the menstruation or birthing structures, but he (1978:115) noted that birthing huts were situated near the dwellings.

Sweat Lodges

These were simple shed structures made of cedar (Teit 1906:215). Sweat houses for men and women were kept separate.

Liluet - Other Features

Storage Facilities

Scaffold and cache pit features were similar to those used by the Nlaka'pamux. The Liluet used elevated cedar wood or bark storage boxes (Teit 1906:215).

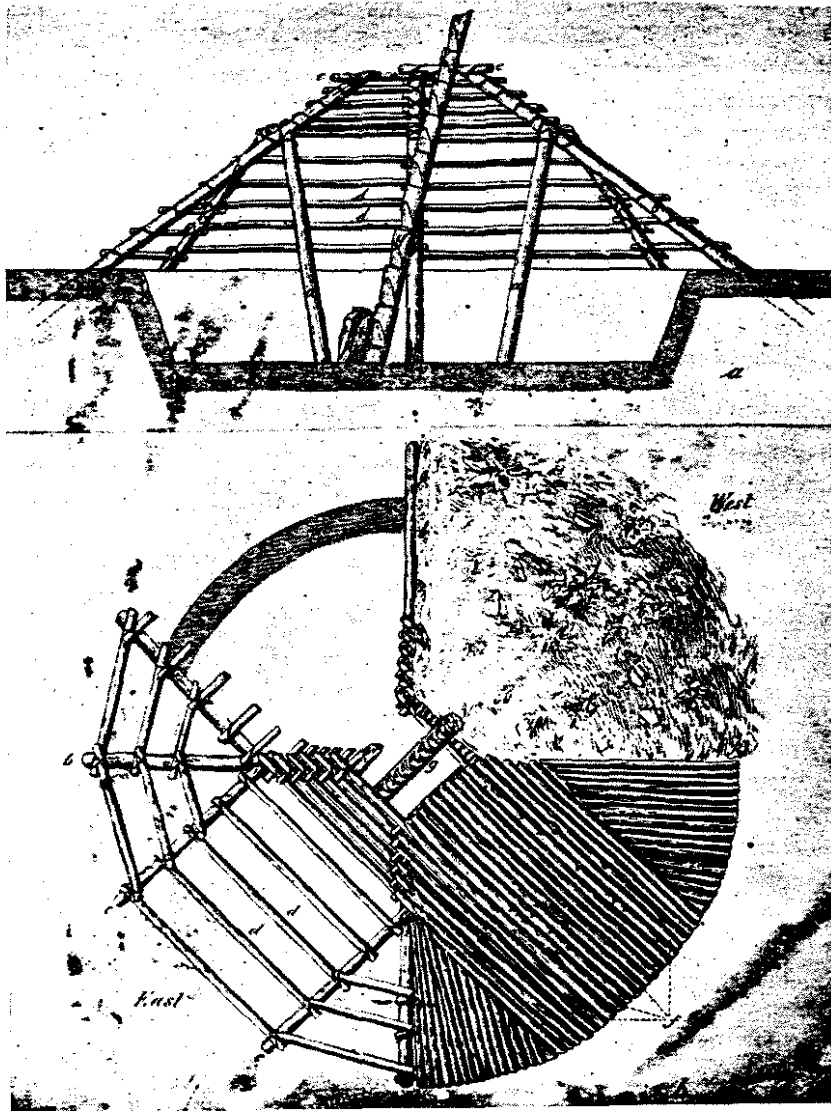


Figure 5. Illustration of typical Interior Salish pithouse taken from B.C. Heritage Series (n.d.), Vol III: Interior Salish, pp.20.

Fishing Features and Structures

Fish Weirs and Traps: Basket type fish traps were set in openings of weirs, in creeks near the outlets of lakes, near mouths of creeks flowing into lakes, or along the banks of swift flowing rivers. Teit (1906:228) recorded that in some drainages double weirs were built across streams, forming a corral where fish could be speared. Weirs were fence-like and made of sticks and brush.

Fish Drying Sheds: Due to the moist climate the Líl'uet dried all their fish in sheds (Teit 1906:228, 229 Fig. 88). These consisted of a pole framework and a series of horizontal racks on the short walls. On the floors of these sheds were smudge fires which provided the heat and smoke for preservation.

Hunting Features

Pitfall Trap: These features were excavated in flat areas frequented by deer at night or on known deer trails (Teit 1906:226). Pits were excavated to a depth of ≥ 2 m. and sharpened wooden spikes were set in the floor. A collapsible board cover was set over the pit, held up in the middle by a pole supported on forked stakes, then covered with earth and vegetation. The trap was constructed so that the prey would fall head first onto the spikes.

Plant Resource Preparation Features

Teit (1906:223) stated that the Líl'uet cooked wild roots in holes dug into the ground. Presumably these earth roasting pits were similar to those used by the Nlaka'pamux and Sto:lo as described previously.

Líl'uet Sacred Sites and Places

Transformer Sites: Like the Sto:lo and the Nlaka'pamux, the Líl'uet believe that there were a number of supernatural transformers that walked the earth. Throughout Líl'uet traditional territory there are many rocks that are believed to be metamorphosed animals, humans or human body parts (Teit 1906:274).

Rock Art Sites: Teit (1906:275) observed that the largest and oldest pictographs found in the Líl'uet landscape "are said to have been made by the people of the mythical age". Paintings were known to have been made on both rock and on trees by adolescent girls and boys during their puberty rituals. Prior to the painting of a tree, the bark was

first stripped off (Teit 1906:282). Pictographs were also made by Líl'uet men as "dream records". Traditionally, the Líl'uet used red, white and black paints (Teit 1906:282).

Burials: Among the Líl'uet, Teit (1906:271) recorded that the "earliest known method of disposing of the dead was to place the body in a sitting posture on top of the ground", and to place boulders and stones over the corpse in a burial mound or cairn. Teit (1906:272) also recorded that the Líl'uet began using cedar mortuary boxes prior to the arrival of the Europeans and Americans. These boxes were decorated with carved crests and totem figures and were commonly associated with painted bark-stripped trees, or carved anthropomorphic figures of the deceased (Teit 1906:273).

Traditional Resource Localities: consist of sites and locations where materials used for ceremonial and ritualistic activities were procured.

Líl'uet Trails

Douglas Hudson (1994) has conducted an extensive literature review for the presence of trails in the Lower Lillooet area. Hudson found that major waterways served as the primary transportation routes, consequently temporary camps should be found along known waterways. There are accounts of the Líl'uet travelling from the end of Harrison Lake to Anderson Lake. Trails were also noted to the Stein River Valley, to Fountain, the Pitt Lake System and Alouette Lake.

Suttles (1955) mentions that the Douglas people occasionally came over the mountains to Upper Pitt Lake in order to collect roots, and proceed to Fort Langley. The Hudson's Bay Company journal from Fort Langley lists the "*Squaals*", believed to be the Douglas people of Southern Líl'uet. Suttles (1955:13) notes that the "trip through the mountains to the Lower Fraser might have been preferable to the longer water trip by way of Harrison River for the very reason that food could be easily collected on the way." Other reasons for this route to Fort Langley may be that Pitt Lake lies at sea level. Poor relations between the Douglas and some of the Stó:lō Nation may have also determined the use of this route. Another Southern Líl'uet route to the Lower Fraser may have been via Alouette Lake and the Alouette River (Suttles 1955:13).

PREVIOUS ARCHAEOLOGY IN THE STUDY AREA

The following is a summary of the general and specific archaeological documentary and field research which has been conducted within the Squamish Forest District. The first section entitled "Regional Cultural Sequences" summarizes the patterns of prehistoric culture and subsistence for the coastal and interior regions of the province as interpreted by archaeologists. The second section, called "Previous Archaeological Investigations" describes the type and location of archaeological work conducted in the Squamish Forest District prior to the commencement of the Squamish AOA.

Regional Cultural Sequences

Following many years of archaeological research, artifact assemblages and sites which are thought to indicate the presence of distinct cultural groups in particular geographic areas over specific time periods, have been grouped together. The practice of categorising archaeological data and inferring cultural shifts from that information is called culture history. Culture-historical sequences are, therefore, the patterns of culture change as interpreted through changes in material remains. The following section briefly summarizes the culture-historical sequences from each of these regions, as they are presently understood.

Generally, the study area can be divided into coastal and interior zones. Because climatic, topographical, and vegetative differences effect cultural patterns, cultural attributes will vary within different environments. Consequently, interior and coastal zones will have different cultural histories, although cultural attributes associated with both interior and coastal culture sequences may be expected at various archaeological sites.

Coastal Cultural History

The culture history of the coastal zone is summarized by Mitchell (1991:340). Mitchell's information comes from data compiled by R.L. Carlson (1990), Suttles (1990), Burley (1989), and Matson and Coupland (1995). Mitchell (1991) suggests that generally, the known ethnographic Salish way of life can be applied to the last 5,000 years of culture history on the southern coast of British Columbia. Ethnographically the way of life of the Salish was based on river and marine resource procurement, land animal hunting and plant

gathering. Cultural historical sequence for the coastal areas of the Squamish Forest District are divided into five distinct cultural phases or cultural types. Old Cordilleran (ca. 9000 - 5500 B.P.), Charles Phase (5500 - 3500 B.P.), Locarno Phase (ca. 3500 - 2500), Marpole Phase (ca. 2500 - 1000), and the Strait of Georgia Phase (ca. 1000 - 200 B.P.) (see Table 2). An outline of the culture history, applicable to the coastal zone, is as follows:

Old Cordilleran (ca. 9000 - 5500 B.P.)

The Old Cordilleran culture is "clearly derived from the earlier Proto-western cultures" (Matson and Coupland 1995:68). Also known as the Pebble Tool Tradition (R.L. Carlson 1990:62), it is defined by the abundance of unifacial pebble choppers and leaf-shaped bifaces. Old Cordilleran components have been recorded and excavated at the Glenrose Cannery site near Vancouver, and the Bear Cove site at the northern tip of Vancouver Island. The analysis of faunal remains from Old Cordilleran sites suggest that people at that time were generally large game hunters, although the faunal remains of Bear Cove suggests a wider subsistence base (Matson and Coupland 1995:76).

The Gulf of Georgia regional cultural sequence subsequent to the Old Cordilleran was first outlined by Borden based on the results of excavations at Locarno Beach, Marpole, Whalen Farm, Beach Grove, and Musqueam (cf. Mitchell 1990:340). Borden (1968a) defined Early (Locarno), Middle (Marpole and Whalen II), and Late (Stsleax) stages in the Gulf of Georgia sequence. In a later work Borden (1975) outlined the characteristics and origins of the Charles and Locarno periods. Although Borden's framework has been revised several times, it has remained influential in archaeological literature.

Charles Phase (ca. 5500 - 3500 B.P.)

The Charles Phase was originally defined for the lower Fraser River Canyon, the lower mainland and the southern islands of the Strait of Georgia. Charles Borden amalgamated the separately but similarly defined Eayem, St. Mungo, and Mayne phases under the heading of the Charles Phase (Borden 1975:97). The Charles "Type" has been adopted in order to address the regional nature of this classification. There are no known sites within the Squamish Forest District with Charles Type deposits, but Pitt River (DhRq 21) and Park Farm (DhRq 22) sites can be found just outside the southern border of the Squamish Forest District.

Charles Type assemblages are defined by expedient chipped stone tools made from locally available basalt and some imported obsidian. Quartzite and chert were also used in some quantity. Artifact types include flake tools, pebble tools, and cores. Very few formed tools are known but leaf-shaped and shouldered bifaces have been found associated with this culture type. Ground and pecked stone artifacts are rare as are preserved organic tools. Those organic tools that have been found associated with Charles Period deposits include bone and antler artifacts such as bone awls, antler wedges and unilaterally barbed bone points; bone and antler tools appear to have been manufactured in an expedient manner. Artifacts first appearing in the Charles period include small awls, large and small unipoints and bipoints, ground stone and shell disc beads, and the occasional end scrapers, chipped stone drills, chipped/ground slate points and knives, ground stone celts. Nephrite woodworking tools, ground on the edges only, have been recovered from deposits at the Pender Canal site and date between 4000 and 3500 BP (Carlson 1996: pers. comm.). Where preservation is favourable, antler tine wedges, shell disc beads and shell celts, bilaterally barbed antler harpoons, and bone points and chisels are found.

Faunal assemblages indicate subsistence was mixed, dominated by fish, followed in importance by land mammals, shellfish, sea mammals and birds. Pratt (1992:293) argues that specialization in fish exploitation (e.g. the taking of salmon over other species) had not yet begun. In later culture types salmon is usually the most common fish species in the faunal assemblage and often outranks land mammal species such as deer and elk in dietary importance. Regional variation reflecting the availability of resources is reflected in faunal assemblages.

Living floors, post holes and hearths are common to most sites dated to the Charles Culture. Mason (1994:7) states that there is no evidence for the large structures known in the ethnohistoric period, however, Ham *et al.* (1984:85) state that "all three excavation projects at St. Mungo have encountered large postmoulds between 26 and 80 cm in diameter suggesting that permanent house frames were maintained at the site through the Charles Culture occupation." House floors excavated at the site appeared smaller than those known ethnographically, ranging in size from 4.5m x 4m to 6m x 4m (Ham *et al.* 1984:85).

Locarno Beach Phase (ca. 3500 - 2500 B.P.)

Although no sites with Locarno Beach deposits have been recorded within the Forest District, sites with this component (Locarno Beach, Point Gray, Noons Creek, and Belcarra Park) are found along the southern shore of Burrard Inlet, just outside the study area.

The Locarno Culture type was originally identified by Borden in the 1950's (1950, 1951) from his excavations at Locarno Beach, and was refined on the basis of findings from Whalen Farm. The culture type, as he understood it, was characterized mainly by "Eskimoid" traits and was devoid of many of the characteristics associated with the "later Northwest Coast Culture" (Mitchell 1990:340). Borden believed that Locarno peoples relied primarily on marine and riverine resources such as mussels, cockles, fish, and sea mammals (Borden 1950:244) although not to the total exclusion of game (Borden 1970:99). He noted a near absence of sophisticated woodworking tools and inferred that the culture lacked the plank houses and dugout canoes of ethnographically known peoples.

Since Borden's early reports, a new model for the Locarno Beach Phase has been developed. In Borden's analysis the Locarno Phase was not seen to be closely tied to either earlier or later cultures. As a result of more archaeological research, elements of cultural continuity have been identified in both previous and subsequent archaeological sequences. However, the origin of the Locarno Culture remains a matter of great debate. In general, sites with Locarno components are located in the traditional territories of Salishan groups. Pratt's (1992) analysis suggests that the Locarno Beach culture evolved from the earlier St. Mungo phase (Pratt 1992) and Carlson (1975 cited in Burley 1980:9) notes similarities between the Locarno and Mayne phase assemblages. Some have proposed that the recognizable differences between the Mainland and Island components may indicate that the Locarno culture first developed on the islands (Matson and Coupland 1995:165). However, others maintain that the peoples of the Locarno were immigrants to the area. For example, Cressman (1977 in Burley 1980:32) suggested that the Locarno population were Penutian speaking peoples who came from the Great Basin via the Columbia River and then northward.

Recent analyses of artifact types, such as those by Pratt (1992) and Matson (1989), suggest that the Locarno Culture developed *in situ*. Artifact types of the Locarno Beach tool kit include objects used for the "working of wood, antler, and bone and for the

hunting and butchering of animal life" (Mitchell 1971:70). Ground stone and bone artifacts occur in large numbers during the Locarno period on the Islands, more so than on the Mainland where chipped stone tools seem to have dominated (Matson and Coupland 1995:165, 176). Common Locarno Beach artifacts include: ground slate projectile points; ground slate knives; well made objects of antler and bone; chipped slate artifacts; microblades and cores; bilaterally barbed antler points; toggling harpoons and large amounts of fire altered rock (Mitchell 1971:57; 1990:341). Also of note are clay lined depressions (Matson 1994:341) which may have been used as containers for food or water storage, or perhaps for cooking. Items of the "Gulf Islands Complex" are also of note (Duff 1956). These are simple yet sophisticated small carvings of soapstone, coal, or sometimes bone. They are usually labrets, ear spools, or perforated geometric shapes. For a detailed outline of the Locarno Beach tool kit and characteristic features, see Borden (1970), D.Mitchell (1971:57), M.Mitchell (1991:341) or Matson and Coupland (1995).

Little is known about habitation practices during Locarno Beach times. So far, all settlements discovered have been located on salt water or are situated inland at locations which may once have been on salt water. All of those that are on the present coastline are at sites which were occupied by later cultures, indicating that at least some of the patterns of site selection were similar to those of later cultures. None of the inland sites shows signs of having been occupied by any other cultures, and this may be due to a change in the coastline.

Matson and Coupland (1995: 156-7) recognize 28 excavations of probable Locarno components. Of these, at least 21 sites are located on extant beaches, and the remainder on the banks of rivers. A search of the Canadian Heritage Inventory Network (CHIN) revealed an additional 17 Locarno sites, only eight of which are located inland, primarily on the banks of rivers and streams.

The remains of only a few dwellings have been identified in Locarno components. Most of these are relatively small structures which do not resemble the long plank houses of the ethnographic period. While no specific population estimates can be suggested, the relative lack of large-scale features in investigations to date suggests that settlement sizes may have been smaller than those in the succeeding phases (Mitchell 1971:59, 1990:344). Further, settlements presumably lacked the large permanent winter villages and extended family households of later periods.

Detailed analysis of the faunal remains and artifact types from Locarno sites has enabled a partial reconstruction of Locarno subsistence patterns. Despite previous arguments to the contrary, the current consensus is that both marine and land mammals, predominantly deer, were hunted, and a variety of fish and shellfish were collected (Mitchell 1971:57; 1990:341). It has been proposed that salmon was stored for the first time during the Locarno Beach phase as the assemblage of fish remains at some sites (Locarno Beach, Whalen Farm, Musqueam NE) indicates methods for preserving salmon similar to those used during ethnohistorical times (Matson and Coupland 1995). Very little data is available on plant utilization during the Locarno Culture, however, extensive collection of local roots, berries and other local plant foods was likely.

The social organization of the Locarno peoples can only be roughly inferred from the archaeological record. The presence of finely worked artifacts suggests that a stratified social order (which would have enabled craft specialization) or ritual activity may have existed during this time. Labrets, earspools and other objects associated with the Complex are commonly seen as status indicators (e.g. Mitchell 1971:58; Matson 1994:182). The objects are often manufactured from soapstone which must be imported from a considerable distance; the closest known source is near Lillooet (Dahm 1995: pers. comm.).

Marpole Culture Type (ca. 2500-1000 B.P.)

Differences in the assemblages of the Locarno and Marpole cultures was first interpreted by Borden (1951) to represent a Marpole culture that displaced its precursor. Borden suggested that the Marpole peoples arrived from the interior and represented a transitional stage in the adaptation to the marine and riverine environment of the coast. This migratory hypothesis was severely criticized by Caldwell (1954), and Osborne, Caldwell and Crabtree (1956) and was subsequently abandoned in favour of *in situ* development models, which have remained in favour (Borden 1970, Carlson 1960, Mitchell 1971).

Nonetheless, there has been some debate in the literature with regards to the cultural sequence of the Marpole. Mitchell (1971:52) outlined 20 "distinctive archaeological features" of the Marpole culture type. These and other traits were analyzed by Burley (1980), who found that many of Mitchell's distinctive features overlapped with earlier or later cultural horizons. Traits identified by Burley (1980:19-29, 60-61) to be most diagnostic of the Marpole period include: a wide variety and abundance

of chipped stone points; thin, rectangular or semi-lunate ground slate knives; large celts; representational zoomorphic and anthropomorphic stone sculpture; unilaterally barbed harpoon points; unilaterally barbed antler points; small crowned tear drop antler pendants; and burials, including female and child interments, with plentiful grave goods. Disc shale and shell beads are listed by both Burley (1980) and Mitchell (1971) as nearly unique to the Marpole culture, but since Burley's analysis of the Marpole, disc beads have been recovered from numerous sites with Charles, Locarno, Marpole and Gulf of Georgia components (see Eldridge 1984; Matson, Pratt, and Rankin 1991) and they are no longer considered distinctive of Marpole.

Burley (1980) attempted to reconstruct the economic and socio-political organization during the Marpole period on the basis of the archaeological data and ethnographic analogy (primarily Barnett 1955, Duff 1952, and Suttles 1951). Both Burley (1980) and Mitchell (1971) noted the association between Marpole site distribution and the Fraser River. Mitchell (1971:52) stated that the large salmon runs in the river were probably "a mainstay of the economy." Although few analyses had been completed at the time Burley wrote his monograph, faunal evidence suggested that "at least in types of resources being procured, Marpole peoples differed little from their historic counterparts." In addition to salmon, herring, eulachon, rock fish and sturgeon were caught (Boucher 1976, Casteel 1976). The large house platforms and post-molds which first appear in Marpole sites are suggestive of the multi-family winter households, similar types known ethnographically.

The recovery of large quantities of wealth items such as copper, disc beads, and dentalium from some burials of the period, including those of women and children, suggests a system of social stratification was in place during Marpole times. The accepted archaeological understanding is that "a stratified society, similar to that of the historic period, was in existence during the Marpole" (Burley 1980:60-61). The differential distribution of grave goods suggests the presence of both noble and common classes, and Burley suggests that it is likely a slave class also existed, although archaeological support for the latter is lacking (Burley 1980:60-63).

As noted above, copper and dentalium are assumed to have been wealth items which could only be amassed in any quantity by the nobility. These items are not found in the Gulf of Georgia area (dentalium is found on the west coast of Vancouver Island, copper may come from the Copper River in Alaska) and would likely have been obtained through trade. Other extra-local materials recovered from Marpole components include

obsidian from Oregon, and nephrite and soapstone from the Fraser Canyon. Burley (1980:63-64) suggests that intra-regional trade was also important because of unequal access to resources. This trade would have involved the exchange of subsistence goods, lithic materials, and manufactured utilitarian items and valuables.

Strait of Georgia Culture Type (ca. 1000 - 200 B.P.)

As with other culture types on the Northwest Coast, there has been considerable debate concerning the origin of the Strait of Georgia Culture. Between the Marpole Phase and the Strait of Georgia Phase, there existed, until recently, a 400 to 500 year gap in the archaeological record (Burley 1980:37). A number of models have been directed at explaining the development of the Strait of Georgia Culture type which appears in the archaeological record approximately 1000 years ago. These included: an immigration of people with a different technology (e.g. Borden 1951, 1970, Carlson 1970:122); a local response precipitated by shifting environmental conditions; or the cultural diffusion of different techniques for exploiting the environment (Carlson 1970:122).

As Carlson (1976:29) noted, the typical Strait of Georgia assemblage is characterized by an emphasis on bone artifacts. Antler wedges are common; chipped stone artifacts are rare and consist mostly of small, side-notched and triangular arrowheads. Ground slate is also infrequent, although thin ground slate knives and triangular, ground points, often with thinned bases, are distinctive of the culture type. Also characteristic are triangular, ground California mussel points. The importance of fishing is reflected in the both the variety and complexity of the fishing technology.

Despite some significant differences in artifact types, Mitchell (1971:72) noted many continuities in the Strait of Georgia and Marpole assemblages, and suggested that those differences that did exist were slight in comparison. He predicted that as the gap in the archaeological record was filled by new research, the differences would become less obvious. In fact it is now generally accepted that the Strait of Georgia "appears to evolve in a seamless manner from the previous Marpole phase" (Matson and Coupland 1995:268).

Mitchell (1971:49) suggests that the settlement pattern during the Strait of Georgia Culture was similar to that known from the ethnographic record (e.g. Barnett 1955). The ethnographic pattern is typified by large winter villages and some large summer villages, with smaller spring, summer and fall camps at gathering and fishing sites.

"This means that villages would be situated on the Mainland or large islands and most likely be placed near the mouths of large rivers" (Mitchell 1971:49). Permanent houses with timber frames, probably fitted with cedar planks, were arranged in one or two rows along the shore. Fortified sites with walls and ditches, often without fresh water sources and with only shallow shell middens, may be located nearby. Archaeological support for Mitchell's association between the Strait of Georgia Culture and the Coast Salish includes a well developed woodworking tradition, indicated by flat topped hand mauls, antler wedges, chisels of bone or ground stone, beaver teeth incisors, bone drills, well made celts, and irregularly shaped abraders. Houses are visible archaeologically as large post moulds and house outlines.

Archaeological evidence suggests that the Strait of Georgia Culture type "was built on fishing, hunting, and gathering, with a heavy reliance placed on fishing for salmon" (Mitchell 1990:346), although most faunal analysis has been of spring occupations, none from winter villages are available. Previous analyses indicate a focus on shellfish and herring in the spring, and salmon in the summer and fall. Flat fish, dogfish, coast deer, wapiti, waterfowl and gulls, were also important food sources.

Details about social organization during the Strait of Georgia period are inferred from both the archaeological record and ethnographic accounts (Barnet 1955, Suttles 1960). Ethnographic records describe status differences between individuals that were reflected through the acquisition of ancestral names and personal property including land, houses, and personal effects. Head deformation, tattooing and body piercing may also have indicated status. In death, status was reflected in differential burial practices. Both loosely flexed midden burials and above ground (mortuary house, tree, and cave) methods were common during the Strait of Georgia period. Grave inclusions are rarely found, possibly because they were fashioned from perishable materials.

Summary of Coastal Culture History

The Old Cordilleran Phase is characterized by the presence of unifacial pebble choppers and leaf shaped bifaces. Analysis of sites located near Vancouver indicate the people of the Old Cordilleran Phase were large-game hunters. The second or Charles Phase is characterized by expediently fashioned basalt and obsidian stone tools. Faunal assemblages at Charles Phase sites indicate a mixed subsistence base dominated by fish resources. The Locarno Beach Culture assemblages are extremely varied and indicate cultural continuity between earlier and later phases. Locarno settlement types, however,

are typically smaller than successive ones and faunal assemblages indicate a subsistence base divided between land and sea.

The fourth or Marpole culture type is characterized by several distinct archaeological features including a large variety and type of chipped stone points, large celts, representational stone sculptures, and unilaterally barbed harpoon points. Faunal remains indicate Marpole Phase peoples subsisted primarily on the Fraser River salmon run. The most recent or, the Strait of Georgia Culture Type included in this summary is characterized by an emphasis on bone as the major material of tool manufacture. Inferences based on artifact assemblages suggest that West Coast peoples maintained a complex social system. These inferences have been supported by observations found in the writings of early ethnographers.

Interior Culture History

The prehistoric cultural sequence for the Interior Plateau is summarized from published syntheses on each of the three major periods of prehistory. The Early Period discussion is based on Rousseau (1993), the Middle Period summary emphasizes Stryd and Rousseau's (1996) analysis, and the Late Period section draws heavily upon Richards and Rousseau (1987).

Early Period (ca. 12,000-7000 BP)

Information for the initial part of this period in British Columbia is based entirely on surface finds which resemble artifacts dated elsewhere to the Early Period. Only three investigated sites on the southern interior plateau have been chronometrically dated to the Early Period.

The Drynoch Slide site (EcRi-1) is located south of Spences Bridge in the Thompson River valley. Cultural materials were collected from a stratum underlying Mazama tephra, and charcoal associated with the artifacts yielded a radiocarbon date of 7530 +/- 150 BP (Sanger 1967). The Landels site (EdRi 11) is located in the Oregon Jack Creek valley a short distance north of the study area. Excavations revealed a pre-Mazama component suggesting two brief occupation episodes (Stryd and Rousseau 1996). The uppermost of the pre-Mazama occupations yielded a radiocarbon date of 7700 BP, while the older occupation was dated to 8400 BP (Stryd and Rousseau 1996). The only other

dated Early Period site in the southern plateau region is the Gore Creek site, located in the South Thompson River valley, a considerable distance from the present study area.

Although direct evidence is scanty, Rousseau (1993) has hypothesized that Early Period inhabitants of the area were primarily big game hunters. Shortly after deglaciation, Late Pleistocene megafauna such as bison (species now extinct) and larger forms of modern species, were probably dietary staples. Throughout the Early Period, a gradual shift to a broader subsistence base is suggested, although the limited archaeological data suggest that hunting remained the main subsistence focus. Technological sophistication also seems to have increased over time, with a wider range of artifact types known from the later part of the Early Period. Finally, Rousseau (1993) speculates that population slowly increased throughout the Early Period, possibly resulting in regional cultural adaptations by about 9000 to 7000 years ago.

The Middle Period (ca. 7000 to 3500 BP)

According to the 1996 Stryd and Rousseau model, the Middle Period covers the time span from the beginning of the Nesikep Tradition at the end of the Hypsithermal climatic period (ca. 7000 BP) to the commencement of the Shuswap horizon ca. 3500 BP. During this period, a distinctive southern interior ungulate hunting tradition is believed to have developed. Known as the Nesikep Tradition, it is divided into the Early Nesikep Tradition (ca. 7000-6000 BP) and the subsequent Lehman phase (ca. 6000-4500 BP). It is expected that further regional phases of the Nesikep Tradition will be defined in the future (Stryd and Rousseau 1996).

Beginning about 5500 BP, there is some evidence for a second, possibly unrelated, cultural tradition represented by the Lochnore phase. Stryd and Rousseau (1996) propose that the Lochnore phase signals an inland migration of Coastal Salish peoples, who relied on the improving salmon runs and forest resources of the Mid-Fraser-Thompson River area. However, this interpretation has been disputed by Wilson (1991a) and Wilson (1992c), and the issue has not been resolved.

The Lochnore phase is presently defined on the basis of excavated and dated components in the Mid-Fraser and Thompson River regions (Stryd and Rousseau 1996). At least 15 sites with Lochnore phase components have been excavated, and associated surface finds have been collected throughout the Thompson River area (Stryd and Rousseau 1996).

Lochnore phase residential and field encampment sites are often small to medium in size, fairly deeply buried, and suggest relatively short-term occupation episodes bearing medium to high density scatters of lithics, bone, and fresh water mussel shell. Some of the larger residential encampments indicate repeated occupations. Many known sites are situated on the edges of fairly flat upper river terraces along the sides of main river valley bottoms, especially near junctures with major tributary creek valleys. They have also been found and investigated in mid-altitude valley contexts, where they are common beside small lakes and streams, and are interpreted to be seasonal field camps occupied by fairly small groups for relatively short periods.

Pithouses were initially thought to be absent during this phase, but a group of three house pits thought to relate to the late Lochnore phase were recently excavated at the Baker site (EdQx 43) near Monte Creek in the South Thompson River valley (Wilson 1992c). Radiocarbon dates from the Baker site structures place them between 4450 and 3950 BP, in the latter part of the Lochnore Phase (Stryd and Rousseau 1996).

Diagnostic Lochnore phase artifacts include "Lochnore side-notched" points, concave edged endscrapers, and microblade technology. Other tool types resemble those of earlier and later archaeological horizons.

Faunal assemblages suggest that during the Lochnore phase people participated in a generalized subsistence economy typified by a broad-spectrum foraging strategy. Fauna represented in Lochnore phase components include deer, elk, beaver, migratory fowl, anadromous salmonids, turtles, and freshwater mussels. Until recently, there was no direct evidence for intensive utilization of anadromous salmon during this phase, but salmon consumption may have been relatively high, as storage pits containing articulated salmon vertebrae were found within the Lochnore phase housepits at the Baker site (Wilson 1992c).

The Late Period (ca. 3500 to 200 BP)

Late Period cultural horizons appear to represent an intensification of the Lochnore phase adaptive strategy, showing continuity of artifact types, continuing use of pithouses, and increasing harvesting of salmon (Stryd and Rousseau 1996). Many of the features now attributed to the Lochnore phase were formerly believed to have originated during the Shuswap horizon, and some modification of the sequence has been necessary as a result of the recent findings in the South Thompson River valley.

Shuswap Horizon (ca. 3500-2400 BP)

Although no Shuswap horizon component in the Mid-Fraser-Thompson River region has been unequivocally dated earlier than 3000 BP, Stryd and Rousseau (1996) have tentatively suggested that the horizon *may* extend back as far as 3500 BP. However, this is based on questionable dates from two sites, and it is suggested that the date ultimately will be revised to approximately 3000 BP.

Palaeoclimatic data from the Canadian Plateau suggest that sometime between about 4500 and 4000 BP, there began a gradual change from warm and dry conditions to a significantly cooler and wetter climate, with grasslands reaching their minimum extent by about 3000 BP (Hebda 1995). The effects of this climatic change on various aspects of local environmental systems are not yet entirely clear, but they must have had a significant impact on the adaptive pattern practised by Lochnore phase people to have persuaded them to adopt the markedly different Shuswap phase cultural pattern.

The transition from the Lochnore phase to the Shuswap horizon is not very well understood, due to the limited excavation data available for the period between 4000 and 3000 BP. Models proposed by Stryd and Rousseau (1996), Kuijt (1989), and Rousseau (1990) suggest that the transition occurred between about 3600 and 3300 BP. Several obvious and important changes in cultural behaviour are implied in the archaeological record during this time, and they have been interpreted as indicating cultural adaptations to changing environmental conditions.

The commencement of the Shuswap horizon sometime around 3500 BP also marks the beginning of the Plateau Pithouse tradition (Richards and Rousseau 1987). It is characterized by an apparent increase in the use of pithouses, semi-permanent winter pithouse villages, and intensive salmon fishing in the South Thompson-Shuswap Lake region (Richards and Rousseau 1987).

Plateau Horizon (2400-1200 BP)

Between about 3000 and 2500 BP, cool and moist climatic conditions gradually changed to the warmer and drier conditions experienced today (Hebda 1995). The archaeological record on the Canadian Plateau indicates that shortly after about 2500 BP, there were significant changes in subsistence and settlement adaptive patterns, marking the commencement of the Plateau horizon (Richards and Rousseau 1987).

The Plateau horizon is characterized by several material traits that are distinct from the preceding Shuswap horizon, including differences in house size and shape, artifact assemblages, and village size (Richards and Rousseau 1987). An apparent increase in storage features during the Plateau horizon suggests a heavy reliance on stored salmon. Numerous small field camps and resource extraction locations attributed to this phase have been identified in mid- and high-altitude areas, suggesting increased use of resources in these zones. Notably, intensive root resource collection is clearly evident (Rousseau and Howe 1987). The high degree of site variability suggests that a relatively wide spectrum of economic activities were undertaken by specific task groups (Richards and Rousseau 1987).

Kamloops Horizon (1200-200 BP)

Material traits of the Kamloops horizon express major differences from those found during the preceding Plateau horizon. According to Richards and Rousseau (1987), many aspects of the basic adaptive pattern remained constant during the Plateau and Kamloops horizons; however, notable differences in the latter include: (1) larger average housepit size (about 7 m); (2) the appearance of the Kamloops side-notched arrow point; (3) a significant elaboration in mobile art and decoration of utilitarian items; (4) increased interaction with Northwest Coast groups; (5) and a decline in specific task-group mobility as indicated by an obvious decrease in the relative frequency of sites in mid-altitude and upland settings compared to the preceding Plateau horizon. This lower site density is interpreted to reflect a reduced emphasis on mid-and high altitude faunal and floral resources.

Summary of Interior Culture History

Current archaeological evidence on the Interior Plateau suggests that three main periods of prehistory can be identified. Although these periods are largely defined on the basis of biface types and inferred technological systems, more general cultural shifts are also suggested, perhaps in response to environmental changes. During the Early Period, a mobile settlement pattern based on a big game hunting economic base is inferred from the scanty evidence currently available. The Middle Period, commencing about 7,000 years ago, seems to signal a shift to a more generalized subsistence base with an increased reliance on riverine resources, including salmon and shellfish. General cultural continuity is indicated from the beginning of the Plateau Pithouse Tradition (about 4500 BP) to

European contact, with some variability in house and village sizes, technology, and other cultural attributes.

Archaeological site locations are expected to vary across time in relation to environmental conditions (e.g., shifting forest margins, lake level and stream channel variations) and cultural adaptations, such as the adoption of winter pithouses.

Table 6: Current Culture History Models for the Gulf of Georgia and Interior Plateau culture areas.

Years B.P.	Gulf of Georgia Region ¹	Fraser Canyon ²	Interior Plateau ³
Contact			
500		Esilao Phase	Kamloops Horizon
1,000		Emery Phase	
1,500		Stamuel Phase	Plateau Horizon
2,000	Marpole Culture Type	Baldwin Phase	Shuswap Horizon
2,500			
3,000	Locarno Culture Type		
3,500			
4,000		Charles Culture (Bayem Phase)	Lochnore Phase
4,500	Charles Culture Type		
5,000			
5,500			Lehman Phase
6,000			
6,500	????	Mazama Phase	Early Nesikep Tradition
7,000			
7,500			
8,000	Old Cordilleran Culture Type	Milliken Phase	
8,500			
9,000			
9,500			
10,000	Protowestern		
10,500			
11,000	????	????	
11,500			
12,000			
12,500			

¹ (Adapted from Burley 1989, Figure 2)

² (Compiled from Borden 1968a; Arcas Associates 1985)

³ (Compiled from Rousseau 1993; Stryd and Rousseau 1996; Richards and Rousseau 1987)⁴

⁴ Table compiled by Bailey 1996 for the Chilliwack AOA

Previous Archaeological Investigations

The following is a summary of past archaeological work conducted in specific locations within the study area as well as any investigations just outside of the study area that aided in model development. This data helped define the model for determining cultural heritage potential within the Squamish Forest District.

The Archaeology Branch Annotated Bibliography (Ministry of Small Business, Tourism and Culture 1995) was accessed to determine what archaeological investigations had been conducted within the Squamish Forest District. The relevant data from these reports was collated. Of the archaeological projects undertaken within the Squamish Forest District most of these relate to surveys of hydro lines and other linear developments. Prior to 1993, the year that Mackie and Eldridge reviewed the archaeological investigations in British Columbia, no probabilistic or intensive selective surveys had been conducted within the Squamish Forest District (Eldridge and Mackie 1993). Nevertheless, the land within the forest district did not fall within the areas they "flagged" as needing further survey. Since that time the archaeological investigations undertaken in the study area have been limited to spatially limited impact assessment type investigations.

In addition to accessing the Archaeology Branch Bibliography, we downloaded site information for the study area from the Canadian Heritage Inventory Network (CHIN). This was done using the latitudes and longitudes for the 1:20,000 BCGS TRIM maps covering the Forest District. One hundred and three sites have been recorded within the Squamish Forest District. Each site has a siteform, which lists the report or other publication discussing the site. These documents were reviewed to summarize all archaeological investigations in the Forest District.

The following section has been organized by drainage area, for two reasons: 1) organizing the data in this fashion makes it more accessible for use in the model; and 2) site types can vary considerably between drainage areas.

Coastal Zone

The coastal zone of the Squamish Forest District is restricted to Howe Sound. Archaeological investigations conducted within the coastal zone of the study area are discussed below.

Howe Sound Area

The entire eastern shore and the northern portion of the western shore of Howe Sound fall within the Squamish Forest District and within the Squamish Traditional Territory. Howe Sound, ethnographically, was inhabited by the Squamish during the winter. In the spring they would camp up the Squamish River to harvest eulachon as well as gather shellfish and young plants. In the fall berries and spawning salmon were abundant. Resource acquisition activities and the more sedentary winter living pattern have left considerable archaeological remains in the Howe Sound area.

There have been few archaeological investigations conducted in this portion of the Squamish Traditional Territory. Ten sites have been recorded to date along the shores of Howe Sound. Site types include: surface and subsurface lithic deposits, petroglyphs, pictographs, and shell middens. Only one site has been recorded at a distance greater than 200 metres from the shoreline; that site, DjRt-1, is an inland shell midden. The lack of additional inland sites is most likely a result of survey bias rather than patterning in the archaeological record.

The first archaeologist to investigate the Coast Salish culture type was Charles Hill-Tout (1900) who noted middens in the Howe Sound area. Harlen I. Smith recorded DjRt 2, the pictograph near Furry Creek, in the early 1900's (Smith 1907). In the 1950's, Charles Borden recorded three sites in the Howe Sound area. Place name investigations conducted by Hill-Tout (1978), Kuipers (1969), and Matthews (1955) list several areas along Howe Sound important to the Squamish people. All the sites are situated within a hundred metres of the shoreline.

In 1975 Pat Winram conducted a comprehensive shoreline survey of Howe Sound. Winram recorded a total of 69 sites including shell middens, non-midden lithic scatters, a single rock cairn, fish traps, canoe skids, and rock art. Not all of these sites occur within the Squamish Forest District. However, Winram lists common settlement characteristics that which might assist archaeologists in locating additional sites in the area. Winram noted: sites were never far from the water; the beaches on which the sites were located consisted of small water worn pebbles; sites with deep deposits were found on the west shore of the sound, and these seldom face north (Winram 1975:10).

Quirolo and Ham (1990) followed this study with a comprehensive overview and field reconnaissance of 275 hectares (both coastal and inland) centred on Furry Creek, on the east side of Howe Sound. This survey was important as Winram's study, discussed

above, omitted inland areas. Quirolo and Ham note that the Furry Creek study area has been disturbed by Highway 99A (the Sea to Sky Highway), power transmission lines, a quarry site, and shoreline erosion from recreational boating and ferry traffic (Quirolo and Ham 1990:10). Quirolo and Ham concluded that the site types expected along the coastline include shell middens, lithic scatters, and isolated finds. Those steeper areas (between the highway and railway) were given a medium potential rating since they border the high potential areas. Lithic scatters and isolated finds might also be found in the medium potential area but were not recorded by Quirolo and Ham (1990). The remainder of the study area was given a low potential rating because, despite an extensive shovel testing program and the inspection of exposures, no sites were found. Nevertheless, the presence of a previously recorded pictograph site and recorded Squamish placenames suggest that the area was extensively used by the Squamish.

Zacharias (1992) conducted an impact assessment of a terminal parking lot at Gibsons, British Columbia. Although the area is located outside of the Squamish Forest District, results from the investigation may shed light on cultural activities conducted in the rest of the sound. However, despite extensive testing, Zacharias did not locate any archaeological deposits.

In 1994, Merchant and Rousseau conducted an archaeological resource overview assessment of a section of land along Howe Sound near Porteau. This study consisted of background research and a brief in-field visual reconnaissance. The study area investigated by Merchant and Rousseau is described as consisting of ocean foreshore and steep hillsides and cliff tops (Merchant and Rousseau 1994:2). The shell midden site DjRt-1 is located just outside the northern boundary of the study area. Merchant and Rousseau found an unrecorded lithic scatter approximately 1 km south of the recorded shell midden but did not formally record it. The majority of the study area was given a low archaeological potential rating because much of it is characterized by steep slopes not suited for occupation. A small flat forested area with access to fresh water on the northern part of the study area was given a high archaeological site potential (Merchant and Rousseau 1994:10).

Cheakamus River Valley

The Cheakamus River flows south from Cheakamus Lake and parallel to the Squamish River. The Cheakamus and Squamish rivers meet south of Cheekye and feed into Howe Sound. Only four sites have been recorded along the Cheakamus River: DkRs-

7 is a cache pit depression along the east bank of the river; DkRs-3 is recorded as the location of two transformer stone features, and; DkRs-1 is listed in CHIN as a mythological site. Both of the sacred sites are located approximately 500 metres back from the river bank. The fourth recorded site along the Cheakamus is a lithic scatter referred to as EaRs-1.

May and Lucs (1976), as part of an inspection of areas threatened by development, surveyed selected areas along the Cheakamus River (near the Squamish River). No evidence of cultural deposits were found on the 20 acres surveyed. As well, no cultural deposits were found on the fifty acres surveyed north of the confluence of the Cheekye and Cheakamus Rivers. May and Lucs suggest logging disturbance accounts for the lack of cultural remains despite the nearby abundant salmon resources. A small recreational reserve at the mouth of Hat Creek (located at the junction of Callaghan Creek and the Cheakamus Rivers) and north of Cheekye, was thoroughly tested with no archaeological deposits found. May and Lucs note that this area has high archaeological potential because of the high salmon productivity in the area (May and Lucs 1976). No sites were found on a small recreational site on talus slopes above a lake. A recreational site at a higher elevation (3000 feet asl) on a lake west of Callaghan Creek was inspected by May and Lucs, however no archaeological deposits were noted.

Squamish River Valley

The Squamish River Valley runs approximately 60 kilometres from the head of the Squamish River south to Howe Sound. Twelve sites were recorded along the Squamish River during the Squamish Project conducted by Arcas Consulting under permit 1990-32. These include: three historic cemeteries, one burial cairn, two culturally modified trees, one historic habitation, two lithic sites, a habitation depression, a cache and a pictograph (Arcas 1996). There are five additional sites in the Squamish River Valley, for a total of seventeen.

Portions of the study areas of two other projects fall within the Squamish River Valley. Both of these are heritage resource overviews. Friesen (1980) reviewed the proposed route of the Squamish Lateral gas pipeline which ran up the Squamish River to where Sims Creek and the Elaho River diverge and across the highlands to the headwaters of the Lillooet River. From the Lillooet River the route was to run across Donnelly Creek and Hurley River. This route is described by Friesen as having high topographical relief except for the flat Squamish Valley.

In 1980, 12 sites had been recorded along the Squamish Lateral, all of these outside of the Squamish River Valley. The overview gave the entire pipeline route a medium to high archaeology potential rating (Friesen 1980:31). The Squamish lateral was given a medium to high archaeological potential rating (Friesen 1980:31). A low-level helicopter overflight was conducted for part of the study area and several areas were given a brief on-ground inspection. This assessment does not provide any correlations that can be used in the current model as only brief and minimal survey was conducted.

Apland conducted a heritage resource impact assessment of the Cheekye to Dunsmuir hydro line in 1980. This route traversed the present study area as it ran along the Squamish River and Howe Sound to Woodfibre and then across a mountainous ridge to Sechelt Creek. Two sites were recorded along the hydro line and three rock art sites fell just outside the study area. All of the line was observed by helicopter and all areas designated as "high priority" were given on-ground coverage. Subsurface testing was conducted in areas where exposure was poor (Apland 1980). The potential usefulness of this report to the current model is decreased by the fact that low and moderate potential areas were not inspected in the field.

Mamquam River

A portion of the Mamquam River was investigated as part of a Hydroelectric Project (Wilson 1992a). This included the transmission line and powerhouse area. No sites had been recorded in the area prior to 1992 and none were located during the 1991 field project. The area was logged earlier in the century and the remaining cedars were noted as stunted and thus unsuitable for aboriginal bark stripping.

Soo River

Bussey (1990a) conducted an impact assessment of a proposed hydroelectric facility on Soo River 12 km north-north-east of Whistler B.C. Soo River supports Rainbow Trout and Dolly Varden downstream from the Soo Canyon. Previous to Bussey's study no detailed heritage resource inventory had been conducted in the Soo River study area (Bussey 1990a:7). No heritage resources were located by Bussey (1990a) within the proposed Soo River Project study area. Topographical features suggested low potential for heritage resources.

Harrison Lake

An overview of the heritage resources within the Sto:lo traditional territory was undertaken by Mohs (1991) on behalf of the Sto:lo. This study included the Harrison Lake area. Mohs notes that this area has only received a " cursory " investigation by archaeologists but the potential for heritage sites is high (1991:36). Mohs describes the foreshore of Harrison Lake as being largely undeveloped but those areas that have been developed are characterized by logging and outdoor recreation activities.

A systematic inventory of the foreshore of Harrison Lake was conducted by Joyce May and Sandy Lucs in the early 1970's. Approximately 30 sites were recorded, largely pictographs. They noted that the potential for new sites is moderate as the area was an important communication and trade route to the interior (May and Lucs 1976).

Interior Zone

Lillooet Lake

Wilson (1991b) conducted a heritage resource inventory of a haulroad on the western shore of Lillooet south of Ure Creek and east of Bastion Peak. The entire road network was surveyed by foot and included the inspection of exposures as well as judgementally placed subsurface testing. Traditional placenames abound along the shoreline and Wilson lists these in his 1991(b) report. These are taken from Bouchard (1991). Two archaeological sites (pictographs) and seven ethnohistoric sites were recorded along this section of the lake. No sites are located along the right-of-way of the haulroad. The head of S and M Creek has a placename and would have served as a good place for temporary camps (Wilson 1991b:10).

In 1976 May and Lucs recorded three sites (EaRp 1, 3, and 4) within the bounds of the reserve at the southeastern end of Lillooet Lake. All three sites are depressions, of what nature they do not indicate. A historic boat-canoe was found in association with EaRp 4. They recorded a large open-air site and rock shelter (EbRp 9) where Joffre Creek meets Lillooet Lake. They noted that the area was currently used by the Mount Currie band as a fishing station. They recorded another open air site (EbRp 10) southeast of Joffre Creek (May and Lucs 1976).

Lillooet River Valley

Sneed and Smith (1977a) conducted an archaeological and ethnohistorical assessment of the Lillooet River Valley. They describe the area as having steep-walled, deeply incised valleys and rugged mountains. A receding glacier can be found at the head of the Lillooet River. The upper Lillooet River is gentler with flat and braided rivers. A total of 32 sites had been recorded in the study area by 1977 including 17 village sites. Thirteen of the total of seventeen sites occur in the Squamish River Valley north of Lillooet Lake, between D'Arcy and Mt. Currie. Cache pits were observed at 14 sites, nine of these associated with house pit remains, most of these north of Mount Currie. Sneed and Smith (1977a:25) succinctly summarize their findings:

the majority of the aboriginal archaeological sites are found on or north of Lillooet Lake and the largest number of habitation sites are found in the vicinity of the Birkenhead River. I believe this is more a reflection of archaeological observation than of actual aboriginal population distribution. It appears the semi-subterranean house structures and underground caches (which are easily observable) were in heavy use by the Lower Lillooet people occupying the Birkenhead River valley, while plank houses and box caches (which leave little or no archaeological evidence) were utilized predominantly by the remaining Lower Lillooet occupying the Harrison -Lillooet River valley.

Sneed and Smith (1977a:25) also note that the dense vegetation, damming of the Lillooet River, annual flooding, and agricultural development of the main valley system have seriously disturbed the area and could account for the lack of sites.

The Heritage Conservation Branch, as part of their Lillooet-Fraser Heritage Resource Study (1980), conducted an exhaustive literature review of aboriginal site locations along the Lillooet River. The Branch (1980:160) notes that:

The general absence of recorded village sites in the Lillooet Lake and lower Lillooet River area may confirm the ethnographic observation that plank houses, as opposed to underground houses, were the predominant structure in use by the Lower Lillooet. The plank house structures would have left little or no physical evidence of their presence for archaeological observation.

The Branch survey also suggests that underground caches were used "almost exclusively" in the north-eastern part of the Lower Lillooet territory. Other sites included camp sites (sometimes associated with fishing stations), a proto-historic cemetery, pictograph panels, and two isolated finds.

Melvin Creek Valley

Melvin creek is a tributary of Cayoosh Creek which is located just outside the north-western boundary of the Squamish Forest District. While not directly within the Squamish Forest District boundaries, data can be used to extrapolate to other upland (subalpine/alpine) river valleys that fall within the study area. Melvin Creek runs through a glacier scoured u-shaped hanging valley. This area was most likely used in the early spring and late summer as a hunting and plant gathering area by the people who lived at the head of Anderson Lake (now D'Arcy). Rousseau *et al.* (1993) conducted an archaeological overview assessment of the Melvin Creek area and field inspected all medium and high potential areas. A single recorded lithic scatter site (EdRn 1) located in the upland regions of the Melvin Creek area is significant because "little is known of prehistoric upland use in the area" (Rousseau *et al.* 1993:ii). EdRn-1 is situated on a high treeless glacial outwash terrace 2.5 kilometres from Anderson Lake on a major tributary of Melvin Creek (Rousseau *et al.* 1993:17). The site provides a good lookout spot and it is interesting to note that it has been used by recent hunters as a field camp. The assemblage from EdRn-1 included three basalt formed bifaces, three formed unifaces, resharpening flakes, a bifacial knife, and a triangular side-notched point. The point is similar to those typical of the Shuswap Horizon (ca. 3500 to 2400 BP).

Ure Creek

The archaeology of this area is virtually unknown (Wilson 1990). During an archaeological impact assessment an I.R. Wilson crew recorded seven sites, three of which were found at the mouth of Ure Creek. These include a cache pit site with 14 cultural depressions, and two smaller cache pit sites. The name *mkw'alts* or "smooth rocks" is associated with Ure Creek and housepits had been reported in the area before being recorded by Wilson. In addition to the 3 above noted sites, a rectangular bark-stripped tree, two possible culturally modified trees, cache pit or possible burial sites, and an historic gravesite were noted. Results of this study indicate that the Ure Creek Valley and especially the mouth of the creek are high potential areas for archaeological sites.

Expanding on the project discussed above, Wilson (1991b) conducted an AIA on the S & M haul-logging road south of Ure Creek, along Lillooet Lake. The proposed road was to run along the 1100 metre elevation contour. The entire flagged right-of-way was walked, all exposures were inspected, and judgementally placed subsurface testing was conducted. No cultural remains were encountered. Although the northern half of the road consisted of second growth, the southern half was covered by old growth forest. No CMT features were found.

Wilson (1991b) notes that both ethnographic sites and recorded archaeological sites occur along this stretch of Lillooet Lake.

In 1991, Albright conducted a test excavation of a reported burial site near the Ure Creek Logging Road. Testing of a large flat area about the shoreline located evidence that the area had been used in the past 30-40 years as a temporary shelter. No human remains were recovered (Albright 1991:4).

Pemberton Valley

This valley has been a centre of human activity for millennia. The Pemberton Valley served as a trade route between the coast and interior of British Columbia. Wales and Murray (1975:2) list events in the recent history of the valley which may have disturbed archaeological resources in the area. These events include: fire deforestation (1800's), cultivation activities (last 100 years), and river flooding.

In 1975 Wales and Murray conducted a survey of a large portion of the Pemberton Valley. The study area included Pemberton and Mount Currie, Green Lake, Green River, and all of Lillooet Lake, and extended up to the northern end of Gates Lake, and from Pemberton north along the Lillooet River. Survey generally extended up the mountain sides to the 1500 foot level, at Gates Lake to the 2000 foot level, and in the Green Lake area to 2500 feet. The survey was conducted judgementally and by foot.

Wales and Murray recorded 11 sites: a pictograph site, two isolated finds, and eight housepits. All of the housepits are situated near rivers or lakes. Wales and Murray note that the number of sites recorded is low for an area that is abundant in resources, was a major trade route, and supports a large First Nation population.

Bastion Group undertook an archaeological impact assessment of the Birkenhead Crossing of the Pemberton Portage Road (Simonsen 1993). One large housepit site had

been previously recorded in this location. The assessment was spatially limited and, while the investigators were informed of other sites outside of the study area, they did not have time to record them.

Echo Lake

May and Lucs (1976) surveyed this small lake at 2300 feet asl but found no archaeological deposits.

Gates River

Two lots on Gates River were inspected by May and Lucs under a 1976 permit. The area was rocky and steep; no archaeological deposits were found (May and Lucs 1976).

The northern end of the Gates river was studied by Sneed and Smith in 1977 as part of an overview assessment of the Fraser Canyon and Bridge River areas. No sites were noted within the Squamish Forest District portion of the Gates River (Sneed and Smith 1977).

Kelly Lake to Cheekye

Points West Heritage Consulting (Bussey 1988; 1990b) conducted an impact assessment of heritage resources along the single circuit transmission line between the Kelly Lake (near Clinton) and Cheekye (near Squamish) substations. Over half of this study falls within the Squamish Forest District along the main transportation route that splits the Forest District in half. This report was the final in a series of studies of the Duffy, Birkenhead/Owl, Ryan, and Soo/Rainbow routes. Helicopter overflights and truck survey were used to determine heritage resource potential. This data, previous experience, and air photos were used to determine heritage ratings for the new routes (Bussey 1988:12). Those areas with heritage resource potential were surveyed on foot; natural and artificial exposures were examined.

The Duffy Route runs along the east side of the Fraser River from Pavilion Creek to north of Lillooet. It then follows the Cayoosh Creek valley past Duffey Lake, into the Joffre Creek valley and on to the head of Lillooet Lake. The area was characterized by Bussey (1990b) as having low heritage potential. The floodplain of Cayoosh Creek was given a low potential rating because of the high level of disturbance in the area. The Seton

River (which also showed extensive disturbance) was surveyed but no cultural materials were located. The southern end of Duffey Lake was given a moderate to high rating. The area north of the Birkenhead River, where five sites have been recorded, was awarded a high potential rating. Cayoosh Pass to Joffre Creek was given a low to moderate rating but Bussey suggests that field reconnaissance of this area is needed to validate this rating.

The Birkenhead/Owl route runs up the south end of Anderson Lake, west up the Blackwater drainage and south along the east side of Birkenhead Lake, across rugged uplands of Owl Creek where it descends into the Lillooet River valley and to south of Pemberton. Most of this area is in rugged upland and steeply sloped. Blackwater Creek is predominately steeply sloped. Narrow terraces and moderately sloped landforms occur at the valley bottom near the watercourse which could be considered to have a low to moderate potential rating. The southern end of Birkenhead Lake and the headwaters of Owl Creek also have moderate potential for cultural remains.

The Ryan Route extends from the south end of Birkenhead Lake in a south-westerly direction to cross the Lillooet River Valley and ascend the Ryan River drainage. This route traverses rugged terrain south along the Rutherford Creek drainage and further south across the rugged uplands to join the Rainbow Route in the Soo River Valley. The majority of this area has low heritage potential because of its high elevation, rugged terrain, and steep slopes. Because Birkenhead Lake, Birkenhead River, and Tenas Creek areas are accessible, close to sources of freshwater and have natural resource availability they were given a moderate potential rating. Soo River has well defined and drained terraces but no heritage investigations have been conducted in the area.

Following field reconnaissance in the area, the Soo/Rainbow-Whistler Bypass was given a low heritage potential rating. Green River and vicinity, although considerably disturbed, has landforms suitable for sites and was given a moderate potential rating. Both Callaghan Creek and Brandywine Creek have low to moderate potential.

Darcy-Birken Area

Zacharias and Maas (1995) conducted a Cultural Heritage Resource Overview of the northern portion of the Squamish Forest District. Their study also included land north of the Forest District. Potential areas were awarded based upon a review of land use, known archaeological sites, and archaeological evidence from surrounding regions. They suggest that high potential areas should include the valley bottoms, and areas near lakes,

ivers, and river confluences and terraces. Archaeological sites commonly associated with these types of areas include: village settlements, fishing camps, seasonal base camps, fish weirs, isolated finds, pictographs/petroglyphs, trails, historic structures, sweathouses, and burials.

Zacharias and Maas (1995:16) list medium potential areas as "traditional trail corridors (as well as minor stream courses), high elevation and alpine areas in the upper drainages, and open slopes above the valley bottoms, including steep slopes of mountain goat habitat". Archaeological remains associated with these areas would include "small seasonal resource use sites, including upland/alpine hunting camps, upstream fishing stations, plant gathering and root roasting locations, culturally modified trees, trails, temporary camps along trails, cave and rock shelter sites, trapping sites, and game fences: burials, pictographs/petroglyphs, spirit quest/puberty ritual sites, historic structures, boundary markers, quarries, and early post-glacial occupations" (Zacharias and Maas 1995:16).

Low potential areas are cited as "mid-altitude forested slopes at a distance from streams and recently de-glaciated alpine areas" (Zacharias and Maas 1995). Archaeological sites possibly located in these areas include: CMTs, isolated finds, hunting/trapping locations, game fences, plant gathering sites, and boundary markers (alpine locations)" (Zacharias and Maas 1995:16).

Summary

Previous archaeological investigations in the Squamish Forest District have tended to focus on valley bottoms, river and creek drainage areas and lake shores. Very few archaeological surveys have been conducted in higher elevation areas where sub-alpine camps and other resource acquisition sites may be located. In addition, previous archaeological work in the area has tended to focus on development areas in a very site specific manner.

ARCHAEOLOGICAL CORRELATES

Archaeological correlates are one of the most important sources of information for potential model development. Archaeological correlates attempt to summarize the relationship between distinct environmental zones and the types of archaeological sites which might be found within each of those zones. Thus, knowledge of the faunal and floral resources available in each biogeoclimatic zone combined with ethnographic information and First Nations knowledge concerning aboriginal resource use, enables archaeologists to predict the type and distribution of archaeological sites within different environmental zones.

It is generally recognized that climate is the overall controlling environmental factor, determining forest cover, vegetation, and fauna. Within distinct environments we can expect to find different types of archaeological sites, as faunal and floral resources specific to each area were utilized differently. And as differences in climate are closely related to elevation, the following archaeological correlate zones were delineated on that basis.

In consultation with the First Nations, knowledge about known Mainland Halq'emylem, Coastal and Interior Salish traditional site types and distribution patterns can be synthesized with information obtained through the ethnographic overview and previous archaeological research to prepare site location criteria. The following summary divides the traditional use sites of these groups between two broad geographical zones (coastal and interior) as the material culture of these two areas can vary considerably.⁵

Archaeological sites located in certain geographic areas tend to reflect use of resources specific to that region, therefore descriptions of archaeological correlates have been divided into five major geographic regions or zones; Maritime Zone, Valley Bottom Zone, Montane Zone, Sub-Alpine Zone and Alpine Zone. With the exception of the Maritime Zone, each of the remaining larger geographic zones has been further divided into coastal and interior zones. These further sub-divisions are necessary as faunal and floral resources typically used by First Nations peoples tend to differ from coast to interior (eg. between interior valley bottoms and coastal valley bottoms) and it is assumed that

⁵ Traditional use areas in this instance refer to very general categories of resource use. Archaeological correlates must take into account aboriginal resource use on a macro level in order to predict where resource use areas such as berry picking grounds, hunting areas and fishing locales might be located. The definition of traditional use area in this project should not be confused with the Traditional Use Studies currently underway in many First Nations communities. Traditional Use Studies are an attempt to document very specific use areas on a micro-level.

archaeological sites will reflect this diversity. Descriptions and resource use in the interior and coastal sub-divisions of the larger, geographically defined areas are described below. **Correlates which specify a particular archaeological/environmental relationship are highlighted in bold.**

Maritime Zone (MZ)

The Maritime Zone of the Squamish Forest District is limited to the east coast of Howe Sound and a small portion of Burrard Inlet. The area is dominated by western hemlock, Pacific silver, amabilis fir, western red cedar, and Sitka spruce. This zone has a great diversity and abundance of animal habitat elements (Meidinger and Pojar 1991). For example, rocky outcrops within this marine environment provide protection and nesting habitat for many species of colony-nesting birds and low tidal islets are haul-out areas for many seal species.

Structures (MZ)

The Maritime Zone would have been heavily used for habitation and resource collection and processing because of the highly concentrated subsistence resources found here. This abundance of marine resources would lead to concentrations of settlement along or in close proximity to the shoreline on rocky beach fronts, on islets and steep sided peninsulas. The remnants of plank houses such as planks or posts are rarely preserved; but subsurface post molds and surficial house platforms (floors) may be visible. The latter are large flat areas with banked sides.

Plank house locations are often associated with shell middens. Shell middens are visible as concentrations of shell and animal bone often seen eroding out of banks, road cuts or tree throws. Shell midden sites recorded on Howe Sound strongly correlate with pebble beaches (Winram 1990), however distribution patterns indicate that middens have seldom been recorded on southern (i.e., north facing) bayshores. Other sites that can be expected in this area are lithic scatters, rock cairns, fish traps, canoe skids, and rock art.

Resource Acquisition Sites (MZ)

Lithic scatters can be expected in the form of resource acquisition camps throughout the Squamish Forest District Marine Zone. As a result of sea-level changes, lithic scatters and possible shell-less middens found in association with palaeoshorelines, if extant, will be

concentrated at varying elevations along the modern shoreline. Shell-less midden sites recorded north and south of the study area are usually associated with fairly flat terraces (Christensen 1996; Hobler 1995; Ross 1983). Deposits are commonly buried or exposed in creeks and cutbanks.

Along the southern coast of British Columbia, sea-levels fell quickly from 200 metres above modern sea levels to 12 m below modern sea levels between 11,000 and 8,400 years BP. Settlement patterns reflect the constantly changing shorelines that were the result of rising and falling sea levels prior to 5000 BP, when they stabilized at modern levels. Therefore repeated use of the same locations for resource acquisition and settlement over long periods of time was impossible, and the density of cultural material along paleoshorelines is expected to be very low and difficult to locate. Nevertheless these sites types should not be overlooked. Areas of high archaeological paleoshoreline potential include flat terraces associated with short but gradual slopes on their downslope sides. In other coastal locations there is a strong correlation between site density along the modern shoreline and older raised beach sites (Christensen 1996). Consequently, areas of known high site density along the shoreline should be inspected closely for higher elevation shell-less midden sites on adjacent paleoshorelines.

A recent intensive survey of a highway corridor on southern Vancouver Island has significantly increased the number of inland sites recorded in the Coast Salish culture area. Findings from this survey can be extrapolated to the mainland coast. These sites are typically greater than 200 metres inland and do not seem to be correlated with any specific landform (Owens-Baird 1996:63). In fact, much of the area surveyed would have been rated as having low potential for archaeological sites according to "traditional archaeological wisdom" (Owens-Baird 1996:7). These sites were located through subsurface testing which revealed shell deposits. Keddie suggests that these sites are inland components of marine economies where people collected cedar, nettles, willow, and reeds to produce canoes, nets, etc. as well as hunting (Keddie 1987). It is likely that a similar settlement pattern may occur on the mainland.

Valley Bottom Zone

This zone covers the lower elevation areas of the study area. Throughout the Squamish Forest District, the Valley Bottom Zone is dominated by waterways, lakes and riparian areas within large tracts of forest. This environment provides habitat for a variety of economically important biota. Salmon are found in the larger rivers, and many of the

smaller streams provide spawning grounds. Lakes and surrounding environs support a wide variety of waterfowl, non-anadromous fish and mammals.

The Valley Bottom and Maritime zones were the most heavily used zones for both habitation and resource collection and processing. Lakes and rivers were sources of food and water, as well as access corridors and transportation routes. For obvious reasons heavy use of valley bottoms has continued since European settlement and consequently sites in these areas will have sustained the greatest impact through agriculture, highway construction, Hydro line construction, and settlement. Therefore, it is important that any undisturbed valley bottom areas be inspected thoroughly.

Coastal Valley Bottom Zone (CVB)

This zone covers the lower elevations of the Squamish River and its tributaries, the larger of which is the Cheakamus River, as well as the south end of Harrison Lake and the lower Lillooet River. The majority of the Coastal Valley Bottom Zone is characterized by the Coastal Western Hemlock (CWHZ) biogeoclimatic zone and, at higher elevations, the Mountain Hemlock (MHZ) biogeoclimatic zone. On average, the CWHZ is the wettest biogeoclimatic zone in British Columbia, and is dominated by western hemlock with western red cedar occurring frequently throughout (Meidinger and Pojar 1991). In this zone, the summers are cool, and the winters mild. The MHZ is characterized by short, cool summers, and long, cool, wet winters, with heavy snow cover for several months.

Structures (CVB)

Winter villages were generally the largest site type. Village sites often consist of a large number of dwellings and related features associated with the aggregation of several families or clans. Ideally, village sites were located in areas providing a variety of plant and animal resources, sheltered from strong winds, and with some natural defence from attack. Many winter villages were repeatedly occupied over time, and deep multi-component or well-stratified cultural deposits may be present at these sites. In the study area, many village sites were located along the banks or terraces of the Squamish and Lillooet Rivers and their tributaries as these localities featured fluvial deposits (sands and gravels) that were easily excavated and provided good drainage.

Plank and pit house structures leave archaeologically visible remains. Plank houses and pithouses were typically built on level ground on inactive floodplains or terraces.

Archaeological traces of plank houses may consist of either shallow depressions and/or raised platform features (Alexander in Rousseau et al. 1994). Pithouse village sites are characterized by a cluster of large (5-20m diameter) depression features, containing dense cultural deposits.

Remains of structures built specifically for the important winter ceremonials may also be present within the village site. Other features associated with winter village sites include small, temporary structures associated with female puberty rituals, menstrual and birthing huts, and sweat lodges. Sweat lodges may be archaeologically recognizable by their close proximity to a stream and the presence of an external hearth for heating stones; they may also be expected to be located at a distance from resource gathering areas.

Seasonal base camps will be situated near important natural resource locations, such as fishing grounds or root crop gathering sites. Generally, base camps are expected to contain fewer structures and features than winter villages. However, the structure/feature content as well as the archaeological visibility, will vary depending upon the type of structures present. The Stó:lo used above-ground plank houses in the spring, summer, and early fall, which may be initially evident by dense scatters of fire-broken rock, charcoal, and lithics. Other structure types present at seasonal base camps could include menstrual, and birthing huts, sweat lodges, and specialized subsistence structures such as fish or meat drying racks. Features situated near these sites may include roasting pits, cache pits and fish weirs. An anomalous seasonal base camp type has been reported from Sumas Lake, outside of the study area but within Sto:lo traditional territory; here during the summer months, the Stó:lo occupied platforms on the lake to avoid mosquitoes (Lord 1866; Bernick 1992:31).

Features such as cache pits, roasting pits, and hearths will be the most conspicuous, indicated by smaller circular depressions averaging about 1-2 m across. These may be found in association with village sites, seasonal camps, and along trails.

Burials (CVB)

Burials were commonly located near winter villages. Among the Stó:lo, interment in cedar boxes was common, with the boxes placed in mortuary houses, trees, or secluded rock shelters and caves. Within Squamish traditional territory, islands near villages were commonly used as burial locations. The remnants of cedar slab sheds and boxes used for burial by the Squamish may also be evident near village sites (Hill-Tout 1978:34). However burial shelters were not noted for the Howe Sound area (Winram 1975:5).

Resource Acquisition Sites (CVB)

A variety of resources were harvested in the forested Valley Bottom. Shelters, when used at resource acquisition sites, were temporary in nature and will not likely be extant in the archaeological record, however the physical remains of hunting and gathering activities will remain. Western red cedar was of primary technological importance in this zone. It was harvested to produce many items of material culture ranging from plank houses to basketry and clothing. Culturally modified trees (CMTs) including cedar, hemlock, lodgepole pine, and ponderosa pine can be expected in this zone. Any CMTs which pre-date 1846 are automatically protected under the Heritage Conservation Act, therefore tree stands of an age class of 8 or 9 may contain aboriginally modified trees or features which are protected. Additionally, protected CMTs may appear in small stands or as isolated veteran trees within stands of much younger age classes as identified in the Forest Inventory. Traditional use of white or silver fir boughs, Balsam fir, white pine, western hemlock, and Sitka spruce for medicinal purposes will seldom leave cultural scars.

In addition, edible plants including several types of berries, cambium, and root crops were often processed at the collection site (Turner 1978). Archaeological remains associated with plant gathering and processing in this zone might include lithic scatters, hearths, and roasting pits.

Archaeological remains associated with hunting and processing sites in the Valley Bottom forests will be similar to plant gathering sites and may consist of both natural and cultural features. Natural features, such as gullies and bluffs, were used to control game. Mule or blacktail deer and elk were hunted in the forested and parkland zones along drainages and lakes (Alexander in Rousseau et al. 1994:15; Duff 1952:70). Goats were hunted at higher elevations in the Coastal Mountains or at lower elevations near water sources during the summer. Snares and pitfall or deadfall traps and deer fences were placed in known habitats and strategically along game trails. Birds and some mammals were hunted using blinds along shorelines or known animal trails. Generally, kill and butchering sites are found anywhere prey was located and thus may not be associated with any particular landform. It should be noted that many sites likely served a dual function as both plant and animal harvesting locations. Anvil, Bowen, Keats and Gambier Islands, White Beach and the Squamish River Valley on the mainland were known deer hunting grounds; as a result resource acquisition camps, identified by lithic scatters, may occur in these locations.

Salmon spawning streams will be areas of high site potential. For example, fishing sites on the Squamish River were located in those places where water and shore conditions were suitable for dip-netting. These locations may contain evidence of nearby fish processing in the form of lithic scatters.

Interior Valley Bottom Zone (IVB)

The Interior Valley Bottom Zone falls within the Coastal Western Hemlock Biogeoclimatic Zone. The Gates, Lillooet, and Birkenhead River valleys and associated tributaries, located in this zone, were extensively used traditionally.

Structures (IVB)

Evidence of residential and field encampment sites, accompanied by surficial to deeply buried scatters of bone and lithics may be located at the edges of flat upper river terraces along main river valley bottoms. These are more commonly found near the junctures of major tributary creek valleys.

Depressions associated with semi-subterranean house structures and cache pits are commonly found in the Birkenhead River Valley, north of Mount Currie. Teit (1906: 196) lists the names of several villages belonging to the Lower Liluet, and all are along the Lower Lillooet River except for one on Little Harrison Lake, and another on Little Lillooet Lake. The lack of recorded habitation sites on Lillooet Lake and the lower Lillooet River may be the result of taphonomic and erosional processes. Ethnographic sources suggest that plank houses and box caches were also used in this area, however, evidence of these may not be well preserved.

As in the coastal areas, small temporary structures associated with female puberty, menstrual and birthing, as well as sweat lodges may be found in proximity to village sites. These remains may include small depressions with associated post molds and hearths. Sweat lodges may be archaeologically recognizable by their close proximity to a stream and the presence of an associated external hearth.

Seasonal base camps will be situated near important natural resource locations, such as fishing grounds or plant gathering sites. Similarly to the Coastal Valley Bottom Zone, salmon spawning streams will be areas of high site potential, as will be hunting grounds in

the forested and parkland areas along drainages and lakes. In these areas, snares and pitfall or deadfall traps were placed strategically along known game trails and in known habitats.

Burials (IVB)

Burials were commonly located in close proximity to villages, thus the potential for burials in the Interior Valley Bottom zone would be high. Two methods were used for interring the deceased in this portion of the study area Teit (1906:271). The first method is evidenced archaeologically by a small mound or a cairn, while the second method involved the use of a small cedar mortuary box. The potential for finding a burial mound is greater than finding a mortuary box burial as the former is less likely to deteriorate. However, CMTs (bark-stripped trees, painted trees, or trees with carved anthropomorphic figures), which are often found in association with mortuary box burials, may still be evident. Historic graves may be marked by wooden picket or wrought iron fences.

Resource Acquisition Sites (IVB)

Resource acquisition sites found in the Interior Valley Bottom zone will be similar in nature to those found in the Coastal areas. Hunting of a wide range of animals, including bear, deer, wolf, otter, fox, and lynx took place in the valley bottom forests. Teit (1906) describes two types of hunting lodges used by the Lower Liluet when day trips from the village were not possible. For temporary campsites, a bark and brush shelter would be built, while for those sites occupied more frequently, permanent lodges consisting of log walls chinked with moss and grass were built. Remains of the temporary campsites themselves may be difficult to find due to poor preservation, however, the trees stripped for their bark in constructing the shelters may still be present. Such campsites may be found near bodies of water, or along known game trails. Archaeological remains associated with hunting, plant gathering and processing in this zone might include lithic scatters, hearths, and roasting pits.

Trails (IVB)

Trade among First Nations has left archaeological evidence in the form of the extensive aboriginal trail network found throughout British Columbia. In addition to trade these trails were used by people as they moved from one area to another to exploit natural resources. Archaeological sites or features associated with trails may include culturally modified trees, cultural depressions and lithic scatters.

Rock Art (IVB)

Pictograph sites are most commonly located on sheltered rock faces along lakes and rivers, though are not limited to these locations.

Montane

This zone covers mid-elevation areas, and is located above the Valley Bottom Zone. The majority of the Montane region in the study area is characterized by the Coastal Western Hemlock biogeoclimatic zone and is dominated by western hemlock, amabilis fir, western red cedar in moist areas and Douglas-fir in dryer climes. In the Interior valleys and mountain sides, the Mountain Hemlock biogeoclimatic zone is characterized by stands of mountain hemlock, western hemlock, Engelmann spruce and amabilis fir. A variety of blueberries and huckleberries and other economically important food plants grow throughout the zone.

Coastal Montane Zone

The Coastal Montane Zone occurs at low to mid-elevation and is characterized by temperate rainforest. Western hemlock, red cedar, Pacific silver fir and, in drier areas, Douglas-fir are the typical tree species in this zone.

Structures (CM)

Structures built in this zone were temporary shelters, either of lodge or lean-to construction, designed to accommodate small groups. These sites were used during natural resource procurement activities away from a winter village. Associated archaeological remains would include lithic scatters, roasting pits, hearths and cache pits (used for storage of collected resources or for temporary storage of goods to be traded), and scars left on plank- or bark-stripped trees. Certain resource procurement sites were used seasonally over long periods of time resulting in concentrated accumulations of cultural material.

A variety of prehistoric activities were associated with the montane streams and lakes. Archaeological evidence of fishing camps on spawning streams and rivers may include the remains of fish weirs and traps. The remains of other structures and features such as drying racks and smoking stations may include hearths, cultural depressions, post molds and lithic scatters. Camps were also established along the lakes to harvest the abundant waterfowl located in this zone.

Resource Acquisition Sites (CM)

The potential for a high density of upland resource acquisition sites exists in montane areas, as a large part of the year was spent in these areas collecting plant foods and hunting. Evidence of activities in this zone would include stone tools and debitage from game butchering, hearths, smudge pits (vertical-sided circular holes containing charcoal and fire broken rock) from hide tanning, and other circular depressions from roasting and storing activities. Alexander (1992) writes that "these camps were typically set up on flat dry land, close to water, and at the edge of the forest (Alexander 1992)."

In coastal montane areas, where access is relatively easy, culturally modified trees can be expected in stands of old growth yellow and red-cedar, hemlock, and spruce. The inner bark of red and yellow cedar was processed for weaving rope, clothing, cordage, coverings, basket, mats and a host of other items. Planks were removed for creating boxes and walls for houses. Trees were felled for canoes, houseposts, poles or when a large number of planks were required. These activities will leave behind scarred trees and tool marks, stumps, and tree sections.. Scars from cambium collection may be visible on poplar or alder trees in this zone, as should scars left on plank/bark stripped cedar trees.

Trails (CM)

Archaeological sites or features associated with trails may include culturally modified trees, cultural depressions and lithic scatters.

Interior Montane Zone

Structures (IM)

Residential and field encampment sites have been found and investigated in mid-altitude valley contexts, where they are common beside small lakes and streams. These are interpreted as seasonal field camps occupied by fairly small groups for relatively short periods. In a survey of the Pemberton Valley, at elevations of between 2500 and 2000 feet, Wales and Murray (1975) recorded eight housepits, all located near rivers or lakes.

Resource Acquisition Sites (IM)

Based on her ethnoarchaeological research of the Fountain and Pavilion Indian Bands, whose traditional territory is adjacent to the study area, Diana Alexander believes

that “this environment was largely exploited secondarily to other, richer environments.” Furthermore, the places visited most often included “open woods near forested margins, and open areas along streams and trails used to travel between the montane and the river terraces” (Alexander 1989:78).

Scattered kill and butchering sites can be expected throughout the area (Alexander, 1989:80). Hunting in this zone occurred during the fall, as the men followed the large game down from higher elevations. Archaeological remains associated with hunting these animals include stone tools and debitage. Artifact densities may be a slightly higher on well established trails leading up into sub-alpine areas (Alexander 1989:78).

CMTs can be expected in any areas of rich natural resources, as well as along trails which pass through this zone.

Trails (IM)

As well as the CMTs mentioned above, archaeological sites or features associated with trails may include cultural depressions and lithic scatters.

Subalpine

The Subalpine Zone is located above the Montane Zone, and beneath the alpine tundra. It is characterized by the Engelmann-spruce, Subalpine fir (ESSF) and the Mountain Hemlock (MN) biogeoclimatic zones. Subalpine zones are generally composed of clumps of trees separated by meadows. **The meadows likely had the greatest economic value** for the First Nations in the study area. In ESSFZ, the temperatures are below freezing for 5-7 months of the year, and above 10 Celsius for only two. The winters are long and cold, and the growing seasons short.

Coastal Subalpine Zone

The coastal sub-alpine zone is found at high elevations, usually more than 1000m above sea level. Coastal sub-alpine zones are characterized by alpine meadows and lakes. Tree species typical of sub-alpine areas include Mountain hemlock, yellow cedar and Pacific silver fir.

Structures (CS)

The structures used in this zone were generally temporary shelters, of lodge or lean-to construction, designed to accommodate small groups. Berries as well as fish were processed at these sites. **Camps were also established along the lakes** to harvest the waterfowl located here. Evidence of base camps, with smudge pits and other depressions, sweathouses, and trails both in the vicinity and for excursions into the alpine zone might be expected.

Resource Acquisition Sites (CS)

A variety of animals were hunted in the subalpine meadows throughout the year. These meadows provided summer habitat for mule deer, elk, mountain goat, big horn sheep, bears, mountain sheep, and marmot, and fall habitat for mountain sheep. Meat was dressed and further cut into strips which were hung on drying racks for sun drying. The fat of deer, elk, or bear was rendered and stored for later use. Archaeological sites associated with these hunting and processing activities might include hunting blinds, deer fences, butchering sites, and caches. In addition, a variety of economically important plants were harvested and processed. Archaeological sites associated with food gathering and processing include roasting pits, lithic scatters, and hearths. CMTs can also be expected in this zone.

Trails (CS)

Trails leading to subsistence activity areas within the Subalpine Zone and providing into the Alpine Zone may be present. **Archaeological sites or features associated with trails may include culturally modified trees, cultural depressions and lithic scatters.**

Interior Subalpine Zone (IS)

Very little work has been conducted at the upper elevations of the interior regions of the study area. Recorded sites are limited to a few lithic scatters (Rousseau 1993:17). Therefore, we have drawn heavily, in the following section, upon previous ethnoarchaeological studies of the Fountain and Pavilion Indian Bands, whose traditional territory border the study area (Alexander 1989).

Structures (IS)

Basecamps were built in this zone from which the people would exploit the resources of the sub-alpine and alpine zones. Associated with the basecamps were temporary shelters and lodges, sweathouses, seclusion structures for women, and cache and fire pits (Alexander 1989). Shelters may leave very little archaeological evidence behind as they were used for a short time, and the poles were probably not in the ground long enough for posthole impressions to form (Alexander 1989:54). In her report, Alexander (1989:40) gives the following description of basecamp locations:

The camps were set up on flat, dry land, close to water, and at the edge of the forest (Turner 1988:34; Tyhurst 1988; D.L.; D.P.)....The trees provided shelter from the wind and rain, and firewood for the roasting pits and hearths....The camps were on the lee side of the trees where feasible with the open meadows in front of the trees being used for general camp activities (D.L.). Since the deer are often captured in the more open areas and the basecamps are near treeline, the basecamps are generally below the kill sites.

As these camps were often used year after year, the potential is for large sites evidencing a great diversity of artifacts and features.

Resource Acquisition Sites (IS)

The sub-alpine zones of the Interior provided an abundance of natural resources many of which were utilized traditionally. As with the coastal sub-alpine zone, a variety of animals were hunted in the sub-alpine meadows throughout the year including mule deer, bighorn sheep, mountain goat, bears, marmot, snowshoe hare, porcupine, and squirrels (Alexander, 1989:33). As well, marten, mink, fisher, fox, and lynx were hunted for their furs. Archaeological sites associated with these hunting activities may include hunting blinds, deer fences, butchering sites, and caches. A wide variety of plant resources were collected and processed in sub-alpine meadows and forests. These include roots, berries, bulbs, stalks, and bark. Archaeological remains associated with plant gathering and processing in this zone may include lithic scatters, hearths, culturally modified trees, and roasting pits. Studies in nearby areas suggest that evidence of root roasting pits will almost certainly be present (Alexander *et al.* 1985).

Trails (IS)

Trails throughout this zone, led up to the Alpine Zone above, and down to the winter village below. **Archaeological sites or features associated with trails may include culturally modified trees, cultural depressions and lithic scatters.**

Alpine

The Alpine Zone is characterized by a cold, windy, and snowy climate. The growing season is very short as the temperature is below freezing for 7-11 months of the year (Meidinger and Pojar 1991:264). This zone is treeless, except for stunted species of subalpine fir, Engelmann spruce, white spruce, mountain hemlock, and whitebark pine.

Coastal Alpine Zone (CA)

Coastal alpine zones are typically characterized by rock outcrops, cliffs, boulders, scree slopes and other rocky terrain. Plant cover in this area is sparse but includes various types of grasses and saxifrages. Although they appear barren, these areas support a wide variety of rare animal species.

Structures (CA)

Due to harsh weather conditions and lack of raw materials, evidence of base camps is unlikely to be found in alpine areas. Instead, day trips into the Alpine Zone were made from base camps set up in the Subalpine Zone.

Resource Acquisition Sites (CA)

Resources utilized by First Nations peoples, in those coastal alpine areas which could be accessed, included high altitude ungulates such as goats (for both wool and meat) and mountain sheep, root crops and stone sources. The alpine areas of the province have been prospected and mined by aboriginal people for at least 10,000 years as demonstrated by the presence of very **high-elevation source obsidian** in the earliest archaeological sites on the Northwest Coast (Fladmark 1985). Prehistoric quarry sites may be found in areas with outcrops or drifts of crypto-crystallines.

Previous research has shown that alpine areas have an overall low potential for sites but pockets of high potential occur in open areas on ridges used for travel or gathering roots and berries (Hudson 1994). Archaeological correlates for these activities would include fire pits and cooking pits. As well, stone cairns and lithic scatters may indicate hunting areas (Rousseau *et al.* 1993:17). Other sites that occur in the alpine areas include rock art, caves and rockshelters used as temporary shelter, and camps in mountain passes.

Trails (CA)

Cairns can be expected along trails leading to resource areas where evidence of resource extraction, such as cultural depressions, are found.

Interior Alpine Zone (IA)

Very little work has been conducted in the Alpine Zones of the study area. Therefore, as with the Coastal Alpine Zone, we have drawn heavily upon previous research conducted in traditional territories bordering the study area (Alexander 1989).

Structures (IA)

As with Coastal Alpine Zone, the potential for basecamps in this zone is considered low, camps were located in the Sub-alpine Zone with day trips into alpine areas made for specific resource procurement. Again, this was due in part to the harsh weather conditions, and the lack of trees.

Resource Acquisition Sites (IA)

A variety of plant and animal resources were exploited in this zone. Of the plants which were harvested, spring beauty was the most common and abundant. Other species included dwarf mountain blueberry, fireweed, and avalanche lily (Alexander 1989:20). The tools used to gather these foods were highly labour-intensive to make and were unlikely to be discarded; more likely they were brought back to base camps in the Subalpine Zone for repair. Therefore these items will rarely be found in the Alpine Zone. As well, since most food preparation was done at the base camps, evidence of cooking pits will not often appear. Alexander (1989:21) suggests: "Broken or lost knives used to cut shoots, leaves,

and stems may be the only evidence of plant gathering to survive, and such remains would be highly dispersed and isolated”.

Deer was the primary animal hunted in the Alpine Zone, but bears, mountain goats, bighorn sheep, and elk were also sought. As well coyote, wolf, wolverine, marmot and short-tailed weasel were hunted for their pelts (Teit 1906:227). Archaeological sites associated with hunting will include kill sites, butchering sites, hunting blinds, and occasional lithic scatters. Alexander (1989:28) summarizes the sites expected in this zone as follows:

In summary, although heavily used in certain seasons, **the alpine is expected to contain only small, scattered hard-to-locate archaeological sites.** The most conspicuous site type would be the stone hunting blinds, which may have some sparse evidence of tool resharpening and repair along with food and hunting gear. Any burial cairn would also be highly visible. The most common site is expected to be a small kill, and possibly butchering, site with only a few discarded or lost tools. Butchery sites near the hunting blinds or marmot colonies where repeated kills were made may be more visible due to greater densities of material as a function of reuse. **Small isolated hearths, in more protected locations, may occur occasionally,** but would be associated with little, if any, cultural material and hard to locate. Large hearths, food caches, shelters, or drying racks are very unlikely to have been used traditionally in the Alpine and, therefore, should be absent from the archaeological record.

Trails (LA)

Trails leading down into the sub-alpine zone can be expected.. **Cairns can be expected along trails leading to resource areas** where evidence of resource extraction, such as cultural depressions, are found.

Summary of Archaeological Correlates

Valley Bottoms were extensively and intensively used, producing a myriad of site types. Zacharias and Maas (1995:15) rate valley bottoms and benches above the valley bottoms both as high potential, especially those areas close to lakes, rivers, and at the confluence of rivers and smaller streams. Sites to be expected include: villages with house features including plank house platforms and pit house depressions, sweat lodge and smoke house features, seclusion lodges, cache pits, midden deposits, hearths, earth ovens, and burials; fishing camps with temporary shelters, hearths, drying racks, cache pits, earth ovens, weirs and fish traps; rock art sites, pictographs, and petroglyphs associated with trade, ritual, and ceremonial activities; lithic scatters, hearths, earth ovens associated with berry and plant collection and processing; lithic scatters and hearths resulting from hunting activities; and red cedar CMTs.

Of the four environmental zones, the **Valley Bottom Zone** was utilized most commonly and we can expect to find the greatest diversity of site types. Unfortunately, valley bottoms are the most disturbed geographical zones, as agricultural activities and settlement are concentrated in these areas and annual flooding and the damming of rivers seriously alter valley bottom geomorphology.

Pockets of high potential may be expected in the **Montane Zone**, especially for culturally modified trees. Harvesting and processing of cambium often was conducted along lakes and rivers in this zone. Scars from cambium collection may be visible on poplar or alder trees. Lithic scatters, earth ovens, cache pits, and hearths resulting from hunting and gathering activities may be present. Salmon harvesting sites may occur on upriver runs. Finally, remains of camps for harvesting waterfowl may be present along lakes. However, the Montane Zone is considered to be of primarily low archaeological significance in those areas at a distance from streams (Zacharias and Maas 1995:16). This was also indicated in Alexander's (1989) research in lands adjacent to the study area.

Sites to be expected within the **Subalpine Zone**, especially in the meadows are: high elevation berry and plant processing locations, which may include earth ovens, roasting pits, and hearths, and earth ovens for cooking animals transferred from meat processing sites. Sites associated with hunting activities may also include hunting blinds, deer fences, butchering remains, and caches. Base camps, smudge pits, sweathouses, and trails for excursions into the Alpine zone might also be expected.

In the **Alpine Zone**, isolated finds, hunting blinds, and cairns may indicate past hunting excursions. Hearths, earth ovens, and lithic scatters may also be present from root crop gathering or hunting activities. Aboriginal trails may be present and prehistoric quarry sites and associated evidence of resource extraction may be found.

Some activities, such as medicine gathering, were spread across the landscape in all geographical zones, and because of this they are unlikely to have specific archaeological correlates. Extensive aboriginal trail networks likely cross-cut all environmental zones (Suttles 1955; Duff 1952:51-53, Hudson 1994) and are often associated with other archaeological features and sites. Although it is possible that remains of trails can be located throughout the study area, their survival is dependent upon geological stability, slope and the level of historical disturbance.

In conclusion, aboriginal peoples travelled throughout and lived in all biogeoclimatic and geographical zones described above. Evidence in the form of archaeological sites may be present in all zones. However, it should be noted that the lack of archaeological sites in a given area does not necessarily translate into a low usage of that area. Archaeological sites are physical manifestations of activity and as such are subject to a wide variety of erosional and destructive processes. The assumption that an area of low archaeological site density is indicative of low aboriginal usage may be dangerous and misleading. To begin to appreciate the manner in which First Nations peoples lived on the land would involve a lengthy traditional use study, a process which is not within the scope of the Squamish Archaeological Overview Assessment. The preceding archaeological correlates section is a general description of aboriginal land use and the corresponding archaeological evidence which may be expected as a result and is intended for use as a predictive tool at the macro level.

Archaeological Correlates and Model Development

As described above, a range of site types and component structures and features were spread across the cultural landscape for all the groups discussed within this study. These include occupation sites, resource procurement sites, trails, and ceremonial and sacred sites. Archaeological investigations indicate that the placement of sites was based on several practical criteria including: cardinal exposure or aspect; climatic exposure; slope or grade; site drainage; proximity to necessary natural resources (water, wood, animals, plants); and finally proximity to transportation routes (Alexander in Rousseau *et al.*

1993:12; Maschner and Stein 1995:62-64). Soil conditions and water table would have been important considerations for pithouse construction, as would less tangible cultural considerations especially for ceremonial and sacred sites.

Despite the large size of the Squamish Forest District very few sites have been recorded in the area; likely a result of survey bias and preservation factors rather than a lack of land-use in the area. One-hundred and three sites grouped into 16 different site types have been recorded to date in the Squamish Forest District. These sites are summarized by site type in Table 7.

Also included in this table is the "Model Category" for each site type. In many cases certain types of sites are found in similar types of environments. For example, house pits, lithic scatters and burial sites are often found in direct association with one another. For this reason, different site types have been grouped together in an overall site type model. The habitation model for instance is designed to rate potential for areas which likely contain housepits and/or house platforms and/or fishing stations and/or lithic scatters etc.. The "Model Category" column in Table 7 indicates which sites types have been included in each of the four models developed for the Squamish AOA.

In some cases it is impossible to predict over a large geographic area where certain types of sites are likely to be found. This is due primarily to the lack of available environmental and cultural data. For example, the inability to predict where quarry sites are likely to occur is primarily due to the lack of detailed geological information available; there is not enough information regarding the specific location of rock sources which may have been mined for raw materials. While we were able to identify some specific correlates for the prediction of pictograph site locales (see Rock Art Model), petroglyph sites remain beyond the capability of our modelling abilities. Remaining cultural knowledge regarding the complex reasons for the placement of pictograph sites rests primarily with the First Nations.

Historic Sites are not included in the potential models as they do not fall under the automatic protection clauses of the Heritage Conservation Act nor were they included in the terms of reference for the Squamish AOA.

Table 7. Archaeological site types recorded within the Squamish Forest District.

Site Types ⁶	Number	Model Categories
Burial	9	Habitation
Cairn	1	Sub-alpine Camp
Cache Pits	29	Sub-alpine Camp
CMT	3	CMT
Fishing Stations	0	Habitation
Fire Cracked Rock	1	Habitation/Sub-alpine Camp
Historic Sites	25	Not Modelled
Housepit	25	Habitation
Houseplatform	0	Habitation
Lithics	25	Habitation/Sub-alpine Camp
Logging Features	1	CMT
Midden	5	Habitation
Mining	1	Not Modelled
Petroglyph	1	Rock Art
Pictograph	9	Rock Art
Quarry	0	Not Modelled
Roasting Pits	1	Sub-alpine Camp
Rockshelter	1	Not Modelled
Trail	2	Not Modelled (see Appendix 5)

MODELLING RESULTS

The following section summarizes the results of the application of the four models developed for the Squamish AOA (see Modelling Methodology section in this report). The first section describes the results of the preliminary test using the known archaeological sites as baseline data and the second section outlines fieldwork results. The Modelling Results section concludes with a discussion regarding the effect fieldwork results had on the potential models and maps.

⁶ Each site (each designated by one Borden Number) may have several different types of activities within it. This accounts for the larger number of site types than sites in the Squamish Forest District.

Results of the Comparison of Site Location Accuracy between Original Site Forms, CHIN and Archaeology Branch Plots

In order to ensure that baseline site location data was correct, Millennia and Timberline staff spent a significant amount of time plotting site locations onto GIS using the original site form locational descriptions and maps. Once completed, this data set (Millennia Data) was compared to the GIS ArcInfo site locations plotted by the Archaeology Branch from site forms and sites hand plotted onto 1:50,000 NTS maps (ArchBr Data). Finally, archaeological site recorded by latitude and longitude in CHIN were downloaded onto a GIS and their location compared with the Millennia Data. Results of the comparison indicated some major discrepancies in archaeological site locations especially between CHIN and Archaeology Branch ArcInfo plots (see Table 8).

Table 8 illustrates the magnitude of discrepancy between the location of sites plotted from each data base. For example, in CHIN site DbRq 1 may be plotted 300m along a lakeshore from a known datum while the Archaeology Branch ArcInfo may plot that same site 800m along the same lakeshore. In that case there would be a 500m discrepancy for the location of DbRq 1. In the CHIN to ArchBr. ArcInfo graph the majority of site plots were within 500m of one another, however 8 site plots had a discrepancy of 500m to 1km, 2 site plots had a discrepancy of 2km or more and one site plot discrepancy was over 5km. The CHIN to Millennia Data graph is virtually identical to the CHIN to ArchBr. ArcInfo. Most site plots were within 500m of one another, while 7 site plots were between 500m and 1km of one another. Two site plots had a discrepancy of 1km to 1.5km, two site plots had a discrepancy of 2km to 2.5km, and one site plot had a discrepancy of more than 5km.

As the ArchBr. to Millennia Data graph indicates, site plots were very similar. Only 4 plots had a discrepancy of 250-500m, one site plot had a discrepancy of more than 500m and only one had a discrepancy of more than 1km.

The comparison of various site location plots from three separate data bases indicate that CHIN plots have the most discrepancies from the Millennia and Archaeology Branch Data. The Archaeology Branch and Millennia Data set plots have the least discrepancy.

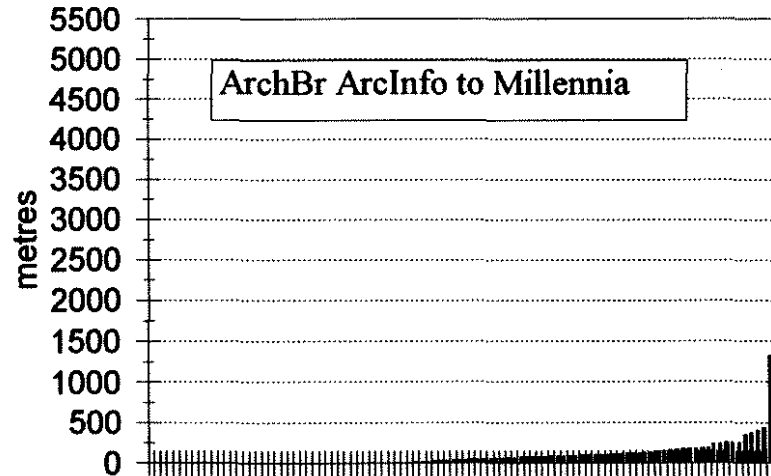
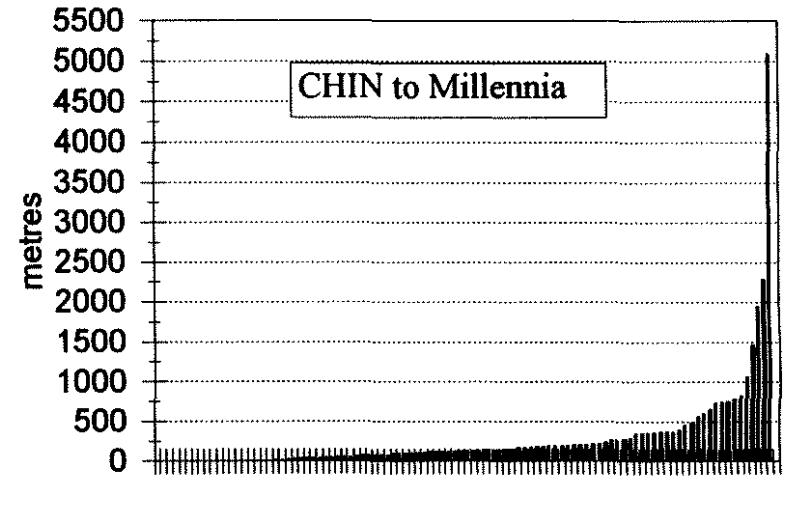
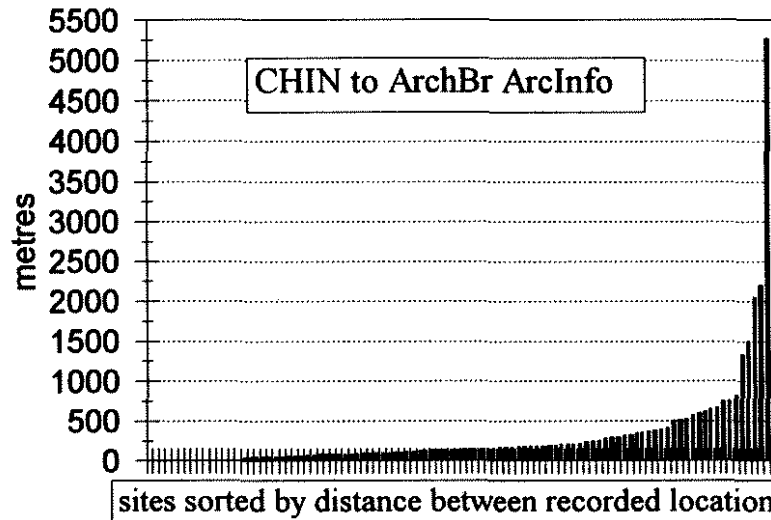
Missing Data refers to the number of sites for each graph which were not present in one or more of the original data bases (CHIN, Arch. Branch ArcInfo, or Millennia). Missing sites are represented as having '0' m discrepancy with an overlying horizontal bar (to indicate the number of missing sites). For example, in the CHIN to ArchBr. ArcInfo graph a total of 16 sites were missing from either the CHIN or Archaeology Branch records.

Some errors were removed prior to site location discrepancy analysis. These errors included sites plotted in the wrong Borden Block, gross errors in latitude/longitude designation, and obvious typographical errors.

Following a comparison of site locations from the three data bases, the initial model developed for the Squamish AOA was run. It was essential that site locations be plotted as accurately as possible for this first test of the model so that there was some assurance that potential ratings assigned for different areas could be compared with the known sites in that same locale.

Locational Discrepancies Squamish F.D. Archaeological Sites

Table 8: Archaeological Site Discrepancies



Preliminary Baseline Data Test of the Models

The initial models produced provided a baseline for refinement of model parameters. A number of planned refinements of the potential model were undertaken, once initial models were reviewed, to enhance the ability of the models to predict archaeological sites.

In the initial test of the model 46 (45%) of the 103 known sites were not caught. It was determined that we had set the slope parameter too low for the Habitation model and that once we asked the GIS to identify all those areas with a slope of 30% or less (as opposed to our original 10% or less), the model caught all but 10 of our original population of 46 sites missed. This increased our overall known site capture rate to 97% (93 of n=103 caught) as opposed to our initial 55% (57 of n=103 caught) capture rate. Of those 10 sites which were not caught after the slope parameter adjustment, one was an isolated lithic found in a sub-alpine area farther than 1000m from any body of water, another was recorded as an isolated lithic on a very narrow beach at the foot of a steep bank, and the remainder were located on very small terraces or microfeatures (<1 ha) which the GIS could not pick out.

Increasing the slope parameter from <10% slope to <30% slope resulted in an overall increase of land-base caught for moderate and high potential Habitation models. It is assumed that future field-work results will be used to refine the Habitation model. There is a possibility that future refinements could reduce the amount of overall land-base caught while still catching a majority of known sites.

The slope for the CMT model was adjusted to account for the generalized slope on TRIM maps. Slope data does not include information on existing rock bluffs or other large outcrops which may influence CMT potential. The current slope parameters have been chosen to offset the generalized slope data and provide a more accurate reflection of slope on the ground.

TRIM does not support sufficient slope or escarpment data for the Rock Art Model, which allows for the capturing of rock bluffs and other small rock formations which may have rock art sites. Steep areas can be modelled, but the types of landforms on which rock art can be predicted to often occur -- on long, narrow low to moderate bluffs with good overviews over a river valley -- but are too complex to carry out with information now available. Based on this assessment the Rock Art Model has been eliminated from this overview assessment.

The buffers around major water features was initially incorrect in early versions of the potential maps. Small lakes (<2 hectares) had a 'major water feature' water buffer

placed on them and these small features were also buffered, up to 1km distance, for CMTs. The model was corrected in the final version so that lakes <2 hectare no longer have a water buffer or CMT buffering. These small lakes still show habitation potential where ground conditions are within model parameters. Because the buffering could not be removed in the main model without re-running all buffering over all maps (a very costly process), a 'work around' to the model was added on to null out these small areas as a final step to the model. A minor inaccuracy was thereby introduced: in some instances the removal of the water buffer from small lakes has removed a portion of the water buffer from an adjacent major water feature. All major water features should maintain buffering around their entire perimeter.

FIELD-WORK RESULTS

The following section summarizes the results of field-work conducted within three of the six First Nations territories which encompass the Squamish Forest District. The focus of the field survey was to assess the accuracy of the potential models for mapping archaeological potential on the ground. The discussion of fieldwork, presented below, presents the areas surveyed, the types of potential polygons assessed and an assessment of the accuracy of those polygons to reflect variables on the ground.

Presentation of the field results is divided by traditional territory. For each traditional territory a description of the survey coverage, including the number of potential polygons visited, access, and a brief summary of any newly-recorded or re-visited sites within the study area is provided.

The summary of field work provides a presentation of the total number of polygons visited and an assessment of model performance for each. This includes a review of the printed model in light of the ground-truthing.

Potential ratings from model maps and ground assessments are presented in a series of tables. The tables are divided into the three traditional territories and assign a letter to each survey transect. The survey location is described and figure and map-sheet references provided. Figures are presented in Appendix 6. The model potential ratings are listed along with the ground survey potential rating. Notes provide details about terrain or other variables which either support the model potential rating or changes to potential rating. Figures show the survey coverage, locations and potential ratings within surveyed areas.

Potential-polygon information for revisited and recorded sites is also presented for each traditional territory. Tables show the Borden or temporary site number, and the potential-polygon rating and a brief description of the site type. Sites are mapped as dots on the accompanying figures, but detailed site descriptions are not provided. Mapped locations have been intentionally shifted from accurate locations to provide security.

Fieldwork in In-SHUCK-ch Traditional Territory

Fieldwork in In-SHUCK-ch traditional territory was conducted from May 12-16, 1997. Collete Hogue, treaty analyst for the In-SHUCK-ch/ N'Quat'qua Offices provided

overall support for the project. Doug Hudson, anthropologist for the In-SHUCK-ch/N'Quatqua offices was running a three week archaeology workshop for a number of In-SHUCK-ch and N'Quat'qua individuals. Our field work was incorporated into the workshop so that participants were able to gain some experience in archaeological survey. On Monday, May 12, members of Millennia Research conducted a brief training session; field survey commenced on the following day.

Potential Rating Assessment of In-SHUCK-ch Traditional Territory Survey Areas

Field survey was intended to focus on the Glacier Lake, Gowan Creek and Rogers Creek watersheds. Gowan Creek and Glacier Lake were accessible for the field survey, while Rogers Creek and Lizzie Creek were not, due to snow on the access roads. The methodological procedure follows that outlined in the methodology section of this report. Three crews of three to four persons were deployed to examine road-cuts and examine cut block areas. All survey areas were accessed by truck.

Survey coverage included two trail polygons, one high potential CMT polygon, one medium CMT potential polygon, three high potential habitation polygons, two medium potential habitation polygons and a number of low potential areas (Table 9).

Table 9. Potential polygon assessment for In-SHUCK-ch Traditional Territory

Area surveyed	Figure Reference	Map sheet	Prior potential rating	Ground Survey Rating	Notes
Road survey 1 - Gowan Creek logging road		92G099	Trail polygon	Trail polygon	Trail recorded at 21km (Trail 1)
Survey A - Gowan Creek logging road		92G099	Low potential	No change	No cultural material recorded
			Trail polygon	No change	No cultural material recorded
Survey B - CB 405	Figure 1. Appendix 6	92G099	Low potential	No change	Pine and cedar trees with a number of terraces
			Medium CMT	No change	medium (some second growth) Douglas-fir and cedar trees
			High CMT	No change	Large Douglas-fir and cedar trees
Survey C - confluence of Gowan Creek and Lillooet River	Figure 2. Appendix 6	92G099	High habitation	No change	Lithic scatter, house pits, cache pits, triangular bark stripped cedar recorded (Temporary site 1)
			Medium habitation	No change	Cache pits (Temporary site 1)
			Trail polygon	No change	
Survey D - CB 4371 Glacier Lake	Figure 3. Appendix 6	92G088	Low	High CMT	Six triangular bark stripped cedar recorded (Temporary site 2): 30% slope with old growth western red cedar

Survey E - CB 4371 Glacier Lake	Figure 3. Appendix 6	92G088	Medium habitation	No change	<30% slope up to road large cedar stumps, oral history of trails and hunting activity in the area
			High habitation	No change	Flat within 100m of lake, oral history of trails and hunting activity in the area
			Trail polygon	No change	
Survey F - CB 4365 Glacier Lake	Figure 3. Appendix 6	92G088	Medium habitation	No change	<30% slope up to road large cedar stumps, oral history of trails and hunting activity in the area
			High habitation	No change	Logged, large cedar stumps, oral history of trails and hunting activity in the area
			Trail polygon	No change	
Road Survey 2 - Glacier Lake logging road		92G098	low	No change	No cultural material recorded

A number of sites were recorded including a lithic scatter, two CMT clusters and an historic trail. Table 10 lists the sites recorded during the field survey. Of the three sites two fall within the expected potential polygon. The third, six CMTs, fall within a low potential area.

Table 10. Sites revisited or recorded and potential ratings in In-SHUCK-ch Traditional Territory

Site (revisited or recorded)	Figure Reference/ Survey Letter	Potential Polygon	Notes
Temporary Site 1	Figure 2. Appendix 6 Survey C	High habitation	Lithic scatter, house pits, triangular bark stripped cedar recorded
		Medium habitation	Cache pits
		Trail polygon	No identified trails
Trail 1	Road Survey 1	Trail Polygon	Trapper's trail
Temporary Site 2	Figure 3. Appendix 6 Survey D	Low potential	Six triangular bark stripped cedar recorded

Fieldwork in Lil'wat Nation Territory

Field-work in Lil'wat Nation Territory commenced on June 2, 1997 and was completed on June 6, 1997. Millennia Research worked closely with the members of the Lil'wat Nation Traditional Use Study team, more specifically with Johnnie Abraham, Elmer Dan, Johnny Jones and Sue Montgomery. Lyle Leo of the Lil'wat Nation Forestry Office provided us with overall technical support and guidance while the Traditional Use Study steering committee chose our survey areas. The Traditional Use Study team provided us with a great deal of useful information which assisted us in narrowing our survey focus on areas which may not have been caught in a model but which are known as culturally significant. Initially, the TUS steering committee had chosen three areas for survey; including the Owl Creek watershed, the Miller Creek drainage and the area surrounding Aides Lake. Survey of these areas was conducted in the first two days of fieldwork and additional areas were chosen by the TUS team. These additional areas included Signal Hill, One Mile Lake, Pemberton Creek, Mud Lake, Mosquitoe and Horseshoe Lakes. Results of the survey for each area are presented below.

Potential Rating Assessment of Lil'wat Traditional Territory Survey Areas

Survey covered a number of areas around Mount Currie including Owl Creek, Miller Creek, Aides Lake, Signal Hill, One Mile Lake, Pemberton Creek, Mud Lake and Mosquitoe and Ivey Lakes. The methodological procedure follows that outlined in the methodology section of this report. All areas were accessible by truck. The following sections describe the results of the survey.

Survey coverage included one trail polygon, two high potential CMT, two medium potential CMT, eight high potential habitation, and seven medium potential habitation polygons (Table 11).

Table 11. Potential polygon ratings for Lil'wat Traditional Territory

Area surveyed	Figure reference	Map sheet	Prior potential rating	Ground Survey Rating	Notes
Survey A - north side of Miller Creek (David)	Figure 4. Appendix 6	92J036	Medium habitation	No change	Three cache pits recorded (Temporary Site 1) along terrace immediately west of habitation polygon: River used to flood to base of slope and fishing was undertaken in pools that formed
			High CMT	No change	Old growth cedar, Douglas-fir and birch
			Moderate CMT	No change	Cedar and Douglas-fir, good potential
Survey B - south side of Miller Creek	Figure 4. Appendix 6	92J036	Water buffer	High CMT	Old growth Douglas-fir and cedar abundant - logging underway
Road survey 1 - north side of Miller Creek -		92J036	Low Potential	No change	Second growth Douglas-fir and cedar: No cultural material located
Survey C - Birkenhead River		92J036	High habitation	No change	Cluster of 10+ cedar CMTs, and five cache pits recorded (Temporary site 2)
Survey D - Owl Creek	Figure 5. Appendix 6	92J037	Low potential	No change	Area has been logged, mixed cedar and Douglas-fir stumps, Rocky bluff, southeast facing, pine with some Douglas-fir and cedar
Road Survey 2 - Owl Creek		92J037	Low	No change	

Survey E - Pemberton Creek	Figure 6. Appendix 6	92J036	High habitation	No Change	Historical blazes (2) and remnants of old shack with garbage dumped down bank: no other cultural material
			Medium habitation	No change	Mixed cedar and Douglas-fir with some flat areas
Survey F - Mud Lake (old road)	Figure 7. Appendix 6	92J037	High habitation	No change	Second growth area, no cultural material recorded
			Medium habitation	No change	<30% slope, some level areas, second growth area, no cultural material recorded
			Low potential	No change	75% slope, large rock bluff at top of cut block: no cultural material recorded
Survey G - Horseshoe Lake	Figure 8. Appendix 6	92J037	High habitation	No change	Area of flat adjacent lake, good potential
			Medium habitation	No change	Area of flat adjacent lake, good potential
			High CMT	No change	Large cedar and Douglas-fir mix
			Medium CMT	No change	Large cedar and Douglas-fir mix, some second growth

Survey H - Aides Lake	Figure 9. Appendix 6	92J037	High habitation	No change	Flat area adjacent to lake, good potential
			Medium habitation	No change	Two cache pits recorded (Temporary site 3) on terrace: Trapper's trail (north) and cabin: Blazes (1)
			Trail polygon	Trail Polygon	No trails recorded
Survey I - Aides Lake	Figure 9. Appendix 6	92J037	High habitation	No change	Cluster of 11 triangular bark stripped cedar and two cache pits recorded (Temporary site 4); 30-40% slope, young cedar and Douglas-fir
			Medium habitation	No change	Flat areas with good potential
Survey J - One Mile Lake -	Figure 6. Appendix 6	92J036	High habitation	No change	Area of flat within old growth adjacent stream, good potential: One rectangular bark stripped cedar tree recorded (Temporary site 5)
			High habitation (north end)	Low potential	Artificially enhanced spit, with vehicle access, was once marsh
			Moderate habitation	No change	Good level areas adjacent of stream, second growth
			Water buffer	No change	

Six new sites were recorded and two recorded sites revisited during the survey (Table 12). All the newly recorded sites lie within expected potential polygon ratings. The Signal Hill recorded site lies within a High potential habitation polygon, while the pictograph site lies in a low potential rating.

Table 12. Sites revisited or recorded and potential ratings in Lil'wat Traditional Territory

Site (revisited or recorded)	Figure/ survey Reference	Potential Class	Notes
Temporary Site 1	Figure 4. Appendix 6 Survey A	Medium Habitation	Three cache pits on terrace
Temporary Site 2	Survey C	High habitation	Cluster of 10+ cedar CMTs, and five cache pits recorded
Temporary Site 3	Figure 9. Appendix 6 Survey H	Medium habitation	Two cache pits on terrace associated with historic blazes
Temporary Site 4	Figure 9. Appendix 6 Survey I	High Habitation	Cluster of 11 triangular bark stripped cedar recorded and two cache pits
Temporary Site 5	Figure 6. Appendix 6 Survey J	High habitation	One rectangular bark stripped cedar tree recorded
Temporary Site 6	Figure 8. Appendix 6 Survey G	Medium CMT	Pine CMT
Pictograph		Low potential	Large figure
Signal Hill Recorded Site		High habitation	House Pits

Fieldwork in Squamish Traditional Territory

Field work in Squamish Traditional Territory commenced on June 9, 1997 and was completed on June 13, 1997. Millennia Research worked closely with Tony Moody and Randall Louis in the initial setup of the field work component and Rudy Reimer during the field survey. Randall Louis, Tony Moody and Rudy Reimer provided a great deal of local knowledge with which the model could be tested. Field survey focused on the Squamish River between the confluence of Ashlu and the confluence of the Elaho River. Survey also covered areas adjacent to both the Ashlu and the Elaho Rivers.

Potential Rating Assessment of Squamish Traditional Territory Survey Areas

Survey covered a number of areas on map sheets 92J004, 92J013 and 92G094 including areas at the confluence's of the Ashlu and Squamish Rivers, the Elaho and Squamish Rivers, along the north and south banks of the Ashlu and Elaho Rivers and along the eastern banks of the Squamish River. Two crews of two persons were deployed during the field survey. All areas were accessible by truck.

Survey coverage included nine medium potential CMT polygons, two high potential habitation polygons, ten medium potential habitation polygons and a number of low potential areas.

Table 13. Potential polygon ratings for Squamish Traditional Territory

Area surveyed	Figure Reference	Map sheet	Prior potential rating	Ground Survey Rating	Notes
Survey A - Confluence of the Ashlu and Squamish River (north bank of Ashlu)	Figure 10. Appendix 6	92G094	High habitation	No change	Willow and cottonwood, flat sandy areas
			Medium habitation	No change	Recorded site in survey area (DIRt-2), additional cache pits recorded: second growth willow and cotton trees, some Douglas-fir and cedar
			Low potential	No change	
Survey B - West of bridge 1 Squamish mainline	Figure 10. Appendix 6	92G094	Low potential	No change	Flat area adjacent river, birch and willow, flooding evident
Survey C - Ashlu River (logging road A300)	Figure 11. Appendix 6	92G094	Medium habitation	No change	Rocky bluff with salal and other shrubs, some large Douglas-fir and cedar
			Medium CMT	No change	Large Douglas-fir and cedar: no cultural material
Survey D - Ashlu River	Figure 12. Appendix 6	92G094	Medium habitation	No change	Rock bluff area, dry, low shrubs, pine trees
			Medium CMT	No change	Small pine, Douglas-fir and some small cedar: no cultural material
			High CMT	No change	Small pine, Douglas-fir and medium sized cedar: no cultural material

Survey E - Ashlu River (logging road A100)	Figure 12. Appendix 6	92G094	Medium habitation	No Change	Rocky bluff, dry with salal, bogs and small Douglas-fir
			Medium CMT	No Change	Good old growth cedar: No cultural material recorded
Survey F - East Squamish River (logging road 300)	Figure 13. Appendix 6	92G094	Medium habitation	No change	Area of rocky, undulating bluffs, low salal and other shrubs, pine
			Medium CMT	No change	Douglas-fir (large and small) and cedar (large and small), creek adjacent to area: no cultural material
Survey G - East Squamish River (logging road BR 400)	Figure 14. Appendix 6	92J004	Low Potential	No change	Extensive vertical cliffs with small flat terraces, large and small Douglas- fir and cedar
Survey H - East Squamish River (logging Road BR800)	Figure 15. Appendix 6	92J004	Medium habitation	No change	30% slope, second growth Douglas-fir and cedar, creek with many flat areas, salal and other shrubs, easy access
Survey I - East Squamish River (logging road BR815)	Figure 15. Appendix 6	92J004	Medium CMT	Changes to Low potential	Lies on a 80% slope, dry rocky outcrop, consisting of small pine, Douglas-fir and cedar
			Medium habitation	No change	Flat area, logged
Survey J - Confluence of Elaho and Squamish Rivers (west of Squamish River) (logging road 212)	Figure 16. Appendix 6	92J004	Medium CMT	No change	Steep slope (80%) throughout survey area with flat terraces in between, old growth cedar, hemlock and Douglas-fir
			Medium habitation	No change	Flat terraces with old growth cedar, hemlock and Douglas-fir

Survey K - Confluence of Elaho and Squamish Rivers (east of Squamish River) (logging road 212)	Figure 16. Appendix 6	92J004	Medium habitation	No change	Flat ground, logged with some high points, good potential for habitation sites
			Medium CMT	No change	Second growth mixed with veteran Douglas-fir and cedar
Survey L - Elaho River (south bank) (logging road G100)	Figure 17. Appendix 6	92J013	Medium habitation	No change	Slope 20-30% with some rocky outcrops: one rectangular barked stripped cedar (Temporary site 1)
			Medium CMT	No change	Old growth Douglas-fir and cedar, area to west becomes steeper (60-70%) with occasional flats: recorded within medium CMT polygon
Survey M - Elaho River (south bank) (logging road E205)	Figure 18. Appendix 6	92J013	Medium CMT	No change	Topography of the area consists of cliffs topped by rocky flats: flats are dry with salal, small pine and hemlock and large (old growth) Douglas-fir and cedar in many places

One site was revisited (DIRt-2) and one site recorded. Site DIRt-2 lies within a low potential polygon and consists of three cultural depressions. The recorded site consists of a single rectangular bark stripped tree located in a medium potential CMT polygon (Table 14).

Table 14. Sites revisited or recorded and potential ratings in Squamish Traditional Territory

Site (revisited or recorded)	Figure/Survey Reference	Potential Polygon	Notes
DIRt-2	Figure 10. Appendix 6 Survey A	Medium Habitation	House pit and cache pits, additional cache pits recorded
Temporary Site 1	Figure 17. Appendix 6 Survey L	Medium Habitation	One rectangular barked stripped cedar

Fieldwork Assessment Summary

The fieldwork examined 51 potential polygons within the three traditional territories and a number of low potential areas (Table 15). The field work focused on low and medium potential areas, but also assessed a few high potential polygons. Table 15 includes only those low potential areas that were assessed to be inaccurate (see Table 16) Nine new archaeological sites were recorded and three recorded sites re-visited. The following section summarizes the findings of the fieldwork in all three traditional territories and provides an assessment of model performance.

Table 15. Number and Type of High and Moderate Potential Polygons Assessed during fieldwork by Traditional Territory

Traditional Territory	High Potential CMT	Medium Potential CMT	High Potential Habitation	Medium Potential Habitation	Trail	Total Number of Polygons
In-SHUCK-ch Traditional Territory	1	1	3	3	2	10
Lil'wat Traditional Territory	2	2	8	7	1	20
Squamish Traditional Territory	0	9	2	10	0	21
Total number of Polygons	3	12	13	20	3	51

Potential Rating Accuracy

The ground survey indicates that the model potential ratings are generally accurately predicting archaeological potential. Of the 51 polygons surveyed four were highlighted as inaccurate (Table 16). All but one of the 11 newly recorded and previously recorded sites and one trail were located within potential polygons. A large number of high and medium potential polygons were checked, with no cultural remains found, yet these are mostly noted as 'no change'. Intensive methods of survey were not applied in the assessment of potential, but the researchers conducting the reconnaissance agreed with the potential ratings. In any case a large number of 'false positive' predictions are inevitable due to the nature of the archaeological resource.

The inaccuracies can be traced linked to three factors: inaccuracy of forest cover information and slope from TRIM data. Survey D in In-SHUCK-ch Traditional Territory located six cedar CMTs in an area of low potential which showed a forest cover of 100% Douglas-fir (Table 16). Ground survey showed a mix of old growth western red cedar and Douglas-fir. Further, age classes for forest cover may be just below model parameters or may inaccurately reflect stand ages. Survey B in Lil'wat Traditional Territory examined

of mixed stand of western red cedar and Douglas-fir rated as low potential, but with trees of a size for good potential for CMTs (although none were found). However, forest cover records the age of the stand as one class below model parameters.

Slope is generalized over an area and sometimes does not reflect the presence of rock outcrops resulting in inaccuracies for some potential polygons. Survey B in Squamish Traditional Territory indicates a medium CMT polygon on an area of slope 80% to 110%. The tree cover in this polygon lies on a large rock outcrop with some sheer faces. However, some inaccuracies apparent in the field were the result of working with out-of-date DT< based maps. When the models were run on the revised DTM, many of these problems may be resolved.

The TRIM data may not reflect areas which have been altered by construction. Survey J in Lil'wat Traditional Territory recorded an area of high habitation potential as being an artificially enhanced spit, associated with fish habitat improvement. The area was once marsh land.

All but two of the sites located during survey work and recorded sites which were revisited were within a potential polygon. An inaccuracy in the forest cover information resulted in the area containing six CMTs not having a potential polygon identified. The pictograph was in an area not captured by any of the models.

Table 16. Potential Polygon Rating Alterations based on Fieldwork

Traditional Territory	Survey Letter	Model Potential Rating	Ground Survey Rating	Justification
In-SHUCK-ch Traditional Territory	Survey D	Low Potential	High CMT	6 cedar CMTs recorded: Forest cover information incorrect listing 100% Douglas-fir
Lil'wat Traditional Territory	Survey J	High Habitation (north end of lake only)	Low Potential	Artificially enhanced spit, was once marsh
Lil'wat Traditional Territory	Survey B	Water Buffer (low/medium potential)	High potential	Forest cover indicates one age below model parameters: good large trees with flats
Squamish Traditional Territory	Survey I	Medium CMT	Low Potential	Poor stand of pine and cedar on 80-110% slope

EVALUATION AND DISCUSSION

As the maps accompanying the final report will indicate, there are many areas of archaeological potential within the boundaries of the Squamish Forest District. As described in the ethnographic summary included in this report, First Nations peoples have lived within and around the boundaries of the Forest District for many millennia and have left behind physical evidence of their use and occupation of the land. The high and moderate potential polygons generated from the models developed by Millennia Research and Timberline delineate areas where that physical evidence is most likely to be present and preserved. It should be noted that low potential areas (all those areas not identified as high or moderate potential) should not be interpreted as areas where no First Nations occupation or use took place. Low potential zones simply indicate areas where archaeological remains are *unlikely* to be present or preserved. Therefore, archaeological sites can be found in low potential areas, but very rarely.

There has not been much previous archaeological research within the boundaries of the Squamish Forest District. What research has been conducted has focused almost exclusively on the low lying valley bottoms and lake shores. Consequently there exists a major data gap in regards to the higher elevation areas throughout the District.

As discussed in the archaeological correlates section, sites are most likely to be found in the low lying valley bottom areas near bodies of fresh, potable water. Not surprisingly, high and moderate potential polygons for habitation sites tend to cluster in these areas. It is likely that future survey will reinforce the model's prediction with regards to habitation site locations. The habitation model has identified areas of potential in high elevation locales throughout the district. Although it is known that First Nations peoples consistently used sub-alpine areas as base camps for summer plant and root gathering and hunting, it is not known how many of these sites have been preserved. The ground truthing conducted as part of this overview was limited by the extraordinary deep snow conditions during the spring and summer of 1997. Virtually all fieldwork was conducted below 900m. Large areas of the Forest District have been tagged as high and moderate potential areas for CMTs. Again, it is difficult to predict the density of CMTs that may be found in these areas as no extensive data on CMTs has been collected for this particular region. The CMT potential model was based on information from other, similar environments; however, compilation of field testing results should serve to refine the model and make it more specific to the Squamish region.

Potential impacts on the archaeological resource base in the Squamish Forest District can be narrowed down to two major factors. The first of these is logging and associated silvicultural activities. Logging is ongoing in most areas throughout the forest district, in some more heavily than others. Currently most logging activity is taking place in the TFL 38 area in the western third of the Forest District. The Lillooet River valley and drainage area has seen heavy logging activity in the past however, relatively few development areas in the Lillooet Lake and River area are slated for harvesting in the next five years. The Squamish River Valley and its tributaries have also been the focus of considerable logging and silvicultural activity and several licensees have planned harvesting in that area in the next five years.

The second major factor having current and potential impacts to the archaeological record is resort development. In the past several years Whistler Ski Resort and adjacent developments have grown exponentially. With the influx of more and more tourists, developers are looking to adjacent areas for further expansion. Consequently, areas which are likely to be considered high potential for archaeological sites are also likely to be pinpointed for ideal resort locales. With these new developments come necessary facilities such as roads, utility corridors and residential development all of which have the potential to impact archaeological sites in the area.

The model and associated potential maps produced for the Squamish AOA should serve to focus archaeological efforts on particular areas which are of high and moderate potential for archaeological sites while assisting with the Ministry of Forests land-use planning process.

RECOMMENDATIONS

Overall Management Recommendations for the Squamish AOA

The following are management recommendations specifically related to the use of the Squamish AOA potential maps:

- All **high potential** areas should require an Archaeological Impact Assessment (AIA);
- All **moderate potential** areas should require a Reconnaissance survey (RECCE) in order to determine whether or not further work (an AIA) is required in those areas;
- Areas delineated as **high or moderate potential for CMTs only** could, instead of requiring an AIA, be subject to a **CMT inventory** (see discussion below);
- All AIAs, and RECCEs should be **conducted under permit** in order to ensure that a quality, standardized methodological approach is being used and that data derived from field survey can be used in model refinement; and;
- Development areas falling within the 'caution zone' delineated by the **purple border** following the perimeter of major lakes and rivers, should also require an initial **RECCE** survey (except those areas within the 'caution zone' which are already defined as high potential and therefore require an AIA) the results from which should be used to determine whether or not further work is required.

Management Options

CMT Inventories for areas of High or Moderate CMT potential only.

In areas which are defined as high or moderate **only** for the CMT potential could be subject to a **CMT inventory** as opposed to an AIA or RECCE. Areas which are declared high or moderate potential for CMTs and other site types will require an AIA or RECCE as prescribed below. The CMT inventory process is sanctioned by the Archaeology Branch for areas which likely contain CMTs but no other site types. CMT inventories can be conducted by trained individuals in the forestry or First Nations communities. CMT inventories are designed to survey, identify and record, to level 2 standards, CMTs in all potential areas. If CMTs are located but there is uncertainty as to their nature or age, archaeologists can then be brought in to assess and deal with the final site recording.

Blanket Permits for AIAs and RECCEs

While AIAs must be conducted under an Archaeology Branch permit, a permit is not necessary for RECCEs. However, it is extremely important that certain standards of survey be maintained so that results of RECCEs are compatible with one another and of use for future

model refinement. To this end, we strongly recommend that RECCEs be conducted under an Archaeology Branch permit. We also understand that this recommendation could come at considerable cost to licensees and suggest that any licensee who requires archaeological work in their development areas request that the archaeologist they hire apply for a "blanket permit" from the Archaeology Branch. A "blanket permit" is one which allows an archaeologist to apply for work to be done in a certain Chart Area, TFL or series of development areas under a single licensee. The methodological approach outlined in a "blanket permit" can be flexible and allow for in-field assessment or re-assessment of original archaeological management prescriptions.

Levels of Future Work

As stated previously, the model designed for the Squamish Forest District AOA was developed and applied based on known information for the Forest District area. Because there is a paucity of information for many of the regions which were assessed during this project, a number of checks have been built into the results to ensure those areas are investigated. **A predictive model is only as effective as the data used to generate it**, consequently, it is essential that data gathered during upcoming field work portion of Archaeological Impact Assessments and Reconnaissance is tabulated and introduced into the existing model. These recommendations should provide some standards for model revisitation while simultaneously refining the model itself⁷:

- Any information which may indicate likely site locations (traditional use sites, ceremonial sites, unrecorded habitation sites etc.) from the First Nations whose traditional territories encompass parts of the Forest District must be added to the model. Consultation with First Nations should be ongoing;
- The model should be revisited every year for the first two years and every second year following;
- Results of field work should be tabulated and introduced into the model by one party to maintain consistency and reliability of results;
- The model may need to be changed to incorporate further information from First Nations or other sources of knowledge; and;
- Avoid adding new site models and concentrate on refining existing ones.

⁷ Recommendations specific to individual First Nations territories will be made in the final report in co-operation with the First Nations whose territories encompass portions of the Forest District.

Recommendations for future model refinement: In-house

The following are some suggestions for in-house refinement of the existing Squamish AOA models:

- Results of AIAs and RECCEs of development areas should be compiled and used to provide base-line data to test the existing models. For example, areas which are subject to AIAs should yield more sites than those subject to RECCEs. If RECCEs are yielding more sites than AIAs then the models will have to be adjusted accordingly.
- Since TRIM data is still somewhat unreliable, archaeologists hired to conduct survey in development areas in the Squamish Forest District should be required to comment on their impressions regarding the potential ratings for both the survey area and access to that area (i.e. were there any major discrepancies between the potential rating and the actual landscape along the access road and in the development area?).
- Serious consideration should be given to providing funds to have RECCEs conducted in a certain percentage of the low potential areas. Survey in low potential areas will serve to verify whether the model is working. If there is no survey conducted in low potential areas the model cannot be tested effectively.
- Future model refinements should be based on culture area/traditional territory. As noted in the ethnographic and archaeological correlates sections of this report, First Nations peoples whose territories encompass portions of the Forest District lived in culturally distinct ways descriptions of which may or may not be included in the ethnographic and anthropological information available at this time. For this reason, it is important to further refine models based on information derived from the First Nations themselves. This may require establishing different model parameters for each First Nations territory and then applying those models within the boundaries of each individual territory.
- Biogeoclimatic sub-zones may provide another data set for further model refinement. Since certain plant and animal species thrive in certain biogeoclimatic zones, models could be changed to reflect specific sub-zones which may have potential for archaeological sites based on those plant and animal species commonly used by aboriginal peoples.

Recommendations for future model refinement: External

The results of the field-work for the Squamish AOA could only be used to refine the potential zones within the survey areas and immediately adjacent landscape. Consequently, model refinement for the majority of the Forest District will have to take place after the AOA is

completed. It would be beneficial to supplement in-house development area survey results (from AIAs and RECCEs) with Archaeological Inventory Surveys (AIS). An AIS could focus on low potential areas or locales where the potential map designation is suspect.

Since there are many different types of map coverages which are not yet available for the entire Squamish Forest District, there are certain classes of potentially valuable information that we could not use in generating the potential maps, for example;

- **fisheries and wildlife** information could be used to pinpoint spawning channels or ungulate habitat upon which a fishing camp/station or hunting model might be generated;
- **terrain stability mapping** and/or **aerial photographs** could be used to establish the exact location of ancient beaches and river terraces which in turn could be used to establish a paleoshoreline habitation model or to locate areas of active geological processes which may severely effect the preservation of archaeological sites (e.g. avalanche chutes);
- **soils maps** may be use to pinpoint areas of good drainage, soil texture and type (e.g. fluvial-glacial), and associated vegetation which may lend themselves toward a variety of activities and associated site types.

While it is not possible at this stage to determine whether the application of these additional coverages would have produced significantly different results it may be beneficial to choose an area which has a number of different coverages, produce a refine model based on those coverages, and apply it to that area and compare the resulting potential maps to the ones produced for the Squamish AOA. The TFL 38 area may be an excellent choice for this type of exercise.

Minimum Standards for Archaeological Impact Assessments (AIA) and Reconnaissance (RECCE)

The Ministry of Forests, Squamish Forest District requested that there be minimum standards outlined for both AIAs and RECCEs. The following are intended to serve as *minimum standards* for each type of assessment and should not be viewed as restrictions should more thorough work be deemed necessary by field crews.

Guidelines for Archaeological Impact Assessments (AIAs) in the High Potential Areas of the Squamish Forest District

All AIAs must be done under a permit from the Archaeology Branch. The Branch has established a set of *Guidelines* (see Appendix 4) which should be adhered to however, the

Squamish Forest District has requested we establish a list of suggested minimum standards necessary for effective archaeological inspection and assessment of development areas which fall within high potential areas. These standards are also intended to ensure that results of archaeological survey, regardless of who does the work, will provide a set of compatible results upon which the AOA models can be tested.

Archaeologists conducting an AIA for development areas in the Squamish Forest District must:

- consult with the First Nations within whose traditional territories the development areas lie prior to conducting any field work;
- obtain the appropriate Archaeology Branch and First Nations permits;
- shovel test (screening or trowelling through backdirt) within a maximum 50 metre grid in areas judgmentally deemed to have high archaeological potential within the development area;
- ensure that a crew of two is not expected to cover more than 30 hectares per day in areas with difficult access or significant undergrowth (e.g. open canopy stands in very wet maritime coastal western hemlock zone) or 40 hectares per day in areas with easy access and little undergrowth (e.g. Interior Douglas Fir Zone);
- conduct, in areas of old growth, traverses no more than 50 metres apart in order to locate CMTs;
- be provided with a copy of the potential map coverage for their survey area and should be required to note their impressions regarding the assessment the potential the map has given compared to their impressions of potential upon viewing the actual landscape, and;
- note general vegetation within the development area and specific vegetation in association with sites.

Guidelines for RECCE in the Moderate Potential Areas of the Squamish Forest District

A significant amount of the Squamish Forest District has been assigned a moderate potential rating and will require reconnaissance survey (RECCE). The reconnaissance is designed to provide a quick assessment of areas in a mid-archaeological potential range, and provides some flexibility should the archaeologist wish to change a moderate potential rating to a high or low rating. The need for on-site assessment, especially in areas which are poorly represented by previous archaeological survey, cannot be overstressed. However, guidelines for reassessment should be established so that archaeologists are changing potential ratings according to standardized criteria. In addition, permits from the Archaeology Branch should be required for Reconnaissance surveys as this is one of the only ways to ensure that survey and recording standards are maintained and, should the archaeologist come upon an area of high potential within

a moderate potential zone, sub-surface testing for archaeological remains can be conducted immediately. The following are suggested minimum guidelines for archaeologists conducting reconnaissance.

Archaeologists conducting reconnaissance for the Squamish Forest District must:

- consult with the First Nation(s) whose traditional territories encompass the development areas prior to conducting any field work;
- obtain a permit issued by the Archaeology Branch, Ministry of Small Business, Tourism and Culture so that subsurface testing can be done if necessary;
- obtain a permit from the First Nation (for those who require one);
- be provided with a copy of the potential map coverage for their survey area and should be required to note their impressions regarding the assessment the potential the map has given compared to their impressions of potential upon viewing the actual landscape;
- walk at least two traverses the width of the block or for at least 200m, no closer than 100m to one another, to ensure coverage of all major landforms/vegetation zones in the block. For roads, the majority should be traversed along the centreline;
- flag and map areas if they appear to have archaeological potential sufficient to require an AIA; and,
- complete a brief report which includes a description of; the block, its location and the type and extent of survey coverage performed; the location and nature of any cultural remains or deposits including CMTs; and finally; recommendations regarding future plans for the area (i.e. whether the area needs an AIA or no further work) and justifications for any change in archaeological management prescription.

Low Potential

The GIS generated model for the Squamish Forest District will designate all those areas not deemed as either high or moderate potential, low potential. However, one should not assume that low potential areas do not contain archaeological sites. Some site types, such as lithic quarries, are dependent upon geological exposures which can not be mapped. Very large and significant quarry sites may be found in areas otherwise totally unsuitable for any other activity.

Areas identified as low potential may also have been extensively used by First Nations in ways which may leave few physical traces (e.g. berry picking areas, hunting locales) or in areas where site preservation is unlikely. A low potential rating therefore should not be interpreted as part of an overall statement concerning aboriginal use of a particular area. Low potential ratings in this case are *specific to archaeological sites*. If the First Nations indicate an area which has been identified as low potential but they know has archaeological deposits, that area should be immediately considered of high potential and all development areas within 500m or less of that site should require an Archaeological Impact Assessment.

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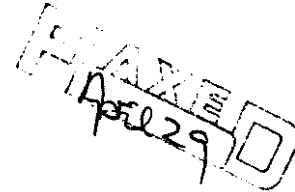
Appendix 1: Letter of Introduction to the First Nations.

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April 29, 1996



Re: Squamish Forest District, Archaeological Overview Assessment (AOA).

Further to our conversation today, please find following a brief outline of the AOA as proposed by Millennia Research and a company profile.

We are in the initial stages of the project and wish to meet with interested parties from the In-SHUCK-ch Nation to discuss it in detail. In brief, we have been retained by the Squamish Forest District to conduct an assessment of the relative potential of areas within the entire district to contain archaeology sites. The study does not include a traditional land use study, but does include a review of existing published and unpublished ethnographic and historical documents, a check of archaeology sites listed in the B.C. Archaeological Site Inventory, a review of previous archaeology in the district, and an examination of the local palaeoecology. Information from these reviews will be compiled with data on forestry and fisheries values, terrain, slope, etc., to formulate a predictive model for each archaeological site type. This model will combine an assessment of known site distribution, ethnographic land use, and physiographic characteristics. When completed, a draft of this model will be forwarded for your comment.

The data will be linked to polygons created with the GIS and stored in Arc-Info Export data format. Two datasets will be produced: Dataset I will include the archaeological potential polygons with linked attributes; Dataset II will present all known archaeological sites with Borden number used as unique identifiers. This information will be used by the Squamish Forest District as a management tool allowing informed decisions regarding the necessity of future archaeological impact assessments.

Millennia Research is a firm specializing in archaeological and ethnographic consulting. Formed in 1984, the firm has provided professional expertise to governments at all levels, including First

Nations governments, forest and oil sector companies, and smaller companies and developers. Some of our areas of expertise include: archaeological inventory and impact assessment; culturally modified tree research; wet site research; GIS applications; and overviews and management of large-scale archaeological inventories. Millennia Research is committed to working with First Nations to document and organize information on traditional use places. The Traditional Use Site Inventory System (TUSIS) was developed by Millennia and Silhouette Software to help organize the complex information involved in a traditional use study into an easily entered and accessed format.

The firm's principle, Morley Eldridge has an M.A. in anthropology from the University of Victoria and 26 years of archaeological experience throughout the Pacific Northwest. Morley will act as overall project supervisor, analyse known site distribution patterns, create models of site distribution, oversee the application of these models in GIS, and will edit the final report. The primary researchers for the project are Tanja Hoffman and Tina Christensen. Tanja is an M.A. candidate in First Nations Studies and the University of Northern British Columbia. She has three years of archaeological experience in British Columbia. Tanja will be responsible for the majority of the liaison and consultation with all concerned First Nations and with the Squamish Forest District. Tina has just been accepted as a M.A. candidate at Simon Fraser University but will continue with her work at Millennia. She has three years of archaeological experience in both B.C. and Belize and has participated in several overview assessments with Millennia Research.

For the duration of this project, Millennia will be working with Steve Lipscomb of Timberline Forest Inventory Consultants who will be responsible for the GIS portion of the project. Timberline has extensive practical experience with database design, digital mapping, and data analysis gained over the past ten years in short and long term projects. Timberline currently employs a staff of approximately 100 computer professionals, foresters, forestry technicians, geographics, and photogrammetrists.

Tanja is just finishing her studies at UNBC and will return to the Millennia office in early May. At present I am filling her position but I will defer to Tanja upon her arrival. In the meantime, please do not hesitate to contact me if you have any questions or concerns regarding the project.

Yours sincerely,



D'Ann Owens-Baird



c.c. Djane Reed
Squamish Forest District

Appendix 2: The Heritage Conservation Act.

From: *British Columbia Archaeological Impact Assessment Guidelines*, Archaeology Branch,
Ministry of Small Business, Tourism and Culture. Pp. 29-48. Revised 1995. Victoria, B.C..

HERITAGE CONSERVATION ACT

CHAPTER 187

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PART 1 – INTRODUCTION

Definitions

1 In this Act:

“**alter**” means to change in any manner and, without limiting this, includes

- (a) the making of an improvement, as defined in the *Builders Lien Act*, and
- (b) any action that detracts from the heritage value of a heritage site or a heritage object;

“**board**” means the board of directors of the Heritage Trust;

“**conservation**” includes any activity undertaken to protect, preserve or enhance the heritage value of heritage property;

“**designate**” means to designate under section 9;

“**first nation**” means, as the context requires, an aboriginal people sharing a common traditional territory and having a common traditional language, culture and laws, or the duly mandated governing body of one or more such people;

“**heritage inspection**” means a physical examination and other research necessary

- (a) to identify the heritage value of property or a portion of it, and
- (b) to establish, if the property is a heritage site or heritage object,
 - (i) the need for protection and conservation, or
 - (ii) conformance with heritage protection requirements;

“**heritage investigation**” means an archaeological or other systematic study of heritage property to reveal its history, and may include the recording, removal and analysis of artifacts, features and other material necessary for the purpose of the heritage investigation;

“**heritage object**” means, whether designated or not, personal property that has heritage value to British Columbia, a community or an aboriginal people;

“**heritage site**” means, whether designated or not, land, including land covered by water, that has heritage value to British Columbia, a community or an aboriginal people;

“**Heritage Trust**” means the British Columbia Heritage Trust continued under section 24 (1);

“**heritage value**” means the historical, cultural, aesthetic, scientific or educational worth or usefulness of a site or object;

“heritage wreck” means the remains of a wrecked vessel or aircraft if

- (a) 2 or more years have passed from the date that the vessel or aircraft sank, was washed ashore or crashed, or
- (b) the vessel or aircraft has been abandoned by its owner and the government has agreed to accept the abandonment for the purposes of this Act;

“local government” includes the council of a municipality, the board of a regional district, and the Trust Council and a local trust committee established under the *Islands Trust Act*;

“Provincial heritage object” means a heritage object designated under section 9;

“Provincial heritage site” means a heritage site designated under section 9 or a Provincial heritage property established under section 23.

Purpose of Act

- 2 The purpose of this Act is to encourage and facilitate the protection and conservation of heritage property in British Columbia.

Provincial heritage register

- 3 (1) The minister must establish and maintain one or more registers, to be known collectively as the Provincial heritage register, for the recording of the following:
- (a) Provincial heritage sites;
 - (b) Provincial heritage objects;
 - (c) heritage sites and heritage objects that are included in a schedule under section 4 (4) (a);
 - (d) other known heritage sites and heritage objects that are, in the opinion of the minister, protected under section 13;
 - (e) buildings, structures and sites for which the minister has received notice from a local government under section 977 (1) of the *Municipal Act* or section 602 (1) of the *Vancouver Charter*;
 - (f) other prescribed heritage property.
- (2) Subject to subsections (3) and (4), information in the Provincial heritage register must be available for inspection by any person during regular business hours.
- (3) Despite the *Freedom of Information and Protection of Privacy Act*, the minister may refuse to disclose information in the Provincial heritage register and other information obtained in the administration of this Act or the *Museum Act* if any of the following apply:
- (a) disclosure of the information could, in the opinion of the minister, result in damage to or interfere with the conservation of a heritage site or heritage object;
 - (b) disclosure of the information would violate an agreement made under section 4;

Section 4

- (c) anthropological information that is of traditional social, spiritual or other cultural importance to a living community
 - (i) was obtained under conditions of confidentiality, or
 - (ii) is confidential at the request of representatives of the community whose heritage is represented by the information.
- (4) The inspection of information in the Provincial heritage register is subject to reasonable conditions the minister may impose.
- (5) Without limiting subsection (4), the minister may require payment of a prescribed fee to inspect the information in the Provincial heritage register.
- (6) Protection of a heritage site or heritage object is not affected by an error or omission in the Provincial heritage register or, except for a Provincial heritage site or Provincial heritage object, by a failure to register property in the Provincial heritage register.

Agreements with first nations

- 4 (1) The Province may enter into a formal agreement with a first nation with respect to the conservation and protection of heritage sites and heritage objects that represent the cultural heritage of the aboriginal people who are represented by that first nation.
- (2) An agreement under subsection (1) must be in writing and must be approved by the Lieutenant Governor in Council.
- (3) Subsection (2) does not apply to an agreement that is entered into under section 20 (1) (b) or 28 (1) (b).
- (4) Without limiting subsection (1), an agreement made under this section may include one or more of the following:
 - (a) a schedule of heritage sites and heritage objects that are of particular spiritual, ceremonial or other cultural value to the aboriginal people for the purpose of protection under section 13 (2) (h);
 - (b) a schedule of heritage sites and heritage objects of cultural value to the aboriginal people that are not included in a schedule under paragraph (a);
 - (c) circumstances under which the requirements of sections 13 (1) and (2) and 14 (1) do not apply with respect to heritage sites and heritage objects, or to types of heritage sites and heritage objects, for which the first nation administers its own heritage protection;
 - (d) policies or procedures that will apply to the issuance of or refusal to issue a permit under section 12 or 14 with respect to
 - (i) sites and objects identified in a schedule under paragraph (a) or (b), or
 - (ii) other sites and objects or types of sites and objects identified in the agreement;

- (e) provisions with regard to the delegation of ministerial authority under sections 12 and 14 (4);
 - (f) any other provisions the parties agree on.
- (5) For the purpose of section 13 (2), if an agreement includes a schedule under subsection (4) (a), the agreement must identify actions which would constitute a desecration or which would detract from the heritage value of scheduled sites and objects, and different actions may be identified for different sites or objects or for different classes of sites or objects.

Act is binding on the government

- 5 Despite section 14 (2) of the *Interpretation Act*, this Act and the regulations and orders made under it are binding on the government.

Act prevails over conflicting legislation

- 6 If, with respect to any matter affecting the conservation of a heritage site or heritage object referred to in section 13 (2), there is a conflict between this Act and any other Act, this Act prevails.

Provincial heritage policies

- 7 The minister may, with the approval of the Lieutenant Governor in Council, establish policies and standards for the identification, conservation, management and disposition of any heritage site or heritage object owned or managed by the government.

No derogation of aboriginal and treaty rights

- 8 For greater certainty, no provision of this Act and no provision in an agreement entered into under section 4 abrogates or derogates from the aboriginal and treaty rights of a first nation or of any aboriginal peoples.

PART 2 – PROVINCIAL HERITAGE CONSERVATION**Heritage designation**

- 9 (1) The Lieutenant Governor in Council may
- (a) designate land as a Provincial heritage site, or
 - (b) designate an object as a Provincial heritage object.
- (2) A designation under subsection (1) (a) may apply to land that does not have heritage value if, in the opinion of the Lieutenant Governor in Council, designation is necessary or desirable for the conservation of heritage property that is
- (a) designated under this section,
 - (b) protected under section 13 (2),

Section 10

- (c) protected heritage property under the *Municipal Act* or the *Vancouver Charter*, or
 - (d) established under section 23.
- (3) A designation made under this section may do one or more of the following:
- (a) apply to a single property or to part of a property;
 - (b) apply to more than one property including properties owned by different persons;
 - (c) establish policies or procedures regarding the provision of financial or other support for the conservation of a heritage site or heritage object;
 - (d) specify types of alterations to the property which may be made without a permit under section 12;
 - (e) specify policies or procedures concerning the issuing of permits under section 12 with respect to a property.

Designation procedure

- 10 (1) Before a designation is made under section 9, the minister must serve notice of the proposed designation on the following persons:
- (a) in the case of land,
 - (i) all persons who, according to the records of the land title office, have a registered interest in the land to be designated,
 - (ii) the local government or local governments having jurisdiction over the land to be designated, and
 - (iii) the first nation or first nations within whose traditional territory the land to be designated lies;
 - (b) in the case of objects,
 - (i) the person who has possession of the object,
 - (ii) all parties who, according to the records of the personal property registry established under the *Personal Property Security Act*, have a registered interest in the object, and
 - (iii) any other person or party who, in the opinion of the minister, is or may be the owner of the object or has or may have a proprietary interest in the object;
 - (c) any other prescribed person.
- (2) A person or party served with notice under subsection (1) may serve the minister with a notice of objection to the proposed designation within 30 days after receiving the notice of the proposed designation.
- (3) On receiving a notice of objection, the minister must review the objection and may then amend or cancel the proposed designation as the minister considers appropriate.

- (4) Before a designation is made, the minister must advise the Lieutenant Governor in Council if any notice of objection to the proposed designation has been received and, if so received, provide the Lieutenant Governor in Council with a copy of each notice of objection received, the results of the review of the notice or notices of objection and the terms and conditions of any amendment to the proposed designation.
- (5) Within 30 days after
 - (a) the minister cancels a proposed designation,
 - (b) the Lieutenant Governor in Council makes a designation, or
 - (c) the Lieutenant Governor in Council decides not to make a designation,the minister must serve notice on the persons entitled to notice under subsection (1) that a designation has or has not been made.
- (6) Within 30 days after a designation is made, the minister must register a description of the designated property in the Provincial heritage register established under section 3 (1) and,
 - (a) in the case of land, file a notice of the designation in the land title office in the manner provided under section 32, or
 - (b) in the case of personal property, file a notice of the designation in the personal property registry under the *Miscellaneous Registrations Act, 1992*.
- (7) No designation is invalid because of inadvertent and minor non-compliance with this section.

Compensation for heritage designation

- 11 (1) If a designation under section 9 causes, or will cause at the time of designation, a reduction in the market value of the designated property, the government must compensate an owner of the designated property who makes an application under subsection (2), and the compensation must be in an amount or in a form the minister and the owner agree on or, failing an agreement, in an amount or in a form determined by binding arbitration under subsection (4).
- (2) The owner of a designated property may apply to the minister for compensation for the reduction in the market value of the designated property.
- (3) An application under subsection (2)
 - (a) must be made, in order for the owner to be entitled to compensation under this section, no later than one year after the designation under section 9, and
 - (b) may be made before the designation under section 9.
- (4) If the minister and the owner are unable to agree
 - (a) that the owner is entitled to compensation under subsection (1), or
 - (b) on the amount or form of compensation,

Section 12

then either the minister or the owner may refer the matter to binding arbitration under the *Commercial Arbitration Act*.

- (5) An arbitration under this section must be by a single arbitrator unless the minister and the owner agree to the appointment of an arbitration panel.
- (6) The arbitrator or arbitration panel, in determining whether the owner is entitled to compensation and the amount or form of compensation, must consider
 - (a) eligibility for financial and other support for conservation of the heritage site or heritage object, and
 - (b) any other benefits that are available because of the designation of the property.
- (7) Compensation must not be paid, and an arbitration must not continue, if
 - (a) the minister cancels the proposed designation, or
 - (b) the Lieutenant Governor in Council does not make the designation.
- (8) Nothing in this section authorizes the government to give any financial or other benefit to an owner except that which is commensurate with the reduction in market value of the designated property as caused by that designation.
- (9) This section does not apply to property that, immediately before its designation under section 9, is
 - (a) designated as a Provincial heritage site,
 - (b) designated as a heritage object,
 - (c) protected under section 13 (2), or
 - (d) designated under section 967 of the *Municipal Act* or section 593 of the *Vancouver Charter*.

Permits

- 12 (1) In this section, except subsection (6), and in sections 13 (4) and 14 (4), “minister” includes a person authorized in writing by the minister for the purposes of the section.
- (2) The minister may
 - (a) issue a permit authorizing an action referred to in section 13, or
 - (b) refuse to issue a permit for an action that, in the opinion of the minister, would be inconsistent with the purpose of the heritage protection of the property.
- (3) A permit issued under subsection (2) (a) may include requirements, specifications and conditions that the minister considers appropriate and, without limiting the generality of this, the permit may
 - (a) be limited to a specified period of time or to a specified location,
 - (b) require the holder of the permit to consult with or obtain the consent of one or more parties whose heritage the property represents or may represent,

- (c) require the holder of the permit to provide the minister with reports satisfactory to the minister, and
 - (d) specify a repository for heritage objects that are removed from the heritage property.
- (4) Despite any other enactment, a permit issued under subsection (2) (a) may specify the siting, dimensions, form, exterior design and finish of new construction or renovations to a building or structure.
- (5) The minister may, with the concurrence of the holder of the permit, amend, suspend or cancel a permit issued under subsection (2) (a).
- (6) The minister may, by order, without the concurrence of the holder of the permit,
- (a) amend or suspend a permit issued under subsection (2) (a) if the minister has information that was not considered when the permit was issued respecting the heritage value of heritage property that would be materially affected by an action authorized by the permit, or
 - (b) cancel a permit issued under subsection (2) (a) if the minister has reasonable and probable grounds to believe that
 - (i) the application for the permit included information that was false or misleading with respect to a material fact, or that omitted to state a material fact the omission of which makes information in the application false or misleading,
 - (ii) the holder has contravened or is in default of a requirement or condition of the permit, whether or not the holder is charged with an offence under this Act, or
 - (iii) the holder has contravened a provision of this Act, whether or not the holder is charged with an offence under this Act.
- (7) A permit does not authorize the holder of the permit to enter property, or to make any alteration to property, without the permission of the owner or occupier.

Heritage protection

- 13 (1) Except as authorized by a permit issued under section 12 or 14, a person must not remove, or attempt to remove, from British Columbia a heritage object that is protected under subsection (2) or which has been removed from a site protected under subsection (2).
- (2) Except as authorized by a permit issued under section 12 or 14, or an order issued under section 14, a person must not do any of the following:
- (a) damage, desecrate or alter a Provincial heritage site or a Provincial heritage object or remove from a Provincial heritage site or Provincial heritage object any heritage object or material that constitutes part of the site or object;

Section 13

- (b) damage, desecrate or alter a burial place that has historical or archaeological value or remove human remains or any heritage object from a burial place that has historical or archaeological value;
 - (c) damage, alter, cover or move an aboriginal rock painting or aboriginal rock carving that has historical or archaeological value;
 - (d) damage, excavate, dig in or alter, or remove any heritage object from, a site that contains artifacts, features, materials or other physical evidence of human habitation or use before 1846;
 - (e) damage or alter a heritage wreck or remove any heritage object from a heritage wreck;
 - (f) damage, excavate, dig in or alter, or remove any heritage object from, an archaeological site not otherwise protected under this section for which identification standards have been established by regulation;
 - (g) damage, excavate, dig in or alter, or remove any heritage object from, a site that contains artifacts, features, materials or other physical evidence of unknown origin if the site may be protected under paragraphs (b) to (f);
 - (h) damage, desecrate or alter a site or object that is identified in a schedule under section 4 (4) (a);
 - (i) damage, excavate or alter, or remove any heritage object from, a property that is subject to an order under section 14 (4) or 16.
- (3) The Lieutenant Governor in Council may make regulations respecting the following:
- (a) defining the extent of types of sites protected under subsection (2), except heritage sites or objects protected under subsection (2) (h);
 - (b) identifying types of features, material or evidence for which the requirements of subsection (2) (d) and (g) do not apply, and these may be different for different types of sites;
 - (c) establishing identification standards for archaeological sites to be protected under subsection (2) (f);
 - (d) identifying actions that shall be deemed to derogate from the heritage value of a site or object, or class of sites or objects, protected under subsection (2), except with respect to sites protected under subsection (2) (h).
- (4) The minister may, after providing an opportunity for consultation with the first nation whose heritage site or object would be affected,
- (a) define the extent of a site protected under subsection (2), or
 - (b) exempt a site or object from subsection (2) on any terms and conditions the minister considers appropriate if the minister considers that the site or object lacks sufficient heritage value to justify its conservation.
- (5) Subsection (4) does not apply to a site or object protected under subsection (2) (h).

- (6) Except as authorized by a permit issued under section 12, a person must not damage, alter or remove
 - (a) a notice erected under section 17, or
 - (b) a plaque or marker installed under section 18.

Heritage inspection and heritage investigation

- 14 (1) A person must not excavate or otherwise alter land for the purpose of archaeological research or searching for artifacts of aboriginal origin except under a permit or order issued under this section.
- (2) The minister may, by permit, authorize a heritage inspection or heritage investigation of any property.
- (3) A permit issued under subsection (2) does not authorize entry onto land or into a building without the permission of the owner or occupier.
- (4) The minister may order that a heritage inspection or heritage investigation be conducted if the minister considers that any one or more of the following apply:
 - (a) land may contain a heritage site or heritage object protected under section 13;
 - (b) land that may have heritage value, or that may include a heritage site or heritage object, may be subject to subdivision;
 - (c) the property may be subject to alienation from government ownership;
 - (d) property that may have heritage value, or land that may include heritage property, may be subject to alteration by natural or human causes;
 - (e) an object that may have heritage value may be subject to removal from British Columbia.
- (5) The provisions of section 12 (2), (2.1), (2.2), (3), (5) and (6) apply to permits and orders under this section.
- (6) A heritage inspection or heritage investigation ordered under subsection (4)
 - (a) must state the purpose of the heritage inspection or heritage investigation,
 - (b) must specify how long the order is to remain in effect,
 - (c) must require that the heritage inspection or heritage investigation be carried out in an expeditious manner,
 - (d) may provide that property covered by the order is subject to protection under section 13 while the order remains in effect,
 - (e) may require the owner to undertake actions to preserve the integrity and condition of property covered by the order while the order remains in effect, and
 - (f) may include any terms, conditions or specifications that the minister considers appropriate for the purpose of the heritage investigation.

Section 15

- (7) If an order for a heritage inspection or heritage investigation made under subsection (4) relates to
- (a) alienation of government owned property,
 - (b) a public work authorized to be undertaken by or under an Act,
 - (c) the extraction or harvesting of resources from land,
 - (d) the subdivision of land, or
 - (e) changes in use or development of land,
- the minister may require the person purchasing, subdividing, developing or using the property to undertake or pay for the heritage inspection or heritage investigation.
- (8) A person must not interfere with a heritage inspection or heritage investigation ordered under subsection (4).
- (9) A person whose property is damaged during the course of a heritage inspection or heritage investigation ordered under subsection (4) is entitled to have the damage repaired at the expense of the government or, if the damage cannot be repaired, to compensation from the government.

Entry authority for heritage inspection and heritage investigation orders

- 15 (1) An order made under section 14 (4) authorizes the person or persons conducting the heritage inspection or heritage investigation to enter land identified in the order at any reasonable time for the purposes of the heritage inspection or heritage investigation.
- (2) Before entering or when entering land under subsection (1), the person conducting the heritage inspection or heritage investigation must make a reasonable attempt to notify the owner or occupier of the land and, if requested, present proof of his or her authorization.
- (3) Except as provided in subsection (4), nothing in this section or in an order made under section 14 (4) authorizes entry into a building without the permission of the owner or occupier.
- (4) A justice may issue a warrant authorizing a person to enter land or a building to conduct a heritage inspection or heritage investigation ordered under section 14 (4) if the justice is satisfied that
- (a) there are reasonable grounds to believe that entry is required to achieve the purposes of the order, and
 - (b) there are reasonable grounds to believe that
 - (i) an emergency exists,
 - (ii) the person conducting the heritage inspection or heritage investigation has been unable to notify the owner or occupier after making a reasonable attempt to do so,
 - (iii) the admission has been refused or refusal is anticipated, or
 - (iv) the notification may defeat the object of the entry.

- (5) A warrant issued under subsection (4) continues in force until the purpose for which the entry is required has been satisfied.
- (6) If a heritage inspection or heritage investigation conducted under the authority of a warrant under subsection (4) requires entry into a building, the person conducting the heritage inspection or heritage investigation must be accompanied by a peace officer.
- (7) On completion of a heritage inspection or heritage investigation ordered under section 14 (4), if the owner of land was not notified under subsection (2), the person undertaking the heritage inspection or heritage investigation must mail a notice informing the owner that a heritage inspection or heritage investigation has been conducted.

Temporary protection orders

- 16 If the minister considers that property has or may have heritage value and is likely to be altered for any reason, the minister may issue, to a person or class of persons, a stop work order that prohibits any alteration of the property for a period of up to 120 days, subject to any requirements and conditions the minister considers appropriate.

Notices and immunity

- 17 The minister may erect and maintain a notice referring to this Act, or an order made under this Part, on or near a Provincial heritage site, and an action for loss, damage or trespass must not be brought for anything done or omitted in good faith under this section.

Promotion of heritage value

- 18 The minister may acknowledge the heritage value of any heritage site or heritage object by issuing a certificate or, with the permission of the owner, by installing a commemorative plaque or marker.

Unclaimed objects in heritage collections

- 19 (1) A public museum, archive or other heritage conservation organization that has possession of an object that it does not own, or is uncertain as to whether it owns, may apply to the Supreme Court for an order vesting ownership of the object in the museum, archive or organization if one of the following applies:
- (a) a reasonable attempt has been made to locate the owner of the object and
 - (i) at least 25 years have passed since the making of a written agreement with the owner of the object for custody of the object, or
 - (ii) at least 10 years have passed since the making of an oral agreement with the owner of the object for custody of the object and there is no known written custody agreement;
 - (b) at least 2 years have passed since the museum, archive or organization gave to the owner of the object a notice of the termination of a custody agreement with respect to the object;

Section 20

- (c) the owner of the object cannot be identified or the circumstances of the acquisition of the object are not known;
 - (d) the object was acquired from a person who may not have been the true owner.
- (2) On application under subsection (1), the court may, with respect to the object that is the subject of the application, make an order vesting ownership of the object in
 - (a) the museum, archive or organization that made the application, or
 - (b) any other party the court considers is the most appropriate to own the object having regard to any heritage value the object may possess.
- (3) Before making an order under subsection (2), the court must be satisfied that
 - (a) a requirement of subsection (1) has been met,
 - (b) the limitation in subsection (6) does not apply,
 - (c) a reasonable attempt has been made to notify any other parties who may have an interest in the application, and
 - (d) all parties the court considers to have an interest in the application have been given a reasonable opportunity to be heard.
- (4) An order under subsection (2) may include any terms or conditions that the court considers appropriate.
- (5) If an order vesting ownership is made under this section, the previous owner has no further claim to ownership of the object or to compensation for the object.
- (6) This section does not apply to an object that has cultural heritage value to an aboriginal people.

Powers of the minister

- 20 (1) To further the objects of this Act, the minister may do one or more of the following:
- (a) acquire, manage and conserve property or acquire an interest in property;
 - (b) enter into agreements with a person, organization, local government, first nation or the government of Canada or of a province;
 - (c) conduct and arrange exhibits or activities to inform and stimulate the interest of the public in any matter related to the purposes of this Act;
 - (d) subject to a trust or agreement under which a property was obtained, dispose of the property and execute instruments required to effect the disposal;
 - (e) receive, by donation, public subscription, devise, bequest or otherwise, money or property;
 - (f) assist in or undertake research, study or publication respecting heritage conservation;
 - (g) provide grants, advice and services to other parties having aims and objectives consistent with the purposes of this Act;

- (h) establish and maintain one or more inventories of heritage sites and heritage objects, including a list of heritage buildings for which the Alternate Compliance Methods of the British Columbia Building Code may apply.
- (2) Property acquired by the minister under this Act is the property of the government and title to the property may vest in the name of the government.
- (3) Despite the *Land Act*, property acquired by the minister under this Act may be dealt with by the minister under this Act.

Preservation intervention

- 21 (1) If the minister considers that property protected under section 13 (2) is subject to damage or deterioration, the minister may order the owner, on terms and conditions that the minister considers appropriate, to preserve the property at the expenses of the government.
- (2) If the minister considers that property protected under section 13 (2) is subject to damage or deterioration and is being unreasonable neglected by the owner, the minister may order the owner, on terms and conditions and to specifications that the minister considers appropriate, to preserve the property at the expense of the owner or at the expense of the owner and the government on a cost sharing basis.

Advisory committees

- 22 (1) The minister may establish or authorize one or more committees to act in an advisory capacity on matters relating to this Act or to the conservation of heritage sites, heritage objects and other heritage resources.
- (2) The minister may appoint, or provide for the manner of appointment of, the members of any committee established under this section and may set the terms of reference for the committee.
- (3) The members of any committee established or authorized under this section must be paid reasonable and necessary travelling and incidental expenses incurred in the discharge of their duties under this Act, and may be paid remuneration for services in an amount determined by the Lieutenant Governor in Council.

Provincial heritage properties

- 23 (1) The Lieutenant Governor in Council may, by order, designate a heritage site on Crown land as a Provincial heritage property and the Provincial heritage property includes the collection of accessioned artifacts associated with that heritage site.
- (2) The Lieutenant Governor in Council may, by regulation, provide that any provision of the *Park Act* applies to a Provincial heritage property designated under subsection (1), and all authorities, rights, duties and other matters under these provisions will apply in relation to

Section 24

- (a) the minister as though he or she were the minister under the *Park Act*,
 - (b) any branch or agency assigned by the minister to administer a Provincial heritage property as though it were the Parks Branch under the *Park Act*,
 - (c) the director and staff of a branch or agency referred to in paragraph (b) as though they were the directors and officers respectively of the Parks Branch, and
 - (d) the Provincial heritage property as though it were a Class A park established under the *Park Act*.
- (3) If a park use permit applies in respect of land when that land is established as a Provincial heritage property under subsection (1), that permit is deemed to have been issued under this section by the minister, and subsection (2) applies for the purpose of interpretation of that permit.

PART 3 – BRITISH COLUMBIA HERITAGE TRUST

Heritage Trust continued

- 24
- (1) The British Columbia Heritage Trust is continued as a corporation.
 - (2) The Heritage Trust is for all purposes an agent of the government and the powers of the Heritage Trust may be exercised only as an agent of the government.
 - (3) Subject to the other provisions of this Part, the Heritage Trust has the power and capacity of a natural person of full capacity.
 - (4) The *Company Act* does not apply to the Heritage Trust but the Lieutenant Governor in Council may, by order, direct that one or more provisions of the *Company Act* apply to the Heritage Trust.

Objects of Heritage Trust

- 25
- The objects of the Heritage Trust are as follows:
- (a) to conserve and support the conservation of heritage sites and heritage objects;
 - (b) to gain further knowledge about British Columbia's heritage;
 - (c) to increase public awareness, understanding and appreciation of British Columbia's heritage;
 - (d) to undertake such other activities related to British Columbia's heritage as the minister may authorize.

Directors

- 26
- (1) The Lieutenant Governor in Council must appoint a board of directors of the Heritage Trust.
 - (2) The Lieutenant Governor in Council must designate one of the directors as chair and one or more of the directors as vice chair of the board.

-
- (3) The directors must be paid reasonable and necessary travelling and incidental expenses incurred in the discharge of their duties under this Act, and may be paid remuneration for services in an amount determined, on the recommendation of the board, by the Lieutenant Governor in Council.
 - (4) The board may
 - (a) determine its own procedure and provide for the regulation and conduct of its meetings,
 - (b) delegate any of the powers, functions and duties of the Heritage Trust to a committee of directors, to an officer or employee of the Heritage Trust or of the ministry or to any other person, and
 - (c) establish rules or policies governing the powers, functions or duties delegated under paragraph (b).

Officers and employees

- 27 (1) The board may appoint officers and employees of the Heritage Trust as it considers necessary.
- (2) The power of appointment under subsection (1) is subject to the *Public Service Act*, and employees of the Heritage Trust are deemed to be employees and the Heritage Trust is deemed to be an employer in respect to those employees for the purposes of the *Public Service Act*, the *Public Service Labour Relations Act* and the *Pension (Public Service) Act*.
- (3) The minister may authorize an employee of the ministry to provide services to the Heritage Trust, with or without compensation from the Heritage Trust.
- (4) The Lieutenant Governor in Council may make an order to transfer one or more employees of the ministry to the Heritage Trust, and such an order must
 - (a) identify by name each employee of the ministry who is to be transferred to the Heritage Trust,
 - (b) specify a transfer date for each employee who is to be transferred, and
 - (c) establish conditions for the transfer that the Lieutenant Governor in Council considers advisable to preserve the rights and benefits of the employees to be transferred.
- (5) On the transfer date specified by an order under subsection (4), an employee of the ministry named in the order ceases to be an employee of the ministry and becomes an employee of the Heritage Trust as if he or she were appointed under subsection (1), subject to any conditions established under subsection (4) (c).

Powers of Heritage Trust

- 28 (1) To further the objects of this Part, the Heritage Trust may do one or more of the following:
 - (a) acquire, manage and conserve property or acquire an interest in property;
 - (b) enter into agreements with a person, organization, local government, first nation or the government of Canada or of a province;

Section 29

- (c) conduct and arrange exhibits or activities to inform and stimulate the interest of the public in any matter related to the purposes of this Part;
 - (d) subject to a trust or agreement under which a property was obtained, dispose of the property and execute instruments required to effect the disposal;
 - (e) receive money or property by donation, public subscription, devise, bequest or otherwise;
 - (f) charge fees for any service that it provides including fees for the use of or admission to any of the facilities that it operates;
 - (g) assist in or undertake research, study or publication respecting heritage conservation;
 - (h) provide grants, advice and services to other parties having aims and objectives consistent with the purposes of this Part;
 - (i) subject to terms and conditions it may choose to apply, lend money from the trust fund continued under section 29 or guarantee loans made by a financial institution for the acquisition, management, conservation or development of heritage property by a party referred to in paragraph (b);
 - (j) do such other things as the Lieutenant Governor in Council may authorize.
- (2) Subject to the approval of the Lieutenant Governor in Council, the Heritage Trust may, for the purpose of engaging in a commercial, industrial or business undertaking,
- (a) incorporate a corporation,
 - (b) acquire shares in a corporation, or
 - (c) enter into a partnership or joint venture.
- (3) Subject to the approval of the Lieutenant Governor in Council, the Heritage Trust may borrow money in accordance with regulations made under section 75 of the *Financial Administration Act*.

Heritage Trust Fund

- 29** (1) The fund maintained under section 22 (1) of the *Heritage Conservation Act* as it read immediately before October 14, 1994, is continued as the British Columbia Heritage Trust Fund.
- (2) The Heritage Trust must pay any money received by it into the fund.
- (3) The Heritage Trust may pay money out of the fund for
- (a) remuneration, expenses and compensation referred to in sections 26 and 27,
 - (b) operation and administration expenses of the Heritage Trust,
 - (c) investments referred to in subsection (4), and
 - (d) any other expenses incurred in the exercise of its powers.

- (4) Money of the fund may be invested in
 - (a) the acquisition, management, conservation and development of property under section 28 (1) (a),
 - (b) loans made under section 28 (1) (i), and
 - (c) investments approved by the Minister of Finance and Corporate Relations.

Financial administration

- 30 (1) The Heritage Trust must establish and maintain an accounting system satisfactory to the Minister of Finance and Corporate Relations, and must render detailed accounts of its revenues and expenditures as required by that minister.
- (2) The Minister of Finance and Corporate Relations may direct the Comptroller General to examine and report on any or all of the financial and accounting operations of the Heritage Trust.
- (3) The accounts of the Heritage Trust must, at least once every year, be audited and reported on by an auditor appointed by the board.
- (4) The Heritage Trust must annually, within 120 days of the end of its fiscal year, submit to the minister
 - (a) a report of the Heritage Trust and its operations for the preceding fiscal year,
 - (b) a financial statement showing the assets and liabilities of the Heritage Trust at the end of the preceding fiscal year, and
 - (c) the annual report of the auditor referred to in subsection (3).
- (5) The report and financial statement referred to in subsection (4) must be laid before the Legislative Assembly by the minister during the next session of the Legislative Assembly following the submission of the report and financial statement to the minister.
- (6) The *Financial Information Act* applies to the Heritage Trust.
- (7) The fiscal year of the Heritage Trust ends on March 31.

Property of the Heritage Trust

- 31 (1) Property acquired by the Heritage Trust under this Part is the property of the government and title to the property may vest in the name of the government or in the name of the Heritage Trust.
- (2) Despite the *Land Act*, property acquired by the Heritage Trust under this Part may be dealt with by the Heritage Trust under this Act.
- (3) Property vested in the Heritage Trust is exempt from taxation, levies and all other charges, except to the extent that the government is liable.

PART 4 – GENERAL PROVISIONS**Notice of heritage status on land title**

- 32 (1) The minister must file a written notice in the land title office with respect to land that is designated under section 9.
- (2) The minister may file a written notice in the land title office with respect to land
- (a) for which a notice has been given under section 10 (1),
 - (b) that, in the opinion of the minister, is protected under section 13 (2),
 - (c) for which an order is in effect under section 14, 16 or 21, or
 - (d) that, in the opinion of the minister, has been altered in contravention of section 13 (2).
- (3) On receipt of a notice under subsection (1) or (2) in which the affected land is described sufficiently to be identified in the records of the land title office, the registrar must make a note of the filing on the title of the land.
- (4) If the basis on which notice was filed under subsection (1) or (2) no longer applies to the land, the minister must notify the land title office.
- (5) On receipt of a notice under subsection (4), the registrar must cancel the note made under subsection (1) or (2).
- (6) Notification to the land title office under subsections (1), (2) or (4) must be made in a form satisfactory to the registrar of the land title district.
- (7) The protection of property under this Act is not affected by
- (a) an error or omission in a notice given by the minister to the registrar,
 - (b) an error or omission in a note made by the registrar under this section, or
 - (c) a failure by the registrar to make or cancel a note on a land title.
- (8) In the event of any omission, mistake or misfeasance by the registrar or the staff of the registrar in relation to the making or cancelling of a note under this section,
- (a) the registrar is not liable nor is the government vicariously liable, and
 - (b) the assurance fund or the Attorney General as a nominal defendant is not liable under Part 20 of the *Land Title Act*.

Service of documents

- 33 (1) Where this Act requires service of a document on a person, other than service in relation to a court application under section 19, the document is sufficiently served on a person if
- (a) it is served personally on the person,
 - (b) it is sent by registered mail, or a method of delivery that provides proof of delivery, to the person's actual or last known address, or

- (c) in the circumstances described in subsection (2), it is published in accordance with that subsection.
- (2) If a document cannot be served personally on a person and the person's actual or last known address cannot be determined after reasonable steps for the purpose have been taken, the document may be served by publishing a notice in the prescribed form in 2 issues, at least one week apart, of a newspaper having general circulation
 - (a) in the area where the person to be served was last known to reside or carry on business according to the information available to the person serving the document, or
 - (b) in the area in which the land is situated if the document relates to land owned by the person to be served.
- (3) A document served under subsection (1) (b) is deemed to be received on the earlier of
 - (a) the date the person to whom it is sent actually receives the document, and
 - (b) the expiry of 10 days after the date on which the document was sent.

Civil remedies respecting contraventions

- 34
- (1) The minister may apply to the Supreme Court for an injunction restraining a person from committing, or continuing to commit, a contravention of this Act or the regulations.
 - (2) The minister may apply to the Supreme Court for a restoration or compliance order if a person
 - (a) fails to comply with or contravenes the requirements or conditions of a permit issued under section 12 or 14,
 - (b) fails to comply with or contravenes an order made under section 14 or 21,
 - (c) removes property, or attempts to remove property, from British Columbia in contravention of section 13 (1),
 - (d) moves, removes, damages, desecrates, alters, excavates or digs in property, or removes objects from property in contravention of section 13 (2), or
 - (e) contravenes a regulation made under section 23 (2) or 37 (2) (e).
 - (3) An order of the court in respect of an application under subsection (2) may include one or more of the following:
 - (a) a requirement that the person restore the property to which the matter relates to its condition before the contravention on terms and conditions the court specifies;
 - (b) a requirement that the person undertake, as the court considers appropriate, compensatory conservation work on the property that was affected or on other heritage property, or that conservation work be performed by others at the expense of that person;

Section 35

- (c) an authorization that the minister may undertake conservation work at the expense of the person;
 - (d) any other requirements the court considers advisable.
- (4) This section applies whether or not a person is charged with an offence under this Act.

Indemnity

- 35
- (1) Except as provided in section 11 or 14 (9), no compensation is payable to a person for any loss or damage, or for any reduction in the value of property, that results from the operation of this Act, the performance in good faith of any duty under this Act or the exercise in good faith of any power under this Act.
 - (2) An action for damages must not be brought against the minister, an employee of the government, the Heritage Trust, a director, officer or employee of the Heritage Trust, a member of a committee established or authorized under section 22 or a person who is subject to the direction of the minister or the board of directors of the Heritage Trust, because of anything done or omitted to be done in good faith in the performance or intended performance of a duty or in the exercise or intended exercise of a power under this Act or the regulations.
 - (3) Subsection (2) does not absolve the government from vicarious liability for an act or omission of a person referred to in that subsection for which an act or omission the government would be vicariously liable if the subsection were not in force.

Offence and penalty

- 36
- (1) A person who does any of the following commits an offence:
 - (a) contravenes section 13 (6), 14 (1) or (8) or a provision of the *Park Act* referred to in section 23 (2) as it applies to a Provincial heritage property;
 - (b) fails to comply with or contravenes a requirement or condition of an order or permit under section 12 (2) (a), 14 (2) or (4), 16, 19 (2), 23 (2) or 34 (3);
 - (c) contravenes a regulation made under section 23 (2) or 37 (2) (e);
 - (d) contravenes section 13 (1) or (2).
 - (2) A person convicted of an offence under subsection (1) (a) to (c) is liable to a fine of not more than \$2 000 or to imprisonment for a term of not more than 6 months or to both.
 - (3) A person convicted of an offence under subsection (1) (d) is liable,
 - (a) if the person is an individual, to a fine of not more than \$50 000 or to imprisonment for a term of not more than 2 years or to both, or
 - (b) if the person is a corporation, to a fine of not more than \$1 000 000.
 - (4) If a corporation commits an offence under this Act, an employee, officer, director or agent of the corporation who authorized, permitted or acquiesced in the offence also commits the offence and is liable,

- (a) if it is an offence under subsection (1) (a) to (c), to the penalty set out in subsection (2), or
 - (b) if it is an offence under subsection (1) (d), to the penalty set out in subsection (3) (a).
- (5) Section 5 of the *Offence Act* does not apply to this Act or the regulations.

Power to make regulations

- 37 (1) The Lieutenant Governor in Council may make regulations referred to in section 41 of the *Interpretation Act*.
- (2) Without limiting subsection (1), the Lieutenant Governor in Council may make regulations as follows:
- (a) respecting the form, content and manner of giving notice in relation to this Act;
 - (b) respecting the form, content and manner of giving information for registration in the Provincial heritage register under section 3;
 - (c) respecting the administration and conservation of Provincial heritage properties;
 - (d) prescribing fees for a service, or for use of or admission to a facility, under this Act;
 - (e) respecting the maintenance of order at Provincial heritage properties;
 - (f) respecting heritage property that may be recorded in the Provincial heritage register under section 3 (1) (f);
 - (g) prescribing persons entitled to notice under section 10 (1) (c);
 - (h) prescribing the manner in which a notice of designation under section 10 (6) (b) is to be filed in the personal property registry;
 - (i) respecting the conduct of a heritage inspection or heritage investigation under section 14.

Continuation of former designations

- 38 (1) In this section, "**former Act**" means
- (a) the *Archaeological and Historic Sites Protection Act*, S.B.C. 1972, c. 4,
 - (b) the *Archaeological and Historic Sites Protection Act*, R.S.B.C. 1960, c. 15, or
 - (c) the *Historic Objects Preservation Act*, R.S.B.C. 1948, c. 145.
- (2) All heritage designations made under a former Act that have not been rescinded are continued as if they were designated by the Lieutenant Governor in Council under section 9, but a continuance under this subsection does not entitle any person to compensation under section 11.

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HERITAGE CONSERVATION — HISTORICAL TABLE

Amendments Not in Force

HERITAGE CONSERVATION ACT

RSBC 1996, chapter 187

Section	Citation
12	RS1996 (Supp) -187-1; 1994-43-16(part).

Legislative History

HERITAGE CONSERVATION ACT

RSBC 1996, chapter 187

Section	History
1	RS1979-165-1; 1994-43-13.
2	RS1979-165-2.
3	RS1979-165-3; 1994-43-14.
4	RS1979-165-3.1; 1994-43-15.
5	RS1979-165-3.2; 1994-43-15.
6	RS1979-165-3.3; 1994-43-15.
7	RS1979-165-3.4; 1994-43-15.
8	RS1979-165-3.5; 1994-43-15.
9	RS1979-165-4; 1994-43-16.
10	RS1979-165-4.1; 1994-43-16.
11	RS1979-165-4.2; 1994-43-16.
12	RS1979-165-5; 1994-43-16.
13	RS1979-165-6; 1994-43-16.
14	RS1979-165-7; 1994-43-16.
15	RS1979-165-7.1; 1994-43-16.
16	RS1979-165-7.2; 1994-43-16.
17	RS1979-165-8.
18	RS1979-165-8.1; 1994-43-17.
19	RS1979-165-8.2; 1994-43-17.
20	RS1979-165-8.3; 1994-43-17.
21	RS1979-165-8.4; 1994-43-17.
22	RS1979-165-9; 1994-43-18.
23	RS1979-165-9.1; 1994-43-18.
24	RS1979-165-16; 1994-43-20.
25	RS1979-165-17; 1994-43-20.
26	RS1979-165-18; 1994-43-20.
27	RS1979-165-19; 1994-43-20.
28	RS1979-165-20; 1994-43-20.
29	RS1979-165-21; 1994-43-20.
30	RS1979-165-22; 1994-43-20.
31	RS1979-165-23; 1994-43-20.
32	RS1979-165-27; 1994-43-21.
33	RS1979-165-28; 1994-43-21.
34	RS1979-165-29; 1994-43-21.
35	RS1979-165-30; 1994-43-21.
36	RS1979-165-31; 1994-43-21.
37	RS1979-165-32; 1994-43-21.
38	RS1979-165-33; 1994-43-21.

HERITAGE CONSERVATION — HISTORICAL TABLE

EXPLANATORY NOTE

Amendments Not in Force: If there are any legislative changes to the Act that are not in force as of December 31, 1996, these are identified in *italics* at the beginning of the historical table. The "Section" column identifies the affected provisions of the Act. The "Citation" column identifies the amending legislation by its citation in the 1996 Statute Revision Supplement.

Legislative History: The second part of the table provides a legislative history of each section of the Act between the 1979 Statute Revision and the 1996 Statute Revision. The "Section" column identifies all sections of the Act in force on December 31, 1996. The "History" column for each section begins with the citation of the section immediately before the 1996 Statute Revision. This is followed by a list of citations for the legislation that enacted or amended the section between the 1979 Statute Revision and the 1996 Statute Revision (if a section was repealed and replaced during that period, these last citations begin at the most recent replacement).

Legislative citations have the format of "year-chapter-section".

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HERITAGE CONSERVATION ACT

CHAPTER 187

1 Section 12 of the Heritage Conservation Act is amended by adding the following subsections:

- (2.1) On receipt of an application for a permit that would, in the opinion of the minister, affect a site or object referred to in subsection (2.2), the minister must provide an opportunity for consultation by informing the appropriate first nation.
- (2.2) Subsection (2.1) applies in respect of the following:
 - (a) a heritage site or heritage object that is included in a schedule under section 4 (4) (a) or (b);
 - (b) a heritage site or heritage object for which the first nation has requested an opportunity for consultation under this section;
 - (c) a site of aboriginal origin protected under section 13 (2) (b), (c), (d) or (f);
 - (d) other circumstances the minister considers advisable.

1994-43-16[part].

Commencement

- 2** Section 1 comes into force by regulation of the Lieutenant Governor in Council.

1994-43-108.

Appendix 3: Glossary of Terms.

Glossary of Terms

Abrasive Stone: Usually a sandstone slab used for grinding and polishing.

Activity Area: A limited portion (area) of a site in which a specialized cultural function was carried out, such as food preparation, tool manufacture etc.

Adze-Blade: A ground and polished stone artifact characterized by a generally rectangular shape with a beveled (slanted) cutting edge on one end. Used as a wood-working tool.

Arbitrary Level: An excavation level defined by factors of convenience, with no necessary relationship to site-stratigraphy or cultural components.

Archaeology: The discipline concerned with the recovery, analysis, description and explanation of remains left by humans. The remains can include artifacts, features, human skeletons, plant and animal food refuse, etc..

Archaeology Branch: A Branch of the Ministry of Small Business, Tourism and Culture. The Archaeology Branch is responsible for issuing permits and is the central repository for information pertaining to archaeological sites in B.C..

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.

Assemblage: A collection of cultural materials such as artifacts, animal bones, and fire cracked rock from a sampling area or unit, such as a site, pit, or level.

Association: Archaeological materials are said to be associated when they are found in close proximity in an undisturbed context.

Awl: A small pointed hand tool used for piercing holes in leather, wood and other materials.

Basalt: A fine-grained volcanic rock and used for the manufacture of chipped stone artifacts. Colour black to grey, texture granular to glass-like.

Basal Thinning: The intentional removal of small longitudinal flakes from the base of a chipped stone projectile point or knife to facilitate hafting.

Baulks: Unexcavated "walls" which may be left between pits to provide stratigraphic control.

Biface: A stone artifact flaked on both faces.

Bi-facial Flaking: The manufacture of a stone artifact by removing flakes from both faces

Bilaterally Barbed: A projectile point or harpoon with barbs on both edges.

Bipoint: A bone or stone artifact pointed at both ends.

Blade: A long slender stone flake usually made from very fine stone material such as obsidian or basalt. A blade is twice as long as it is wide and very sharp.

Blank: An “advanced” preliminary stage in the manufacture of an artifact, also perform.

Borden System: A code of four letters and a number based on a grid system used to designate archaeological sites in Canada. It is named after Charles E. Borden who devised the system. E.g.: DgRn 23. The letters represent an area on a map, the capitalized ‘D’ and ‘G’ refer to a longitudinally and latitudinally designated 10 degree coordinate while the lower case ‘g’ and ‘n’ refer to finer degree increments within the upper case designation. The number following the four letters indicates that the site was the 23rd found in the Borden Block.

B.P.: “Before Present” The notation commonly used on radiocarbon dates, e.g. 1,000 B.P. = 1,000 years before A.D. 1950 or approximately 950 years ago.

Burial: A human internment (burial). May be “flexed” (curled up), or “extended” (arms and legs straight); single or multiple; primary (in its original location) or secondary (reburied).

Burial Mound: An artifact aboriginal mound containing or covering human burials.

Carbon Sample: A quantity of organic material, usually charcoal, collected for radiocarbon dating.

Catalogue: The systematic list recording artifacts and other finds, recovered by archaeological research, including their description and provenience.

Catalogue Number: A number assigned all items recovered by archaeological research to cross-index them to the catalogue.

Ceramics: Deliberately fired clay artifacts, such as ceramic vessels, bowls, bottles, etc.

Chalcedony: A semi-translucent (transparent) 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 (non-transparent), fairly granular, silicate rock with a dull shiny luster and a great range of colours, used a raw material for the manufacture of chipped stone artifacts. Varieties include jasper and flint.

Chronology: Arrangement of past events in time.

Complex: A consistently recurring assemblage of artifacts or traits which may be indicative of specific set of activities, or a common cultural tradition.

Component: The manifestation of a given archaeological PHASE at a site. Sites may be “single component” (only one distinct cultural unit), or “multi-component” (2 or more cultural units).

Composite tool: A tool formed of two or more joined parts, e.g. "composite toggling harpoon head".

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

Context: The spatial relationship of archaeological items and samples within a site. "Primary Context" refers to materials found in their original position, also known as "in situ"; "Secondary Context" refers to materials which have been disturbed and then redeposited.

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

Cortex: The naturally weathered outer surface of a pebble.

Cultural: Of human origin.

Culture: The sum of human non-biological behavioral trait - learned, patterned and adaptive.

Culture History: A record of the cultural changes through time within a particular group.

Culture Sequence: The chronologically succession of cultural traits, phases, or traditions in a local area.

Culturally Modified Tree: A tree that has been altered intentionally by First Nations peoples in their utilization of the forest.

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

Debitage: Waste by-products from tool making.

Dentalia: Small, slender horn-like Pacific Ocean shell used and traded as beads and wealth-items.

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

Diffusion: When elements of one culture spread to another.

Distal: That portion of a tool or bone farthest from the body of the user or "owner".

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

Drinking Tube: A length of hollow bird-bone used in aboriginal ceremonial situations for drinking liquids.

Ethnography: The description of the culture, of particular social groups, through interaction and interviews with members of that group.

Faunal Remains: Bones and other animal or fish parts found in archaeological sites. Important in the reconstruction of environments and diet of past cultures.

Feature: A non-portable product of human activity such as house depressions, hearths, fire pits, cache pits, etc. Features are destroyed when removed from the ground.

Flake: A fragment removed from a core or nucleus of cryptocrystalline 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.

Flexed Burial: A human interment (burial) where the body is placed in a semi-fetal position with the knees drawn up against the chest and hands near the chin.

Floral remains: Remnants of past vegetation found in archaeological sites. Useful in the reconstruction of past environments.

Flotation: The process of recovering small particles of organic material by immersing sediment samples in water or other fluids and skimming off the particles which float to the surface. An important method for obtaining microfloral and microfaunal remains and carbon samples.

Gorge: A bone bi-point used to catch fish or waterfowl. After being swallowed, the hook will toggle (snag) in the stomach of the prey and cannot be drawn out.

Grave Goods: (Also: "Grave Inclusions", "Mortuary Goods" etc.): Tools, weapons, food, or ceremonial objects placed with a burial.

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

Habitation Area: A generalized term for a house or tent floor, or the remains of any other type of shelter.

Habitation Site: A location where a human group has lived and conducted normal daily activities for a significant period of time.

Hafted: Attached with a binding to a shaft or handle (eg. a "hafted knife").

Hammerstone: A natural rounded, largely unmodified pebble used as an un-hafted hammer.

Hand-maul: A carefully manufactured un-hafted stone hammer.

Harpoon: A thrown or thrust spear-like weapon armed with a detachable point fastened to a retrieving line.

Harpoon Head (Point): The arming tip of a harpoon. Generally classifiable into 2 main forms - toggling and barbed - each of which may be composite, and have cutting-blades or side-blades. Always have line-guards or other means of line attachment, which distinguishes them from other points.

Hearth: A fireplace, often circular and may be unlined, rock or clay-lined, or rock-filled.

In Situ: Archaeological items are said to be “in situ” when they are found in the location where there were first deposited.

Level: The basic vertical subdivision of an excavation unit. May be natural, arbitrary or contoured.

Line -Guard: A device to fasten the retrieving line to a harpoon point.

Lithic: Of, or pertaining to stone.

Lithic Industry: That part of an archaeological artifact assemblage manufactured of stone.

Lithic Technology: The process of manufacturing tools etc. from stone. Most frequently refers to stone flaking.

Midden: A deposit of camp refuse. Many middens on the coast are made almost entirely of shell and are called “shell middens”.

Natural Levels: (Also “Stratigraphic Levels”): An excavation level defined by the original stratigraphic units of the site.

Nephrite: A hard, fibrous, green to white rock often used for the manufacture of adze-blades. Commonly called jade.

Ochre: Iron oxide or hematite. Colour is commonly reddish-brown to yellow. Used as a natural pigment.

Paleontology: The study of fossil animal remains.

Pecking (Also “Pecking and Grinding”): The process of manufacturing heavy-duty stone tools (bowls, mauls etc.) from granular rocks by prolonged hammering with a hammerstone. Abrasive techniques might be used to finish the piece.

Pedestal: A raised area isolated around important excavated materials to facilitate their study.

Permit: According to the *Heritage Conservation Act*, in order to disturb an archaeological site one must be under a permit issued by the Archaeology Branch. Qualifications for permit holders are listed in the *Archaeology Branch Archaeological Impact Assessment Guidelines*.

Phase: A unit of time within a defined area and culture that is characterized by its cultural material. The material culture within a phase is distinct, and sets it apart from other phases. Examples of such phases are the St. Mungo and Mayne Phases.

Post-Contact Period: Refers to the period following the first arrival of Europeans.

Post-Mold: The impression, stain, or cavity, left in the ground by a rotted wooden post.

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

Preform: An early preliminary stage in the reduction manufacture of a flaked stone artifact.

Prehistoric: The period prior to written records for any given area. In North America this is the same as pre-contact.

Profile: A section, or exposure of the ground, showing depositional or developmental strata or horizons.

Projectile Point: A term used to describe arrow, spear or dart points. The points are symmetrical, with the base designed in such a fashion that they can be attached to the projectile shaft. Some common shapes are: leaf-shaped; lanceolate; triangular; stemmed; corner-notched; and side-notched.

Radiocarbon Dating: An absolute dating method based on the radioactive decay of Carbon-14 (C14) contained in organic materials. Samples of carbon (like charcoal) from an archaeological site can be used to provide a time-line of occupation for a site or in some cases several sites.

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.

Sampling: The probabilistic, systematic, or judgmental selection of a sub-element from a larger population, with the aim of approximating a representative picture of the whole.

Sampling Unit: The sub-element of the total population selected for sampling.

Serrated: Notched or toothed. May refer to the edge of a tool.

Shell Midden: A site consisting mainly of concentrated shellfish remains (See **Midden** above).

Site: Any location with detectable evidence of past human activity. Includes habitation sites, kill-sites, quarry sites, burial sites, etc.

Skull Deformation: The artificial distortion of cranial bones during growth, practised by some aboriginal cultures.

Stratigraphy: The depositional layers within a site and their study.

Subsistence Pattern: The basic means by which a human group extracted and utilized energy from its environment.

Surface Collection: Archaeological materials obtained from the ground surface.

Survey(ing): In archaeology, the process of locating archaeological sites. More generally, the process of mapping and measuring points on the surface of the ground (eg. "legal" or "topographic surveying").

Topography: The physical ground features of an area.

Tradition: A continuum of gradual and cumulative culture-change through time, representing a single culture.

Type: A distinctive formal artifact class restricted in space and time; e.g. the "Plateau Point" is a projectile point "type".

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

Uniface: A stone artifact flaked only on one surface.

Unifacial Flaking: The removal of secondary flakes from only one surface of a stone nucleus.

Utilized Flake: A stone flake used as a tool without deliberate retouching, but exhibiting use-wear.

Appendix 4: Archaeology Branch Guidelines for Archaeological Overview Assessments.

From: *British Columbia Archaeological Impact Assessment Guidelines*, Archaeology Branch,
Ministry of Small Business, Tourism and Culture. Pp. 8-10. Revised 1995. Victoria, B.C..

- (e) ensuring that First Nations who could be affected by decisions are given an opportunity to have their concerns considered prior to making decisions;
- (f) providing consultants with access to archaeological site files, maps, and other documentary materials maintained within the Ministry;
- (g) monitoring field aspects of archaeological impact assessment and management studies for compliance with terms and conditions of orders and permits;
- (h) reviewing reports and research proposals for relevance, completeness and objectivity; and
- (i) establishing terms and conditions for project approval.

3.2.3 Project Committees

Committees set up for each project review incorporate the archaeological resource assessment process by providing general direction and coordination of the province's overall environmental assessment and review process. These committees work directly with the proponent and the Branch to clarify requirements or provide general advice on assessment and review procedures at various stages in the approval process. They also coordinate review comments, advice and queries the Branch may have regarding a proponent's archaeological impact studies.

3.3 Review Procedures

The Branch may conduct as many as three formal reviews. The first involves an examination of the proponent's application for a Project Approval Certificate to determine whether further involvement in the archaeological resource assessment process is required. Therefore the application should include an archaeological overview. The second review is to evaluate the Project Report which should include the results of an archaeological impact assessment. The third review is to assist in the preparation of the terms of reference for an Environmental Assessment Board hearing, if required, and will address archaeological impact management issues.

The Branch may request that report deficiencies either be rectified immediately or, depending on the nature of these deficiencies, in a following stage of the assessment process. In this regard, the Branch will advise the proponent of the nature of deficiencies and how they may be rectified.

Archaeological assessment reports should be received by the Branch as early as possible in the project planning process. Early Branch review will provide maximum lead time for correcting report deficiencies and/or designing and implementing subsequent archaeological investigations. This practice will minimize expense and delay to the proponent.

Unless the proponent requests otherwise, final reports received by the Branch are considered public information.

3.4 Overview

The archaeological resource overview is intended to identify and assess archaeological resource potential or sensitivity within a proposed study area. Recommendations concerning the appropriate methodology and scope of work for subsequent inventory and/or impact assessment studies are also expected.

Typical overview studies should entail (see Appendix A):

- (a) a background library and records search of ethnographic, archaeological and historical documents pertinent to the study area;
- (b) a statement of archaeological resource potential and distribution in the study area;
- (c) a preliminary assessment of anticipated impacts in light of proposed development plans; and
- (d) recommendations concerning the need for further archaeological impact assessment studies.

These studies are of fundamental importance in assessing the archaeological resource potential of a study area, and should result in predictions regarding archaeological site variability, density and distribution. In addition, it may also be possible to develop a preliminary evaluatory framework within which to judge the significance of archaeological sites. Depending on the availability and quality of existing data, it may be possible to achieve these research objectives without undertaking field survey; however, documentary research and, where practical, direct consultation with knowledgeable persons and organizations is essential.

Overview studies are particularly important with respect to large-scale development projects such as hydro-electric dams, electrical transmission lines, pipelines, etc. More site specific projects involving small, well-defined localities such as residential subdivisions, manufacturing plants, and port facilities may effectively combine an overview and impact assessment study. However, the most appropriate type of study to be undertaken at this stage should be established through consultation with the Branch.

3.4.1 Documentary Research

This aspect of the overview study should involve a thorough review of library and archival literature as well as other relevant data sources. The research should include, but need not be limited to:

- (a) a check of extant records including the B.C. Archaeological Site Inventory, legal land survey records, and other pertinent records and inventory files;
- (b) a review of all previous archaeological investigations in the study area or in immediately adjacent areas;
- (c) a review of relevant information from published and unpublished sources such as local and regional history, pre-history and ethnography;
- (d) a review of relevant paleoecological studies to assess past environmental conditions that may have influenced cultural adaptations; and
- (e) examination and interpretation of air photographs and geomorphological and pedological information as an aid for assessing the potential for human habitation.

Occasionally, access to relevant unpublished data may be seriously hindered. For example, some institutions or organizations that maintain archaeological documents, records, files, etc. may have, except under special arrangement, a confidential policy regarding use of the material. Such a policy usually reflects legitimate concerns about the integrity of the documents. In other cases, the researcher may face a long waiting period before access to the data is permitted. Problems in accessing pertinent and necessary documentary sources should be ascertained as early as possible, and those problems which cannot be immediately resolved should be brought to the attention of the Branch.

3.4.2 Direct Consultation

Individuals and organizations with knowledge of archaeological resources in the study area should be contacted where appropriate. The objective is to compile information concerning the location, distribution and significance of reported archaeological sites. Interviews should be designed to elicit information which may facilitate reconstructing or confirming ethnographic and historic patterns of settlement, land use and subsistence. Among those who should be consulted are aboriginal groups, local museums, archaeological or historical societies, longtime residents, and specialists having local or regional expertise in the area. Specialists may include archaeologists, historians and ethnohistorians, among others.

Local perceptions and attitudes may have a significant bearing on resource management decision-making, and therefore should be reported. This is especially true when there is strong local interest and concern regarding the safety of a particular archaeological site or a group of such sites. Interviews with various persons can provide the researcher with an opportunity to document public or community attitudes toward impacts which a proposed development may have on local archaeological resources. However, particularly in the early project planning phases where speculation may be a concern, these interviews must be conducted only with the approval of the proponent, and must be handled very objectively.

3.4.3 Preliminary Field Reconnaissance

The archaeological overview may require a preliminary field reconnaissance, which may involve a simple overflight of the study area or, if greater intensity is demanded, a field survey using either systematic or judgemental site sampling techniques. Reconnaissance survey should be undertaken in the event that historical, archaeological, ethnological, or other documentary sources necessary for assessing the archaeological resource potential of the study area are insufficient or unavailable. A field reconnaissance is also warranted in the case where many alternatives are under consideration for the location of

project facilities. In this case, an overview of the resource potential of an area, based entirely on documentary research, may be inadequate for providing effective guidance in project planning. The Branch will provide assistance in determining the need and appropriate intensity of preliminary field reconnaissance for specific development projects.

The reconnaissance survey should be designed to assess the archaeological resource potential of the study area, and to identify the need and appropriate scope of further field studies. Although this may involve some ground reconnaissance, areal coverage will usually be quite small relative to the overall size of the study area. This preliminary survey will seldom provide sufficient data to ensure an adequate estimate of all archaeological sites in an area. However, information resulting from preliminary field reconnaissance should:

- (a) confirm or refute the existence of archaeological sites reported or predicted from documentary research;
- (b) allow further predictions to be made about the distribution, density and potential significance of archaeological sites within the study area;
- (c) identify areas where sites are apparently absent, implying low or no potential;
- (d) verify, wherever possible, potential impacts imposed by the development project;
- (e) suggest the most appropriate survey methods or techniques to be used in an intensive field survey should such a survey be necessary.

By accomplishing these research objectives, the reconnaissance survey serves as a useful preliminary study for designing and subsequently implementing a more intensive site survey.

Techniques employed in reconnaissance survey will vary depending on such factors as terrain, vegetation, land use, ease of access, urbanization, the size of the project area, and the types of archaeological resources being sought. Where archaeological sites are anticipated, it may be necessary to undertake some subsurface testing to locate sites lacking surface evidence, to delineate site boundaries or, where necessary, to obtain sufficient information for preliminary site evaluation.

In undertaking an archaeological overview the development proponent, or his consultant, is encouraged to develop innovative approaches to predicting or evaluating overall resource sensitivity or potential within the study area. In this respect, it is important to consult all relevant data sources. Furthermore, the services of specialists such as ethnohistorians and geologists should be drawn upon so as to make the fullest use of the data. A comprehensive overview will ultimately result in more efficient and cost-effective research in later stages of the assessment process.

Appendix 5: Trail Routes within the Squamish Forest

TRAILS WITHIN THE SQUAMISH FOREST DISTRICT

The purpose of this section is to identify the extent of trails located within the Squamish Forest District for archaeological site potential. The following trail information was researched at the Surveyor Generals Office, located in Victoria, B.C. By no means is this a complete trail study within the Squamish Forest District. The following sources have been examined but not in full detail, and therefore should be revisited. They are:

- the British Columbia Archives -information concerning railway lines, traplines (maps), RG-10 documents, and timber cruising reports.
- the Ministry of Highways reports (Public Works).
- detailed ethnographic literature.
- *Indian Reserve Commission* reports.

The process of retrieving trail information was a time consuming task, and could not have been completed without the cooperation of the qualified staff at the Surveyor Generals Office. Traditions Consulting Services Inc. would also like to thank Lori Williamson for her assistance and input on this preliminary study. To complete this study, all surveyor maps for the Squamish Forest District were examined. This report:

- identifies each trail found at the Surveyor Generals Office
- assigns each trail a site number
- plots each trail on a corresponding 1:50,000 NTS map
- provides a trail name or reference, as it appeared in the source document
- provides a general geographic description of trail location
- source of information (see mapping key)
- additional remarks concerning the trail

In total 35 trails (some interconnected) were identified, mapped and referenced.

Map Key - Trails in the Squamish Forest District

- L1 IR Plan of Pemberton Indian Reserves, Yale District, surveyed by WS Jemmett, 1882, 1883.
- L2 IR Plan of Anderson Indian Reserves, Yale District, surveyed by WS Jemmett, 1882, 1883.
- L 22 IR Plan No. 2 of the Pemberton Indian Reserves, Lillooet District, surveyed by J.F. Ritchie, 1905.
- W 20 IR -Plan of Douglas Indian Reserves, Yale District, surveyed by WS Jemmett, 1882, 1883.
- 21 W IR -Plan No. 2 of Douglas Indian Reserves, New Westminster District, surveyed by JF Ritchie, 1904
- 16T1 Land Divisions -Lillooet Electoral District, BC Lands and Works Department, date unknown.
- 2 Locker 4 -New Westminster District, no maker, no date.
- 6 Locker 25 -Hydro Electric Survey, City of Vancouver, 1923.
- 11 Locker 25 -Hydro Electric Schemes, City of Vancouver, Portion of Harrison Lake and Lillooet River, by A. Lighthall, BCLS, 1924.
- 7 Locker P -Bridge River Power Co.Ltd, Capilano Route, WR 8982, Sheet 20, date unknown.
- 25 T Misc. -Pemberton Portage, no maker, no date.
- 1AT7 Old Maps - Map of Portion of New Westminster District with Adjacent Islands and Part of Vancouver Island, by Lands and Works Department, 1910.
- 6T4 Old Maps - Map of Mineral Claims on Fire Mountain, New Westminster District, by JW Vaughan, 1897.
- 4T7 Old Maps - Map of Portion of New Westminster District with Adjacent Islands and Part of Vancouver Island, BC Department of Lands and Works, 1906.
- 12AT2 Old Maps - Map of the Peace River Block, BC Department of Lands, 1922.

- 17T2 Old Maps - Pre-Emptor's Map, Lillooet Sheet, Map N. 3K, BC Department of Lands, 1924.
- 34T1 Original Maps - Map of the South-Western Part of British Columbia, by BC Lands and Works, CW Wells, 1903.
- D2 Railway Index - New Westminster and Yale, BC Department of Lands, 1914.
- 1T169 RWY -Pacific Great Eastern Railway, Alta Lake Summit North, Plan of Right of Way, District of Lillooet, by CW Williams, BCLS, 1915.
- 1RY 169 -Pacific Great Eastern Railway, District of Lillooet, District of Lillooet, Alta Lake Summit North, Mile 10 to Mile 22.65, Plan of Right of Way from N.Body of District of New Westminster to DL 210- District of Lillooet, by C Williams, BCLS, 1923.
- 6T131 RYS -Pacific Great Eastern Railway, District of Lillooet, Plan of Location of Birkenhead Summit South and Revised Birkenhead Summit North, by J Callaghan, 1913.
- 4T135 RYS -Pacific Great Eastern Railway Right of Way Through Lots... and Crown Lands, Lillooet District, maker and date unknown.
- 17T1 R & T -Sketch Map of Part of British Columbia Shewing Trails and Routes of Communication, no maker, no date.
- 3T2 R & T -Plan of Douglas and Lillooet Road, by JB Launders, date unknown.
- 4T2 R & T -Sketch of the 2nd or Birkenhead Portage from Pemberton to Anderson, by JB Launders, date unknown.
- 13T4 -untitled, plan taken from FB - PH48, 24/45, Lillooet District, surveyed by A. Cummings, 1945.
- 14T4 -untitled, plan taken from FB - PH20, 3577/12, 1912.
- 7T3B Townsites - untitled, plan of Pemberton, Pemberton and Little Lakes, by J Conroy, RM Carsons, 1861.(9T195)

TRAILS - SQUAMISH FOREST DISTRICT

Trail #	NTS Map	Name/Reference	Geographical Description	Source Maps	Notations/Remarks
1	92 G/16 92 J/ 1, 2, 7	"Old Trail" "Waggon Road" "Mule Trail" "Douglas Road" "Caribou Road"	From Douglas, N along E side of Lillooet R. and Lk to Pemberton.	11 Locker 25 D2 Railway. Index 17 T1- Roads and Trails 12A T2- Old Maps 17 T2- Old Maps 21 W - Indian Reserves, New Westminster 6 T4-Old Maps 34 T2-Original Maps L 1- Indian Reserves, Lillooet	Main trail which connects with trails north to Anderson and Lillooet. 17T1 (n.d.) refers to this as a mule trail which changes to wagon road in progress for section S from Lillooet Lk. 17 T2 (1924) shows the Douglas to Lillooet Lk section as road which then reverts to trail. Some early maps show trail ending at Lillooet Lk (34 T1-1903, 17 T1-n.d.). 21W IR (1904) only shows section of trail from IR 11 N to IR 2A. Most give N end of trail at NE end of Lillooet Lk as marked on NTS. L1 (1882.83) indicates N end of trail "to Douglas" at 29 Mile House at Little (Xit'olacw) Lk. From here trail continues on to Anderson #3 trail (7 T3B-1861).
2	92 G/11, 14 92 J/2, 3, 7	"Howe Sound Trail" unnamed trail indefinite road road	From Squamish N to Pemberton; from Squamish at S end along Cheakamus R and Green R to Pemberton.	4 T7- Old Maps D 2- Railway Index 12A T2- Old Maps 17 T2- Old Maps 2 Locker 4	Main Trail. 4 T7 (1906) shows as trail; D2 (1914) shows as road; 12A T2 (1922) gives rough sketch outline as trail; 17 T2 (1924) legend shows as indefinite road and 2 Locker 4 (n.d.) gives Howe Sound notation. Squamish end of trail is unclear- NTS location is aprox. N end of trail at Pemberton crosses Lillooet R and connects with #21 trail W up Pemberton Valley and #22 trail E into Mount Currie. From here trail #24 feeds into main Anderson trail.

Squamish Forest District - Trails

3	92 J/7, 9, 10	"Birkenhead Portage from Pemberton to Anderson" "Pemberton Portage" "Waggon Road" "Government Road"	From Xit'olacu Lk at NE end of Lillooet Lk in Pemberton area, NW to Birkenhead R, continuing N along river past Gates Lk to Gates R, and on to Nequatque IR at S end of Anderson Lk.	16 T1- Land Divisions 4 T2- Roads and Trails D2- Railway Index 17 T2- Old Maps 12A T2- Old Maps L2- Indian Reserves, Lillooet 34 T1-Original Maps 17 T1- Roads and Trails 25 T2- Misc 6 T131 RYS 7 T3 B- Townsites	Some discrepancies between maps on route of trail. NTS location is approx. Several trails feed into this main trail at Pemberton end (#24,25, possibly 22). 7 T3 B (1861) shows version of S end of trail at Xit'olacu Lk (also known as Little LK). Some maps show N end of trail stopping at S end of Anderson Lk (17 T1-n.d., 4T1-1903, 16T1- n.d.). Later continuation of trail on to Seton and Lillooet (see trail #35). This northern extent of the trail is primarily outside the study area. Gates R was also called Anderson R and Gates Lk was formerly Summit Lk.
4	92 G/16	unnamed trail "to Douglas"	Little Harrison Lk, starting in NE corner from Douglas, along E side of lake to NE corner of Harrison Lk.	L 1-plan, Lillooet W 20- Indian Reserves, New Westminster 11 Locker 25	L 1 (1882.83) notation "to Douglas" at S end of trail. W 20 (1882.83) has no legend and shows as coloured dotted line. Trail provides overland access to Douglas from N end of Harrison Lk. Trail possibly continues down E side of Harrison Lk?
5	92 G/9, 16	unnamed	Lillooet R, W side, from mouth of Fire Ck SE past Tipella Ck to NW corner of Harrison Lk.	D 2- Railway Index 17 T2- Old Maps 11 Locker 25	D2 (1914) and 17 T2 legends show as unnamed trail. 11 L25 (1924) does not show trail but marks junction of trail with Sloquet Ck trail and S terminus of trail in Tipella. Appears to be access trail along W shore joining Tipella, IR 8, and adjacent creek trails. N end of trail at river crossing over to IR 6.

Squamish Forest District - Trails

6	29 G/ 9, 16	unnamed	Sloquet Ck (formerly Springy Ck), N side, from mouth at junction with Lillooet R.	D 2-Railway Index 17 T2- Old Maps	D 2 (1914) shows as longer, unnamed trail. Later map 17 T2 (1924) indicates trail ends midway along length of creek. Furthest extent is marked on NTS. Both sources show this access trail connecting with trail #5 along W shore of Lillooet R.
7	92 G/16	unnamed	Unnamed tributary, extend S from midway along S side of Fire Ck. Trail parallels W side of stream.	17 T2- Old Maps	17 T2 legend (1924) shows as unnamed trail. Trail jogs steep sided creek to follow ridge. Likely tertiary trail for exploration.
8	92 G/16	"Horse Trail" or unnamed	Fire Ck, N side, from mouth at junction with Lillooet R, W to Fire Lk.	6 T4- Old Maps D 2- Railway Index 17 T2- Old Maps 11 Locker 25	6 T4 (1897) terminates trail in mineral claim L1685 on S side of Fire Mtn. D 2 (1914) puts terminus midway along N shore of Fire Lk. 17 T2 (1924) and 11 Locker 25 (1924) legends show as unnamed, shorter trail which ends at start of Fire Lk. Furthest extent up mountain side to claim area is marked on NTS.
9	92 G/16	"trail" or unnamed	Snowcap Ck, W side, from mouth at junction with Lillooet R south past Glacier Lk.	D 2- Railway Index 17 T2- Old Maps 11 Locker 25	D2 (1914) has no legend and shows trail as unnamed coloured dotted line. 11 Locker 25 (1924) gives "trail" notation and extends N and S ends of the trail. 17 T 2 (1924) legend shows as unnamed trail connecting with offshoot trail near Snowcap Ck mouth..
10	92 G/16	unnamed	Trail crosscuts Snowcap Ck just W from Lillooet R.	17 T2- Old Maps	Map legend (1924) shows as short, unnamed trail. Trail begins from Snowcap Ck trail. This is likely a tertiary trail to access benchland. NTS location is aprox.

11	92 G/16	unmarked	Gowan Ck, E side, upstream from mouth at junction with Lillooet R.	21 W- Indian Reserves, NW 17 T 2- Old Maps	17 T2 legend (1924) shows as unnamed trail. This was only map found to indicate a trail here. 21 W (1882.83) marks this as "Salmon R" but does not show river course or trail. Trail follows steep sides of creek. It crosscuts #1 trail along Lillooet R, continuing downstream to creek mouth. Possibly used as access trail for fishing upstream?
12	92 G/16	unnamed	Skookumchuck IR 4, starting from Lillooet R it crosscuts E half of the reserve.	21 W- Indian Reserves, NW	21 W (1904) has no legend and shows as coloured dotted line. Trail climbs slope to benchland and branches N. This trail did not show on some later maps of same area.
13	92 G/11	"South Valley Trail" "trail to beach" unnamed	Furry Ck, along N side then crosses S along E side of Phyllis Ck to Marion Lk.	7 Locker P	Exact extent of trail is vague- NTS location is approx. and needs verification. Also included are 2 additional, incomplete sections of trail in general area which possibly connect with section along Phyllis Ck. South Valley notation on 7 Locker P (n.d.) refers to short section marked ca.600' inland from Howe Sound shoreline.
14	92 G/7, 11	unnamed trail	Overland trail from Squamish to Burrard Inlet; south along Stawamus R, past Loch Lomand, down the Seymour R to its mouth.	D 2- Railway Index 17 T2- Old Maps	D 2 legend (1914) shows full extent of this overland trail along river courses. 17 T2 legend (1924) shows as unnamed trail. Both maps mark start of trail further upstream from Stawamus R mouth. Only N half of this trail is inside study area and marked on NTS.

15	92 G/10	unnamed	Mamquam R, S side, from Stowammusa R at W end upstream to Crawford Ck.	D 2- Railway Index 17 T2- Old Maps	D 2 (1914) and 17 T2 (1924) legends show as unnamed trail. Trail appears to follow river along base of mountain range then crosses SE to connect with the Stawamus R trail.
16	92 G/14	indefinite road unnamed road	Squamish R, E side, from SE corner of Cheakamus IR 11 north to Skowishin IR 7.	D 2- Railway Index 17 T 2- Old Maps	D 2 (1914) legend shows this as a road. 17 T2 (1924) legend shows this as a road which reverts to indefinite road in northern half. (This source also classified trail #2 from Howe Sound as a road at this time). N end of this "indefinite road" is estimated. Further research required.
17	92 G/13, 14	"Tsuahdi Trail"	Estimated course from Jervis Inlet SE along N side of Tsuahdi and Ashlu Creeks to Squamish R.	12A T2- Old Maps	12A T2(1922) is a very rough sketch map which provides notation and arrow indicator with minimal locational information. It shows trail ending at junction of Ashlu Ck and Squamish R. NTS location for this trail is aprox and needs verification. The Tsuahdi Ck portion of the trail is outside the study area.
18	92 J/2, 3	"Trail to Cheakamus Lake"	Cheakamus Lk, from NE corner shoreline downstream along W side of Cheakamus R to junction with Miller Ck.	6 Locker 25	Map source (1923) shows as dotted line with notation. Some other maps of same general area do not mark this trail.
19	92 J/2	unnamed trail	Fitzsimmons Ck, from area adjacent to SE corner of Alta Lk, crossing NE and then turning sharply SE along W side of the creek.	D 2-Railway Index 12A T2- Old Maps	Trail appears to stop midway along the river. 12A T2 (1922) gives rough sketch outline of trail with buildings? marked Green Make M.Co. across the river from end of trail. W end of trail is not clear, NTS location is aprox.

Squamish Forest District - Trails

20	92 J/2	"Wagon Road" or unnamed	Soo R, S side, to railway line along Green R.	D 2- Railway Index 1 T169- Railways 17 T2- Old Maps	D2 (1914) and 17 T2 (1924) legends show as unnamed trail. E end of trail is unclear but it is likely a tertiary trail connecting with Squamish Pemberton trail. NTS location is aprox. Soo R was also known as Eight Mile Ck.
21	92 J/7	"Old Road"	Pemberton Valley, follows Lillooet R, S end in Pemberton townsite area, N end on W side of Lillooet R past Ryan R.	D 2- Railway Index 17 T2- Old Maps	Access trail up Pemberton Valley corridor. S end of trail connects with Howe Sound #2 trail and Mount Currie area. N end of trail is unclear. 17 T2 legend (1924) shows as road reverting to indefinite road just N from Pemberton. D2 (1914) marks this as road reverting to trail N from Ryan Ck. NTS location of trail is aprox.
22	92 J/7	unnamed	Mount Currie area, N side of Lillooet R, W end at IR 2 through IR 1 and 3 to the east.	L1- Indian Reserves, Lillooet D 2-Railway Index 17 T2-Old Maps	Major junction area. This trail connects with Squamish-Pemberton #2, with Pemberton Valley #21 and the #24 feeder trail into the Anderson #3 trail. E end of trail unclear but likely links with #1 trail from Douglas. Trail is detailed in L1 (1882.83) and shows as coloured dotted line. NTS location is aprox.
23	92 J/7	unnamed	Green R, E end, short trail continuing W from Green and Lillooet R junction, on S side of the river below Pemberton airport.	D 2- Railway Index	Short trail follows river course at base of Mount Currie, across from Mont Currie IR 1 and 2. D 2 (1914) legend shows as unnamed trail. Not indicated on some other maps of same area.

24	92 J/7	"Trail" continues N "to Lillooet" "Mule Road"	Birkenhead R, S end from Mount Currie , just north of IR 1, along W side of river to Lockla IR 4.	L1- Indian Reserves, Lillooet L22- Indian Reserves, Lillooet 12 A T2- Old Maps	Major junction area. Appears to be connecting trail between Mount Currie area and Anderson #3 trail north. Trail is detailed in L1 (1882.83) and L22 (1882.83) and shows as coloured dotted line. Both maps show this trail joining with trail from Burrard Inlet (#22) and with #21 trail to Anderson Lk. 12A T4 (1922) gives rough sketch of trail. Notation indicates #25 trail to Howe Sound branching off this trail. This southern portion of Birkenhead R was also known as Mosquito R.
25	92 J/7	"from Burrard Inlet" "from Howe Sound"	Lower Birkenhead R, SW from Owl Ck junction.	L 1- Indian Reserves, Lillooet L 22- Indian Reserves, Lillooet	No map found which details course of trail. Li (1882.83) and L22 (1905) both mark with notations and show N end of this trail feeding into trail #24. Possibly was earlier, seasonally used shortcut linking Howe Sound and Anderson trails, bypassing Mount Currie. Possible course SW between Mosquito and Ivey Lakes.
26	92 J/10	unnamed	Unnamed creek between Tenas and Fowl Ck off Birkenhead R. Follows N side of ck then cuts S along W side of Birkenhead R past Fowl Ck.	17 T2- Old Maps 12A T2- Old Maps	One of several tertiary access trails in this area of creek junctions along Birkenhead R. Marked as a trail on 17 T2 legend (1924). Discrepancies between source and NTS map- 17T2 puts trail on Tenquille Ck. Same location on NTS location is unnamed ck, with Tenquille Ck showing further N from Tenas Ck.

Squamish Forest District - Trails

27	92 J/7,10	"trail"	From S end of Birkenhead Lk along E side of Taillefer Ck, along E side of Birkenhead R. almost reaching junction with Gates R.	17 T2- Old Maps 16 T1- plan Lillooet	17 T 2 legend (1924) shows as unnamed trail. 16 T 1 plan gives abbreviated, earlier (1897) version of trail which stops at Tenas Ck- Birkenhead R junction. One of several tertiary access trails in this area of creek junctions.
28	92 J/7,10	unnamed	Taillefer Ck, W side, from S end of Birkenhead Lk almost to junction with Birkenhead R.	17 T2- Old Maps 16 T1- plan Lillooet	One of several tertiary access trails in this creek junction area. Discrepancies between maps on southern extent- NTS location is aprox. 16 T 1 (1897) could show trail crossing the creek near the Birkenhead R junction and connecting with #27 trail.. Taillefer Ck was also known as Birkenhead Lk Ck.
29	92 J/7, 10	unnamed "trail"	Tenas Ck, trail runs N-S paralleling the Birkenhead R and crosscutting the creek.	16 T1, plan, Lillooet	Plan map taken from surveyor's 1897 FB. Short trail shows as dotted line. Several other trails are found in area surrounding this junction of creeks with the Birkenhead R.
30	92 J/7	unnamed	Gates (formerly Summit) Lake, unnamed creek midway along S shoreline of lake, follows E side of creek.	25 T2- Miscellaneous	No date on map- 1911 railway notation only. No legend- shows as coloured dotted line on original. Tertiary trail up steep sided creek course on flank of Gates Peak.
31	92 J/7	unnamed	Eight Mile Creek, E side, starting from junction with Gates R.	25 T2- Miscellaneous	Tertiary trail off Pemberton- Anderson trail follows steep sided creek course up steep slope. No date on map- 1911 railway notation only. No legend, shows as coloured dotted line. NTS location is aprox.; course of creek varies from source map.

Squamish Forest District - Trails

32	92 J/9	unnamed "trail"	Spruce Ck, runs E-W on N side of the creek.	13 T4, plan, Lillooet	A short trail that parallels the creek but is some distance from it. It climbs a steep slope. Trail does not connect with anything and appears to start and end in the middle of nowhere
33	92 J/9	unnamed "trail"	S end of Anderson Lk, E from Gates R, trail crosscuts Nequatque IR 1 and L2682.	13 T4- plan, Lillooet	Short trail marked on surveyor's plan which does not show on some other maps of same area.
34	92 J/9,10	"Trail to Blackwater" "Blackwater Trail"	Blackwater Ck, N side, from junction with Gates R West to Birkenhead Lk.	25 T2- Miscellaneous 17 T2- Old Maps 13 T4- plan Lillooet	25 T 2 (n.d.) gives notation but only shows E end of trail. 17 T2 (1924) shows full extent as dotted line. 13 T4 is plan from 1945 survey and shows only E half but notes continuation. E end of trail connects with Anderson trail #3.
35	92 J/7,9 92 I/12	"Trail from Pemberton Meadows to Lillooet" "Waggon Road" "Anderson - Lillooet Trail"	Anderson Lk, from Nequatque IR 1 at S end, along W side of lake to Seton (see remarks).	25 T2- Miscellaneous 17 T2- Old Maps	This trail is northern extension of #21. It also continues N from Seton (Seton Portage) to Lillooet. Most of trail is beyond study area. Some early maps (17 T1-n.d., 4 T1-1903, 16 T1-n.d.) do not show this continuation of the trail along W shore of the lake.

**Appendix 6: Maps of Survey transects and potential polygons
assessed during field work in In-SHUCK-ch, Lil'wat and
Squamish Traditional Territories.**

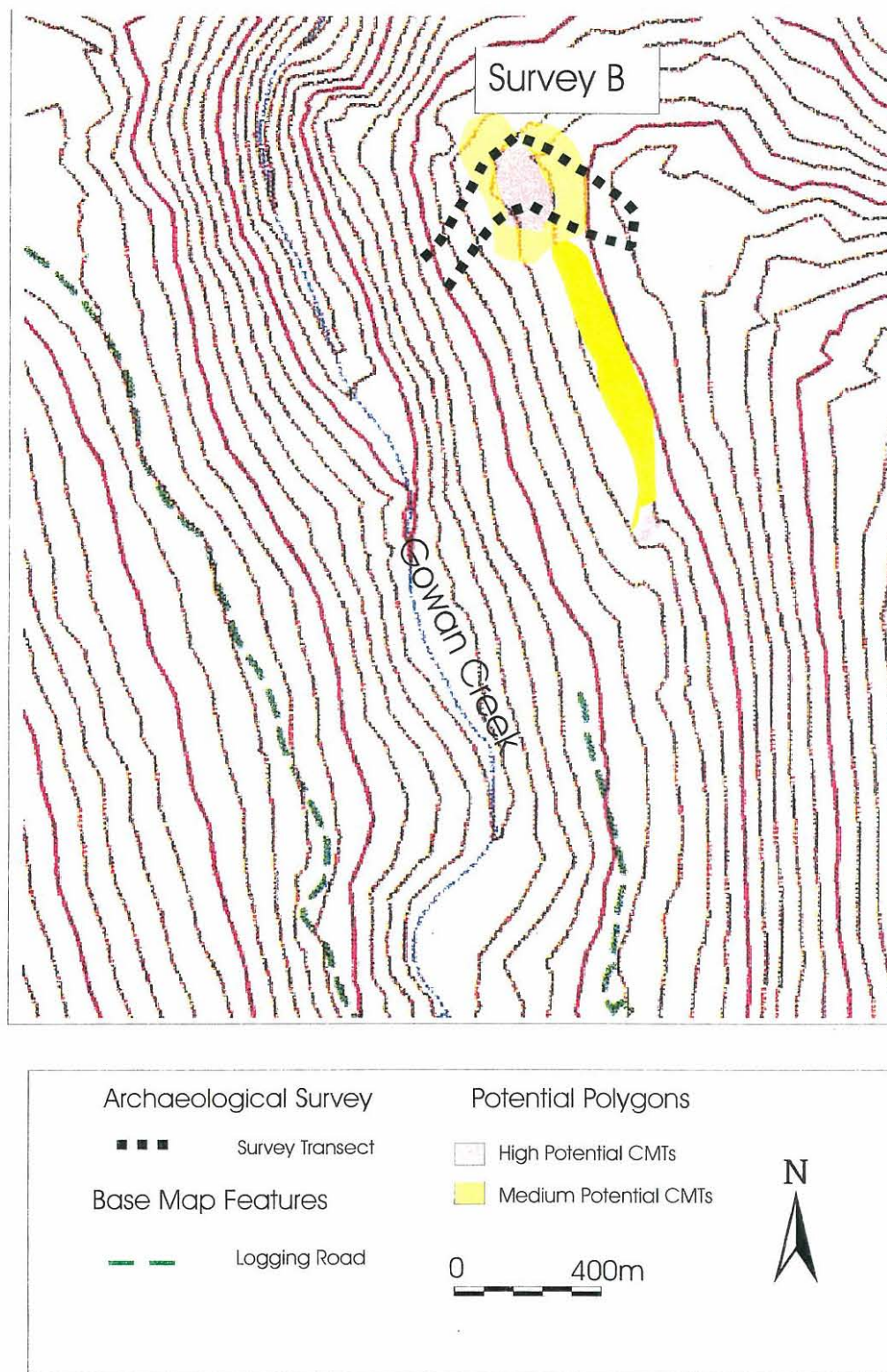


Figure 1. Survey transects and potential polygons for Survey B, Gowan Creek, In-SHUCK-ch Traditional Territory

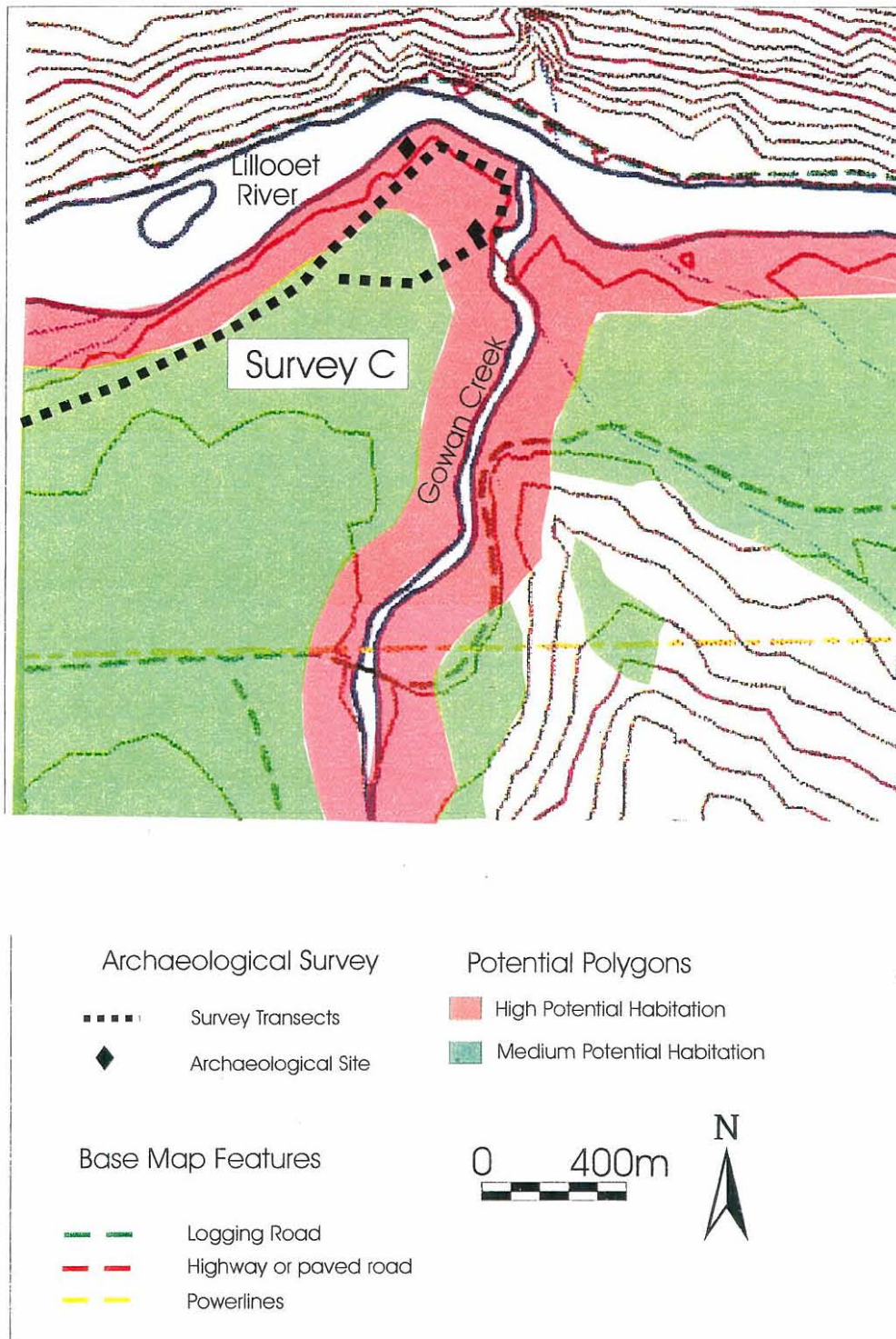


Figure 2. Survey transects and potential polygons for Survey C, confluence of the Lillooet River and Gowan Creek, In-SHUCK-ch Traditional Territory

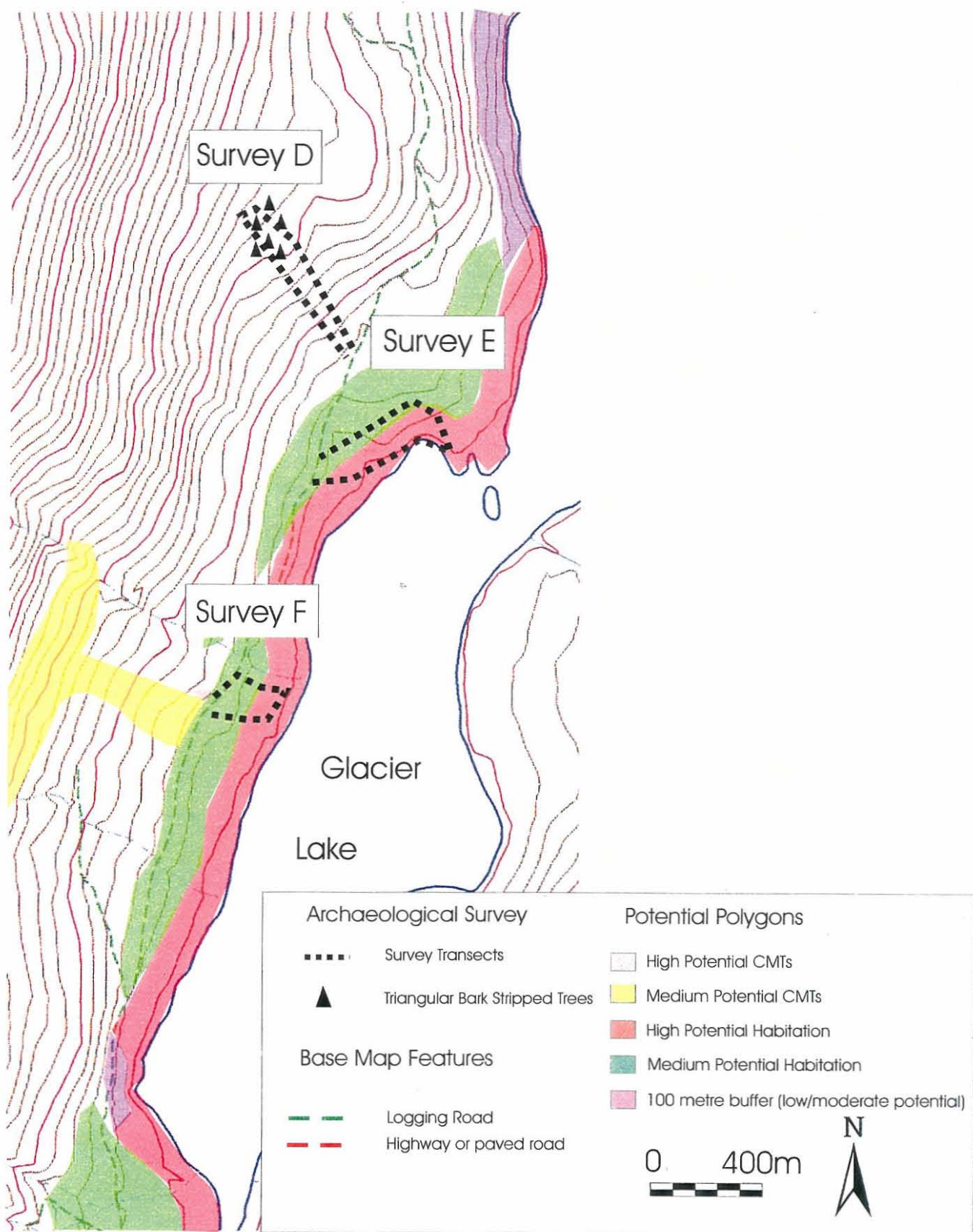


Figure 3. Survey transects and potential polygons for Surveys D, E, F, Glacier Lake, In_SHUCK-ch Traditional Territory

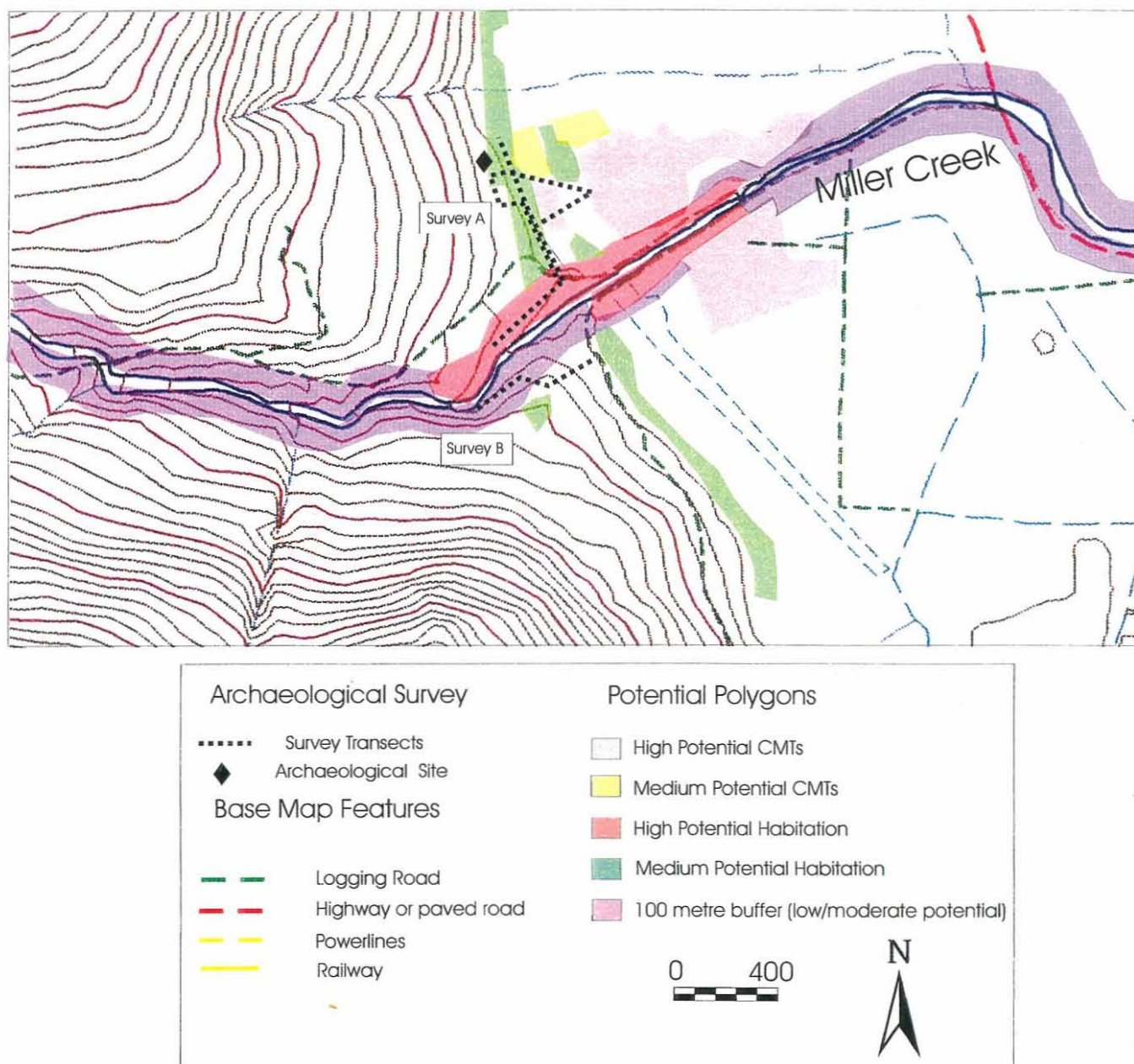


Figure 4. Survey transects and potential polygons for Survey A and B, Miller Creek, Lil'wat Traditional Territory

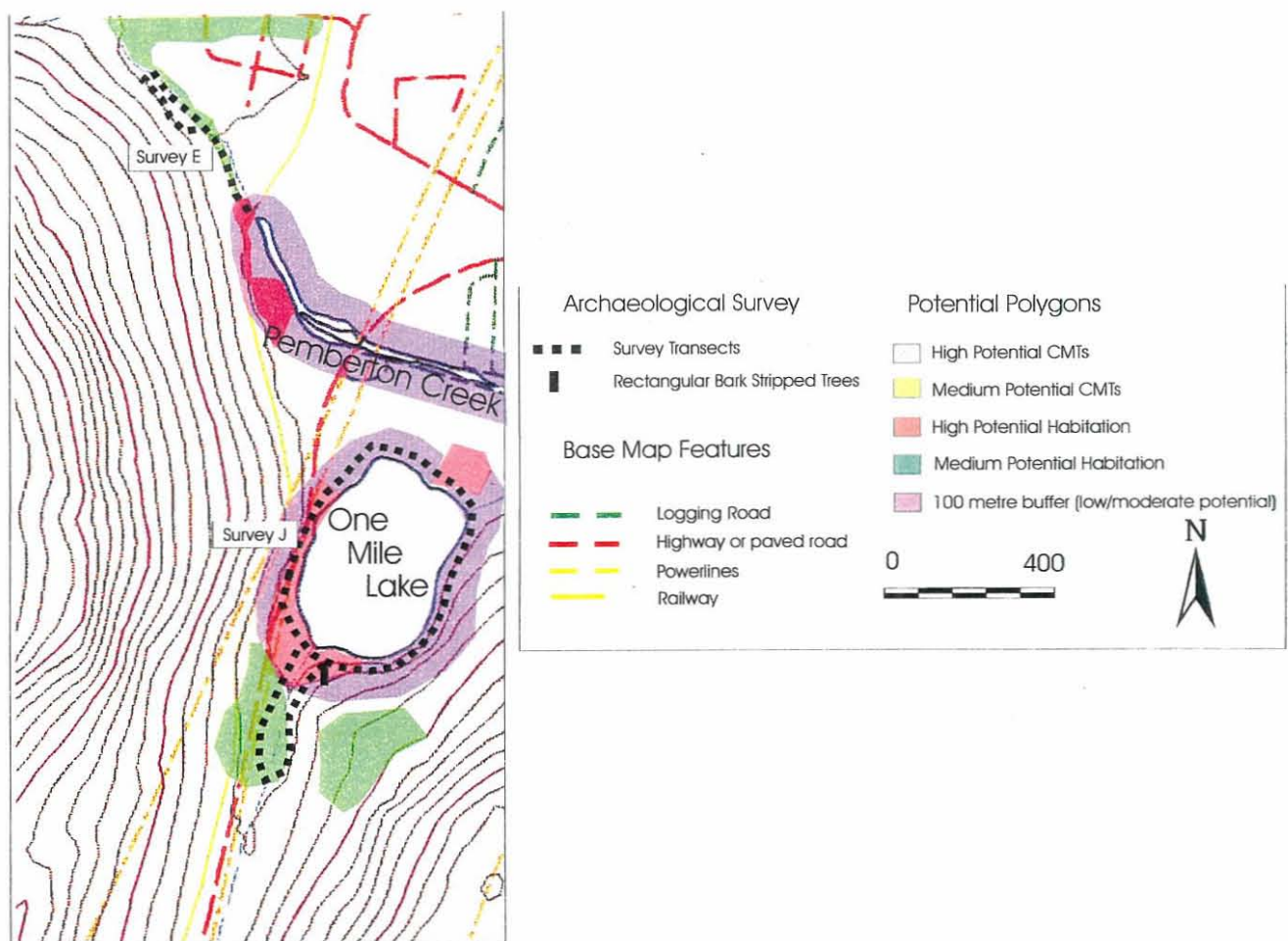


Figure 6. Survey transects and potential polygons for Survey E and J, Pemberton Creek and One Mile Lake, Lil'wat Traditional Territory

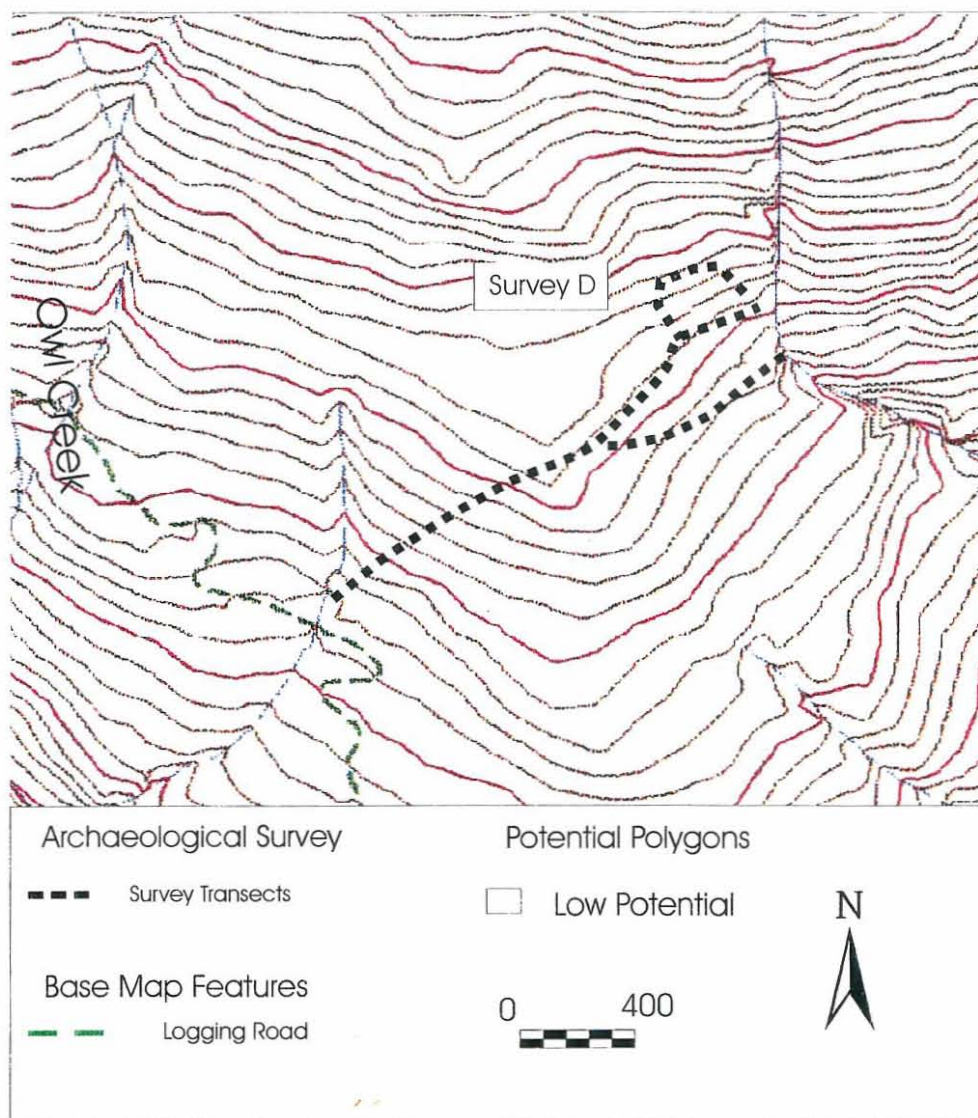


Figure 5. Survey transects and potential polygons for Survey D, Owl Creek, Lil'wat Traditional Territory

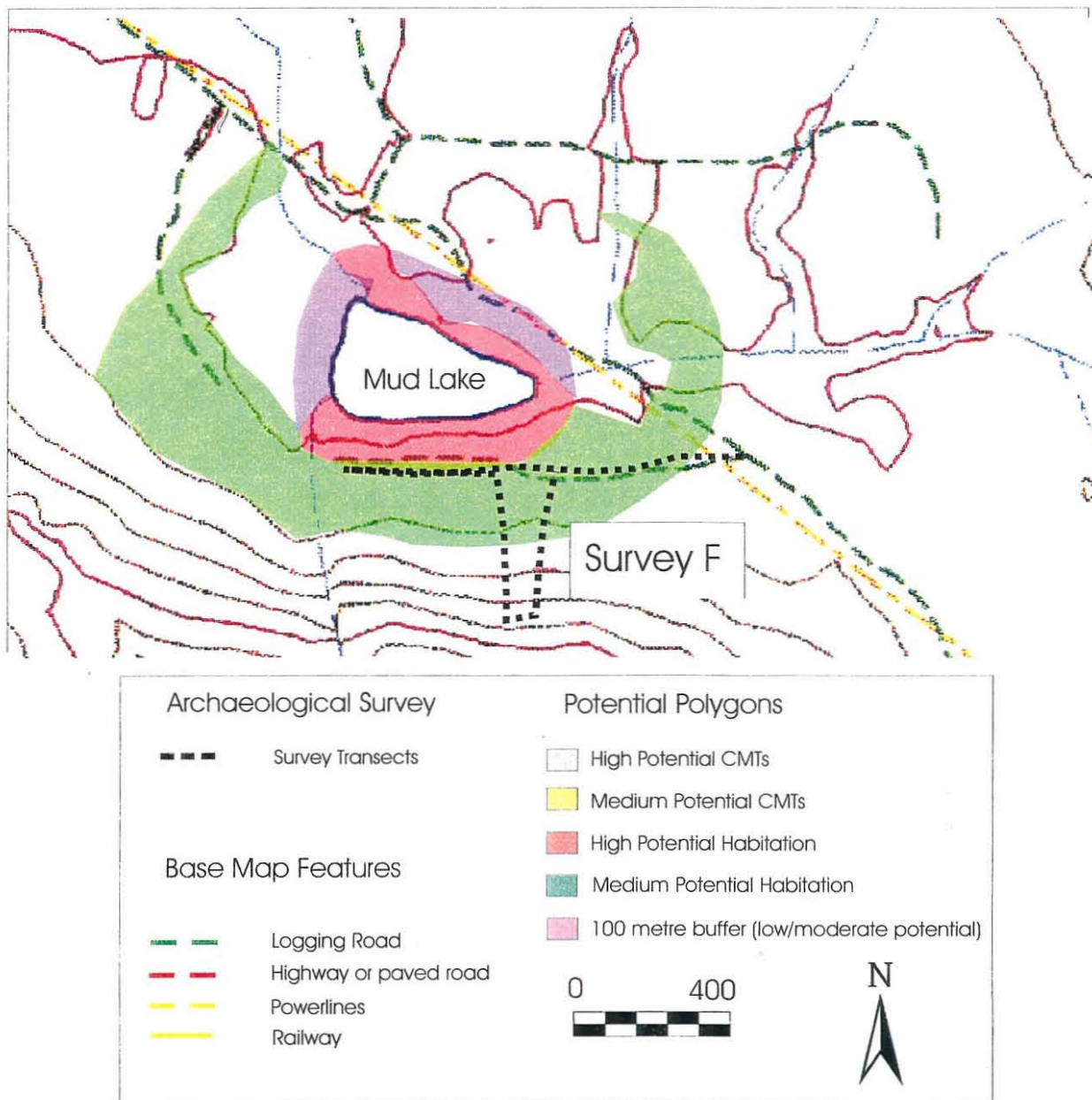


Figure 7. Survey transects and potential polygons for Survey F, Mud Lake, Lil'wat Traditional Territory

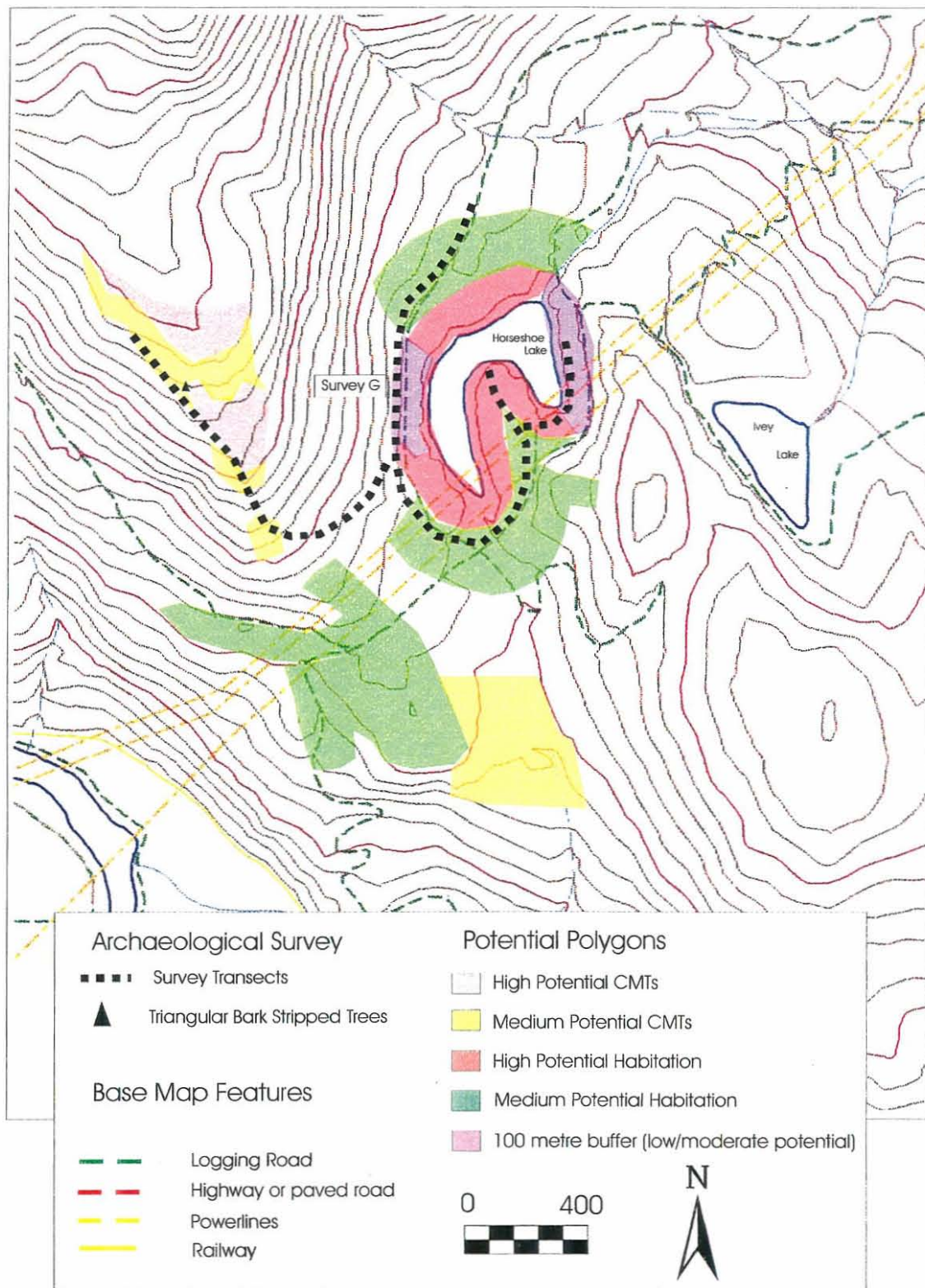


Figure 8. Survey transects and potential polygons for Survey G, Horseshoe Lake, Lil'wat Traditional Territory

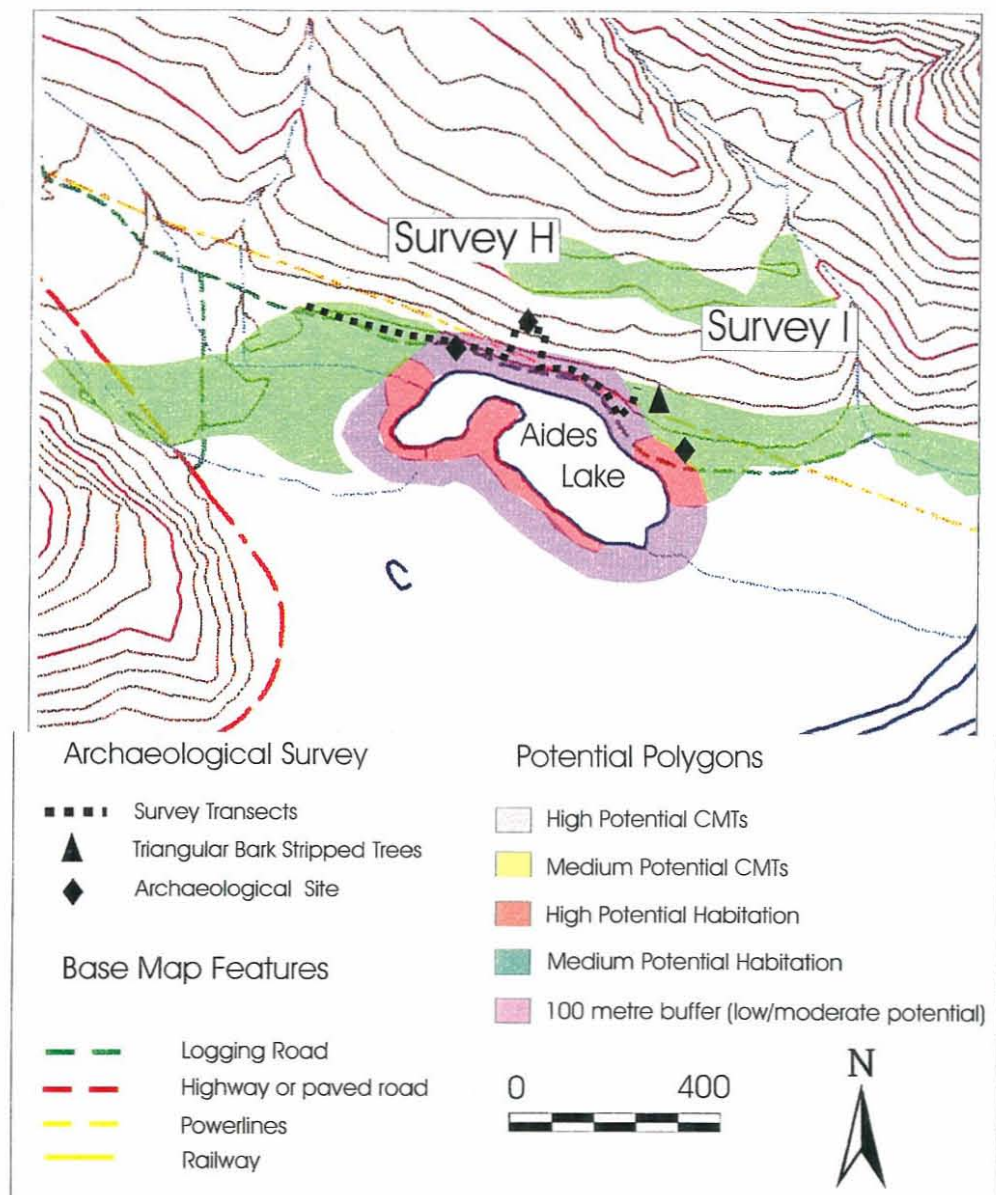


Figure 9. Survey transects and potential polygons for Survey H and I, Aides Lake, Lil'wat Traditional Territory

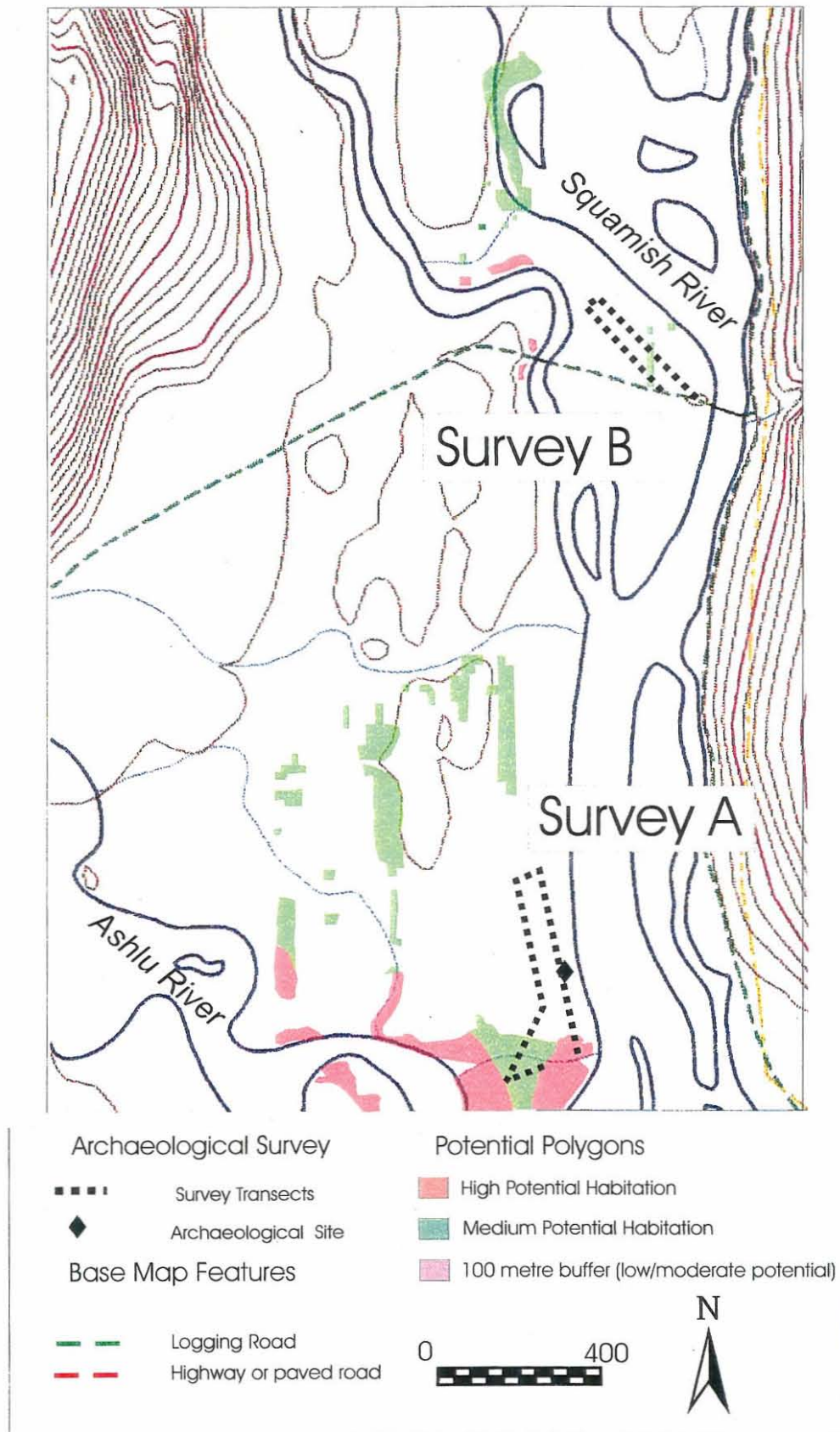


Figure 10. Survey transects and potential polygons for Survey A and B, Squamish and Ashlu Rivers, Squamish Traditional Territory

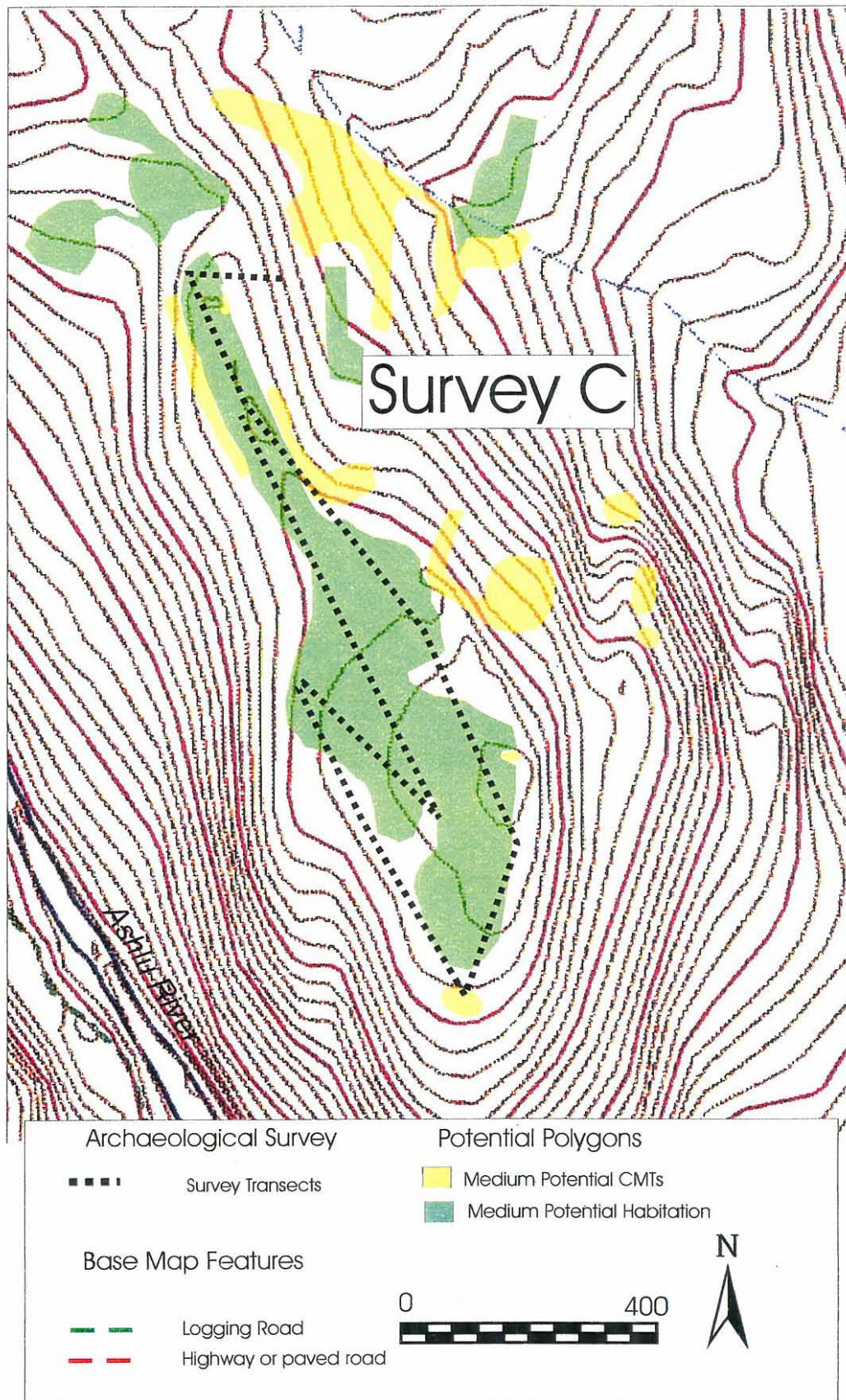


Figure 11. Survey transects and potential polygons for Survey C, Ashlu River, Squamish Traditional Territory

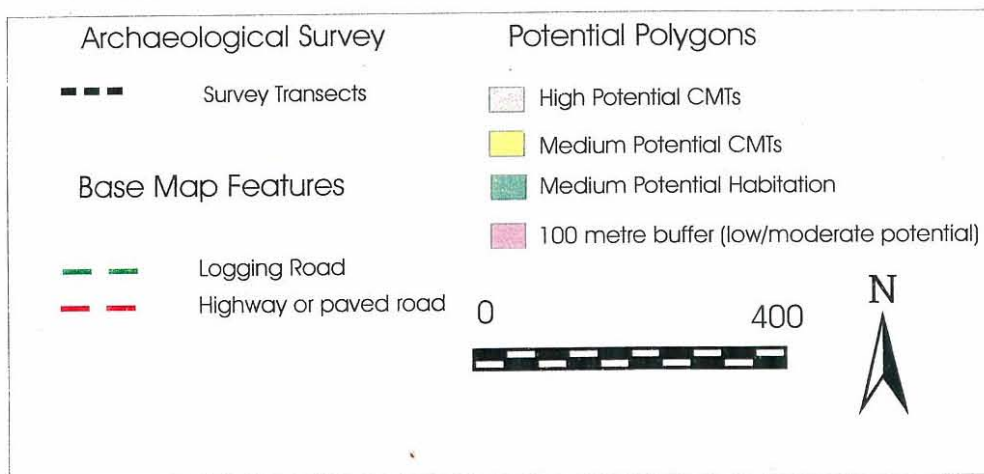
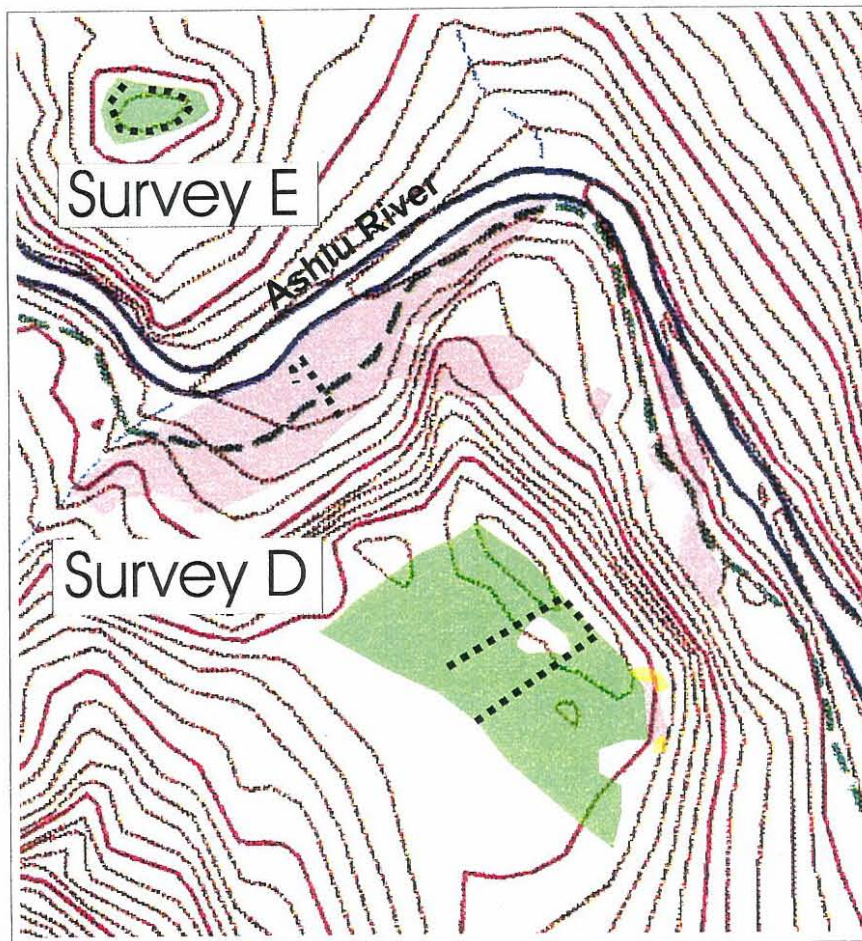


Figure 12. Survey transects and potential polygons for Survey D and E, Ashlu River, Squamish Traditional Territory

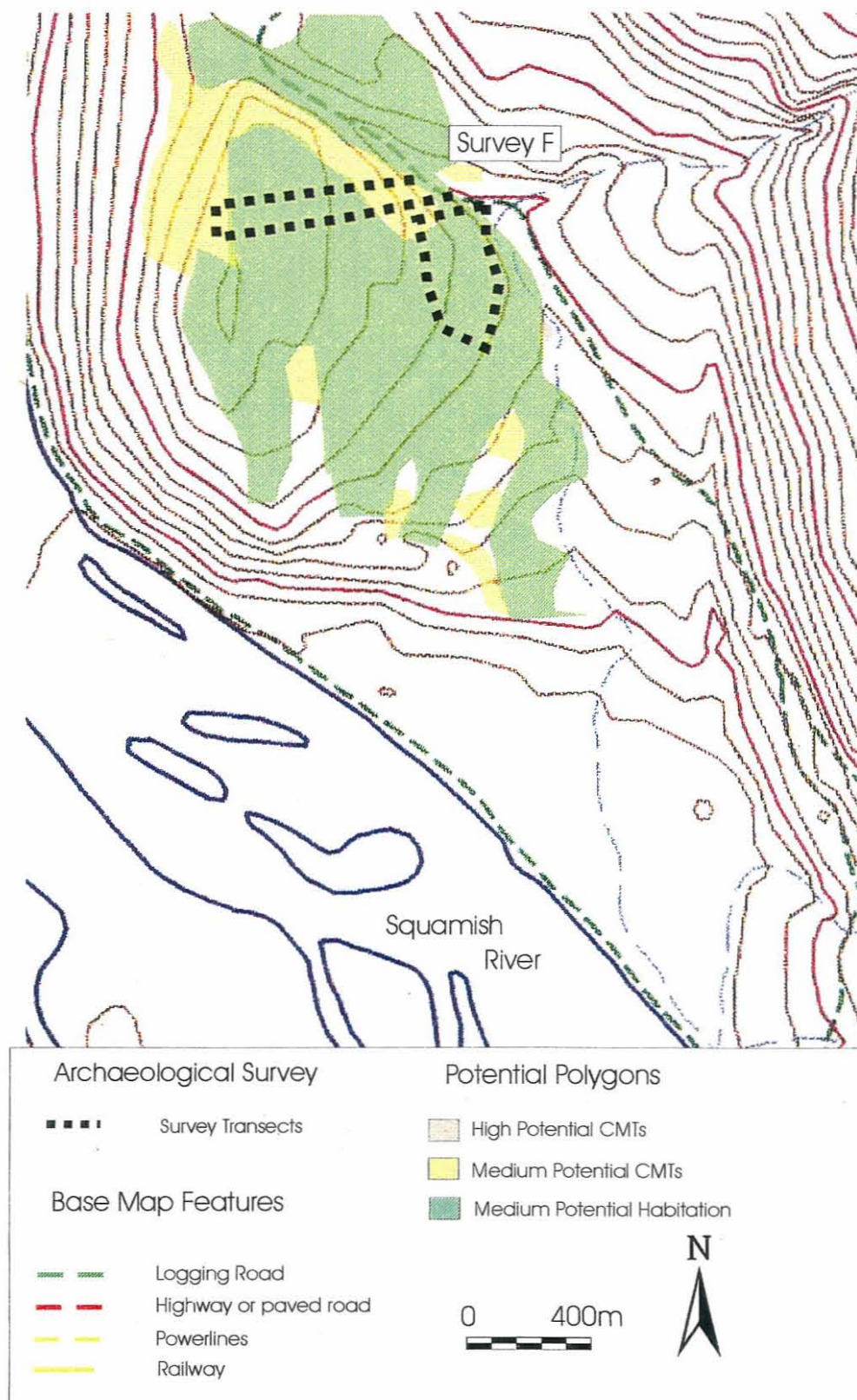


Figure 13. Survey transects and potential polygons for Survey F, Squamish River, Squamish Traditional Territory

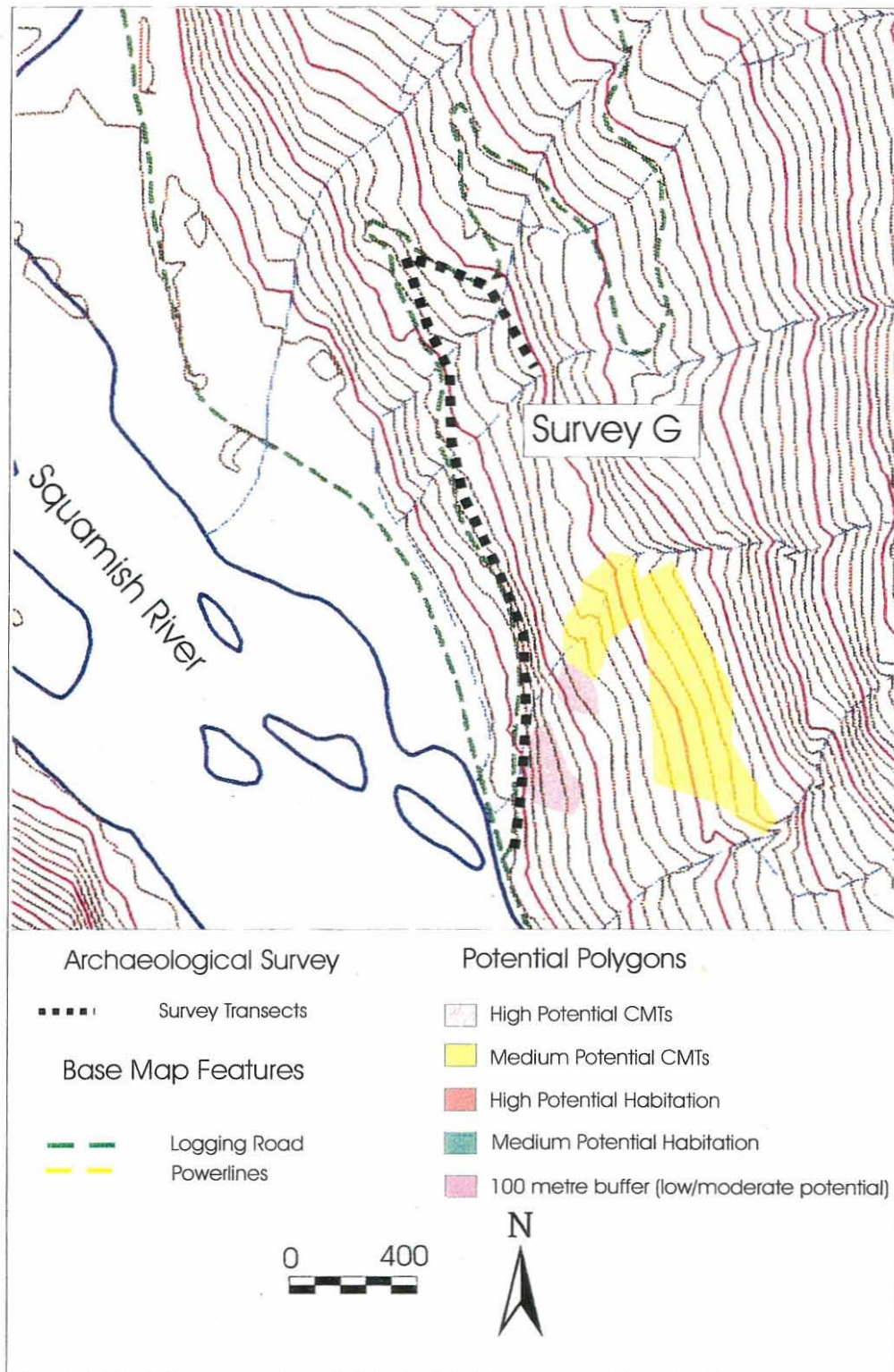


Figure 14. Survey transects and potential polygons for Survey G, Squamish River, Squamish Traditional Territory

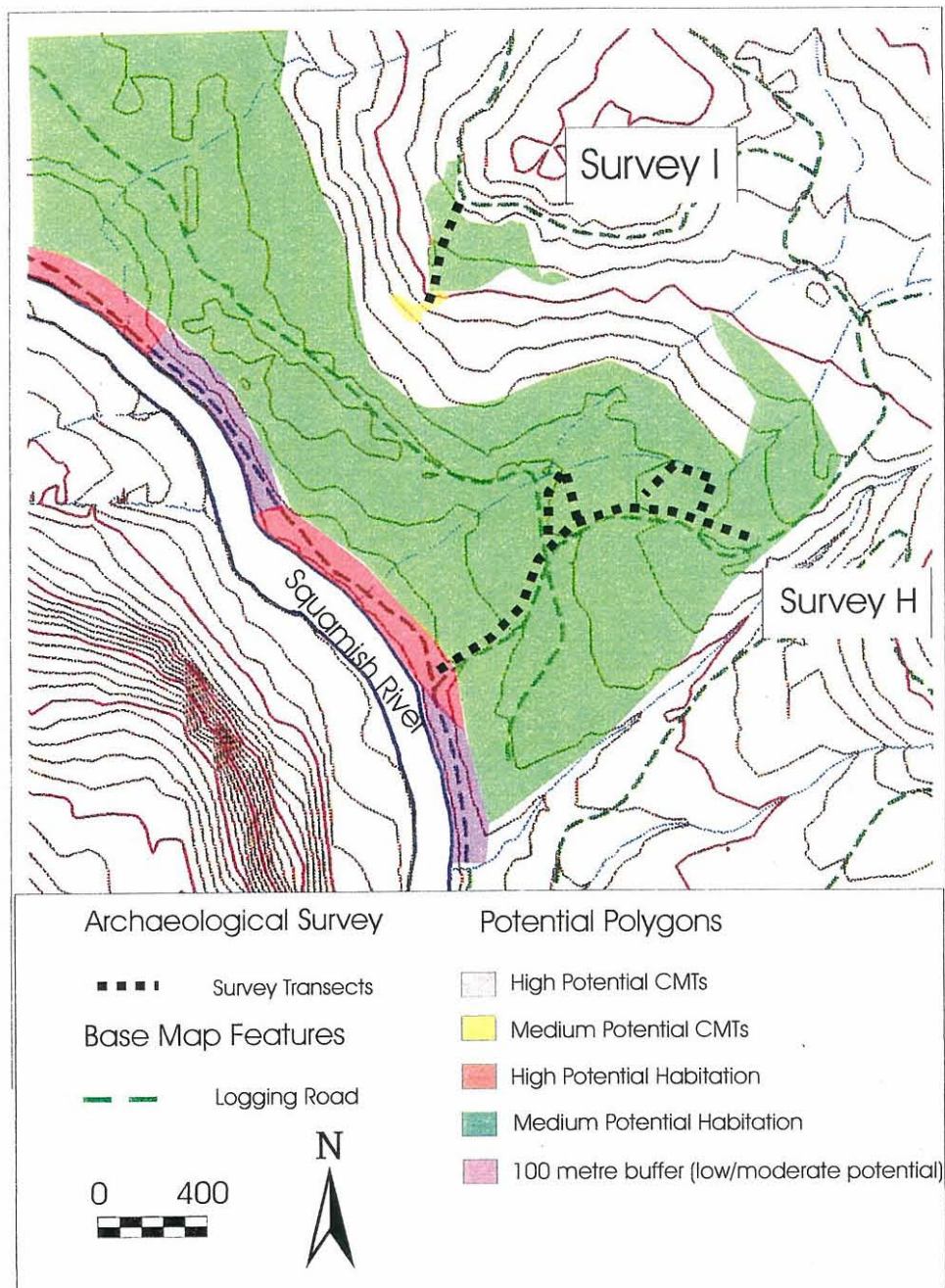


Figure 15. Survey transects and potential polygons for Survey H and I, Squamish River, Squamish Traditional Territory

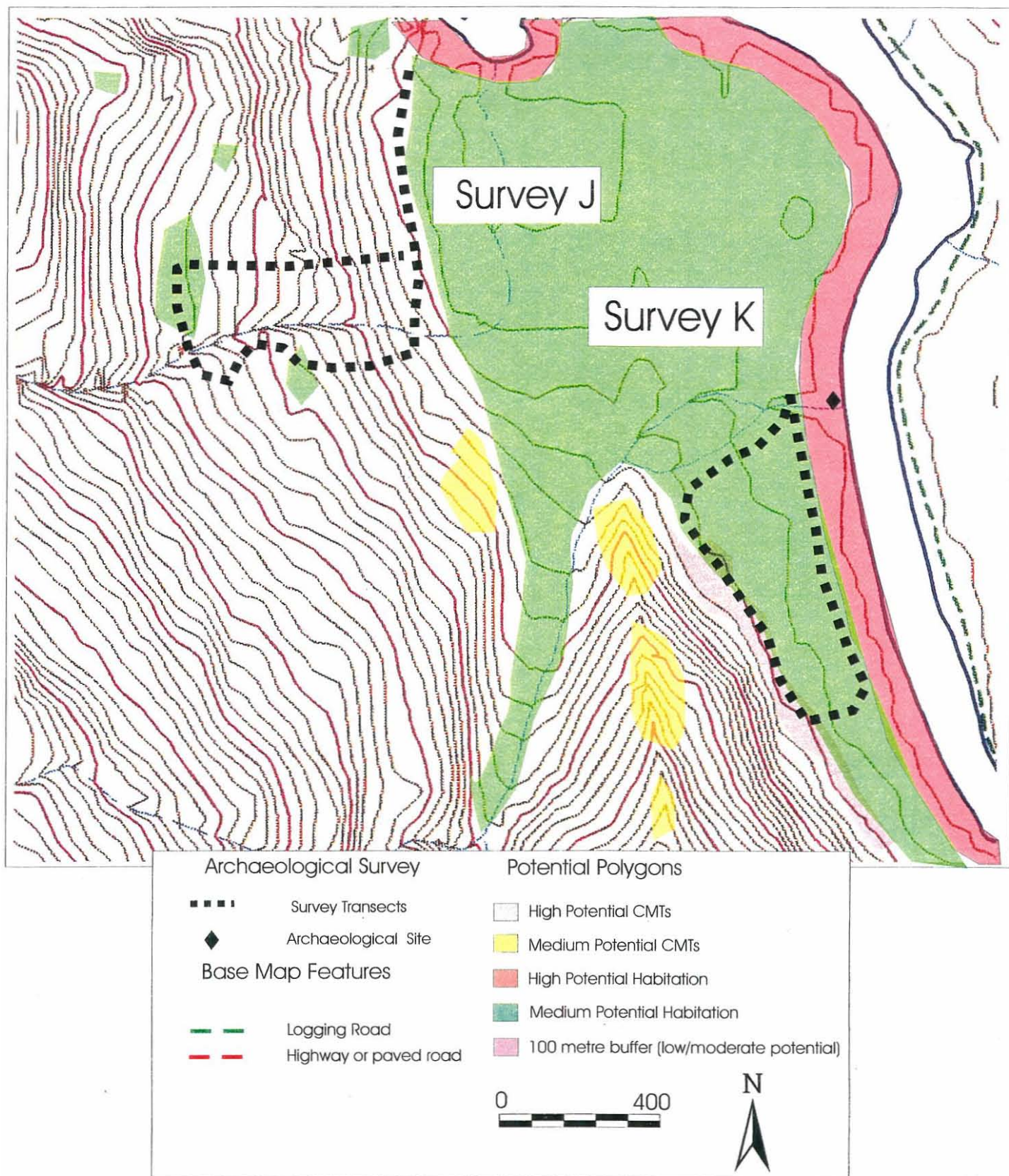


Figure 16. Survey transects and potential polygons for Survey J and K, Squamish and Elaho Rivers, Squamish Traditional Territory

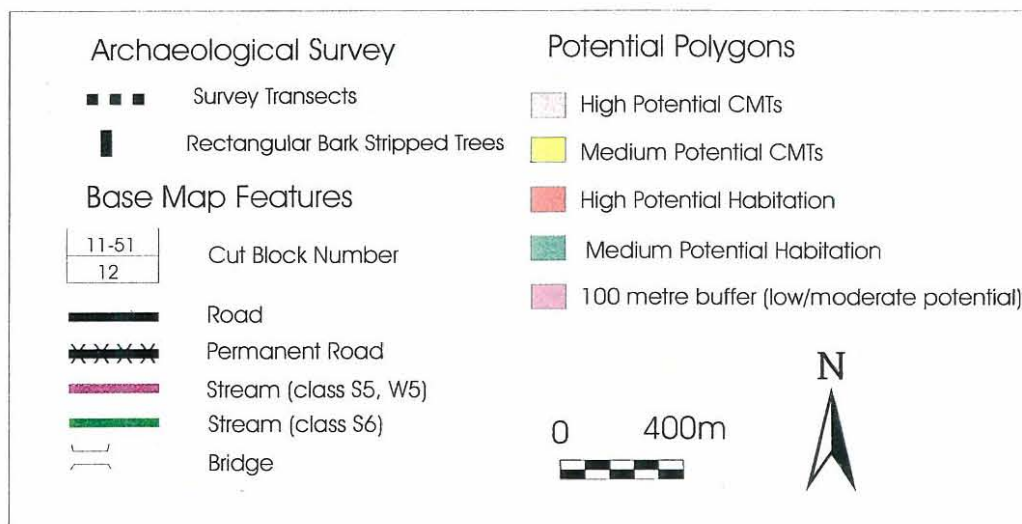
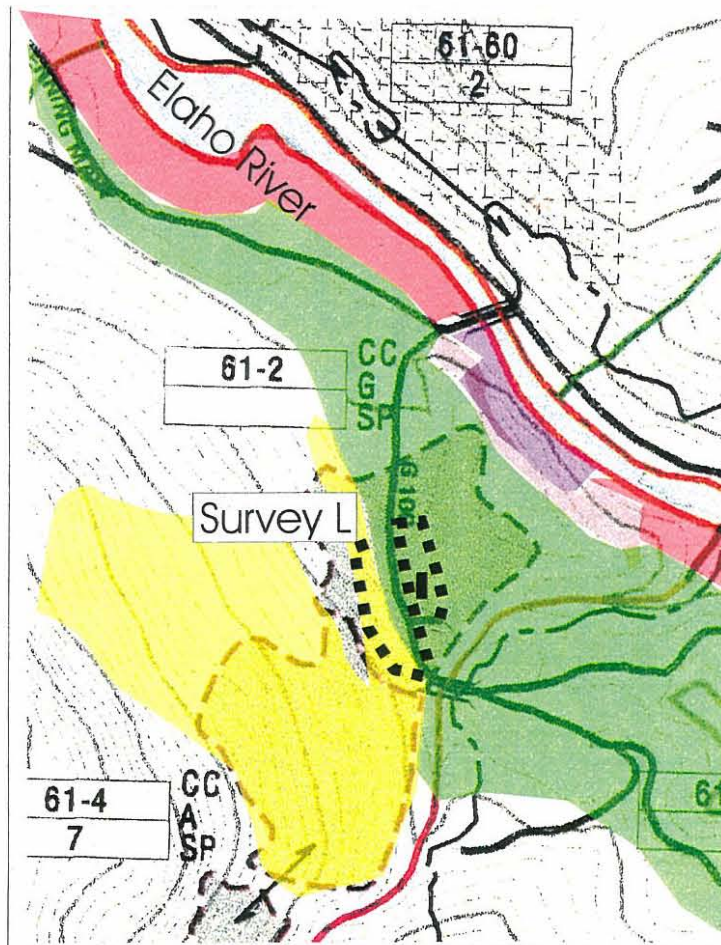


Figure 17. Survey transects and potential polygons for Survey L, Elaho River, Squamish Traditional Territory

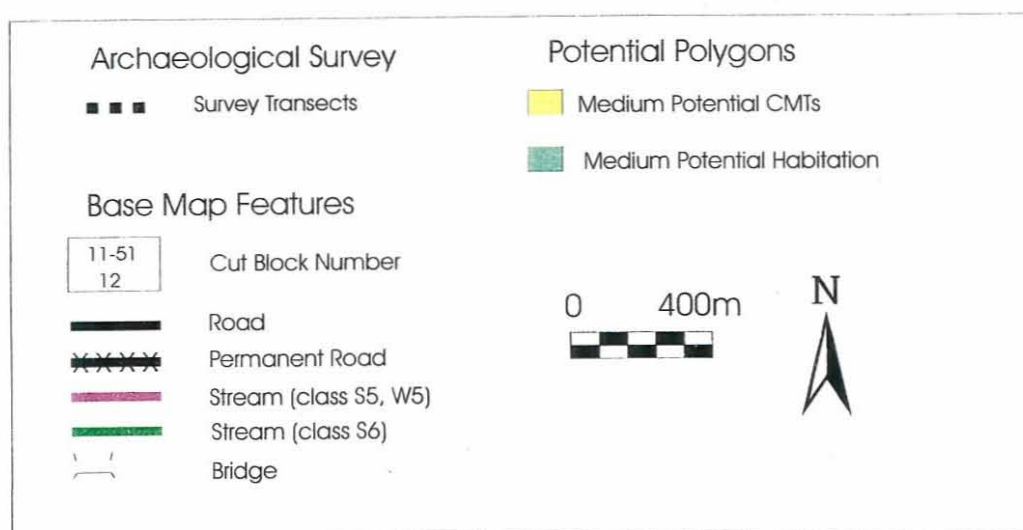
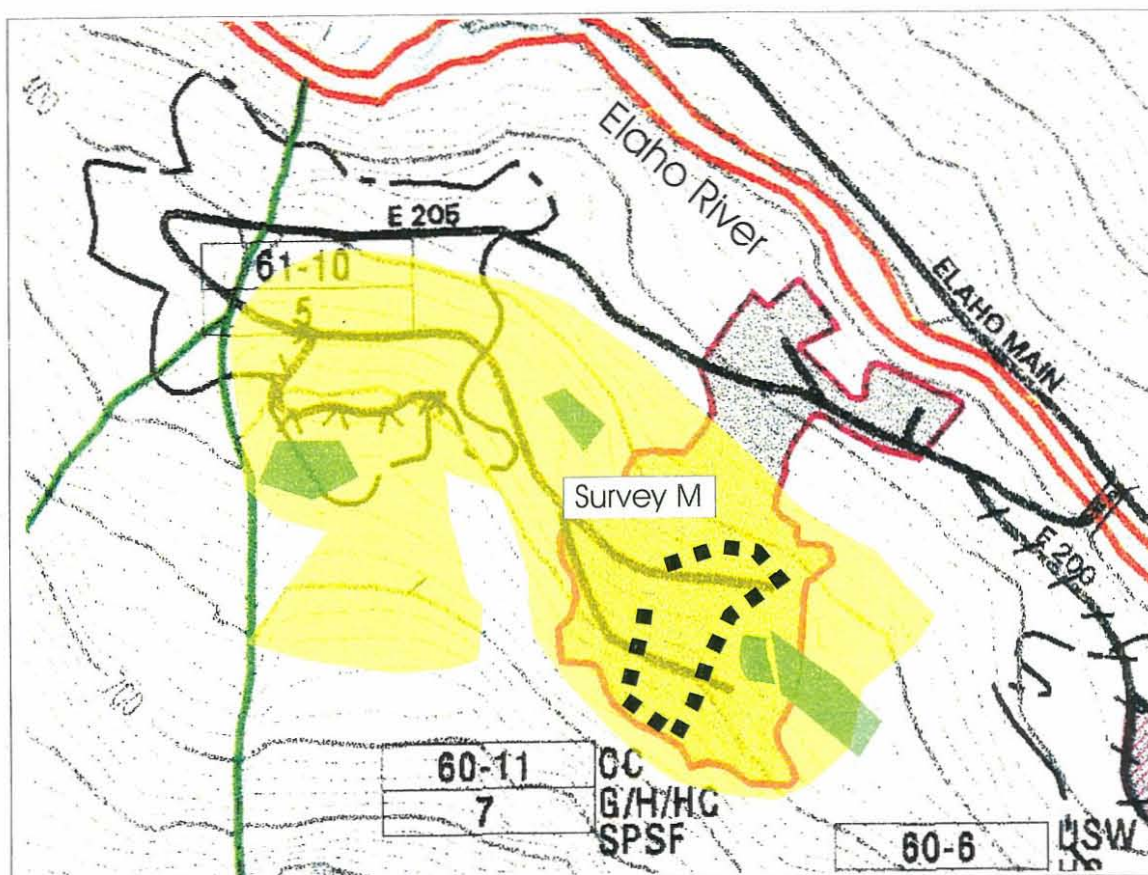


Figure 18. Survey transects and potential polygons for Survey M, Elaho River, Squamish Traditional Territory