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REPORT ON

AN ARCHAEOLOGICAL OVERVIEW OF THE CENTRAL COAST LRMP AREA

Submitted to:

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MANAGEMENT SUMMARY

This report describes the results of an archaeological overview assessment (AOA) of the Central Coast Land and Resource Management Plan (LRMP) area. The study was undertaken on behalf of the Ministry of Forests (Vancouver Forest Region).

The objectives of the study were to summarize and evaluate existing information about cultural heritage resources in the study area and to develop a series of predictive models to help assess the need for archaeological investigation (impact assessments or reconnaissance) prior to land development. The project involved four main phases: (1) background research, including a review of previous archaeological, historical, and ethnographic reports and publications; (2) development of models to predict where archaeological sites are most likely to be found; (3) implementation of the models to assess the archaeological site potential of the Central Coast; and (4) recommendations for appropriate cultural resource management strategies for the LRMP area.

The project is GIS-based, providing a mapped representation of areas of potential archaeological concern that can be viewed or plotted at various scales. Information derived from the study will help the Ministry of Forests and other govermnent agencies, including First Nations, to integrate archaeological resource management with other land use planning decisions so that heritage sites may be preserved or managed according to the *British Columbia Heritage Conservation Act*, the *Forest Practices Code Act*, and other relevant legislation and protocol agreements.

Predictive models were developed according to archaeological site type. Models were created for coastal and inland habitation sites, culturally modified trees (CMTs), subalpine camps, trails, pictographs, and petroglyphs. Modelling involved dividing the entire study area into 25 metre grids and predicting the archaeological site potential of each grid cell, based on a series of rules. Model results were tested by evaluating the degree to which they correctly predicted the locations of recorded archaeological sites. No field testing has been undertaken to date. Based on the analysis of recorded site capture. the most successful first-generation models were the inland habitation and petroglyph models, for which 88% and 73% of recorded sites (buffered by 100 metres) were fell within areas predicted to have high or moderate archaeological site potential. First-generation model results for coastal habitations, culturally modified trees, trails and

pictographs did not perform well. It was determined that the available data were inadequate for successfully modelling pictographs or trails. The pictograph model was abandoned, and the trails model results should be considered very preliminary. No management decisions should be made solely on the basis of these two models. No subalpine sites have been recorded in the study area to date, so the subalpine camp model could not be evaluated.

The coastal habitation and CMT models were revised, incorporating additional and improved baseline data, and the models were re-run. The second-generation model results showed marked improvement, with 96% of recorded coastal habitation sites and 99.5% of recorded CMT sites falling within areas predicted to have high or moderate site potential. Sixty-four percent of recorded CMT sites were correctly predicted by the CMT model, while the remaining 35.5% were encompassed by the coastal habitation model results.

The models classified all lands according to a tripartite scheme, in which Class I lands are predicted to have the greatest archaeological potential and Class III lands the lowest. Site potential can also be viewed as relative predicted site density, in which the highest density and greatest variation of sites equates with highest site potential. Given the severe terrain of much of the Central Coast, it was expected that moderate to high site potential ratings would cover a relatively small portion of the study area land mass. The models predict that 3.1% of the study area (147,440 hectares) falls within the Class I category (highest site potential), while 16.7% (808,068 hectares) fall within Class II lands. This suggests that the vast majority of archaeological sites in the Central Coast LRMP area will occur in less than 20% of the land mass. A significant portion of this area is designated Class II for CMTs only or for subalpine campsites. Additional field data may reduce the area encompassed by these models.

The model results can be used as a risk index to guide future cultural resource management efforts. It is recommended that archaeological impact assessments be undertaken in all Class I lands (highest risk areas) prior to any land-altering developments, except where only CMT potential is predicted. In those areas, a preliminary field reconnaissance (PFR) is recommended. For Class II lands, including those predicted to have only CMT potential, a PFR is recommended. A PFR may be adequate to assess Class II areas, or field observations may indicate that a more detailed impact assessment is warranted. No archaeological fieldwork is recommended for Class III lands, although it is cautioned that occasional sites may be present in those areas. Consistent with Section 51 of the Forest *Practices Code*, if an archaeological site is encountered during development, it is recommended that all land-altering activity in the immediate vicinity of the site until the Archaeology Branch and local First Nations are contacted to develop a site management plan. The report also presents a number of more general recommendations relating to the AOA and future refinements to the models.

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TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

1.0 INTRODUCTION

Public and private land developments are threatening heritage sites at an unprecedented rate. In addition to direct land alterations, resource extraction industries and other developers create infrastructure that affords greater public access to remote and often sensitive areas, while public and private recreation facilities bring ever-increasing numbers of people into areas where they are likely to come into contact with heritage resources. It is important that a mechanism be developed to identify areas where potential conflict could occur and to work toward the protection and management of cultural heritage sites.

Archaeological and other types of heritage sites are important for a number of reasons. The majority of archaeological sites in British Columbia are of First Nations origin, and many aboriginal people maintain strong spiritual, cultural and social connections with these places. In addition, archaeological sites are becoming increasingly important as legal evidence, as illustrated by the recent Supreme Court of Canada ruling on the Delgamuukw case. For the genera1 public, archaeological sites represent a unique educational resource. Through interpretive programming, archaeological sites could provide people of all ages and educational backgrounds with a more thorough understanding of First Nations cultures and the contributions First Nations people have made to our collective histories.

Cultural heritage sites in British Columbia are currently protected under several legislative and policy measures, most notably the Heritage Conservation Act. It should be stated that the *Heritage Conservation* Act protects most archaeological sites, but it does not afford automatic protection to a number of equally significant spiritual, traditional use and relatively recent heritage locales. Other legislation, including the *Forest Practices Code* Act, have provisions for the management of cultural heritage sites as integral to the environment. Numerous local and international governmental policies and protocol agreements, such as the Ministry of Forests/Ministry of Small Business, Tourism and Culture Protocol Agreement on the Management of Cultural Heritage Resources also afford a measure of protection to heritage sites.

The following section describes the Archaeological Overview Assessment (AOA) process and, more specifically, the steps involved in the overview of the Central Coast

AOA area (Figure 1). Included are descriptions of relevant legislation and court decisions, terminology, First Nations participation and study objectives and limitations.

1.1 The Land Resource Management Plan (LRMP) Process

The LRMP process is a sub-regional, multi-agency integrated land use planning initiative that is part of the Provincial Land Use Strategy. A primary objective of an LRMP is to ensure the sustainability of both the environment and the economy through integrated resource management strategies. An LRMP considers all resource values and requires public participation, interagency co-ordination and consensus on land and resource management decisions. Land and Resource Management Plans provide direction for more detailed resource planning by government agencies and the private sector, and provide a context for local government planning.

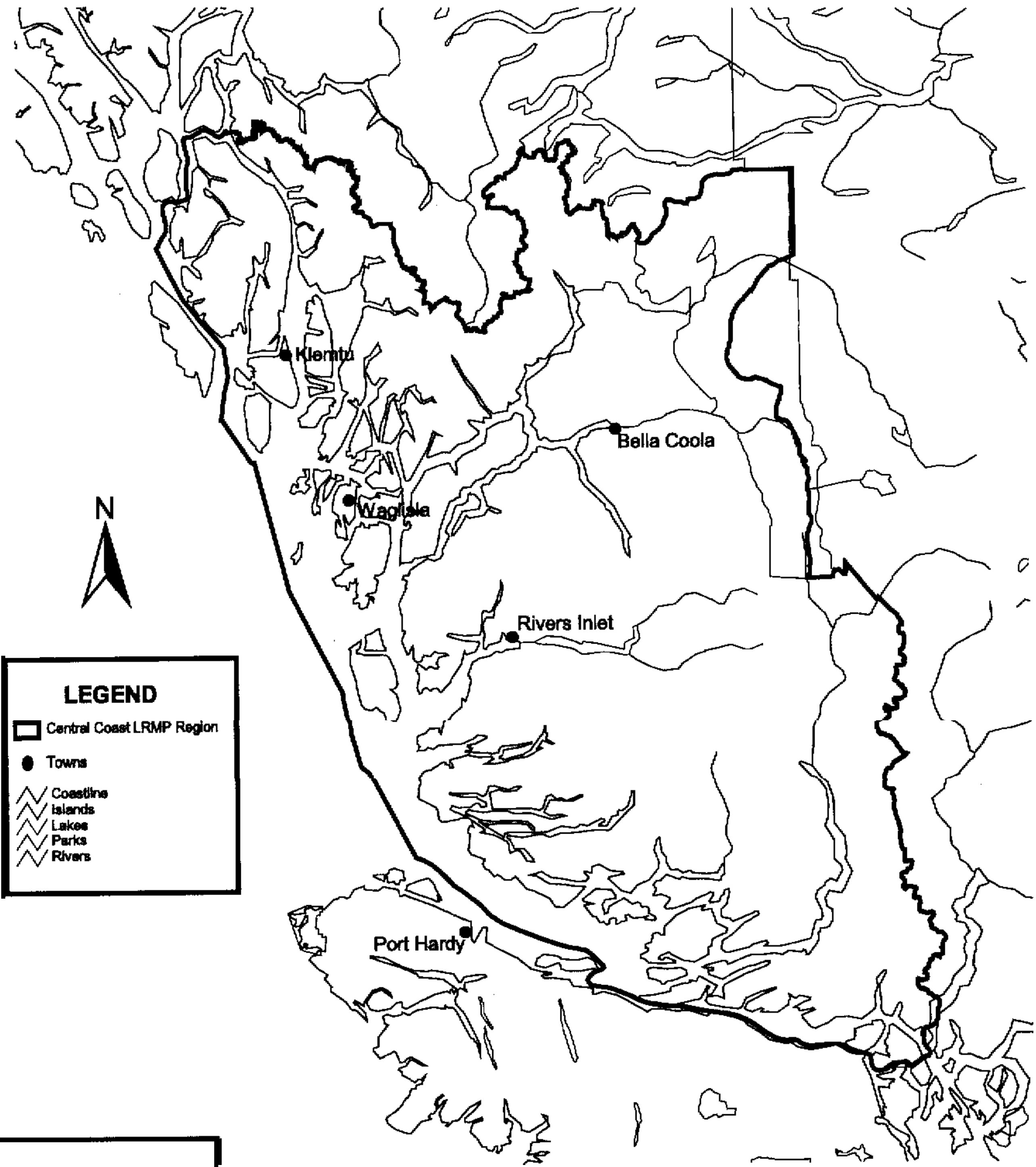
Some of the roles of Land and Resource Management Plans are to:

- refine the broad land allocation zones defined in regional plans and guide lower level land use plans;
- provide specific management guidelines to implement strategies developed in the regional plan;
- develop protected areas recommendations where there is no regional planning process; and
- use existing management guidelines to define the primary requirements for resource management.

LRMPs will be recognized in the Forest Practices Code as higher level plans that define the objectives that must be met in applying the operational rules of the Code.

1.2 The Archaeological Overview Assessment (AOA) Process

Archaeological overview assessments (AOAs) are planning tools designed to assist resource management personnel in making land-use decisions that take into account archaeological concerns. Through the use of site sensitivity maps, an AOA defines areas that have relatively high, moderate or low predicted archaeological potential, or cultural resource sensitivity. The cultural resource sensitivity ratings are based upon predictive



Projection: Albers
Units: meters
Datum: NAD 83
Map Data Source:
MELP - lpln_bc ARC/INFO coverage

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CENTRAL COAST LRMP STUDY AREA

SCALE
1:2,250,000

FIGURE: 1

models which, in turn, are derived from known information about past use of the landscape and the characteristics of documented archaeological sites. The predictive

models are not designed to pinpoint specific archaeological site locations but rather, to delineate areas where archaeological sites are most likely to be present and preserved. Fieldwork in the form of impact assessments, reconnaissance surveys or inventories must be conducted in order to locate, record and evaluate actual sites.

The AOA is intended to be a resource management tool and its use should not preclude other resource management measures, including direct consultation with First Nations. Land-use managers can overlay development plans and assess which proposed development areas are most likely to come into conflict with archaeological sites. The AOA report and accompanying potential maps can be used to assess where archaeological field work (i.e., an archaeological impact assessment [AIA] or preliminary field reconnaissance [PFR]) is required to obtain more detailed information.

The AOA process can be broken down into several phases, each building on the one before.

1.2.1 Phase One: Data Collection and Review

The initial stage of an AOA involves gathering and synthesizing relevant archaeological, environmental and anthropological information about the study area. Because most archaeological sites in the province are of First Nations origin, knowledge about the use of the environment by the aboriginal people is particularly important. Consequently, it is most often during the information gathering phase that consultation is initiated with First Nations whose traditional territories encompass portions of the study area. In addition, other sources of data regarding the First Nations past and present uses of an area are consulted, where possible. These sources include, but are not limited to, ethnographies, journals, published volumes, reports, articles, monographs, maps, diaries and archival documents. First Nations elders and community members are often the best sources of knowledge about specific places and the traditional uses of an area. Although some of these uses may not be specific to a particular site, many can leave behind physical remnants that are relevant to archaeological research.

In addition to cultural information, data regarding the environment of the study area must also be reviewed. Several sources of terrain, stream, climate and vegetation information were gathered for the present study and are discussed in detail in this report.

The information gathering stage also involves the acquisition and compilation of known archaeological site data for the study area. Recorded archaeological sites are valuable sources of information because they relate certain activities to particular places on the landscape. For example, although exceptions are known, most recorded village sites recorded on the Central Coast occur in areas of gentle terrain, near potable water and within a short distance of the ocean. This type of information is essential to the predictive model building phase of an AOA.

1.2.2 Phase Two: Data Preparation and Archaeological Predictive Model Development

Phase two involves the consolidation of information gathered in phase one and the development of a series of predictive models. The objective of the modelling component is to draw on existing archaeological site data and the collective expertise of the study team and First Nations participants to develop a set of criteria, or rules, to describe places where archaeological sites are most likely to occur. Since different site types represent different cultural activities, it stands to reason that their spatial distributions will vary. For example, short-term campsites associated with mountain goat hunting will tend to occur at high elevations, near goat habitat. Shellfish processing sites, on the other hand, would be expected along the coastline, near shellfish beds. These simplistic examples illustrate that it is important to develop modelling rules based on different site types, rather than producing a single general model that is meant to account for all sites.

For the Central Coast AOA, predictive models have been developed for coastal and inland habitations, culturally modified trees (CMTs), subalpine camps, trails, pictographs and petroglyphs. A detailed description of each site type and associated model is included in the modelling section of this report.

The archaeological team works closely with GIS experts to create digital coverages (computer generated maps) of the study area that contain information relevant to model development. For example, if a site type model uses distance to salt water, slope and distance to fresh water as defining variables, then the digital coverage must contain correlating terrain and biophysical data. Details of data sources used for the Central Coast AOA are contained in this report.

1.2.3 Phase Three: Site Potential Mapping and Reporting

The third phase of the AOA involves presentation of the study results in a way that is accessible and useful to land-use mangers. One presentation tool is the archaeological sensitivity, or predicted site potential map. An archaeological potential map graphically illustrates those areas considered to have relatively high, moderate or low potential for certain archaeological site types to be both present and preserved.

For the Central Coast AOA, areas that meet all the criteria of a certain site type model were given a Class I designation and are considered to have the highest potential for the presence of that specific archaeological site type. Areas assigned a Class II designation are those that could support the same site type, but do not contain the optimal criteria for doing so. Consequently, these areas are considered to have moderate site potential. Class III lands are considered to have relatively low archaeological site potential due to constraints on human occupation/use, or archaeological site preservation. A more detailed description of these designations is provided in later sections of this report.

Archaeological potential maps generated for the Central Coast AOA should be used with forestry and other development plans to identify potential conflicts with predicted archaeologically sensitive areas. The potential maps were produced at a scale of 1:20,000 and submitted in digital format to the Vancouver Forest Region. The maps are currently stitched into a contiguous coverage for the LRMP Region but can be clipped to correspond with the TRIM grid or other administrative boundaries. Access to the results of this study are subject to confidentiality agreements between the Ministry of Forests, the Archaeology Branch and the First Nations of the Central Coast.

1.3 Relevant Legislation and Policy

In recent years, amendments to existing heritage legislation and a number of landmark court decisions have significantly altered the way in which cultural heritage sites are managed in British Columbia. The following section summarizes some of the current legislation and government policy most applicable to land-use managers dealing with heritage concerns.

1.3.1 Legislation

Heritage Conservation Act [R.S.B.C. 1996. c.187]

All archaeological sites on Provincial Crown or private land that predate A.D. 1846 are automatically protected under 1996 amendments to the Heritage Conservation Act (HCA). Certain sites, including burials, rock art sites and shipwrecks are protected regardless of age. Any person or corporation knowingly or unknowingly disturbing an archaeological site can be charged under the Act. For individuals in contravention of the HCA, a maximum fine of $50,000.00 and/or a two year jail sentence may be imposed. Corporations charged under the HCA can be fined up to $l,OOO,OOO.OO and the person, employee or director responsible for the offence can be held personally liable (HCA 31.[3] and [4]).

Sub-surface investigation of an archaeological site or investigation with the intent to locate a site, requires a permit under Section 14 of the HCA. The Archaeology Branch (Ministry of Small Business Tourism and Culture) is the provincial government ministry responsible for administering the HCA, issuing permits, maintaining a database of recorded archaeological sites and handling referrals from various development agencies. Site protection under the HCA does not necessarily negate impact. In many cases, development can proceed once a thorough impact assessment or other mitigative actions have occurred. With the exception of impacts occurring under a Section 14 permit, any alteration to a known archaeological site must be permitted under Section 12 of the HCA. A Section 12 permit is held by the individual responsible for the site alteration, and it normally includes data recovery or mitigative requirements such as development monitoring or (in the case of CMTs) sampling.

All applications for S. 12 or S. 14 HCA permits are forwarded by the Archaeology Branch to appropriate First Nations for review. A 30-day review period is provided for comments regarding the proposed methodology. If no comments are received and the application is otherwise complete and acceptable, the permit will be issued. If comments are supplied, additional time is for response by the applicant and further First Nations review. In some cases, the permitting process can take up to six weeks.

The British Columbia Forest Practices Code Act (FPCA) and the Forest Practices Code (FPC)

The FPCA recognizes cultural heritage as integral to Provincial lands (Section 51). The Forest Practices Code "recognizes cultural heritage resources" and assists the government in protecting these resources by requiring the Crown, or license holder (e.g. forest companies), to include "known information about these resources in their forest development plans" (Moon et al. 1997). More specifically, under the Forest Practices Code the holder of an agreement under the Forest Act is required, in preparation of operational plans, to assess cultural heritage resources.

In some cases, heritage issues may also be addressed under the Environmental Assessment Act or the Forest Land Reserve Act.

1.3.2 Policy

Throughout the past several years, a number of policy agreements have been established that affect the management of cultural heritage sites in a forestry context. Two of the most relevant policies are summarized below.

The Ministry of Small Business, Tourism and Culture (MSBTC) and Ministry of Forests (MoF) Protocol Agreement on the Management of Cultural Heritage Resources.

In 1994 the MSBTC and the MoF signed a protocol agreement regarding the management of cultural heritage resources. The agreement, amended in 1996, defines the roles and responsibilities of each government ministry "in assuring the integration of cultural heritage resources in MoF's land and resource management planning and operations"(Section l(1)).

1.4 First Nations Participation in the Central Coast AOA

At the outset of this study, all First Nations with major territorial interests with the study area were contacted and invited to participate in the project. Five major First Nations groups were identified by the Ministry of Forests, based **on** Statements of Intent and other information sources: the Oweekeno, Kitasoo, Nuxalk and Heiltsuk Nations, and the northern Kwakwaka'wakw speakers, represented by 10 separate communities.

Given the scope of the study area, it was clear that extensive involvement of First Nations, in their home communities, would be difficult. Consequently, a steering committee was established and periodic meetings were held during the study to discuss the project goals, progress, and plans for implementing the study results. A newsletter was sent to the Steering Committee to help keep them apprised of ongoing project details, and portions of this report were circulated for their review. Presentations were made to the Galgalis Steering Committee and the Oweekeno Kitasoo-Nuxalk Tribal Council, the Mid-Coast TSA Steering Committee and the Central Coast Interagency Planning Team, all of which were attended by First Nations representatives. Community visits were made to Bella Coola, Rivers Inlet and Klemtu to discuss the project and collect information about known cultural sites. Additional discussions were held by telephone and fax throughout the project.

1.5 Study Objectives

The main objectives of the Central Coast Archaeological Overview Assessment were to:

- summarize documentary sources concerning aboriginal use and archaeological sites in the study area and to incorporate the results of the Heiltsuk Traditional Territory Archaeological Overview Assessment (Maxwell et al. 1997);
- develop a series of predictive models based on known and inferred archaeological site characteristics on the Central Coast;
- produce GIS coverages indicating areas of relative predicted archaeological site potential; and
- provide management recommendations for areas of predicted archaeological sensitivity with respect to potential land-altering developments.

1.6 Study Limitations

The Central Coast AOA involves encompasses a large study area of great environmental and cultural diversity. A project of this magnitude necessarily faces certain limitations. Some of the obvious study limitations of the Central Coast Archaeological Overview Assessment project are described below.

1.6.1 Cultural Factors

The administrative study area boundary used for this project has no cultural meaning. The LRMP boundary encompasses traditional lands of at least five distinct First Nations. Applying predictive models across such a large and culturally diverse study area tends to mask the effects of cultural variability on archaeological site types and distributions.

The study team was comprised of non-aboriginal people. While archaeologists and others can approach an understanding of aboriginal use of the landscape, the project would have benefited greatly from more direct involvement of members of the First Nations whose territories encompass portions of the Central Coast LRMP study area.

Human behaviour is sometimes unpredictable, and cross-cultural assumptions inevitably introduce error. Using computers to model human behaviour introduces additional limitations.

1.6.2 Data Limitations

The success of a predictive model is completely dependent on the quality of the data used to generate it. Every attempt was made in this study to ensure the quality and appropriateness of the baseline data. However, one consequence of the quality control process was that a "lowest common denominator" approach became necessary. Only data that were available in GIS-ready format and for the entire study area were used in developing predictive models. Given the great extent of the CCLRMP area, this significantly limited the available data sources. Some data that could improve the power of the predictive models simply do not yet exist; or are not available in a format suitable for GIS modelling. A prior data development and project would have been of great benefit to the study.

No probabilistic archaeological inventory has taken place anywhere in the study area and consequently, no reliable "non-site" data were available.

No traditional land use data were available. Traditional use studies were being completed by the Oweekeno and Kwakwaka'wakw concurrent with the AOA, and the Oweekeno project is now complete. Unfortunately, the results were not available in time to be incorporated into the AOA.

Although a significant amount of palaeoenvironmental research is ongoing in Haida Gwaii and surrounding areas, very little information specific to the Central Coast study area is currently available. Given the apparent high degree of regional variation in sea levels over time, it is not possible to confidently model extinct landforms, such as palaeoshorelines and extinct terraces. Field survey would be required to locate and map these features.

1.6.3 Research Biases

Most of the available archaeological data represent ethnographically-known subsistence and settlement patterns; documentary information regarding pre-contact cultural systems does not exist. Detailed traditional use information and oral histories might help to fill in some of these gaps.

Probabilistic archaeological inventory data do not exist anywhere in the study area. Previous archaeological surveys on the Central Coast were highly judgmental and geared toward finding large and artifact-rich sites, or specific site types. Consequently, the current site register is skewed toward coastline habitation sites that are highly visible, easily accessible, large, generally deeply stratified and therefore present good excavation prospects. Other recorded sites including petroglyphs, and burials are also located primarily along the coast. Only recently, with the extension of cultural resource management practices to forestry operations, have archaeologists begun to focus on inland sites, primarily cultural modified tree (CMT) sites. Unfortunately, the database of recorded inland sites remains quite limited for predictive modelling.

1.6.4 Other Limitations

Not all archaeological site types were modelled. Some sites, such as spiritual or ceremonial places are very difficult to model. For several other site types, the available data were considered insufficient to support modelling

The models developed for the Central Coast AOA are untested. A field inventory should be undertaken to ground truth the baseline data, model assumptions, and archaeological potential ratings.

The AOA is not intended to identify specific archaeological site locations or to address issues of site significance. All archaeological potential ratings are relative. Not all Class I lands will contain sites, and some sites may be present in Class II zones. The model results should be used only as a guide for land use planning.

1.7 The Present Study

This overview was commissioned by the Ministry of Forests (Vancouver Forest Region), with assistance from the Archaeology Branch (Ministry of Small Business, Tourism and Culture). Funding was provided by Forest Renewal B.C., under MoF Contract # 42420. The objective of the study was to summarize existing archaeological knowledge of the Central Coast, to provide information about recorded or known archaeological site locations and to assess the archaeological site potential of the study area. The project is GE-based, allowing a mapped representation of areas of potential archaeological concern at a 1:20,000 scale. Information derived from the study will help the Ministry of Forests and other government agencies, as well as First Nations, to integrate archaeological resource management with other land use planning decisions so that heritage sites may be preserved or managed according to the British Columbia Heritage Conservation Act, the Forest Practices Code and other relevant legislation and protocol agreements.

This report is organized in general accordance with Archaeology Branch Guidelines for archaeological overview assessments (Apland and Kenny 1996). This introductory section has explained the AOA process and the context of the project, as well as the objectives and limitations of the study. The second section describes a number of development types that could potentially impact archaeological sites. Section 3 summarizes the physical setting of the study area, with discussions about the climate, vegetation and physiography, both today and in the past. Section 4 very briefly describes the traditional cultures of the Central Coast First Nations, based primarily on published information. This discussion is followed by two detailed archaeological summary sections. Section 5 deals with the culture history sequence of the Central Coast, and describes the main archaeological sites types and their spatial distribution across the landscape. Section 6 presents a review of previous archaeological research in the study area. Sections 7 through 9 explain the methods and results of the predictive modelling component of the study, including a description of the data, the individual models and the variables used to develop them. Section 10 evaluates and discusses the study results, and

Section 11 provides cultural resource management recommendations linked to the predictive modeling results. Appendices include excerpts from a previous overview of the Heiltsuk First Nation's traditional territory, photographs and descriptions of major archaeological site types on the Central Coast, a glossary of technical terms, a review of published Central Coast aboriginal place names, and a database of archaeological site attributes in the study area.

2.0 POTENTIAL IMPACTS TO ARCHAEOLOGICAL SITES

Many natural processes and activities related to development and recreation within the Central Coast LRMP **area** have the potential to damage archaeological resources including culturally modified trees (CMTs). One goal of this study is to help identify those areas so proper management measures can be implemented prior to ground' disturbance. The following sections summarize some of the natural processes and development activities that may affect the integrity of archaeological sites.

2.1 Potential Impacts from Natural Processes

Natural processes are defined as those that occur without human interference. Impacts to archaeological deposits as a result of natural processes may include the destruction of archaeological features, artifact breakage, and the disturbance of cultural matrices. Some of the natural processes that may effect the integrity of archaeological sites are described below.

- Eroding shorelines and riverbanks pose a severe threat to archaeological sites; erosion of soil may result from current action, slumping, flow slides, or seepage.
- Rock, talus and mud slides (including avalanches in alpine areas) can affect sites located on or at the base of steep slopes; however, mudslides can create anaerobic environments conducive to organic preservation.
- Glacial scouring can damage or destroy archaeological sites in high elevation areas.
- Flooding and the deposition of riverine deposits can destroy sites; however, certain types of flood-deposit episodes may serve to preserve organic archaeological deposits.

- Seasonal run-off from melting mountain snowpack can cause stream bank erosion, landslides and flooding.

- Wildfires can destroy culturally modified trees and may also affect other site types such as pictographs.

2.2 Potential Impacts from Development

Most land-altering developments have the potential to adversely impact archaeological sites. Direct impacts may include, but are not limited to, artifact breakage or displacement, destruction of features, and disturbance to stratigraphic deposits. Examples of indirect impact include increased public access (may lead to site looting or vandalism, or more gradual impacts from heavy use of an area) and possible increased rate of natural degradation (e.g., increased erosion following vegetation removal).

Some of the main impacts associated with particular development types are summarized below.

2.2.1 Residential and Recreational Developments

A number of activities related to residential and recreational development have the potential to impact archaeological sites. Road construction, excavation of building foundations, leveling of lots and trenching for service installation may damage archaeological sites by disturbing cultural deposits and features, damaging artifacts, and destroying contextual information essential for interpreting site function and age. Less intensive activities such as auguring for fence posts, planting trees, or rototilling may also damage intact archaeological sites. Increased access to archaeological sites may lead to site vandalism or unauthorized disturbance of deposits.

- downhill ski facilities would involve the removal of vegetation, including mature trees. Grooming of runs would include the extraction of large stumps and the disturbance of the upper substrate. Erosion of slope surfaces could cause indirect disturbance to archaeological sites.

- road construction often occurs in areas suitable for past travel corridors and may involve blasting (potential damage to petroglyphs and pictographs)

- off-road vehicles can have direct impacts by disturbing the ground surface and compacting subsurface deposits, causing artifact breakage and displacement. In addition, loss of soil due to erosive processes of all-terrain vehicles may result in the destabilization of existing landforms.

- increased access to remote sites as a result of road construction, remote wilderness lodges and other factors heightens the chances that vandalism may occur.

- construction of airfields may involve leveling of well drained terrain with good potential for archaeological sites.

2.2.2 Mining

Most mines involve several levels of large scale development. From the initial exploration to the final reclamation stages, mining developments can pose serious threats to archaeological sites.

- exploration stage: roads, drill pads, vegetation removal, pond construction, camps and other buildings, helicopter pads/air strips, fuel storage/spill collection areas.

- construction phase: stream diversion, open pits, clear cuts, more and larger roads, transmission lines, bridges, water storage and tailings ponds, dams, larger camps, mill/concentrator buildings, and waste dumps.

- extraction phase: use of heavy machinery, construction of tailings ponds, excavation of open pit mines, large rig drilling, increased access to remote areas, accumulation of tailings piles.

- reclamation phase: construction of decontamination ponds, excavation of trenches for water diversion and treatment, reshaping and revegetation of tailings piles, redistribution of tailings.

2.2.3 Hydroelectric Developments

Due to characteristic physiography of stream valleys and patterns of past land use, many archaeological sites are found along lake shores or rivers, all of which are locations susceptible to impact from hydroelectric projects and reservoirs.

- construction of dams and reservoirs related to hydroelectric power projects may inundate archaeological sites. In addition, sites located above maximum reservoir levels may be damaged through secondary impacts such as the erosion of shoreline.

- hydroelectric powerlines and pipelines (e.g., for natural gas) often cover long sections of terrain, and involve the removal of vegetation, the excavation of footings for powerline towers, and excavation of long trenches for pipeline installation and associated facilities. These types of developments are likely to impact archaeological sites because they tend to correspond with areas that may have been used as travel corridors

2.2.4 Agricultural Activities and Ranching

While the government maintains some control over most development activities, the damages to archaeological sites from agriculture are difficult to assess. Though not occurring in any large scale in the study area, even small-scale agricultural processes can effect archaeological deposits. Some typical types of sub-surface disturbance associated with ranching or farming include:

- construction of irrigation canals,
- construction of fences over long tracts of land;
- domestic livestock grazing may damage archaeological sites through artifact breakage and displacement, and also through erosion caused by loss of vegetation; and
- use of heavy machinery can cause soil compaction and artifact breakage, while the use of plows may severely disturb deposits to some depth.

2.2.5 Forestry Operations

Because much of the development in the study area is related to forestry, a more detailed discussion of potential impacts resulting from forest practices is included below.

Timber harvesting and associated activities can potentially damage heritage sites through displacement or breakage of artifacts, destruction of structures or other cultural features (including CMTs), and disturbance to the integrity of stratified deposits. Eldridge (1990) and Mackie and Eldridge (1992) summarize some potential impacts associated with timber harvesting and related development activities. Relevant sections of their discussion are summarized below.

Falling

Different logging methods can create varying levels of disturbance to archaeological sites, although logging itself is often less destructive than associated invasive developments such as road building and landing construction. 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

Yarding techniques (Figure 2) have more potential for impact to archaeological sites than falling techniques. Helicopter logging is by far the least harmful to archaeological sites, but this method is not always logistically or economically feasible. A skyline system or standard high-lead yarding may reduce the potential for damage to archaeological sites by lifting logs at least partially clear of the ground (Figure 3). 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 archaeological sites. 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.

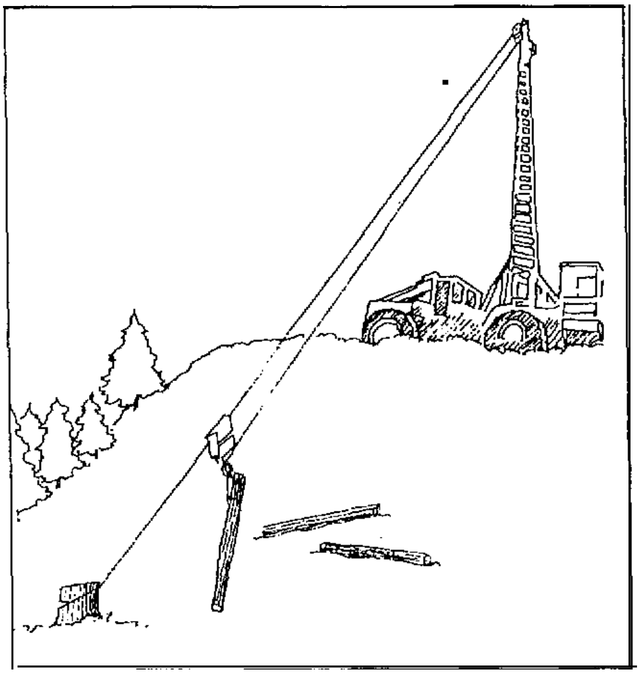


Figure 2 - Sketch of Yarding System (from Forestry Canada 1993:62)

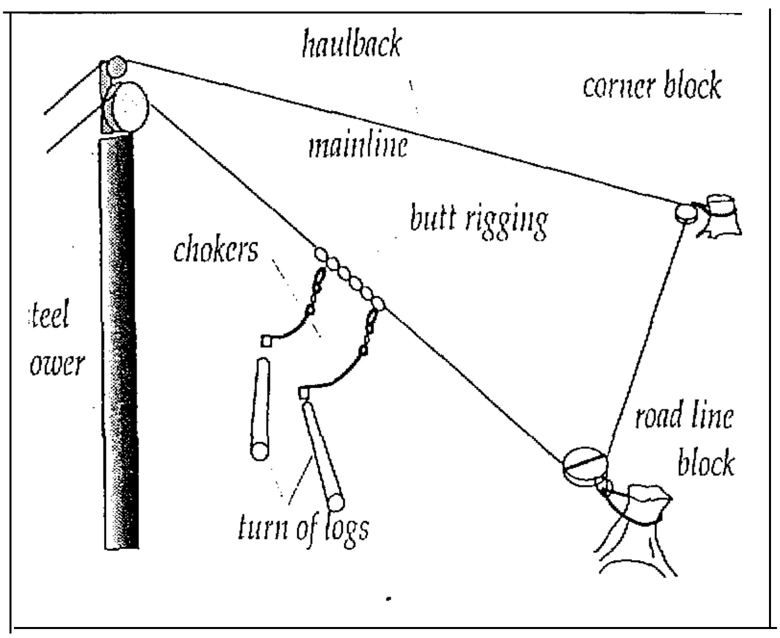


Figure 3 - Highlead System (from Forestry Canada 1993:31)

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 often has the greatest archaeological site potential. Many logging roads undoubtedly follow aboriginal trails and some have destroyed archaeological sites located along the trails. For instance, archaeological site EfRj 34, located between Cache Creek and Clinton, and consisting of a large surface and subsurface lithic scatter site, was bisected by road and landing construction (Bailey 1995). Similarly, two pithouse dwellings (DlRj 9) located in the Nahatlatch River area, were partially impacted by road construction. Road building severely disturbs the ground, and can completely destroy archaeological sites. 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 (Bailey 1996). A potential indirect impact 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 leveling and heavy equipment traffic. Artifact displacement and breakage are common types of damage to archaeological sites.

Silviculture

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 (Figure 4). Tree planting, thinning and pruning, in contrast, should have relatively little effect on archaeological sites unless skidding is involved.

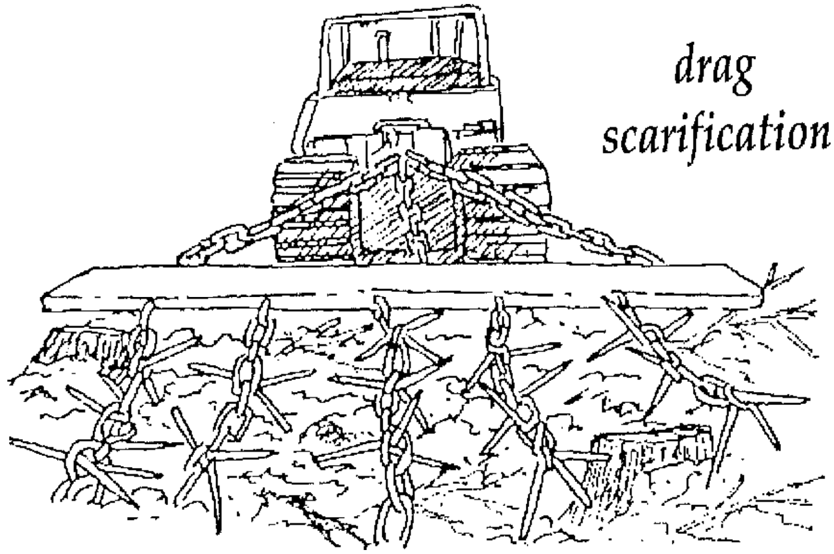


Figure 4 -Example of Scarification Method (from Forestry Canada 1993:19)

3.0 PHYSICAL SETTING OF THE CENTRAL COAST LRMP AREA

An understanding of the physiographic and biogeoclimatic setting of the study area is important to archaeological research because First Nations peoples practice specialized adaptations to the environment that are reflected in the archaeological record. The location, preservation and visibility of archaeological sites is often directly linked to physical factors such as terrain, climate, proximity to water, and vegetation. The following sections summarize the physical setting of the study area, including the location of the Central Coast LRMP area, physiography, sea-level changes, tides, climate, the establishment of cedar forests and biogeoclimatic zones.

3.1 Study Area

The Central Coast LRMP area stretches along the coast of British Columbia from the south end of Sonora Island through Johnstone, Queen Charlotte and Hecate Straits to the northern tip of Princess Royal Island (Figure 1). From Princess Royal Island, it extends inland to the southeast, following the height of land to the headwaters of the Nascall and

Skowquiltz Rivers, then north to encompass the headwaters of the Kimsquit River. The boundary then meanders eastward through central Tweedsmuir Park to the eastern park margin, which it follows south over the Rainbow Range to the Atnarko River. Continuing south along the Atnarko and South Atnarko rivers to Knot Lakes, it juts eastward to encompass the Klinaklini watershed and cross Mount Waddington. From that point, the LRMP area boundary winds southward along the height of land to join Bute Inlet north of Stuart Island.

The LRMP area encompasses approximately 4.78 million hectares and includes mainland portions of the Port McNeil1 and Campbell River Forest Districts, all of the Mid-Coast Forest District and the islands north along the coast to Princess Royal Island. Some of the main communities include Hagensborg, Bella Coola, Firvale, Bella Bella, Ocean Falls, Shearwater, Klemtu, Kimsquit, Namu, Rivers Inlet and Port Neville.

Major rivers in the study area include the Dean, Bella Coola, Atnarko, and Klinaklini. Moderate-sized rivers are abundant, especially in the northern part of the LRMP area. These include the Nascall, Talchako, Necleetscormay, Kimsquit, Machmell and Kingcome Rivers. Large and small lakes are found throughout the study area, with a notable concentration in the northeast.

3.2 Physiography

An understanding of the geography of the Central Coast is important for predicting archaeological site potential. Certain archaeological site types, notably habitation areas, are constrained by topography. For example, village sites tend to be found on well-drained, relatively flat landforms near a source of fresh water. These variables can be used to model predicted village locations. However, exceptions are known (e.g. fortified sites on steep-banked islands, houses built on stilts extending into the water, and sites to which water was carried in from elsewhere) and these cases can confound modelling efforts. Geological processes can also affect site preservation. Certain factors, such as unusually dry or wet soil conditions, can enhance preservation (particularly of organic materials) while other processes such as flooding and avalanching can destroy archaeological evidence.

The study area lies almost entirely within the Coast Mountain physiographic unit as defined by Holland (1976). The Coast Mountains are a nearly continuous inland range running roughly parallel to the Pacific coast and forming the boundary between the wet coastal zone and drier regions to the east. The differential uplift and erosion of the late Tertiary period (65-5.3 million years ago) established the present arrangement of mountains, plateaus, and plains (Holland 1976). This late Tertiary topography was modified by glaciation in the Pleistocene period (2 million to 12,000 years ago) to produce the current landscape. The Coast Range bedrock geology is predominantly coarse-grained granite, quartz and diorite with unconsolidated deposits left by glaciers and streams. Residue produced by prolonged physical and chemical weathering provides a coarse-textured acid parent material (Jungen and Lewis 1978).

One of the most notable geographic features of the Central Coast is its complex system of fjords, some of which are unusually long. For example, Burke Channel extends about 90 km into the Coast Mountains while Dean Channel is approximately 95 km long (Holland 1976). This network of inlets and channels is the result of the intense glaciation of the mountainous coastline (Ryder 1978).

Valleys on the western side of the Coast Mountains were occupied by Pleistocene glaciers and served as routes for ice migrating westward to the sea from areas of high accumulation along the axis of the Coast range (Holland 1976). Glacial erratics found on the shoulders of Rainbow, Ilgachuz and Itcha Mountains (extinct volcanoes east of Bella Coola) and ice-beveled platforms on the highest peaks in the Monarch Icefield indicate that ice thickness once exceeded 2,000 metres (Tipper 1971). As the ice moved through existing valleys, it excavated troughs now occupied by rivers such as the Dean and the Bella Coola, resulting in the present topography of steep mountains with rounded summits and U-shaped valleys (Ryder 1978). Subsequent erosion has continued to shape the landscape.

When the glaciers reached lower elevations closer to the coast, the valleys were excavated to depths below the present sea-level. As the ice melted, these low-lying coastal valleys were inundated by sea water. Extensive icefields and glaciers remain at high elevations in the Coast Mountains. The major rivers draining these areas have broad gravel floodplains crossed by shifting, braided channels (Ryder 1978).

Within the mountains, thick drift deposits are restricted to the margins of major valley floors and adjacent hillsides (Ryder 1978). On most slopes there are extensive bedrock outcrops and accumulations of colluvium, while gentler slopes may have a thin till mantle. Among the glacial deposits in the study area is nodular obsidian drift, which has been found in several stream beds in the Rainbow Range (Nelson and Will 1976). This obsidian is extremely significant in the archaeology of the Central Coast (Apland 1982, Carlson 1996).

The rugged, steep nature of Coastal terrain results in unstable areas where soil development is hindered by the slow creep of surficial materials. Avalanching is one of the principal geomorphic processes active today on steep slopes at intermediate and high elevations (Ryder 1978). These conditions restrict the potential for the preservation of archaeological sites.

3.3 Sea-level Changes

Changes in sea-level over time are significant for interpreting early human occupation of the coast. As early coastal cultures are believed to have had a marine orientation, relying on the sea for subsistence and transportation, settlement locations would have corresponded with sea-levels (Easton and Moore 1991). The following discussion examines sea-level changes occurring since the Pleistocene which may have affected archaeological site locations.

Sea-levels clearly have varied since the Pleistocene-Holocene Transition (ca. 13,000-10,000 B.P.), but data specific to the Central Coast are relatively sparse (Fedje 1997 pers. comm.). The lack of data is largely due to the difficulties that vegetation and logging activities have imposed on field reconnaissance (Andrews and Retherford 1976). Sea-level changes along the Pacific coast are complicated by the interplay of three factors: isostatic rebound of the earth's crust in response to Pleistocene ice loading and melting; tectonic movements of the crust in response to uplift and depression caused by movement of crustal plates; and eustatic movements of sea-level as glaciers grew or melted, causing sea-levels to rise and fall (Holland 1976). Evidence clearly indicates that ice build-up was not uniform along the coast. Differences in regional ice loads would have caused significant variation in sea-levels along the coast, since a large amount of ice in one valley would have caused more isostatic depression than in valleys with less ice (Holland, 1976). These factors make it extremely difficult to predict where raised beaches or sea terraces will be present along the Central Coast as a whole.

Like most of British Columbia, the study area was covered by ice during the glacial maximum of the Pleistocene approximately 14,500 years ago. According to Clague et al. (1982), the coastline was buried beneath as much as 2000 m of ice at the climax of the Wisconsinan glaciation, which would have resulted in a high degree of isostatic depression. Relative sea-levels were lower than those of the present day throughout the late Pleistocene. Recent research in the Queen Charlotte Islands indicates that some areas currently submerged such as Cook, Laskeek and Dogfish Banks were exposed during the late Pleistocene (Josenhans et al. 1995) In the vicinity of the study area, the Wisconsinan ice sheet, at its maximum extent, covered the mainland, most of northern Vancouver Island and extended into Mitchell's Trough and Goose Island Trough (Josenhans et al. 1995). The retreat of glacial ice began by at least 13,500 years B.P. (Josenhans et al. 1995) and was well underway along the outer islands of the Central Coast by about 12,500 years ago (Andrews and Retherford 1976). Localized ice would have been present in the area until approximately 10,000 to 11,000 years ago (Clagne et al. 1982). Due to the factors described above, sea-levels have changed dramatically since deglaciation.

Higher relative sea-levels marked the period of deglaciation that persisted from 13,000 to approximately 9,000 years ago. In areas where isostatic depression was great due to the degree of ice loading, such as Central Coast, relative sea-levels reached their highest during this time period. Clague et al. (1982) report that sea-levels near Bella Coola were as high as 150 metres above present levels during the initial deglaciation. Further inland, raised marine deposits have been identified at more than 200 metres above modem sea-levels. Along the outer islands, a maximum relative sea level of 120 metres or more above present levels has been inferred from the identification of glaciomarine drift on Calvert Island.(Andrews and Retherford 1976).

In general, at the onset of the Holocene, about 10,000 years ago, relative sea-levels dropped dramatically, reaching a point about 12 metres below the present sea-level by about 8,000 years ago. Due to isostatic uplift, shorelines along the inland fiord-heads fell rapidly throughout the period (Lutemauer et al. 1989). Raised marine features in the study area suggest that this fall in sea-level was not constant, but occurred as a series of alternating periods of relative sea-level stability and rapid isostatic rebound (Retherford 1972:90). Along the Central Coast, the present sea-level was reached between 8,000 and 7,000 years ago, and may have continued to drop to approximately four metres below the present level (Andrews and Retherford 1976:349).

Between 7,500 and 7,000 years ago, sea-levels rose again — a trend that continued until about 5,500 to 5,000 B.P. Clague et al. (1982) suggest the sea was within 2 metres of its present level by 5,000 B.P., and that sea-levels have remained relatively stable since that time with local fluctuations of no more than 1 or 2 metres.

This sea-level reconstruction suggests that palaeoshorelines in the Bella Coola area could be present 150 metres or more above the present sea-level, and very early archaeological remains could be associated with them. In contrast, shoreline archaeological sites dating between about 8,000 and 3,500 years ago are likely to be below the present sea-level.

Raised marine terraces may be present throughout the coastal margin of the study area and the potential exists for archaeological sites to be located on remnant beach features related to the early periods following deglaciation. Marine deposits at 200 metres above present sea-level (a.s.l.) at the heads of fjords in the Kitimat Trough, north of the study area, have been radiocarbon dated to 10,500 B.P. (Clague 1985). Raised marine deposits at 230 metres a.s.l. have similarly been identified at the head of Dean Channel (Retherford 1972, Andrews and Retherford 1976). The Tsini Tsini archaeological site (FcSm 11) in the upper Bella Coola Valley is located on a palaeoshoreline feature at about 250 m asl, but it has not yet been dated (Hobler 1997 pers. comm.).

The drop in relative sea level along the outer coast does not appear to have been quite as dramatic. At Namu, the sea-level was about 20 to 35 metres above its present position about 10,200 years ago. By about 9,000 B.P. it had fallen to around 10 metres above current sea-level. Few data on post-Pleistocene sea-levels are available for other areas of the Central Coast, although Heusser (1960) records evidence from nearby Hope Island (on the west side of Queen Charlotte Strait) for two shorelines at around 30 metres and 5 metres, with a 1,500 B.P. (pollen) date on the lower section.

Retherford (1972) suggests, in general, that sea-levels fell in stages of rapid rebound followed by periods of stability or intense sedimentation. Andrews and Retherford

(1976) describe in detail the sea-level fluctuations of the post-Pleistocene period in the Bella Bella—Bella Coola region over the past 12,000 years. They present a tentative sea-level curve for the area based on their examination of shell middens, glaciomarine deposits and raised river deltas and terraces. Their research suggests that a relatively rapid submergence immediately followed glacial retreat, followed by a sea-level drop from at least 120 metres above present levels around 12,000 B.P. to levels approximating present sea-level by 7,500 B.P. Sea-levels may have been slightly lower than those seen today between 7,500 and 4,000 B.P.

On Cooks Bank, about 20 km north of Cape Scott, at the north end of Vancouver Island, a core sample containing a palaeosol with in *situ* rooted plant remains was recovered from the floor of a submerged valley (Lutemauer et al. 1989). Radiocarbon dates on materials in this core indicate that the sea-level in this area was 95 metres lower than present about 10,500 years ago. The core data suggest that large areas of the British Columbia continental shelf were exposed 11,000 to 10,000 years ago and may have allowed human migration at the end of the Pleistocene. According to this model, people could have lived along the Central Coast 10,000 to 10,500 years ago, with physical evidence of such occupations subsequently erased by rising sea-levels. Under favourable conditions, some remains of these early sites may have survived (Lutemauer et al. 1989) and there is a possibility that these could be recovered using underwater archaeological techniques (see Easton and Moore 1991).

3.4 Climate

Climate strongly influences the distribution of plant and animal resources, which in turn affect human subsistence strategies and settlement patterns. These factors should be reflected in the archaeological record in generally predictable ways, at least to the extent that modem resource distributions can be extrapolated into the past.

In general, the climate of the Central Coast is characterized by moderate temperatures year-round, high levels of precipitation and a relative lack of sunlight. Temperatures throughout the study area are generally moderate to cool, and the mean annual range along the outer coastal zone is the narrowest in Canada at 10 degrees Celsius (Schaefer 1978). The Pacific Ocean acts as a reservoir of heat and moisture, cooling the air *in* summer and warming it during the winter. The study area has high precipitation rates, in excess of 2,500 mm in some areas (Schaefer 1978). Because the moisture comes in from the west, rainfall is greatest on the western slopes of the Coast Mountains, while the eastern slopes of the range generally have significantly reduced precipitation. Snowfall constitutes a small fraction of annual precipitation at sea-level. In the summer there are frequent spells of sunny weather as the North Pacific high-pressure cells extend over the coast (Jungen and Lewis 1978).

At increasing elevations, climatic conditions change rapidly from moderate and rainy to cold and snowy. Mean temperatures decrease an average of 5 degrees Celsius for every 1000 metres increase in elevation (Schaefer 1978), with summers becoming increasingly cool and short, and snowpack lingering into mid-summer. Glaciers are present on the highest peaks of the Coast Mountains.

3.5 Palaeoclimate

Hebda (1995) has used pollen data from sediment cores to construct palaeoclimate climate trends for several regions of British Columbia. Although information for the Central Coast is scant, data from Haida Gwaii and Vancouver Island are consistent, and Hebda (1995) suggests that general trends can be extrapolated from those regions.

Shore pine or lodgepole pine forests probably developed under cool and relatively dry conditions associated with deglaciation. Following this episode, a cool, moist period allowed the establishment of a mixed spruce-fir-hemlock-pine forest for a short time before about 10,000 BP. Sitka spruce and western hemlock became dominant during a warm period between about 10,000 and 9,000 years ago. As the climate became more moist, about 7,500 years ago, western hemlock became dominant over spruce. Beginning about 6,000 years ago, cedar began to become established (see below), apparently in response to a cooling episode that led to a moderate, moist climate similar to modem conditions between 6,000 and 4,000 BP. Minor glacial advances and lower tree lines were associated with this climatic shift. Between about 4000 and 2000 years ago, the current vegetation regimes began to develop, and fully modem conditions were established by about 1000 years ago.

3.6 Establishment of Cedar Forests

Western redcedar is known to have long been the primary material used by the aboriginal people of the Northwest Coast to produce houses, monuments, canoes, boxes, basketry and a wide range of other utilitarian and ceremonial items. However, the establishment of western redcedar and yellow cedar on the Central Coast appears to be relatively recent, in archaeological terms, starting perhaps 6,000 years B.P. These species found refuge in California during Pleistocene glaciation, then expanded northward during the late Holocene (Hebda 1995, Hebda and Mathewes 1984).

Hebda and Mathewes (1984) used palaeobotanical data to document the expansion of western redcedar in coastal forests between 6,000 and 2,500 B.P. Their data indicate that, beginning around 6,000 year ago, cedar pollen gradually increased in abundance. Macrofossils of redcedar at Marion Lake near Vancouver also appear in significant quantities after about 6,000 B.P. Maximum pollen frequencies are seen in deposits between 5,000 and 2,000 years old. These findings correlate with early archaeological evidence for the development of woodworking technology among aboriginal cultures, which suggests that specialized woodworking tools, such as adzes, were not common until after about 5,000 years B.P. (Hebda and Mathewes 1984). Archaeological evidence of structural remains at the X̱á:ytem site (DgRn-23), near Mission, B.C., dates to about 4,700 B.P., with radiocarbon dates averaging 4,725± 39 B.P. (Mason 1994). The oldest plank house documented on the Central Coast is from Milbanke Sound, dating to approximately 2,000 B.P. (Simonsen 1973). Hebda and Mathewes (1984) conclude that woodworking technology was well established by 3,500 to 3,000 years ago and attained its peak beginning 2,500 years ago and continuing to the present.

Based on the information sources discussed above, Table 1 summarizes the inferred major trends in climate, glaciation, relative sea-level and dominant vegetation on the Central coast since the late Pleistocene.

Table 1 - Summary of Palaeoenvironmental Data Relevant to the Central Coast

Approx. Date	Climate	Glacial Activity	Sea-Level	Vegetation
14,500 BP	Cold, dry	Glacial		
13,500	Cool, dry	Deglaciation begins	Rising	Pine forest begins
12,500	Cool, dry	Deglaciating	Rising	Pine forest
12,000	Cool, moist	Localized ice	Rising	Spruce-fir-hemlock-pine
10,000	Warming	Largely deglaciated	150-200 m above present	Sitka spruce-western hemlock
9,000		High altitude glaciers	Dropping	Sitka spruce-western hemlock
8,000		High altitude glaciers	12 m below present	Sitka spruce-western hemlock
7,500	Warm, moist	High altitude glaciers	Rising	Western hemlock
7,000		High altitude glaciers	4 m below present	Western hemlock
6,000	Cooling	High altitude glaciers	Rising	Cedar begins
5,500		High altitude glaciers	Rising	Cedar establishes
5,000		High altitude glaciers	Within 2 m of present	Hemlock-cedar
4,000	Moderate moist	Minor glacial advance	Stable	Modern vegetation establishes
2,000	Modern	High altitude glaciers	Stable	Modern vegetation establishes
1,000	Modern	High altitude glaciers	Stable	Modern vegetation
Today	Modern	High altitude glaciers	Stable	Modern vegetation

3.1 Modern Biogeoclimatic Zones

Most of the study area falls within the Coastal Western Hemlock (CWH) biogeoclimatic zone, with the Mountain Hemlock (MH) zone occurring at higher elevations, and Alpine Tundra (AT) prevailing above the tree line. The Engelmann Spruce-Subalpine Fir (ESSF) zone is also present in a small but significant quantity. Patches of the following biogeoclimatic zones are also present in the study area: Sub-Boreal Spruce (SBS), Sub-Boreal Pine Spruce (SBPS), Montane Spruce (MS) and Interior Douglas-fir (IDF).

3.7.1 Coastal Western Hemlock (CWH) Zone

The majority of the study area lies within the Coastal Western Hemlock (CWH) biogeoclimatic zone. The CWH zone covers low to middle elevations throughout the Central Coast, extending from sea-level to 900 metres a.s.l. on windward slopes up to 1,050 metres a.s.l. on leeward slopes (Pojar et al. 1991). This is the most productive zone in British Columbia in terms of overall biomass (Jones and Annas 1978).

On average, CWH is the rainiest zone in British Columbia, and features cool summers and mild winters. The mean annual temperature is about 8 degrees Celsius, while mean annual precipitation for the zone is 2,228 mm, ranging between 1,000 to 4,400 mm. Less than 15 percent of total precipitation occurs as snowfall in the south, but as much as 40 to 50 percent in the northern parts of the zone is snow (Pojar et al. 1991).

Pojar et al. (1991) provide a thorough description of the plant and animal species characteristic of the Coastal Western Hemlock zone. The forests of the CWH zone are dominated by Western hemlock and Pacific silver (or amabilis) fir. Other tree species that are commonly found in this biogeoclimatic zone include western redcedar, and Douglas-fir in dry areas and Sitka spruce in moist areas (especially on floodplains).

The understory in the CWH zone is generally lush, and contains a number of food species important in traditional First Nations' subsistence, including blueberry, salmonberry, bunchberry, soopolallie (soapberry), wood fern and lady fem. Rod huckleberry, stink currant, Nootka rose and prickly rose are also characteristic of CWH.

Economically-important mammal species include marten, mule deer, black bear, grouse, mountain goat, and various species of waterfowl. Low-lying areas near tidal inlets are inhabited by sea mammals such as harbour seals and Steller sea lions. Throughout the CWH zone, streams and rivers provide spawning habitat for salmon and other fish, such as the economically important eulachon. Intertidal invertebrates are diverse, and include economically significant species such as mussel, cockle, abalone, limpets, butter clam, little-neck clam, octopus and sea cucumber.

3.7.2 Mountain Hemlock (MH) Zone

The Mountain Hemlock (MH) biogeoclimatic zone is characteristic of subalpine areas of the Coast Mountains above the CWH zone, at elevations between 900 and 1,800 metres in the south, and 400 to 1,000 metres in the north. The characteristics of this zone are summarized in Pojar et al. (1991). The coastal subalpine climate of the MH zone features relatively dry, short, cool summers, and very wet, long, cool winters, with heavy snow cover for several months. The mean annual temperature varies from 0 to 5 degrees Celsius, while mean annual precipitation ranges from 1,700 to 5,000 mm, of which 20percent to 70 percent is snow. The deep winter snowpack is slow to disappear, resulting in a short growing season.

Dominant tree species in the MH zone include mountain hemlock, Western hemlock and amabilis fir, with redcedar, yellow cedar and subalpine fir found in smaller proportions. Common shrubs in the MH zone include Alaskan and oval-leafed blueberry, black huckleberry, salmonberry, bunchberry and lady fem. Due to the long period of snowpack, the diversity of animal species is low. Notable mammals include snowshoe hare, black bear, mule deer, Roosevelt elk and mountain goat.

3.7.3 Alpine Tundra (AT) Zone

The Alpine Tundra (AT) biogeoclimatic zone, which characterizes the highest elevations of the Coast Mountains of the Central Coast, consists of treeless meadows, windswept ridges, snowfields and icefields in high elevation mountainous terrain (Pojar and Stewart 1991). The AT zone starts at elevations as low as 900 metres a.s.l. along the Central Coast and extends to the highest peaks (Jones and Annas 1978). Harsh conditions prevail in the AT zone and much of this area lacks vegetation, being typically covered with rock, ice and snow.

The Alpine Tundra zone is by definition treeless, although some species are found at lower elevations in Krummholtz (stunted) form, the most common being subalpine fir, Engelmann spruce, white spruce, mountain hemlock and whitebark pine. Due to a very short frost-free growing season, lower alpine subzone vegetation is typically characterized by dwarf alpine scrub or deciduous shrub vegetation such as willow species and scrub birch. Mountain heathers, kinnikinnick, lingonberry and bog blueberry grow in moister, snowier regions, and herb meadows are found in drier regions of the lower alpine elevations, where soil depth is sufficient. Species include various arnicas, pussytoes, groundsel, arctic lupine, subalpine daisy and Indian paintbrush.

Despite the harsh climate and rugged topography, the AT zone provides habitat for several economically significant mammal species, though overall species density and diversity is low. Ungulates, including Roosevelt elk, black-tailed deer and mule deer, forage at lower elevations of the Alpine Tundra zone adjacent to ESSF zones, and they were traditionally hunted in the alpine during the summer. In the driest regions, bighorn sheep and caribou winter on steep south-facing slopes, and some of the densest populations of mountain goat in North America are found in these areas. Other animal species found seasonally in the AT zone include grizzly bear, black bear, golden-mantled ground squirrel, hoary marmot, wolverine, golden eagle and common pika.

3.7.4 Engelmann Spruce-Subalpine Fir (ESSF) Zone

The Engelmann Spruce-Subalpine Fir zone lies between the Alpine Tundra and Mountain Hemlock forests on the eastern side of the Coast Mountains. The ESSF is characteristic of steep, rugged mountainous terrain and has a cold, moist and snowy continental climate (Coupé et al. 1991). Winters are long, snowy and cold, while summer growing seasons are cool and short. Precipitation is highly variable within the zone.

Engelmann spruce and subalpine fir are the dominant tree species, although lodgepole pine is a common forest fire succession species that dominates some of the drier regions of the zone. Other tree species occasionally found in the ESSF zone include whitebark pine, limber pine, alpine larch, Pacific silver (or amabilis) fir, mountain hemlock, western white pine, Douglas-fir, Western hemlock and western redcedar. Subalpine heath, grasslands and meadows are also characteristic of the ESSF zone, and these areas often offer edible roots and bulbs that were harvested by First Nations.

Ungulates such as moose, mountain goat, caribou and mule deer are common throughout the ESSF zone, and elk, bighorn sheep, white-tailed deer and stone sheep appear in more limited distributions. The zone is a favourable habitat for grizzly bear, and fur-bearing mammals such as snowshoe hare, marten, fisher, red squirrel and wolverine are common. Subalpine parklands also provide habitat for hoary marmot, ground squirrels and porcupine.

Abundant plant and animal resources make the ESSF zone important to aboriginal economies. Tiger lily, avalanche lily, cow parsnip, and saskatoon berry are some of the ESSF zone plant species used by First Nations groups for food, and common juniper, stinging nettle and other plants were used in traditional medicines.

4.0 ETHNOGRAPHIC SUMMARY

4.1 Introduction

Ethnographies are descriptions of indigenous cultures written by non-Native people, often based on participation in, and observation of, First Nations cultural practices. On the Central Coast, most ethnographic work was undertaken in the late 1800s. Some ethnographies were written by individuals trained to observe and record aspects of First Nations cultures, many of whom went on to publish their notes in European and American books and journals. Some of the best-known ethnographers in British Columbia include Franz Boas, Thomas McIlwraith and James Teit.

The leading school of thought for most turn-of-the-century ethnographers was developed by Franz Boas. Boas believed that the First Nations peoples of North America were destined to become assimilated into mainstream Euro-American society thereby rendering their traditional cultural practices extinct. Because of this belief, he sent a number of different ethnographers to First Nations communities to record local cultural practices.

Not all historic documentation of First Nations cultures was recorded by trained ethnographers. The letters, journals and other records of fur traders, explorers, surveyors, priests and other visitors to the coast provide valuable information about the conditions that prevailed during the early contact period, and these documents are often considered part of the "ethnographic record". While ethnographies and other written records provide a wealth of information concerning First Nations cultures, they are only one source of knowledge, and they should not be used in isolation without consultation with contemporary First Nations communities. Ethnographies were recorded at specific points in time, by individuals who, as strangers to indigenous societies, could not possibly have recorded or understood every facet of the cultures they were observing. Moreover, their observations were limited to information First Nations people were willing to share.

Many ethnographies contain a great deal of information that can be used for archaeological modelling. Ethnographers often recorded place names and details about cultural practices that could have left physical evidence in the form of archaeological sites and features. For example, ethnographies often contain descriptions of where habitation, fishing, hunting, and other sites were located on the landscape. Appendix 3 contains a partial list of published place names in the Central Coast LRMP area compiled from ethnographic sources. Archaeologists can use those descriptions to assist in the development of site potential models. A further discussion of this process is included in the modelling section of this report.

The following summary describes the general cultural traits of the Central Coast First Nations and provides context for the historic and ethnographic details that appear throughout the report and appendices. This review is by no means exhaustive, and it emphasizes aspects of the aboriginal cultural systems that are most likely to leave physical traces that can be identified archaeologically. It should be stated that this summary is written from a non-Native perspective and, as such, may not accurately express the views of the First Nations people it describes. Many of the linguistic and cultural links described below are ethnographic constructs and do not necessarily reflect how contemporary First Nations would defme their own past and present ethnographic and linguistic relations.

It is important to note that the use of the past tense to describe traditional cultural practices in the following sections reflects the use of ethnographic and historic sources and is not intended to imply that these activities no longer occur. Many of the traditions described in this report remain integral to the cultures of First Nations throughout the Central Coast area.

4.2 First Nations Of The Central Coast

People of First Nations ancestry comprise the majority of the Central Coast population. According to “Statements of Intent” submitted by First Nations for treaty negotiations, together with mapped information provided by the Ministry of Forests (MoF) and the Land Use Coordination Office (LUCO), the study area encompasses all or parts of the traditional territories of the Kitasoo, Heiltsuk, Oweekeno, Nuxalk and the Kwakwaka'wakw. The Oweekeno and Heiltsuk speak northern variants of the Wakashan language family (sometimes known as Northern Kwakiutl), the Kitasoo are Southern Tsimshian speakers, the Nuxalk are a Salish group, and the Kwakwaka'wakw speak variants of the Kwak'wala language. The traditional territories of several other First Nations extend into very small portions of the LRMP study area, but these Nations were not participants in the project, at the discretion of the Ministry of Forests.

While significant linguistic and cultural variation is evident among the First Nations of the Central Coast, general similarities exist, particularly in terms of socioeconomic organization and material culture. The dense coastal rain forests have provided the raw materials for houses, canoes, implements and utensils. Probably the most extensively used traditional plant resource for Northwest Coast First Nations is the western redcedar, its wood being used for house construction and for carving masks and ceremonial regalia, and its bark for making clothing, basketry, rope and many other items.

The sea provides the majority of food resources for coastal First Nations. Sea mammals are abundant, but the most important marine resources have always been the various species of salmon, bottom fish, herring, shellfish and eulachon. Hobler (1990b) points out that a heavy reliance on salmon fishing was an important and unifying factor for Central Coast people. He further notes that people of the outer coast tended to rely more on intertidal resources and bottom fish than land mammals, but that they did move inland to catch salmon from spawning streams. Inner coast cultural groups, notably the Nuxalk, practiced a riverine-oriented subsistence system, supplemented by hunting deer, elk, mountain goat and various fur-bearing animals. Other common subsistence pursuits included collecting a myriad of plant resources, including berries, seaweed, roots, herbs and various medicinal plants.

The principal means of transportation for the peoples of the Central Coast was by cedar wood or bark canoes. Water transportation was an essential part of Northwest Coast life as people traveled great distances for trade and intermarriage, and in pursuit of seasonally available resources. The traditional settlement pattern involved winter residence in villages with large cedar winter houses, and spring, summer and fall excursions to resource harvesting camps. The socioeconomic system revolved around harvesting and distributing resources, expressed through the potlatch, intermarriage, trade and other means.

While similarities in overall material culture and some sociocultural traits may exist between groups, each First Nation comprises a unique cultural entity. The following sections summarize the attributes of the various First Nations of the Central Coast.

4.2.1 Kitasoo (Southern Tsimshian)

The following summary of Kitasoo culture is largely derived from Halpin and Seguin (1990) and the Kitasoo/Xaixais First Nations Resource Mapping Project (1995).

The Kitasoo are one of three groups (along with the Kitkiata and Kitkatla) that comprise the Southern Tsimshian division of the Tsimshian language and culture area. Today, the primary Kitasoo village is Klemtu, which is shared with the Xaixais First Nation. The traditional territory of the Kitasoo Nation stretches from Butedale in the north to Ivory Island in Milbanke Sound in the south, and from the watershed divide of the Coast Range in the east to Hecate Strait in the west. This territory encompasses over 510,000 hectares of land and approximately 17,500 hectares of lakes, for a total of 528,469 hectares (Kitasoo/Xaixais First Nations Resource Mapping Project 1995).

In Tsimshian society the 'house' was the basic social unit. A house consisted of individuals who trace their descent along a common matrilineal line, along with their children, children of other lineages, and slaves. Each 'house' occupied one or more dwellings and owned hunting, fishing and gathering locales to which access was controlled by the house chief (Halpin and Seguin 1990).

Each house moved seasonally to fishing camps along rivers and other resource locations where seaweed, halibut, herring roe, cedar bark, bird eggs, abalone, roots, berries and other items were harvested. Bears, deer, elk, seals, sea lions, goats and other mammals and waterfowl were hunted. Shellfish, including cockles, clams, mussels and abalone, were abundant in coastal waters and the frequency of large and small shell middens attests to their importance as food. Large surpluses of foodstuffs, particularly salmon, were preserved for winter.

Winter featured ritual and ceremonial events, including potlatches and secret society dances that were held only during this time. The potlatch complex was the core around which the social system revolved and was used to maintain social order, validate inheritance and succession, and manage conflict.

Tsimshian winter houses were constructed of massive redcedar timber frames, with cedar plank walls that were independent of the post-and-beam and roof structure. The winter house frames were left in place year round, but the planks were sometimes removed and carried to spring and summer camps for use in temporary summer house structures. Winter houses were about 50 to 60 feet long, with chiefly families occupying cubicles at the rear and other families having quarters along the side walls. In addition, these dwellings usually featured excavated pits about five feet deep and 30 feet square which formed the central living space. Housefronts were painted with crest designs, and wooden screens, painted with sacred designs, were erected inside at the rear of the house.

The Tsimshian are noted for their fine basketry, made by women using redcedar bark and spruce roots. Utilitarian wood objects made by male carvers include a wide variety of storage boxes and chests, canoes, totem or crest poles, woodworking tools and fishing and hunting gear.

Early European Contact

The Southern Tsimshian were the first division of the Tsimshian to come into contact with Europeans. In 1787, a fur-trading expedition run jointly by Duncan and Colnett is believed to have visited the village of Kitkatla and, in 1792, the Spanish explorer Caamano visited a village on Pitt Island.

The continuing presence of the fur traders and the influx of European settlers and missionaries had a profound effect on the aboriginal inhabitants of the Coast and, despite the attempts of missionaries to assimilate Native cultures, Tsimshian culture remained resilient. There were, however, changes to Tsimshian lifeways that resulted from the shifi to trapping for trade, a minor gold rush along the Skeena, the establishment of commercial salmon canneries and migration of some Tsimshian peoples to Alaska.

Duff (1964) estimated the 1835 population of Tsimshian speakers at 8,500, of which 1,200 were Southern Tsimshian. By 1895, however, disease and other rapid social and economic changes reduced that number to 3,500. By the twentieth century, the

Tsimshian population had recovered, and as of 1980 there were approximately 9,500 Tsimshian in the province.

4.2.2 Heiltsuk

The following discussion of Heiltsuk culture is based on Hilton (1990) and Maxwell et al. (1997). Other important ethnographic sources include Boas (1928, 1932), Olson (1955) and Storie and Gould (1973). The ethnographic summary presented in Maxwell et al. (1997) is included with this report as Appendix 1.

The Heiltsuk language is considered a member of the northern branch of the Wakashan language group. Heiltsuk traditional territory extends from Butedale in the north to the south side of the mouth of Rivers Inlet in the south, and from the outer coast inland to encompass Kimsquit, Dean Channel and most of Burke Channel (Canada 1991, 1994, in Maxwell et al. 1997).

The Heiltsuk Nation is comprised of a number of local subtribes that owned and used villages and resource sites on the coastal islands and on the mainland. Today, five subtribal groups are recognized (Heiltsuk Cultural Education Centre, cited from Maxwell et. al 1997):

- the 'Yídsáitxv of Dean Channel and Burke Channel:
- the 'Wúyalitxv of the Fitzhugh Sound area;
- the ,'Qvúqvayitxv north of Waglisla, from Milbanke Sound up Spiller Channel and Spiller Inlet;
- the 'WúíʌitXv of Roscoe Inlet; and
- the 'Xíxís from Milbanke Sound up the channels as far north as Kynoch and Klekane Inlet.

Heiltsuk lands border to the north with the Tsimshian and Haisla, and with the Nuxalk, Oweekeno and Kwakwaka'wakw to the east and south, who share many Wakashan and Salish traits. As a result, the Heiltsuk had strong social and economic ties with neighbouring groups; for example, intermarriage between the Heiltsuk and the Nuxalk was so extensive that some villages were bilingual. Trade in commodities such as eulachon grease, clams, herring roe, seaweed and obsidian was a vital part of relations between neighboming groups, and hostilities occurred mainly with more distant tribes.

The basic sociopolitical unit of the Heiltsuk was the local group, members of which were descended from a common ancestor (Hilton 1990). Each local group was politically autonomous, with its own chiefs, resource sites, traditions, names and ceremonial privileges. The local groups often joined to form tribes that congregated in winter villages. In addition to the local groups, there were social groups based on residence. Heiltsuk society was divided into a number of social ranks-mainly chiefs, commoners and slaves. Symbols of high status included tattoos, ornamentation, coppers and the possession of chiefly titles. Slaves, who were usually prisoners of war, could be bartered to acquire material goods.

The Heiltsuk subsistence economy centered around the seasonal movement of families to a series of resource sites. Such sites were owned by families, local groups or crest groups. In the winter, families returned to permanent villages to celebrate the ceremonial season and manufacture or repair equipment (Hilton 1990).

The Heiltsuk used a wide variety of subsistence technologies. The Heiltsuk gathered a wide variety of shell fish and marine plant species. Salmon were caught using stone or wooden stake weirs, and traps, harpoons, dipnets and clubs. Sea foods such as clams, abalone and seaweed were gathered during resource harvesting expeditions. In addition to harvesting seafoods, sea mammals, including seals, sea lions and sea otters, were hunted using harpoons, clubs and the bow and arrow (Hilton 1990). Land animals, such as mountain goat and deer were hunted with dogs and either snared or speared. Bears and small game were caught in deadfall traps. Travel was accomplished primarily by canoe; a cedar dugout style was used for sea travel and a bark canoe was used on lakes.

Heiltsuk winter villages featured rectangular cedar plank houses characterized by gabled roofs, double ridgepoles, vertical wall planks permanently attached to the house frame, carved interior posts, a central smoke-hole and mat-lined walls in the sleeping compartments. Less elaborate but similar plank houses were also built at major seasonal resource sites in areas where seasonally available marine and riverine resources were abundant. Bark houses were used at hunting stations and minor camps (Hilton 1990).

Heiltsuk clothing and adornment styles were similar to those of neighbouring groups. The most distinctive practice was the combination of the northern custom of wearing labrets (reserved for high-status women) and the Central Coast practice of cranial modification.

Heiltsuk society also had a strong tradition of highly skilled artisans noted for the construction and decoration of bentwood boxes, chests, canoes and horn spoons and ladles. After European contact, the skills of these artisans was in high demand throughout North America and abroad.

Early European Contact

The first recorded contact with Europeans occurred in 1793 when two explorers separately entered Heiltsuk territory. Captain George Vancouver surveyed local channels and inlets while heading north, while Alexander Mackenzie traveled overland down the Bella Coola Valley and into Dean Channel. Soon after these initial explorations, maritime fur traders seeking valuable sea otter pelts entered Heiltsuk territory, often stopping at Milbanke Sound to trade. The fur trade instigated a period of rapid social and economic change for the Heiltsuk and other First Nations along the Coast. In 1833, the Hudson's Bay Company established a second major trading center, at Fort McLoughlin on Campbell Island, and it remained the only fort and trading store on the Central Coast for many years. The establishment of two trading centers (Milbanke Sound and Fort McLoughlin) within their territory allowed the Heiltsuk to position themselves as middlemen and to control the competition between the British and the Americans.

While the fur trade provided some economic benefits for Central Coast First Nations, European diseases, most notably smallpox, swept through the Northwest Coast causing a massive decline in aboriginal populations throughout the area. Boyd (1994) reports smallpox epidemics in the late 1770s, 1801-02, 1836-38, 1853 and 1862-63. The extensive 1770s epidemic reportedly affected the entire Pacific Northwest (Boyd 1990), while subsequent outbreaks were more localized. For example, the 1836-38 epidemic apparently affected the 'Yídsáitxv and ᵛXíxís subtribal groups more drastically than other Heiltsuk groups, due to the distribution to those groups of vaccines from Fort McLoughlin. Using CMT data, Lepofsky and Pegg (1995) documented evidence that this epidemic also affected the Haisla to the north. In 1862 a devastating smallpox epidemic spread from Victoria and decimated the Heiltsuk (Maxwell et al. 1997).

Population decline due to disease was drastic. The Heiltsuk population, which may have numbered between 20,000 and 30,000 prior to contact (Jennifer Carpenter, pers. comm. 1998), was estimated by Tolmie in 1833 to be about 1600 (Tolmie 1963). By the turn of the century, the population had dwindled to only about ZOO-300 (Hinton 1990).

The marked population loss has important implications for archaeological modelling and consultation. Not only have settlement distributions changed as village groups amalgamated in the face of reduced populations, but a significant body of knowledge and oral tradition undoubtedly has been lost.

The years that followed were influenced by the combined processes of missionization, and the growth of the commercial salmon and timber harvesting industries. Settlement patterns shifted as groups suffering from population decline due to disease and pressure from missionaries amalgamated into central villages.

Between 1862 and 1900, the Heiltsuk tribes became concentrated around McLoughlin Bay to be near the store and mission. Methodist missionaries saw Bella Bella as a model Christian village, with European-style housing, church and educational facilities. In 1898, the village was moved two miles to the north to the present site of Bella Bella. Accompanying the changes in social structure brought about by disease and missionary influence was the severance of traditional land ownership as, beginning in 1880, reserves were established without treaty.

Heiltsuk population began to grow in the first half of the twentieth century. Settlement patterns continued to be influenced by the fishing and logging industries, and were further affected by the influx of non-Native residents, license limitations restricting Native access to commercial resources, new technologies and loss of rights to land. The result has been high unemployment and considerable out-migration, though strong ties typically exist between migrants and their home communities. Contemporary Heiltsuk communities are determined to preserve their cultural traditions and to control social and economic development.

4.2.3 Nuxalk

This description of Nuxalk culture is summarized primarily from Kennedy and Bouchard (1990). Other useful sources include Boas (1892), Lepofsky (1985), McIlwraith (1948) and Turner (1974).

The Nuxalk (sometimes referred to as the Bella Coola) speak a Salish language that is geographically isolated from, and forms a separate division within, the Salishan language family. At the time of contact, the Nuxalk occupied a number of permanent villages at the mouths of rivers and creeks in the Bella Coola Valley, North and South Bentinck Arms, Dean Channel and Kwatna Inlet. There is some evidence to suggest that the Nuxalk once may have occupied the east front of the Coast Range south of Anahim Lake (Kennedy and Bouchard 1990). Beginning approximately at the time of contact, and accelerating rapidly thereafter, the Nuxalk abandoned villages in the inlets and in the Bella Coola Valley, and concentrated their settlements near the mouth of the Bella Coola River. By the early 1900s, most of the Nuxalk were living at a village on the north bank of the mouth of the river. Following a severe flood in 1936, the village was moved to the south bank where it is currently located.

Though the Nuxalk share a common language, culture and territory, individual villages did not form a political unit. Villages were typically divided into four subgroups: the nuxalkmx, who lived in the villages of the Bella Coola Valley; the Talio or talyumx of South Bentinck Arm; the Kimsquit or suclmx, inhabitants of the Dean Channel villages; and the k'walnzmx of Kwatna Inlet. At the time of European contact, there may have been as many as 60 named villages in Nuxalk territory, although not all would have been occupied simultaneously.

A village consisted of anywhere from two to thirty houses arranged in a row along a river or creek. The household was the dominant socioeconomic unit, and family sizes varied according to the wealth and status of its head. A wealthy and powerful man's household was sometimes occupied by the husbands of his daughters, his wives, married sons and aged relatives of himself and his wives. The next unit of social structure was the mnmnts or descent group, the members of which shared ancestral names and prerogatives derived from a common origin myth. Nuxalk social structure was relatively fluid and several family histories could be associated with one village. Family histories were never completely revealed except to members of the descent group whose names were embodied in them.

Culturally, the Nuxalk are most similar to their western neighbours, the Heiltsuk (Hobler 1983b). The principal distinction between the Heiltsuk and the Nuxalk is their distinctive specialized subsistence economies, a function of the variation in the nature and distribution of resources between the outer and inner coasts. The Nuxalk are oriented toward the exploitation of riverine resources, while the subsistence pattern of the Heiltsuk was characterized by the exploitation of a diversity of intertidal and deep-sea marine resources (Hobler 1983b). Despite extensive conflicts with some of their neighbours, the Nuxalk traded and intermanied with the Heiltsuk and also with the Carrier and Chilcotin.

The territory of the Nuxalk is rich in subsistence resources, resulting in a settlement pattern characterized by sedentary villages with seasonal resource harvesting camps. Fish were the main food resources, and both fishing and hunting areas were strictly controlled along descent lines. Five species of salmon, as well as steelhead trout were caught using weirs set across the mouths of creeks and rivers, however during the late nineteenth century, the use of gill nets became popular. Due to the high trade value of eulachon grease, this fish, caught in basketry traps or conical nets, was second only to salmon in importance to the Nuxalk. Other important fish species were trout, herring, halibut, flounder, perch, sole and rockfish. Intertidal mollusks, such as clams and mussels were only available on the outer channels, where they were collected using digging sticks. Important sea mammal species included hair seals and sea lions, which were harpooned, and beached whales were used when fortuitously available.

Land mammals that were hunted include mountain goat, black and grizzly bear, lynx, hare, beaver, marmot and deer. These animals were caught using a variety of deadfall traps, snares, spears and bows and arrows. Over 135 plant species were regularly harvested for food, medicine and raw materials. Examples include western redcedar, hemlock, thimbleberry, fireweed, salmonberry, nettle and wild clover.

Perhaps the most prominent characteristic of Nuxalk life was its rich and complex ceremonialism, dominated by two secret societies, the Kusiut and the Sisaok, and the potlatch. Membership in these secret societies was limited to those with hereditary rights acquired through descent or marriage. The ceremonial dances were accompanied by elaborate drumming, masks, costumes and other paraphernalia such as whistles and bellows. As with other Northwest Coast groups, the potlatch was an important means of validating social status and redistributing surplus wealth, and were held for a variety of reasons. The winter ceremonials were dominated by the proceedings of the Kusiut society, who were credited with supernatural powers and which involved elaborate initiation ceremonies. Shamanic contact with the supernatural was an important and widespread culture trait.

Houses were generally large and built with cedar planks, sometimes on stilts in response to frequent floods and in defense from raiding tribes. House fronts were often decorated with the resident's crest. Rectangular plank houses were sometimes constructed in rectangular pits, with only the roof visible above the ground surface.

Common household items, such as dishes and vessels, were traditionally made from wood, bark, bone, horn and stone but after European contact these materials were largely replaced by iron.

Both men and women wore capes, fur ropes and sometimes moccasins. Women also wore aprons. Capes were commonly of woven cedar bark, rabbit skin or mountain goat wool, and the later were often trimmed with otter pelts. Personal adornment included necklaces, bracelets and nose and ear ornaments of shell and bone. The long, conical shells of dentalium were particularly prized.

Travel was primarily by canoe, although foot trails to the Interior are known to exist. The most common canoe type among the Nuxalk was a long narrow spoon-shaped variant constructed from a single redcedar tree, which was used on rivers. Large sea-going dug-out canoes were also used, sometimes with sails of skin or woven cedar. Snowshoes were worn in winter for travel in deep snow.

Unlike cultural groups located on the outer coast such as the Heiltsuk, whose widely dispersed resource base required seasonal migration to resource camps, the Nuxalk were able to maintain major villages throughout the year, instead sending out expeditions for specific resources such as mountain goat. This subsistence pattern resulted in a greater degree of settlement stability (Hobler 1983b).

Early European Contact

The first European contact with the Nuxalk occurred in 1793. Captain George Vancouver and his crew surveyed Dean Channel, Cascade Inlet, Burke Channel and North and South Bentinck Arms where they encountered the Nuxalk and exchanged trade goods for fish and skins. About a month later, Alexander Mackenzie arrived in the Bella Coola Valley from the east, stopping at Burnt Bridge on his way to the Pacific. With the establishment of Fort McLoughlin by the Hudson's Bay Company in 1833, the Nuxalk began to travel there to trade furs for manufactured goods. An additional Hudson's Bay Company post was established in Bella Coola in 1869, although it was abandoned 13 years later. Like the Heiltsuk, the Nuxalk also acted as middlemen and traded extensively with the Carrier to the east, exchanging eulachon grease for furs and other items.

Following the establishment of the fur trade and associated forts, European missionaries began arriving in the area. In 1883, at the invitation of the Nuxalk Chief, a mission was established in Bella Coola, and other religious denominations followed. The first major non-Native settlement was established by Norwegian colonists in 1894, at Hagensborg in the Bella Coola Valley.

The devastating effects of the smallpox epidemics were felt by all the Northwest Coast Native peoples including the Nuxalk. Indeed, the 1863 smallpox epidemic decimated the population of a number of villages along the Bella Coola River. By the early 1900s few of the traditional Nuxalk villages remained, primarily due to population decline caused by epidemics of disease.

In the early 1920s residents of Kimsquit, Talio and Kwatna came to live in the villages at the mouth of the Bella Coola River. The focus of the Nuxalk economy gradually changed from hunting, fishing and gathering to commercial fishing and logging. By the 1920s, the role of descent groups in political life had been largely lost, and many songs and ceremonials had been merged or forgotten. Since the 1970s, a considerable resurgence of Nuxalk culture has occurred, including a renewed interest in understanding and preserving heritage sites.

4.2.4 Oweekeno

Oweekeno are speakers of Oowekyla, a Central member of the northern branch of the Wakashan language group. Oowekyla is similar to, but distinct from, the Heiltsuk language. The majority of the Oweekeno winter villages were located at the head of Rivers Inlet, on the Wannock River and around Oweekeno Lake; the Oweekeno also had rights to resources along the inlet, on Calvert Island. Another group, the Koeye had a number of villages in the vicinity of Koeye River and Koeye Lake. The Koeye were considered half Heiltsuk and half Oweekeno, and had strong social affiliations with both groups.

The extent to which the Oweekeno had a tribal organization is unclear, but they appear to have placed more emphasis on village membership than on tribal affiliations. Indeed Hilton (1990) and Olson (1954 in Hilton 1990) report that while a Bella Bella (Heiltsuk) person will reference him/herself to both tribe and village an Oweekeno refers only to his/her village of origin. Oweekeno society was ordered by a series of group 'crest groups'. Unlike their neighbours, the Oweekeno crest groups were named after groups of peoples as opposed to the crests themselves. Hilton states that crest groups "were not an important basis of identity, and beyond determining who sat where at feasts, they seem to have had few ceremonial functions"(Hilton 1990). Individuals could choose to belong to more than one crest group at a time and could choose which of their parent's groups they wished to affiliate themselves with.

Oweekeno social structure was similar to that of the neighbouring Xaixais and Heiltsuk. There were ranks of society including; chiefs (both male and female), commoners, low class people and slaves. Those of high rank were often identified by cranial modification, ornamental jewelry and the possession of coppers and chiefly titles. Commoners held names of less social honour and held minor feats while the low class was often composed of those who were "unambitious, orphans, or those who did not have kinsmen to sponsor them at Potlatches and feasts (Hilton 1990). The slave class was composed of captives of war and their children.

Oweekeno culture resembles those of the Heiltsuk and the Kwakiutl Laich-kwil-tach in many respects, with several specific differences. Based at the head of Rivers Inlet, Oweekeno culture shows a greater inland subsistence orientation than that of the

Heiltsuk, although the Oweekeno did travel seasonally to the mouth of the inlet to harvest seaweed, herring roe and other marine resources. Owikeno Lake and the surrounding rivers were rich in salmon and eulachon and these areas were heavily utilized.

Like other Northwest Coast groups, the Oweekeno relied on canoes for travel. According to Hilton (1990) the Oweekeno used only the northern cedar dugout style of canoe, and not the bark style used by the Nuxalk for lake travel.

Early European Contact

While the centralizing forces for the Heiltsuk were the fur trade and the missionaries, for the Oweekeno, it was the burgeoning salmon and logging industries. Around 1900, two villages were established at the foot of the Wannock River close to a cannery and sawmill. Between 1900 and 1935, many traditional Oweekeno villages were abandoned as groups moved to join those at Kitit. The Oweekeno were very resistant to the ideas and assistance of Methodist missionaries, and attempted to retain much of their traditional culture.

Smallpox decimated a large number of Oweekeno just as it had all the Coastal groups. The decline in population amongst the Oweekeno occurred at the same time as the other Nations on the Coast; however, unlike their neighbours, Oweekeno populations did not begin to rise again until the 1940s (Hilton 1990).

4.2.5 Kwakwaka'wakw

The following discussion of Kwakwaka'wakw culture is summarized from Galois (1994) and Codere (1990). Galois provides the most detailed and up-to-date source on the Kwakwaka'wakw and his volume provides a geographic overview of the changing demography and settlement patterns of the Kwakwaka'wakw between 1775 and 1920, as well as a gazetteer of the location and uses of numerous settlement sites. Other useful sources include Boas (1909, 1921, 1934, 1966), Bouchard (1995), Dawson (1887), and Drucker (1943, 1965).

The Kwakwaka'wakw live on northern Vancouver Island and the adjacent mainland of British Columbia. Much of the available ethnographic literature refers to the Kwakwaka'wakw as the Kwakiutl or the Southern Kwakiutl. In 1980, the U'mista

Cultural Centre in Alert Bay recommended that the term Kwakwa̲ka̲'wakw (meaning "those who speak the Kwak'wala language") be used rather than Kwakiutl or Southern Kwakiutl (Galois 1994). There are many groups that speak Kwak'wala, of which the Kwakiutl (or Kwagu'ł) are only one group, centered around Fort Rupert. All other Kwakwa̲ka̲'wakw tribes had their own names. However, early officials and anthropologists referred to all speakers of Kwak'wala as Kwakiutl. In addition, the related languages of the Heiltsuk, Oweekeno and Haisla were called "Kwakiutlan". Thus, to differentiate the Kwak'wala-speaking "Kwakiutls" from the "Kwakiutlans who were not Kwakiutls", it became common to refer to the Kwakwa̲ka̲'wakw as the "Southern Kwakiutl" (Galois 1994).

The Kwak'wala language is part of the Wakashan language family. While Kwak'wala is generally homogeneous, there are dialectal distinctions from community to community (Galois 1994). Kwak'wala has numerous sounds that do not occur in English and, as a result, a number of orthographies have been developed to write the Kwak'wala language. Table 2 uses one such orthography (employed by the U'mista Cultural Centre), as well as anglicized spellings, to present a rank-ordered list of the village groups and numayma (local groups) of the Kwakwa̲ka̲'wakw, as reported to Wilson Duff by Mungo Martin (in Galois 1994:7-8).

It is crucial to note the differing assumptions of aboriginal and non-aboriginal culture regarding the organization of lands and places associated with tribes and numayma. While non-aboriginals may find it convenient to list tribal names and villages alphabetically, such a list would appear disordered to someone familiar with traditional Kwakwa̲ka̲'wakw social organization. In Kwakwa̲ka̲'wakw culture, the most logical means of providing such a list is to rank groups according to status, as reflected in the feast system (Galois 1994).

The Kwakwa̲ka̲'wakw groups within the Central Coast LRMP area represented on the project are: the Weewiakay (Cape Mudge), Gwa'sala-'Nak'waxda'xw (Smith and Seymour inlets), Mamaleleqala Qwe'Qwa'Sot'Enox (Village Island), Weiwaikum (Campbell River), and Tanakteuk (New Vancouver) First Nations, ail represented by the Kwakiutl District Council; the Kwa-Wa-Aineuk (Hopetown, Watson Island), Kwicksutaineuk-Ah-Kwaw-Ah-Mish (Gilford Island), Namgis (Alert Bay), and

Tsawataineuk (Kingcome) First Nations of the Musgamagw Tsawataineuk **Tribal** Council; and the independent Tlowitsis Mumtagila (Turnour Island) First Nation.

Table 2 - Rank-Ordered List of the Village Groups and *numayma* (local groups) of the Kwakwaka'wakw (Modified from Galois (1994:7-8)

Rank	U'mista Orthography	Anglicized Spelling
1.	Kwagu'ł	Kwakiutl
2.	Mamalilikala	Mamaleleqala Qwe'Qwa'Sot'Enox (Mamaliklikulla)
3.	'Namgis	Namgis (Nimpkish)
4.	ławit'sis	Tlawitsis
5.	Da'naxda'xw	Tenaktak
6.	Ma'amtagila (Madilbe')	Matilpi
7.	Dzawada'enuxw	Tsawataineuk
8.	Kwikwasut'inuxw	Kwicksutaineuk (Kwicksotaineuk)
9.	Gwawa'enuxw	Kwa-wa-aineuk (Gwawaenuk)
10.	Haxwa'mis	Hahuamis
11.	'Nak'waxda'xw	Nakwoktak
12.	Tlatlasikwala	Tlatlasikwala
13.	Nakamgalisala	Nakumgilisala
14.	Gwa'sala	Gwasilla
15.	Gusgimukw	Koskimo
16.	Gop'inuxw	Giopino
17.	Gwat'sinuxw	Quatsino
18.	T'łatsinuxw	Klaskino
19.	Wiweka'yi	Weewiakay (Assu-20)
20.	Wiwek'am	Weewiakum (Assu-21)
21.	Walitsma	Walatsama (Assu-19)
22.	Kwixa	Kweeha

Social Organization

Kwakwaka'wakw social organization is based principally on kinship and rank (Galois 1994). Above the level of the family, there are two primary social structures: the numaym and the tribe. The numaym, or local group, is considered to be the fundamental unit of Kwakwaka'wakw society and consists of one or more extended family groups, with members claiming common ancestral descent (Galois 1994). The term numaym (plural numayma) implies a people of "one kind" (Codere 1990). However, because descent is determined bilaterally in Kwakwaka'wakw culture, the composition of numayma was often flexible, and the fluidity of the system increased during the historic period due to the severe decline in population (Galois 1994). Continuity of the numaym was ensured by the explicit separation of name and holder; names belonged permanently to the numaym, while individual holders were considered transient. Status was expressed through the order of the names within each numaym and in the order of the numayma themselves (Galois 1994). The individual with the highest rank acted as chief, and represented the numaym in external dealings. The rank ordering of names was expressed most clearly in, and was validated by, the feast system. In addition to names for important members, each numaym owned myths, crests and houses in the winter villages (where they hosted feasts and winter ceremonies), as well as rights to seasonal resource locations (Codere 1990; Galois 1994). Kwakwaka'wakw tribes were composed of a number of numayma and employed similar organizational concepts. Tribes formed distinctive social and political units, each with a defined internal social structure and associated with specific geographic localities. Typically, each tribe inhabited its own winter village and often acted as a group, particularly during times of conflict.

The most important socioeconomic institution of the Kwakwaka'wakw was the feasting (or potlatch) system (Codere 1990). The feast was (and continues to be) a public event with important social, political and economic consequences. The redistribution of material wealth through the feasting system was used to legitimize social status and to reinforce the network of reciprocal social and economic exchange (Codere 1990). Feasts were held for a variety of occasions, ranging from the naming of children to marriages or the erection of crest or memorial poles. Factors such as population decline, efforts by external agencies to abolish the feast, and the use of goods of non-Aboriginal manufacture modified the nature and the scale of the potlatch; nevertheless, despite such obstacles, the practice has continued virtually without interruption to the present day. In addition, ceremonial complexes, the most important of which are the Winter Dances, featuring dramatic representations of supernatural beings and their interactions with ancestors, played an important role in traditional culture. Like the potlatch, these Kwakwaka'wakw ceremonies have been performed continuously up to the present day.

Settlement Patterns

The primary pattern of the Kwakwaka'wakw seasonal round involved three major movements: from winter villages to eulachon fisheries; then to a variety of other resource procurement sites; and, finally, a return to the winter villages (Galois 1994). In general, the Kwakwaka'wakw harvested, processed and stored a surplus of diverse food resources, allowing the winter season to be devoted to ceremonial activities and craft production in the permanent villages (Codere 1990). Groups that did not have direct access to certain resources, such as eulachon oil, traded with neighbouring tribes to obtain them. The winter season, largely devoted to feasts and ceremonial activity, ended with the arrival of the eulachon, usually around the end of March. Following the two-month eulachon season, people dispersed to a variety of resource procurement sites, most significantly the salmon fisheries, which were occupied until late fall. Each Kwakwaka'wakw tribe had access to a variety of other resource harvesting areas such as herring spawning grounds, berry patches, clover-root fields, and halibut fishing grounds. Rights to certain resources were hereditary and were based on numaym membership, while other resources were communally owned (Codere 1990). Some resources, such as berries and clams, were widely distributed and could be gathered near fishing stations, while others, such as meat and pelts, usually required more extensive hunting trips. By the end of November, following the final run of chum salmon, the winter villages were generally re-occupied.

Each stage of the annual round was associated with a particular type of settlement and a particular level of social organization (Galois 1994). Resource camps were occupied by the numaym or some portion thereof, often in temporary dwellings. Winter villages were usually occupied by members of a single tribe, but typically contained people from several numayma. This social structure influenced the organization of the winter villages, with each numaym occupying houses in each own section of the village (Galois 1994). Eulachon sites were typically occupied by several tribes, usually in temporary dwellings, forming what Mitchell (1983, in Galois 1994) describes as village aggregations. Superimposed upon the sequence of seasonal movements were longer-term changes in Kwakwaka'wakw settlement patterns (Galois 1994). Boas, whose fieldwork took place a century after contact, concluded that the number and arrangement of Kwakwaka'wakw tribes had changed dramatically, with at least some of the changes occurring after contact. Some communities had undergone splits, leading to the establishment of new numayma or tribes (and eventually new villages), while others had disappeared through mergers. Boas linked these processes to the evolution of Kwakwaka'wakw social structure and proposed that each numaym had once occupied its own winter village; for reasons such as population decline and defence, some groups left their villages to join other communities (Galois 1994).

Material Culture

The material culture of the Kwakwaka'wakw was complex and sophisticated, and utilized highly-specialized woodworking and weaving technology. Kwakwaka'wakw art made extensive use of crests to express the hereditary rights and distinctions of the numayma. Artistic motifs were ubiquitous, and utilitarian objects (such as housewares, furnishings and tools), as well as ceremonial or symbolic objects (such as carved poles, feast dishes and masks), were adorned with carving and painting (Codere 1990). Carving was basically sculptural, and appendages such as beaks, fins and wings were frequently attached to poles, house posts and masks. Masks were designed with hinges and strings to move mouths and wings, and transformation masks opened to reveal hidden inner faces.

At the time of contact, the Kwakwaka'wakw lived in shed-roofed houses (Codere 1990). By the mid-nineteenth century, they began to build houses with low-pitched roofs and walls using huge planks held between pairs of upright poles. There were no painted facades or external carvings at that time. The typical Kwakwaka'wakw house of the late nineteenth century measured 40 to 60 feet square and had a gabled front facing the shore (Codere 1990). Three styles of framework were commonly employed, each using between two and four central posts and a single or double ridgepole; all three types used rafters and stringers to hold the roof planks. After about 1865, the central posts were often carved with crest figures. Most often, a single platform followed the interior walls, although some houses had multiple levels. Four families typically occupied each house, each family partially partitioning off a comer with its own fireplace (Codere 1990).

Canoes were the principal means of transportation among the Kwakwaka'wakw (Codere 1990). These were mainly in the "Northern style", featuring a high prow and stem and measuring between 10 and 50 feet in length. The Kwakwaka'wakw of Vancouver Island are reported to have used canoes in the "West Coast style", with a long, tapered bow and low stem. In earlier times, the Kwakwaka'wakw may have also used a type of war canoe, with a narrow, heavy hull and a high flaring bow.

Clothing consisted of aprons and blankets of woven yellow cedar bark or sewn skins (Codere 1990). Conical hats and coats made of cedar bark matting were worn in rain. Status items included nose and ear pendants of abalone shell, and necklaces, bracelets and anklets of dentalia. At one time, all Kwakwaka'wakw groups reshaped the heads of their infants by cradle binding, although some tribes reserved this practice for the children of high-ranking individuals (Codere 1990).

Early European Contact

Kwakwaka'wakw culture was influenced by the arrival of Euro-Americans in the last quarter of the eighteenth century. The ongoing cultural interaction that followed caused not only adjustments to these new arrivals, but also changes in relations between various Kwakwaka'wakw groups and between the Kwakwaka'wakw and their neighbours. Resulting changes were eventually reflected in settlement patterns.

Initial contact between the Kwakwaka'wakw and Euro-Americans was fueled by exploration and the trade in sea otter pelts. Spanish and British explorations of Nootka Sound in the 1770s may have affected the Kwakwaka'wakw of the outer coast of Vancouver Island. British, American and Spanish traders continued to enter the area throughout the late eighteenth century. While a few vessels visited the Kwakwaka'wakw directly, the area was peripheral to the principal focus of the fur trade, and the Kwakwaka'wakw traded more often with Nuu-chah-nulth intermediaries than with Euro-Americans (Galois 1994).

By the early nineteenth century, contact between the Kwakwaka'wakw and non-aboriginal people was frequent. By the 1830s, the Hudson's Bay Company was trading in the region, and Fort Rupert was established in 1849 on northwest Vancouver Island. Fort Rupert quickly became a major Kwakwaka'wakw settlement and the centre of ceremonial activity, remaining so until about 1900, when the community at Alert Bay grew in importance. Alert Bay was built around a cannery established in 1870, a sawmill built in 1888, and an industrial school for boys opened in 1894.

Missionaries had a complex and often contradictory relationship with First Nations groups in the area (Galois 1994). The Oblates, followed by the Anglicans and Methodists, set up missions in Kwakwaka'wakw territory. The first permanent mission was established at Fort Rupert in 1863. The First Nations of the area remained largely indifferent to these missionary efforts. In 1866, the mission was relocated on Harbledown Island, until the Oblates withdrew from the area in 1874. The Anglicans moved in shortly after, establishing a new mission at Fort Rupert in 1878. This mission was soon shifted to Alert Bay, and a day school was established in 1881, followed by residential schools in the 1890s. After two unsuccessful attempts, the Methodists established a mission and a school at Cape Mudge in 1893.

The effects of the contact process on Kwakwaka'wakw demographics was devastating. The most recent estimate of Kwakwaka'wakw population at contact is 19,125 (Boyd, in Galois 1994). This figure is speculative, and data on early population levels is sparse and unreliable. Two broad processes associated with contact were responsible for the drastic decline in Kwakwaka'wakw population: the introduction of diseases to which the First Nations population had no resistance; and, the escalation of conflicts and warfare (Galois 1994). Smallpox, influenza, measles and tuberculosis, had fatal consequences, particularly when combined with trade in low-grade alcohol. According to Boyd (1985, in Galois 1994), smallpox seems to have become widespread on the coast sometime during the 1770s. The effects of the earliest epidemics on the Kwakwaka'wakw population are unclear; the most dramatic documented decline in population seems to have begun in the 1820s.

The contact process seems to have had a significant impact on the balance of power both within Kwakwaka'wakw territory and between the Kwakwaka'wakw and their neighbours (Galois 1994). Perhaps the most distinctive feature of the early contact period settlement patterns is the frequency of defensive sites. Almost all of the villages described by Euro-American visitors had a defensive capacity. At Smith Inlet, for example, Vancouver reported a village built on a detached rock, connected to the mainland by a platform constructed for defence (Galois 1994). Tribes acquired territory by two sometimes related processes: conquest and division of an existing tribe into two independent entities. Warfare was a significant factor in the territorial changes that took place between about 1780 and 1850. In particular, conflict between the Lekwiltok group of Kwakwaka'wakw tribes and their neighbours produced important geographical changes. From origins in the vicinity of the Nimpkish River, the Lekwiltok pushed south into territory occupied by the Salish. The scale of fatalities resulting from inter-tribal warfare is difficult to assess. One of the most dramatic conflicts occurred in the 1850s, when the village of Gwayasdams was destroyed by Nuxalk raiders. Conflict with Europeans also had direct consequences for many Kwakwaka'wakw (Codere 1990). In 1850 the village of Nahwitti was destroyed during a conflict between the Kwakwaka'wakw and British authorities, and in 1865 the Kwakwaka'wakw village at Fort Rupert was destroyed by the British Navy. After about 1870, the scale and frequency of armed conflicts between First Nations groups was reduced due to the imposition of the colonial political and administrative system. However, by the 1880s, the presence of European settlement in the area was manifested in the imposition of the reserve system on the Kwakwaka'wakw as the Crown formalized its claim to the rest of their aboriginal territories.

Historic Kwakwaka'wakw settlement patterns come into clear focus about 1850, following the establishment of Fort Rupert (Galois 1994). The Kwakiutl tribes consolidated into a single winter village in Beaver Harbour to secure their intermediary role in the fur trade; the 'Ilawitsis, in turn, adopted the old Kwakiutl village on Turnour Island. However, the actions of the Kwakiutl exacerbated inter-tribal conflict. The well-known wars between the Nuxalk and some Kwakwaka'wakw tribes were part of this context, and produced repercussions in Kwakwaka'wakw settlement patterns, as villages were destroyed, merged and resettled.

Factors shaping new settlement patterns in the late nineteenth century were a reduced frequency of conflict, growing Kwakwaka'wakw participation in the Euro-American economy, and population decline (Galois 1994). Accessibility to the new economy significantly influenced the selection of winter village sites. In general, shifts were made towards the economic thoroughfare of the Inside Passage from sites on inlets, on the inner coast or towards the outer coast. The decline in population produced further pressure for village consolidation.

Kwakwaka'wakw material culture and socioeconomic patterns changed rapidly after contact. Trade introduced iron and steel implements, which quickly replaced tools of wood and stone. Following the establishment of Fort Rupert, Hudson's Bay blankets began to replace traditional hand-woven Kwakwaka'wakw robes (Codere 1990). Growing involvement in commercial enterprise also affected First Nations annual rounds. By the end of the nineteenth century, the Kwakwaka'wakw had become involved in a variety of activities within the new economy, including commercial fishing, canning, hop-picking, sea mammal hunting and logging. Some of these activities took place within Kwakwaka'wakw traditional territory and were complementary to existing seasonal rounds, while others required adjustment in annual patterns or relocation and extended absences. The Kwakwaka'wakw prospered economically during the early 1900s as their in-depth knowledge of the land and resources-provided them with an advantage over others less familiar with local resources. This advantage was particularly evident among Kwakwaka'wakw who engaged in the commercial fishing industry. Despite the new techniques for acquiring it, much of this wealth was redistributed in traditional means through the feast system.

Today, the Kwakwaka'wakw live in a number of politically autonomous communities, each governed by a Chief and Band Council (Codere 1990). In 1985, the population of all Kwakwaka'wakw communities was approximately 3,500 people (Webster, in Codere1990). Today, many of the Kwakwaka'wakw work in resource-related industries such as fishing, logging and mining; however, an increasing number of people is once again exploring a traditional, seasonal resource based economy (Webster, in Codere 1990). The cultural identity of the contemporary Kwakwaka'wakw community is strong, as seen in 1980 at the opening of the U'mista Cultural Centre in Alert Bay.

5.0 HISTORY OF ARCHAEOLOGICAL RESEARCH ON THE CENTRAL COAST

As background to this overview, an extensive review of previous archaeological research in the study area was conducted. The purpose of the review is to identify which portions of the study area have, and more importantly have not, received archaeological attention. This information allows for a gap analysis- an assessment of how well the existing archaeological inventory may represent the entire range of sites that may be present.

Considerable academic research has focused on the Central Coast and the results of many investigations have been published as theses, articles, academic papers and permit reports. More recently, significant research has been conducted by professional consulting archaeologists at the request of First Nations groups or in response to development plans related to forestry, mining and other land developments with the potential to disturb archaeological resources.

5.1 Methodology

The Archaeological Field Research in British Columbia: Annotated Bibliography provided by the Archaeology Branch (1995) was consulted in order to locate overview, inventory, impact assessment and excavation reports conducted by academic researchers and cultural resource management consultants. In addition, the published and unpublished reference fields of recorded sites in the study area were searched in the Canadian Heritage Information Network (CHIN) database and referenced reports were obtained where possible. The majority of these documents are unpublished reports, but most are on tile at the Culture Library of the Ministry of Small Business, Tourism and Culture in Victoria. Several non-permit reports were not on file, and it was necessary to contact individual researcher(s) or development proponents to obtain copies. The majority of the academic reports were available through libraries or relevant university departments. In particular, a number of published and unpublished reports, theses and articles in the possession of professor Philip Hobler of Simon Fraser University were consulted.

The following review begins with a brief description of early regional research on the Central Coast. For a more detailed summary, it was considered useful to subdivide the LRMP area into subzones, due to the extent of the study area. The initial division was based on the North and South administrative divisions established for the LRMP. The north subzone extends approximately from Caamano Sound to Blunden Bay, while the south section extends approximately from Burnett Bay to Sonora Island. Within these two divisions, the literature was roughly divided according to geographic area (outer coast and islands, inner coast/fjords, inland lakes and river valleys, alpine), and according to project type (e.g., excavation, probabilistic survey, intensive systematic survey). Discussions of specific geographic locations of archaeological research proceed roughly from north to south within each of these geographic subdivisions. Reference is also occasionally made to archaeological studies conducted outside, but adjacent to, the study area when they can contribute to interpreting the archaeological context within the Central Coast LRMP area.

5.2 Categories of Archaeological Investigation

The main categories of archaeology that have been undertaken in the study area are research-oriented excavation and survey, and development-related overviews, inventories, impact assessments and mitigative excavations. The following sections describe each of these categories.

5.2.1 Inventory

Archaeological inventories on the Central Coast have employed a variety of field strategies including probabilistic surveys, systematic intensive surveys, and localized, non-systematic surveys. The following summary of inventory techniques is based on a discussion by McRanor and Bailey (1996).

5.2.2 Probabilistic Inventory

Probabilistic inventory is often considered the most "objective" type of archaeological survey, as it is designed to reduce many of the biases and assumptions inherent in other research designs. Consequently, it is the most appropriate approach for obtaining data that can be used for predictive modelling. Probabilistic inventory involves the random selection of units for field investigation, without consideration of predicted site potential or other factors. In theory, all areas selected for field inspection are examined equally, regardless of terrain, vegetation or preconceived ideas of site distribution.

Probabilistic sampling strategies may be stratified. In a stratified sample, a study area is divided into discrete sub-units based on defined criteria, such as physiographic units (e.g., river valleys, lake shores, alpine) or inferred archaeological potential (e.g., high, moderate or low). Within each stratum, individual study units are randomly selected for field survey. A key feature of probabilistic survey is that all portions of the study area have an equal chance of being selected for analysis, and therefore assumptions about site potential can be field tested. Archaeological investigations of areas of predicted low potential may confirm or refute the assumed absence of sites in these locales. Negative data (i.e., areas that have been inspected and shown to not contain sites) are often as important for archaeological modelling as positive site location data.

Although probabilistic survey is clearly the most useful approach for the development of predictive models and archaeological site potential mapping, few studies of this type have been undertaken in British Columbia, and none have been conducted in the Central Coast LRMP area. The absence of probabilistic survey data for the Central Coast LRMP area complicates the development of archaeological site potential models for this region.

5.2.3 Systematic Intensive Survey

Systematic intensive survey was conducted throughout B.C. during provincial government inventory projects of the mid-1970s to mid-1980s. More recent archaeological impact assessments conducted in response to proposed land use developments also typically employ this inventory technique, although the degree of systematic versus judgmental inventory varies among researchers. Most often, this type of inventory involves a walking survey of areas judgmentally assessed as having high or moderate archaeological potential, and subsurface testing in selected locations. Field coverage often follows specific landforms (e.g., shorelines, river valleys, terrace edges, lake shores) or specific development corridors, such as roads, rail lines, pipelines or transmission lines. Areas designated as having low archaeological potential are often left unexplored by these studies.

5.2.4 Other Types of Survey

Some archaeological surveys cannot be conveniently classified into the categories of "probabilistic" or "systematic intensive". They are characterized by non-systematic methodologies or a lack of a description of field methods and survey coverage. Prior to the 1970s, few archaeologists included subsurface testing as part of their methodology, though today this practice is standard. As a result, archaeological sites that were not evident on the surface or in existing exposures may have been overlooked. Early survey techniques varied significantly, from undefined survey methods to exclusive use of informant testimony. Although they may be spread over large areas, these survey types tended to be small and specific.

5.2.5 Excavation

Archaeological excavations most often occur as academic research, or as mitigation projects related to immovable land developments. Consequently, excavations vary substantially in objectives, research methods, and analytical and reporting detail.

5.2.6 Overviews

Four overviews have been conducted within the study area. I.R. Wilson Consultants Ltd. (1995) completed an overview and 1:250,000 scale predictive modelling project for the Port MacNeill Forest District. The project resulted in broad archaeological sensitivity zones being identified, primarily along the coast line. The scale of the project did not allow for operation use.

Millennia Research undertook an overview and brief inventory study in the Spiller Inlet, Mooto, Polallie and Ellerslie Lake areas, on behalf of Western Forest Products Limited (Maxwell and Vincent 1997). GIS-based predictive models were developed for shell middens, fish traps, palaeoshoreline lithic scatters, inland camps, pictographs, rockshelter burials and CMTs. Due to problems with slope and DEM data, the results were not considered useful for planning purposes.

Arcas Associates and Archeo Tech Associates (1994) completed an ethnographic and archaeological overview of the Broughton Archipelago Marine Park on behalf of BC Parks. The study produced archaeological resource polygons that represent predicted site potential, based on recorded site locations, ethnographic and historic references and environmental factors. Modelled site types included burials, habitation remains, intertidal features, rock art and culturally modified trees. The study provided management recommendations that ranged from a park-wide inventory though site-specific impact assessments.

Millennia Research and the Heiltsuk Cultural Education Society completed a detailed overview of archaeological resources and site potential in the traditional territory of the Heiltsuk Nation (Maxwell et al. 1997). The study produced predictive models for a number of archaeological site types, but the models were not implemented and no maps were produced. The terms of reference for the present study required that the Heiltsuk overview results be incorporated into the Central Coast LRMP AOA. To that end, some of the Heiltsuk AOA modelling rules were adopted in the predictive models used in this study.

5.3 Review of Previous Archaeology on the Central Coast

5.3.1 Regional Research

The Northwest Coast has long been an area of considerable archaeological interest due to the complexity of coastal cultures, and the deep stratification of many coastal sites. In addition, the extensive ethnographic documentation for the area made research appealing, as it allowed archaeologists to apply a direct historic approach to interpreting archaeological remains. Archaeologists studying the early peopling of the New World have also focused much of the their research along the Pacific Coast, arguing for a coastal migration route from the Old World via the Beringian land bridge.

The earliest archaeological "survey" of the Central Coast appears to have been conducted by Newcombe during a trip to collect ethnographic materials for museums. A nautical chart with "sites" numbered faintly in pencil in the Ocean Falls region is believed to be Newcombe's, although no other records of the trip are known (Hobler 1997 pers. comm.). Historical reports of abandoned villages were recorded by Alexander Mackenzie and numerous others. True archaeological investigations were first conducted on the Central Coast in the 1920s by Harlan Smith. A six-week-long survey of the Central Coast between Prince Rupert and Rivers Inlet was conducted by Philip Drucker in 1938 (Drucker 1943). His study included some small, well-documented excavations in the Bella Bella area.

Intensive archaeological investigation of the Central Coast began in the 1960s and has continued to the present. Researchers from the University of Colorado and Simon Fraser University were the first to actively pursue academic research in this area of British Columbia. In 1968, Philip Hobler of Simon Fraser University and James Hester of the University of Colorado, aided by J. Anthony Pomeroy, conducted intensive coastal surveys of the Bella Coola and Bella Bella regions respectively (Hester 1968, Hobler 1969a). A relatively low site density was observed, with a wide variety of site types recorded, including cedar plank houses, cemeteries, burial caves, a pithouse village, fish traps, surface and underwater shell middens, lithic artifact scatters, petroglyphs and pictographs. Hobler's survey area included Dean Channel, Burke Channel and associated inlets.

Following Hobler and Hester's work, four years of concentrated research took place in Kwatna Inlet, yielding a culture historical sequence spanning the last 2,000 years (Hobler 1969b, 1970b, 1972a, 1972b, 1976; Carlson 1970, 1971). Subsequent work on the Central Coast has yielded a cultural sequence associated with shell midden deposits 5,000 years old (Hester 1968, Simonsen 1973). Pre-shell midden deposits characterized by chipped stone artifacts have been dated on the Central Coast to nearly 10,000 years ago (Hester and Nelson 1978, Carlson 1979b, Apland 1982) confirming a long history of human occupation on the Central Coast.

A number of other research-oriented surveys have been conducted on the Central Coast, including an inventory by Bjom Simonsen in the Bella Bella area (Simonsen 1973), surveys in the Douglas Channel area by Mitchell and Misbra (Mishra 1975), and a survey of the Bella Coola River valley by Hughes (1977).

Simon Fraser University has sponsored numerous archaeological projects on the Central Coast over the past three and a half decades, including more than a dozen full-scale excavations associated with field schools (Nobler 1982a). These excavations were conducted in Kimsquit, located at the head of Dean Channel (Hobler 1969b, 1972a, 1972b), Kwatna (Carlson 1970, 1971), Namu (Carlson 1978, 1979a) and the Bella Coola valley(Hobler 1988b, 1989, 1995b; Hobler and Bedard 1988,1990, 1992).

Since the mid 1980s, a considerable amount of archaeological work on the Central Coast has been conducted by consulting archaeologists in response to specific development proposals. Several dozen archaeological impact assessments have been completed, the majority related to proposed timber harvesting developments. Several overviews have been conducted on the Central Coast as the result of concerns over the possible impacts of resource use such forestry on the archaeological record. LR. Wilson Consultants conducted an overview of the Port McNeil1 Forest District at the request of the Ministry of Forests (Wilson 1995). Millennia Research conducted archaeological overview/inventory studies of the Heiltsuk Nation Traditional Territory on behalf of the Heiltsuk First Nation and the Archaeology Branch (Maxwell et al. 1997), and of the

Northern end of Spiller Inlet, Ingram, Mooto, Polallie and Ellerslie Lake areas on behalf of Western Forest Products Ltd. (Maxwell and Vincent 1997).

5.3.2 The North LRMP Area

Outer Coast and Islands

Princess Royal Island

Princess Royal Island is located at the northernmost extremity of the Central Coast LRMP area. Several development-related archaeological inventory and impact assessment projects have been conducted on the island in recent years. In 1992, I.R. Wilson Consultants conducted an archaeological resource inventory and impact assessment of a series of proposed forestry developments near Drake Inlet on Princess Royal Island. One small shell midden site (FgTf-3) of about 500 m^2 was identified in a clearcut at the south end of the inlet (Wilson 1992). The following year, Wilson (1993a) conducted an archaeological inventory and impact assessment of proposed forestry developments at Kiln Bay in Chapple Inlet. The survey identified a number of CMTs which were not recorded as archaeological sites. North of Chapple Inlet, Macnab and Wilson (1994) conducted an archaeological resource inventory and impact assessment of a proposed forestry program centered around Cornwall Inlet and up Cornwall Creek, near Douglas Channel. The survey consisted of an initial overflight, followed by a ground survey. As a result of the investigations, the survey crew recorded a rock shelter in Cornwall Inlet containing several aboriginal burials, which had been heavily disturbed by vandals. This site was located outside the boundaries of the proposed forestry operation, and as such, it was not threatened by the proposed development.

Two archaeological overview studies have been recently completed in the Princess Royal Island area. Ferguson et al. (1996) prepared an overview mapping report on archaeological resource potential in the North Coast Forest District. The project involved the map-based integration of archaeological and traditional use data, designed to assist future forestry development planning in the District. The Kitasoo/Xaixais First Nations Resource Mapping Project (1995) produced maps and related information on 96 archaeological sites in Kitasoo/Xaixais traditional territory, to facilitate community and government consultation on archaeological resource management. This study also mapped Kitasoo/Xaixais resource use areas.

Milbanke Sound

In an intensive shoreline survey that included the northernmost portion of the LRMP area, Bjom Simonsen and Donald Mitchell recorded 108 archaeological sites (Simonsen 1969, 1973). The project area was bounded by Milbanke Sound in the south, Hecate Strait to the west, Browning Entrance to the north, and the B.C. mainland to the east. Unfortunately, the researchers were unable to survey the exposed outer islands within the project area (including Aristazabal and Price Islands). Survey was conducted primarily by boat, with closer examination of judgmentally selected locations. No subsurface testing was used, and only areas which appeared to have high site potential were examined. Fitly-eight sites were identified: 26 habitation sites (middens), including 3 refuges on islets; 26 fish traps; 5 pictograph panels; and one petroglyph panel. One site (FcTe-4) on Grant Anchorage in Higgins Passage, was selected as being representative of a concentration of large habitation sites, and was excavated to provide data for a local culture history sequence. The site is believed to have been continuously occupied between ca. 3,500 B.P. and 100 B.P., based on artifact styles (Simonsen 1973). However, it seems likely that a significantly greater time depth of occupation exists for the general region, considering the much longer archaeological sequences to the north and south.

During an inventory and impact assessment within Briggs Inlet, Spiller Inlet, Neekas Inlet and Matheson Channel, CMTs were observed but not recorded as sites (Simonsen 1993b). CMTs were also observed by Millennia Research (Finnis and Eldridge 1993) during an archaeological impact assessment of proposed cutblocks in the Tom Bay area, east of Milbanke Sound. During this survey, two previously recorded sites were revisited, FcTb-2 (a stone fish trap) and FcTb-5 (a CMT site), and several additional CMTs were recorded.

Bella Bella Area

An extensive judgmental survey of the Bella Bella region was conducted by James Hester of the University of Colorado in 1968. The study involved examining areas perceived as having high archaeological potential and visiting sites reported by informants. Forty sites were recorded, and an additional thirty-one sites were reported by informants but not visited by the survey team (Hester 1968). No subsurface testing was employed during the study. Hester concluded that the inner coast had larger sites and higher site density than the more exposed outer coast.

Survey of the Bella Bella area was continued by Brian Apland and Anthony Pomeroy. Their survey was conducted with the specific aim of locating chipped stone assemblages by targeting intertidal areas and raised beach features (Apland 1974). The study area included parts of Roscoe Inlet, Cunningham Island, Denny Island, Campbell Island, the west sides of Hunter Island and King Island, and the southern part of Burke Channel on the east side of Fitz Hugh Sound. A total of 110 archaeological sites was identified and recorded during the survey, including structural remains, shell middens, fish traps, pictographs, petroglyphs and intertidal beach sites containing chipped stone. By investigating areas at low tide, Apland was able to recover chipped stone artifacts from intertidal areas associated with 28 of the sites. While no excavations were conducted, subsurface testing was used to determine the depth of cultural deposits.

Like Apland, Hobler (1978a) specifically sought out intertidal lithic sites. His survey focused on areas in Burke Channel, Kwatna Inlet, Dean Channel to east and upper Spiller Channel in the north. Forty-four sites were revisited or recorded including 14 midden sites (4 of which had flaked stone on adjacent beaches); 14 intertidal lithic sites; 12 rock art sites; 9 fish traps; and 3 rock features consisting of amorphous piles of boulders.

Reconstruction and restoration work has also been carried out in the Bella Bella area. By looking at the relationship of salmon streams to site locations and comparing the ethnographic and archaeological distribution of shell middens, fish traps, rock art, graves, historic sites, beach lithics and other site types, Pomeroy reconstructed the aboriginal settlement and subsistence patterns of the Bella Bella (Pomeroy 1980). In 1982, Hobler conducted archaeological work at Fort McLoughlin and Old Bella Bella (Hobler 1982b). His analysis used archival photos and historical records of the evolution and development of Old Bella Bella, and archaeological evidence regarding the cluster of native settlements around the fort. He noted that the establishment of the store affected native trade networks and profoundly changed the native economic system.

Intensive restoration efforts at eight historic grave sites in Heiltsuk traditional territory was undertaken by Streich (1983). Hundreds of tombstones dating from I879 to 198 1 -spanning times of known epidemics- were recorded and restored.

Bella Bella and its surrounding areas have also been the subject of three overview studies. In an attempt to mitigate the loss of wooden archaeological features, Burton (1986) conducted an overview in the Bella Bella region focusing on the management and conservation of wooden architectural remains and mortuary complexes. Thirty-eight relevant sites were identified, and field reconnaissance and detailed site recording was conducted at four of them. Burton made recommendations for documenting and recording the features, and analyzed their significance.

More recently, Millennia Research conducted an archaeological overview and inventory of the northern end of Spiller Inlet, and the Ingram, Mooto, Polallie and Ellerslie Lake drainages (Maxwell and Vincent 1997). The project involved inventory to locate unrecorded sites and revisit recorded sites, and "first generation" predictive modelling of shell middens, fish traps, palaeoshorelines, lithic scatters, inland camps, pictographs, rock shelter burials and CMTs. Due to problems with modelling slopes, the modelling results were not considered adequate for operational planning (Maxwell and Vincent 1997).

Finally, Millennia Research and the Heiltsuk First Nation cooperated to complete an overview assessment of Heiltsuk Traditional Territory (Maxwell et al. 1997). The project included a detailed review of previous archaeological research in Heiltsuk territory, a field inventory, a preliminary predictive model, error-checking of current archaeological data, and recommendations for future work. Results of the predictive modelling exercise were not mapped.

Over the past few years, additional archaeological sites in the Bella Bella area have been reported by elders, local residents and forestry workers, and many of these have been subsequently recorded by the Heiltsuk Cultural Centre. (Simonsen 1993b).

Namu

The Namu site (ElSx-1) is a large, stratified coastal midden site located on the east side of Fitz Hugh Sound. The site was first identified during the University of Colorado Bella Bella Prehistory Project, and was excavated by James Hester in 1968 (Hester 1968). It is one of the most intensively excavated sites on the Central Coast, and was the location of field schools conducted by Simon Fraser University in 1977, 1978 and 1994 (Carlson 1978, 1979a, 1979b). ElSx 1 is one of the oldest known sites on the Central Coast, with evidence of habitation from about 10,000 to 400 B.P. The earliest shell midden deposits at Namu date to about 6,000 B.P., but a deeper portion of the site (4.25 metres below surface) revealed earlier non-midden cultural deposits dated to 9720 years B.P.- the earliest radiocarbon dated occupation on the entire B.C. coast (Carlson 1979b). The preserved technology is relatively simple, emphasizing relatively large flaked stone tools and even larger stone cores and choppers. By about 7,500 years B.P., microblades and microblade cores, as well as tool types similar to styles found in northeastern Asian sites, appear at Namu. These technologies persisted until about 5,000 years ago.

Conover's (1972) Ph.D. dissertation examined non-artifactual debris from midden sites, including Namu, in an attempt to devise a chronology of cultural strata indicative of occupation phases through time. Cannon (1991) conducted a thorough analysis of the fauna1 remains from ElSx 1, and studied the changing patterns of animal utilization in the region. Rahemtulla (1995) examined Early Period (10,000 to 5,000) lithic debitage from Namu to identify the techniques used to manufacture stone tools and to make some preliminary interpretations about the ways in which the inhabitants organized lithic technologies. The lithic assemblage he studied was derived largely from stratigraphic levels predating the earliest preserved evidence of shellfish and other organic remains.

Draney Lakes

Near the headwaters of the Namu River, which flows through the Draney Lakes chain and empties into Fitz Hugh Sound at Namu, two CMTs and a possible trail remnant were observed during an archaeological inventory and traditional land-use study (Simonsen 1995a). Based on information obtained through interviewing Heiltsuk elders, Simonsen postulated that the divide lying between the north end of the northernmost lake in the Draney Lakes chain was once an aboriginal trail. The CMTs on the shore of the lake at the south end of the study area were not recorded as sites.

Pierce Bay

During an impact assessment of archaeological resources at Pierce Bay at the south end of Fitz Hugh Sound, Finnis and Eldridge (1993) revisited a previously recorded stone fish trap and midden site (EjSw-26), originally documented by Mitchell (1968).

Hakai Recreation **Area**

Pomeroy's (1980) Ph.D. thesis on the Bella Bella area was based on survey of parts of the Hakai Recreational Area and 1972 and 1974 excavations at the north end of McNaughton Island. A report by Pomeroy analyzing the area's fish traps is perhaps the best systematic study of this site type available to date (Pomeroy 1976).

In the late 1980s, Hobler (1988a) set out to determine whether the existing site inventory for the Hakai Recreational Area was representative. Using a boat-based shoreline survey that focused on areas with few recorded sites, the project added 37 new sites to the 83 sites that had been previously recorded in the study area. The majority of effort was concentrated south of Spitfire Channel and Sea Otter Inlet, north of Kwakshua Channel, locations in the McNaughton Group, and parts of the west side of Hunter Island. Areas not surveyed include Kildidt Lagoon, the east side of Hecate Island, Nalau and Goose Island. and the west side of Calvert Island.

The following year, Simonsen (1989a) surveyed the Goose Group and the west coast of Calvert Island- two areas that were not surveyed by Hobler. Survey coverage included the immediate shoreline and intertidal zone with foot traverses up to 220 metres inland. All of the shoreline in the Goose Group was accessed by boat, and most parts of the west coast of Calvert Island between Surf Island and Herbert Point was accessed by helicopter and foot traverse. Three new sites were recorded in the Goose Group; no new sites were recorded on Calvert Island.

<u>Inner Coast/Fjords</u>

Kowesas

Lepofsky and Pegg (1995) undertook an inventory of aboriginal forest utilization in the lower Kowesas watershed on Whidbey Reach, just north of the Central Coast LRMP area. Forty-six CMTs were recorded during the study, mostly bark-stripped yellow cedars and Western redcedars. The trees were generally stripped on their up-slope side, and redcedar trees from 25 to 40 centimetres in diameter were preferred. The age range of these modifications was between 39.5 and 98 years B.P. In some remote areas, very few redcedars had been stripped, but as many as half of the yellow cedars had been modified. Extensive and intensive use of cedar occurred *in* the Kowesas watershed in pre-contact and early post-contact times. Several of the trees had been stripped more than once, reflecting a managed, long term use of the resource. Lepofsky and Pegg noted that the relatively high visibility of CMT sites versus subsurface sites makes CMT studies a less expensive, non-destructive means of assessing the extent to which the valley was used in pre-contact and early post-contact times.

Pooley And Roderick Islands

McLaren and Maxwell (1996) conducted an archaeological impact assessment and inventory of proposed forestry operations on Pooley and Roderick Islands, north of Klemm. Shoreline cutblocks were accessed by boat and inland blocks were accessed by helicopter. The field survey identified 13 CMT sites containing a total of 45 CMTs. Several different varieties of culturally modified trees were recorded during the fieldwork, including taper stripped cedars, rectangular stripped cedars, martin trap holes, and possible scarred hemlocks. No other site types were observed.

Several archaeological impact assessment surveys have been conducted by the Bastion Group in Griffin Passage and in the northwestern Pooley Island area (Simonsen 1989b, 1994d). As a result of these investigations, two stone wall fish traps, one midden and one CMT site were identified in the Griffin Passage region. In two other impact assessments carried out by Simonsen (1994d), numerous CMTs were found but not recorded as archaeological sites. His reports later served as an archaeological resource potential overview that assessed areas in Sheep Passage, Pooley Island, Griffin Passage, and Roderick and Wallace Lakes (Simonsen 1994d).

Ellerslie Lake

Southeast of Pooley Island, Brown (1988) conducted an impact assessment of proposed logging activities near Ellerslie Lake and Ellerslie Bay, at the request of the Heiltsuk Cultural Education Centre. The study located two CMTs in a proposed cutblock during foot surveys. No subsurface testing was undertaken. Prior to Brown's impact assessment, five sites had been recorded in the area; three on the lake and two in the bay. Four of the sites are pictographs and one is a small island midden site. Other recorded archaeological sites in the vicinity include burials and pictographs with burial shelters located on the western shores of Ellerslie Bay and Spiller Channel (Brown 1988).

Yeo Island

In advance of proposed forestry developments, Hill (1996) conducted an archaeological impact assessment on Yeo Island, between Spiller Channel, Bullock Channel and Return Channel. The area was accessed by helicopter and examined judgmentally, focusing on the immediate area of the developments. No archaeological sites were identified. Previous to this impact assessment, approximately a dozen archaeological sites had been identified on Yeo Island. All of these sites are located within 100 metres of the shoreline, though CMT clusters (not recorded as archaeological sites) have been documented as far as one kilometre inland (Hill 1996). Most of the recorded sites are in the southern portion of the island near Kokyet LR. 1 (the former village site of 'Qábá).

Roscoe Inlet

In response to concerns expressed by the Heiltsuk First Nation over proposed logging developments in Roscoe Inlet, Rollins and Blake (1975) conducted a survey that involved identifying, on a navigational chart, surficial topographic and cultural attributes believed to correlate with site locations, then visiting the potential sites by boat to test them for cultural remains. In all, eight new sites were added to a previous inventory of twenty-one sites.

McNaughton Island

Located at the northern end of the northernmost island of the McNaughton group, a shell midden known as the McNaughton Island site (ElTb-10) was first surveyed and tested by Pomeroy in 1972 (Pomeroy 1972) and subsequently excavated by Carlson in 1974 (Carlson 1976). The four metre deep midden was found to date almost entirely to the Late Period (ca. 2,000 B.P. to contact) and the archaeological content was similar to that of sites of the same period at Kwatna. The site location important for clam harvesting, seal hunting and salmon fishing for a long time period. Excavated artifacts include chipped stone, pecked and groundstone tools, bone and antler harpoon valves, points and ornaments, shell beads and tools, and European trade goods.

Deer Passage

In 1983, Carlson directed the excavation of FbSx-9, an historic Heiltsuk "big house" at Deer Passage (Carlson 1984). This structure, with four carved posts still standing and massive cedar support beams intact, provided considerable information on ceremonial house construction from the historic period.

Dean Channel

According to Hobler (1970a), much of Dean and Burke Channels and their associated inlets are characterized by beach-less fiord-like shorelines totally unsuitable for human habitation. Although archaeological sites are widely scattered throughout the area, there is a distinct tendency for clustering in certain locations such as the Bella Coola valley, the Dean River at Kimsquit below the canyon, the Kwatna River, and the south end of South Bentinck Arm.

Hobler (1969a) conducted a survey of Kimsquit, Kwatna, Cousins Inlet, Port John, the central portion of Dean Channel, emphasizing the shorelines of the inlets and the mouths of streams and rivers. Thirty-five sites were recorded, representing eleven types: cedar plank houses, cemeteries, burial caves, pithouses, fish traps, middens, submerged middens, surface scatters, petroglyphs, pictographs and "other" sites. Hobler set out to look at the archaeology of the environmental transition zone between Bella Coola and Bella Bella, and to determine the culture history of the Nuxalk. He found that the midden sites typical of Bella Bella were less common nearer Bella Coola.

Hobler (1983a) recorded seventeen sites during an archaeological survey of Alexander Mackenzie Provincial Park and its surrounding areas including Elcho Harbour, and the west side of Dean Channel between Cape McKay and Hokonson Point. No fieldwork was carried out on the east side of Dean Channel. According to Hobler (1983a), research on the inner portions of the Central Coast has shown that archaeological sites are not uniformly distributed, but rather occur in clusters with expanses of intervening territory largely devoid of evidence of human habitation (though not necessarily use). The Elcho Harbour-Mackenzie Rock area is considered one such cluster.

Nascall Bay

In 1968, an intertidal lithic site (FcSt-3) was reported in Nascall Bay by Hobler (1970a). He believed that the artifacts observed in the site were the remains of an eroded midden.

Maxwell et al. (1995) conducted archaeological investigations of a proposed resort near Nascall Hotsprings. The study recorded an elevated lithic scatter and several CMTs near a previously recorded intertidal lithic site and five additional sites (including a pictograph, a fish trap, an isolated intertidal lithic find, and two shell middens with associated CMTs). The sites are believed to span the last 6,000 years, and several were deemed highly significant. No impacts were anticipated from the proposed development.

Skowquiltz River

Hobler conducted a survey in the Skowquiltz River Valley in 1971. Surveying the river mouth, estuary region and bay, he observed but did not record a collapsed wooden structure at the mouth of the river (Hobler 1997 pers. comm.). No archaeological sites were documented. Preckel et al. (1990) conducted an archaeological survey of proposed forestry developments in the Skowquiltz River Valley on Dean Channel. One CMT was identified on the southwestern side of Skowquiltz River along a proposed access road, however it was not recorded as an archaeological site.

Across from Skowquiltz Bay near Dave Lake and the mouth of Nusash Creek, Chatan et al. (1995) conducted a forestry-related impact assessment on the southern shore of Dean Channel. The survey crew located 61 CMTs, which were subsequently recorded as ten separate archaeological sites.

Burke Channel

Hobler (1990a) led an underwater and terrestrial reconnaissance at Restoration Bay on Burke Channel, to search for evidence of Captain George Vancouver's fifteen day stay in the bay in 1793. Despite intensive investigations, no underwater evidence was observed. Four archaeological sites on or near the shore of Restoration Bay were recorded, including a large village site associated with extensive midden deposits and a cleared area on the beach which may have been prepared to careen Vancouver's ship for repairs.

Approximately twenty kilometres north of Restoration Bay, several sites in the vicinity of Kwatna Inlet (FaSu-1, 2, 9, 10, 19) were excavated by Hobler and Carlson (Carlson 1970, 1971, 1972a; 1972b; Hobler 197Ob; 1978b). The late prehistoric village site of Axeti (FaSu- 1), on an island near the mouth of the Kwatna River, was first excavated in 1969. Hobler (1969b, 1976) describes the excavation of a waterlogged portion of an intertidal midden at Axeti, from which rarely-preserved plant and wood fibre materials were recovered, including rope, wooden wedges and woven mats. This material was attributed to the Kwatna phase (ca. 500 B.P. to contact).

Located along the north shore of Kwatna Bay, on the northeast side of the Kwatna River, and at the junction of Burke Channel and Kwatna Inlet, Carlson (1971) excavated seven sites that were threatened by either natural erosion or timber harvesting. This work helped to define the Anutcix Phase (ca. 1800-500 B.P.) and the Kwatna Phase (ca. 500 B.P. to contact). These two phases exhibit a technology much like that of ethnographically-documented inhabitants of the area. The earlier Cathedral phase exhibits a very distinct complex and is speculated to date to the Early Period (Hobler, pers. comm.1997). Typical tools consist of flaked stone projectile points, large core scrapers, denticulates, retouched flakes, notches and perforators. The Cathedral Phase is differentiated by flake stone technologies, while the later Anutcix or Kwatna phases are characterized by the use of grinding, polishing and pecking.

South Bentinck Arm

Wilson (1994c) reports an archaeological inventory and impact assessment related to forestry developments in the area of Hot Springs Creek on the west side of South Bentinck Arm. No archaeological sites were identified, though the area is of considerable traditional significance to the Nuxalk. Bedard (1994) conducted an archaeological survey of the hotsprings area which identified one site, as well as a nearby bark-stripped tree. Bedard also identified two small shell middens along the shoreline north of Hot Springs Creek but did not provide a field designation for these sites.

Rivers Inlet Area

The west side of Darby Channel and Rivers Inlet, between Sandell Bay and Weeolk Passage, and including inland areas of eight kilometres (east-west) and sixteen kilometres (north-south) has been the subject of an archaeological overview conducted by Simonsen

(1994a). Four shell midden sites had been previously recorded at Dawson's Landing, at the location of the Provincial Cannery, at the south entrance to Morgan Bay, and on the north shore of Weeolk Passage. During the overview study, Simonsen re-examined the four previously recorded sites and recorded four culturally modified trees.

In 1995, an impact assessment study was carried out by Simonsen (1996) in Morgan Bay, in the area of previously recorded shell midden sites. Two new sites were recorded: a shallow shell midden deposit situated on a shoreline terrace, and a culturally modified tree located east of the shell midden deposit.

Smith Inlet

At the southeastern end of Smith Inlet lies Burnt Island Harbour, the subject of a 1996 impact assessment (Hill 1996). The Wycleese village site (EhSu-4) lies approximately 15 km to the east, but no archaeological sites were identified within Hill's study area.

Inland Lakes and River Valleys

Kimsquit

Wilson (1994b) conducted an archaeological inventory and impact assessment near the mouth of the Kimsquit River in Dean Channel, in response to proposed forestry developments. During this study, more than 30 culturally modified trees were identified. Garvin (1995) also recorded CMTs in forestry related developments, however, these sites do not appear to have been entered into the provincial site registry. Cultural modifications have been found on both western hemlock and western redcedar trees. Dendrochronological dates have been obtained for a number of CMTs recorded within the lower Kimsquit drainage area. Three CMTs from site FfSs-1 produced dates ranging between A.D. 1839 and 1926 (Howe 1990). Samples extracted from ten CMTs identified by I.R. Wilson in 1994 yielded dates ranging from A.D. 1826 to 1914 (Chatan et al. 1996).

Two small forestry-related impact assessment projects have been conducted in the Kimsquit drainage, focusing on the location and evaluation of several grease trail routes. (Howe et al. 1989; Howe 1990). Three trail sites were recorded- a grease trail along the north side of Cornice Creek rated as having a moderate heritage value and expected to be impacted by logging; and two additional trails located outside the impact area. The report concluded that the low density of heritage sites identified by the study was a reflection of an overall low site density in the general area.

Chatan et al. (1996) conducted an impact assessment of proposed forestry developments on the Lower Kimsquit River. The field survey recorded 28 CMTs at two sites on the north side of the Lower Kimsquit River. The CMTs included tapered and rectangular bark-stripped trees, one planked tree, one notched tree, three stumps, and one test hole, all on western redcedars.

Archaeological surveys at the headwaters of Dean Channel, and the mouths of the Dean and Kimsquit rivers were undertaken by Hobler in 1968 and 1971 resulting in the location of thirteen sites concentrated on the delta of the Dean River and at Manitoo Creek (Hobler 1969a, 1971). Research at the head of Dean Channel identified a range of both pre-contact and post-contact site types including abandoned historic villages, an historic cemetery, a village of rectangular housepits, cache pits, two shell middens and artifacts scattered on the beach. Survey up the Dean River identified a rockshelter, petroglyphs and an aboriginal trail. Two housepit villages were of a type not previously recorded on the mid-coast of British Columbia. Their rectangular shapes suggest that cedar plank houses may have once stood here (Hobler 1971).

At the mouth of Manitoo Creek across Dean Channel, twenty-four rectangular house pits and forty cache pits were recorded as sites FeSr-2, FeSr-6 and FeSr-8 (Hobler 1972b). An historic village (FeSr-1) located on the delta of the Dean River showed various stages of preservation of post and beam cedar planks. Test excavations at this site indicated that the recovered materials were of late nineteenth and early twentieth century refuse with no evidence of a pre-contact component. On the south bank of the Dean River, a few kilometres from its mouth, is a large village site (FeSr-4) consisting of forty-five depressions, of which twenty-three are housepits and twenty-two are cache pits. Hobler (1972b) assessed this site as probably dating to the Late Period (ca. 2,000 B.P. to contact). A smaller site (FeSr-7) dates to the early post-contact period. No housepits were observed at this location; however, numerous copper items and stone artifacts were recorded. A trail (FeSr-13) was also located along the Dean River, as well as petroglyphs (FeSr- 11) in the canyon of the Dean River.

Bella Coola Valley

The earliest archaeological work in the Bella Coola valley consisted of surveys conducted by Harlan Smith in the 1920s and by Donald Mitchell in the 1960s. No excavations were undertaken by either of these investigators. Early ethnographic work in the area, such as McIlwraith's lengthy notes on abandoned villages (McIlwraith 1948), Hobler's (1988b) review of sources of historical records and interviews concerning Native sites in the Bella Coola valley, and written records from the last 200 years from Mackenzie (1793), Palmer (1863), Boas (1898), the Royal Commission on Indian Affairs for the Province of British Columbia (1916), and Duff (1964) have been extremely valuable in locating and analyzing archaeological sites in the area.

In 1964, Donald Mitchell surveyed a number of park reserves on the Chilcotin Plateau and in the Bella Coola valley (Mitchell 1964). While 43 new sites were identified on the Plateau, only one locally-known site (FcSq-1, the Thorsen creek petroglyph site) was recorded in the Bella Coola valley. Mitchell attributes this disparity to the denser ground cover in the valley, and the fact that many of the Bella Coola park reserves are located in low-lying, seasonally flooded areas.

Hughes (1977) led an archaeological survey of the Bella Coola valley, along the mainland waterways of the valley, from the mouth of the Bella Coola River as far up as Stuie. The survey crew had little training but attempted to use an "applied judgmental survey" method. The team recorded two dozen sites including a pictograph, a canoe, three village mounds, two fish weirs, a quarry, a CMT site, seven cultural depressions and eight lithic scatters.

Hobler and Bedard (1988, 1990, 1992) conducted several seasons of excavation concentrating on the period of contact between the Nuxalk and European cultures, during which the Nuxalk began to incorporate and adapt imported materials and ideas into their culture. Excavations were carried out at Qwliutl in the upper valley on the north bank of the Atnarko River, and at Snxlhh, located on a slough off the south side of the Bella Coola River near Four Mile in the lower valley. The upper Qwliutl was a village of small pithouses, a type of architecture not previously known in the valley. Two hundred metres away at Lower Qwliutl is another village consisting of small rectangular wooden houses of distinctly different construction from the well-known coastal house style. Snxlhh was occupied from at least the mid 1800s until 1907, when it was abandoned. Mostly commercially manufactured material culture was found at this site, as well as extensive structural wood which provided new detail concerning Nuxalk house construction. In 1988, Hobler and Bedard excavated sites at Nusqalst (FcSo-1), Canoe Crossing and Stskiitl.

More recently, Hobler's research has focused on early sites in the Bella Coola valley in an attempt to rectify the scarcity of data regarding early sites on the inner coast. Three field seasons were spent excavating at Tsini Tsini (FcSm-11), a site located on a high terrace above the Talchako River in the upper Bella Coola valley believed to date from a period of elevated sea-levels (Hobler 1995b).

Lepofsky's (1985) analysis of late precontact period Nuxalk settlement systems in the Bella Coola valley concluded that the presence of a range of food resources, especially traditional food plants and fish, was the most important variable in determining settlement location.

Hobler (1994) intensively surveyed a proposed subdivision near Salloompt River but did not locate any sites. The following year, Hobler (1995a) conducted an archaeological survey of a property between the Atnarko and Talchako Rivers in Tweedsmuir Park. He notes that a number of aboriginal trails once gave access to the Interior Plateau from the upper and middle Bella Coola valley, and at least one of these passed through Stuie.

The British Columbia Hydro Corporation (n.d.) commissioned research on managing heritage and archaeological resources on powerline corridors in the Bella Coola valley. This internal document provides data on a selection of known archaeological sites in the Bella Coola area, for which potential conflicts with B.C. Hydro development plans and heritage resources were foreseen. The report also outlines a procedure for estimating archaeological site potential and defines a reporting protocol and emergency impact guidelines.

An archaeological field overview of Nusatsum and Cacoohtin drainage systems in the Bella Coola valley was conducted by Wilson (1994a) in response to forestry developments. No archaeological sites were recorded for these areas, and the potential was considered to be low due to the steep terrain.

Extensive surveys in the upper Dean Channel, South Bentinck Arm and the upper Bella Coola valley have been conducted by Bedard (n.d.), however reports on this research have not been filed with the Archaeology Branch nor with the current Band administration, and the study results are currently unavailable.

The Nuxalk-Carrier Grease Trail, also known as the Alexander Mackenzie Heritage Trail (AMHT), represents a combination of aboriginal trading trails and routes that closely follows Mackenzie's overland voyage in 1793 from the Fraser River to the Pacific Ocean (Wilson 1986b). The Grease Trail runs from the Fraser River near Quesnel, along the West Road (Blackwater) River through the Interior Plateau, climbs across the crest of the Rainbow Range, and drops down into the Bella Coola valley (Patton 1990). For centuries before the arrival of Mackenzie, the trail was used as a trade route by the Carrier, who traveled from the Interior to the coast to trade furs and hides with the Nuxalk for eulachon grease. Nearly two centuries ago, the trail was used by Sir Alexander Mackenzie. In June 1793, the fur trader and his party (including two native guides) hiked the trail for two weeks to reach the Pacific. When they reached the coast, Mackenzie and his men borrowed a Nuxalk canoe and, along with a Native guide, paddled into Dean Channel. There the explorer carved the following inscription into a prominent rock: "Alex Mackenzie from Canada by land, 22nd July, 1793." The journey opened the way for future explorers and the establishment of fur-trade posts (Patton 1990). The trail corridor was surveyed from Titetown Lake to Mackenzie Rock over two field seasons (Blacklaws 1979, 1981). Later studies were conducted to fill data gaps and examine trail relocations (Wilson 1983, 1985, 1986b).

The discovery of the "Hole in the Wall" burial box prompted a survey of the Farquhar Valley on King Island in Dean Channel in response to proposed logging activities (Hobler 1980a). The valley was surveyed on foot, from the mouth of the Farquhar River to four kilometres upstream. With the exception of a possible bark stripped tree, no archaeological remains in addition to the burial box were identified. Fedje and Blacklaws (198 1) suggested a date of approximately 350 B.P. for the box and attempted to address the question of its ethnicity. They proposed that the burial belongs to the Istedox tribe, who intermarried with both the Nuxalk and the Heiltsuk First Nations and were subsumed by the former following smallpox epidemics.

Owikeno Lake

Despite several limited site excavations, no time depth for occupation has yet been archaeologically determined in this area. The initial archaeological survey of Owikeno Lake was completed in 1970 by Simonsen and Walkus (Simonsen 1970a), resulting in the recording of five archaeological sites (two pictographs, two villages and one burial).

Eight years later, an archaeological survey was conducted in the vicinity of the lower Machmell River in the Owikeno Lake area (Seymour 1978a, 197813). Eight new sites were identified, including five small "camps", two possible burials and one rock (referred to as "The Lone Eagle") important in the oral history of the Oweekeno. The five sites previously recorded by Simonsen and Walkus (Simonsen 1970a) were revisited.

A small-scale excavation was conducted in 1978 at site EjSp-1, located on a river terrace above and north of the present Machmell River gorge in response to a road and bridge crossing proposal (May 1978). Obsidian and greenstone flakes, and calcined salmon vertebrae and land mammal fragments were collected, suggesting that the site was a camp related to salmon fishing or goat hunting.

Excavation was also conducted at a historic burial site (EkSp-13) on the east side of Owikeno Lake, near the mouth of the Sheemahant River in 1975 (Seymour 1977). The remains of 50 individuals were excavated (Cybulski 197.5). Excavation and *in situ* osteological analysis, was initiated by the Oweekeno of Rivers Inlet. This may have been one of five villages known to have been located on Owikeno Lake prior to 1900 (May 1978). The nature of the artifact assemblage suggests that this site was most intensively used in the late nineteenth century, though the exact time span is not certain.

Seymour (1978a) reports that "stone tools have been found by local people at various locations along the lake and along the Wannock River, which, when compared to dated collections from excavated archaeological sites in adjacent localities, indicate a long time span may be involved. These artifacts were made using either a flaking technique or by pecking and grinding. Archaeological work near the lake's Second Narrows in 1975 and 1977, resulted in additional discoveries of stone artifact types similar to those noted above."

Site location maps supplied by the Archaeology Branch (1:50,000 scale) indicate numerous pictographs all around the lake shore, many of which apparently have not been designated as sites or officially recorded.

Between South Bentinck Arm and Owikeno Lake, Wilson (1986a) conducted an impact assessment of a proposed logging mainline. No new sites were recorded but several were revisited and management recommendations were made. One pictograph was noted, as were CMTs on the Tzeo River between the confluence of the Washwash River and Owikeno Lake. Three years later, Wilson (1989a) returned to the area to conduct an impact assessment of two proposed fish enhancement programs at the north end of Owikeno Lake on the Inziana and Washwash Rivers. One fish weir was recorded upriver from the mouth of the Washwash River on Owikeno Lake.

Alpine

According to Hobler (1997 pers. comm.), local people have shown him surface finds from well above the timberline where the Chilcotin Plateau merges with the Coast Range. Hobler noted that several of these artifacts appear to be of great antiquity, but this possibility has never been researched.

In response to a proposed dam on the Nechako River and the flooding of lakes in Tweedsmuir Park for reservoir, Borden (1952a) conducted a reconnaissance of more than 400 miles of lake and river margins and located 130 sites consisting of small "camps", storage/cache pits, housepits, and lithic scatters.

Rainbow Mountains

In 1976, Apland (1979) conducted reconnaissance investigations of Obsidian Creek and the Rainbow Mountains. This work resulted in the recording of twenty new archaeological sites, the majority characterized as obsidian "workshops". This survey did not reveal the geological source of the obsidian; however, the archaeological source appeared to be nodular drift along the banks of Obsidian Creek, located just east of the Central Coast LRMP boundary in the Mackenzie Pass region. Apland speculates that the nodules may have been glacially re-deposited from an original source located west of Tsitsutl Peak in the Rainbow Range. Apland noted that reports that the aboriginal source of obsidian is located in Anahim Peak are misleading, and that they refer to the peak as a landmark rather than as the source itself. The source of obsidian is significant as it can be traced using x-ray fluorescence (see Nelson and Will 1976; Carlson 1994; James et al. 1996), revealing information on trade patterns. There is evidence from Namu that this source area has been exploited for the last 7,000 to 9,000 years.

Apland (1979) mentions a report of an outcrop of obsidian in the Mackenzie Pass region southwest of the Rainbow Mountains proper. This source has been tentatively characterized by x-ray fluorescence (James et al. 1996).

Eldridge and Eldridge (1980) conducted an overview and inventory study of a portion of the upper Dean River Valley, just outside of the Central Coast LRMP area, and immediately east of the Rainbow Range. A stratified probabilistic approach was used to add to the regional site database and to develop an archaeological potential map for use in resource management. Seventeen new sites were recorded, and maps of archaeological potential were plotted at a 150,000 scale.

Summary of Previous Research in the Northern LRMP Unit

The vast majority of detailed archaeological work, particularly excavation, in the northern LRMP unit has been conducted along the coastline. It is only relatively recently that inland areas have been investigated, typically in response to proposed forestry developments. A focus on locating and recording CMT sites is also a recent development in British Columbia. Many recent archaeological impact assessments have shown that these features are widely distributed and they may be found well inland. Little work has been done to study the correlation of CMTs with other site types, such as hearths and temporary camps.

Archaeological investigations of high-elevation areas have been conducted only sporadically, and have been limited to specific sites and locales, such as Anahim Peak. Similarly, few archaeological studies have focused on mid-elevation lakes, a factor that has probably understated their importance. The presently known site distribution is likely fairly representative of major locations at the time of contact, but it is unlikely to reflect the full range of aboriginal land use at that time, and it is unclear how far back in time this pattern can be extended.

5.3.3 The South LRMP Area

Compared with the northern section of the Central Coast LRMP area and the more populated areas of southern Vancouver Island and the Lower Mainland, the archaeology of the southern portion of the LRMP area has not been extensively investigated.

Excavations

A small number of excavations has been conducted which provide preliminary data for the southern Central Coast. This research has been focused in three areas: around Port Hardy on northeastern Vancouver Island, Echo Bay, and Hopetown Village (Mitchell 1988).

In Port Hardy, the Fort Rupert site (EeSu-1) was excavated by Katherine Capes of the National Museum of Man in 1960 (Capes 1964). The O'Connor site (EeSu-5) near Port Hardy underwent two seasons of excavation in 1971 and 1973 (Chapman 1982). A salvage project was undertaken at the Bear Cove site (EeSu-8) by Catherine Carlson of the Archaeological Sites Advisory Board in 1978 (C. Carlson 1979a, 1979b). Other test excavations near Port Hardy were conducted by Somogyi-Csimazia (1990) of the Port Hardy Museum at the Asondrup Site in 1988, and by Brad Smart at the Glenlion River Site (EeSu-13) in 1992 (Wilson 1993c).

Further test excavations were conducted at Cheslakee Village near the mouth of the Nimpkish River by Howe in 1982 (Howe 1994). Eight sites on the Retreat Passage shore of Gilford Island, on Baker Island and on either side of Fife Sound in the vicinity of Echo Bay were test excavated in 1973 (Mitchell 1981). Test excavations were also conducted at Betty Cove (EeSq-1) on Bonwick Island by Wilson (1989c). In 1974 and 1976, Mitchell (1979) excavated the eastern segment of the Hopetown Village site (EfSq-2) on Watson Island, at the mouth of Mackenzie Sound in Queen Charlotte Strait. Two distinct components were distinguished at the site: a shell midden assemblage dominated by flaked obsidian technology and reaching a maximum depth of 4.4 metres; and an intrusive burial assemblage in the upper portion of the midden. The 1979 report on these excavations is preliminary and contains little analysis.

During an archaeological assessment of a proposed fish farm facility at Betty Cove on Bonwick Island, Wilson (1989b) identified conflicts which resulted in mitigative test excavations of site EeSq-1 (Wilson 1989c). Ten 1 m^2 excavation units revealed that the site likely served as a seasonal camp, used during the spring and early summer to gather shellfish, particularly clams. Faunal analysis indicated that deep sea fishing for salmon and halibut and sea mammal hunting were also important subsistence activities. The fauna1 assemblage closely resembles that typical of the Queen Charlotte Strait culture type. Though the artifact assemblage was too small to make such inferences, radiocarbon dates of 1,180, 1,360, and 1,640 years B.P. support this conclusion. According to Wilson (1989c), this site is significant as it may have the potential to test the hypothesis of a Wakashan replacement of Salish speakers in the area.

Inventories. Impact Assessments and Overviews

Numerous small-scale inventory and impact assessment studies have been undertaken in the South LRMP unit, primarily in response to planned forestry, recreation or other developments.

Outer Coast And Islands

Queen Charlotte Strait

I.R. Wilson Consultants Ltd. conducted an archaeological inventory of proposed logging facilities at three separate locations in Queen Charlotte Strait (Wilson 1991a). At Port Elizabeth on the south side of Gilford Island, two new sites were added to the existing inventory of seventeen. At Tracey Harbour, on North Broughton Island, two new sites were recorded, bringing the total for the area to five. No sites were previously known in the vicinity of Anchorage Cove at the eastern end of Kingcome Inlet. Mitchell observed CMTs in the area but these were not recorded as archaeological sites. Survey coverage was judgmental and consisted primarily of foot traverses of shoreline areas, with a soil probe used judgmentally to search for buried cultural deposits. Avoidance was recommended for all sites, except the CMTs.

Odwak (1996) conducted an inventory and impact assessment of forestry cutblocks on the eastern end of South Broughton Island. A reconnaissance-level survey of the area was completed, with survey coverage based on judgmentally-assessed archaeological potential. Subsurface testing, employing soil probes and shovels, was conducted judgmentally. A number of CMTs were identified and were recorded as archaeological sites. Avoidance of these trees was recommended.

In response to proposed logging, Arcas Consulting Archaeologists Ltd. (1993) conducted an archaeological impact assessment in the south-central portion of Bonwick Island. The proposed development areas were all located inland in areas of cedar-leading forest with a dense salal understory. The primary site type anticipated was CMTs; however the field crew assessed the area as having low potential for CMTs and therefore only a sample of the study area was inspected on foot in the field (Arcas 1993). Due to the dense understory, a systematic transect methodology was not employed. No sites were identified in the examined development areas.

Mitchell (1974) conducted a study in the vicinity of Echo Bay on Gilford Island. Test excavations were conducted at eight sites in the area, seven of which were selected as part of a stratified, randomly-selected sample. The tested sites include large middens (with some deposits measuring almost 6 metres in depth), house platforms, and defensive islets. Mitchell's 1974 report lists the artifacts collected from these sites but does not include any analysis.

Mackie and Scott conducted an impact assessment on Gilford Island to examine two recorded sites in possible conflict with a proposed subdivision (Scott 1990). Survey focused on shoreline exposures and intertidal areas, supplemented by inland transects. Judgmental subsurface testing was conducted using a soil probe and shovel testing. Fifty CMTs, including bark-stripped and planked red and yellow cedars were observed. These trees were not recorded as sites, although recommendations for avoidance were made. The two previously recorded sites consisted of a large, relatively intact midden, and a smaller, 'less significant' midden. Protection through a covenant was recommended for the larger site.

Muir and Dewhirst (1994) conducted an overview of the Broughton Archipelago Marine Park in order to assess archaeological resource potential in the park and facilitate management of cultural resources. The park consists of coastal waters, islands and islets located at the mouth of Knight Inlet between Fife Sound and Johnstone Strait. A database of recorded archaeological and traditional use sites was produced, as well as site potential maps. The assessment of archaeological resource potential was based on consideration of the locations and distributions of previously recorded sites, ethnographic and historic references, and topographical and biophysical characteristics. An attempt was made to correlate site locations with micro-environmental variables, including slope, proximity to water, shelter, drainage, wildlife values, aspect and vegetation cover. The study recommended that an inventory of archaeological resources within the park be completed, with priority given to those areas with the highest intensity of use and areas scheduled for development. It was further recommended that an impact assessment of an impacted burial site be undertaken immediately.

The same year, Howe identified three new archaeological sites and reassessed two previously recorded sites during an impact assessment of a proposed residential development on Alder Island in the Broughton Archipelago (Howe 1994). Survey techniques involved a boat reconnaissance of the shoreline of the island, transects on foot of shoreline and inland areas, and examination of rock outcrops and western redcedar trees. A soil probe was used to locate and assess buried cultural deposits. Avoidance of the five sites (four middens and one CMT site) was recommended.

Johnstone Strait

In the early 1930s, F. J. Barrow recorded a number of pictographs and petroglyphs in the southern Central Coast region, but this information was never published (Wilson 1989b). In 1938, Philip Drucker also completed a brief inventory in this area (Drucker 1943).

Mitchell (1969b) conducted a three-year site survey of most of the islands in the northern Gulf of Georgia-Johnstone Strait Region between 1966 and 1968. Unfortunately, the exact areas he examined are not well documented. This extensive survey was oriented toward the identification of shoreline sites and resulted in over 675 archaeological sites being documented in the area. The survey was based partially on ethnographic information and was conducted primarily by boat, with examination of inferred high potential areas on foot. In addition, rock faces were carefully examined for pictographs and petroglyphs, and obvious caves were examined for burials. Mitchell notes that the study was biased toward the identification of highly visible shoreline sites, and that recognition of fishtraps and canoe runs was affected by tidal levels. Mitchell (1972) suggests that burial sites were not adequately represented as cliffs and bluffs were not systematically examined in the 1966-68 inventory.

Mitchell's 1967 study area focused on the north side of Johnstone Strait from Cortes Island to Tribune Channel, though some areas were omitted. Two hundred and twenty sites were visited that season, including two hundred newly recorded sites. No details on site types, artifacts or analysis are provided in the permit report (Mitchell 1968). The survey continued during the 1968 season, filling gaps in the 1967 work and extending the study area northwestward through Johnstone Straight and into Queen Charlotte Strait (Mitchell 1969a). Some 450 sites were recorded or revisited in 1968, of which fewer than 100 had been previously reported.

The objective of Mitchell's inventory was to identify as many sites as possible and assess the degree of destruction they were experiencing. Little time was devoted to surface collection of artifacts or to assessing site size, and no subsurface testing was undertaken. Pictographs that had been reported by Barrow were monitored for weathering and the crew examined ethnographic locations reported by Boas. The most common site type encountered during the three years of survey was shell middens (608 sites), followed by defensive sites, habitations (n=57), burials (n=17), rock art (n=54), and occasional canoe runs and rockshelters (Mitchell 1969a).

The three years of inventory indicate that site density throughout this area is high. Clustering of sites was observed, with the highest concentrations in the sheltered waterways of the lowland archipelago between Vancouver Island and the mainland, reflecting the ethnographically-known high population density in this area. Fewer sites were recorded along the steep sided mainland shores and along the shores of Queen Charlotte and Johnstone Strait. Within the low island groups there are three main site clusters: near Knight Inlet, Quadra Island and Templar Channel (Mitchell 1969a). Some radiocarbon samples from shell deposits were dated, the oldest suggesting dates of 6,250 B.P. +/- 100 years, although the correlation between diagnostic artifacts and the dated materials is unclear. These age estimates suggest that residents in this area have relied heavily upon shellfish resources for at least the past 6,000 years (Mitchell 1969a).

In response to a proposed fishing resort development on the north side of Chatham Channel, approximately four kilometres southeast of Minstrel Island, an archaeological inventory was conducted by Dewhirst (1990). The investigation was judgmental and focused on shoreline areas, supplemented by parallel transects through upland areas. Subsurface probing and shovel testing were also conducted on a judgmental basis. The study found that a midden on the property had been extensively disturbed, but that no additional impacts were anticipated as a result of the proposed development.

The Bastion Group Heritage Consultants (1988) conducted an archaeological inventory and impact assessment of proposed logging facilities in possible conflict with a First Nations burial site on Helmcken Island. Simonsen examined the entire shoreline of the island and most of its interior, using a boat for access, with foot traverses of shoreline areas and frequent inland transects. Soil probes and shovels were used to test for subsurface deposits. The previously recorded burial site was revisited; in addition, two possible CMTs were noted nearby, as well as an historic steam boiler and a log structure. Only the burial was deemed sufficiently significant to warrant protection.

Points West Heritage Consulting conducted an archaeological inventory and impact assessment of a proposed hydroelectric project at Patricia Creek, which flows into Cordero Channel on the east side of Johnstone Strait (Bussey 1994). The study included a preliminary review of archaeological site potential based on available data and an overview reconnaissance of the study area by helicopter and boat. Areas perceived as having moderate or high archaeological potential were examined on foot and judgmental subsurface testing was employed. No new archaeological sites were located during the study and no impacts to previously recorded sites were anticipated as a result of the proposed developments.

<u>Inner Coast/Fiords</u>

Seymour Inlet

In 1973, Carlson and Hobler undertook a survey of Seymour Inlet on the Central Coast and Quatsino Sound on northwest Vancouver Island in order to locate and assess archaeological resources in the two areas (Carlson and Hobler 1976). A total of 76 sites (the majority not previously recorded) was identified, including 37 sites in Seymour Inlet. Although not explicitly reported, the survey appears to have been conducted primarily by boat and to have been concentrated on shoreline areas; no subsurface testing was undertaken. The authors also examined artifacts in private collections.

The Seymour Inlet study area is not explicitly defined but it appears to have included the entire Seymour Inlet system, including Nugent Sound, Frederick Sound, Belize Inlet and Mereworth Sound. Specific surveyed areas include Cougar Inlet, Slingsby and Schooner Channels, and Blunden and Allison Harbours. Poor weather conditions prevented survey of the Storm Islands, the Schwarzenberg Lagoon and the outer coastline between Blunden Harbour and Cape Caution (Carlson and Hobler 1976).

Very few artifacts were observed in the Seymour Inlet area; those collected include the tip of an ulna awl, a ground slate chisel, and a bone tip. A concerted effort was made to locate intertidal sites containing chipped stone; however no such sites were identified during the Seymour Inlet survey. The most commonly identified site type was the habitation site (identified either on the basis of structural remains or middens). Other site types recorded include defensive sites, seasonal-use sites, burials, rock art, canoe runs and totem poles.

Kingcome Inlet

Ian Wilson surveyed proposed forestry developments at Frederic Creek in Wakeman Sound on Kingcome Inlet (Wilson 1988). A preliminary assessment of archaeological potential was conducted by helicopter, with foot survey along the shoreline and up the creek for approximately 700 metres, at which point steep terrain and high falls were encountered. Judgmental subsurface testing using a soil probe was employed near the mouth of the creek. The rock cliffs were identified as high potential areas for the presence of human burials, though no such remains were found. Three clusters of CMTs (totaling 27 trees) were identified. It was speculated that more culturally modified trees may have once been present, but that these would have been removed by historic logging. The CMTs (all tapered bark stripped redcedars) were not recorded as sites and no recommendations for avoidance were made, although detailed measurements were made of each tree and some basic statistical analysis is provided in the report. It was recommended that stem round samples be submitted for dendrochronological analysis.

Tribune Channel

In 1994, Twohig assessed a possible conflict between a proposed recreational development and a previously recorded shell midden at the north end of Kwatsi Bay off Tribune Channel (Peacock and Twohig 1994). The study involved subsurface probing to determine the exact location and extent of the site, and an assessment of the nature of the midden deposits using evaluative shovel testing. No other archaeological sites were identified on the property. Due to the intact stratification of the site, protection through a covenant was recommended.

Jackson Bay

Simonsen (1988) conducted an impact assessment in response to concerns over possible conflicts between heritage resources and forestry activities in Jackson Bay. The entire east shoreline of Jackson Bay was traversed on foot, with an additional traverse through the upland forests, up to 80 metres from the shore. Judgmental subsurface testing was conducted. Two new sites were documented in addition to three previously known in the area. Four of these sites are middens, and were assessed as highly significant due to their large size, with some deposits measuring in excess of three metres in depth. Avoidance of these sites was recommended.

Phillips Arm

Simonsen (1993a) conducted an archaeological inventory and impact assessment related to planned forestry developments in Phillips Arm. The methodology was judgmental and included examination on foot of shoreline areas, soil probing to assess subsurface deposits and the examination of mature trees and a prominent rock bluff. The study did not identify any new sites; however, the location of shell midden deposits and a defensive site within the development was confirmed and the sites were re-recorded. No impacts to the sites were anticipated as a result of the proposed developments.

Inland Lakes and Valleys

Blacklaws et al. (1983) conducted an inventory and assessment of heritage resources as part of a B.C. Hydro development in the Homathko River drainage at the head of Bute Inlet, just east of the Central Coast LRMP area. The project included the ranking and field testing of a heritage resource potential model, archaeological impact assessments of proposed drilling sites, an examination of the spatial distribution of archaeological potential in the study area, and documentation of an historic wagon road. Survey employed both systematic and judgmental techniques and was accomplished by helicopter, boat and truck.

The study also included a combined probabilistic and judgmental inventory program conducted on a section of the shoreline of Tatlayoko Lake. Eighteen prehistoric sites and one historic site were recorded around the perimeter of the lake. The judgmental survey recorded fourteen sites, while the probabilistic sample documented only five sites. The probabilistic sample divided the shoreline into 400 metre by 200 metre segments, of which 20 percent were randomly selected. Four transects, spaced 100 metres apart, were conducted in each sampled segment, with sixteen 1 metre by 1 metre test pits excavated in each quadrat. One-quarter inch mesh was used to screen all removed sediments. The study found that the sites were distributed equally between the east and west sides of the lake, and that all but two sites were associated with terraces or promontories overlooking the lake. Three-quarters of the sites were associated with the mouths of small streams.

Alpine

No archaeological investigations of alpine areas have been reported in the southern portion of the Central Coast LRMP area.

6.0 ARCHAEOLOGY OF THE CENTRAL COAST

6.1 Culture History Sequence

Culture history, or cultural chronology, refers to the way archaeologists classify past material cultures into descriptive units, usually based on changes in artifact types over time. Although culture history sequences are very broad and are often based on limited data, they can be useful for placing archaeological remains into a general temporal and regional context, and for testing hypotheses about archaeological sites. It should be emphasized that culture history frameworks are subject to revision as new data are uncovered. While archaeological sequences are useful depictions of aboriginal technologies through time and space, they are of limited utility in defining boundaries between the traditional territories of cultural groups.

A general culture history sequence has been established for the Central Coast, using data from archaeological excavations at Namu, Kwatna, Kimsquit, McNaughton Island and other sites on the coast, and from several locations on northeastern Vancouver Island, such as the Bear Cove and O'Connor sites. The time depth of cultural activity in the study area, as estimated from existing archaeological evidence, is widely considered to be

10,000 years or more (Carlson 1983, Hobler 1990b, Matson and Coupland 1995). Carlson (1979b) has proposed three broad time periods for the prehistory of the entire Northwest Coast region, based on Borden's (1950) sequence developed for the Fraser delta. The Early Period dates from 10,000 B.P. (Before Present), or earlier, to approximately 5,500 B.P.; the Middle Period ranges from about 5,500 to 1,500 years ago; and the Late Period spans from 1,500 years ago to the time of contact between First Nations and Europeans in the 18th century. Within these broadly defined periods, several regional sub-periods have been defined. Known as 'traditions', 'complexes', 'phases' and 'culture types', these constructs are generally based on variations in material culture. The Central Coast chronology is tentative, and is based on relatively limited data. It can be expected that as new data become available, the sequence will be refined.

6.1.1 Early Period (ca.10,000 - 5,500 B.P.)

Deglaciation of the Central Coast area began about 13,000 years ago (Clague et al. 1982, Josenhans et al. 1995), resulting in newly accessible travel routes and habitable areas. Based on current archaeological evidence, it seems likely that the initial settlement of the Northwest Coast occurred between 13,000 and 10,000 B.P. As a result of fluctuating sea-levels, poor preservation factors and possibly low population densities, few archaeological remains predating 5,000 years B.P. have been identified on the Central Coast (Carlson 1990; Hobler 1990b).

Our limited knowledge of Early Period cultures is based on archaeological material culture (mostly stone tools) and a general understanding of subsistence systems, and is verified by fragments of native oral traditions, some of which appear to extend back 10,000 years (Hobler pers. comm. 1996). Fladmark (1974) and Borden (1975) proposed that the Early Period was characterized by different technological assemblages to the north and south of Queen Charlotte Strait. Carlson (1983) suggests that such regional variations in material culture became less distinct by about 5,500 B.P., as a result of social interaction through trade and the reduction of localized biogeoclimatic differences.

Pebble Tool Tradition (ca. 10,000 - 8,000 B.P.)

The earliest known Central Coast archaeological complex is the Pebble Tool Tradition, also called the Old Cordilleran tradition (Matson 1996). The earliest unequivocal dates for Pebble Tool assemblages are between 10,000 and 8,000 years ago (Carlson 1983).

While this complex seemingly centres around southwestern British Columbia, it has been identified as far north as the Queen Charlotte Islands, and as far south as the Oregon Coast (Carlson 1996).

The Pebble Tool Tradition is characteristic of coastal areas and the lower reaches of coastal rivers, suggesting a subsistence strategy based on fishing and sea mammal hunting (Carlson 1983). Artifacts associated *with* the Pebble Tool Tradition include leaf-shaped bifacial points and knives which lack stems and fluting, and unifacial cobble (or "pebble") choppers and scrapers (Carlson 1996, Matson 1996). These cobble tools are thought to be partly indicative of woodworking, representing an adaptation to the forest environment that emerged following the disappearance of glacial ice (Carlson 1983). Bone and antler tools, including antler hammers for working stone, antler wedges for woodworking, bone awls, bone hooks, notched elk teeth, and small unilaterally barbed projectile points, were preserved at a Pebble Tool Tradition site on the Columbia River (Carlson 1983). If such tools were once part of Central Coast assemblages of the same age, they have not survived due to acidic soil conditions.

Pebble Tool Tradition assemblages have been recovered from the Bear Cove site in Hardy Bay on the south side of Queen Charlotte Strait and have been radiocarbon dated to approximately 8,000 years B.P. (C. Carlson 1979a, 1979b). The oldest cultural strata of the site were characterized by cobble tools, large leaf-shaped bifaces, and crude primary flake tools. A marine adaptation is clearly indicated by the presence of bones of rockfish, salmon and sea mammals in the uppermost part of the earliest cultural stratum of the site.

Although not yet dated, the early component at the Tsini Tsini site (FcSm-11) in the upper Bella Coola valley may belong to the Pebble Tool Tradition and predate microblade technology (Hobler 1997 pers. comm.). The site has been attributed to the early Holocene period (ca. 10,000+ B.P.), when the sea flooded the valley virtually to its head, as a result of post-glacial flooding (Hobler 1995b).

Microblade Tradition (ca. 9,200-4,500 B.P.)

The Pebble Tool Tradition was followed by the Microblade Tradition, characterized by a technological shift toward the use of microblades and microcores. Microblades are small, parallel-sided stone flakes removed from small prepared cores. Artifacts recovered in Siberia and Alaska indicate that the edges of microblades were inset into wood, bone or antler hafts and used for many of the same cutting purposes as bifaces (Carlson 1983). Microblade technology appears to have been introduced early in the Early Period. At Namu, it is evident before 9,000 B.P. (Carlson 1997 pers. comm.). Microblade technology is typically associated with quantities of large flakes of andesite debitage.

Early Period assemblages recovered from site ElSx-1 at Namu are considered to represent an interface between the Pebble Tool and Microblade Traditions (Carlson 1983). Occupation of the Namu site began around 9,800 years ago; however, no bone was preserved in site deposits older than 6,000 B.P. due to the acidity of the soil (Carlson 1983).

Using data from Namu, Cannon (1991) reasoned that Early Period aboriginal economies on the Central Coast were characterized by a long-term pattern of marine resource utilization, in which changes in the availability of salmon played a key role in the scale of site settlement and cultural activity. Cannon was also able to monitor long-term changes in minor resource utilization using fauna1 data. The subsistence pattern clearly suggests a marine orientation focused on salmon throughout the Early Period at Namu (Carlson 1983). The rugged terrain around the site (which is only easily accessible by water) and faunal evidence of a diet rich in marine resources indicate that water craft were used extensively at this time (Carlson 1983).

Shell middens, common in later period sites, are not typically found at early sites, and they did not occur at Namu until the end of the Early Period. Evidence from other Pebble Tool Tradition sites further south suggest that land mammals, including deer and elk, were also important animal resources at the time (Newman 1966). The later component at the Tsini Tsini site in the Upper Bella Coola Valley, contains microblades and quantities of flaked debitage. As with other undated microblade assemblages, this component is believed to date to after about 9,000 B.P. Hobler (1997 pers. comm.) suggests that the assemblage dates to the early part of this time range.

Apland (1982) analyzed chipped stone material from 38 sites in Kwatna Inlet, Quatsino Sound and Bella Bella. He noted that chipped stone has been recovered in virtually all parts of the Central Coast. The first recorded evidence of chipped stone artifacts in the

Central Coast was described by Harlan Smith, who saw these projectile points as indicating trade with people from the Interior Plateau, and not as an indigenous stone industry (Smith 1909a). A number of authors conceptualized such chipped stone assemblages as belonging to the “Cathedral Phase”.

Retherford’s (1972) thesis suggested that these assemblages dated to a period of lower sea-levels approximately 3,000 years B.P.; however, subsequent investigations of the Early Period components at the Namu and Tsini Tsini sites have suggested that Cathedral Phase technology occurs much earlier, and possibly dates to the beginning of the Early Period on the Central Coast (Hobler 1997 pers. comm.). It appears that the reduced sea-levels associated with this phase may in fact represent the last of the rising post-glacial sea-levels, suggesting that these assemblages may date to the beginning of the Early Period. Excavations at the Joashila site (FaSu-19) in Kwatna Inlet revealed in situ chipped stone assemblages underlying a hearth feature which has been radiocarbon dated to ca. 6,000 B.P. (Hobler 1997 pers. comm.).

There is some evidence that the extensive exchange systems known ethnographically for the Central Coast may have originated during the Early Period. X-ray fluorescence analysis of obsidian found at Namu indicates that this material originated from Anahim Peak and Mackenzie Pass, located about 120 km east of the site (Carlson 1979b).

6.1.2 Middle Period (ca. 5,500-2,000 B.P.)

The onset of the Middle Period (ca. 5,500-4,500 B.P.) is marked by significant changes in the archaeological record (Hobler 1990b). In terms of lithic technology, stone flaking gradually declined in importance, while grinding, pecking and polishing techniques slowly increased. Microblade and microcore technology disappeared by about 4,500 B.P. The frequency of shell middens appears to have increased significantly. As a result of the preservation conditions characteristic of shell deposits, bone tools are more frequently represented in artifact assemblages found in Middle Period contexts than in those from the Early Period.

Obsidian Culture Type (5.000 to 2,500-2,000 B.P.)

The Obsidian culture type is characteristic of the southern portion of the Central Coast between approximately 5,000 and 2,500-2,000 years B.P., when bone, antler and ground stone artifacts became more common (Mitchell 1990). This archaeological complex is defined by the distinctive presence of flaked obsidian characterized by evidence of bipolar percussion (Mitchell 1988). Other tools include rare leaf-shaped stone points, numerous obsidian microflakes, hammerstones, irregular abrader stones, bone composite toggling harpoon valves, bone bipoints, ulna tools, mussel shell celts and knives (Mitchell 1990). Fauna1 remains suggest that a wide range of resources was harvested, including shellfish; a variety of fish species, especially salmon and herring; a number of mammal species, including deer and harbour seal; and a variety of birds such as ducks, gulls, crows, and loons (Mitchell 1990).

Archaeological evidence from the Middle Period indicates a subsistence system based on marine resources (particularly salmon and shellfish), evidence for a highly developed woodworking technology, ceremonialism and ceremonial art, and indications of status and wealth distinctions. Fladmark (1974) suggests that gradient maturation of many coastal rivers related to the stabilization of sea-levels around 5,000 years ago led to the establishment of the large, predictable salmon runs which contributed to the growth of the large, semi-permanent settlements known ethnographically for the Northwest Coast, and the production of large shell midden deposits.

Another environmental factor that may be related to *growing* population sizes is the establishment of redcedar forests along the coast at this time (Hebda and Mathewes 1984). Cedar provided many of the raw materials central to the complex ethnographically documented cultural systems along the coast. For example, cedar provided raw materials for the construction of large plank houses able to accommodate large family groups, for storage boxes that allowed the preservation of food surpluses, and for clothing, baskets, and other utilitarian and ceremonial items.

61.3 Late Period (ca. 2,000 B.P.-European Contact)

The Late Period is generally reported to begin about between 2,000 and 1,500 B.P. (Carlson 1983). However, Maxwell et al. (1996) suggest that artifact assemblages attributable to the **Late Period** began to appear on the outer coast by about 2,800 B.P. The majority of recorded archaeological sites on the Central Coast presumably date to within the last 2,000 years, and archaeological evidence suggests that populations continued to grow throughout this period (Hobler 1983b). An increasing specialization of subsistence techniques may have produced higher food yields which in turn appear to have had a positive effect on population size (Hobler 1983b).

The abundant archaeological evidence for the Late Period indicates general continuity with the cultural patterns established in the Middle Period. The well-established marine orientation, emphasizing salmon resources, has continued into modem times. If the sea-level changes proposed by Retherford (1972) are correct, then many of the undated stone wall fish traps in the Bella Bella area must have been constructed during the Late Period (Mitchell 1988). Cultural features of the Late Period include plank houses, ceremonial art, pecked and ground stone implements, and bone tools. A unique sample of normally perishable artifacts such as basketry, hats, mats, rope and wooden items was recovered from site FaSu-1 at Kwatna (Hobler 1976).

The increase in site numbers seems to correspond with the shift from a flaked stone technology to a more diverse tool kit employing pecking, grinding and polishing of stone as well as the manufacture of bone, wood and shell implements (Hobler 1983b). Archaeological assemblages are characterized by the virtual absence of flaked stone, except for occasional use of obsidian and small basalt triangular notched points (Apland 1982; Chapman 1982). Ground and pecked lithic technology predominates Late Period assemblages (Matson and Coupland 1995), and diagnostic artifacts include perforated and unperforated circular stone disks, greenstone adze blades and hammerstone grinders (Hobler 1990b). Bone and antler artifacts used in fishing and other activities are also preserved in quantity from this period (Carlson 1983).

Anutcix and Kwatna Phases

Two regional Late Period phases have been defined on the Central Coast: the Anutcix Phase (ca. 1,800-500 B.P.) and the Kwatna Phase (ca. 500 B.P. to contact) (Carlson 1971; Hobler, pers. comm. 1997). The Anutcix Phase is characterized by ground and pecked stone technology, bone and antler tools, and occasional flaked stone tools (Matson and Coupland 1995). The two phases are primarily distinguished by the presence of "hammerstone-grinders" and, in the case of the Kwatna Phase, circular stones (these latter items are not present in Anutcix phase assemblages) (Carlson 1971). The large numbers of pecked, ground and polished stone artifacts that characterize Kwatna Phase material culture have been interpreted as woodworking implements (Hobler 1976). The "hammerstone-grinder", found in the Bella Coola area, is considered a typical horizon marker of the Kwatna phase. This artifact type has recently been reinterpreted as a piece from a traditional Nuxalk game known as Sktsa (Crompton 1995).

Queen Charlotte Strait Complex

On the southern Central Coast, the Queen Charlotte Strait cultural complex, dated from 1,600 years B.P. to the historic period (Mitchell 1988), typifies Late Period assemblages. This artifact class is characterized by large quantities of ground bone artifacts and a small proportion of flaked stone (Mitchell 1990). Diagnostic artifacts include flat-topped hand mauls, stone discs, irregular and shaped abrasive stones, ground stone celts, unilaterally barbed bone points, unilaterally barbed non-toggling bone harpoon points, bone composite toggling harpoon valves, bone points and bipoints, bone splinter awls, ulna tools, whalebone bark beaters, bone spindle whorls, bone blanket or hair pins and mussel shell celts and knives (Mitchell 1990).

Fauna1 remains suggest continuity in the range of species utilized during the Middle Period, with an increased dependence on salmon and harbour seal over time (Mitchell 1990). Shellfish were also gathered in great quantity. Burial remains suggest the presence of an ascribed social ranking, and inter-group conflict is indicated by fortified village locations. The great number of these defensive sites suggest fighting and raiding were commonplace (Mitchell 1990).

A possible variant of the Queen Charlotte Strait culture type has been proposed for the Hopetown II component at Hopetown village (a distinctive burial complex dating to about 1,600 B.P.) and the later part of the O'Connor II component (Mitchell 1990). Both sites resemble Marpole culture type assemblages from the Strait of Georgia Salish region dating to the same time period. The Hopetown burials contain many artifacts - predominantly clam shell beads - and the O'Connor II component contains unilaterally barbed points and non-toggling harpoons similar to those found in Marpole sites (Mitchell 1990).

6.1.4 Historic Period

In addition to the three pre-contact periods discussed above, archaeological evidence has been used to study the more recent historic period following European contact with First

Nations. Historical archaeologists study both early Euro-American activities and the effects of cultural contact on aboriginal lifeways. The material record indicates that aboriginal material culture was gradually replaced by manufactured European goods (Hobler 1992). Hobler (1984) used data from eight Native settlements occupied during the historic period to create a quantitative seriation of historic components in an attempt to find patterns in the process of material acculturation.

Prince (1992) studied the process of acculturation among the Kimsquit Nuxalk using both written documents and archaeological evidence. Written records show that direct contact with Europeans was inhequent and had little impact on cultural patterns or values until the 1860s. The material assemblage shows the gradual incorporation of European items into the indigenous culture. By the late nineteenth century, Euro-American goods almost completely replaced indigenous materials. This process reflects the adoption of certain Euro-American practices and the loss of traditional craft skills such as lithic technology. However, many trade goods were adapted to fit First Nations uses, indicating a persistence of aboriginal lifeways well after contact. Many traditional activities and beliefs remain today, though often in modified forms.

6.2 Archaeological Site Types and Distribution

According to information supplied by the Archaeology Branch, the total number of recorded sites in the study area is 1,75 1. The vast majority of sites recorded on the Central Coast are of First Nations origin, and they may be of pre-contact or post-contact age. However, it should not be assumed that the existing inventory of archaeological sites accurately represents the entire range of aboriginal uses or archaeological sites of the area throughout history. It is clear from the previous ethnographic discussion that many aboriginal cultural practices, for example berry picking and certain ceremonial activities, would not have left material remains that can be identified archaeologically. Moreover, wood, bone, antler and other perishable materials were very important in the material culture of Central Coast people and, under most conditions, archaeological sites will contain only a sample of the materials that were originally deposited. Finally, previous archaeological research has tended to focus on shoreline contexts where sites are often highly visible, large and rich in artifacts. This bias in research design has produced a skewed view of the pre-contact history of the Central Coast.

Despite this bias, a wide variety of site types has been recorded for the Central Coast, the most common being shell middens, habitation sites (including village sites and seasonal camps), rock art (pictographs and petroglyphs), burials, trails, culturally modified trees, post-contact/historic sites, lithic scatters, fish traps and canoe runs. It is difficult to create a definitive classification scheme for the wide range of site types which are encountered, as the functions of individual sites often overlap and many sites incorporate components of several different site types.

The following discussion outlines the most common types of archaeological sites that have been recorded and are likely to be encountered in the study area; however, unique or unexpected site types may occasionally be found. The goal of this review is to inform the reader of common archaeological site types and to outline the types of locations in which they may be expected. This information may be used for predictive modelling, to highlight areas that may be archaeologically sensitive.

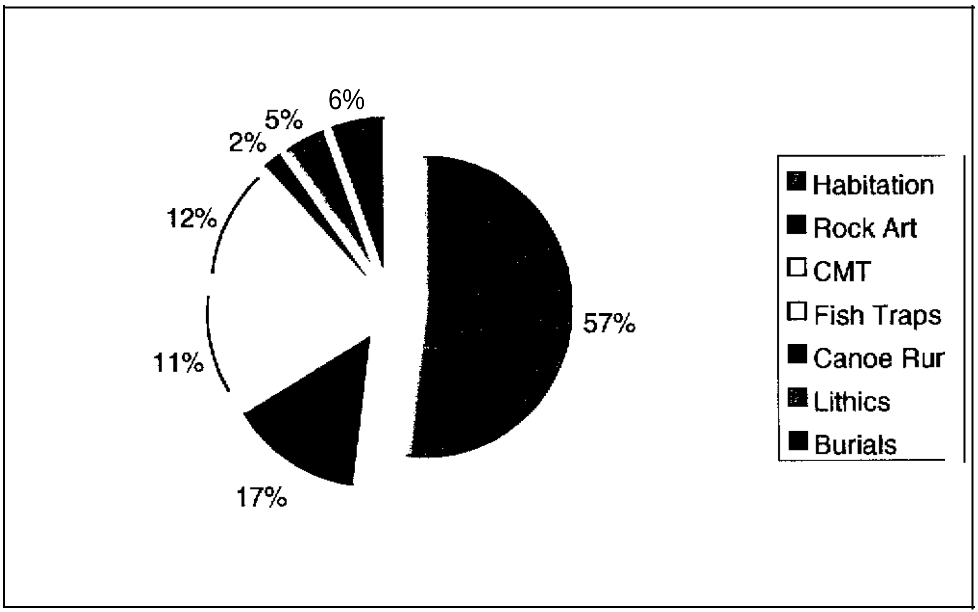
Appendix 4 presents photographs of many of the common site types known for the Central Coast, along with a brief description and a summary of physiographic correlates and commonly associated site types.

Table 3 and Figure 5 summarize the existing inventory of archaeological site components on the Central Coast, according to the primary site type assigned by the investigator, as presented in the Canadian Heritage Information Network (CHIN) database. Some sites have multiple components, so the total number of site components listed in the table is greater than the number of discrete recorded archaeological sites. For example, a single village site may contain a shell midden, house platforms, canoe runs and other site components.

Table 3 - Summary of the Existing Archaeological Inventory for the Central Coast

Site Type	Frequency	Relative Frequency
Coastal and Riverine Habitation (e.g., midden, structural remains, housepits)	996	57%
Rock Art (petroglyphs and pictographs)	294	17%
Culturally Modified Trees	194	11%
Fish Traps	218	12%
Canoe Runs	38	2%
Lithic Sites (scatters, quarries)	84	5%
Burials	108	6%

Figure 5 - Relative Frequency of Recorded Archaeological Site Components in the Central Coast LRMP Area



6.2.1 Habitation Sites

Habitation sites are common on the Central Coast, and a number of distinct sub-types are recognized based on ethnographic and archaeological information (Chatan et al. 1996). The use of the term "habitation" in recording site types has been somewhat problematic, as habitation sites have been identified on the basis of various types of evidence, (including midden deposits, depressions, platforms and structural remains) which are not always made explicit. For the purposes of this discussion, the term habitation will refer primarily to structural remains, house depressions or platforms and rockshelters associated with village sites and seasonal camps. Shell middens are discussed separately below.

Habitation styles varied culturally and temporally. Based on ethnographic data on the Nuxalk gathered by Harlan Smith in the 1920s, Lepofsky (1985) identified a number of structure types reflecting the known pattern of permanent winter villages and seasonal resource camps. Large post and beam plank houses were sometimes built on stilts up to 30 feet high. Based on planks recovered from a shell midden at Grant Anchorage, the post and beam structure type is thought to date to at least 2,000 years B.P. (Simonsen 1973). An example of a plank house site is Nutl at Kimsquit (Hobler 1970a). Smaller houses, used for protection from winter storms, were built separately or within plank houses and sometimes had as many as four levels. Various temporary light-framed house types. with roofs of cedar boughs, skins or skunk cabbage leaves, and smoke houses were also commonly used. Dry rock shelters were used as temporary camps and for drying mountain goat meat.

Rectangular house depressions and subterranean storage pits are the most common types of archaeological depressions documented on the Central Coast. Rectangular or square semi-subterranean houses are uncommon, but have received considerable research attention. At Anutcix in Kwatna Bay, Hobler (1970b) excavated square and rectangular house depressions measuring from 60 cm to 1 metre in depth, and 4 to 7 metres in length. Two villages containing structures of this type were excavated at Kimsquit; the largest contained more than 20 house depressions (Hobler 1972a). Food storage (cache) pits are occasionally found in the vicinity of habitation sites, and some historic era First Nations sites are associated with root cellars (Hobler 1990b).

Defensive sites arc specific types of habitations that are usually located on islands or peninsulas with steep cliffs and a single access corridor. Defensive sites typically do not show evidence of long-term intensive habitation, and they are believed to have been used as areas of refuge during times of siege, although there may be exceptions.

6.2.2 Shell Middens

Shell middens sites most often represent household refuse deposits resulting from the extended use of a habitation site, but they may also indicate non-habitation areas used intensively for harvesting and processing shellfish. On the Central Coast, the primary component of middens is shell, generally dominated by clam species, followed by mussels and other species such as whelk (Hobler 1988a). Other common constituents of habitation-related midden deposits include animal and fish bone and fire-cracked rock. The midden soil matrix is typically highly organic, black and greasy, with a high ash or charcoal content. On the outer coast, middens are often large (greater than 25 cubic metres) and may contain as much as 2,000 cubic metres of cultural material (Hobler 1990b). With the exception of large middens in Kwatna Bay and at Namu, the size of middens and the amount of shell they contain tends to decrease as one travels into the fresher waters of the inner coast (Hobler 1970a, 1990b). Settlements associated with middens, especially those occupied during the windy winter season, were often located near sources of fresh water, in protected locales suitable for beaching canoes (Hobler 1988a).

Midden deposits are frequently found in association with other archaeological components, such as house platforms, burials or canoe runs. The size of a midden is widely assumed to reflect the length or intensity of occupation. While there is clearly some correlation between midden size and duration of use, Hobler (1990b) notes that ethnographic information is sparse for the largest and deepest middens in the Bella Bella area, while important ethnographically-known winter villages tend to have small, shallow midden deposits. One explanation for this discrepancy is that the largest middens represent intensive marine resource collection sites that were not used as habitations. Alternatively, this pattern may reflect changes in village locations following European contact, in response to disease and changing subsistence and exchange systems.

Due to their inferred use as refuse dumps, artifacts (typically broken) are often recovered from shell middens, although artifact densities tend to be low. The number of excavated artifacts varies greatly between middens, but in some cases artifact totals can be exceptionally high. Because of the range of materials encountered and long periods of deposition, shell midden sites can be important for the development of cultural chronologies. The possibility of discovering temporally diagnostic artifacts in datable stratigraphic contexts makes middens an extremely significant site type.

Human remains are also often associated with shell midden deposits, indicating that not all middens are refuse dumps. Carlson (1998) suggests that shell or shellfish may have been used as offerings to the dead, and that some middens should be considered sacred sites.

6.2.3 Wet Sites

Wet sites are a rare site type, but they may be found in locations with permanently high water tables, for example in the sea, in lakes, near rivers, or in wetlands. Inundation creates an anaerobic (oxygen-free) environment that can allow preservation of normally perishable materials. Considering the ethnographically-documented predominance of wood and plant fibres as raw materials in traditional First Nations cultures, wet sites may be of great significance in reconstructing past cultural patterns. For example, the late precontact period village midden at Axeti in Kwatna Bay contained a water-logged component in the intertidal zone that yielded braided rope, woven mats and wooden wedges (Hobler 1976, 1990b). The mud at Axeti yielded twice the number of artifact types as adjacent non-waterlogged midden deposits, illustrating the importance of recognizing that stone artifacts found in most archaeological sites are not representative of entire assemblages.

6.2.4 Rock Art (Pictographs and Petroglyphs)

Two distinct types of rock "art" are found on the Central Coast: pictographs (images painted on a rock surface, usually with red ochre pigments) and petroglyphs (images carved or pecked into a rock surface, sometimes enhanced with pigments). Recorded pictographs are far more common (n=252) in the study area than are recorded petroglyphs (n=43). Pictographs are usually situated in highly visible locations such as prominent bluffs overhanging the water, often far from any known village site.

Petroglyphs have been recorded in a variety of locales, including villages, intertidal bedrock outcrops and isolated ritual bathing areas.

Common motifs include zoomorphic, anthropomorphic or geometric symbols, such as animals, fish, whales, human figures, circles, coppers, and masks. Hobler (1970a) noted considerable overlap in the styles represented in the two rock art forms. Lundy's (1974) thesis on Northwest Coast rock art synthesized data on over 600 rock art sites and found that some designs were unique to the coast, while others showed similarities with neighbouring culture areas including the Interior Plateau.

The function of Northwest Coast rock art is not well understood and little traditional knowledge about these types of sites has been recorded. The carvings and paintings may be of a ceremonial, spiritual or commemorative nature, they may record important cultural events and natural phenomena, or they may define traditional rights and ownership of economically valuable territories. A distinctive type of pictograph site common in the Bella Bella region consists of rows and columns of red dots believed to represent counts of some sort. At some sites there are over 100 such dots; their meaning and function is not understood by archaeologists (Hobler 1988a).

Dating of rock art is problematic, and dating techniques have not been widely applied on the Northwest Coast. Petroglyphs are often assumed to have the potential to represent a greater time depth than pictographs due to preservation factors (Wilson 1995). No studies have been undertaken to test this assumption and little is known regarding possible functional, temporal or cultural differences between pictographs and petroglyphs. Hobler (1988a) speculates that much of the apparent stylistic difference between pictographs and petroglyphs may be less a function of age than the result of limitations inherent in the different media. A small number of recorded petroglyph sites appear to depict European sailing ships, indicating that the practice of rock carving persisted into contact and post-contact times.

6.2.5 Burials

Pre-contact and early post-contact burials have often been recorded as archaeological sites A variety of burial patterns is known for areas of the Central Coast, differing according to cultural group and time period. Hobler (1988a) observed that aboriginal burial practices in the Bella Bella region changed through time. Some of the main Heiltsuk burial locations include shell middens, caves or rockshelters, islets, trees, and burial grounds or cemeteries. Another type of feature associated with burials is the mortuary pole. Burton (1986) noted eight burial sites with mortuary poles in the Bella Bella area.

Partly because soil conditions in middens are relatively favorable to the preservation of bone, excavations at some early pre-contact shell middens have recovered human burials. Few midden burials are known for the inner coast, and evidence of midden burials more recent than about 1,500 B.P. is extremely rare in all areas (Hobler 1988a). After this date, the disposal of the dead tended to take place in isolated areas located one or two kilometres from villages, such as in rockshelters, in trees or on islets. Although these types of burials tend to be correlated with habitation sites, the association has not been systematically studied.

Burials in caves or rockshelters typically consist of several individuals placed in grave boxes. These boxes may be of traditional adzed cedar construction or they may show European influence in design and construction, such as the use metal tools and nails. While cave and rockshelter burial sites are largely of pre-contact age, this form of interment demonstrably continued for some time into the post-contact period.

Tree "burials" are similar to rockshelter burials in that the remains were typically placed in cedar boxes, then positioned in trees or on raised platforms. When the box or tree decayed, the remains scattered on the ground below. Preserved evidence recovered from rockshelter and tree burials indicates that these practice are at least 500 years old, although they may be much older (Wilson 1995).

Early historic burial grounds consist of wooden grave structures within which individuals were interred in boxes. Two main types have been recorded: log crib-houses of traditional design, and grave structures of European-influenced construction that resemble miniature houses with milled lumber and windows (Burton 1986). Traditional crib-houses were constructed of logs piled on four sides. They are much less common and their state of preservation suggests that they predate the European-influenced grave structures, indicating the retention of traditional burial patterns after contact. Interestingly, the appearance of European-style tombstones in association with grave houses dates to just after the establishment of a mission in Bella Bella in 1880 (Streich 1983). Similarly, Hobler (1970a) observed that in the Bella Coola region, the transition from flexed burials in traditional grave structures to extended burials in cemeteries appears to have began around 1890, in response to the arrival of Euro-Canadian settlers in the area.

6.2.6 Culturally Modified Trees

Since the late 1980s, and particularly in the 1990s, considerable research has focused on the analysis of culturally modified trees (CMTs). A CMT is usually defined as "a tree that has been altered by native people as part of their traditional use of the forest" (Ministry of Forests 1997). The most common types of CMTs are bark-stripped trees and aboriginally logged trees. Bark stripping involved the removal of sections of outer bark, usually from cedars, for use as a raw material. Aboriginally logged trees were fully or partially felled to provide wood for the construction of houses, canoes, and other items. Tall stumps can also indicate aboriginal logging.

Specific scar patterns, tool marks and morphology are used to identify and assess CMTs. Bark stripped trees may have a long continuous tapered strip or a rectangular section removed, or they may be girdled by the removal of bark around the entire circumference of the tree. Aboriginally logged trees include planked trees, sectioned trees, canoe trees, undercut trees, trees tested for heartwood soundness, notched trees and felled trees (Mobley and Eldridge 1992; Ministry of Forests 1997). Other types of CMTs include sap, pitch or kindling collection trees; delimbed trees, blazed trees, and dendroglyphs (carved trees) and dendrographs (painted trees) (McRanor 1998) - sometimes incorrectly labeled 'arborglyphs/ arboriglyphs' and 'arborgraphs/ arborigraphs' (e.g., Eldridge 199 1, Ministry of Forests 1997).

According to Hobler (pers. comm. 1997), Mr. Lawrence Mack of Bella Coola was the first person to note the wide distribution of CMTs on the Central Coast. He observed their distribution from the shoreline to elevations greater than 1000 metres a.s.l., and more than 15 km inland.

Little research has been undertaken regarding the association of CMTs with other site types, however, CMTs may correlate with villages, middens and trails. CMTs are often identified near the foreshore area, but have also been recorded several kilometres inland, and on landforms ranging from flat beaches to steep slopes. Both red and yellow cedar, and hemlock were commonly used; however, the majority of recorded CMTs are western redcedars. CMTs are most commonly found in stands of old growth forest.

Dendrochronology (tree-ring dating) is used to date CMTs, and this technique sometimes reveals scars that have completely healed over. At present, the oldest CMT date in British Columbia is AD 1467 (Eldridge and Eldridge 1988; Ministry of Forests 1997), but aboriginal forest utilization undoubtedly predates this. Since CMT dating is completely reliant on the survival of the tree itself, and few species live longer than a few hundred years, direct evidence in the form of CMTs is limited to perhaps the 1,000 years.

6.2.7 Fish Traps

Stone wall or wooden weir fish traps were typically built at the mouths of streams or rivers to catch spawning salmon or in the intertidal zone, to capture other fish feeding near shore. Stone fish traps consist of loosely piled rock walls, sometimes showing complex histories of repair and expansion. Some stone wall traps may have incorporated additional perishable components such as stakes, nets or basket traps.

Fish weirs commonly consist of a line of wooden stakes protruding above the river floor and are thought to have been designed exclusively to trap spawning salmon (Hobler 1990b). Due to their perishable nature and their use in highly dynamic riverine environments, fish weirs may be underrepresented in the archaeological record. Stone wall fish traps are usually located in the intertidal zone and are exposed only at low tide, while wooden stake fish weirs may be found in the intertidal or in the lower reaches of rivers.

Hobler (1988a) observed that all recorded fish traps on the Central Coast occur at elevations within the range of normal tides, and that the walls appear to have been kept intentionally low in order to maximize the number of times they were exposed and covered during normal tidal cycles. By comparing the distributions of stone wall fish traps and wooden fish weirs, Hobler (1988a) was able to distinguish distinct patterns. He found that stone traps were found in relatively protected locations and were associated with the smaller streams common on the outer coast. In contrast, on the inner coast, where rivers are larger, stone traps were replaced by wooden weirs.

In another study, Pomeroy (1976, 1980) analyzed the locations of stone wall fish traps in the Bella Bella region and identified two types: fish traps built in the tidal reaches of small streams, and those built on beaches not associated with a nearby stream. Stream traps were the most common type and were used to capture salmon entering creeks to spawn. Beach traps, consisting of long walls that follow beach contours, were used to capture any species that came in to shore at high tide to spawn or feed.

Hobler (1988a) further found that fish traps and shell middens are mutually exclusive in their distribution in the Hakai area. Sites with shell middens rarely had associated fish traps; the reason for this is not understood, but it may relate to the differential distribution of fish and shellfish resources. In comparison with shell middens, fish traps are more widely dispersed and are found in a wider range of locales.

6.2.8 Canoe Runs

Canoe runs consist of long narrow beach areas cleared of rocks and debris to facilitate the landing of canoes. Hobler (1988a) found that the runs averaged about 8 metres long and 2 metres wide and varied from simple rough clearings to carefully constructed runs. He observed that while the majority of canoe runs in the Hakai area were associated with middens or other evidence of settlement, one example provided access to an area that had been intensively used for bark stripping and another appeared to have been strategically located to allow residents of a nearby village to avoid paddling into exposed rough winter waters.

6.2.9 Lithic Sites

While lithic artifacts and debitage are commonly recovered from previously discussed site types such as middens and habitations, other sites are defined primarily as lithic scatters. These sites may reflect quarry areas, stone tool manufacturing or maintenance sites or hunting locales. Lithic sites can be extremely significant, in part because the durability of lithic artifacts presents the potential for the survival of very old specimens. In addition, stone tool manufacturing techniques underwent stylistic changes over time for which specific chronologies have been constructed. Unfortunately, many sites in which lithic artifacts are the primary components are isolated or surface finds, which makes them difficult to date or interpret. Lithic sites have been found at all elevation ranges in the LRMP study area, from intertidal beaches to obsidian quarries in alpine areas of the Rainbow Range (Apland 1979).

Two specific types of lithic sites are believed to date to the earliest known periods of human occupation on the Central Coast. Intertidal lithic sites and elevated lithic sites are thought to relate to periods of lower and higher sea-levels following deglaciation of the Central Coast. Elevated lithic sites in the Bella Coola region have recently been found at elevations as high as 200 metres above sea-level (Hobler 1995b). Sites of this type are also thought to be very old, dating to periods of higher sea-levels, perhaps 10,000 years ago.

Intertidal lithic sites often contain chipped stone material, and therefore they are believed to be relatively old (Apland 1977). These sites are found on the middle and outer coasts, and they are interpreted as the remains of cultural deposits from periods of rising sea-levels, perhaps 2,000 or 3,000 years B.P., according to Hobler (1990b).

Lithic artifacts manufactured from obsidian (volcanic glass) are useful for reconstructing prehistoric trade patterns. The composition of the trace elements in obsidian varies according to its source and can be "fingerprinted" using X-ray fluorescence analysis (Nelson, D'Auria and Bennett 1975; James et al. 1996). Using this technique, archaeologists determined that obsidian recovered from the Early Period component at the Namu site was from a source in the Rainbow Range some 120 km away, indicating that regional trade networks were already in place at that time (Carlson 1996).

6.2.10 Historic Sites

While all archaeological sites relating to human activities since the period of contact between First Nations and European cultures are commonly termed "historic", the term is most often used to refer specifically to sites of non-aboriginal origin or to aboriginal sites containing manufactured trade goods. This does not, of course, imply that earlier aboriginal cultures lacked a history, and many archaeologists use the term "post-contact" to refer to historic period sites.

A small proportion of the previously recorded archaeological site components in the Central Coast LRMP area arc of historic age. One example of an important post-contact archaeological site is Fort McLoughlin and the adjacent historic period Heiltsuk settlement at Old Bella Bella, which has provided important information regarding the early post-contact period (Hobler 1982b; Maas 1994). Typical post-contact sites found on the Central Coast include structures (e.g., forts, cabins, mills, barns, canneries), trails, shipwrecks, rail lines, hunting features (e.g., traps), mining features (e.g., mineshafts or tailings piles), and logging features (e.g., flumes or stumps). Archaeological techniques can be supplemented by documentary evidence, often enhancing our ability to interpret the past. For example, using historical documentation to supplement archaeological investigations, Hobler (1990a) identified a beach clearing in Restoration Bay on Burke Channel that may have been intended for careening Captain George Vancouver's ship Discovery. The clearing corresponded with written accounts that the ship was to be repaired while in the bay.

6.3 Site Distribution

Chatan et al. (1996) noted some general patterns in the distribution of archaeological sites in the Central Coast region. The outer coast is characterized by large shell midden deposits with relatively uniform site distributions. In contrast, site clustering at river mouths and other landforms that interrupt the steep fjord topography, is marked on the middle and inner coasts. Burton (1986) observed site clustering in the Bella Bella area and speculated that this was representative of actual pre-contact and post-contact population distributions, such as the grouping of early historic populations around Fort McLoughlin and Old Bella Bella. She also observed that all of the historic burial grounds are in close proximity to Bella Bella (representing the amalgamation of historic native populations), and that burial sites located further from Bella Bella are all caves or rockshelters, suggesting that they may be older.

For the inner coast, little correlation has been noted between settlement sites and salmon streams (Lepofsky 1985; Hobler 1990b). While access to animal resources and salmon were a minimum requirement for ethnographic settlement in the Bella Coola Valley, a wide range and variety of resources was a more important determinant than any single resource (Lepofsky 1985).

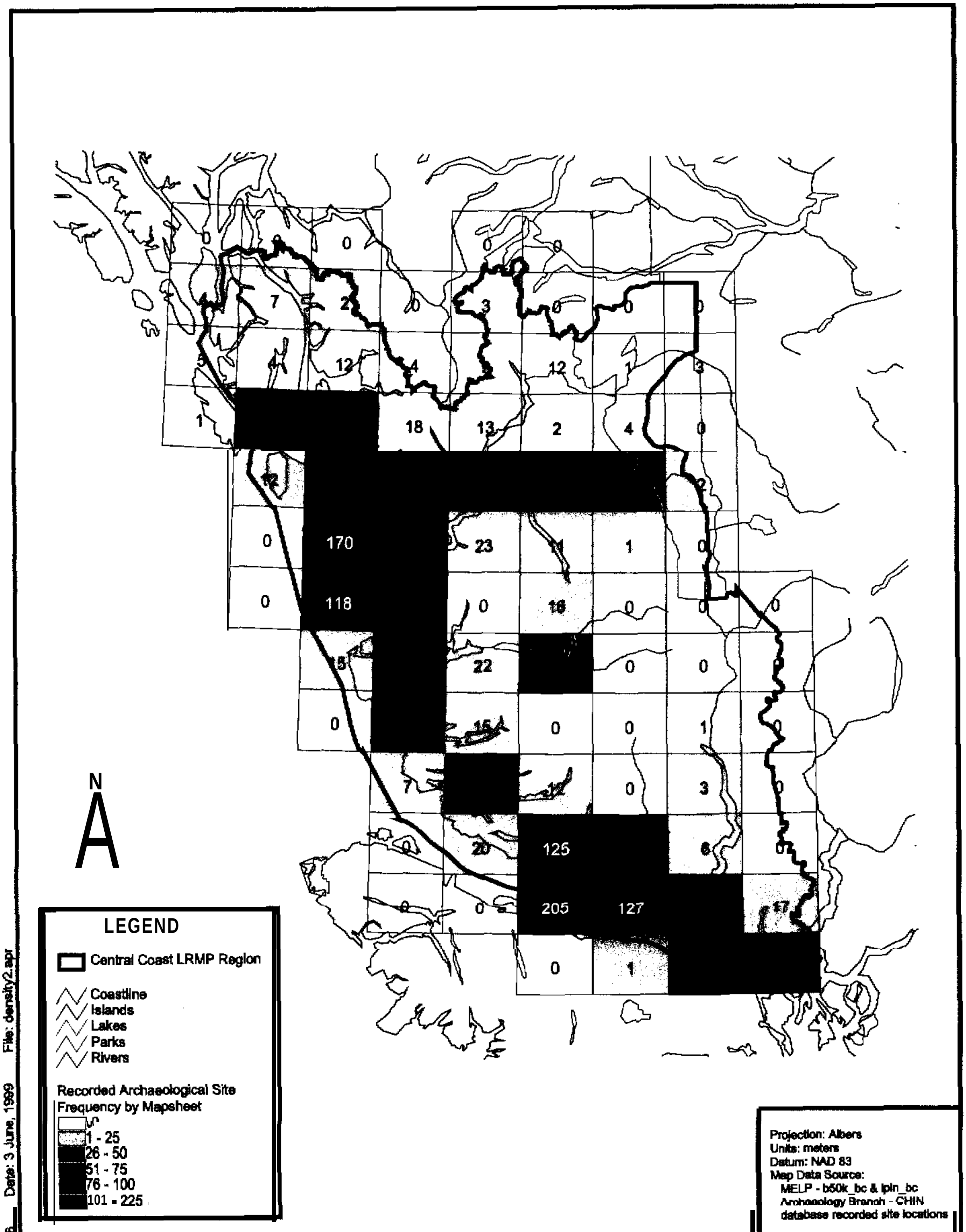
These tentative site distribution patterns are generally consistent with ethnographic information about the settlement and subsistence practices of the Central Coast First Nations. Greater emphasis on marine resources should be archaeologically evident for the Heiltsuk, Kitasoo (Hilton 1990) and Kwakwaka'wakw (Codere 1990) sites, in comparison with Nuxalk and Oweekeno sites. Due to their location at the head of Rivers Inlet, the Oweekeno may have had a greater reliance on river resources and land mammals than did their more coastal neighbours (Hilton 1990), while the Nuxalk relied on the varied resources of the Bella Coola River which allowed a fairly sedentary settlement pattern (Kennedy and Bouchard 1990). All groups would have periodically travelled to resource areas both on the coast and inland, and these activities should be discernible as archaeological sites.

6.3.1 The Existing Archaeological Site Inventory

Archaeological research design biases and changes in site recording standards are clearly indicated in the current site inventory. Varying field techniques and different levels of intensity have been employed in different areas. For example, early inventories tended to focus on shorelines, with few forays inland. Many early studies relied heavily on informant testimony to locate a large number of sites as quickly as possible. It seems likely that this would have biased these surveys toward large, relatively recent, ethnographically-known sites, such as late pre-contact or early post-contact villages, and away from earlier sites or those with more limited use or visibility. Burton (1986) notes that the use of informant testimony was likely a factor in the observed clustering of sites in the Bella Bella area, as it can be assumed that informants would be more familiar with locations nearest their homes.

A further problem that has probably skewed known site distributions toward over-representation of shoreline versus inland sites is the fact that prior to the early 1990s, CMTs were not consistently recorded as archaeological sites. The recent focus on cultural resource management, including intensive survey for CMTs in advance of forestry operations, has produced a fairly substantial body of information on CMT types and distribution in a short time period. However, few previously recorded non-CMT sites have been revisited to determine whether CMTs are also present.

Natural processes have also influenced the existing inventory. Changing sea-levels, the decomposition of perishable archaeological remains, and other natural and cultural transformation processes have affected the preservation and visibility of archaeological sites. These factors have combined to produce an archaeological site register that is strongly skewed to coastal locales. Figure 6 shows the number of recorded sites in each 1:50,000 NTS map sheet in the study area, and Figure 7 shows the locations of all recorded sites in the study area.



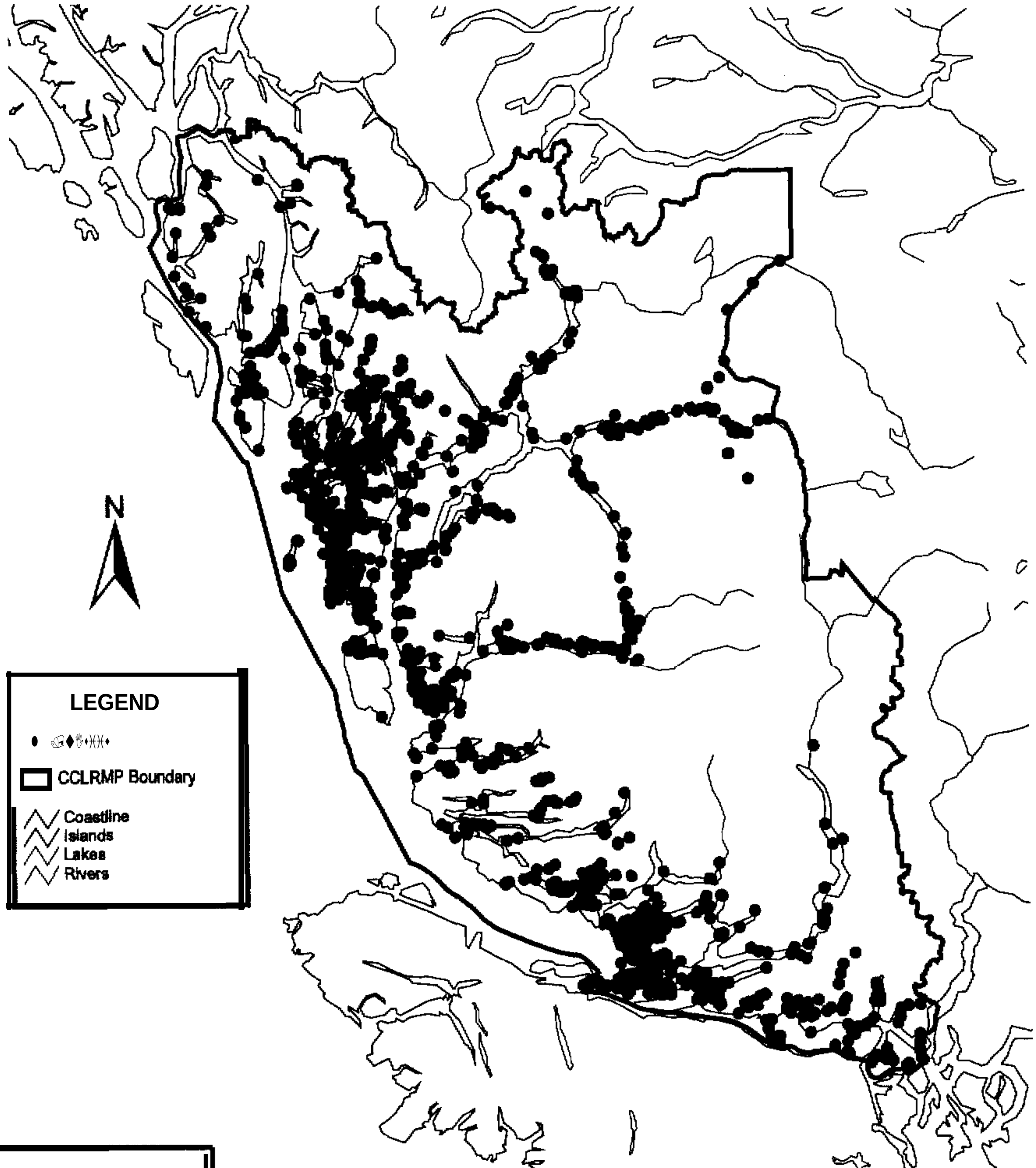
File: density2.apr Date: 3 June, 1999 Project Number: 962-6

Golder Associates

GRADIENT OF SITE FREQUENCY

Scale 1:2,500,000

FIGURE: 6



Projection: Albers
Units: meters
Datum: NAD 83
Map Data Source:
BC 1:6mil

Golder Associates

ALL RECORDED SITE LOCATIONS

Scale
1:2,250,000

FIGURE: 7

Project Number: 1936 Date: 1999 allsites

6.4 GIS Analysis of Recorded Archaeological Sites

GIS analysis of the spatial and terrain characteristics of recorded sites was used to help develop predictive models for estimating archaeological site potential. Slope, elevation, distance to nearest salt or fresh water, and forest cover type were determined for each recorded site. Minimum distances between certain site types were also calculated. The following sections present the GIS results for habitation, CMT, petroglyph, and pictograph sites. Forest cover is discussed for CMTs only. Table 4 presents a summary of the recorded site analysis, using median values.

Table 4 - Summary of GIS Analysis of Recorded Archaeological Sites in the Study Area

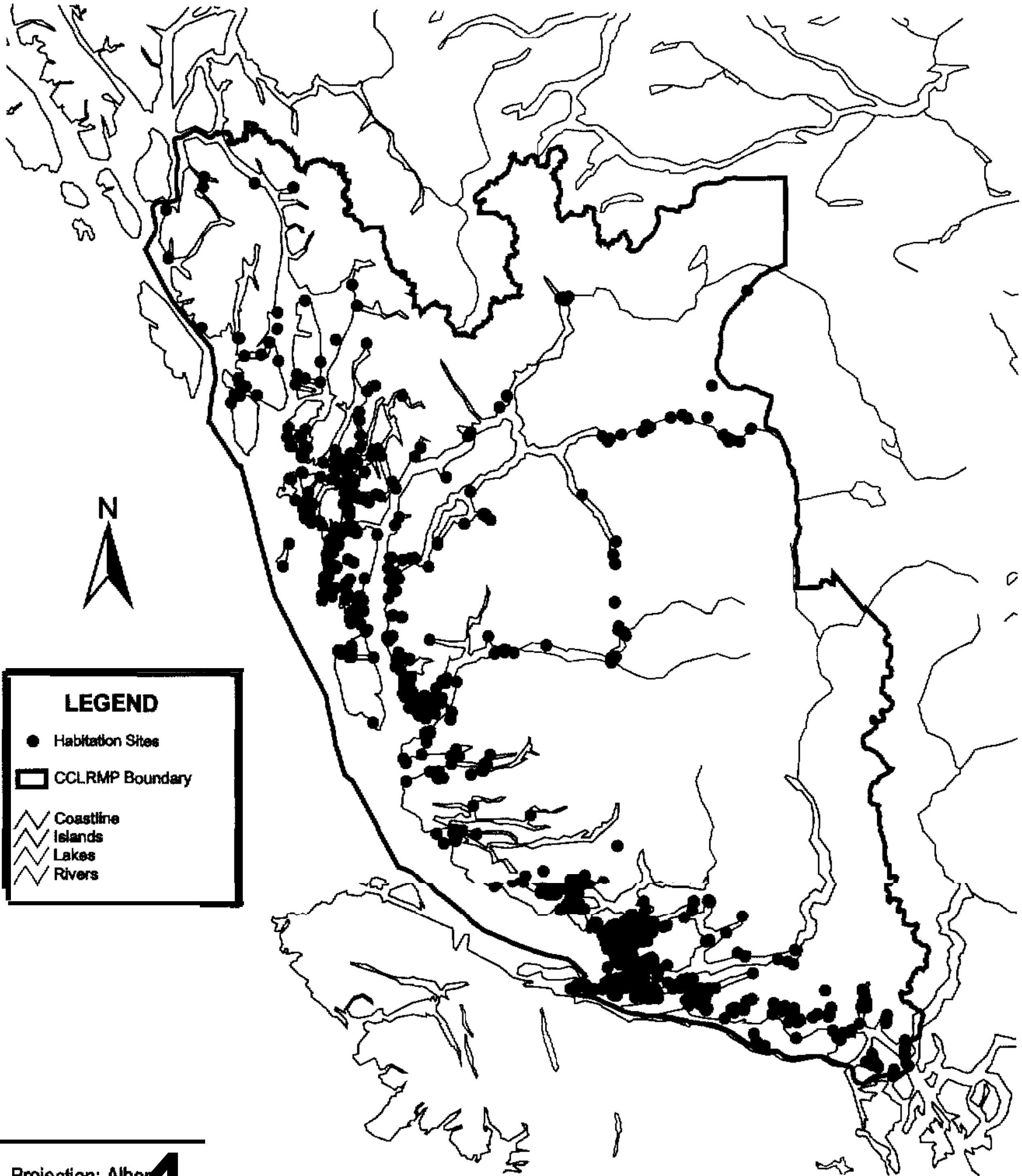
Site Type	Slope (%)	Elev. (m asl)	Dist Salt (metres)	Dist River (metres)	Dist Lake (metres)	Cedar (%)	Dist. Nearest Trail (m)	Dist. Nearest Site (m)
Coastal Habitation	15	5	30	416	1070	n/a	312	497
Inland Habitation	6	57	> 2346	275	52	n/a	481	535
CMT	23	19	52	374	776	20	303	608
Petroglyph	12	7	52	313	1568	n/a	898	713
Pictograph	27	10	26	347	1215	n/a	1694	974

6.4.1 Coastal Habitations

Figure 8 shows the distribution of recorded coastal and inland habitation sites in the Central Coast LRMP study area. A dense cluster of sites is notable on small islands and the adjacent mainland in the southern part of the study area. Particularly high site densities are evident on Broughton and North Broughton Islands and along Drury Inlet, on the east side of Fitz Hugh Sound, and on the islands near and Bella Bella and Waglisla. Sites are strongly correlated with islands and the heads of inlets and bays.

Slope

The slope of each coastal habitation site was determined from the GIS grid values, and frequencies were calculated for slope ranges. Slopes ranged from 0% to 129%, with a median of 15%. Sites with a slope value of zero may represent those that were inadvertently plotted in the water following the shift in scale from 1:50,000 to 1:20,000. Those with unexpectedly high slope values may also indicate data limitations. The 25 metre DEM grid size may be inadequate to discern small, flat landforms, and in some cases narrow terraces or beaches may have been misinterpreted as steep slopes. Figure 9 shows the frequency of sites falling within ranges of slope values.



Projection: Albers
Units: meters
Datum: NAD 83
Map Data Source:
BC 1:6mil

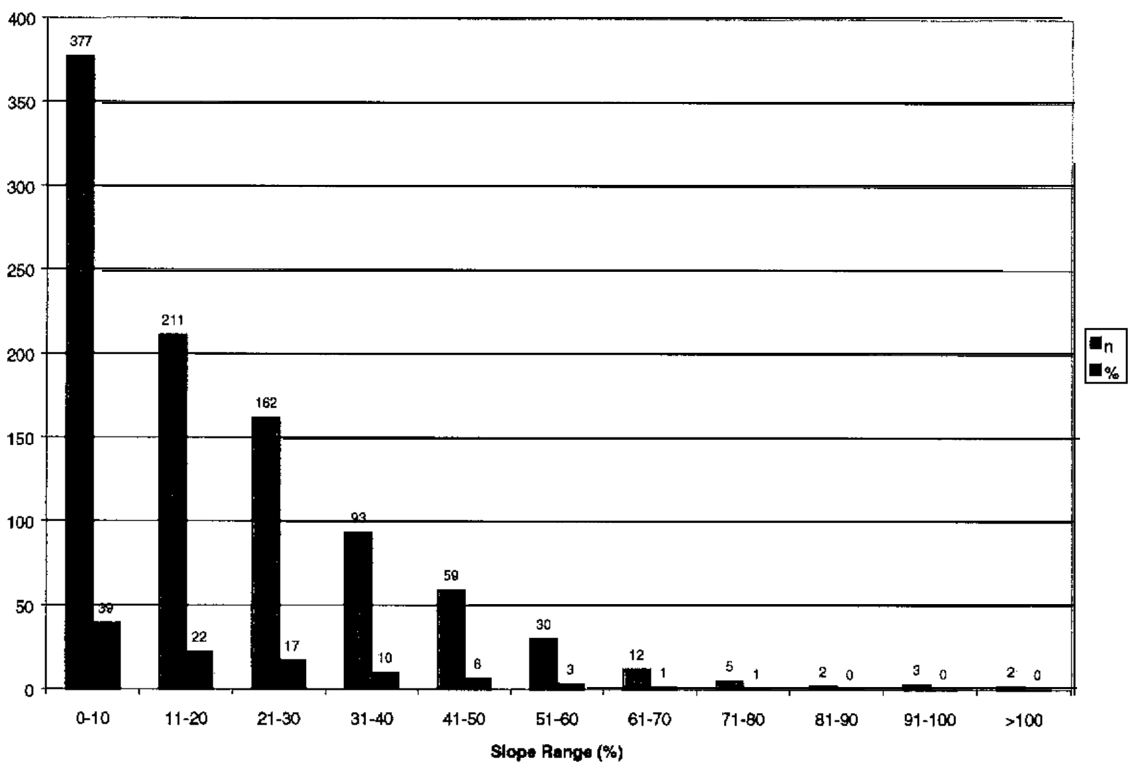
Golder Associates

RECORDED **HABITATION** SITE LOCATIONS
Scale
1:2,250,000

FIGURE:
8

Project Number: 962-1936 Date: 3 June, 1999 File: habitat.apr

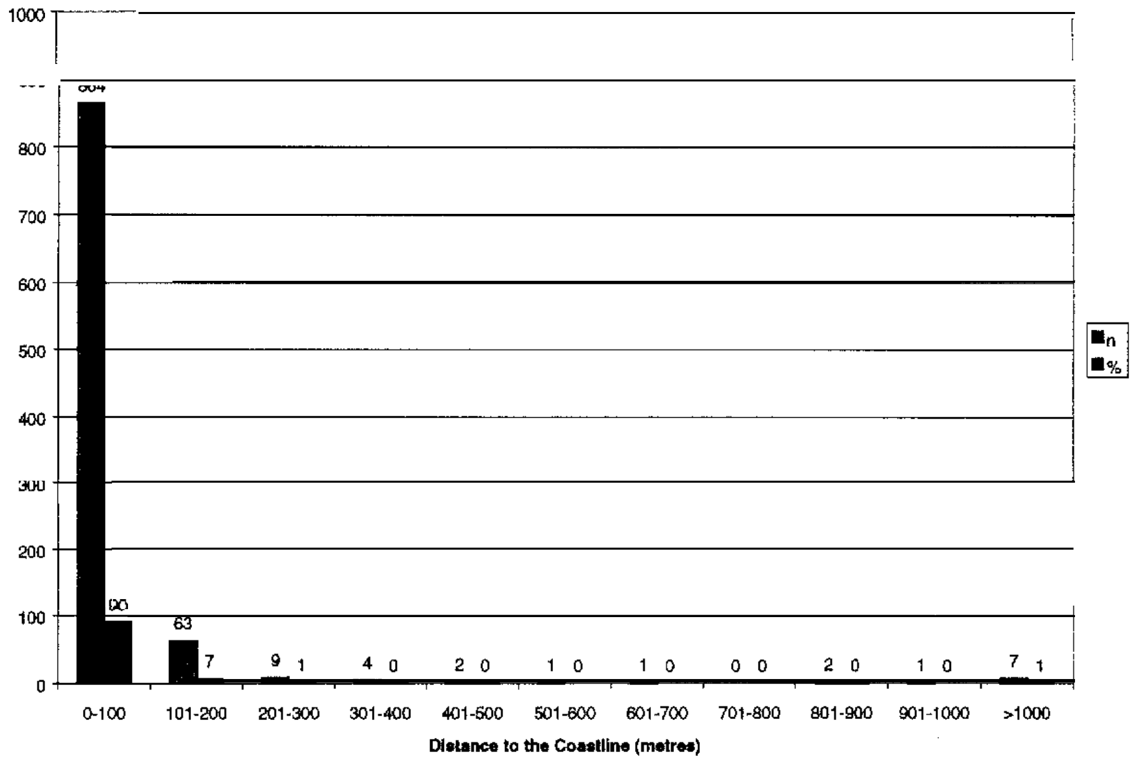
Figure 9 - Slope Ranges for Recorded Coastal Habitation Sites



Distance to Salt Water

Distance to the coastline was determined for each recorded coastal habitation site. As expected, the vast majority (90%) are within 100 metres of salt water and 97% are within 200 metres. Figure 10 shows the number of sites within various distances from salt water.

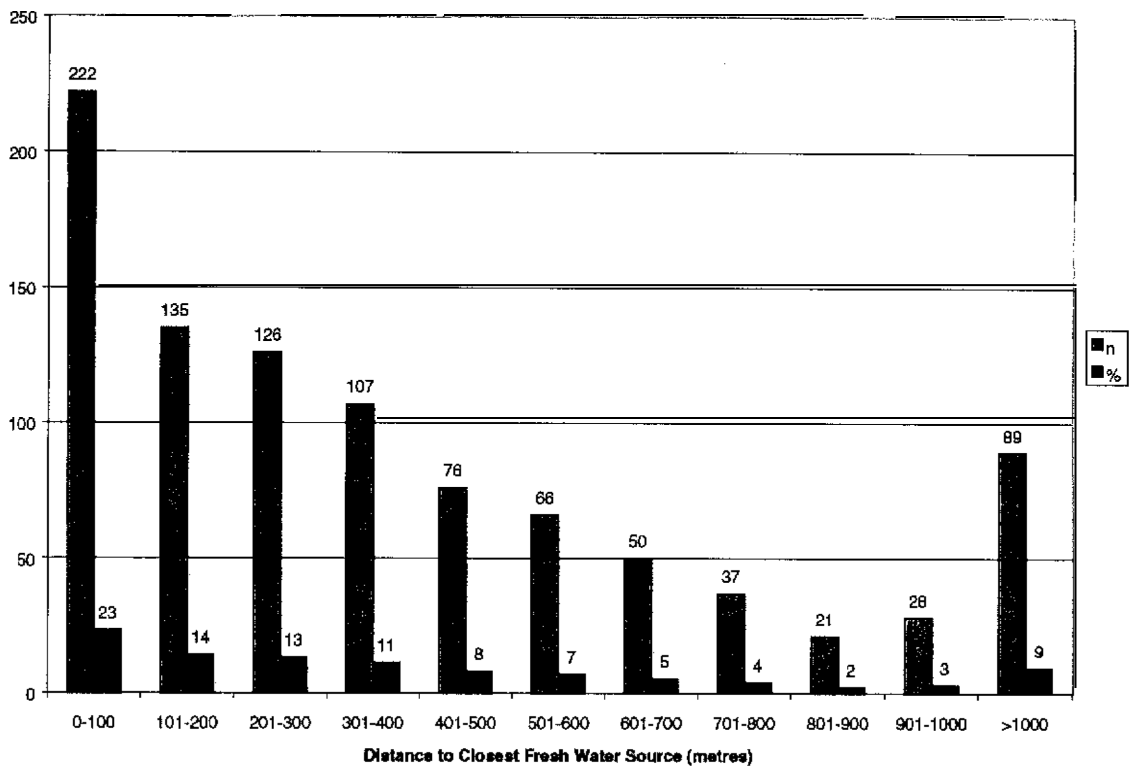
Figure 10 - Distance from Recorded Coastal Habitation Sites to Salt Water



Distance to Fresh Water

There does not appear to be a strong correlation between coastal habitation sites and fresh water sources. Only 23% of recorded sites fell within 100 metres of fresh water, and just 37% are within 200 metres. Thirty percent of recorded sites fall more than 500 metres from a source of fresh water, possibly indicating that water was carried in to the site (defensive sites, for example). Alternatively, the water source, springs, small seasonal stream or rainwater, which are not coded on the TRIM base maps, may have been used at these sites. Figure 1 I shows the number of sites falling within various distances from fresh water.

Figure 11 - Distance from Recorded Coastal Habitation Sites to Nearest Fresh Water



6.4.2 Inland Habitations

Most of the recorded inland habitation sites in the study area are in the Bella Coola River drainage and near Owikeno Lake (Figure 8). Inland habitation sites correlate strongly with sources of fresh water. All inland habitation sites are, by definition, more than 2 km from salt water.

Slope

Slope values for inland habitation sites ranged from 0% to 61%, with a median of 6%. Most sites (75%) have slopes of 20% or less, but 23% of them appear to have slopes greater than 30%. As with coastal habitations, sites with a slope value of zero may be misplaced through the shift in scale from 1:50,000 to 1:20,000. Similarly, sites with unexpectedly high slope values may indicate DEM limitations in which small terraces were not correctly interpreted. Figure 12 shows the frequency of inland habitation sites falling within ranges of slope values.

Distance to Fresh Water

The distance from recorded inland habitation sites to the nearest source of fresh water ranged from 2 metres to 308 metres, with a median of 61 metres. Of these, 62% were within 100 metres, and 93% were within 200 metres. Figure 13 shows the frequency of recorded inland habitation sites within various distances from fresh water.

Figure 12 - Slope Ranges for Recorded Inland Habitation Sites

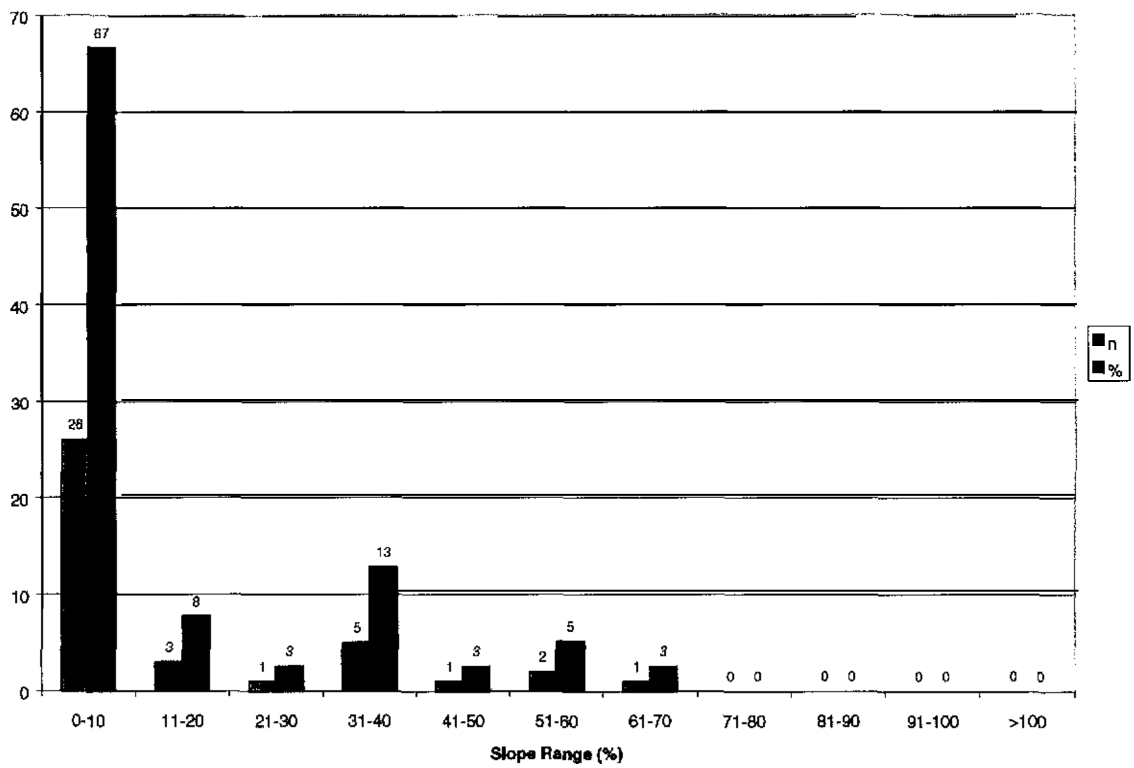
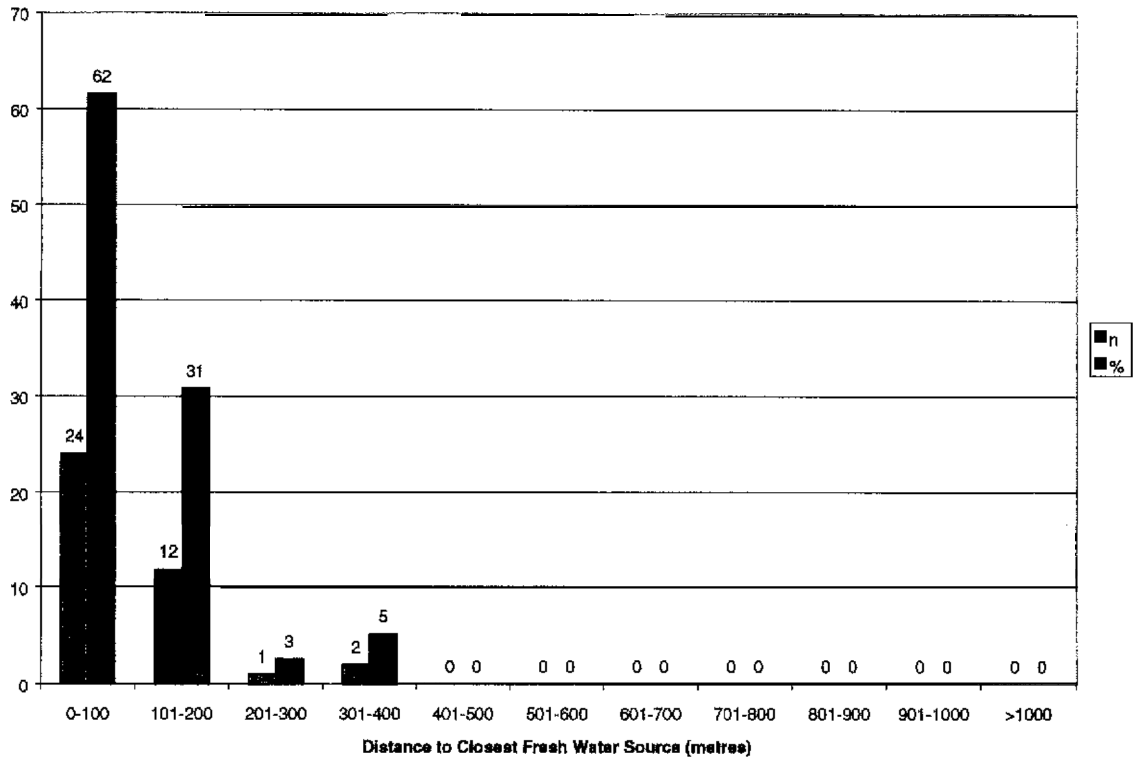


Figure 13 - Distance from Recorded Inland Habitation Sites to Nearest Fresh Water

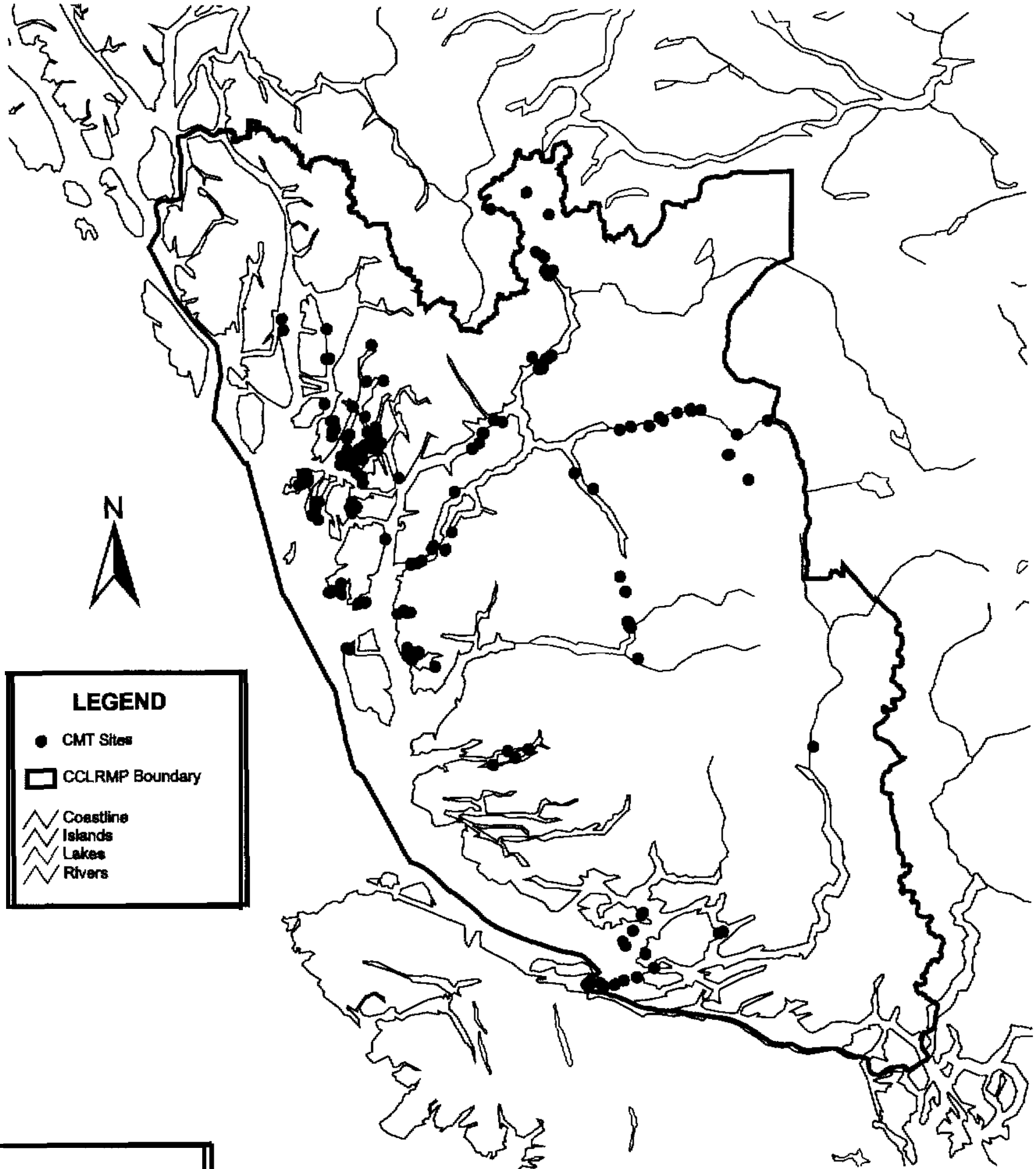


6.4.3 CMT Sites

CMT sites have been **recorded** along the coast, on islands and inland (Figure 14). The majority of recorded CMT sites are on coastal islands, but a significant number are also along the Bella Coola River and between Owikeno Lake and South Bentinck Arm.

Slope

While CMTs have been recorded on a range of landforms, the limited available data suggest that slope is a relevant variable for modelling. Over 25% of recorded CMT sites in the study area are on slopes of 0-10%. An additional 53% are on slopes between 11% and 40%. Beyond this gradient, CMT site frequency drops off dramatically. The minimum recorded slope for a CMT site is 0% (flat), **the** maximum is 95%% and the median is 23%. The relatively large number of sites on moderate slopes may indicate a preference for stripping **bark from** the uphill side of a tree, allowing a longer **bark** removal. Figure 15 shows the range of slope values for recorded CMT sites in the study area.



Projection: Albers
Units meters
Datum: NAD 83
Map Data Source:
BC 1 :6mil

Project Number: 962-1936 Date: 1999 cmtsite

Golder Associates

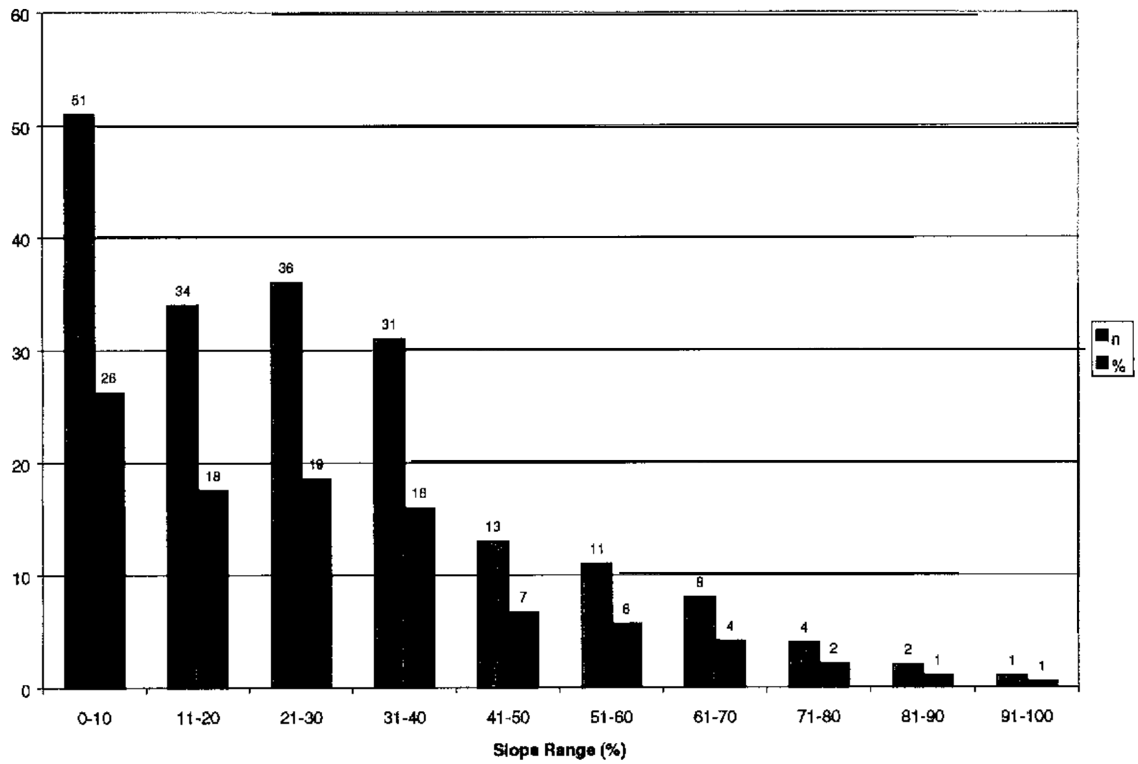
RECORDED CMT LOCATIONS

Scale
1:2,250,000

FIGURE:

14

Figure 15 - Slope Ranges for Recorded CMT Sites



Distance to Salt Water

Recorded CMT sites were found to correlate strongly with water sources. In coastal areas, most recorded CMTs are near the shoreline, and inland they tend to cluster along rivers. However, this apparent distribution may be partially related to archaeological survey coverage. Recorded CMT sites range from 1 metre to more than 2 kilometres from the nearest salt water, with a median distance of 52 metres. Fifty-four percent are within 100 metres of salt water, showing a strong correlation with shoreline areas (Figure 16).

Distance to Fresh Water

As noted, recorded inland CMTs generally tend to occur along major rivers (notably the Bella Coola) and near lakes. Thirty-three percent of recorded CMT sites are within 100 metres of a fresh water source, 53% are within 200 metres, and only 19% are more than 500 metres from fresh water (Figure 17).

Figure 16 - Distance from Recorded CMT Sites to Nearest Salt Water

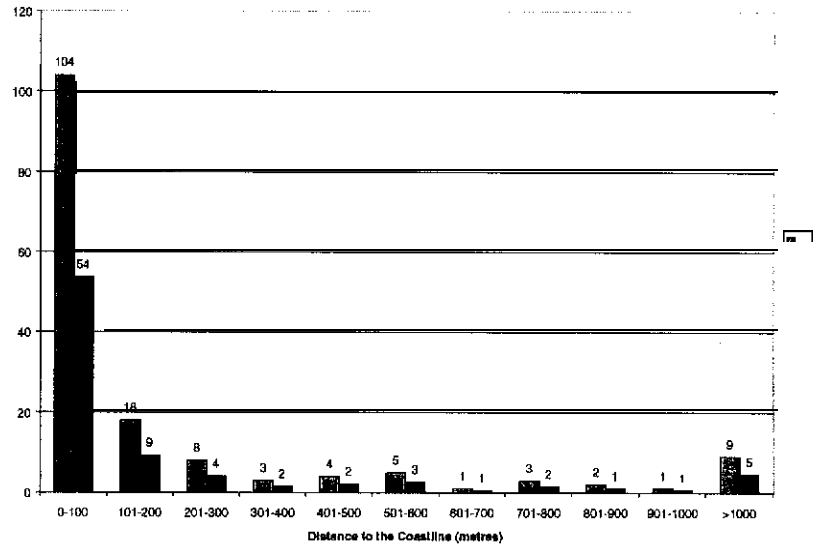
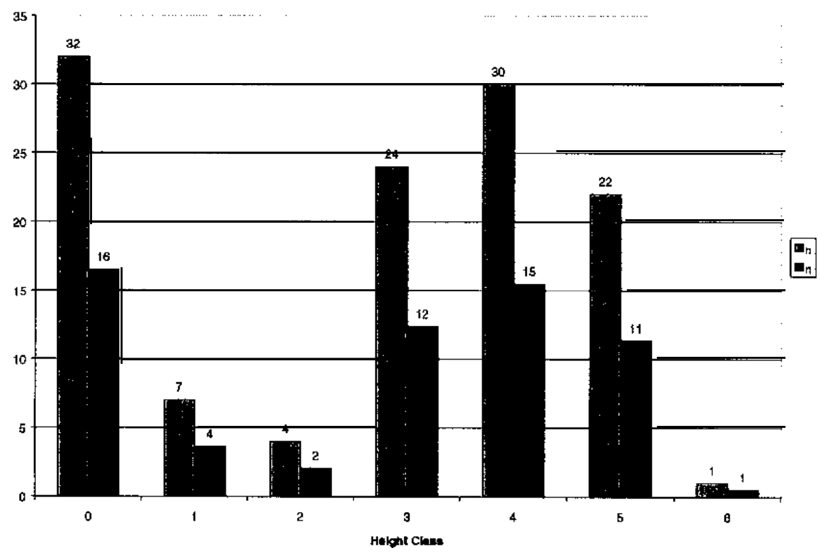


Figure 17 - Distance from Recorded CMT **Sites** to Nearest Fresh Water



Forest Cover

Where data were available, the height class, age class and cedar composition (in percent) was determined for each CMT site, using Ministry of Forests forest cover data. Of the 194 recorded CMT sites in the study area, height class, age class and % cedar data were available for only 121 (62%). Of these, nearly 64% are in forests of height class 3 or greater (greater than 28 m tall), with class 4 being the most common (Figure 18). Age class 9 (older than 250 years) comprised 29.8% of these CMT sites, and 51.2% are in age classes 8 or 9, which together are generally defined as old growth forest. Figure 19 shows the distribution of recorded CMT sites across age classes.

The relative frequency of cedar was also calculated for CMT sites where the appropriate data were available. Figure 20 illustrates the cedar composition of the CMT sites. based on forest cover data.

Figure 18 - Height Classes of Recorded CMT Sites

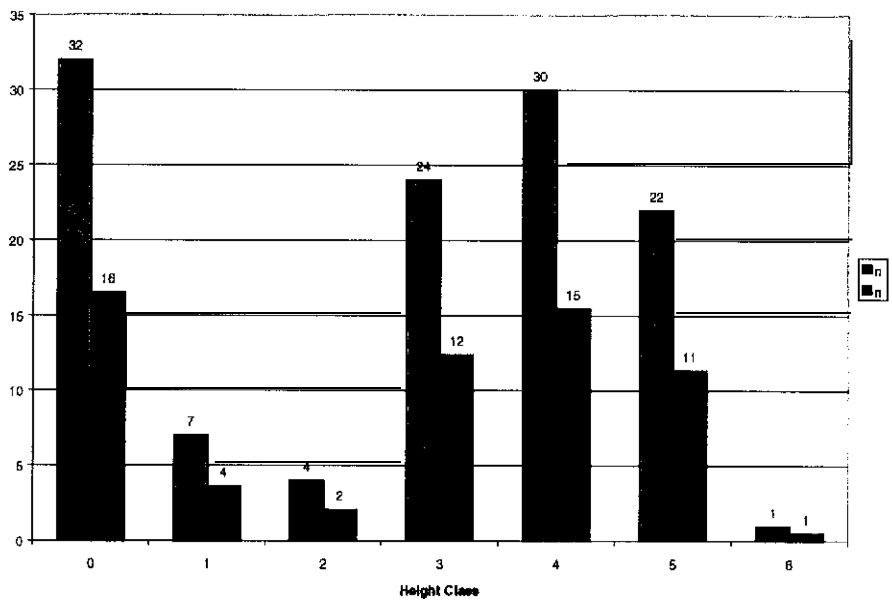


Figure 19 - Age Classes of Recorded CMT Sites

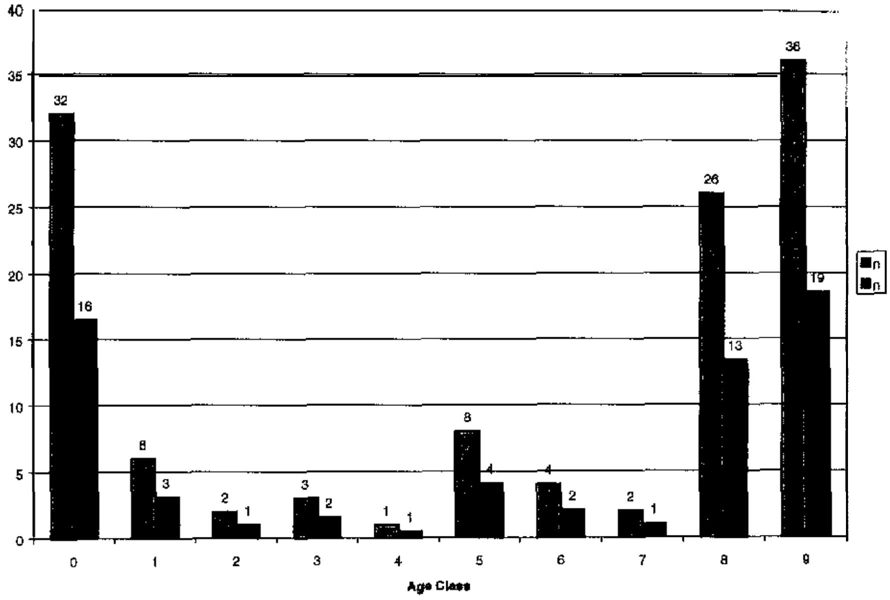
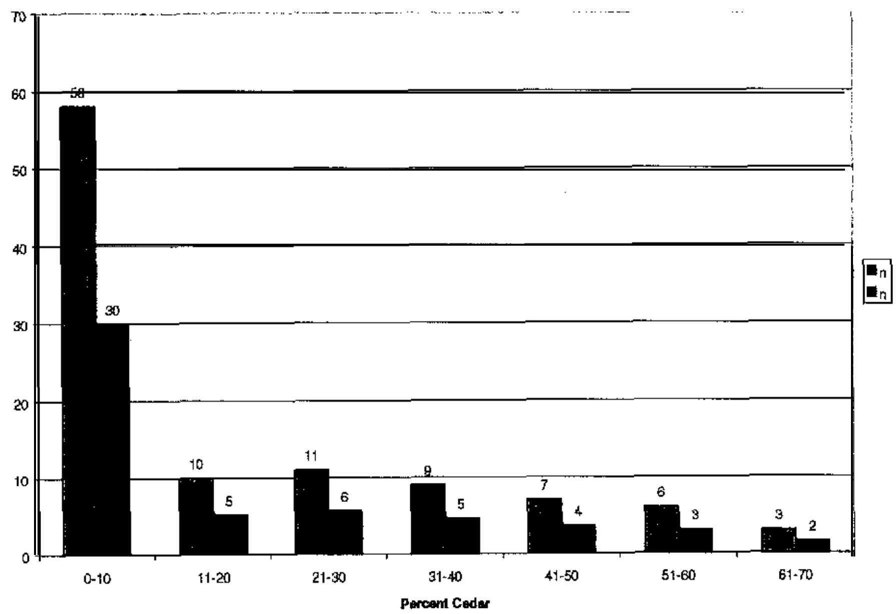


Figure 20 - Cedar Composition of Recorded CMT Sites



6.4.4 Petroglyphs

Slope

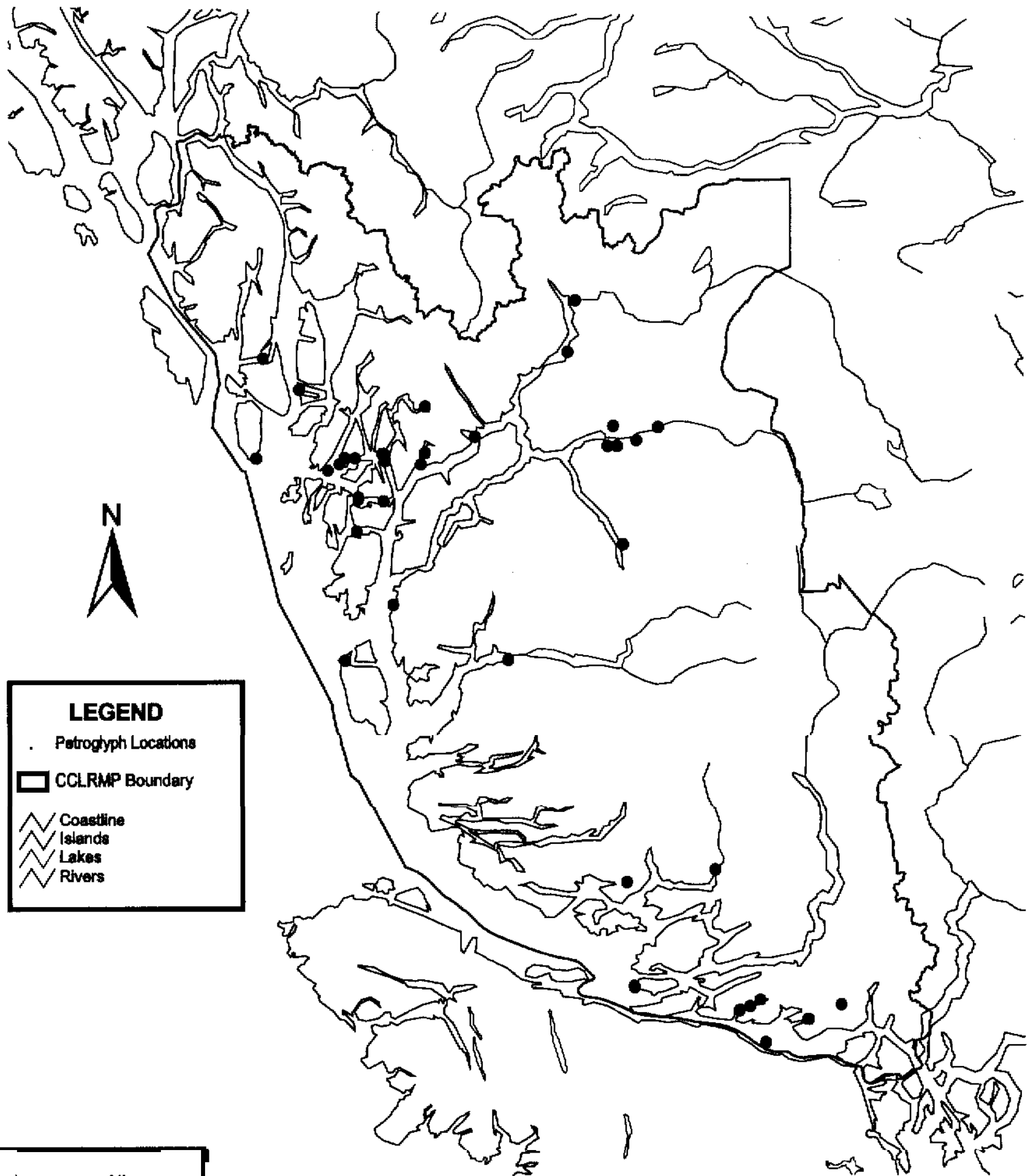
Almost all recorded petroglyph sites are located either near the coastline or along major rivers, notably the Bella Coola (Figure 21). The majority (49%) are on slopes of less than 10%, but 51% of the sites are on slopes greater than 20%, with a maximum grade of 72% and a median of 12%. As previously noted, DEM limitations may have exaggerated the frequency of petroglyph sites on steep slopes by failing to discern small flat landforms. Figure 22 illustrates the range of slopes associated with recorded petroglyph sites.

Distance to Salt Water

Many petroglyphs are located along the coastline, near the ocean (Figure 21). The majority of recorded petroglyph sites (60%) are within 100 metres of the ocean, and 76% are within 200 metres (Figure 23). Still, 7% of all recorded pictographs are more than 500 metres inland, with one site being more than 2 kilometres from salt water. The median distance from a recorded petroglyph to the nearest salt water is 52 metres.

Distance to Fresh Water

While most recorded petroglyph sites are located near the coastline, several are situated inland, primarily along the Bella Coola River (Figure 21). Thirty-three percent are of recorded petroglyph sites within 100 metres of the fresh water, and 49% are within 200 metres (Figure 24). However, 26% are more than 500 metres from the nearest source of fresh water, making this association somewhat tenuous.



Projection: Albers
Units: meters
Datum: NAD 83
Map Data Source:
BC 1:6mil

Project Number: 962-1936 Date: 3 June, 1999 File: petrogly.apr

Golder Associates

RECORDED PETROGLYPH LOCATIONS

Scale 1:2,250,000

FIGURE: 21

Figure 22 - Slope Ranges for Recorded Petroglyph Sites

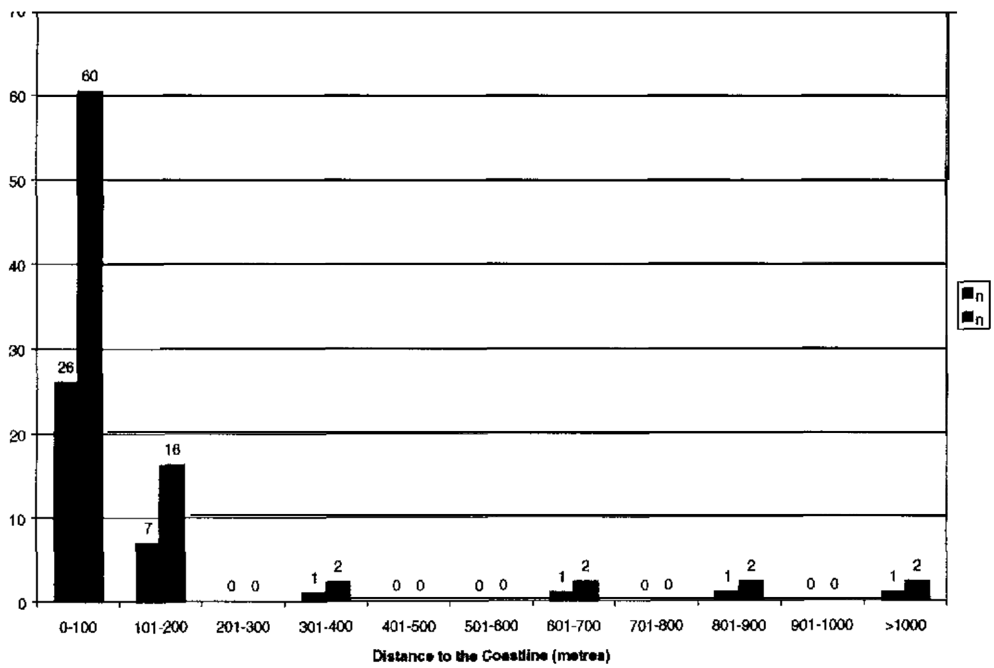


Figure 23 - Distribution of Recorded Petroglyph Sites in Relation to Salt Water

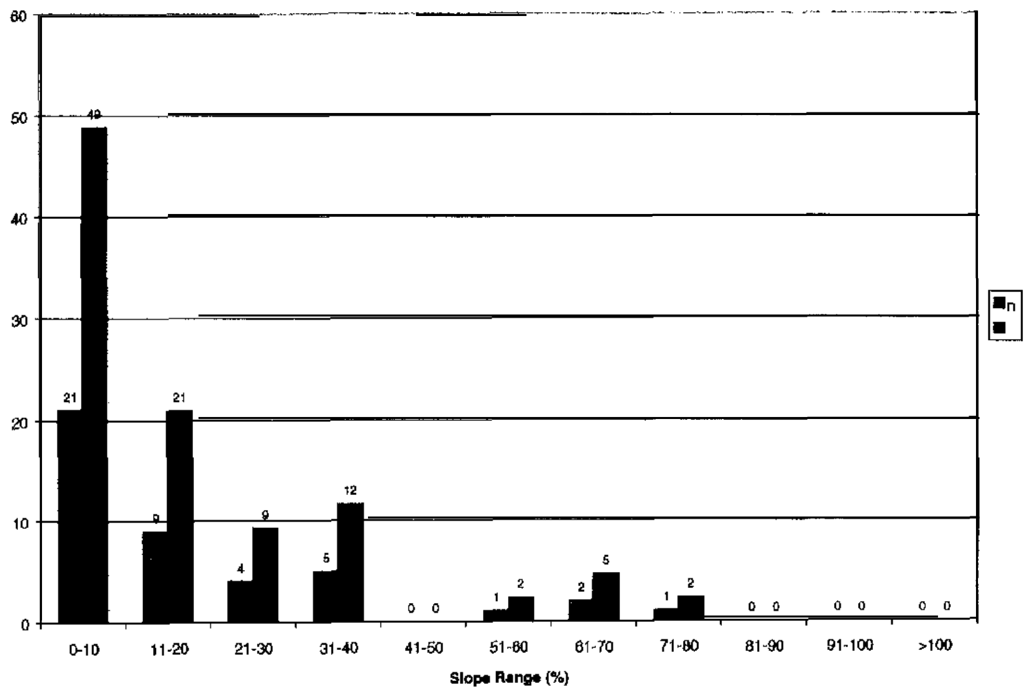
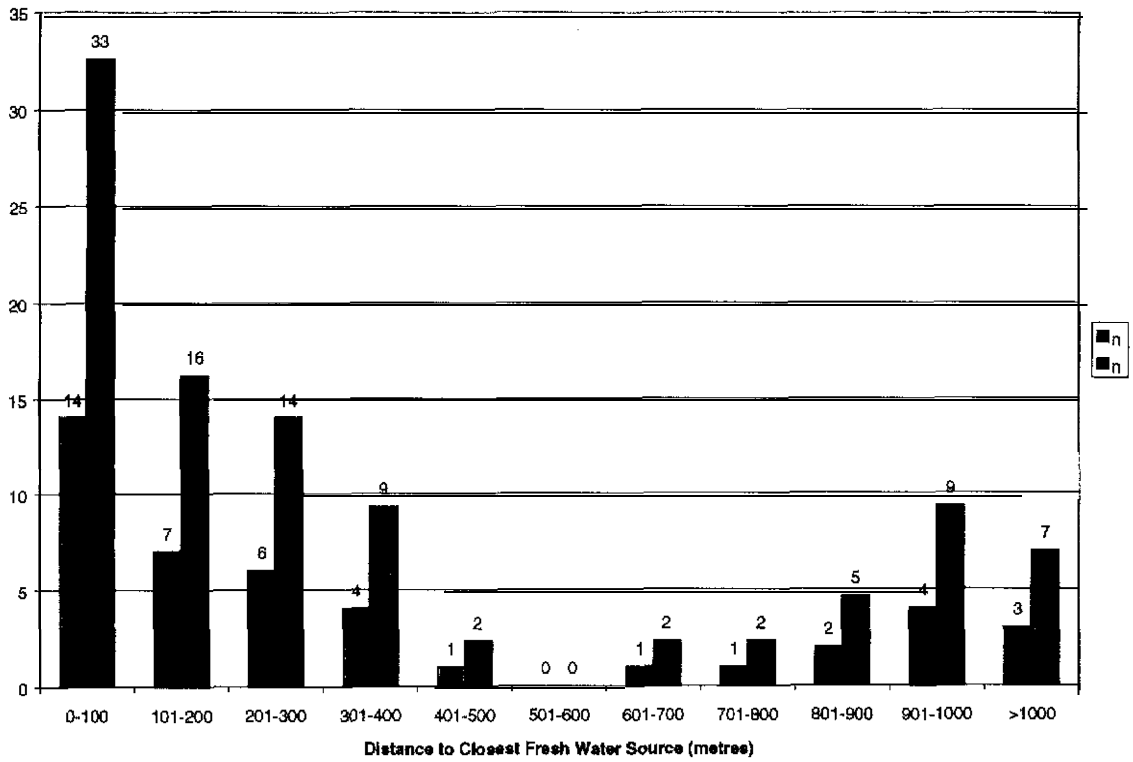


Figure 24 - Distribution of Recorded Petroglypb Sites in Relation to Fresh Water

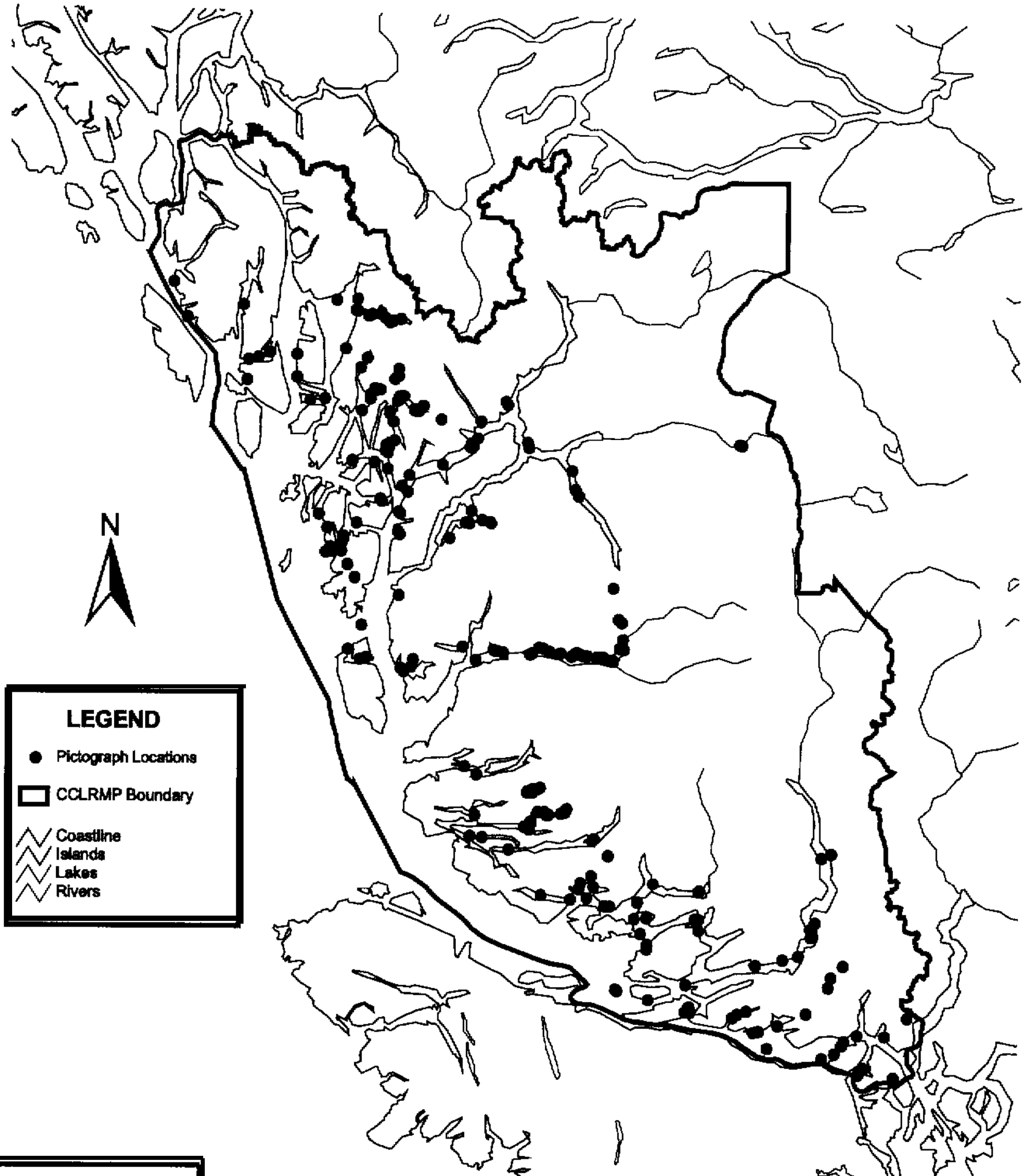


6.4.5 Pictograph Sites

On the Central Coast, the database of recorded pictographs is substantially larger than for petroglyphs. While most known pictographs are situated along the coastline, there is a marked concentration on the north shore of Owikeno Lake (Figure 25), and a few are known along other lakes and rivers. Relatively high site densities are recorded in the Spiller Channel/Spiller Inlet, Ellerslie Lake, Kynoch Inlet, Kwatna Bay, Hunter Channel, Belize Inlet, Watson Island, Knight Inlet and Loughborough Inlet areas.

Slope

Existing data indicate that pictographs usually occur on nearly vertical rock faces. However, the GIS data, limited by the resolution of the DEM, did not discern this pattern. The DEM identified a slope range for pictograph sites from 0% to 210%, with a median of 27%. As these values do not accurately reflect the true gradients of the recorded sites, slope is not discussed further with regard to pictographs.



Projection: Albers
Units: meters
Datum: NAD 83
Map Data Source:
BC 1:6mil

Golder Associates

RECORDED **PICTOGRAPH** LOCATIONS

Scale
1:2,250,000

FIGURE:

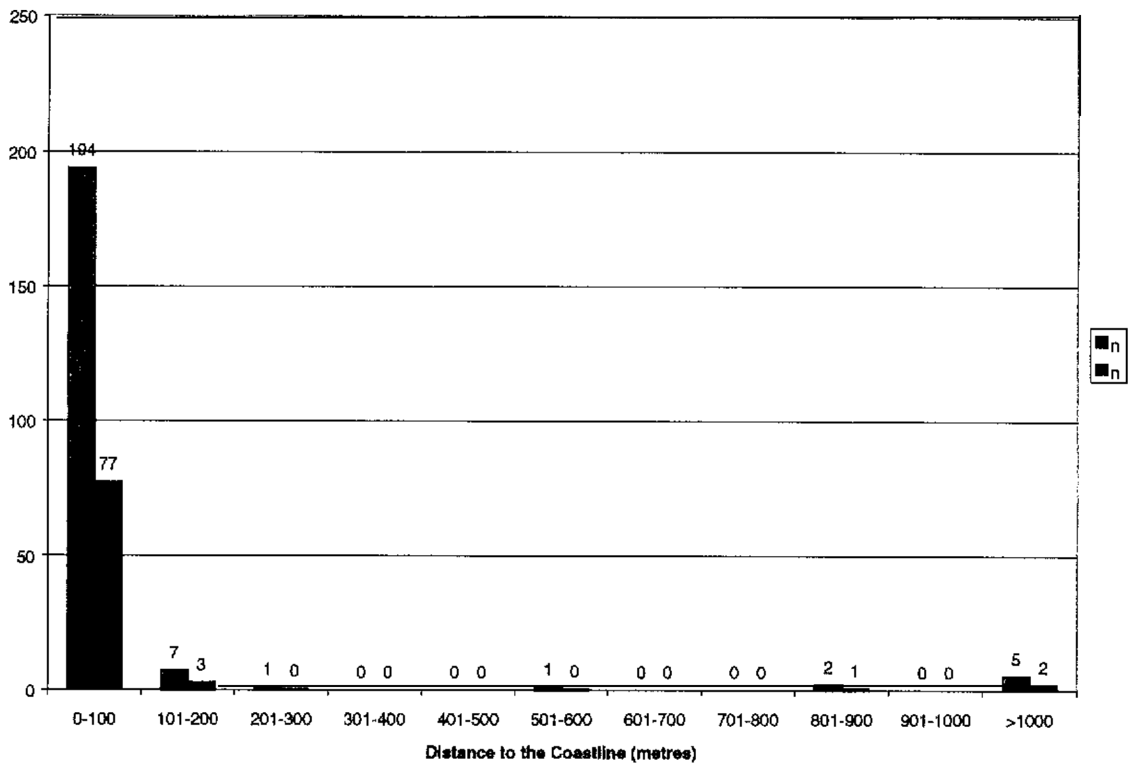
25

Project Number: 962-1936 1999 pictogph

Distance to Salt Water

A strong correlation was observed between pictographs and salt water (Figure 26). Seventy-seven percent of recorded pictographs are located within 100 metres of the shoreline, and 80% are within 200 metres. Only 20% are more than 500 metres from the coastline.

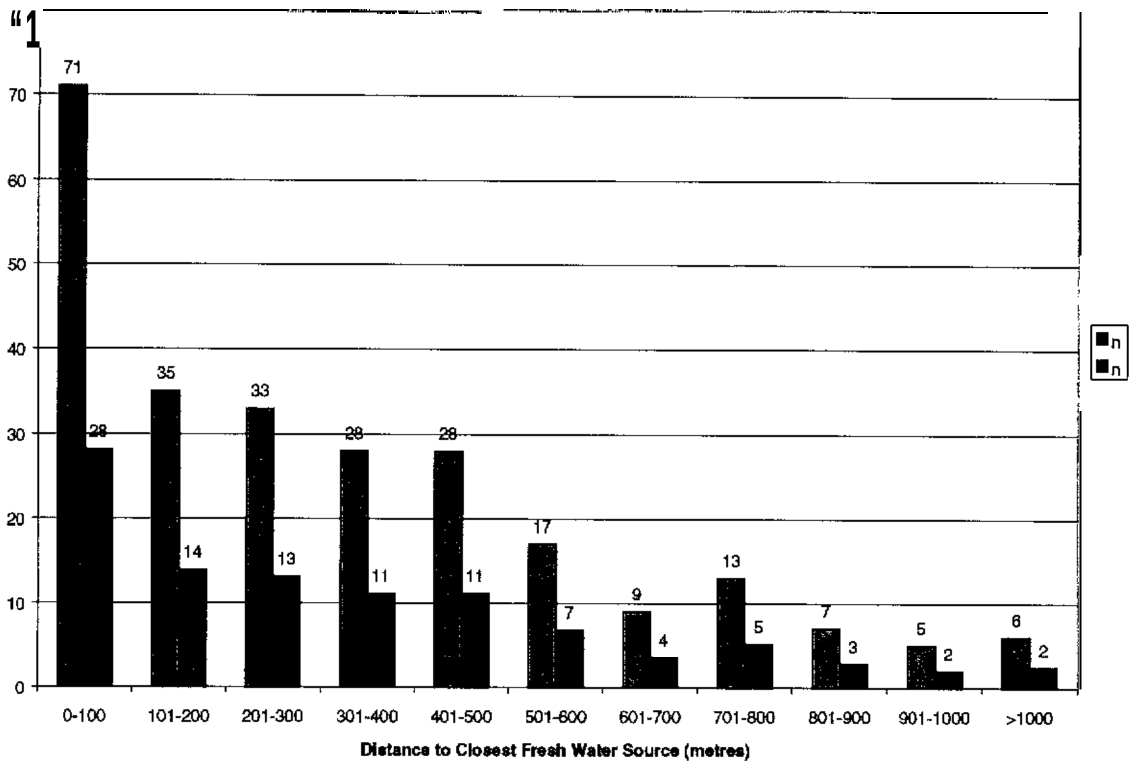
Figure 26 - Distribution of Recorded Pictograpb Sites in Relation to Salt Water



Distance to Fresh Water

A weaker correlation with fresh water is indicated. The median distance from a recorded pictograph site to the nearest fresh water source is about 254 metres. However, only 28% are within 100 metres of fresh water and only 42% are within 200 metres (Figure 27). A substantial number (58%) are more than 200 metres from fresh water, and 23% are more than 500 metres away.

Figure 27 - Distribution of Recorded Pictogrsph Sites in Relation to Fresh Water



6.5 GIS Analysis of Terrain

A number of GIS analyses were undertaken to characterize the Central Coast landscape. Variables that were believed to be important for predicting archaeological site locations were assessed in terms of their overall distribution in the study area. These analyses, taken together with the analysis of recorded archaeological sites, helped to evaluate the discriminating power of the predictor variables. Data for the major modelling variables are discussed in the following sections.

6.5.1 Slope

Slope was considered a highly important variable, particularly for predicting habitation locations. Table 5. Shows the distribution of various slope classes across the study area. These data clearly illustrate the steep, rugged nature of much of the Central Coast.

Table 5 - Slope Classes in the Study Area

Slope	Area (ha.)	% of Study Area
0-10%	454,835.07	9.48
0-15%	704,624.13	14.68
0-20%	946,028.16	19.71
0-30%	1,458,106.97	30.38
0-90%	4.033.214.31	84.03

6.5.2 Elevation

Elevation was used primarily as a supplement to slope, to better reflect the presence of small beaches and terraces. Elevation was also used to help define the subalpine zone for modeling campsite locations in high altitude parklands. Since elevation was not a critical variable for most models, minimal GIS analysis was conducted, as shown in Table 6.

Table 6 - Elevation Ranges in the Study Area

Elevation	Area (ha.)	% of Study Area
0-10 m asl	33,893.93	0.71
0-20 m asl	76,833.61	1.60
0-1100 m asl	3.081.328.28	64.19

6.5.3 Distance to Coast

Distance to the shoreline was considered a very important variable, since most of the First Nations of the study area have maritime-oriented cultures. Many archaeological site types are expected to be associated with foreshore or near shore contexts. Table 7 represents the study area in terms of distance to the coastline.

Table 7 - Distance to Coast in the Study Area

Distance to Coast	Area (ha.)	% of Study Area
O-100 m	103,945.00	2.17
O-200 m	184,173.25	3.84
O-300 m	261,417.56	5.45
O-1000 m	670,195.00	13.96
O-2000 m	1,095,307.44	22.82
200-2000 m	911.135.31	18.98

6.5.4 Islands

Two classes of islands were considered: those smaller than 50 ha., and all islands. 707,004.94 ha. (14.73%) of the study area is made up of islands, of which 55,385 ha. (1.15% of the study area) is comprised of islands smaller than 50 ha. in area. The identification of small islands was considered to be important for the identification of defensive habitation sites and possibly burial places, although neither site type was individually modelled.

6.5.5 Distance to Fresh Water

Four categories of fresh water were considered in the analysis: two-line rivers (>20 m bank-to-bank), definite rivers, intermittent rivers, and lakes. Lakes were defined as those 5 ha. in area or larger. Table 8 provides a breakdown of the amount of the study area within various distances to fresh water.

Table 8 - Distance to Nearest Fresh Water in the Study Area

Water Source	Distance	Area (ha.)	% of Study Area
Two Line River	100 m	47,469.31	0.99
	200 m	96,596.56	2.01
	300 m	136.665	2.85
Definite River	100 m	569,707.25	11.87
	200 m	1,136,330.50	23.67
	300 m	1,517,014.75	31.60
Intermittent River	100 m	187,990.75	3.92
	200 m	471,128.75	9.82
	300 m	2,929,388.25	61.03
Lake	100 m	64,484.06	1.34
	200 m	388,985.56	8.10

6.5.6 Cedar Content

Presence of cedar was considered crucial to the CMT model, which focused on bark-stripped and aboriginally logged cedar CMTs. According to the forest cover data, 1,459,939.19 ha. of the study area (30.42%) contains at least 1% cedar, and 677,777.13 ha. (14.12%) contains 50% or more cedar.

65.7 Age and Height Class

The age and height classes of forest stands are important for evaluating the relative probability of cedar CMTs being present. The models focused on age classes 8 and 9, which together typically define old growth, because CMTs are most likely to be intact in old growth. Height class was considered to be important only for excluding stunted stands that probably would not be valuable for bark or timber. Table 9 shows the distribution of the relevant age and height classes.

Table 9 - Age and Height Class Distribution in the Study Area

Stand Class	Area (ha.)	% of Study Area
Age Class 8+	1,482,688.63	30.89
Age Class 6+	1,516,597.56	31.60
Height Class 3+	1,178,066.00	24.54

6.5.8 Distance to Nearest Recorded Archaeological Site

It was reasoned that certain site types tend to co-occur, because the activities that produced them are associated. An analysis was completed to determine how much land was within 100 or 250 metres of a recorded site of any type, within 100 metres of a recorded fish trap, or within 50 metres or 300 metres of a known or modelled trail. Distance to recorded sites or trails was not considered a highly significant variable because only a fraction of the total site universe has been recorded. Table 10 summarizes these calculations.

Table 10 - Distance to Recorded Site, Fish Trap, or Trail

Cultural Feature	Distance	Area (ha.)	% of Study Area
Recorded Site	100 m	3252.56	0.07
	250 m	18,324.06	0.38
Recorded Fish Trap	100 m	441.50	0.01
Known Trail	300	26,675.88	0.56
Known or Modelled Trail	50	5144.00	0.11

7.0 PREDICTIVE MODELLING

One of the primary objectives of this study was to produce archaeological site potential maps that could be used to assess the need for archaeological field assessments prior to development. To produce these maps, it was necessary to develop a series of GIS-based predictive models.

Predictive modelling has been used as an archaeological tool for a number of years, and many published papers discuss the merits and limitations of its application (e.g., DeBloois 1985; Kohler 1985; Mierendorf n.d., Dalla Bonna 1995). The complexity of site location models has varied widely, from simple inductive models based on a researcher's knowledge and experience (expert inference models) to much more sophisticated statistical routines (e.g., multiple regression analysis) and even neural network modelling based on artificial intelligence research. Regardless of the technique used, most predictive models rely on observed patterns of known archaeological sites across the landscape to suggest where unrecorded sites are most likely to be found. Sophisticated modelling may simultaneously analyze numerous data sources to develop complex statistical models.

Years of archaeological survey have provided a fairly substantial body of site location information for certain parts of the province, and some general distribution patterns can be identified. This information, together with knowledge shared by First Nations people and other informants, ethnographic evidence, historical accounts, and other data, can often provide a good understanding of what types of archaeological sites are likely to exist in a given area and where they may be found.

The accuracy, reliability and complexity of a predictive model is completely dependent on the quantity and quality of available data, particularly when GIS is used. Probabilistic archaeological inventory, in which areas of both high and low site potential are investigated, is the preferred field methodology for producing data for modelling. However, very few probabilistic inventory projects have taken place in British Columbia, and none have occurred in the Central Coast LRMP area (Eldridge and Mackie 1993). Consequently, for most parts of the province, and specifically for the Central Coast, we do not know enough about site distributions to successfully employ complex statistical models. However, some areas have received enough archaeological attention to produce large archaeological datasets. In these cases, more sophisticated computer modelling can be applied, and the results can be presented in GIS formats that provide clear graphical representations of the results. The coastal zone of the Central Coast LRMP area is one area that offers a fairly large dataset. Unfortunately, very few sites have been recorded in the inland portion of the study area.

In-field ground truthing is usually required to test the hypotheses used to create predictive models, and to provide both positive and negative data that can help to refine them. This is particularly true for forested environments, where limited site visibility, poor preservation of organic materials, and a small 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 sensitivity. 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 systematic field inventory. Models help 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 a complete understanding of the 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 a consideration of different interpretations of existing site distribution data (Kohler 1985).

Some archaeological sites will be missed by any sampling method, and some of those sites ultimately may be disturbed or destroyed by development. On the other hand, a significant number of "false positives" are normally expected (i.e., areas assessed as having high archaeological site potential when in fact no sites are present). These limitations are inherent in modelling and overview assessments, and they cannot be avoided without complete survey of all potential development zones- a goal that is clearly impractical.

7.1 Modelling Rules and Rationale

The following section summarizes the steps taken to develop and apply a series of archaeological predictive models for the Central Coast LRMP area.

7.1.1 Model Development

A predictive model is a tool used to identify areas where archaeological sites are most likely to occur on the landscape. The predictive models used in this project were developed using data collected in the earlier literature review, consultation and site analysis phases. Ethnographic and historical documents were reviewed to glean information about past cultural activities in the study area, including subsistence practices, technologies, architecture, and exchange systems. Archaeological reports and publications were reviewed to correlate past activities with archaeological site types. Physical evidence of occupation, such as shell middens, housepits and culturally modified trees, was linked with specific activities (shellfish harvesting/processing, habitation, and bark-stripping, for example). These relationships were used to create entity relationship statements that could be used in GIS modelling. Simple examples of this process are illustrated in Table 11 below. Note that Table 11 is an example only and is not intended to represent a functional model.

Table 11
Example of Predictive Modelling Criteria

Activity	Archaeological Evidence	Modelliig Statement	Archaeological Potential
Shellfish processing	Shell Midden	Distance to shoreline <200 m AND Distance to fresh water <150 m AND Slope < 10% AND Distance to known canoe run < 100 m	High
Bark collection for basketry	Culturally modified trees	Forest cover includes cedar AND Age class = 8 or 9 AND Distance to shoreline < 250 m	High

In the absence of probabilistic inventory data, an inductive modelling approach was adopted, whereby the characteristics of previously recorded archaeological sites provided the primary modelling data. Models were developed for seven site types, which are described in the following sections.

7.2 Data Sources

The following data sources were used for modelling:

- Terrain Resource Information Management (TRIM) maps (1:20,000 scale, ARC/INFO format);
- Gridded DEM (25 m grid size);
- Forest Cover maps (1:20,000 scale, ARC/INFO format);
- Recorded archaeological site data (1:50,000 scale paper maps; ARC/INFO point data and associated database; site forms and sketch maps, where available);
- Digitized Trail Locations (compiled at 1:50,000 scale);
- Watershed Atlas Maps (I :50,000 scale, ARC/INFO format);
- Baseline Thematic Maps (1:250,000 scale, ARC/INFO format); and
- Indian reserve coverage.

7.2.1 TRIM and Gridded DEM

The TRIM base maps provided the most consistent and reliable source of spatial data used in this study. Complete coverage of the Central Coast LRMP area was obtained from the Ministry of Forests. The digital elevation model (DEM) that accompanied the TRIM data was found to be inadequate to allow the resolution necessary for modelling. Specifically, the spot elevations in the TRIM DEM were too far apart to support a small enough modelling cell size to suit the project goals, Consequently, a “Gridded DEM Product” was purchased from Geographic Data B.C. for the analysis. The Gridded DEM represents a re-sampled version of the TRIM DEM in which spot elevations are interpolated to create a grid of elevations at 25 metre interval, allowing a 25 m pixel size for modelling.

Features extracted from the Gridded DEM and TRIM coverages include elevation contours and point files, surface hydrography, shorelines and islands. Surface hydrographic features such as major rivers (bank to bank width greater than 20 metres), definite rivers, indefinite and intermittent streams were also extracted and merged into a single raster coverage. Unfortunately, the grid-based nature of a raster GIS data model degrades the quality of linear features, and streams smaller than 25 metres are nonetheless represented by a 25 by 25 metre cell.

7.2.2 Forest Cover Data

Forest cover data were provided by the B.C. Land Use Coordination Office (LUCO) in ARC/INFO format. Several thematic coverages were extracted from the forest cover data that pertained to the distribution, age, and height of major tree species, primarily western red and yellow cedar. Forest cover attributes used for modelling included: species composition (cedar percentage), age class, and height class. The forest cover data were also used to identify data types to be excluded from the analysis (e.g., exposed rock, ice, and glaciers). The selected data were subsequently exported into a raster database and merged into contiguous data layers.

7.2.3 Recorded Archaeological Site Data

The Archaeology Branch provided several sources of data for recorded archaeological sites in the study area, including:

- GIS point data and an associated database for all recorded archaeological sites;
- original site forms; and
- 1:50,000 scale NTS maps showing recorded site locations.

Additional site information was downloaded from the Canadian Heritage Information Network (CHIN) database. These sources were compared to ensure that all site location and type records were current and as accurate as possible prior to modelling. An unexpectedly high error rate was found in all sources of recorded site data, and substantial interpretations and corrections were required before the data were suitable for modelling. The error-trapping and correcting process is described in Section 7.3.

Almost half of the recorded sites in the study area lie within the area encompassed by the Heiltsuk AOA (Maxwell et al. 1997), and the data for these sites was provided by Millennia Research. Since these data had previously been checked for errors, they were not reevaluated.

Analytical tables were created to summarize the spatial and terrain attributes of the recorded sites (see Sections 6.4 and 6.5 above). For each site type, tables were created to describe relevant variables such as slope, elevation, distance to fresh and salt water, or proximity to other site types. The resultant information was used to evaluate the initial modelling rules and threshold values.

7.2.4 Baseline Thematic Mapping (BTM)

Developed by the Ministry of Environment, Lands and Parks (MELP), the Baseline Thematic Mapping product presents 1:250,000 scale representations of present land uses. The data are derived from satellite imagery and digital topographic mapping, to create a general overview of terrain and vegetation features such as "avalanche", "old forest", "young forest", "alpine", "wetlands", as well as land use classes such as "urban", recreation" and "mining". The BTM data provide relatively coarse slope and elevation values, based on minimum, maximum and mean measurements for polygons, which may be very large.

BTM data were used as supporting data to help identify alpine, barren surfaces, and glaciers, where the potential for most archaeological site types is predicted to be low. The BTM data were also used to generate first generation slope, aspect and elevation classes for the recorded site analyses, but this approach was abandoned due to the lack of resolution in the data.

7.2.5 Recorded and Digitized Trail Data

A few aboriginal and early historic trails had been previously recorded in the study area. Following consultation with the Nuxalk, Oweekeno and Kitasoo First Nations, several additional trails or general trail routes were manually plotted and digitized. Digital trail locations from the Heiltsuk AOA were added to the database. The digital trail locations were used as a variable for modelling culturally modified trees, and as a supporting dataset for assessing the results of the other models. Since precise trail locations were not always known, digitized trails were buffered by 100 metres prior to inclusion in the final modelling results.

7.3 Error-Checking of Archaeological Site Locations and Types

7.3.1 Methodology

An accurate database of known sites and their attributes is crucial to the development of effective predictive models of archaeological resources. To this end, Archaeology Branch-maintained 1:50,000 NTS paper maps indicating recorded site locations and Canadian Heritage Information Network (CHIN) site type data were checked against B.C. Site Inventory forms and maps to establish correspondence between primary and secondary sources. In cases of differing data, the site forms and maps were assumed to be the authoritative sources of information, because they represent primary data, recorded by in-field personnel. Any deviations were noted and corrected, and the revised information was compared with GIS data provided by the Archaeology Branch. Where necessary, corrections were made to the GIS point coverages and associated database.

Unfortunately, the GIS data were not made available until well after the hard-copy error-checking had been completed. Not having all datasets required to simultaneously error-check both hard-copy and digital sources resulted in some sites being left unverified. This was due to the fact that the digital LRMP boundary received from LUCO differed slightly from the boundary shown on paper maps supplied for the project by the Ministry of Forests. This problem was confined to the southern reaches of the Central Coast LRMP region, in small areas of the 92K/06 and 92L/10 1:50,000 NTS map sheets, which respectively represent the entire portion of the Comox (COMX) watershed included in the study area and a small part of the westernmost margin of the Knight (KNIG) watershed.

Sites that had been previously error-checked during the Heiltsuk AOA (Maxwell et al. 1997) were not re-evaluated in this study, and 39 additional sites could not be error-checked due to a lack of information.

7.3.2 Results

An examination of the sites by 1:50,000 NTS map sheet clearly demonstrates that some areas have more accurate site records than others. Map sheets 92M/4, 92M/6, 92M/10, 92M/11, 92M/15, 93D/2, 93D/7, 93D/8, 93D/9, 103A/7, 103A/10, and 103H/3 were particularly problematic (see Appendix V). The following paragraphs explain some types of errors, and Table 12 provides a summary. More specific errors may be found in Appendix V.

On the NTS paper maps, unnumbered site triangles, site locations without formal Borden numbers ("NS" designations), and unapplied "additional information" site form data were some of the occasional errors uncovered for this data set. Several major and minor site type errors were present in the CHIN data set, including omissions of type and subtype components and entirely incorrect type and subtype components. These site type errors were also present in the ARC/INFO database.

It was found that many of the sites in the ARC/INFO database had multiple records. Most were deleted, but closer inspection revealed that certain site locations had been somehow assigned another site number and its attributes. The correct site attributes were seemingly replaced by a different site, which had multiple records. The cause of this data corruption could not be determined, but all such sites falling within the study area have been corrected in the ARC/INFO database.

Table 12 - Summary of Selected Archaeological Data Errors

Site Error	N	*F*
No site form	8	0.01
No site map	42	0.05
Vague/unreadable site map	50	0.05
Not plotted (NTS)	6	0.01
Not plotted (ARC/INFO)	27	0.03
Misplotted (NTS)	115	0.13
Misplotted (ARC/INFO)	23	0.03
Vaguely plotted (NTS)	27	0.03
Mislabeled (ARC/INFO)	46	0.05
Site type error	92	0.10

7.3.3 Site Locations

Although the NTS paper map site triangles are normally plotted by Archaeology Branch staff using original site forms and maps, transcription mistakes, oversights, outdated or missing information, differences in scale between sources, and the use of a large plot symbol on the paper map were considered potential sources of error. For some sites within the study area, however, the site forms and maps were unavailable, and therefore, for these sites, the NTS paper maps were considered more indicative of site location than the ARC/INFO data. This consideration is based on the understanding that the ARC/INFO data were produced by digitizing the NTS paper maps, at which point errors in data translation may have been introduced. A solid triangle on the 1:50,000 hard-copy suggested that site forms and maps were formerly available or other sources of site location information were used. If neither the site form/sketch map or the 1:50,000 paper map provided adequate site location data, a notation was made in the ARC/INFO database and, in some cases, the site was excluded from GIS analysis.

7.3.4 Site Types

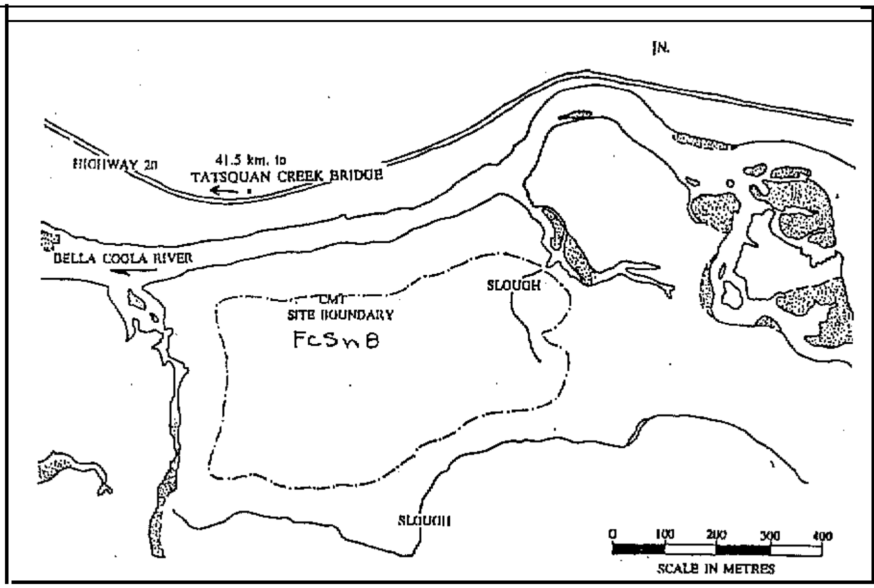
Site type data were gleaned primarily from the original site forms and sketch maps. As with the site location information, errors in data transcription made from the primary sources to CHIN were considered. Also of concern are a number of discrepancies between site forms and CHIN data, wherein very simple site descriptions on the site form (e.g., village, “campsite” or “fishing station”) are substantially expanded in the CHIN database. In many of these cases, it was impossible to evaluate the accuracy of the CHIN data. Concurrence between the site form, CHIN and GIS datasets was ensured wherever possible.

7.3.5 Limitations

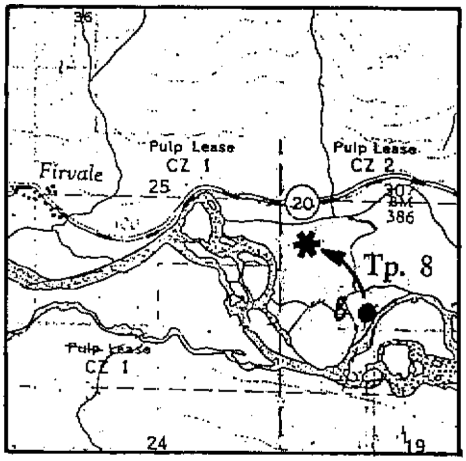
The quality of all data sources ultimately is dependent on the rigor of in-field site recording. Although archaeological field standards have been developed and applied more consistently in recent decades, legacy data from the 1960s and 1970s, which form a substantial part of the site inventory for the study area, are often vague, inconsistent, or even missing. It is questionable whether many sites could be relocated with the information presently available. For may sites, access and location fields on site forms are approximate, latitude and longitude measures are provided in degrees and minutes only, and site maps are hand drawn and not to scale. More recent and more detailed site forms allow for better explanation, UTMs are usually provided, and site locations are often plotted and submitted on 1:50,000 NTS maps by the in-field investigators to simplify translation to the Archaeology Branch-maintained map inventory.

Landfonn changes over time, or differences in map scales can also affect the accuracy of site mapping. For example, the course of the Bella Coola River on a site sketch map, the NTS paper map, and in ARC/INFO were found to vary quite markedly (Figure 28). Whether this reflects a seasonal or more permanent change in the watercourse, it has significant implications for determining correct site location based on geographic landmarks.

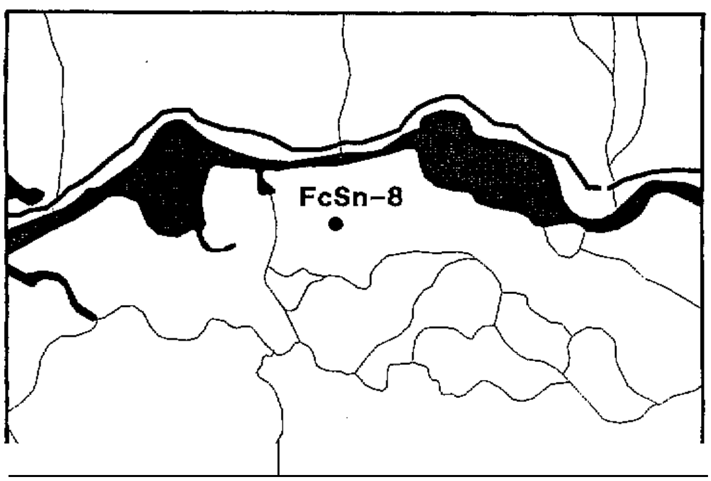
Although some of the above-noted limitations are significant, the rigorous error-checking methods employed in this study has resulted in a relatively accurate database that allows archaeological predictive modelling to be confidently undertaken.



*ORIGINAL **FcSn-8** SITE MAP*



INCORRECTLY PLOTTED SITE LOCATION
(Archaeology Branch. 1 : 50,000 NTS map)
AND CORRECTED SITE LOCATION



CORRECTED SITE LOCATION
(1 : 50,000 Watershed Atlas)

Project No. 962-1936(5010) Drawn w.t. Reviewed J.D.B. Date Aug.'98

Golder Associates

EXAMPLE OF ARCHAEOLOGICAL DATA CORRECTION

Figure **28**

7.4 Modelling Variables

Terrain variables are important in predictive modelling because certain types of archaeological sites correspond with certain landscape features. For example, village sites are typically (although not always) found on flat, well drained beaches near the shoreline. The terrain variables that were used in modelling are briefly defined below.

7.4.1 Slope

For the purposes of this study, slope was defined as surface gradient, in percent, measured as (rise/run) x 100. For example, a rise of 100 metres over a horizontal distance of 1000 metres represents a slope of 10% (100/1000) x 100. For some models, slope data in degrees were converted to percent using the equation: %SLOPE=(TANθ)*100. Slope values and coverages were derived from the gridded DEM.

7.4.2 Elevation

Elevation data was derived from the digital elevation model @EM), which assigns an elevation (in metres asl) to each 25 metre grid cell.

7.4.3 Distance to Fresh Water

Distance to fresh water was measured as simple horizontal distance to a lake, two line river, definite river, or intermittent river, as defined in the TRIM data. The shortest of these distances was considered to be the distance to nearest fresh water for each recorded site. Effective distance (accounting for terrain) was not calculated. Indefinite rivers were excluded from the model, due to the uncertainty of the data.

7.4.4 Forest Cover

Forest cover and other plant species are the basis for defining the subalpine zone and for modelling CMTs. It was originally proposed that biogeoclimatic zones would be used to define the subalpine, but closer analysis showed that the 1:250,000 scale of the data was too coarse for modelling purposes. Through discussions with Ministry of Forests ecologists, it was decided that Alpine Forests, as defined in the Forest Cover data, would be used to define the subalpine zone within which the remaining variables would be applied. Subsequent research led to the addition of the upper elevations of the MH and ESSF zones to the subalpine dataset.

Forest cover was a key variable for CMT modelling. Species composition, age class, and height class were used in combination with terrain variables to develop modelling rules for CMTs. The species composition data were used to calculate how much cedar is present in each forest stand.

7.4.5 Distance to Other Archaeological Sites

Some models incorporated recorded site data in an attempt to indicate correlations between certain site types. In these cases, a simple proximity analysis was used, based on the distribution of recorded sites in relation to one another. It is important to note that the value of the inter-site distance variables is limited by the fact that not all archaeological sites have been located and recorded. Consequently, actual inter-site distances may be lower than suggested by the present data.

8.0 PREDICTIVE MODELS

Models were developed for coastal habitations (including shell middens), inland habitations (primarily riverine and lakeshore), subalpine camps (high elevation habitations), pictographs, petroglyphs, trails and culturally modified trees. The following sections define and describe the seven models. Each discussion includes an explanation of underlying assumptions of the model, and a summary of the modelling rules.

Those areas that best meet the criteria of the model, and therefore are predicted to have the greatest site potential, are labeled Class I lands. Locations that meet some, but not all, of the optimal criteria are identified as Class II lands. Class III areas are the remaining lands, which are predicted to have relatively low archaeological site potential. It should be noted that low potential does not indicate a total lack of potential for archaeological sites, and unanticipated archaeological sites may occur in these areas.

Not all archaeological site types were modelled. Certain sites, such as small lithic scatters, burials, stone quarries and fish traps or weirs, were not modelled due to insufficient data, or a lack of detailed understanding of their spatial distributions. It is anticipated that some of these sites, notably burials, intertidal lithic scatters, and canoe runs will be accounted for by other models, as it is predicted that they will generally (although not always) correspond with other site types.

8.1 First Generation Coastal Habitation Model

For the purposes of modelling, coastal habitation sites were considered to include villages, shell middens (with or without clear evidence of settlement), and structural remains within 2 kilometres of the coastline. Ethnographic information and existing archaeological data suggest that, with the exception of sites on the few major rivers and large lakes in the study area, the vast majority of large habitation sites are expected to be on or near the coastline. In the Heiltsuk AOA study area, all recorded shell midden sites are within 2.4 kilometres of the coast line, and this distance was considered in setting the arbitrary 2 kilometre cut-point to distinguish between coastal and inland habitation sites.

8.1.1 Assumptions

It was assumed that most coastal habitation sites would be located on relatively flat landforms near the shoreline (but beyond the storm tide zone) and near a source of fresh water. This pattern is strongly supported by ethnographic descriptions of villages located near the mouths of streams or rivers, or at the heads of inlets (Hobler 1982, Lepofsky 1985, McIlwraith 1992). Hobler (1982) and Lepofsky (1985) also refer to shell middens and defensive sites on small islands. Nearby presence of a canoe run was predicted to increase the probability of a habitation site being encountered, as villages and shellfish collection areas would have been accessed primarily by canoe. It is recognized that there will be exceptions to these assumptions, notably for defensive sites, which may be surrounded by steep terrain, and to which water may have been transported from another source (Lepofsky 1985).

8.1.2 Variables

The primary variables used for the coastal habitation model were:

- slope;
- elevation;
- distance to coastline;
- distance to fresh water (lake, river or stream);
- islands; and
- distance to a recorded fish trap or canoe run.

Glaciers, wetlands, swamps, avalanche tracks, exposed rock, and the subalpine and alpine were all considered to have very low potential for coastal habitation sites.

8.1.3 Model Rules

Based on recorded site data and inference from archaeological and ethnographic information, the following first-generation model was developed for coastal habitations:

Table 13 - First Generation Predictive Model for Coastal Habitation Sites

COASTAL HABITATIONS		
Class I		Distance to coastline = O-100 metres
	OR	Distance to intermittent river = O-100 metres AND Distance to coastline = 0-200 metres
	OR	Distance to big lake (>5 ha) = O-100 metres
	OR	Distance to double-wide river = O-100 metres
	OR	Distance to definite river = O-100 metres AND Distance to coastline = 0-200 metres
	AND	Slope = 0-20% OR elevation = O-10 metres asl.
	AND	Distance to coastline = O-2000 metres
	AND	Elevation = 0-20 metres asl.
Class I		Select small marine islands (< 50 hectares)
	AND	Distance to coastline = 0-100 metres
	AND	Slope = 0-20% OR elevation = O-10 metres asl.
	AND	Elevation = O-20 metres asl.
Class II		Distance to coastline = O-200 metres
	OR	Distance to intermittent river = O-200 metres AND Distance to coastline = 0-200 metres
	OR	Distance to big lake (>5 ha) = 0-200 metres
	OR	Distance to double-wide river = O-200 metres
	OR	Distance to definite river = O-200 metres AND Distance to coastline = O-200metres
	AND	Slope = 0-30% OR elevation = O-20 metres asl.
	AND	Distance to coastline = 0-2000 metres
	AND	Elevation = O-20 metres asl.

Table 13 - First Generation Predictive Model for Coastal Habitation Sites (cont'd)

COASTAL HABITATIONS		
Class II		Distance to recorded fish trap OR canoe run = 0-100 metres
	AND	Distance to coastline = 0-200 metres
	AND	Slope = 0-30% OR elevation = 0-20 metres asl.
	AND	Elevation = 0-20 metres asl.
Class II		Select small marine islands (< 50 hectares)
	AND	Distance to coastline = 0-200 metres
	AND	Slope = 0-30% OR elevation = 0-20 metres asl.
Class II		Distance to coastline = 0-200 metres
	AND	Distance to double-wide river = 0-100 metres
	AND	Slope = 0-30% OR elevation = 0-20 metres asl.
Class III		All other lands

8.2 Inland Habitation Model

The Central Coast LRMP area is a large study area with a diverse environmental and cultural makeup. Regional variations in climate, flora, fauna and terrain have led to distinct cultural adaptations among the First Nations living on the Central Coast. It was reasoned that to account for some of the cultural differences associated with environmental variation, a distinction between coastal and inland habitation sites was necessary. In particular, it was hoped this approach might highlight differences in settlement patterns between the riverine-adapted Nuxalk and their more maritime-adapted neighbours. An all-encompassing habitation model designed to account for all types of habitations in the study area would have to be very general and likely would result in exaggerated site potential in many locations.

8.2.1 Assumptions

Ethnographic, archaeological and anthropological information indicates that most inland habitation sites will be located either along major rivers, such as the Bella Coola, Atnarko and Klinaklini (Hester and Nelson 1978, Lepofsky 1985, McIlwraith 1992), or possibly on lake shores. It was further assumed that potential settlement sites would require level, well-drained ground and a source of fresh water. Many inland habitations can be expected to have associated trails, especially where canoe access is restricted.

8.2.2 Variables

For the purposes of this study, all inland habitation sites are, by definition, at least 2 km from salt water. Additional variables used in the model include:

- slope;
- distance to fresh water (lake or river);
- distance to recorded archaeological sites; and
- distance to known or modelled trails.

Glaciers, wetlands, avalanche tracks, the subalpine and alpine zones and all lands within 2 km of the continental coastline were excluded from the inland habitation model.

8.2.3 Model Rules

Based on recorded site data and inference from archaeological and ethnographic information, the following simple model was developed for inland habitations:

Table 14 - Predictive Model for Inland Habitation Sites

INLAND HABITATIONS		
Class I		Slope = 0-15%
	AND	istance to large lake (≥ 5 ha.) OR two line river = 0-100 metres
	AND	Distance to coastline > 2000 metres
Class I		Slope = 0-15%
	AND	Distance to lake (≥ 5 ha.) OR definite two line river OR definite river OR intermittent river = 0-100 metres
	(AND	Distance to coastline > 2000 metres
	AND	Distance to known site ≤ 100 m OR Distance to modelled trail ≤ 50 m
Class II		Slope = 0-15%
	AND	Distance to lake (≥ 5 ha.) OR two line river = 0-200 metres, OR Distance to small lake (< 5 ha.) OR definite river OR intermittent river = 0-100 metres
	AND	Distance to coastline > 2000 m
Class III		All other lands

8.3 Subalpine Camp Model

Subalpine parkland areas at high elevations were preferred localities for collecting certain plants, such as avalanche lily, huckleberries and whitebark pine nuts. Since these areas may be some distance from the main villages along the coastline or valley bottoms, base camps were often established along the forest fringe, near the resources. Turner (1995) notes that, due to the steep terrain of the Central Coast and the difficulty of accessing the subalpine, the zone was not intensively utilized. However, use of the subalpine was probably more intensive in the inland portions of the study area. It is reasoned that where subalpine sites occur, the archaeological significance of this purportedly rare site type would be high, and the cultural significance might also be high.

8.3.1 Assumptions

Subalpine plant collecting or hunting base camps will occur only in the subalpine zone. Other habitation sites will occur at lower elevations, primarily in the CWH biogeoclimatic zone. It is assumed that subalpine parklands can be defined largely by forest cover data.

Although no subalpine sites have been recorded in the study area, it is assumed that base camp locations, like other habitation locales, would require level, well-drained ground and a source of potable water. Subalpine site information from other parts of the province supports this inference. A source of fresh water for drinking, cooking and washing is considered essential for all habitation sites, with the possible exception of very short-term camps or defensive sites where water may be carried in from elsewhere. A reliable water source would be particularly important for plant processing that involved large-scale steaming or boiling.

8.3.2 Variables

Subalpine camps were considered special-purpose, high elevation inland habitations. Variables used in the model include:

- slope;
- elevation;
- forest cover; and
- distance to fresh water (lake or river).

All lands outside the subalpine zone were excluded from the subalpine camp model.

8.3.3 Model Rules

A buffer zone was set around lakes and definite streams in the subalpine zone. It is predicted that the buffer of 200 m will be sufficient to account for most, if not all subalpine camp sites, with highest site potential being nearest the water source. It is cautioned that the model relies on modem hydrology data, and sites associated with old drainages or extinct lakes may not be identified by the model.

A maximum value of 20% slope was selected for subalpine camp sites, based on comparisons with previous research. In the Squamish Forest District, all recorded subalpine sites are reported to occur on slopes of 10% or less (Hoffmann et al. 1997). Since no recorded site data were available for the Central Coast study area, this variable could not be evaluated. Given the steep terrain of most of the Central Coast, it is proposed that it may have been necessary to use slightly steeper locales for subalpine camps than for valley bottom or coastline settlements. Moreover, the resolution of the digital elevation model may be insufficient to identify small flat areas. Consequently, a maximum slope of 20% was set as the threshold for the subalpine model.

All areas coded as alpine forest in the forest cover database were included in the defined subalpine zone. Also included were forest stands with hemlock, balsam or yellow cedar as the dominant or secondary species and elevations of 1100 m asl or greater, and subalpine fir forests higher than 1200 m asl. The subalpine zone was defmed as follows:

- Alpine Forest (forest cover data ITG_NUM= 41 or 42);
- Hemlock, balsam or yellow cedar forest (forest cover data spcode_1 or spcode_2 = HM or BL or YC) at elevations > 1100 m a.s.l.; and
- Engelmann spruce or subalpine fir forest (forest cover data spcode_1 or spcode_2 = SE or BL) at elevations > 1200 m a.s.l.

The subalpine model was run only on the lands that met these criteria; all other lands were excluded from the subalpine camp model. Based on these assumptions and variables, the following subalpine model was developed:

Table 15 - Predictive Model for Subalpine Camp Sites

SUBALPINE CAMP		
		Subalpine zone = TRUE
Class I		Slope = 0-10%
	AND	Distance to lake or definite river = 0-100 metres
Class II		Slope = 0-10%
	AND	Distance to lake or definite river < 200 metres
Class **III**		All other lands

8.4 Trails Model

In many areas, trails can be one of the most valuable site predictors available. Where land travel was used, trails should link all other sites. Trails used as exchange routes with Interior First Nations, known as grease trails, may be the most visible and extensive networks in the study area, but routes to upland hunting, plant collecting and ritual sites should also be present.

The trails model is experimental, as it could not be determined which specific sites might be linked by trails. If starting points and destinations were known, it might be possible to use a cost analysis or random walker algorithm to predict the easiest route from Point A to Point B. However, in the absence of this information, the model relies strictly on terrain characteristics and attributes of known trails. Another limitation is that the model cannot account for trails leading to special resource areas that may have very difficult access. Traditional land use information may be useful in this regard. The model is based on the characteristics of known trails.

Several previously recorded trail segments, representing at least five trail systems, were digitized from 1:50,000 NTS maps supplied by the Archaeology Branch and from information provided by the Nuxalk, Oweekeno and Kitasoo First Nations. Trails digitized during the Heiltsuk AOA project (Maxwell et al. 1997) were obtained in digital format and incorporated into the analysis. Nodes were defined every 100 m along the trails, and terrain attributes at each node were extracted using ARC/INFO. This analysis defined the variables used to build the model.

X.4.1 Assumptions

As the trails model was experimental, it focused on areas of relatively easy access and passage. It was assumed that a path of least overall resistance would most often be used, acknowledging the fact that specific trail segments may be relatively steep, especially when access to specific resources is required.

8.4.2 Model Variables

Variables used in the simple buffering model include:

- slope;
- distance to salt water;
- distance to fresh water (lake or river); and
- distance to wetlands.

Slope was considered important is identifying passes and corridors of relatively easy travel. Recorded trail data showed that several trails followed freshwater drainages, such as the valleys joining Oweekeno Lake with South Bentick Arm. Others crossed peninsulas and other landforms to link places along the coastline. As a result, distance to fresh and water were used as modelling variables. Ethnographic information suggests that wetlands would have been important locations for hunting water fowl, collecting eggs, and harvesting plants. Access to these locales probably would have been by foot, indicating the presence of a trail.

8.4.3 Model Rules

Based on recorded trail data and assumptions about the influence of terrain on the selection of travel corridors, the following simple model was developed for trails:

Table 16 - Predictive Model for Trail Locations

TRAILS		
Class I		Slope = 0-20%
	AND	[Distance to coastline OR large lake (≥ 5 ha.) OR definite lake OR two line river OR definite river OR wetland = O-100 metres
Class II		Slope = 0-60%
	AND	Distance to coastline OR lame lake (≥ 5 ha.) OR definite lake OR two line river OR definite river OR wetland = O-200 metres
Class III		All other lands

8.5 First-Generation Culturally Modified Tree (CMT) Model

Trees were used for a wide variety of aboriginal practices, many of which continue today. Bark was stripped from both western red cedar and yellow cedar (cypress) to serve as a raw material for making baskets, clothing, and a host of other items. Hemlock bark was removed to access the inner bark, or cambium, which was eaten. Yew wood was used to make digging sticks, harpoon shafts and other items, and cedar, Douglas-fir, hemlock and other trees were used for house planks, poles, canoes and other items.

The physical remains of these activities are known as culturally modified trees. The major categories of CMTs are bark stripped trees, aboriginally logged trees, and stumps. Previous CMT research has focused almost exclusively on cedar, and little is presently known archaeologically about hemlock CMTs. Consequently, it was reasoned that a robust model could not be developed for hemlock CMTs at this time. Moreover, the small sample size of recorded CMT sites (n=194) did not allow discrimination between red and yellow cedar CMTs, or between bark-stripped and aboriginally-logged trees. Such modelling would require a significantly larger dataset, as well as non-site data (i.e., locations that have been inspected and found not to contain archaeological sites).

8.5.1 Assumptions

Previous archaeological work has shown that CMTs, and particularly bark-stripped trees, may occur in low frequencies almost anywhere on the landscape, but the highest density of CMTs would be found near the shoreline (but set back from the immediate foreshore), in major valley bottoms, near village or other occupation sites, or along trails (Stryd and Eldridge 1993) Due to the extensive history of logging on the Central Coast, it was reasoned that the majority of intact CMTs will be found in older forest stands. Since the cutoff date for automatic protection under the Heritage Conservation Act is A.D. 1846, an emphasis was placed on age class 8 and 9 stands (141 years old and older).

8.5.2 Model Variables

The following variables were found to correlate with the occurrence of recorded CMT sites, and were selected for modelling:

- forest type (defined by forest cover data);
- height class;
- age class;
- elevation:

- slope;
- distance to recorded or digitized trail;
- distance to stream;
- distance to river;
- distance to lake;
- distance to coast; and
- distance to recorded habitation site.

8.5.3 Model Rules

Based primarily on the terrain characteristics of 64 recorded CMT sites in the non-Heiltsuk portion of the study area, the first-generation model on the following page was developed for culturally modified trees.

Table 17 – First-Generation Predictive Model for Culturally Modified Tree Sites

CMTs	Forest Class* AND	Height Class AND	Age Class AND	Elevation (metres) AND	Slope (degrees) AND	Dist Trail OR	Dist Stream OR	Dist Coast OR	Dist River OR	Dist Lake OR	Dist Recorded Habitation Site
Class I	14	4+	9	0-300	13-35	0-300	0-200	0-200	0-200	0-1500	0-250
Class II	9, 11, 13, 16	4+	9	0-300	13-35	0-300	201-1000	0-200	0-200	0-1500	251-2500
Class II	1, 35	2 to 3	6 to 8	301-1000	0-12	301-1000	1001-3000	201-1000	201-2000	1501-6500	2501-5000
Class III	All other lands										

*Forest Class Codes (from MoF Relational Data Dictionary):
14=HCw (hemlock-redcedar) ; 9=Cw (cedar); 1 1=CwH (redcedar-hemlock); 13=HFd (hemlock-Douglas-fir); 16=HS (hemlock-spruce)
1=Fd (Douglas-fir); 35=AcConif (coniferous alpine forest)

8.6 Pictograph Model

Pictographs, or rock paintings, are common on the Central Coast, as is evident in the existing archaeological site inventory. The majority of known pictographs occur on vertical rock faces on the shoreline, primarily along channels or inlets (Pomeroy 1980, Hobler 1997 pers. comm.), but also on major lakes, such as Oweekeno Lake. This distribution strongly suggests that most pictographs were intended to be seen by passing travellers on the ocean. Other examples, possibly those with private or spiritual meaning, may exist in more secluded locations, but if this is the case, they seem to be under-represented in the current site inventory. In addition, some pictographs may occur in inland rockshelters (Maxwell and Vincent 1997).

8.6.1 Assumptions

Based on the known archaeological site distribution, it was assumed that pictographs will most commonly occur on exposed rock outcrops, facing the ocean or other large water body that was regularly travelled. Recorded pictograph sites strongly correlate with the coastline, large lakes and large rivers. It was also assumed that pictograph sites are most likely to occur on very steep slopes because they tend to be found on almost vertical rock faces, either along the coastline or in caves or rockshelters.

8.6.2 Model Variables

The variables chosen for modelling pictographs were primarily based on attributes of known sites. Variables included:

- slope;
- distance to coastline;
- distance to rivers; and
- distance to lake.

Slope was considered one of the strongest pictograph site predictors, as it was expected to help identify rock cliffs. Distance to salt water was the other most significant predictor variable, as the vast majority of recorded pictograph sites face the ocean.

In an attempt to isolate nearly vertical gradients, a slope of >85° was selected as a threshold. GIS analysis showed that recorded pictographs occur on slopes ranging from

0% to 48%, but this is probably a factor of limitations in the digital elevation model grid size rather than representative of the actual slope of the sites.

86.3 Model Rules

Areas with slopes greater than 85" and within a 75 m buffer along the coastline and large lakes (>5 ha) were predicted to have high potential for pictographs (Class I lands). Similar steeply sloped areas within 100 m of a major river (greater than 20 m wide) were rated as Class II lands (moderate pictograph site potential).

The buffer size was selected on the basis of recorded site characteristics, using 25 m increments dictated by the DEM grid size. It is anticipated that the buffer will be sufficient to account for most pictograph sites. It is cautioned that the model relies on modem hydrology data, and sites associated with old drainages or extinct lakes may not be identified by the model.

Glaciers, wetlands, and the alpine and subalpine zones were excluded from the pictograph model, as it was considered unlikely that they would occur in these areas.

The pictograph model was as follows:

Table 18 - Predictive Model for Pictograph Sites

PICTOGRAPIIS		
Class I		Slope >85°
	AND	Distance to coastline or large lake = O-75 metres
Class II		Slope >85°
	AND	Distance to two line stream = O-100 metres
Class III		All other lands

8.7 Petroglyph Model

An analysis of the distribution of known petroglyph sites on the Central Coast shows a somewhat different distribution from that of pictographs. One significant difference is that petroglyphs tend to occur on nearly horizontal rock surfaces or on boulders, as opposed to vertical faces. This has important implications for terrain-based modelling that uses slope as a variable. It has been suggested that most pictographs were intended to be displayed, while petroglyphs may have a less public nature and therefore would not be found in easily visible locations (Hobler, pers. comm. 1997). Maxwell et al. (1997) noted that petroglyphs are commonly located within 30 metres of intertidal zone, sometimes at or near an occupation site.

8.7.1 Assumptions

It was assumed that petroglyph sites are most likely to occur on relatively flat slopes, on almost horizontal rock faces or on boulders on flat terrain. Recorded petroglyph sites also tend to occur near rivers or the coastline. It should be noted that petroglyphs often are not easily seen, and additional sites may be present further inland.

8.7.2 Model Variables

Based on attributes of recorded petroglyph sites, the following variables were selected for modelling:

- slope;
- distance to coast line;
- distance to lake, two line river or definite river; and
- distance to recorded habitation site.

X.7.3 Model Rules

A 10% slope threshold was selected as indicating high potential for petroglyph sites. The slope cut-point for moderate site potential was extended to 20% to account for exposed bedrock or boulders on slightly steeper terrain, as well as limitations introduced by the 25 grid size of the DEM.

A 75 m buffer zone was set around large lakes (>5 ha.), major rivers, and definite rivers. The buffer size was selected on the basis of recorded site characteristics, using 25 m increments dictated by the GIS cell size. It is anticipated that the buffer will be sufficient to account for most petroglyph sites. Like the pictograph model, this model relies on modem hydrology data, and sites associated with old drainages or extinct lakes may not be identified by the model.

Glaciers and wetlands were excluded from the petroglyph model, as it was considered unlikely that they would occur in these areas.

Based on recorded site analyses, the Heiltsuk AOA model and the experience of the study team, the following model was produced for petroglyphs.

Table 19 - Predictive Model for Petroglyph Sites

PETROGLYPHS		
Class I		**Slope** = o-1 0%
	AND	Distance to shoreline OR large lake OR two line river = O-75 metres
	AND	Distance to recorded habitation site = O-100 metres
Class II		Slope = 0-20%
	AND	Distance to shoreline OR large lake OR two line river = O-75 metres
Class III		All other lands

8.8 Second Model Run

The coastal habitation and CMT model results are considered to be of greatest significance for forestry and most other anticipated land developments. Given the relatively poor initial model capture rates, the models were revisited and adjustments were made to enhance their performance. Receipt of improved forest cover data allowed significant revisions to the CMT model.

8.8.1 Revised Coastal Habitation Model

For the coastal habitation model, it was determined that the GIS methods used in the initial model run did not accurately interpret slope, and small flat landforms along the shoreline were often interpreted as having moderate to steep slopes. This factor significantly affected the model results. To address this limitation, elevation criteria were added to the model rules. Slope calculations based on the gridded DEM tended to smooth the data so that small beaches or terraces were represented continuous slopes rather than as stepped terrain. Incorporation of elevation values for each grid cell reduced this effect, allowing a better representation of the actual slope. In addition, the slope requirement of 15% was increased to 20% to further allow for limitations of the DEM. To restrict the increase in land mass encompassed by the relaxation of the slope requirements, the “distance to coastline” variable was reduced from 150 metres to 100 metres. This buffer should be adequate **to** account for most shoreline habitation sites, without encompassing unnecessarily large tracts of land.

A second shortcoming of the first-generation coastal habitation model is that it did not adequately account for high archaeological site potential on the lower reaches of major rivers. Specifically, locations on major rivers, but more than 200 metres from the coastline had been assigned low archaeological potential ratings, despite ethnographic and archaeological evidence to the contrary. This error was corrected by the addition of a **model** rule that assigned moderate site potential to the lower reaches of major rivers, given other required terrain characteristics, while maintaining a high potential rating at the river mouth. The **revised** coastal habitation model rules are presented in Table 20.

Table 20 - Revised Coastal Habitation Model

COASTAL HABITATIONS		
Class I		Distance to coastline = O-100 metres
	O R	Distance to intermittent river = O-100 metres AND Distance to coastline = O-200 metres
	O R	Distance to big lake ((5Ha) = O-100 metres
	O R	Distance to double-wide river = O-100 metres
	O R	Distance to definite river = O-100 metres AND Distance to coastline = 0-200 metres
	AND	Slope = 0-20% OR elevation = O-10 metres asl.
	AND	Distance to coastline = O-2000 metres
	AND	Elevation = O-20 metres asl.
Class I		Select small marine islas (< 50 hectares)
	AND	Distance to coastline = O-100 metres
	AND	Slope = 0-20% OR elevation = O-10 metres asl.
	AND	Elevation = O-20 metres asl.
Class **II**		Distance to coastline = O-200 metres
	O R	Distance to intermittent river = O-200 metres AND Distance to coastline = 0-200 metres
	O R	Distance to big lake ((5Ha) 0-200 metres
	O R	Distance to double-wide river = 0-200 metres
	O R	Distance to definite river = O-200 metres AND Distance to coastline = O-200 metres
	AND	Slope = 0-30% OR elevation = O-20 metres asl.
	AND	Distance to coastline = O-2000 metres
	AND	Elevation = O-20 metres asl.

Table 20 - Revised Coastal Habitation Model (cont'd)

COASTAL HABITATIONS		
Class II		Distance to fish trap OR canoe run = 0-100 metres
	AND	Distance to coastline = 0-200 metres
	AND	Slope= 0-30% OR elevation = 0-20 metres asl.
	AND	Elevation = 0-20 metres asl.
Class II		Select small marine islands (< 50 hectares)
	AND	Distance to coastline = 0-200 metres
	AND	Slope = 0-30% OR elevation = 0-20 metres asl.
Class II		Distance to coastline = 0-200 metres
	AND	Distance to double-wide river = 0-100 metres
	AND	Slope = 0-30% OR elevation = 0-20 metres asl.
Class III		All other lands

8.8.2 Revised CMT Model

The initial CMT model did not perform well in terms of accounting for previously recorded CMT sites, having correctly predicted only 29.9% of the sites within a 100 metre site buffer. Consequently, the CMT model was substantially revised and re-run. Through discussions with the Vancouver Forest Region and an analysis of recorded CMT sites, it was concluded that virtually any area containing red or yellow cedar could potentially contain at least low frequencies of CMTs, regardless of the age of the forest stand. Cultural modifications have been recorded on veteran cedars in logged blocks of various ages, both on the coast and inland.

In the revised CMT model, the "Inventory Group" data in the forest cover database, which identify the leading tree species in a stand, were replaced by the "Species Composition" data. The forest cover database lists up to six tree species in each stand, along with the relative composition of each species, in percent. For each stand that includes red or yellow cedar as one of the six listed species, the total cedar percentage in the stand was calculated. For example, a stand that contains 40% Western redcedar, 30% hemlock and 30% yellow cedar would have a cedar composition of 70%. The percent composition data were used to help indicate relative CMT potential. All stands containing cedar were considered to have some CMT potential unless other factors dictated otherwise. Stands with more than 50% cedar were considered to have potential for higher densities of CMTs, and were therefore accorded a higher site potential rating. The revised CMT model is presented in Table 21:

Table 21 - Revised CMT Model

Class I (Highest Potential	
Forest Type	Species Composition >= 50% Cw or Yc and Height Class >= 3 and Age Class >= 8
	AND
Terrain	Slope = 0-30% and elevation = 0- 1100 metres asl
	AND
Hydrological and Cultural Features	Distance to coast = O-300 metres OR distance to two line river or definite or intermittent stream or lake = 0-200 metres OR Distance to known trail = O-300 metres or distance to known archaeological site = O-250 metres
Class II (Moderate Potential)	
Forest Type	Species Composition >0% Cw or Yc AND Height Class >= 3 AND Age Class >= 6
	AND
Terrain	Slope = 0-90% AND elevation = O-1 100 metres asl
	AND
Hydrological and Cultural Features	Distance to Coast = O-1000 metres OR distance to two line or definite or intermittent river = O-300 metres OR distance to lake = 200 metres OR Distance to known trail = O-300 metres or distance to known archaeological site = O-250 metres

9.0 MODELLING RESULTS

9.1 Dataset I

Dataset I consists of grids representing predicted archaeological site potential, and an accompanying database. Archaeological site potential was ranked as Class I, Class II or Class III, in order of relative predicted site potential. As defined in Section 1.2.3, Class I lands meet the most stringent model criteria, and are considered to have the highest site potential. It is also likely that these areas will have the greatest density and variety of sites. Class II lands are predicted to have moderate site potential (i.e., fewer sites will be found than in Class I) and fewer site types than Class I. Class III lands represent the lowest site potential, according to the models, and should hold few sites and a narrow range of site types. These lands are predicted to have the greatest physical constraints against human occupation or the preservation of archaeological sites. It is important to reiterate that not all site types could be modelled, and some sites may exist in Class III zones. However, it is expected that such sites will be relatively rare.

The total modelled area encompasses 4,832,291 hectares. The study area was divided into a 25 metre grid and each cell was assigned a score for each model. The grid values correspond with Class I, Class II and Class III archaeological potential classifications. A "composite" model combined the results of the coastal and inland habitation, CMT, petroglyph, and subalpine models into one overarching model.

9.2 First-Generation Model Results

9.2.1 Area Results

The initial composite model results indicated that 31,941 hectares, or 0.66% of the study area falls within Class I lands. Class II model results account for an additional 307,981 hectares (6.37% of the study area), for a total of 339,922 hectares of Class I or Class II lands (7.03% of the study area).

In addition to the modelled Class I and Class II areas, all Indian Reserves were automatically given a Class II rating, unless over-ridden by a Class I model result. This is intended to account for the fact that most reserves were created in response to specific uses of the lands by the aboriginal inhabitants. Consequently, it is reasoned that most reserve areas will have a moderate probability of containing archaeological evidence of that aboriginal use. Recorded sites in the study area were buffered by 100 metres on all sides to provide a mechanism for ensuring field inspection of areas immediately surrounding known sites, subject to terrain conditions. The 100 metre buffer also helps to account for ambiguity in site location data due to scale shifts, and better approximates the actual size of the sites (in comparison with non-buffered points, as explained above).

9.2.2 Capture Rates

The results of the predictive models were compared against the database of recorded sites to assess their success rate. Even though the models were based primarily on the characteristics of recorded sites, a 100% success rate cannot be expected, as only a few spatial characteristics of the sites were used in the models, and any number of additional factors may have influenced site locations.

Capture rate calculations that use non-buffered point coverages may grossly underestimate the performance of the models. In the GIS point coverages, sites are represented by hypothetical points on the landscape. Using UTM coordinates taken to three decimal points, this point could actually represent only about a one centimetre area. In assessing the first-generation model results, the number of sites that fell within 100 metres of an area modeled as Class I or Class II was calculated, using the NEAR command in ARCINFO. This method is essentially equivalent to creating a 100 metre buffer around each site. Table 22 shows the success rates of the first-generation coastal habitation, inland habitation, CMT and petroglyph models. Capture rates reflect a combination of Class I and Class II results.

Table 22 - Capture Rates of Selected First-Generation Predictive Models

Model	Total Number of Sites	Within 100 m of Class I or Class II
Coastal Habitation	957	758 (79.2%)
Inland Habitation	39	34 (87%)
CMT	194	58 (29.9%)
Petroglyph	43	31 (72.1%)

First-Generation Coastal Habitation Model

For the first model run, 957 coastal habitation sites were included in the capture rate analysis. Using a 100 metre buffer, a capture rate of 79.2% was achieved.

Inland Habitation Model

The inland habitation zone contained only 39 previously recorded sites. The model captured 87% of recorded inland habitation sites within a 100 m buffer. These results suggest that the current model is relatively successful.

First-Generation CMT Model

One hundred and ninety four previously recorded CMT sites were considered in this analysis. The CMT model was not successful, but given the known limitations of the crucial forest cover data. it was decided that the model should not be revised until better base data could be obtained. Only 29.9% of recorded CMT sites were correctly predicted, using a 100 metre site buffer.

Petroglyph Model

The petroglyph model captured 72% of 43 previously recorded petroglyph sites, using a 100 metre site buffer. These results are encouraging; however, it should be noted that the petroglyph modeling rules were quite simple and, given the fact that most petroglyph sites are quite small, the number of “false positives” (areas modelled as having high archaeological site potential but lacking sites) may be quite high.

9.3 Revised Model Run Results

Following revisions, the coastal habitation and CMT models were re-run and area and capture rate analyses were repeated. Results of the revised model runs are reported below.

9.3.1 Area Results

Following revisions to the coastal habitation and CMT models, and the inclusion of the archaeological site data from the Heiltsuk AOA, the composite model ranked 147,440 ha. (3% of the study area) as Class I, and 806,068 ha. (16.7%) as Class II, for a total of 953,508 ha (19.7% of the study area) in Class I or Class II. Class III lands, representing the lowest predicted archaeological site potential, make up the remaining 4,399,709 ha., or 91.05% of the study area. Table 23 summarizes the modelling results.

Table 23 - Summary of Predictive Modelling Results

Archaeological Land	Area		% of Land	
	Initial Model	Revised Model	Initial Model	Revised Model
Class I	31,941	147,440	0.66%	3%
Class II	307,981	806,068	6.37%	16.7%
Class III	4,492,369	3,878,783	92.97%	80.3%

9.3.2 Revised Model Capture Rates

All capture rates for the revised models are based on 100 metre buffers around recorded sites. Revisions to the coastal habitation model resulted in a dramatic increase in previously recorded site capture. The revised model assigned a Class I rating to 941 of 957 sites (91.0%), and a Class II rating to an additional 70 sites (7.3%), for an overall 98.3% capture rate of recorded coastal habitation sites within predicted Class I or II lands.

For CMTs, 194 sites were used in the capture rate analysis. The revised CMT model correctly predicted 65 sites (33.5%) in Class I, and 60 sites (30.9%) in Class II, for a total of 64.4% of recorded CMT sites within Class I or Class II. Overall, 99.5% of the recorded CMT site locations were rated as Class I or Class II for either the CMT model or one of the habitation models (coastal, inland or subalpine), meaning that all but one site would have been recommended for archaeological field assessment using these models.

9.4 Discussion

Results of the first-generation inland habitation and petroglyph models were relatively encouraging. Fairly high capture rates were achieved by these models without encompassing unnecessarily large areas of Class I or Class II lands. For coastal habitations and CMTs—arguably the most relevant models for most development types-a 200 metre buffer was required to achieve adequate capture rates for recorded sites. The trails model results could not be easily evaluated, as trails are linear features that may be quite extensive and may cross-cut a variety of landforms. This model should be considered preliminary and exploratory. The pictograph model was not evaluated, as earlier runs had shown that the baseline data do not allow accurate modeling of landforms typically associated with pictographs. However, 85.7% of recorded pictograph sites were captured by either the petroglyph or revised coastal habitation model. The subalpine camp model could not be evaluated, as no sites have been recorded in this zone to date. The following sections briefly discuss the results of the first-generation coastal habitation, inland habitation, CMT and petroglyph models.

9.5 Dataset II Known Archaeological Sites

Dataset II consists of a database of recorded and reported archaeological sites and trails. Recorded sites are presented as an ARCINFO point coverage. Reported and recorded trails are presented as a separate line coverage within Dataset II.

10.0 EVALUATION AND DISCUSSION

As expected, the model results indicated that the highest archaeological potential for most site types is near the coastline and on islands. This pattern is consistent with the ethnographically-reported Northwest Coast subsistence and settlement system, which focused heavily on marine resources. The CMT, subalpine and trails models suggest that inland site potential may exceed expectations for the maritime-adapted Central Coast First Nations, but it is likely that existing ethnographic and archaeological information under-emphasizes aboriginal use of these zones. For the more riverine-oriented Nuxalk, inland site potential is predicted to be greater than for other Central Coast First Nations, largely due to their geographic position. Similarly, subalpine site potential is greater in the eastern part of the study area, due to ecological factors that provide for more subalpine parkland habitat.

Revisions to the coastal habitation and CMT models resulted in a significant improvement in the correct prediction of the locations of previously recorded sites. However, the revisions also increased the amount of land modelled as Class I or Class II, resulting in additional requirements for archaeological field assessment, as shown in Table 23 above. The primary reasons for this variance are significant increases in the area modelled as Class II for coastal habitations, and Class II for CMTs. The variance in coastal habitation and CMT model results is presented in Table 24.

Table 24 - Comparison of Initial and Revised Results for Coastal Habitation and CMT Models

	Initial Coastal Habitation	Initial CMT	Revised Coastal Habitation	Revised CMT	Variance: Coastal Habitation	Variance: CMT
Class I	39.3%	0.5%	90.2%	35.3%	+50.9%	+34.8%
Class II	63.6%	29.9%	5.8%	28.7%	-57.8%	-1.2%
Class I or II	79.2%	29.9%	96%	64.1%	+16.8%	+34.2%

11.0 RECOMMENDATIONS

The following recommendations relate to polygons of archaeological potential identified in Dataset I of the GIS component of this AOA. It is important to note that an archaeological overview assessment is an evolving planning tool that is subject to revision and updating as new or better data become available. For this reason, several of the following recommendations are geared toward future model refinement.

Outlined below are specific recommendations regarding Class I, Class II and Class III archaeological potential ratings, followed by general recommendations regarding future archaeological work in the Central Coast LRMP region. The three land classes can be viewed as "risk indices" whereby the risk of impacting archaeological sites is predicted to be highest in Class I lands and lowest in Class III lands. In the absence of detailed field investigations, no location can be considered to be completely risk-free.

11.1 Class I Lands

Based on the modelling criteria, Class I lands are those considered to have the highest potential for archaeological sites to be both present and preserved. An archaeological impact assessment (AIA) should be undertaken prior to land-altering development in any Class I zone, unless only CMT site potential is indicated. An AIA should be conducted by a qualified archaeologist under a *Heritage Conservation Act* permit issued by the Archaeology Branch, Ministry of Small Business, Tourism and Culture. All field assessments should meet or exceed Archaeology Branch guidelines, and should involve consultation with the appropriate First Nations.

Areas rated as Class I for culturally modified trees only should receive a Preliminary Field Reconnaissance (PFR), in accordance with Archaeology Branch guidelines. Reconnaissance typically involves less-intensive ground coverage than an AIA and does not include subsurface testing or other invasive techniques. CMT reconnaissance should be conducted by a professional archaeologist or other individual with adequate training in CMT identification and recording (e.g., a trained local First Nations person or forestry worker). The objective of a PFR is to search for visible evidence of archaeological sites, and to evaluate the site potential of the local environment. A PFR may be adequate to assess a development area, or a detailed impact assessment may be recommended. A PFR should be adequate to locate and document any CMTs present. However, if other site types are encountered, an impact assessment should be conducted under permit by a qualified archaeologist.

A *Heritage Conservation Act* permit is not required for a reconnaissance-level inspection; however, no site alteration or invasive site location technique, including CMT sampling or shovel testing, can be undertaken without a permit. If CMT reconnaissance is completed by a professional archaeologist, it is recommended that a heritage inspection permit be obtained to allow a more detailed impact assessment (including CMT sampling) to be conducted if warranted. This would negate the need for a return field visit, which may be an important consideration for remote regions of the Central Coast.

It must be emphasized that the models are based on assessment of the suitability of the terrain to contain preserved archaeological sites, but not all Class I lands will necessarily have sites,

11.2 Class II Lands

Areas rated as Class II are considered to have moderate archaeological potential and should also receive archaeological field inspection. A PFR is considered an appropriate level of investigation for all Class II lands, including those rated by the models as having potential for CMTs only. A PFR may lead to a recommendation for an impact assessment, or additional work may not be warranted.

A significant amount of land falls within the Class II CMT designation and, depending on the amount of development planned for these areas, it may not be feasible to conduct field studies over 100% of this area. If this is the case, three main risk management approaches are suggested:

1. a field inventory of Class II lands could be undertaken to allow a reassessment of the relative CMT potential of Class II lands. Based on the inventory results, the CMT model would be adjusted, if necessary

2. archaeological impact assessments could be required for a sample of the Class II lands. For example, 50% of proposed roads and cutblocks falling within Class II lands could be selected for PFR, with the results used to evaluate the revised CMT model.

3. the District Manager may decide to manage only Class I CMT lands, accepting the risk associated with waiving the requirements for field assessments of lands ranked as Class II for CMT sites.

Option 3 is the least preferred of these strategies. It is strongly recommended that any management approach that does not involve field assessment of all Class II lands should be developed in consultation with First Nations and the Archaeology Branch.

11.3 Class III Lands

Class III areas are considered to have relatively **low** archaeological potential due to environmental constraints on human use or on site preservation. No archaeological assessment is recommended for Class III lands. It should be noted however, that all site potential classes defined in this report are relative. Low potential does not mean no potential, and there is always the possibility that unanticipated archaeological sites may occur in Class III areas. Should field observations, consultation with local First Nations or other information sources indicate the potential for archaeological sites to be present in a Class III or any other area, a field reconnaissance should be undertaken by a qualified archaeologist to evaluate the site potential of the area.

If archaeological materials are accidentally discovered during **development,** all work in the immediate area should be stopped or altered such that the archaeological site is not impacted. The District Manage, the Archaeology Branch and local First Nations should be contacted immediately to discuss appropriate site management measures. Emergency impact management measures, such as artifact collection, controlled excavation or CMT sampling, may be required to mitigate damage to any newly identified site(s).

11.4 General Recommendations

Ground Truthing and Field Data Collection

- As previously discussed, the predictive models developed and implemented in this study have not been field tested. A representative sample of Class I, Class II and Class III lands should be inventoried, preferably using a probabilistic field approach, to provide reliable site and non-site data that can be used to test and refine the models. Inventory methods should comply with RIC Standards for Archaeological Inventory, once they are implemented, and First Nations consultation should be an integral component of the research design.

- A sample of old growth forests should be selected for probabilistic inventory to provide a larger CMT dataset for predictive modeling. The sample should focus on areas with red or yellow cedar, but other areas could be considered, in consultation with First Nations, to collect information on aboriginal use of other tree species.

- All archaeological impact assessments in the study area should include revisiting and updating site information (including mapping to current standards) for any recorded sites within the AIA study area.

- All future impact assessments in the study area should meet or exceed Archaeology Branch guidelines, and should include clear reporting of the terrain characteristics of examined areas, including slope, distance to water, forest cover and other variables used in predictive modelling. Survey coverage and site/non-site locations should be clearly mapped. A mechanism should be developed for ensuring that these data are stored in a central database and are accessible for future model refinements. Possible mechanisms might include making this type of data collection mandatory under Ministry of Forests contracts, requiring that licensees provide the information with cutting permit applications, adding the requirement as a condition of a Heritage Inspection permit, or revising the British Columbia Archaeological Site inventory Form to include relevant fields.

Data Improvement

- As discussed above, errors or limitations in the archaeological site data adversely affected the modelling results. The archaeological site data should be geo-corrected at a 1:20,000 scale, using TRIM base maps. In addition, actual site boundaries and individual CMT locations should be digitized where this information is available.

- A smaller grid size should be used when generating a gridded DEM. This may allow for the identification of smaller landforms, such as narrow beaches, that may not be captured in the present analysis. A 10 metre grid size is recommended; however, this would require breaking down the study area into smaller units, as the software and hardware requirements for this process over the entire LRMP area would be impractical.

Model Refinement

- The predictive models should be raevaluated and refined as new data become available. It is strongly recommended that refinements be completed on a smaller scale than the LRMP area. Two recommendations are made in this regard: watershed assessment, or landscape planning unit assessment.

Modelling on a watershed basis has the advantage of limiting the volume of GIS data while maintaining some cultural and archaeological relevance. As distinct geographic units, watersheds, should have more cultural meaning than an arbitrary planning unit such as the LRMP area, which encompasses widely diverse cultural and environmental characteristics. A watershed approach may begin to approximate a "cultural landscape" view that accounts for diverse land uses and archaeological site types.

Modelling on a landscape planning unit basis has the benefit of focussing on landscape characteristics that might correlate with specific resource availability and, by extension, with particular archaeological site types. An added advantage is that the landscape planning unit approach is consistent with other types of research and data collection required by the Ministry of Forests, making it easier to incorporate the archaeological results into an integrated resource management plan. Landscape planning units may have less overall cultural relevance than watershed units, but they may provide a better basis for modelling specific archaeological site types.

- Newly available GIS data should be periodically reviewed for their potential to enhance the predictive models, with an emphasis on palaeoenvironmental, fish, shellfish and wildlife habitat and shoreline morphology data. When available for the study area, Terrain Ecosystem Maps (TEM) should also be evaluated in terms of their value for archaeological predictive modelling. Alternatively, relevant information could be digitized from paper maps.

- Future incorporation of traditional land use information could significantly benefit cultural resource modelling efforts. If made available by First Nations, the results of traditional land use studies should be added to Dataset II of this overview.

First Nations Consultation and Training

- Ongoing consultation with First Nations regarding cultural heritage issues is of paramount importance. Due to the size of the study area, detailed consultation was not possible for this project. A watershed or landscape planning unit focus would provide for better consultation opportunities. A stronger First Nations role in high-level heritage planning initiatives may help to improve the quality of available cultural resource data and facilitate cooperative approaches to heritage site management. This AOA can be used as a joint planning tool during government-First Nations consultation, allowing First Nations to view and comment on the assessed archaeological site potential relevant to specific proposed developments.

12.0 CLOSURE

This report was prepared for the use of the Ministry of Forests, the Archaeology Branch and the Central Coast LRMP participants. While its use by individual First Nations or other appropriate agencies is encouraged, any decisions made on the basis of the report by third parties are the responsibility of such third parties. This study was not intended to address issues of traditional land use or aboriginal rights or title, and it is presented without prejudice to land claims or treaty negotiations.

We trust that this report meets your current requirements. Should you have any questions, or require further information, please contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

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APPENDIX I

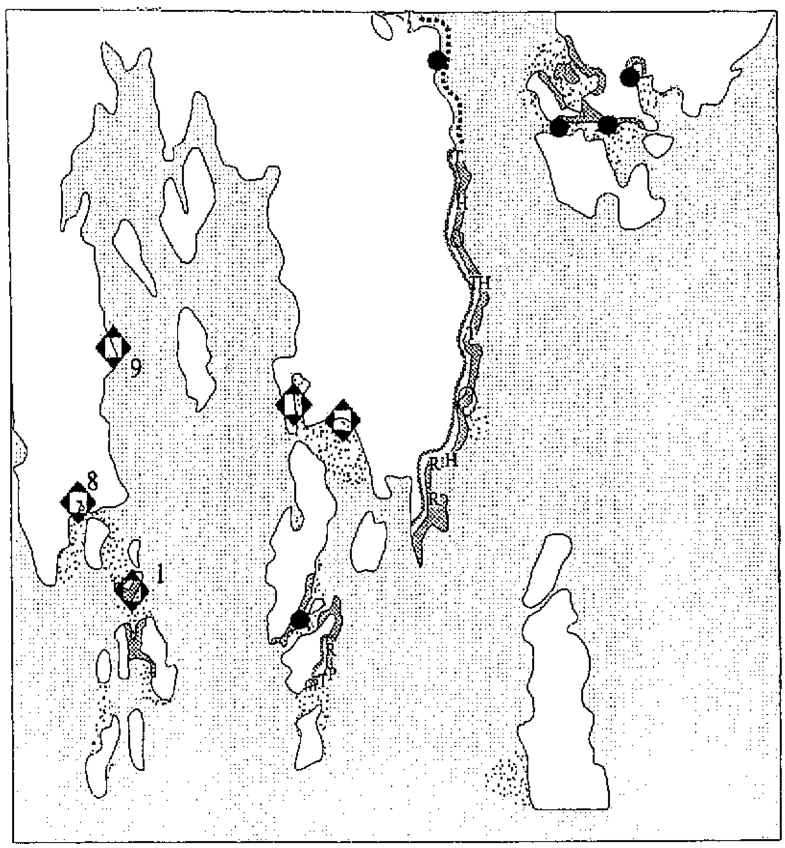
EXCERPTS FROM HEILTSUK AOA LITERATURE REVIEW

Heiltsuk Traditional Territory Archaeological Overview Assessment

Volume 1 Final Project Report

Prepared for:

B.C. Archaeology Branch
Heiltsuk First Nation



Millennia Research Ltd.

July 22, 1997

Study Area

Study Area Definitions

HEILTSUK TRADITIONAL TERRITORY

This archaeological overview report is offered without prejudice to any land claims associated with the study area.

The study area boundaries (Figure 1) are drawn from the approximate boundaries of traditional territories of First Nations shown on Indian and Northern Affairs 1991 and 1994 Comprehensive Land Claims Maps. Areas of overlapping traditional territories appear on these maps. For Heiltsuk Traditional Territory these overlaps are with the Kitasoo/Xai Xais First Nation, the Nuxalk First Nation, and the Oweekeno First Nation in the northern, eastern and southern parts, respectively, of Heiltsuk Traditional Territory.

SUB-TRIBAL TRADITIONAL TERRITORIES

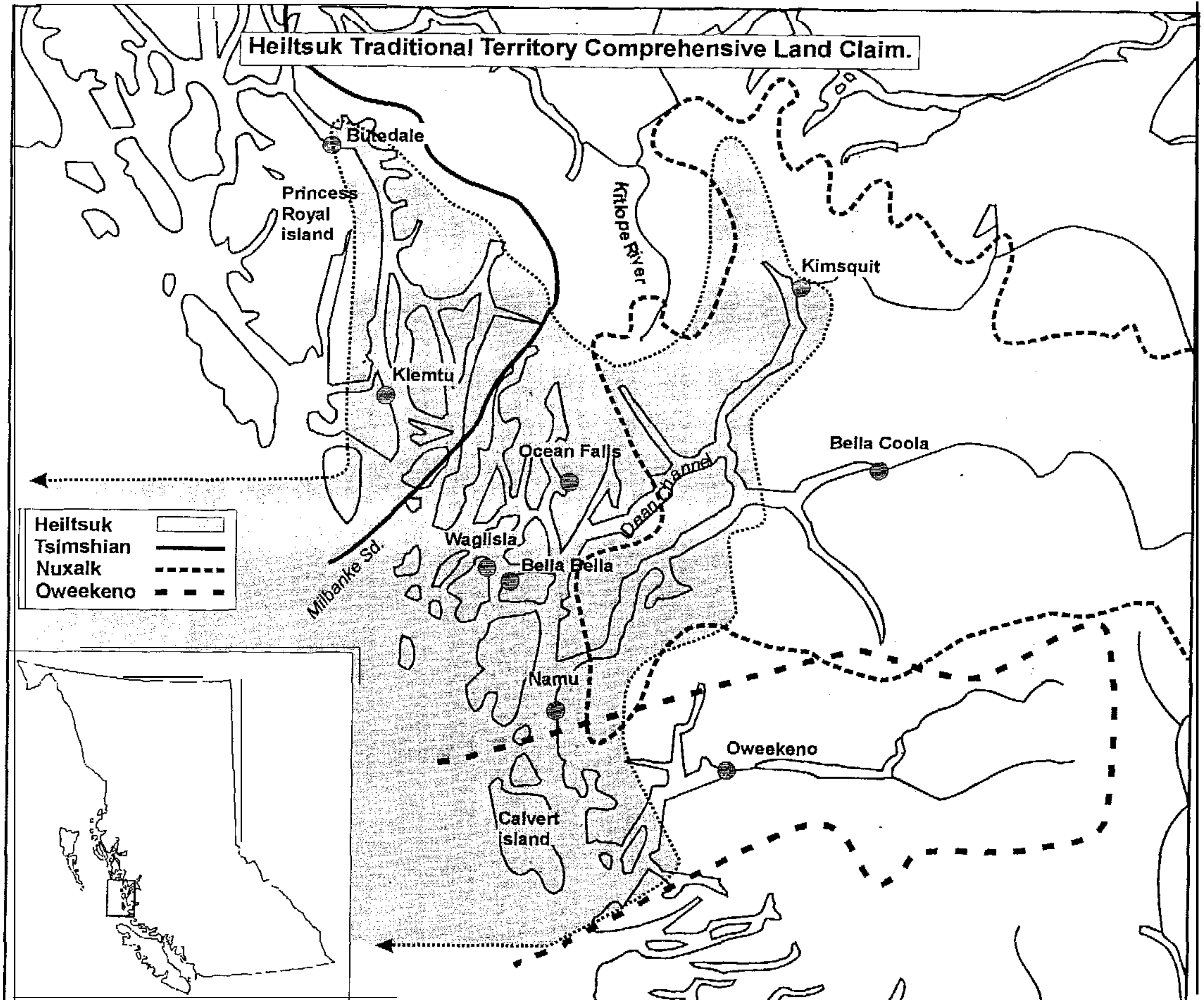
Heiltsuk Traditional Territory can be sub-divided on the basis of sub-tribal traditional territories. These sub-tribal groups are discussed in more detail in the ethnographic review and the assessment of the Inventory makes reference to variation in recorded site density between sub-tribal territories.

PHYSIOGRAPHIC ZONES

Heiltsuk Traditional Territory can also be sub-divided on the basis of physiographic zones. Physiograpbic zones have been used in analysis of the archaeological site inventory by previous researchers (Hester 1968, Pomeroy 1980) who have identified variation in site density between zones. Previous studies have not explicitly defined these zones, or have used the arbitrary boundaries of Borden blocks for analysis. For this study three physiographic zones (Figure 2) have been defined as:

1. Inner Channel and Fjord Zone includes: The area east of Fitzhugh Sound from a point north of Fish Egg Inlet up to the mid point on the east side of Denny Island, and then the area east and north of a line running roughly northwest from that point. This includes the rugged part the of the Denny, Cunningham, Chatfield, and Yeo Islands, Don Peninsula, and Dowager and Swindle Islands. The area is characterised by high and moderately high relief topography. Admittedly this zone could be subdivided into an inner, high relief zone and an outer moderately high relief zone. Such a subdivision boundary could follow the divide between Ecoregions.
2. The Inner Waterway Zone includes: The area centred around the “Inside Passage”, roughly from the entrance to Fitzhugh Sound north to Seaforth Channel. This zone does not include the high or moderately high relief areas (included in the Inner Channels and Fjords zone) making up the eastern edge of Hester’s (1968) and Pomeroy’s (1980) “protected waterway” and “central zone”.
3. The Outer Coast (or Outer Island) Zone includes: The outer coast and island archipelagos, exposed to the Pacific. from Calvert to Price Island.

Figure 1. Heiltsuk Traditional Territory



After Indian and Northern Affairs Canada 1991,1994
(all boundaries approximate).

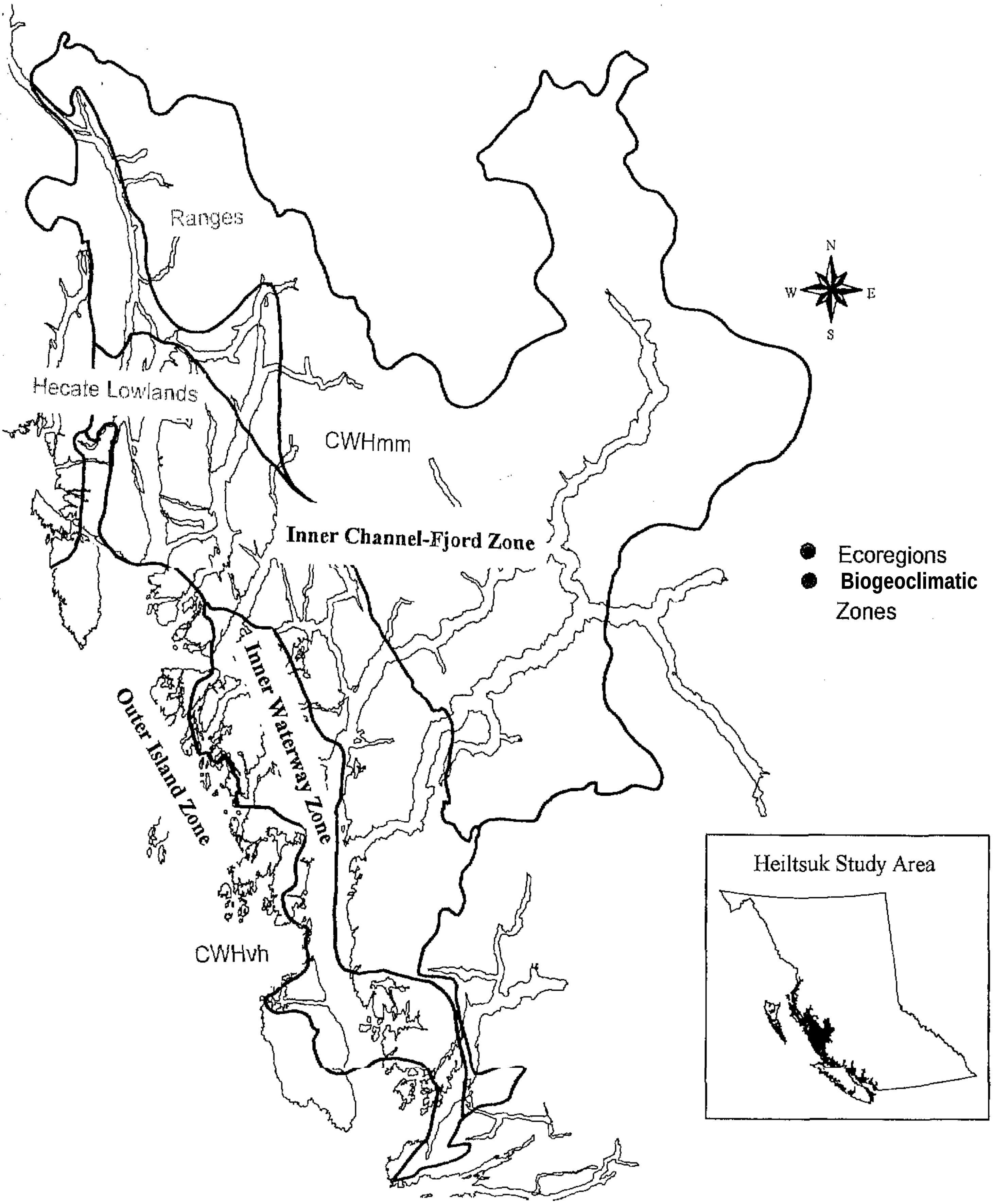


Figure 2. Physiographic Zones, Ecoregions, Biogeoclimatic Zones.

MODERN ENVIRONMENTAL CONTEXT: ECOREGIONS AND BIOGEOCLIMATIC ZONES

Variation in recorded site density has also been examined in this study according to previously defined Ecoregions and Biogeoclimatic units of British Columbia (Ministry of Forests and Lands Research Branch 1988, see Figure 2). The western side of Heiltsuk Traditional Territory, including low and moderate relief, is called the Hecate Lowlands Ecoregion. The eastern, high relief, side of the traditional territory is called the Kitimat Ranges and North Pacific Ranges north and south of Burke Channel respectively.

Most of the study area falls within the Coastal Western Hemlock (CWH) biogeoclimatic zone as defined in Meidmger and Pojar (1991). This zone, mostly west of the coastal mountains, stretches from Oregon through to Alaska. In the central coast the zone is found below elevations of 900m on windward slopes and 1050m on leeward slopes. Typically cool summers and mild winters characterise the zone. This zone is, on average, the rainiest biogeoclimatic zone in British Columbia (Meidmger and Pojar 1991:96).

Flora in CWH is characterised by the prominence of western hemlock, a sparse herb layer, the predominance of several moss species (Meiclmger and Pojar 1991:96).

The Coastal Western Hemlock biogeoclimatic zone includes many subclassifications. The separations are based on gradients of precipitation (very dry through very wet) and of continentality (hypermaritime, maritime, submaritime). The Hecate Lowlands Ecoregion, or outer central coast, is almost exclusively Very Wet Hypermaritime CWH (CWHvh). The only exception is the sub-Montane Very Wet Maritime CWH (CWHvm1) and Montane Very Wet Maritime CWH (CWHvm2) at the northern extremes of Heiltsuk Traditional Territory.

In the inner central coast these last two biogeoclimatic sub-zones continue in a band west of the east side of Cascade Inlet and the Kwatna River drainage. Higher elevations in this band are, with the exception of some Alpine Tundra, Moist Maritime CWH (CWHmm) and Montane Wet Submaritime CWH (CWHws2). The balance of the inner central coast to the east of this band is, at lower elevations, also CWHmm and CWHws2. Higher elevations are Parkland Mountain Hemlock or Alpine Tundra.

In this study only two biogeoclimatic zones, CWHvh on the west and CWHvm on the east, were diierentiated as virtually all of the recorded archaeological sites in Heiltsuk traditional territory are found at low elevations within these two sub-zones.

Historical Review

There is a large body of historical sources dealing with Heiltsuk Traditional Territory. An excellent bibliography including historical sources is on file at the Heiltsuk Cultural Education Centre. Among the sources listed are explorers' works, fur traders' publications and documents, missionaries' papers and articles, government publications and reports, historical travel publications, newspapers, and private papers (Lawson and Carpenter 1989). Other primary historical sources include records at the Surveyor General's Branch.

A comprehensive review of the entire historical record was beyond the scope and resources of this study. Research concentrated on the earliest historic records of the contact period and was limited to a few published explorer's and trader's journals, certain secondary works and articles, and historical summaries included in other reports.

CONTACT AND TRADE

The first ship to visit Heiltsuk Traditional Territory is reported to be the American brig *Peabody* in 1791. Heiltsuk oral traditions also mention the wintering of a Spanish ship at Strom Bay, although documentary record of this encounter has not been found yet (Simonsen 1992a:5). Such documentation may exist in Spanish naval archives. The first Europeans historically recorded to have entered Heiltsuk Traditional Territory are George Vancouver and crew in 1792 and again in 1793. Alexander MacKenzie arrived from the opposite direction also in 1793. This was seven years after the beginning of the maritime fur trade (Hilton 1990:319). While in the area of Restoration Bay Vancouver encountered the *Venus,* an English trading ship, which, finding "the price of skins so exorbitant on the sea-coast" sailed up the channel seeking skins "at a less extravagant price (Lamb 1984:II,652). Other traders, such as freelance American traders who protected their trade secrets, were also active on this part of the British Columbia coast. It is possible that additional early historical records associated with these freelance traders may exist in the United States. Milbanke Sound seems to have been the centre of international trade at this time.

Vancouver's journal describes the country his ships passed through. Some of his crews' interactions with Heiltsuk people, and others, are also described. Vancouver's crew met people, but did not see theii homes, near Point Edmund and at Skowquiltz Bay (Lamb 1984 III: 925, 928). Vancouver's crews saw houses on platforms 25-30 feet above ground near Kimsquit Wage. They saw seven houses of "curious" construction at the south point of the entrance to Cascade Inlet:

> The back parts appeared to be supported by the projection of a very high and nearly perpendicular, rocky cliff, and the front and sides by slender poles, about 15 or 18 feet high [Lamb 1984 III:930].

Vancouver's crew spent a night in Johnson Channel, behind Stokes Island, on an "insulated rock, that had formerly been appropriated to the residence of the natives" (Lamb 1984 III:931-32). Vancouver noted a very populous village on a rock between Beaumont Island (FbSx-1) and the western shore of Johnson Channel and a "considerable village" on Yeo Island (Lamb 1984 III:932, 945). Finally Vancouver describes a house on the North shore of Kynock Inlet:

> Built on the top of a precipice against the side of the steep rocky cliff, by which means the access to it was rendered difficult [Lamb 1984:946].

Nearly all of the villages Vancouver describes are in easily defensible locations: islands, knolls; or along the steep walls of a fjord or channel where access could be easily controlled.

A permanent European presence was first established in Heiltsuk Traditional Territory in 1833 with the construction of the Hudson's Bay Company's post, Fort McLoughlin. This fort was abandoned in 1843 and the material used to build it was disassembled and used in the construction of Fort Victoria (Hobler 1983a). Trade goods in archaeological contexts have been studied by Hobler (1986).

William Tolmie kept journals while at Fort Mcloughlin. The ethnographic pattern of cyclical movement between seasonal villages *is* not as clear in Tolmie's journals as has been generally accepted. He states that "summer quarters" on the Rocky Islands are occupied in February (Tolmie 1963:271) and Spring Village Island is nearly deserted in April (Tohuie 1963:276). Acheson (1995) has noted similar ambiguities in ethnographic and historical records for the Kungit Haida. His re-examination of the documentary record and examination of the archaeological record of Kungit settlements found that instead of large multilineage winter villages characteristic of the post contact period, there was "a far greater partitioning of the landscape by competing groups in small nucleated, year round settlements prior to contact" (Acheson 1995:291). Such a settlement pattern in Heiltsuk Traditional Territory would mean numerous dispersed smaller habitation sites of year round occupation.

Implications for Predictive Modelling and Site Prediction

- **More early contact period sources could exist in Spanish and American archives contact period with references to site locations.**
- **As yet not located (but reported) village sites could be found near Point Edmund, Scowquiltz Bay, Cascade Inlet, Stokes Island, in Kynoch** Inlet, **(and elsewhere).**
- **Refuge, or defensive sites can be expected on knolls, small islands, and along the steep walls of channels Associated middens or the remains of platforms built high above the ground on posts on at least one side could also be found on steep sloped shorelines.**
- **For the precontact period occupation sites may be smaller and more dispersed than villages of the later contact and post contact periods.**

EPIDEMIC DISEASES AND DEPOPULATION

European trade goods, and the attendant technological changes, were not the only influence introduced to Heiltsuk Traditional Territory by early European visitors; new diseases caused even greater changes. George Dawson, on his way back from the Queen Charlotte Islands in 1878, recorded a conversation he had while interviewing an Heiltsuk:

> Ham-chit says **the Indians** are shays talking **among** themselves about their **decrease in number. Long ago he Says they were like the trees, in great numbers everywhere. [Cole and Lockneil, 1989:526-527]**

Among diseases introduced, smallpox caused the greatest mortality. In non-immune populations those infected with smallpox suffer an average mortality rate of 30%, although population declines of up to 90% are often and reliably recorded for several epidemics in some areas of the Pacific Northwest (Boyd 1994:28). An outline of the history of epidemic diseases among the aboriginal population of the Pacific Northwest has been proposed by Boyd (1994, 1990). Smallpox epidemics are recorded at one generation intervals, just long enough to allow a cohort (population group) with no immunities to develop.

Epidemics are recorded for the late 1770's, 1801-02, 1836-38, and in two separate areas in 1853 and 1862-63 (Boyd 1994:7). The following summary concentrates on evidence of smallpox in Heiltsuk Traditional Territory.

The first, and most devastating, smallpox epidemic appears to have affected the entire Pacific Northwest (Boyd 1990:137, 1994:39). The entire Wakashan area also seems to have suffered from an unidentified "mortality" **in** 1824-25.

The 1836-38 epidemic is documented for the *X̌x̌ís* and *Yísdáitx̌v* (Boyd 1990:140). The distribution of vaccine at Fort McLoughlin is believed to have prevented other Heiltsuk sub-tribal groups from suffering as much. Lepofsky and Pegg (1995) recently obtained independent confirmation of this same outbreak documented for the Haisla to the north. By dating bark stripped trees they observed a marked drop in intensity of forest utilization at about the same time as this smallpox epidemic.

Drops in bark-stripping intensity can be linked to historically known population drops caused by epidemics.. Drops in intensity associated with epidemics lacking corresponding historical data on population loss can then be used to obtain a measure of the relative proportion of population loss. This would allow, for the first time, reliable estimates of the precontact population of Heiltsuk Traditional Territory and other parts of British Columbia.

The 1862-63 epidemic, which broke out in Victoria and was so quickly and broadly spread by the forced return of up coast natives, decimated the Heiltsuk (McNeil1 1862 in Boyd 1990):

> By 1870, an increasing number of Heiltsuk village groups were amalgamating by settling together in Old Town [in McLouglin Bay]. In 1881, the first missionary was invited to come and establish a permanent mission in Bella Bella. In 1882, Reserve Commissioner O'Reilly arrived and apportioned 13 reserves to the "Bella Bella indians" and 6 to the near-by "Kokyet Tribe" (*Q̓vúq̓vay̓áitx̌v*). These reserves were surveyed in 1888. (3 additional reserves were allotted in 1916 and surveyed in 1926.). By 1889, the last of the Heiltsuk villages in the area (*Q̓vúq̓vay̓áitx̌v*) bad relocated, some to Old Town and the remaining to Klemtu. By then the combined ravages of smallpox and other diseases had reduced the resident population at Old Town to 250 [
>
> During the late 1890's and early 1900's the entire village relocated from Old Town to the present village site. of Waglisla [HCEC 1995].

Implications for Predictive **Modelling**

- **Precontact** Heiltsuk population may have **been** much larger than late contact and early post contact historical accounts **suggest,** with corresponding higher **site densities**
- **Depopulation caused by epidemic disease drastically reduced the contact period Heiltsuk population, leading to the evacuation of villages and amalgamation of survivors.**

EARLY SURVEYOR'S FIELD NOTES

In order to identify historically documented potential archaeological sites, a test study of several early maps and surveyors' notes at the Surveyor General's Branch was conducted as a part of this project. Several steps were required to locate the original surveyors field notes. First, 1:20,000 and 1:50,000 reference maps at the Surveyor General's Branch were consulted to obtain District Lot and traverse numbers. Then the original land registry volumes were consulted to obtain field book and pigeon hole numbers for the original field notes and maps in the land registry vault. For ten selected areas 60 traverses were examined, most predating 1920 and some as old as 1882. Each survey with indications of archaeological potential are numbered below and on the photocopies of the findings in Volume III, Appendix 1.

1. A 1904 survey of Chatscah I.R. No 2 shows a two or possibly three house village on the north bank of the Kimsquit River near its mouth. Air photos indicate active channelling may have already destroyed this site (John Howe 1995, personal communication). A clearing is also noted further up the river from the village.

2. A 1926 survey of Skowquiltz I.R. 3 does not show any record of the two or possibly three ethnographic villages recorded near the mouth of Skowquiltz River (Arcas 1990:9-10). There are, however, two meadows mapped that fit the descriptions given for the location of two of these villages.
3. Nascall Bay was first surveyed in 1905. A suspension bridge is shown over the waterfalls near the mouth of Nascall River. It may be aboriginal in origin as European settlement at Nascall Bay did not begin until the very late 1800's and was not particularly extensive (Frank Tracy 1995, personal communication).
4. A 1904 survey of Lot 53 shows an "old indian village" near Green River (Simonsen 1995a).
5. A 1917 traverse of Lot 1161, about mid way on the south shore between the head of Cousins Inlet and Coolidge Point, shows a trail from Ocean Falls leading in the direction of the point,
6. A 1901 traverse of District Lot 3 1 between the head of Cousins Inlet and Link Lake shows an "Indian Trail" leading from an "Indian House", just in from the edge of the woods between the tidal flats and the mouth of Link River. Traverse notes have "Summer" pencilled in front of the penned caption "House".
7. In the Spiller Inlet area the first survey of Pulp Lease L130 in 1904 (Field Book 545/04) includes a map showing a trail between Spiller Inlet and the eastern arm of Cheenis Lake
8. The same survey identies a camp just south of the creek north of the trail head on Spiller Inlet (545/04: 17); and
9. A cabin at Salmon Bay is also shown on the same map.
10. The 1904 Field book 545/04 also shows a shack at the reserve at Neekas and a shack at the mouth of the creek draining Cheenis Lake.
11. The first survey of L604 on Ellerslie Lake (Field Book 1699/13, Pigeon Hole 58) includes a key map showing a cabin on Boukind Bay, Roscoe Inlet.
12. A survey of the Ingram, Mooto, and Polallie watersheds (Field Book207/27, Pigeon Hole 86) may provide a clue regarding the location of the continuation of a trail, identified during field reconnaissance, from Ingram to Polallie Lake on the south side of the creek (see Maxwell and Vincent 1997).
13. Lot 1174, on the north shore of Jackson Passage near its west end, was purchased in 1916 and surveyed in 1918. The traverse, in addition to a cannery and wharf shows a house and garden, a "Siwash House" and another unidentified house.
14. A 1920 traverse in Safety Cove, on Calvert Island, shows a shack mid way along north shore of the cove. Pomeroy's survey failed to locate archaeological resources associated with an ethnographically recorded site in Safety Cove (Olson 1955:320). This map could aid in directing efforts for intensive subsurface testing.
15. The traverse of District Lot 1 at Namu, between Namu Harbour and Namu Lake, was made using an "Indian Trail".
16. Timber Licence 9144P at head of Koeye Lake was traversed in 1916. Field notes show a "camp" on the east side of the mouth of the Upper Koeye River,
17. In the same Timber Licence an apparently very distinct trail is shown following the north side of the Upper Koeye River.

Implications for Site Prediction

- **trails, identified on early survey maps, may be found leading to Cheenis, Polallie, Link, Namu, Nascall and upper Koeye Lakes, and along on the south shore of Cousins Inlet**

- occupation sites, identified on early survey maps, may be found on DL 1174, at Salmon Bay, at Neekas Cove, at the mouth of the creek draining Cheenis Lake and at the mouth of the creek immediately north, on Bonkind Bay, near the mouth of Link River, in Safety Cove, on the east side of the upper Koeye River, at or near Skowquiltz I.R No. 3, and on Chatscah I.R. No. 2.
- Further investigation of the holdings of the Surveyor Generals Branch should be very productive towards identifying potential archaeological sites.

Ethnographic Review

The Heiltsuk language is a member of the North Wakashan family of languages. Haisla, Oowekyala, and Kwakwala are the other members of this language group.

Boas and Olson are the most accessible ethnographic sources available. Boas (1973[1932], 1969[1928]) collected information almost a generation earlier than Olson (1954, 1955) and worked closely with George Hun:. Suttles includes a summary of information found in Boas's field notes and papers which Boas obtained from Hunt and a Heiltsuk elder identified as Andrew (probably A. Wallace: 1990). Suttles also includes a map prepared by Boas and Hunt. This map is refered to as the Boas-Hunt map in this report. Pomeroy's 1980 thesis includes an ethnographic synthesis (Chapter II) and a model of population amalgamation (1980: 77). Other sources consulted include: McIlwraith (1992[1948]); Storie and Could (1973); Rath et al. (n.d.), Kennedy and Bouchard (1990); Hilton (1990); Lepofsky (1985); Carpenter (1993); Cannon (1994) and several archaeological impact assessment reports.

SUBSISTENCE

The following is a review a limited number of published and unpublished material pertaining to Heiltsuk subsistence patterns. It is by no means exhaustive, but a general outline of marine and shoreline resources and of inland and montane resources is provided. Unfortunately, ethnobotanical studies conducted in Heiltsuk Traditional Territory have not been reported as they have for Kitasoo, Haisla, Nuxalk, and Oweekeno territories (for example Compton 1993, Lepofsky 1980). No easily accessible comprehensive synthesis is available for food gathering and procurement practices in Heiltsuk Traditional Territory. Pomeroy's 1980 disertation includes some information, but is limited. A Traditional Use Study currently being conducted will provide a more detailed and thorough record of traditional subsistence practices,

Today, and in the past, Heiltsuk people made use of an abundant and wide range of plant and animal resources. The outline provided here attempts to illustrate the broad distribution of many of life's necessities and enrichments prior to contact. These subsistence resources provided attractions throughout Heiltsuk Traditional Territory for people living in the past, as they do today.

Shoreline/Sea

Ethnographic and historical literature, and current practice, indicates Heiltsuk peoples relied and continue to rely heavily upon the resources of the sea. Cannon's analysis of samples from (1994: 103) excavations at Namu revealed a reliance on a broad range of marine plants, shellfish, fish (especially salmon) and mammals by 6000 B.P. and outlined clear temporal trends in subsistence remains, Conover (1978) also provides details of subsistence remains through time.

Resource procurement activities were conducted according to a seasonal round from a series of well-situated base camps which were located near main villages (Brown et al. 1988:18). Herring spawned early in the spring. Plant resources harvested during the spring included: the inner bark of hemlock for food (Brown et. al. 19885); skunk cabbage for food storage and cooking (Carpenter 1993); and seaweed. Bark stripping began in the spring and the bark was used for a wide variety of items such as clothing, baskets, and ceremonial items. Cedar was also used for canoes and in structures as posts, beams, and planking. Summer food gathering and procurement activities included: berry gathering (blue berries, huckleberries, salmonbenies, and salalberries), and in early summer, the continuation of cedar bark stripping. Salmon were also taken in the summer. Fall and early winter were dominated by the procurement and preservation of salmon for the coming winter season. At Namu Cannon (1994:103) states there is significant evidence for a late fall salmon fishery as the majority of fish faunal remains from the site are composed of coho and chum, both of which run in the late fall. Other sea mammals such as harbour seal, sea lion, dolphins and porpoise were also procured by the Hieltsuk.

Though the majority of remains from archaeological sines indicate a pronounced reliance on sea resources, the reliance was not exclusive. Faunal resources also included black tail deer, goat, mink, marten, otter, beaver and black bear (Carpenter 1993: 5; Cannon 1994:104). Birds, though present in the archaeological assemblage at Namu did not, according to Cannon (1994: 106) form a major part of the diet but rather were used as supplementary food sources.

According to Cannon (1996: 106), whose analysis of the faunal remains from excavations at Namu provide much insight into subsistence activities in one part of Hieltsuk Traditional Territory: "The early Namu archaeofauna indicate a strong element of continuity in the overall orientation of the site's subsistence economy. The orientation was overwhelmingly toward the food resources of the sea."

Inland/Montane

An important source of information used in writing this section is the field notes of Brian Compton (1989). Access to these was provided by the Heiltsuk Cultural Education Centre. While researching the ethnobotany of the Heiltsuk, Compton interviewed several elders from the community. When not specifically referenced, information regarding plant resource use was found in the transcripts of these interviews.

Plants were used as raw materials for manufacturing, medicine, food, and ritual items. Cedar wood was used for house posts, planks and canoes. People would "make a canoe out of a large cedar tree growing on top of a mountain" (Boas 1973[1932]: 104), and "when the canoe is finished they carry it out of the woods" (Boas 1973[1932]: 15). One of the elders interviewed by Compton reported yellow cedar was used for making spoons, deer whistles, in boat building, and the berries were used for medicine. Cedar bark was used for building shelters (Boas 1973[1932]:81,102), making fishnets (ibid:112), baskets, and mats, and for ritual regalia. To obtain good bark people might go to great lengths where:

> halfway up the mountain they saw a cedar tree of moderate size, very straight, with very smooth bark and without branches. [Boas 1973:36].

Elders reported that lodge pole pine pitch was used as gum, the pitch of balsam and tips of sitka spruce branches as medicine, and the cambium of hemlock as food. As well, yew wood was used for bows and axe handles and in medicine, Other plants, such as devils club and hellebore, were also used as medicines. Fern, native rice and other roots were used for food as, of course, were berries. A creation story describes two supernatural beings making the "berries on top of mountains" (Boas 1973[1932]:2). One elder remarks that wild currants "grow up in the mountains, lakes" and black huckleberry only grows in the mountains. Other ethnographic references refer to people going "up the

> mountains to pick salmonberries' (Boas 1973[1932]:69) and **building houses on lakes where viburnum berries could be obtained (ibid:82).**

Land animal resources were hunted and trapped. There are numerous ethnographic references to mountain goat hunting (Boas 1973[1932]:59,60135) and to people who "lived inland...[and] used to go mountain goat hunting" (ibid:50).

> ...many of them were mountain goat hunters and the women would go up the mountains to pick berries...some times the hunters and berry gatherers would stay away ten days at a time. [Boas 1973[1932]:46].

Often goats were killed by driving them over precipices or ridges (ibid:83,151,155) and were butchered, dried and cached before returning to the home village (ibid:60). The importance of mountain goat meat, and especially tallow, is given in a story of a potlatch where three bottomless boxes provided the food for the feast: one of salmon, one of berries, and one of mountain goat meat and tallow (ibid:58).

Plant and animal resources used traditionally were observed in the study area during field, reconnaissance. Plant resources observed include: red and yellow cedar, hemlock, spruce, balsam, lodgepole or shore pine, yew, crab apple, skunk cabbage, ferns, Labrador tea, devils club and hellebore. Red and blue huckleberries, cranberries, salal berries, and other berries were also observed.

Implications for predictive modelling follow:

- **traditional use resources in the study area would have provided attraction for people in the past.**
- **marine resources are an important determinant for base camp occupation sites.**
- **land mammals were hunted and deadfall or pitfall traps may be found along game trails**
- **mountain goat hunting and berry picking base camps and processing (drying) sites may be found. Mountain Goat drives may be found in association with ridges and precipices.**
- **culturally modified trees, including bark stripped and logged features may be found even at higher elevations.**

HEILTSUK SUB-TRIBAL GROUPS

Five Heiltsuk sub-tribal groups (Figure 3) are recognised today (HCEC 1988). These are:

- the *Yísdáitx̌v* of Dean and Burke Channels
- the *Wúyalitx̌v* of Fitzhugh Sound and the islands west
- the *Q̓vúqvaýáitx̌v* north of Waglisla from Milbanke Sound up Spiller Channel and Inlet
- The *Wúíx̌itx̌v* of Roscoe Inlet
- the *X̓íx̌ís* from Milbanke Sound up the channels as far as Kynoch and Klekane Inlet.

Ethnographers earlier in this century, and historical records from the last century, describe more than five Heiltsuk speaking sub-groups during the contact period. Olson (1955:320) describes eight "village-tribes", sub-dividing the *Wúyalitx̌v* into four "village-tribes". Boas (in

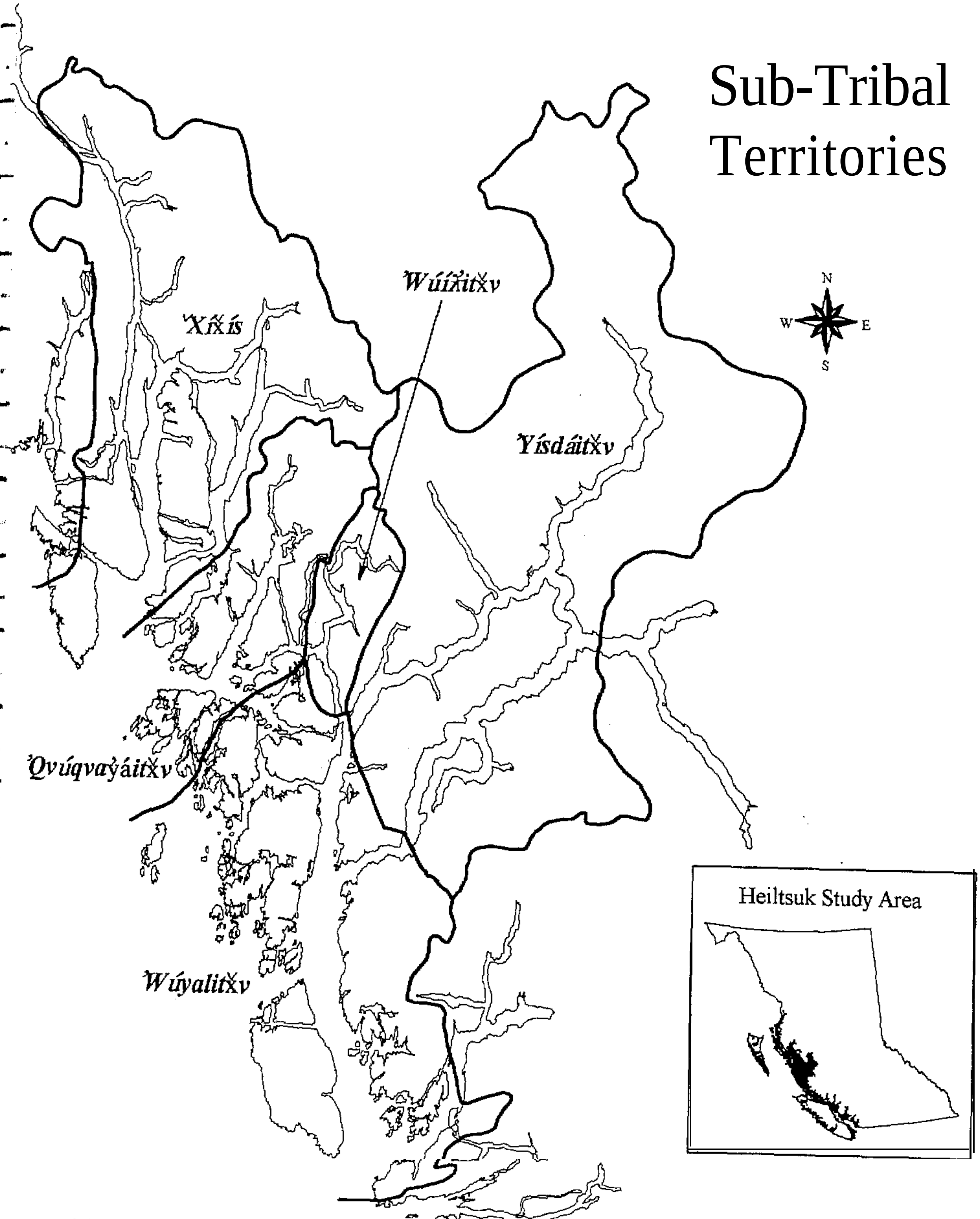


Figure 3. Sub-Tribal Traditional Territories.

Suttles 1990: Map 1) names ten "tribes". On this map (Figure 4) the *W̓úyalitx̌v* are sub-divided into five groups and the *Y̓ísdáitx̌v* into two Tolmie (1963) names six Heiltsuk speaking groups (Pomeroy 1980:51) not including the *X̓íx̌ís*. Pomeroy (1980: 71-77) describes eight sub-groups, not including the *X̓íx̌ís*.

Several orthographies have been employed by different researchers, This report has used the Revised Practical Orthography (Rath 1995) for the names of the five main Heiltsuk sub-tribal groups. However, group, village, or other names appear as presented by the authors referenced. This will highlight some of the variability between, and sometimes within these ethnographic and other references. This variability may result from: 100 - 150 years of contact and post-contact period epidemic diseases, subsequent catastrophic population loss, and loss of remembered detail prior to ethnographic recording; from loss of remembered detail due to the passage of one or two generations between ethnographers' field work; and from differing degrees of familiarity informants might have with the history of sub-tribal groups other than their own.

Y̓ísdáitx̌v

Olson describes *Y̓ísdáitx̌v* territory as Dean Channel below Kimsquit, names three locations for *Y̓ísdáitx̌v* settlements, Elcho Harbour, Green River, and Cascade Inlet, and mentions others were at "several unidentified places" (1955:21). He indicates the *Y̓ísdáitx̌v* spoke an Heiltsuk dialect and married freely with both their neighbours the Kimsquit, a Salishan people at the head of Dean Channel and on the Dean River (McIlwraith 1992[1948]: 14-16), and with the "Bella Bella" on the outer coast (McIlwraith 1992[1948]:21). Olson (1955: 322-323) and Boas (1973[1932]:59-63) recorded the tradition that the *Y̓ísdáitx̌v* originated at the head of Cascade Inlet and Boas (1973[1932]) recounts a tradition relating the *Y̓ísdáitx̌v* to the Kimsquit River valley.

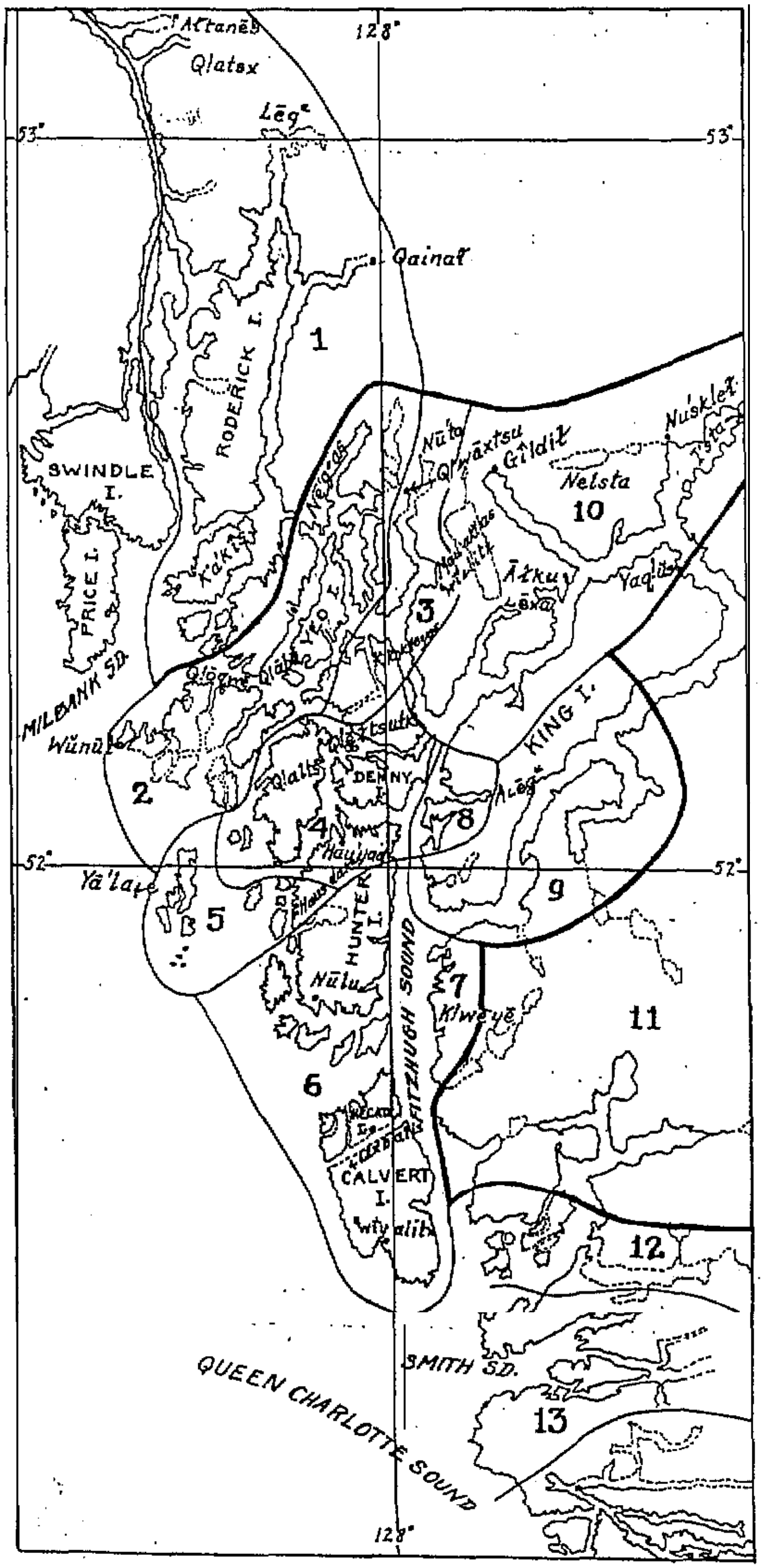
In a tradition recorded by Olson (1955:321):

> It is said that the [*Y̓ísdáitx̌v*] once lived at Kimsquit and later that the Bella Coola moved there. Long ago the Bella Coola lived only along the Dean River, the Kwakiutl [sic] at the mouth of the river.

Olson (1955:321) recounts a series of moves by the *Y̓ísdáitx̌v* down Dean Channel. Beginning at Kimsquit they first moved to SuXwi'lk, and then to A'Lko. He records they were living here at Elcho Harbour about the time of Mackenzie's visit. From here they moved to Ya'hais, in Jenny Inlet, and then to Kwa'tos, at the mouth of Dean Channel on Stokes Island. The *Y̓ísdáitx̌v* were living here during the smallpox epidemic of 1860. Following this epidemic the survivors settled at Old Bella Bella where they amalgamated with other Heiltsuk speakers,

McIlwraith (1992[1948]:21) was given a list of seven towns of the *Y̓ísdáitx̌v*: *ätko*, at Elcho Harbour; *kilde 't* (Cascade Inlet); *äitlik* or *yuqwa't* (Eucott Bay, *atłƛliqʷ* in Kennedy and Bouchard 1990:325); *nuwaisä'x*, two nautical miles above Eucott; *nusqatł*, three miles further; *'omitom*, three miles further (*umƛum* in Kennedy and Bouchard 1990:325); and *suxwilk*, two miles above that, or thirty miles below Kimsquit. According to his informant the village of *nuxwilst* at Kimsquit, identified by McIlwraith (1948:21) as a Kimsquit Bella Coola village,

> was also populated by [*Y̓ísdáitx̌v*]. There was so much intermarriage between the two groups that it is now impossible to ascertain whether the inhabitants not only of *nuxwilst*, but of *suxwilk* as well, were predominantly Kimsquit or [*Y̓ísdáitx̌v*].



Number on Map	Name on Chart
1	Xaexaes (Xixis, Haihais)
2	Qloqwuidx (Gwuqwayaitxw, Kokyet)
3	wiL!idx (Wu'it+itxw, Uwitlit)
4	Oyalaidx (Wuyalitxw, Uyalit)
5	YalaLaidx (Yalat+attxw)
6	Nulu widx (Nulawitxw)
7	Kloyeyeyitx (Kwiyiitxw)
8	ALeq!widx (At+iqwitxw)
9	Klwa+nag imix (Kwa+nagimix)
10	I staidx (Yisdaitxw, Istalt)
11	Awiklenox (Oowekeeno)
12	QlauL!axtlenx
13	Gwasila (Gwasilla)

Figure 4. Boas Hunt Map (Boas, Franz, 1923 Fieldnotes. American Philisophical Society Library. In Suttles 1990b).

Boas learned from his Heiltsuk informant Andrew the names of four "houses" for the *Yísdáitx̌v* (ii Suttles 1990:8-9). The first is the *Yísdáitx̌v* proper with their village identified by Andrew as Nut'ł, although the village is called I'sda on the Boas-Hunt map reproduced in Suttles (1990:Map 1). The second "house" is Géldít'łitx̌w with their village at Géldíł. The Áłkuwuitx̌w had their village at 'Áłkwu at Elcho Harbour, and the Laíx'itx̌w had their village at Laíq at Martin's Valley near Ocean Falls. Two more villages appear on the Boas-Hunt map in Suttles 1990: Nu'sk!eł, at Nascall Bay, and Yaq!ŭs, on King Island near Edward Point. Boas (1973[1932]:67) names another village in Cascade Inlet,Ts!awŭ'naxats!ᵋ.

Table 1 Named *Yísdáitx̌v* Group or **Village**

Boas		Olson	McIlwraith
"House"	Village (and general location)	Village	Named Village
Ísdaitx̌w	Nut'ł (I'sda) (1)	Kimsquit (1)	*muxwilst (1)*
		SuXwi'lk *(2)*	*suxwilk '(2)*
			'omłom (3)
	Nu'sk!eł (Nascal Bay) (4)	(4)	*musqatł (4)*
			muwaisā'x (5)
	Yaq!ŭs (Edward Point) (6)		
			äłlik or *yuq̓wa't (7)*
Géldiłtitx̌w	Géldił (Cascade Inlet) (8)	(Cascade Inlet) (8)	*kilde't (8)*
		(Green River) (9)	
Áłkuwuitx̌w	Áłkwu (Elcho Harbour) (10)	A'Lko (10)	*äłko(10)*
		Ya'hais (Jenny inlet) (11)	
Laix'itxw	L aiq (Martin's Valley, Ocean Falls) (12)		
		Kwa'tos (Stokes Island) (13)	
'Quatn'agimi (14)			Qwatna (and 6 or 7 more) (14)
			Nootum (15)
			Namu (16)

Burke Channel, included in *Yísdáitx̌v* territory (HCEC 1988, Pomeroy 1980:55), is described as the home of the 'Qváłn'agimi, centred in Kwatna Inlet. Boas provides no further information on the 'Qváłn'agimi but McIlwraith provides details on seven or eight villages on Kwatna Inlet and Kwatna River (1992[1948]: 19-20). McIlwraith describes *Qwatna*, on Kwatna Bay, as one of the chief Heiltsuk villages, but does not include it in his list of seven. Four of the villages *on* the list have considerable antiquity suggested, while three were still occupied at the time of MacKenzie's visit, Two of these were subsequently wiped out by small pox. McIlwraith (1992: 19) reports that at *Qwatna*:

> so many of the people spoke Bella Coola that it was practically bilingual. There bad been... intermarriages for generations,

McIlwraith also mentions Heiltsuk villages at Nootum and Namu (1992[1948]:19). Pomeroy (1980:48) indicates a *Yísdáitx̌v* winter village was on Namu Lake but does not give a source for this information.

'Wúyalitx̌v

The *Wúyalitx̌v* (meaning seaward or outside people) are an amalgamation of several earlier distinct groups. Their territory stretched from Raymond and Troup Passages in the north to Calvert Island, Fish Egg Inlet and the entrance to Rivers Inlet in the south. Conflicting accounts of the process of amalgamation are given by Pomeroy (1980), Olson (1955) and Boas (in Suttles 1990). The information of Boas and Olson is summarized in Table 2.

Table 2. Named *Wúyalitx̌v* Group or Village.

Boas			Olson	
"Tribe"	"House"	Village (general location)	"Village-tribe" in Bold	Named Villages
Wúyalitx̌w	'Uyalitx̌w (26)	Q̓élc (Mclaughlin Bay, IR #1) (26)	**O'yalidox (26)**	
	Húýatitx̌w	Húýat (Howeet, IR #8)		Hau'wiyat
	'Qíłsutk̓witx̌w	'Qíłsutkw (Kunsoot, IR #9)		
Yalatłaitx̌w	Yalatłaitx̌w (22)	Wak̓nalakw (Werkinellak, IR #11) (22)	**Yalaklai'.dox (22)**	Wa'h!enalux (22)
	Hansdakwitxw (23)	(Choked Passage, Hunter Island ?,) (23)		
Atłiq̓witx̌w	Atłiq̓witx̌w (21)	Atliqwa (Evans Inlet) (21)	(A'k!legūs) (21)	A'k!legus (21)
'Núláwitxw	'Núláwitxw (20)	'Núlú (on Kildet Sound) (20)	(Nulu'widox) (20)	Nu'lu (20)
	Lúx̌wbálíčitx̌w (19)	Lúx̌wbálís (north end of Calvert Island) (19)		Lu'xpalis (19)
	Uwigaitx̌w (18)	Uwiga (Chic Chic Bay, south end of Calvert Island) (18')	**Uwi'gālidox (18)**	Uwi'kēh (18)
'Kwiyíitx̌w	'Kwiyíitx̌w (17)	Kwiyi (Koeye River) (17)	**K!we'y (17)**	Several villages on Koeye River and Lake. (17)
				Na'mu (16)

The Boas-Hunt map indicates the *Wúyalitx̌v* are an amalgam of five "tribes". The list of houses obtained from Andrews includes ten or possibly eleven "houses" for these "tribes". Olson gives four "village-tribes" for the *Wúyalitx̌v* (1955:320). A further two groups are mentioned, bringing the total to six. Pomeroy proposes five, or possibly six, groups amalgamated (1980). Other villages (Olson 1955:320,321) are also named for this sub-tribal group: K!likili's, A'lstim, Tuxsowi's, and T!ilya'su. Olson recorded a camp on Calvert Island in Safety Cove and several on the west coast of the island.

Olson sub-divides the 'Kviáitxv into one group on Koeye River and Lake and another at Namu. The 'Kviáitxv of Koeye were regarded by the Oweekeno as "half Heiltsuk half Owikeno" (1954:214) and their descendants can be found in both Waglisla and Oweekeno today. Olson also recorded an Oweekeno camp at the southern tip of Calvert Island (19.54215) and an Oweekeno camp in Fish Egg Inlet (1954:216).

'Qvúqvaýáitx̌v

The *Q̓vúqvaýáitx̌v's* (calm water people's) territory extends from Milbanke Sound up Seaforth, Return Bullock, and Spiller Channels and included Briggs and Spiller Inlet, Ellerslie Lake, and a part of Mathieson Channel (HCEC 1988). Olson described their territory as Ellerslie Channel (1955320). The *Q̓vúqvaýáitx̌v* had their own reserves assigned and were the last Heiltsuk speaking sub-group to join the community of Bella Bella in the late nineteenth century. Some background details regarding *Q̓vúqvaýáitx̌v* traditional territorial boundaries, land use, and recent history are provided in Carpenter (1993). These details provide context for a focused ethnographic cultural inventory of Tom Bay on Mathieson Channel.

Olson (1955:321) recorded five *Q̓vúqvaýáitx̌v* villages: K!okyet (IR#1), K!o'kwi, O'pẽs, Ni'kãs, K!apa'h (Kokyet), and Te'nki. Boas and Hunt (in Suttles 1990:2-3) recorded five villages, each associated with a "house": Q̓úqwai of the Q̓wúqwaýáitx̌w, Wunut of the Wunutitx̌w, obis (of the Wunutitx̌w), Q̓ába of the Q̓ábáitx̌w, and Nigas of the Nigac̓itx̌w. Four of the village names are common to both Olson and Boas and Hunt. Two more are different bringing the total of named groups to six for the *Q̓vúqvaýáitx̌v*.

Nigas (IR #4) is remembered as the site of a territorial dispute with the Kitasoo Tsimshian. By winning a contest, the *Q̓vúqvaýáitx̌v* secured their traditional title to Spiller Channel (Olson 1955:321).

Table 3 Named *Q̓vúqvaýáitx̌v* Group or Village

Boas		Olson
"House"	Village	Village
Qwuqwuyaitxw (29)	Qwuqwai (Koqui IR #6) (29)	K!o'Kwi (29)
Wunutitxw	Ubais (obis) (Deep Bay) (28)	O'pes (28)
	Wunut (Cape Mark) (27)	(27)
Nigacitxw (32)	Nigas (Neekas IR#4) (32)	Ni'kas (32)
Qabaitxw (3 1)	Qaba (Koket IR #1) (3 1)	K!apa'h (3 1)
		Te'nki (Tankeeab) (30)

'Wúíx̌itx̌v

The *Wúíx̌itx̌v* (let people) inhabited Roscoe Inlet and Johnson Channel. Olson (1955:321) includes Ellerslie Lake, which he describes as salt water. Mrs.Moses Knight, a *Wúíx̌itx̌v*, related to Olson (1955341) two village names, located on Ellerslie Lake, which were used by her family when she was young. Three village names are given for Roscoe Inlet. The Boas-Hunt map does not include Ellerslie Lake, but does include Troup Passage in *Wúíx̌itx̌v* territory. Boas and Hunt included five "houses" for the *Wúíx̌itx̌v*, three corresponding to those recorded by Olson, One more apparent village name is marked on the Boas/Hunt map.

Table 4 **Named *Wúíx̌itx̌v* village or group**

Boas		Olson
"House"	Village	Village
Wu'it'titx̌w (33)	Tłacza (Clatse IR#5) (33)	
	Mau'ak!as (34)	
Qwax̌cuitx̌w (35)	Qwax̌cu (Quartcha IR #3) (35)	Kwa'xtsu (35)
Xwenicitx̌w (32)	Xwenís (Hoones IR #2) (32)	Huni's (32)
Kakusdičitx̌w (37)	Kakusdis (Kajustus IR #10) (37)	(37)
Nudaitx̌w (36)	Nuda (Noota IR #4) (36)	Nútå (36)
		Ai'kyahuis
		Klatula'spela
		Ellerslie A (Ku'kåsxaiya)
		Ellerslie B (Uwi'tlidox 7)

ᵛXíx̌is

Olson (1954:344) recorded four summer villages: Kwi'itu (or Kuwi'h) in Marmot Cove across from Butedale (52), Kåtsu'L on Sarah Island (48), one on Ivory Island(39), and I'xwåh (49). Olson recorded three winter villages: Kai'nĕt(Qainal) (44), Le'yuk (Lega)(45), and Sxaiyala'x (43). Other villages and people of the villages are named in several oral traditions recorded by Olson: Gwiyutux (42), K!yakis (k'a'kis)(41), Tcimsit (40), and Haphsu'L on Mussel Inlet (46) and possibly one other at Kynoch (44) not shown Two more named villages are known Qlatsx (50), and Altanes(51), and a small village on Lime Point (47) is recorded (Simmonsen 1994a). Olson also indicates *X̌ix̌is* lived at Ho'kwis,on a lake on a mountain called K!wakwahai'yas, and at Ka'si.ah at the mouth of the crab river in Gardener Canal.

Conclusion

In total 52 groups or villages are named in Olson and Suttles. Each appears to correspond closely with a drainage system on the mainland, along passages off the mainland. When only named groups are considered, more than two dozen local groups lived in Heihsuk Traditional Territory in the late or very late precontact period.

Figure 5. Proposed model of precontact local group approximate territories.

Implications for Predictive Modelling

- **Archaeological site distribution especially for the more recent pre-contact period may be related to major drainages or to passages and transportation routes within Heiltsuk Traditional Territory**
- **Many ethnographically named and known but un-named villages have yet to be located archaeologically.**
- **A pattern of more numerous and dispersed settlement predates settlement amalgamation induced by and in response to the effects of european contact.**

PLACE NAM-ES

Indigenous place names can suggest archaeological potential (Mackie 1986). The most obvious archaeologically correlated place names are of course village names. At least 27 archaeological sites are associated with named villages (Pomeroy 1980:34). However, many known village names have not been positively identified with archaeological sites.

A study of the coincidence of placenames and archaeological sites as of 1983 was undertaken at the Heiltsuk Cultural Education Centre by Elroy White. Six hundred and thirteen archaeological sites are plotted on the map set used. Two hundred and seventeen placenames are plotted on the map sets used. Fifty, or 23%, of the place names coincided exactly with recorded archaeological sites (see Volume III, Appendix 2). A study of Mearse Island placenames, which were assessed to be names requiring physically being at the location, showed a very high correlation between place names and CMT distribution (Eldrige and Stafford 1996: 26). Of a sample of 250 CMT sites, 70% were within 400m of a place name and 95% were found within 1200m of a place name.

Place names can also provide clues for resource locations and season of use of an area (Carpenter 1993:5) and can refer to specific historical events. Un-analysable place names may be very old.

Implications for Site Prediction and Predictive Modelling

- **Archaeological potential may be high within 400m of a placename (where meanings would require physically visiting the place to name it).**
- **Archaeological potential may be moderate between 400m and 1200m of a placename (where meanings would require physically visiting the place to name it).**

TRAILS

Numerous trails are noted in ethnographic and other references. Paul Hopkins describes a trail between James Bay and Sheep Passage in Klemtu Stories (Storie and Gould 1973:29). A trail between Neekas and Salmon Bay is also remembered (Simonsen 1994:23). Olson (1955:322) recorded a story describing a network of trails between Nascall Lake, Cascade Inlet, Ellerslie Lake and Kynoch Inlet. Heiltsuk today remember a t&between Ellerslie Lake and the south end of Ingram Lake and between Mooto Lake and Kynoch Inlet as well as between Ellerslie and Link Lakes (Mitch Vickers, personal communication 1996, see Maxwell and Vincent 1997:8,9). There was a short trail between Ellerslie Lake and Bay (Brown 1988:7). The old route passed along the north side of the falls to a sand beach in a small bay on the lake. In Rath et al. there are references to trails between Briggs Inlet and Boukind Bay on Roscoe Inlet (199 : 10) and a trail "left of Mount Keyes" (199 :40) near the entrance to Roscoe Inlet. Rollins and Blake (1975:17) were also told of three more trails on Roscoe Inlet: one between Shack Bay and Ocean Falls, another between Shack Bay and Clatse, and another between the head of Roscoe Inlet and Ocean Falls. There are also references to a trail between Scowquiltz and the Kitlope.

(Thommasen 1994: 126) and between Mussel Inlet and the Tezwa River (Ecotrust 1992). Undoubtedly many more references to trails exist.

Implications for Predictive Modelling

- From ethnographic references trail corridors can be expected: between James Bay and Sheep Passage; Neekas Cove and Salmon Bay; Ellerslie Lake and Spiller Inlet, Briggs Inlet/ Boukind Bay, and Kynoch Inlet; between Ingram Lake, Mooto Lake and Kynoch Inlet,; between Nascall Lake, Cascade Inlet, and Ellerslie Lake; between Shack Bay and Ocean Falls and Clatse; the head of Roscoe Inlet and Ocean Falls; between Scowquiltz and the Kitlope River; and between Mussel Inlet and the Tezwa River.
- Other trail corridors undoubtedly exist where natural access routes are found.

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APPENDIX II

GLOSSARY OF TECHNICAL TERMS

GLOSSARY OF TECHNICAL TERMS

Aborighxally-logged tree: A tree that has been felled, planked or otherwise modified to obtain wood by First Nations people.

Abrader: A stone used as an abrasive element to shape or sharpen tools.

Adze: A woodworking tool typically consisting of a wedge-shaped ground stone blade hafted or bound onto a wooden handle.

Anthropomorphic: A design resembling a human form, a common motif in Northwest Coast rock art.

Archaeological correlate: An observed or predicted association between a landscape feature and a type of archaeological site.

Archaeology: The study of human cultures though the material remains of their activities.

Artifact: A portable object manufactured or intentionally modified by human action. Examples include stone tools, cedar baskets and wooden utensils.

A.S.L.: Above Sea-Level, based on the position of the sea's surface at mean level between high and low tide.

Bark-strip scar: A section of a tree in which the outer bark has been removed, exposing the underlying wood.

Basalt: A fine-grained volcanic rock that was commonly used to make stone tools.

Biface: A general term for stone artifacts that have been modified on two opposing sides, or faces. Examples include stone projectile points and knives.

Biogeoclimatic zone: An ecosystem classification scheme based on vegetation, soils, topography and climate.

Blazed tree: A tree displaying chop marks used to indicate a boundary, trail, trapline or other feature on the landscape.

Borden Number: A system for numbering archaeological sites which divides Canada into a series of rectangles based on latitude and longitude. Each rectangle (or Borden block) is given a four letter code and sites are numbered sequentially as they are recorded in each block. For example, FcSm-11 is the Borden number for the Tsini Tsini site near Bella Coola, B.C.

B.P.: Before Present; a dating convention often used with radiocarbon dating. "Present" is universally considered to be A.D. 1950.

Burial Site: A site used for the placement of human remains. Some sites referred to as "burials" do not actually involve burying the dead. A number of different burial practices were used by aboriginal people, including interment in trees, rockshelters, grave houses and cemeteries. In many cases, the remains were placed in cedar boxes prior to interment.

Cache pit: An underground storage feature, usually used to preserve dried food, but also sometimes used to store tools and other items.

Canoe blank: A log that has been partially shaped into a canoe.

Canoe **run:** A long narrow beach area cleared of rocks to facilitate the landing of boats on shore.

Chopper: A cobble tool typically having a unifacially or bifacially flaked cutting edge.

Climatology: **The** study of the prevailing weather conditions of a region.

Cobble: A rounded stone with a diameter between 64 and 256 mm.

Cobble Tool: A tool produced by striking flakes from the edge of a cobble to produce a working edge.

Colluvium: Weathered material transported by gravity to the base of a slope. Includes scree, talus, etc.

Copper: Among Northwest Coast First Nations, a hammered copper plaque used in ceremonies, such as the Potlatch, and often depicted in rock art. The copper remains a powerful symbol of wealth and status in First Nations societies.

Core: A stone from which flakes have been removed during the manufacture of lithic artifacts.

Cranial modification: The process of intentionally elongating or flattening the natural shape of the skull, practiced among certain First Nations groups. Typically accomplished through the use of a cradleboard and considered a mark of status or beauty.

Culture: 1. A pattern of human activity transmitted between individuals by teaching; includes both material culture (e.g., artifacts and features) and non-material culture (e.g. practices and beliefs). 2. A term used by some archaeologists to refer to an assemblage of cultural material recurring in a restricted geographic area within a specified time period.

Culture History: An archaeological construct used to describe cultural changes over time, often based on variations in artifact styles.

Culturally Modified Tree (CMT): A tree that has been intentionally altered by First Nations people as part of their traditional use of the forest. Examples of CMTs include bark stripped trees, blazed trees, planked trees and notched trees.

Debitage: Waste material produced during the manufacture of flaked stone tools.

Dendrochronology: A technique of dating living or dead wood through the examination of tree growth rings.

Dendroglyph: A carved tree used for a traditional First Nations purpose, such as marking an important cultural location or a territorial boundary. Also sometimes called an arborglyph/arboriglyph.

Dendrograph: A painted tree used for a traditional First Nations purpose. Also sometimes called an arborgraph/arborigraph.

Dentalium: A long, thin mollusk shell used for ornamentation by Northwest Coast cultures; considered a wealth item and sometimes used as a form of currency. Dentalium is known to have been traded widely in pre-contact times.

Direct historic approach: An archaeological methodology in which ethnographic or historic patterns are used as models for the interpretation of archaeological data.

Drift: Sediments deposited during the retreat of glaciers and ice sheets.

Erratic: A large pebble, cobble, or boulder which has been transported some distance from its sources, usually by glacial forces.

Ethnography: A detailed descriptive study of a culture through participant-observation techniques, including interviews with community members.

Ethnohistory: The study of the past using both non-western, indigenous historical records (particularly oral traditions) and early historic written records.

Eulachon: A fatty type of smelt, highly valued by First Nations along the Northwest Coast. Various other spellings are common, including oolichan and ooligan.

Eustatic: Pertaining to changes in absolute sea-level on a global scale, and not regional changes produced by localized movements of land or the sea floor.

Excavation: The controlled and systematic removal and exploration of subsurface archaeological deposits.

Faunal Remains: The remains of animals, fish or shellfish, found in archaeological deposits which have not been intentionally modified for use as tools, ornaments, etc.

Feature: A cultural component of an archaeological site, such as a housepit or hearth, that cannot be removed intact from the site.

Fire-cracked rock: Stone that has been altered as a result of rapid or alternate heating and cooling, caused, for example, by stone boiling or in campfires.

Fish trap: A wall of loosely piled stones used to capture fish feeding in the intertidal zone, sometimes incorporating perishable components such as stakes, nets and basketry traps.

Fjord: A long, steep-sided coastal inlet produced as a result of intense glaciation of a previously existing river valley.

Flake: A piece of stone intentionally removed from a core during the manufacture of stone tools. Flakes were sometimes used as expedient tools and may show evidence of retouch or use wear.

Fluvial: Of or pertaining to streams or rivers.

Geographic Information System (GIS): A computerized database and analysis system with the primary functions of capturing, storing and manipulating geographic information. Geographic information contains a combination of location, attribute and topographical data.

Geomorphology: The description and interpretation of landforms and the processes that create them.

Glacial: Of or pertaining to glaciers.

Glacier: An extended ice mass that originates as compacted snow at high mountain elevations. When the ice achieves a certain depth it will begin to move from its point of origin.

Glaciomarine: Refers to sediments or landforms created through a combination of glacial and marine forces.

Grease trail: A trail used by aboriginal people as part of a regional exchange system; the term is a reference to eulachon oil, a commonly-traded commodity.

Groundstone: A class of stone tools, manufactured by pecking, grinding and polishing to achieve the desired shape.

Ground truthing: Field investigations designed to assess the accuracy of inferences or predictions made about a dataset. Ground truthing is often used in cultural resource management **to** test the results of predictive modelling studies.

Haftiug: The process of attaching a tool of flaked stone, bone or other material to a handle to facilitate use.

Historic site: **A** site dating from the period following early contact between First Nations and European or Euro-American cultures. Includes sites produced by Native and non-Native activities.

Holocene: A geological term referring to the post-glacial period spanning approximately the past 10,000 years, following the Pleistocene Ice Age.

Housepit: A depression, usually circular or rectangular, marking the former location of a semi-subterranean dwelling.

Igneous: Rocks of volcanic origin.

Impact Assessment: In archaeology, a study designed to assess possible impacts of proposed developments on archaeological resources, Impact assessments typically incorporate documentary research, field inspections, and other lines of inquiry. Recommendations regarding the significance of any archaeological resources encountered and resource management strategies are usually provided.

In situ: In its original place.

Intrusive: A formation of igneous rock which has forced itself into a pre-existing rock structure.

Inventory: The compilation of information on archaeological resources within a given project area, through documentary research and field investigations, often supplemented with interviews. Inventory does not typically include an assessment of the significance of these resources or of potential development-related impacts upon them.

Isostatic: Pertaining to sea-level changes resulting from the tendency of the earth's crust to maintain a state of equilibrium, in which forces tending to elevate balance with those tending to depress. For example, continental plates may be depressed under the weight of glacial ice, and rebound following ice melting, resulting in variations in relative sea-level.

Labret: An ornament worn in and projecting through perforations below the lip or near the comers of the mouth; sometimes referred to as a lip-plug.

Lithic: Of, or pertaining to, stone. In archaeology, a general term for stone tools and debitage.

Marine transgression: The inundation of a large area of land by the sea in a relatively short period of geological time.

Microblade: A small parallel-sided blade removed from a core using a distinctive "punch" technique. Microblades were typically set into bone or wood handles to form cutting tools.

Midden: A deposit of soil and cultural debris produced as byproducts of human activities. Middens of clam and mussel shell, often containing artifacts, are common on the coast of British Columbia.

Mitigation: Archaeological work required to lessen the impact of a development on an archaeological site; typically consists of the excavation of the site or a representative sample thereof.

Numaym: A kin group with its own myths and crests, which controls access to resources.

Obsidian: A semi-transparent volcanic glass, usually black, grey or olive green formed by rapid cooling, resulting in a lack of crystalline structure. Obsidian has excellent flaking qualities and was highly valued by aboriginal people as a raw material for use in stone tool manufacture.

Ochre: A general term, applied to coloured oxide and carbonate precipitates, often red in colour and used as a pigment in pictographs and ceremonial activities.

Old growth: Natural stands of old and young trees and their associated plants, animals and ecological systems, that have remained essentially undisturbed by human activity. The age and structure of old growth forests varies by forest type and between biogeoclimatic zone.

Oral history: A method by which aspects of an individual's life experience and cultural knowledge are collected by an interviewer.

Oral tradition: A non-material process of creating, transmitting and preserving cultural knowledge across generations.

Osteology: The scientific study of bones.

Overview: An assessment of the archaeological resources present in a defined study area. Typically includes an assessment of the potential for unexplored areas to contain archaeological sites

Paleosol: A soil or sediment of ancient origin.

Pebble Tool: A common term synonymous with "cobble tool". A pebble tool may be bifacially or unifacially worked, often with the original rounded cortical portion opposite the working edge left unmodified.

Pecking: A technique of lithic manufacturing which uses percussion (tapping or hammering) to wear down a stone tool into the desired shape. The technique is also used to incise petroglyph designs into rock surfaces.

Petroform: An alignment of rocks intentionally produced by human activity, such as a stone wall fish trap or canoe run.

Petroglyph: An image carved or pecked into a rock surface, sometimes enhanced with pigments.

Physiographic zone: A system of zones based on geomorphology and climatology.

Pictograph: An image painted on a rock surface, typically using red ocbre pigments.

Pithouse: A semi-subterranean dwelling with a superstructure of wooden beams, soil and other insulating materials. Pithouses were commonly used in areas of British Columbia prior to European contact.

Planked tree: A log or tree from which a long, flat piece of timber has been removed.

Pleistocene: The most recent geological period of glaciation, beginning about 1.6 million years ago and continuing until the onset of the Holocene between 13,000 and 10,000 B.P.

Polishing: A tool manufacturing technique involving intentional smoothing of an object through rubbing with finely abrasive materials.

Post-contact: The period of time following early contact between First Nations and European cultures. Contact occurred intermittently over a period of approximately 50 years, between the late eighteenth and early nineteenth centuries. Written documents, in conjunction with archaeological data and oral tradition, can be used to study this period,

Potlatch: A feasting complex that is the central social and political institution among First Nations of the Northwest Coast and portions of the adjacent Interior Plateau, which employs the reciprocal redistribution of material goods to establish and reinforce sociopolitical order.

Pre-contact: The period of time prior to the earliest contact between First Nations and European cultures, for which written documents are unavailable. Research into this time period relies on archaeological information and oral tradition. Contact occurred intermittently over a period of approximately 50 years, between the late eighteenth and early nineteenth centuries.

Predictive Model: A construct developed to make inferences about unobserved phenomena based on the observed characteristics of similar phenomena. In archaeology, models are often used to predict site distributions in areas that have not been examined in the field.

Probabilistic survey: Archaeological field inventory involving the random selection of survey units with the intention of eliminating judgmental biases regarding site distribution and location normally inherent in archaeological survey. Typically, the study area is divided into units of high, moderate and low archaeological potential, based on topography, physiography, and other factors, and specific units are then randomly selected for field inspection.

Projectile Point: A sharpened stone, bone or wooden implement used to tip a projectile such as a spear, arrow or dart.

Quarry: A source area for lithic materials used in the production of stone tools. Such areas are often characterized by dense concentrations of flaking or chipping debris.

Quatenary: The period of time between approximately 1.6 million years ago and the present. The Pleistocene and Holocene are divisions of the Quatemary.

Radiocarbon Dating: A technique used to determine the age of organic material through analysis of the proportions of naturally-occurring radioactive carbon isotopes.

Reconnaissance: Non-intensive field investigation designed to assess the archaeological site potential of landforms within a prescribed area. Reconnaissance typically does ***not*** involve subsurface testing.

Retouch: Intentional, patterned modification of the surface of a material, most often related to the sharpening of a stone cutting edge.

Rockshelter: A small cave or rock overhang used for shelter, habitation, or human burials.

Scraper: A type of stone tool, typically consisting of a thick flake with steep retouch on one side or end, with minimal retouch on the remaining margins.

Significance: In cultural resource management, the relative scientific, cultural, public, economic and historic importance of an archaeological site.

Site: A place exhibiting physical evidence of past human activity.

Stratigraphy: The layering of natural and cultural subsurface deposits in archaeological sites.

Subsistence strategy: A cultural system for obtaining and processing food and raw materials.

Tapered bark-strip: A relatively long bark removal feature which narrows to a point at the upper end.

Tectonic: Pertaining to the major structural features of the earth's crust and the broad geological structures of a region.

Test hole: A deep cut or chop into a standing tree used to check the soundness of heartwood.

Till: An unstratified glacial drift deposit.

Topography: The physical features of an area, for example mountains and rivers.

Traditional Territory: An area used by a cultural group for subsistence, ceremonial and other cultural practices.

Traditional Use Area: A natural area used by First Nations people **to** practice traditional activities including, but not limited to, resource gathering (e.g., plant gathering, hunting, fishing, etc.), raw material procurement (e.g. stone quarries, timber or bark harvesting areas, etc.) and ceremonial or spiritual activities. Traditional use sites may lack physical evidence of their use, but maintain cultural significance to a living community of people.

Uniface: An artifact that has been modified, usually through the removal of flakes, on one face or side of its cutting edge only.

Utilization: Chipping along one or more edges of flake produced as a result of use as a tool and not by intentional modification.

Weir: A type of fish trap consisting of a line of wooden stakes placed at the mouth of a river designed to trap spawning salmon, often incorporating additional elements such as nets or basketry traps.

X-Ray fluorescence (XRF): A spectroscopic technique for measuring the composition of chemical elements in geological materials. In archaeology, XRF is most commonly used to correlate obsidian artifacts with parent geological sources, based on trace element "fingerprints".

Zoomorphic: Any design resembling or representing an animal, a common stylistic motif in Northwest Coast art.

APPENDIX III

SUMMARY OF CENTRAL COAST PLACE NAMES FROM SELECTED ETHNOGRAPHIC AND HISTORIC DOCUMENTS

The following database summarizes a review of selected ethnographic and historic references to traditional First Nations activities within the Central Coast LRMP area. The historical review was designed to identify locations and descriptions of specific aboriginal sites or activities, as recorded by non-native observers. The review is not intended to represent all known traditional activity areas and does not constitute a traditional use study.

The database provides information on site location, traditional site name (when possible), site type and the published source of the reference. Sites are listed by 1:50,000 NTS mapsheet. Some of these sites may be recorded archaeological sites; however, these locations have not been cross-referenced with the Provincial Heritage Register. References to site locations which could not be accurately determined (due to vague location descriptions) are included in the final section. Locations outside the Central Coast LRMP area have been excluded from the database. It is acknowledged that many places outside the LRMP area were frequented by Central Coast First Nations. Some of these sites may be of high cultural significance and important for understanding the seasonal movements of aboriginal people. Many sites appeared more than once in the historical review; the database maintains the level of repetition in the literature, in order to enhance the reliability of written sources. In some cases, the orthography used in the original document has been modified in the database.

Location numbers refer to locations mapped on 1:50,000 scale NTS maps on file with Golder Associates Ltd. In the case of references to Boas (1934), the location number refers to Boas' maps and the numeric index contained in that volume. These include areas where migratory species of fish, birds and mammals were available.

This research does not seek to define or confirm First Nations territorial boundaries or ownership. It is intended to highlight descriptions of locations and activities that may help in predicting archaeological site locations.

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APPENDIX III

NTS : 092K/05

Name	Type	Location/Description	Reference	Location No.
Hkusam	Village/Hunting Ground	Johnstone Strait	Galois 1994:241	340
Quatselees	Village	Hardwicke Island	Galois 1994:243	344
Samama	Village	Beaver Inlet, Loughborough Inlet	Galois 1994:249	348
q'uyumin	Fishing	On Little Bear River	Galois 1994:272	362
xeq!amin	Origin Site	Blenkinsop Bay	Galois 1994:216	337

NTS : 092K/06

Name	Type	Location/Description	Reference	Location No
Arran Rapids	Fishing	Entrance of Arran Rapids	Lamb 1984:606	008
Kwi-ha	Village	Entrance to Bute Inlet	Dawson 1888:3	
Matltun	Village	Codero Channel, Phillips Arm	Galois 1994:252,259	355
Ogwiltoia	Village/ Fishing (halibut)	Charles Bay, East Thurlow Island	Galois 1994:260	358
Point Chatham	Village	"In the bay to the north westward of Point Chatham was situated an Indian village"	Lamb 1984:621	059
Rocky Islands	Village	"Kyeets people summer quarters are at Rocky Islands"	Tolmie 1963:271	059
Tsaiiyeuk	Village	Arran Rapids, Bute Inlet	Galois 1994254,256	356
g'aldis	Fishing (salmon station)/Site of Interaction w/ Non-natives	Elk Bay	Galois 1994:269	360

NTS : 092K/11

Name	Type	Location/Description	Reference	Location No
Hwihawi	Origin Site	Islet in Phillips Lake	Galois 1994:257	350
Hwihawi	Village	Phillips Lake	Galois 1994:252	350
Kakanuts	Origin Site	Fanny Bay, Phillips Arm	Galois 1994:252	351
Matsayno	Village	Head of Phillips Arm	Galois 1994:252	352
unknown	*Fishing Station*	Phillips Arm, immed. west of the *mouth* of the **stream** flowing into the head of Phillips Arm	Galois 1994:256	353
unknown	Sealing Station	Frederick Arm, north side at mouth of narrow sea passage connecting Frederick Sound and Estero Channel	Galois 1994:255	354

APPENDIX III

NTS : 092K/12

Name	Type	Location/Description	Reference	Location No
Freda Point	/Burial Ground	Siwash Bay, Knight Inlet, north of Kwatsi Village , Tribune Channel	Galois 1994:142	290
Glu'gwalus	Origin Site	On a mountain, north side of Loughborough Inlet	Galois 1994:249	
Gwakdala	Village	Jackson Bay, Topaze Harbour	Galois 1994:240	345
Hahum - Salish site	Village	Port Neville, on an island	Galois 1994252	324
Hanatsa	Houses/Resource Gathering	Narrows, Port Neville	Galois 1994:173	323
Homayno	unspecified	Heydon Bay, Loughborough Inlet	Galois 1994:249	346
Igisbalis	Village	Knight Inlet	Galois 1994:163	311
Kakum - Salish site	Settlement	Port Neville	Galois 1994:174	324
Keogh	Village	Glendale Cove, Knight Inlet	Galois 1994:144	296
Kliquit	Village	Knight Inlet	Galois 1994:164	313
Lagiklila	Fishing	Knight Inlet, south shore between Siwash Bay and Littleton Point	Galois 1994:175	
Maltsayeu River	Hunting/Resource Gathering	Knight Inlet	Galois 1994:145	291
Mataltsyu	Village	Knight Inlet	Galois 1994:165	291
Nalakglala	Origin Site/Fishing/Hunnting	Hoeya Sound	Galois 1994:166,221	312
Pakaiyouk	Village	Loughborough Inlet, east side, opposite William Point	Galois 1994:249	347
Pawala	Resource Gathering (clams)	Call Creek	Galois 1994: 176	325
Tekya	Settlement	Read Bay, Topaze Harbour	Galois 1994:254	349
Zalidis	Village	Glendale Cove, Knight Inlet	Galois 1994:146	289
axyadbi	Village	Glendale Cove, Knight Inlet	Galois 1994:142	287
gagolam	Village	Rock Bay	Galois 1994:269	361
goxudEEms	House	Knight Inlet	Galois 1994:142	
ta'yagol	Village	Glendale Cove, Knight Inlet	Galois 1994: 146	288
ts!e'qwas	Trail	From head of Call Inlet north to Knight inlet	Boas 1934 (15:64)	15:64
unknown	Village	Apple River and the head of Loughborough Inlet	Galois 1994265	359
wase las	Resource Gathering (herring)	At head of Call Inlet where trail (15:64) begins	Boas 1934 (15:87)	15:87

Tuesday, June 1, 1999

APPENDIX III

NTS : 092K/13

Name	Type	Location/Description
Awagi	House	Stirling Point, Mackenzie Sound
Hunwati	Village/Origin Site/Resource Gathering	Knight Inlet
lawigalis	Fishing/Possible Burial Ground	Knight Inlet
Qualadi	Village	Kwalte River, Knight Inlet
Xuse'la	Fort	Thompson Sound
tsElexwas	Settlement/Origin Site	Ahnuhati River
unknown	Fishing Camp	Mouth of Ahnuhati River

NTS : 092L/09

Name	Type	Location/Description
wa' mas	I/Fishing (salmon)	On shore to north of peninsula described in 14:42
Adabe	Village	Turnour Island
Adlagamalla	Village	Klaoitsis Island. Baroney Passage
Apsagayu	Salmon Station with Houses	Shoal Harbour, Gilford Island
Apsigiyu	Village	Shoal Harbour, Gilford Island
Etsekin	Village	Havannah Channel
Gildeglise	Resource Gathering (clams)	Cutter Cove
Giltum	Village	Port Harvey
GogyEwe	House	Viscount Island, Nickoll Passage
GoxdEmis	House	Thompson Sound
Ha-wit-sis	Village	Ka-loo-kwis, Turnour Island
Kakweken	Village	Thompson Sound
I(night Inlet	Village	"a village discovered a few miles from its upper extremity" -near Tribune Channel.
Kwakglala	Settlement	Lull Bay
Kwatsas	Resource Gathering	Port Neville

APPENDIX III

NTS : 092L/09

Name	Type	Location/Description	Reference	Location No
Kyimla	wage	Gilford Island	Galois 1994: 100	230
Kyimla	Village	Gilford Island, Tribune Channel	Galois 1994:122	230
Ma-tilh-pi	Village	Havanna Channel	Dawson 1888:3	318
Mahmagalesala	Resource Gathering	Robbers Nob, Port Neville	Galois 1994: 176	319
Musas	Resource Gathering (clams)	Boughey Bay, Call Creek	Galois 1994:176	195
Qalogwis	Village	Nicholas Point, Turnour Island	Galois 1994:213	026
Qalogwis	Village	Turnour Island	Galois 1994:146	026
Sasukw	Village	Gilford Creek, Gilford Island	Galois 1994:167	308
Turnour Island	Village	Turnour Island	Rohner and Rohner 1970:4	026
Wakidatsi	Village	Cracroft Island, opposite Farquharson Island	Galois 1994216	326
Wakidatsi	Village	Lagoon Cove, East Cracroft Island	Galois 1994:185	326
XudzEdza'?lis	Fortified Village	Robbers Nob, Port Neville, halfway up northern shore	Galois 1994:176,255	319
Zumbakiyu	Fishing Station	Cracroft Island, Cracroft Lagoon, including an area drained by two small streams flowing into the lagoon	Galois 1994:186	327
adap!a	Village	Turnour Island	Galois 1994:206,220	329
dzExwi'la	Fishing (coho salmon)	At creek to east of Cracroft Bay, Cracroft Island	Boas 1934 (14:127)	14:127
jog'x de ms	House	On east end of Turnour Island, across channel from Village Island	Boas 1934 (14:90)	14:90
a'nxwe las	Fishing (humpback salmon)	At small creek on north side of peninsula described in 14:42	Boas 1934 (14:49)	14:49
!akEXXalilku	Settlement	Port Harvey	Galois 1994:173	317
akwithala	Village	Ray Point, Call Inlet	Galois 1994:176	322
nE wa	Salmon Trap	At head of Bouhey Bay	Boas 1934 (15101)	195
Egwa'de	Resource Gathering (salal berries)	On tip of peninsula, south side of Gilford Island, across Knight Inlet from passage between Turnour and Village Islands	Boas 1934 (14:42)	14:42
!a'beE	Settlement	Unnamed island west of Klaoitis Point	Galois 1994:218	338
!o'qwadilbe	Shelter	At point on east end, south side of Turnour Island	Boas 1934 (1483)	14:83
!ox be	Shelter	On south tip of East Cracroft Islands	Boas 1934 (15147)	15:147
!we'qwa laLa's	Cache (cedar bark)	At point of land at fork of Knight inlet and Clapp Passage	Boas 1934 (15:54)	1554
a'mlElas	Village/Origin Site	Forward Bay, Cracroft Island	Galois 1994:167	309
ha'susto	Village	Minstrel Island	Galois 1994213	335

APPENDIX III

NTS : 092L/09

Name	Type	Location/Description	Reference	Location No.
unknown	Village	Bones Bay, Cracroft Harbour	Galois 1994:217	336
wase'las	Resource Gathering (herring spawn)	On shore to north of peninsula described in 14:42	Boas 1934 (14:53)	14:53

NTS : 092L/10

Name	Type	Location/Description	Reference	Location Nc
Aglakumnala	Village/Graveyard	Island off east end of Harbledown Island	Galois 1994:182	330
Aklikwis	Resource Gathering	False Cove, Gilford Island	Galois 1994:116	
Amdigalis	Village	Bonwick Island	Galois 1994:116	
Dakiulis	House	Islet Point, Gilford Island	Galois 1994:117	268
Dsunugwadi	Village	Bonwick Island	Galois 1994:117	270
Gwayasdums	Village	Gilford island	Galois 1994:102; Rohner and Rohner 1970:4	250
Gwumbak	Village	Port Elizabeth, Gilford Island	Galois 1994: 162	278
Hohopa	Village	Confusion over location, but probably Baker Island	Galois 1994: 103	249
Kayala	Burial Ground	Sail Island, Retreat Passage	Galois 1994:119	271
Kukglaka	Resource Gathering	Crease Island	Galois 1994:165	306
Kuthgakla	Resource Gathering	Freshwater Bay, Swanson Island	Galois 1994:165	305
Kwakwakas	Village (midden)	Health Bay, Gilford Island	Galois 1994:120	276
Kwokayes	Village	Health Bay, Gilford Island	Galois 1994:121	274
Kwumbax	Village	Port Elizabeth, Gilford Island	Galois 1994:121	270
Le'q!as	Canoe Building	In first bay west from eastern tip on north side of Harbledown Island	Boas 1934 (11:59)	11:59
Ma-me-li-li-a-ka Kwik-so-tino	Village	Mem-koom-lish (Village Island) near entrance to Knight Inlet	Dawson 1888:3	
Madzaku	Village	Health Lagoon, Gilford Island	Galois 1994:122	275
Memkoomlish	Village	Village Island	Galois 1994:100; Rohner and Rohner 1970:4	325
Memkoomlish	Village	Village Island	Galois 1994:123	277
New Vancouver	Village	New Vancouver, Harbledown Island	Rohner and Rohner 1970:4	

APPENDIX III

NTS : 092L/10

Name	Type	Location/Description	Reference	Location Nc
Nuhdana	Village/Fishing/Resource Gathering	Compton Island	Galois 1994:166,212	307
Tsaite	Village	Mound Island, Indian Channel	Galois 1994:219	298
Tsedi	Hunting/Resource Gathering	Mound Island, Indian Channel	Galois 1994:152	298
Tside	Resource Gathering (clams)	Mound Island, Indian Channel	Galois 1994:168	298
Tzatsisnukomi	Settlement	Harbledown Island	Galois 1994:146	297
Umdigalis	Resource Gathering	Sail Island, Retreat Passage	Galois 1994:124	272
Xuse'la	Fort	Gilford Island	Galois 1994:125	273
Yukusam	Village	Hanson Island	Galois 1994:186	331
Zakpusdisita	Village	Harbledown Island	Galois 1994: 186	332
dEga'ts!eEs L! esElahiEla	Burial (graves)	Kamano Island	Galois 1994:182	
dza'wadExste	Fishing (eulachon)	On large island on south side of Spring Passage (on north side of island)	Boas 1934 (11:25)	11:25
dze'gade	Resource Gathering (clams)	On south side of eastern peninsula of Baker Island	Boas 1934 (14:1)	14:1
dze'gade	Resource Gathering (clams)	On western tip of island on north side of Spring Passage	Boas 1934 (11:39)	11:39
go'x de ms	House	On western tip of Turnour Island	Boas 1934 (11:62)	11:62
goxdEEms	Village	Turnour Island, Canoe Passage	Galois 1994: 162	189
k!wa'dzade	Resource Gathering (mussels)	On point of land just east of 14:1	Boas 1934 (14:2)	14:2
ma'xmExas	"Place of eating killer whales"	On north side, west end of Village Island	Boas 1934 (14:65)	14:65
nEgwa'de	Resource Gathering (salal berries)	On south side of Cracroft Island, eastern end directly across Johnstone Inlet from mouth of Tsitika River	Boas 1934 (11:7)	11:7
q!oqwade	Shelter	On southern tip of island northeast of Swanson Island	Boas 1934 (11:31)	11:31
qaqape'xEla	Village	Near Dinner Point, Village	Galois 1994: 167	304
sa'wagaxtEwe	Village	Innis Island	Galois 1994:124	170
ts!ena'ts!	Resource Gathering (elderberries)	On southwest corner of Village Island	Boas 1934 (11:64)	11:64
wa' mas	Fishing (salmon)	In bay on north side of island (mainland?) on north side of Spring Passage	Boas 1934 (11:69)	11:69

Tuesday, June 1, 1999

APPENDIX III

NTS : 092L/13

Name	Type	Location/Description
Tsle'gwade	Settlement	Pine Island
unknown	Village	Trivett Island, Penphrase Passage

NTS : 092L/14

Name	Type	Location/Description
Awutse	Houses/Fishing Station	Shelter Bay
Blunden Harbour	Village	Blunden Harbour
Kwetahkis	Fishing (salmon station)/House	Whelakis Lagoon
Makootsawakis	Potato Grounds	Blunden Harbour, on peninsula on east side of harbour
Mapakum	Fishing (halibut station)/Houses	Deserters Island
Paas	Village	Blunden Harbour
Sinku	Fishing/ Gathering	Kenneth Bay, Wells Passage
Ugina	Fishing Village	Wishart Island, Deserters Group
gebeE	Halibut Fishing Village	Staples Island, Walker Group
ma'lis	Salmon Trap	At a small island at tip of land south of Stuart Point
a'be s malis	Salmon Trap	Between mainland and a small island at south end of Richards Channel
t'amxsem	Village	Collinson Bay, Drury Inlet
unknown	Fish Trap	North end of Drury Inlet
unknown	Fish Trap	Shelter Bay
unknown	Source of black soil for paint	Drury Inlet
wa'yade	Herring Spawning Site	In bay to east of Stuart Point on north side of Queen Charlotte Sound

NTS : 092L/15

Name	Type	Location/Description
Awakglalaa	Village	Moore Bay, Kingcome Inlet

NTS : 092L/15

Name	Type	Location/Description	Reference	Location No
Fly Island	Reserve	Fly Island, Benjamin Group, Fife Sound	Galois 1994:117	266
Gwadze	Village	Mackenzie Sound	Galois 1994:143	296
Hikums	Settlement	South shore of Watson Island	Galois 1994: 102	023
Hopetown	Village	Hopetown, Watson Island	Rohner and Rohner 1970:4	023
Kadis	Fishing/Houses	Dickson Island, Wells Passage	Galois 1994: 104	235
Kawages	Village	Simoom Sound	Galois 1994:119	263
Keogh	Fishing Station (salmon)	Mackenzie Sound	Galois 1994: 104	236
Kilwadi	Resource Gathering (unspecified)	Cartwright Bay [?] N. Broughton Island	Galois 1994:104	237
Kukwapa	Village	Insect Island, Fife Sound	Galois 1994:120/128	267
Kunstamish	Fishing Camp	Claydon Bay, Grappler Sound	Galois 1994:104	155
Kuthlo	Fishing/Hunting/House	Frederick Sound	Galois 1994:341	408
Kwita	Village	Denham island, Burdwood Islands	Galois 1994:121	262
Kyukaigwisnuk	Hunting/ Resource Gathering Camp	Deep Harbour, Broughton Island	Galois 1994:111	251
L!E'nyade	Black Bear	On north side, east end of Sutlej Channel	Boas 1934 (10:12)	10:12
Lawanth	Salmon Traps/ Fishing Site	Embley Lagoon	Galois 1994:105	238
Lixes	Village	Burdwood Group Islands	Galois 1994:122	
Magwekstala	Resource Gathering (unspecified)	Burley Bay, Mackenzie Sound	Galois 1994:105	239
Philip Point	Village	'we visited a small Indian village situated on a rocky islet' -7miles north of Philip Point.	Lamb 1984637	
Quay	Fishing/Hunting Station	Nimmo Bay, Mackenzie Sound	Galois 1994:106	242
Willis	Resource Gathering (unspecified)	Wehlis Bay, Wells Passage	Galois 1994: 106	244
Zawntl	Houses	Nepah Lagoon	Galois 1994:107	246
amda'de	Resource Gathering (sea eggs)	East side of peninsula on the north side of Broughton Island	Boas 1934 (10:66)	10:66
dE'nyade	Resource Gathering (cedar bark)	At head of small bay on south side of Broughton Island	Boas 1934 (10:92)	10:92
dze'gade	Resource Gathering (clams)	On second largest island south (and east) of Broughton in Fife Sound	Boas 1934 (10:174)	10:174

APPENDIX III

NTS : 092L/15

Name	Type	Location/Description	Reference	.ocation No
k!wa'dzade	Resource Gathering (mussels)	On east side of of second largest island south (and east) of Broughton in Fife Sound	Boas 1934 (10:173)	!0:173
la'yade	Resource Gathering (mussels)	At head of long bay on north side, west end of Broughton Island	Boas 1934 (10:72)	!0:72
nEgwa'de	Resource Gathering (salal berries)	On a small island in Fife Sound	Boas 1934 (10:131)	!0:131
o le'gade	Hunting? (wolves)	Wolves on east side of island to north of west end of Broughton Island	Boas 1934 (10:78)	!0:78
o legade	Wolves	On large island which forms east side of Grappler Sound	Boas 1934 (7:116)	':116
pa'lk'a	Village	Nimmo Bay, Mackenzie Sound	Galois 1994:105	!40
q!o'q!wa	Shelter	On north side of eastern peninsula of Baker Island	Boas 1934 (14:5)	!4:5
q!o'q!wa	Shelter	On north side of second largest island south (and east) of Broughton in Fife Sound	Boas 1934 (10:175)	!0:175
q!o'qwade	Shelter	4t top of large sheltered bay on south side of Broughton Island	Boas 1934 (10:94)	!0:94
q!o'qwade	Shelter	On southern tip of second largest island south (and east) of Broughton in Fife Sound	Boas 1934 (10:135)	!0:135
q!o'qwadilbe	Shelter	On southernmost point of Broughton Island	Boas 1934 (10:93)	!0:93
q!o'qwadilbe	Shelter	On western most tip of largest island south of Broughton Island (in Fife Sound)	Boas 1934 (10:109)	!0:109
q!o'qwado yEwe	Shelter	On a small island in Fife Sound	Boas 1934 (10:128)	!0:128
q!unyade	Resource Gathering (lupine roots)	On a tiny island in Fife Sound	Boas 1934 (10:101)	!0:101
q!wa la'de	Resource Gathering (salmonberry shoots)	On east tip of peninsula in Sutlej Channel's eastern end (north side after Kingcome Inlet)	Boas 1934 (10:183)	!0:183
q!we'qwa laLa's	Cache (cedar bark for bedding in cradles)	On east end of small island to north of Baker Island across Fife Sound	Boas 1934 (14:7)	!4:7
q!we'qwa laLa's	Cache (cedar bark)	On south side of the large peninsula at the east end of Broughton Island	Boas 1934 (10:176)	!0:176
q'ati's	Village	3uckingham Island, Grappler Sound	Galois 1994:105	141
thiakacolis	Village	Drury Inlet. opposite Collinson Bay	Galois 1994:107	
ts!Eewu'nxas	Village	Greenway Sound, Broughton Island	Galois 1994:106	!43
tsa'gade	Resource Gathering (fern roots)	On north side of largest island south of Broughton Island (in Fife Sound)	Boas 1934 (10:106)	!0:106
unknown	Village	Drury Inlet	Galois 1994:107	
wa'yade	Resource Gathering (herring spawning ground)	To northeast of point where Drury and Wells Inlets (Grappler Sound) meet	Boas 1934 (7:66)	':66

NTS : 092L/15

Name	Type	Location/Description	Reference	Location No.
xu'dzexsteE	Fort	Drury Inlet	Galois 1994:107	245

NTS : 092L/16

Name	Type	Location/Description	Reference	Location No
A'wagawe'	Origin Site	Mouth of Holden Creek	Galois 1994:131	284
Bat!ki	Village	Belle Isle Sound	Galois 1994: 127	280
Gilford Island	Resource Gathering (marine life)/Village	At base of mountain	Rohner and Rohner 1970:4,88	
Giltais	Resource Gathering	Viner Sound, or Tribune Channel	Galois 1994:117	259
Hata	Fishing Station	Bond Sound	Galois 1994:163	184
Hata	Village	Bond Sound	Galois 1994:118	184
Kingcome Inlet	Village	Kingcome Inlet	Rohner and Rohner 1970:4	
Kingcome River	Fishing (eulachon)	Kingcome River	Rohner and Rohner 1970:28	027
Kwakwalawadi	Village	Echo Bay, Gilford Island	Galois 1994:120	261
Kwatsi	Village	Kwatsi Bay, Tribune Channel	Galois 1994: 121	256
Lalwai	Village	Charles Creek, Kingcome Inlet	Galois 1994: 129	180
Metap	Village	Viner Sound, Gilford Island	Galois 1994:123	258
Okwunalis	Village	Kingcome River	Galois 1994: 129	282
Tikia	Fishing Camp	Scott Cove, Gilford Island	Galois 1994: 124	260
Wakhanaq	Village	Wahkana Bay, Gilford Island	Galois 1994: 124	257
Waluk	Village	Anchorage Cove, Kingcome *Inlet*	Galois 1994:130	281
Waselas	Resource Gathering/House	Wakeman Sound	Galois 1994:130	181
dEk!Es	Burial (grave)	On west bank at mouth of Kingcome River	Boas 1934 (13:51)	13:51
deqweL!a	? Stakes driven in on rock	At bend in Kingcome River, southern end of obvious meander just north of head of the Inlet	Boas 1934 (13:47)	13:47
dzE lalo ye we	Cache (redcedar bark)	On tiny lake, north side of Gilford Island, at head of river located at head of deep inlet at west end of Tribune Channel	Boas 1934 (1421)	14:21
gag'l !aa's	Hunting (grizzly bear)	Up small tributary of eastern fork of Kingcome River (north side)	Boas 1934 (13:31)	13:31

Tuesday, June 1, 1999

APPENDIX III

NTS : 092L/16

Name	Type	Location/Description
gego'k!wade	I/Shelter (hunter's shed)	Up eastern fork of Kingcome River, on west side away from river
go'xdE mis	House	On beach at head of Thompson Sound
gogo yEwe	House	On Kingcome River, west side, north of major tributary at a bend to the e (when travelling north)
ha'msdEmis	Resource Gathering (berry picking)	On beach (map shows the site far from any water to east of head of Kingcome Inlet)
ha'myade	Resource Gathering (berry picking)	On north shore of Kingcome Inlet (referenced between Belle Island Soun and major river to the Belle Island Sound's east on south shore)
lEqwe	Camping Ground	At mouth of creek on north shore of Kingcome Inlet opposite the entrance to Belle Island Sound
lEqwe'	Camp	At small bay on north side of mouth of Thompson Sound
lalaq	Settlement (settlement of first people in oral history)	Up Kingcome River
q!o'qwadilbe	Shelter	At point at northeast corner of Gilford Island
q!wa la'de	Resource Gathering (salmonberry shoots)	On south side of Tribune Channel (near its west end), north side of Gilfor Island
q!walEmdzade	Resource Gathering (salmonberry)	South side of creek from 13:31
q!we'qwa laLa's	Cache (cedar bark used in bedding of cradles)	Just east of Belle Island Sound on south shore of Kingcome Inlet
q!we'qwa laLa's	Cache (cedar bark used in bedding of cradles)	On north shore of Kingcome Inlet, at first point of land southwest from he of Inlet
q!we'qwa laLa's	Cache (cedar bark)	Cache On east side of Kingcome inlet just south of the inlet's fork
q'a'ltalik	Village	Kingcome River about 2.5 miles up river
sa'gwade	Resource Gathering (fern roots)	
t!e't!eEki lak	Resource Gathering (clover garden)	At mouth of tributary which flows into the major tributary of Kingcome Inle east of Belle Island Sound
tEwe'nas	iunting (mountain goat)	On east side of north arm of Kingcome Inlet, north of creek half way between the head of the north arm and the Inlet's fork
tEwe'nas	iunting (mountain goat)	Towards west end of Kingcome Inlet, north shore (impossible to referenc on the map)
wase las	Fishing (herring)	Just north of fork in Kingcome River (west fork
wato	(Village	Head of Thompson Sound

NTS : 092L/16

Name	Type	Location/Description	Reference	Location No.
xEx dEma'	Place for gathering cooking stones	On east shore at head of Kingcome Inlet	Boas 1934 (13:59)	13:59

NTS : 092M/01

Name	Type	Location/Description	Reference	Location No.
Kwae	Village	Kingcome River	Galois 1994:129	
gogyEwe	House Site	Kingcome River	Galois 1994:127	285

NTS : 092M/02

Name	Type	Location/Description	Reference	Location No.
Dugdamyse	Burial Ground	Wakeman Sound (on I.R.2)	Galois 1994:111	252
Kukupa	Unknown	Wakeman Sound, western shore	Galois 1994:111	
Kyidagwis	Fishing	Frederick Creek, Wakeman Sound	Galois 1994: 111	158
Okwialis	Village	Wakeman Sound	Galois 1994:112	253
Owhwistooawan	Hunting Station/House	Eclipse Narrows, Frederick Sound	Galois 1994:343	175
Pelloothlkai	Fishing (salmon station)/House	Belize Inlet	Galois 1994:343	403
Penecee	Fishing (salmon station)/House	Wigwam Bay	Galois 1994:344	406
Taaltz	Village	Salmon Arm, Seymour Inlet, at the mouth of a creek	Galois 1994:344	407
Wauump	Fishing (salmon station)/House	Alison Sound	Galois 1994:346	404
Wawwalth	Fishing (eulachon)/Houses/Burial Ground	Seymour Inlet, and Wawwatl Creek	Galois 1994:346	405
go'x dE ma	House	On rock where southern arm of Seymour Inlet narrows (its head)	Boas 1934 (10:212)	10:212
q!o'qwadilbe	Shelter	On east side of peninsula at fork of Seymour Inlet's northern and southern arms	Boas 1934 (10:214)	10:214
tEwe'nas	Hunting (mountain goat)	On east side of northen arm of Seymour Inlet near head	Boas 1934 (10:222)	10:222
tEwi'xe	Hunting (mountain goat)	Along west shore of southern arm at east end of Seymour Inlet	Boas 1934 (7:39)	7:39
tEwi'xe	Hunting (mountain goat)	Near head of Seymour Inlet on east side	Boas 1934 (7:33)	7:33

APPENDIX III

NTS : 092M/02

Name	Type	Location/Description	Reference	Location No.
tEwi'xe	Hunting (mountain goat)	On southern arm of Seymour Inlet, south shore just as the southern arm forks	Boas 1934 (10:209)	10:209
ts!o'yade	Resource Gathering (root digging)	At river mouth at head of Belize Inlet [north side)	Boas 1934 (7:11)	7:11

NTS : 092M/03

Name	Type	Location/Description	Reference	Location No
Akanoyi	House/Fishing (salmon /station)	Warner Bay, Seymour Inlet	Galois 1994:339	394
Kaitookwiss	Fishing (salmon station)/House	Alison Sound	Galois 1994:340	400
Kequesta	Origin Site or Village	Nugent Sound	Galois 1994:340	396
Khatapsee	Fishing (salmon)/House	Nugent Sound	Galois 1994:341	395
Kokwiiss	Fishing (salmon station)/House	Alison Sound	Galois 1994:341	401
Mookstooawan	Fishing (salmon roe station)	Alison Sound	Galois 1994:343	402
Nekite	Fishing (salmon)	Nekite River, Smith inlet	Galois 1994:331	393
Toksee	Site in Story with Known Uses, including Houses and Gardens	Wyclees Lagoon	Galois 1994:331	390
Tsaikwie	Fishing (salmon station)/Houses	Village Bay, Mereworth Sound	Galois 1994:345	398
dixwilas	Settlement	Mereworth Sound	Galois 1994:340	397
tEgwa'de	Hunting (deer)	Near small lake, south side of Seymour Inlet, to west of obvious bay/river	Boas 1934 (7:48)	7:48
wa'Elats!E	Settlement	North side of Strachen Bay	Galois 1994346	399

NTS : 092M/04

Name	Type	Location/Description	Reference	Location No.
Dedagus	Burial Ground	Seymour Inlet, probably on an island	Galois 1994:340	420
Fishing Salis t a t i o n		Indian Cove	Galois 1994:330	389

NTS : 092M/04

Name	Type	Location/Description	Reference	Location No.
Saagoombahlah	Fishing/Village	Schooner Passage, Seymour Inlet	Galois 1994:344	418
Tauack	Fishing Station	Storm Islands, Queen Charlotte Sound	Galois 1994:345	415
XusE'la	Fort	Skull Cove, Branham Island	Galois 1994:346	416
ba'ku las	Fishing (halibut)	On tip of mainland north and west of Branham Island	Boas 1934 (18:42)	18:42
dEgi'lbala	Burial (grave)	On westernmost island north west of Branham Island	Boas 1934 (18:45)	18:45
de'xwe las	Resource Gathering (yellow cedar)	On west bank of Alison Sound just north of where it meets Belize Inlet	Boas 1934 (18:71)	18:71
goxudEmdzoEye weE	House	Branham Island	Galois 1994:340	417
la'xlaqwis	Fishing	Upper 2 miles of Wannock River (to Owikeno Lake)	Olson 1954:214	074
q!o'gwade	Shelter	Strait north of west end of Branham Island, on mainland	Boas 1934 (18:44)	18:44
qElqExade	Resource Gathering (fish eggs)	On tiny islet to south west of Branham Island	Boas 1934 (18:51)	18:51
xwa'sto?l	Village	Fox Islands, Slingsby Channel	Galois 1994:346	419

NTS : 092M/05

Name	Type	Location/Description	Reference	Location No
Ann Island	Village/Houses	Smith Sound	Galois 1994329	386
Calvert Island	Fishing Camps	On southern tip of Calvert Island	Stevenson 1980:10; Olson 1954:215	
Gla'glaxeth	Camp	Head of Goose Bay	Olson 1954:215	082
Goose Bay	Fishing Stations	Head of Goose Bay	Stevenson 1980:10	082
Hahabis	Fishing Camp	Wilson Bay on Ripon Island	Stevenson 1980:133	
Kigeh	Village	Indian Island. Smith Sound	Galois 1994:329	060
Mehaitl	Hunting/Fishing/Resource Gathering/Houses	Ethel Cove, Margaret Bay	Galois 1994:330	388
Ninaca	Fish Camp	Penrose Island	Stevenson 1980:134	
Penrose Inlet	Fishing Camps	Mouth of Penrose Inlet	Stevenson 1980:11	
Rivers Inlet	Fishing (herring gathering)	At mouth of Rivers Inlet	Olson 1954:213	073
Takush Harbour	Winter Village	"Halfway up the channel a village of the natives was discovered...built on a detached rock, connected to the mainland by a platform"	Lamb 1984:654	060

Tuesday, June 1, 1999

APPENDIX III

NTS : 092M/05

Name	Type	Location/Description
Yilktama	Fishing (halibut station)	Table Island, Smith Sound
gaEya'xsteE	Origin Site/Settlement	Table Island

NTS : 092M/06

Name	Type	Location/Description
Halowis	Fishing (salmon station)/Houses	Smoke House Creek, Long Lake
Tseetsumsawlasil ah	Houses	Naysash Inlet
VQuascilla Bay, Sr	Fortified Villagen	I e t
uAhclakerho Chan principal village	Village	Ahclakerho Channel, village in a side channel to west of Wyclese, the

NTS : 092M/10

Name	Type	Location/Description
Asxwilam	Village	Mouth of Ashlulum Cr.
Chinici	Site where mythical figure Ha'ntlikwinas lived	Where Genesse Creek meets Walkus Lake
Ci nisi	Village	Genesse Creek which flows into Owikeno Lake near First Narrows.
Ketit	Village	Foot of Owikeno Lake
Nu xvanc	Village	Neechanr river valley near First Narrows in Owikeno Lake, mouth of the river.
Nu'xants	Village	Mouth of Neechanz River
Owikeno Lake	Trapping	Ciu, Asxvlem, Suemxulh, Cinisi, Ovapx, Dalik, Dooz Falls
Su loxxumlidax	Village	"on Owikeno Lake near the head of Su loxxumlidax lived a man"
Su'mxuh	Village	Mouth of Shemmahaut River

NTS : 092M/11

Name	Type	Location/Description	Reference	Location No.
Ca gvala	Village	Chuckwalla River north and west of the Owikeno Lake drainage system.	Hilton et al. 1982:128	
Caxcagalis	Village	A site near Wui gis	Hilton et al. 198283	
Gil'dalah	Village	2 miles above mouth of Kibella River	Olson 1954:214	080
Kilbella Bay	Village	"And then he travelled onto the village of..."	Olson 1940:187	067
Kilbella River	Village	At mouth of Kilbella River	Stevenson 1980:10	080
SE'mxot.!	Village	"The ancestors of the Se"mxolidx lived at the head of Rivers Inlet at SE'mxot.!	Boas 1910:385	
ke'tyt	Houses (12)	Grassy islet, 12 houses 200 yards from foot of Owikeno Lake (destroyrd by fire in 1935)	Olson 1954:214	075
kitit	village	Island in the Wannock River.	Hilton et al. 198244	090
kvamua	Village	Mouth of Wannock River, on the north shore.	Hilton et al. 198243	088
unknown	Houses (6)	North bank of Wannock River, 2.5 miles from mouth of River	Olson 1954:214	075
wui gis	Village	Large gravel beach on lakeshore where Owikeno Lake flows into Wannock River.	Hilton et al. 198243	089

NTS : 092M/12

Name	Type	Location/Description	Reference	Location No
Addenbroke Point	Fishing Camps	Addenbrooke Point	Stevenson 1980:11	085
Fish Egg Inlet	Fishing	Fish Egg Inlet, Weekenoch region	Pomeroy 1980:188	054
Fish Egg Inlet	Fishing Stations	Mouth of Fish Egg Inlet	Stevenson 1980:11	
Gabilis	Fishing Camp	Penrose island	Stevenson 1980:132	
Hayuqva	Fishing Camp	Mouth of Illahie Inlet on an island	Stevenson 1980:133	087
Oatsoalis Creek	Fishing	Oatsoalis Creek, Safety Cove, Weekenoch region	Pomeroy 1980:188	053
Safety Cove	Village/Fishing Camp	Calvert Island	Olson 1955:320	019
Talgvis	Village	Northwest shore of Calvert Island.	Hilton et al. 1982:130	
Walbran Island	Villages/Fishing Camps	Walbran Island	Stevenson 1980:10	
Xvnis	Spring Water	Addenbrooke Point	Stevenson 1980:134	085

NTS : 092M/13

Name	Type	Location/Description	Reference	Location No.
K!we'y	Village	Modern Koey	Olson 1955320	
Kisameet	Village (Bella Bella people)	Kisameet	Pomeroy 1980:34	439,29
Kisameet Bay	Midden		Hester 1978:17	029 (EISx-3)
Koeye River	Fishing	Koeye River, Nulauwidox-Quaynoch region	Pomeroy 1980:187	049
Koeye River	Village	At mouth of Koeye River	Stevenson 1980:10	084
Kwe'h	Village	On Koey River and Lake	Olson 1954:214	
Na'mu	Village	Modern Namu	Olson 1955320	018
Namu	Trail/ Rest Spot	Namu	Stevenson 19808	018
Namu	Village (midden)	Current town sitelmidden site	Hester 1978: 1	028 (EISx-1)
Namu	Village (midden)	Large bay just south of junction of Burke Channel and Fitz High Sound	Borden 1975:28	EISx-1
Nootum River	Fishing	Nootum River, Istitoch region	Pomeroy 1980:186	048
unknown	Village	On Koey Lake and River	Olson 1955320	

NTS : 092M/14

Name	Type	Location/Description	Reference	Location No.
Moses Inlet	Fishing Camps	At head of Moses Inlet	Stevenson 1980:10; Olson 1954c:215	081

NTS : 092M/15

Name	Type	Location/Description	Reference	Location No
'healing water"	Village	Spring near Tzeo River at the head of Owikeno Lake	Hilton et al. 1982:45	079
4si.x	//Village	South end of South Bentinck Arm, at the south end of a bay, west of two small tributaries.	Lepofsky 1985:48	092
Ciu River and South Bentinck Arm	Trail/Village	"a trail connecting Ciu River with South Bentick Arm, halfway along this trail is a camp marked by a overhanging cliff this was a place of feasts"	Stevenson 1980:14	
K apx	Village	South end of South Bentinck Arm, at the south end of a bay, west of two small tributaries.	Lepofsky 1985:48	092
Tsi'u		Mouth of Tzeo River	Olson 1954:214	079
asiixw	Village	end of the inlet	Wilson 1986:4	093

APPENDIX III

NTS : 092M/15

Name	Type	Location/Description	Reference	Location No.
kw apx	Village	South end of Bentick Arm, east side of the creek that flows into the bay.	Wilson 1986:4	092
unknown	Trail	At the head of the rivers inlet following the valley to Owikeno Lake.	Wilson 1986:6	
unknown	Trail/Pictographs	Along the trail to Owikeno Lake near a cliff overhang	Wilson 1986:10	094

NTS : 092N/04

Name	Type	Location/Description	Reference	Location N
Asnaakyi	Village	Franklin River	Galois 1994:149	301
Astahw	Hunting Site with House	West shore, head of Knight inlet	Galois 1994:149	
Tsawatti	Village/Fishing (eulachon)	Mouth of Klinaklini River, Knight Inlet	Galois 1994:150	207
Wakas	Village	Whakash Creek, Knight Inlet	Galois 1994:152	303
Wasilas	Village	Slim Creek, Knight Inlet	Galois 1994:153	302
go'go yEwe	House	On west bank of river flowing into head of Knight Inlet from East	Boas 1934 (1625)	16:25
gu'myade	"Having ochre"	On third largest island (northernmost of three largest ones) at head of Kinght Inlet	Boas 1934 (16:24)	16:24
ha'ymyade	Resource Gathering (berries)	On west bank of Klinaklini River, at a small creek	Boas 1934 (16:8)	16:8
o'sagumlis gEg'ok wal	Hunter's Shed	At the mouth of a small river directly north of the head of Knight Inlet	Boas 1934 (163)	16:3
unknown	Fish Traps (eulachon)	Head of Knight Inlet	Boas 1966:24-28	207
unknown	Fishing (eulachon)/Resource Gathering (berries/ Garden Beds	At head of Knight Inlet and into surrounding mountains	Boas 1934 (22)	207
unknown	Spiritual Site/ Eulachon Fishing Site	Waterfall in Knight Inlet	Boas 1966156	
xegwa's	Stone Gathering	Along west side of head of Knight Inlet	Boas 1934 (1634)	16:34
xex de ma	Stone Gathering (for cooking)	At head of Knight Inlet, west side	Boas 1934 (16:30)	16:30
xusE'la	Fort	Franklin River	Galois 1994:153	299
xweExaweE	Fort	Klinaklini River	Galois 1994: 153	100

Tuesday, June 1, 1999

APPENDIX III

NTS : 093C/05

Name	Type	Location/Description
SlaaxL	Village	North side of Atnarko River just west of Janet Creek
Snu la L	Village	North side of Atnarko River just west of Janet Creek

NTS : 093D/02

Name	Type	Location/Description
Kxdis	Village	South side of Noeick River, as it merges with South Bentinck Arm.
Nuik	Village	South end of South Bentinck Arm, east side below south of Noeick River and north of long narrow inlet.
Qnklst	Village	East side of South Bentinck Arm as to flows south from North Bentinck Arr south of Qnklst
Ta'lu	House	Head of South Bentinck Arm
Talyu	Village	South end of South Bentinck Arm, east side below south of Noeick Riverr and north of long narrow inlet.
TsoaLtmem	Village	East side of South Bentinck Arm as to flows south from North Bentinck Arr
Wanuku	Village	"Big village on each side of the Wanuku right below the rapids"
unknown	Village (fortified with stockade of cedar trunks)	At the head of South Bentinck Arm

NTS : 093D/03

Name	Type	Location/Description
AnuLxu.mx mi	J/Village	North side of Kwatna River, north end of a small bay east of the mouth.
AqEt'q	Village	North side of Kwatna River, north end of a small bay east of the mouth.
LixLixkuLank	Village	North side of Kwatna River, north end of a small bay east of the mouth.
Nu"tL1tLiqolEnk	Village	South side of Kwatna River, along the south shore of Burke Channel.
Pakwana	Village	North side of Kwatna River, north end of a small bay east of the mouth.
Sinalk	Village	North side of Kwatna River, the mouth.
Sinuxm	Village	South side of Kwatna River, along the south shore of Burke Channel.
Waxwas	Village	North side of Kwatna River, north end of a small bay east of the mouth.

NTS : 0930104

Name	Type	Location/Description	Reference	Location No
Evans Inlet	Fishing	Evans Inlet, Istitoch region	Pomeroy 1980:186	041
Goat Bushu Creek	Fishing	Goat Bushu Creek, Oyakutoch region	Pomeroy 1980:187	042
Gullchuck River	Fishing	Gullchuck River, Oyakutoch region	Pomeroy 1980:187	
Hooknose	Fishing	Hooknose, Istitoch region	Pomeroy 1980:186	040
Jenny Bay	Fishing	Jenny Bay, Istitoch region	Pomeroy 1980:186	039
Kwa'tos	Village	Stoker Island at mouth of Dean Channel	Olson 1955:321	
Scribers Creek	Fishing	Scribers Creek, Oyakutoch region	Pomeroy 1980:187	043
Uwi'tlitXU	Village	In Gunboat Passage	Olson 1955:321	
Ya'hais	Village	Jenny Inlet	Olson 1955:321	
unknown	Village	Mouth of Dean Inlet	Olson 1955:322	

NTS : 0930105

Name	Type	Location/Description	Reference	Location No.
A'Lko	Village	Elcho on Alice Harbour	Olson 1955321	006
Beaumont Island	Village	"is a larger islet, having between it and the shore a rock on which was an indian village"	Lamb 1984:932	062
Cascade Inlet	Resource Gathering (salmonberry)	Valley west of Cascade Inlet where berries ripen late	Olson 1955322	066
Clatse	Village (Roscoe Island people)	Clatse River	Pomeroy 1980:34	437
Clatse River	Fishing (salmon)	Clatse River	Pomeroy 1980:185	034
Dean Channel	Resource Gathering (cedar logs)	Dean Channel	Mcllwraith 1948:482	
Elcho Harbour	Resource Gathering (wood)	Described in story	Mcllwraith 1948:427	015
Elcho Harbour	Village	"...the opposite shore, that led to his village" -at the head of Elcho Harbour.	Lamb 1970:375	006
Elcho Harbour	Village (Dean Channel people)	Elcho Harbour	Pomeroy 1980:34	006,346
Elcho Harbour Creek	Fishing	Elcho Harbour Creek, istitoch region	Pomeroy 1980:186	037
Frenchman Creek	Fishing	Frenchman Creek	Pomeroy 1980:186	036

NTS : 093D/05

Name	Type	Location/Description	Reference	Location No.
Hoones	Village (Roscoe Island people)	Juncture of Return Channel and Roscoe Inlet.	Pomeroy 1980:34	030
Huni's	Village	Tip of Florence Peninsula	Olson 1955:321	030
Johnson Strait	Village	"at noon the village bore west of us at the distance of about half a mile" - east shore of Johnson Strait before Bullock Channel.	Lamb 1984:940	030
Kwa'xtsu	Village	Head of Roscoe Inlet	Olson 1955:321	
Lee Creek	Fishing (salmon)	Lee Creek, Owitlitoch region	Pomeroy 1980: 185	
Marin River	Fishing	Marin River, Istitoch region	Pomeroy 1980:186	035
Noota	Village (Roscoe Island people	Noota	Pomeroy 1980:34	065
Nu'ta	Village	Head of Roscoe Inlet	Olson 1955:321	065
Roscoe Inlet	Midden	Roscoe Inlet	Hester 1978:17	030 (FbSx-6
Walker Lake Creek	Fishing	Walker Lake Creek, Oyakutoch region	Pomeroy 1980:187	047

NTS : 093D/06

Name	Type	Location/Description	Reference	Location No.
A liq	Village	North side of Dean Channel, east of Cascade Inlet, in a mall bay.	Lepofsky 1985:49	105
Cape McKay	Village	"They strongly solicited us to visit their houses"	Lamb 1984	66
Cascade Inlet	"House of man who was a Raven"	Head of Cascade Inlet	Olson 1955322	
Cascade Inlet	Village	"We were visisted by about 40 male inhabitants...equal that number remained in their houses"	Lamb 1984:930	
Elcho Harbour	Village	"We were in mid channel, I perceived some sheds" -eastern side of the entrance to Elcho Harbour.	Lamb 1970:376	
Eucott Bay	Fishing	Eucott Bay, Istitoch region	Pomeroy 1980: 186	:
Jacobson's Bay	camp	Jacobson's Bay	Mcllwraith 1948:366	
SiLtmtimut	Village	East side of Labouchere Channel, on a small point.	Lepofsky 1985:49	6
Um n um	Village	East side of Dean Channel, as it flows towards Skowquilz River.	Lepofsky 1985:49	104
Virgin Rocks g	Hunting (sea lion) o	c k s	Mcllwraith 1948:360	14

NTS : 093D/07

Name	Type	Location/Description	Reference	Location No
A q'laxL	Village	North side of Bella Coola, east of Necleetsconnay River, as Bella Coola River flows southward.	Lepofsky 1985:45	123
Aima'ts	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.	Lepofsky 1985:46	121
Alq1axL	village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.	Lepofsky 1985:47	121
Anucquc	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.	Lepofsky 198546	121
Assa.qta	Village	North side of Bella Coola, east of Necleetsconnay River, as Bella Coola River flows southward	Lepofsky 1985:46	122
Bella Coola	Village	Bella Coola	McIlwraith 1994:vol. I/map	005a
Bella Coola	Village/Trail	"...along a road through a wood for some hundred yards when we came to a village" -near the mouth of the Bella Coola.	Lamb 1970:372	005(trail)/00
Bella Coola River	Village	"There was another habitation of some sort" -at mouth of Bella Coola.	Lamb 1984:936	059
Clkt	Village	North side of Bella Coola, eastward, mid way between Thorsen Creek and the first tributary east of it.	Lepofsky 1985:45	130
Cumu.L	Village	Just east of Snu?unik lxs	Lepofsky 1985:45	129
Klisheooalletoch	Village	East of A q'l axL	Lepofsky 1985:45	124
Nu?l.xmaq s	Village	North side of Bella Coola, eastward, mid way between Thorsen Creek and the first tributary east of it.	Lepofsky 198545	130
Nukic	Village	South side of Bella Coola River, eastward, just before the second tributary after Thorsen Creek	Lepofsky 198544	134
Numamis	Village	North side of North Bentinck Arm, before Necleetsconnay River.	Lepofsky 198547	121
Nuqa'xmac	Village	North side of Bella Coola, eastward, opposite the first tributary past Thorsen Creek	Lepofsky 1985:45	131
NusmaLLayx	Village	North side of Bella Coola, east of Necleetsconnay River, as Bella Coola River flows southward	Lepofsky 1985:46	123
Nusxiq	Village	Mouth of Noosesack River, east side	Lepofsky 1985:47	120
OsmaxikeLp	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.	Lepofsky 1985:46	122
Qameix	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.	Lepofsky 1985:47	121
Qbutz	Village	North side of Bella Coola just opposite Thorsen Creek	Lepofsky 198545	125
Qoalna	Village	Point of land that parts North Bentinck Arm and South Bentinck Arm	Lepofsky 1985:47	118
Qumquts	Village	East of North Bentinck Arm on the south side of the Bella Coola River	Lepofsky 1985:46	005a
SaLya	Village	Point of land that parts North Bentinck Arm and South Bentinck Arm	Lepofsky 1985:47	119
Salmt	Village	North side of Bella Coola River, eastward just before Salloomt River	Lepofsky 1985:44	136

APPENDIX III

NTS : 093D/07

Name	Type	Location/Description
Saqta	Village	East of North Bentinck Arm. on the east side of the mouth of Necleetsconnay River.
Scki.L	Village	East of North Bentinck Arm on the south side of the Bella Coola River.
Selkuta	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.
Snu?unik Ixs	Village	South side of Bella Coola, eastward, just past Thorsen Creek
Snutli	Village	South side of Bella Coola River, just before the first tributary after Thorsen Creek.
SnxL	Village	Just west of SquaL
SquaL	Village	South side of Bella Coola, on the west site of Thorsen Creek.
T'itsal	Village	East of North Benticnk Arm, on the east side of the mouth of Necleetsconnay River.
T'satL m	Village	East of North Bentinck Arm on the south side of the Bella Coola River,
Talio	Village	Talio
Tlatlekeytoch	Village	North side of Bella Coola River, eastward just before Salloomt River
Tloqo tL	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.
TsaL	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.
Tsxoaxqa'n	Village	West of Uqmik
Txeixtskune	Village	East of North Bentinck Arm, on the east side of the mouth of Necleetsconnay River.
Uqmik	Village	North side of Bella Coola, eastward, opposite the third tributary after Thorsen Creek
Us?usq p	Village	North side of Bella Coola just opposite Thorsen Creek
unknown	Bathing Flats	Tidal flats at head of North Bentinck Arm
unknown	Fishing	On Bella Coola River near Hagensborg
unknown	Fishing (salmon weir)	West side of South Bentinck Arm, near junction with Burke Channel
unknown	Mooring Rocks	Submerged pile of rock at mouth of Bella Coola River where mythical river conductor moored a boat
unknown	Village	Above Canoe Crossing where two creeks enter the Bella Coola River from either side - uninhabited during mid-19th century because of fears of a creature

APPENDIX III

NTS : 093D/08

Name	Type	Location/Description	Reference	Location Nc
As'q'neaLh	Village	North side of Bella Coola River, eastward,. just before the first tributary after Nusatsum River.	Lepofsky 1985:44	141
Assanani	Village	South side of Bella Coola River, eastward, just before the first major bend past Nusatsum River.	Lepofsky 1985:44	138
Burnt Bridge Creek	Village/Fishing Weir	"I arrived at a house, and soon discovered several fires and small huts" - 200 yards above the present mouth of Burnt Bridge Creek	Lamb 1970:360	003
Mount Nuslaxim	Spiritual Significance	Small mountain on south side of Bella Coola River about 3/4 mile from the sea	Mcllwraith 1948:43	
Nooskulst	Village	North side of the Bella Coola River at the mouth of the Noosgulch River	Lamb 1970:364	004
Nu li.x	Village	Bella Coola River, moving east, north side, the south east corner of third tributary after Salloomt River.	Lepofsky 1985:43	303
Numc	Village	South side of Bella Coola River, moving east, just before the third tributary after Salloomt River	Lepofsky 1985:44	142
Nunutwinm	Village	South side of Bella Coola River, eastward, at the first major bend past Nusatsum River	Lepofsky 198544	139
Nusqalst	Village	North side of Bella Coola River, eastward, on the east side of the first tributary aftre Salloomt River	Lepofsky 1985:44	140
Nuxnu.xskani	Village	North side of Bella Coola River, eastward, after the second tributary after the Salloomt River	Lepofsky 1985:44	
Q liyu L	Village	North side of Atnarko River at the juncture with Talchaka River	Lepofsky 198543	316
Stuix	Village	On Whitewater (Atnarko) River just above the junction with the Bella Coola River	Mcllwraith 1948436	)16
Stwix	Village	Mouth of Talchako River	Lepofsky 1985:43	316
anneolekootsi	Village	South side of Bella Coola River, eastward, just before Nusatsum River.	Lepofsky 198544	137
tsi'pa	Underground House	"west side of Thorsen Creek at Stewie"	Lepofsky 198557	
twina.L	Village	South side of Bella Coola River north of the juncture of Atnarko and Talchako Rivers.	Lepofsky 198543	143

NTS : 0930109

Name	Type	Location/Description	Reference	Location No.
Sitkatap Lake	Burial	"We then set forward and came to a pond, on whose bank we found a tomb" -shores of Sitkataoa Lake.	Lamb 1970:359	002
Takia River	Trail	"I proposed to them to conduct us along the road"-this trail was at Takia River and it split, one route followed the Takia and Dean Rivers the other went overland to the south towards the Bella Coola	Lamb 1970:356	001

APPENDIX III

NTS : 093D/11

Name	Type	Location/Description	Reference	Location No
AskLta	Village	North side of Dean River just before a small tributary	Lepofsky 1985:49	
SuXwi'lk	Village	Mouth of Skowquiltz River	Olson 1955:321	
Sx ax ilk	Village	West side of Skowquiltz River, mouth.	Lepofsky 1985:49	103

NTS : 093D/12

Name	Type	Location/Description	Reference	Location No.
Cascade River	Fishing	Cascade River, Istitoch region	Pomeroy 1980:185	033
Kai'net	Village	Mouth of river in Kynoch Inlet	Olson 1955:334	068
Quartcha Bay	Village (Roscoe Island people)	Quartcha Bay	Pomeroy 1980:34	438
unknown	Fishing (salmon)	Ellerslie Inlets and Lake	Pomeroy 1980:185	058
unknown	Village	Ellerslie Lake	Olson 1955:320	

NTS : 093D/14

Name	Type	Location/Description	Reference	Location No.
Nux Ist	Village		Lepofsky 1985:51	095
Sack	Village	West side of mouth of Kimsquit River	Lepofsky 1985:50	102
SotsL	Village	East side of mouth of Kimsquit River	Lepofsky 1985:50	101

NTS : 093D/15

Name	Type	Location/Description	Reference	Location No.
AnutL'l'x	Village	Dean Channel, northern end before Kimsquit Rvier, small bay on the east side, north of Dean River.	Lepofsky 1985:50	097
Axati	Village	Mouth of Dean River, south side.	Lepofsky 1985:50	100
Dean Channel	Village	"A fire was burning on it at one end" -east shore of Dean Channel at the mouth of Dean River.	Lamb 1984:929	061
Ixwcnk	Village	North side of Dean River just before a small tributary	Lepofsky 198550	
Kimsquit	Village	Kimsquit	McIlwraith 1948:vol. I/map	061

APPENDIX III

NTS : 0930115

Name	Type	Location/Description	Reference	Location No.
Nu l	Village	Dean Channel, northern end before Kimsquit Rvier, small bay on the east side, north of Dean River.	Lepofsky 1985:50	197
Nucq alst	Village	Mouth of Dean River, south side	Lepofsky 1985:50	399
Nusqapts	Village	South side of Dean River just before a small tributary	Lepofsky 1985:50	
Siwalos	Village	North side of Dean River just before a small tributary	Lepofsky 1985:50	
TxEtlsik	Village	Opposite the Manitou Cannery Site, below Kimsquit	Mcllwraith 1948:265	
Txa sik	Village	Dean Channel, northern end before Kimsquit Rvier, small bay on the east side, north of Dean River.	Lepofsky 1985:50	196
U tsea	Village	Tip of land that points out on the eastern side of Dean Channel when it merges with Dean River	Lepofsky 1985:50	)98
Us usq p	Village	Dean Channel, northern end before Kimsquit Rvier, small bay on the east side, north of Dean River.	Lepofsky 1985:50	197
tsi'pa	Underground House	"at Kimsquit"	Lepofsky 1985:57	

NTS : 102P/09

Name	Type	Location/Description	Reference	Location No.
Aqtha ai	Village	Hakai Passage, north end of Calvert Island	Hilton et al. 1982:134	
Lu'xpalis	Village	Boulder Point-at head of Kwakshua Inlet on Calvert Island	Olson 1955:320	

NTS : 102P/16

Name	Type	Location/Description	Reference	Location No.
A'k!lequs	Village	In Evans Arm	Olson 1955321	
A'lstam	Village	On Duck Island	Olson 1955:321	
Bukwiya'h	Village	Hunter Channel	Olson 1955:321	
Goose Island	Hunting/Resource Gathering	Goose Island	Simonsen 1994:14	
Gull Inlet	Village (midden)/Petroglyph/Non-native cemetery	Gull Inlet on Hunter Island where ancestors of Eagle Sept lived	Olson 1955:332	
K!lakili's	Village	On Nalau Channel, southern tip of Hunter island	Olson 1955:320	
Kildidt Lagoon	Fishing	Kildidt Lagoon, Nulauwidox-Quaynoch region	Pomeroy 1980: 187	051

Tuesday, June 1, 1999

APPENDIX III

NTS : 102P/16

Name	Type	Location/Description
Kiltic Harbour Creek	Fishing	Kiltic Harbour Creek, Nulauwidox-Quaynoch region
Lilu'k	"Dangerous place"	In Hunter Channel
Nu'lu	Village	East end of Ruth Island at southwest point of Hunter Island
Tugna'nux	"Dangerous place"	Superstition Point on Hunter Island
Wa'hk!enalux	Village	Southern tip of Goose Island
Ya'lakli	Island which was whale, where 1st Eagle Sept members lived	Goose Island
Yellertlee	Village (Gale Creek people)	Goose Island
unknown	Village	On Goose Island
unknown	Village	South end of Hunter Channel

NTS : 103A/01

Name	Type	Location/Description
Ankya'k	Village	Grower Point, 1 mile south of BB Cannery
Bar-at-Mouth-of-River	House	"Then he found Bar-at-Mouth of River. There he built a house on the meadow back of the point" - near Bella Bella
Choke Pass	Fishing	Choke Pass, Oyakutoch region
Copper Inlet	Fishing	Copper Inlet streams, Oyakutoch region
Du'xsowis	Village	On Stryker Island, Louise Channel
Fort McLoughlin	Village	"4 miles southeast of the fort, crossed an arm of the sea and portaged between two small islands and entered a by where there was a winter village"
Fort McLoughlin	Village	"On a point about a league from the Fort where Boston and his people had their winter village"
Fort McLoughlin	Village	Fort McLoughlin
Gladtulaspala	Village (Roscoe Island people)	Gladtulaspala
Hau'wiyat	Village	North shore of Hunter Island
Howeet	Village (Bella Bella people)	Howeet

NTS : 103A/01

Name	Type	Location/Description	Reference	Location No
Joassa Channel	Village (Roscoe Island people)	Joassa Channel	Pomeroy 1980:34	425
K!a'ttamk!es	Village	North shore of Hunter Island	Olson 1955321	
K!o'kwi	Village	Modern Koqui northwest comer of Dufferin Island	Olson 1955321	063
Kadjusdis River	Fishing	Kadjusdis River, Oyakutoch region	Pomeroy 1980:187	044
Kajustus	Village (Bella Bella people)	Kajustus	Pomeroy 1980:34	430
Koqui	Village (Gale Creek people)	Koqui	Pomeroy 1980:34	063
Kunsoot	Village (Bella Bella people)	Kunsoot	Pomeroy 1980:34	442,435
McLoughlin Bay Creek	Fishing	McLoughlin Bay Creek, Oyakutoch region	Pomeroy 1980:187	345
Neekus	Village (Gale Creek people)	Neekus	Pomeroy 1980:34	132
Old Bella Bella	Village	McLaughlin Bay, 3 miles south of present (1954) village site	Olson 1955320	317
Ship Point Creek	Fishing	Ship Point Creek, Oyakutoch region	Pomeroy 1980:187	346
T!ilya'su	Village	Near Howeet on north end of Hunter Island	Olson 1955:321	
Tani'l	Village	South of BB Cannery	Olson 1955:322	
Tuxsowi's	Village	Louise Channel west of Campbell Island	Olson 1955321	

NTS : 103A/07

Name	Type	Location/Description	Reference	Location No.
Katsu'L	Village	In bay on Sarah Island across from Separation Point on Swindle Island	Olson 1955:334	

NTS : 103A/08

Name	Type	Location/Description	Reference	Location No.
Briggs Inlet	Fishing (salmon)	Briggs Inlet, Owitlitoch region	Pomeroy 1980:185	057
Green Island	Village (Gale Creek people)	Green Island	Pomeroy 1980:34	426

APPENDIX III

NTS : 103A/08

Name	Type	Location/Description	Reference	Location No.
(Grief Island	Village (Gale Creek people)	Grief Island	Pomeroy 1980:34	428
Ivory Island	Village	Ivory Island	Olson 1955:334	072
K!apa'h	Village	Southern tip of Yeo island, now Kokyet	Olson 1955321	064
Kokyet (Gapa)	Village (Gale Creek people)	Kokyet (Gapa)	Pomeroy 1980:34	429
Kyahti	Village (Gale Creek people)	Kyahti	Pomeroy 1980:34	433
Munskamachtlee	Winter Village of Chief Boston	Howeet Say	Pomeroy 1980:34	434
Neekis River	Fishing	Neekis River, Kokyitoch region	Pomeroy 1980:185	031
Ni'kas	Village	Spiller Channel at Neskas Cove	Olson 1955:321	
Return Channel	Fishing (salmon)	Upper reaches of Return Channel, Owitlitoch region	Pomeroy 1980: 185	
Tankeeahi	Village (Gale Creek people)	Tankeeahi	Pomeroy 1980:34	443,444,427
Te'nki	Village	Southeast coast of Don Peninsula	Olson 1955321	
Tuno Creek West	Fishing	Tuno Creek West, Kokyitoch region	Pomeroy 1980:185	055
unknown	Petroglyphs	Spiller Channel, Spiller Inlet	Simonsen 1993:2	

NTS : 103A/09

Name	Type	Location/Description	Reference	Location No.
CuitkU	Village	James Say on Matheison Channel	Olson 1955347	
Pine River	//Fishing (salmon)	Pine River	Pomeroy 1980: 185	032

NTS : 103A/16

Name	Type	Location/Description	Reference	Location No.
Haphsu'L	Village	On Mussel Inlet	Olson 1955:346	
Kai-net	Village	James Island north of Griffin Passage	Olson 1955:334	
Le'yuk	Village	Poison Cove on Feeder or Lizette Creeks	Olson 1955:334	070

APPENDIX III

NTS : 103A/16

Name	Type	Location/Description	Reference	Location No.
SXaiyala'x	Village	James Island north of Griffin Passage	Olson 1955:334	
unknown	Fishing (halibut)	Hiekish Narrows	Olson 1955:347	
unknown	Main Settlement	Kynoch and Mussel Inlets	Olson 1955:334	069

NTS : 103H/02

Name	Type	Location/Description	Reference	Location No.
Kwi'itu	Village/Summer Camp	In Marmot Cove across from Butedale	Olson 1955:334	071

NTS : unknown

Name	Type	Location/Description	Reference	.ocation Nc
A'smakla	Resource Gathering	"They came to A'smakla"	Boas 1910:457	
Burke Channel	Village	Entering Burke Channel on the face of a steeprock.	Lamb 1984:606	
Canal de Laredo	Village	"They inhabit the shores of Canal de Laredo"	Tolmie 1963:300	
Crooked Beach	Resource Gathering	"Then they arrived at the beach of Crooked Beach"	Boas 1910:163	
Cut Beach	Resource Gathering	"They paddled and came to Cut Beach"	Boas 1910:185	
Deer Pass Creek	Fishing (salmon)	Deer Pass Creek, Owitlitoch region	Pomeroy 1980: 185	
Deer Pass Lagoon Creek	Fishing	Deer Pass Lagoon Creek, Oyakutoch region	Pomeroy 1980:187	
G i o'x	Settlement	"The thunderbird clan lived at G i o'x"	Boas 1910:39	
G i p.la, Da'yuxwiwe, Tse'sk as	Fishing (salmon weirs)	"I should give the names of my salmon weirs..."	Boas 1910:117	
Grass island	Village	"they saw the houses of the ancestors of the Black tribe at Grass Island"	Boas 1910:303	
Gwa dze	Ceremonial Site	"They came to dance the winter dance at Gwa ' dze"	Boas 1910:29	
Ha 'nwade	War	"They came to Ha 'nwade, and there they fought for ten days"	Boas 1910:469	
Hai-haish	Village	Tolmie Channel and Mussel Inlet	Dawson 1888:3	
Hail-tzuh	Village	Millbanke Sound	Dawson 1888:3	
Having-Humpback-Salmon	House	"A person living at Having-Humpback Salmon"	Boas 1910:9	

Tuesday, June 1, 1999

APPENDIX III

NTS : unknown

Name	Type	Location/Description
He `gEms	//Village	"He was going to He `gEms, the village"
l'xwah	Village	Timber lot 10859 at Hikish narrows
Johnstone Strait	Village	"The southern shore which from the large village" -on the water side.
K !i'mse las	House	"and the home site of the raven was called K !i'mse las"
K!wa'pax		Mouth of Ambock Creek
Kitoah	Trail	"There is a river of considerable size at Kitoah which in its windings approaches near to the Billichoola and by a portage of no great length the two tribes communicate with each other"
Klas'-kaimo	Village	Tse-oom'-kas on Knight Inlet
Klatsaskay	Hunting/Fishing	Cooper Reach, Loughborough Inlet
Kokwietock village	Village	Head of Kyeets Cove
Koomkotash village	Village	"Billichoola village"
Kwa'-shi-la	Village	Kwa-ki-lis. Rivers Inlet
Kwa'kumi	Camp	Walkran Island
Kyeets Cove	Village (12 houses)	At the head of Kyeets Cove close to the beach.
Kyimkhakgla	Village	False Cove, Gilford Island [?]
L o'gwal Eldzas		"He came to a pretty place called L o'gwal Eldzas"
Middle-of-the-Beach	House	"The house was called Middle of the Beach"
Moss Island	Resource Gathering (clams)	West side of Moss Island
Na-kwak-to	Village	Te-kwok-stai-e, Seymour Inlet
Nakli	Village	Health Bay, Gilford Island
No x "dem	Village	"He was going to No x"dem, the village"
Nowhalik River	Village	"Inhabit the entrance of the river"
O'pes	Village	Mouth of lagoon at northwest corner of Smyth island
Odza lis		"He landed at Flat Place"
Point Portlock	Burial	The foot of Weweshla nearly opposite Point Portlock, just south in a small cove
Popaalumsum	Spring Village	"At Popaalumsum or spring village island there are 16 lodges"

NTS : unknown

Name	Type	Location/Description	Reference	Location N
Prideaux Haven	Village	In Homfray Channel south of Mount Addenbroke, on a rock.	Lamb 1984604	
Q!asa k as	Fishing Station	"There is a fishing station"	Boas 1910:7	
Quahcuil	Village	"Bostons people depart for Quahcuil"	Tolmie 1963:276	
Su4m xulh	Village	Sheemahant delta, two sites on the river and one on the lake near the river mouth.	Hilton et al. 1982:141	
Tatapowis	Village	Whiterick Passage, Maurelle Island	Galois 1994:253	
Te-nuh-tuh, A-wa-l-tle-la	Village	Kwa-tsi Point, MacDonald, Knights Inlet	Dawson 1888:3	
Tlsasken Salish site	Settlement	Mouth of a stream flowing into Loughborough Inlet	Galois 1994:250	
Trees-on-Ground	Village	"going to Trees-on-Ground for that was the village"	Boas 1910:347	
Trees-on-Rock	Village	"going to Trees-on-Rock, for that was the real village"	Boas 1910:365	
Tsa-wut-ai-nuk, A-kwa-amish, Kwa-wa-ai-nuk	Village	Kwa-us-turns, West Gilford Island	Dawson 1888:3	
Up-River	House	"and they built their house at Up-River"	Boas 1910:97	
Waves-Striking-Forehead	Resource Gathering (clam beds)	"To dig clams at Waves Striking Forehead"	Boas 1910:347	
Whale Beach	Village	"Now they were going to the northern people who lived at Whale Beach"	Boas 1910:301	
Wik-eimoh	Village	Calvert Island. River's Inlet	Dawson 1888:3	
Xukwe'k in	Village	"The people lived at Xukwe'k in"	Boas 1910:113	
\fiuyigai	Village	Between Port Elizabeth and Mataltsyu	Galois 1994:168	
Yo gwate	Village	"it was not yet noon when they arrived at Yo gwate, the village"	Boas 1910:331	
Yulath	Hunting (sea otter)	"at Yulath, a group of rocky islets to the westward"	Tolmie 1963:311	
laxoh	Settlement of first people (in oral history)	Wakenon River	Rohner and Rohner 1970:86	
q!o'gwade	Shelter	Shelter	Boas 1934 (18:106)	18:106
q!wa la'de	Shelter	At creek mouth on south side of Port Neville	Boas 1934 (15129)	15:129
t!si'pa	Underground House	"far end of Atnarko River near Assannay Creek"	Lepofsky 1985:57	
unknown	Fishing (eulachon)	Knight Inlet	Boas 1909:448	
unknown	Resource Gathering (kelp)	Green Point	Boas 1909:405	

NTS : unknown

Name	Type	Location/Description	References	Location No.
unknown	Shaman Hut/ Cave	Behind Xute's at south side of Turn Point	Boas 1966:127	
unknown	Source of copper salt	Knight Inlet	Boas 1909:403	
unknown	Source of red ochre and graphite	Knight Inlet	Boas 1909:402	
unknown	Village	Head of Elcho (Alice) Harbour	Olson 1955:321	
unknown	Village	In Dean Channel	Olson 1955:320	
unknown	Village	In Ellerslie Channel	Olson 1955320	
unknown	Village	In Lama Passage	Olson 1955320	
unknown	Village	On Calvert Island	Olson 1955320	
unnnamed	Non-Native Archaeological Site	Anchor found above timber line on Mt. Kwatna	Mcllwraith 1948:503	
wa' mas	Fishing (salmon)	Up north arm of Kingcome Inlet at a large creek on west side	Boas 1934 (10:26)	10:26

APPENDIX IV

SELECTED ARCHAEOLOGICAL SITE TYPES

HABITATION SITES

DESCRIPTION

- includes structural remains, house depressions, house platforms, housepits, and rockshelters
- a number of structural styles are known for the Central Coast, including:
  - large post and beam plank houses
  - rectangular semi-subterranean houses
  - temporary light-framed houses covered with cedar bark, boughs, skins or leaves
  - defensive sites on islands or knolls

INTERPRETATION

- may represent permanent villages or seasonal camps related to resource procurement areas

CORRELATES/ASSOCIATIONS

- frequently associated with middens, canoe runs and storage pits, and less commonly with culturally modified trees, pictographs and petroglyphs
- relatively uniformly distributed on the outer coast, village sites are
- clustered at the heads of channels and in river valleys on the inner coast
- tend to be densely distributed along the entire length of large river valleys, with heavy clustering at the valley mouth
- correlated with plant, fish and mammal resources, fresh water and shelter
- preferred locations: level, well-drained ground above the reach of winter storm tides overlooking open beaches, in sheltered coves, at the mouths of inlets or rivers, with a short steep bank between the house level and the beach
- refuge sites on small steep-sided islands, often joined to the mainland by a narrow isthmus
- post-contact habitations tend to correlate with trading posts

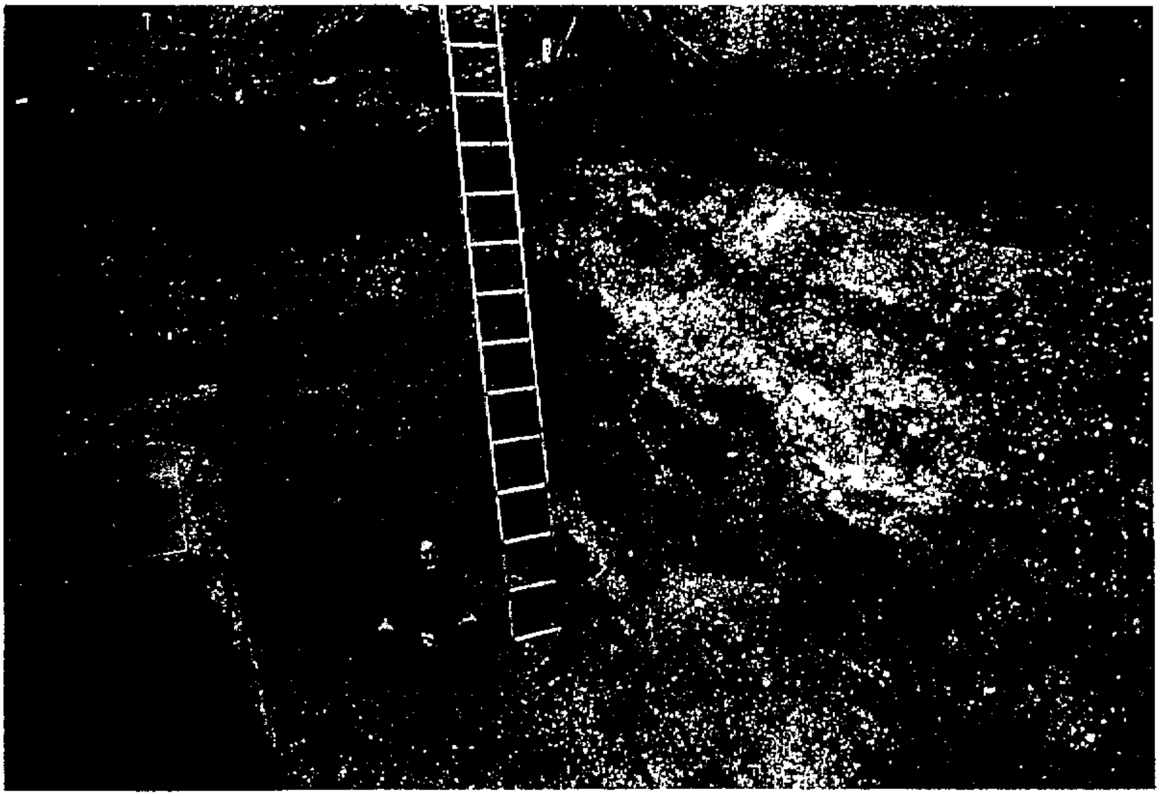
SHELL MIDDEN

DESCRIPTION

- primary component: typically whole or crushed shell, generally dominated by clam species, followed by mussel and other species such as whelk
- other possible components: animal or fish bone, artifacts, fire-cracked rock, human remains
- highly organic soil, black and greasy with a high ash or charcoal content
- generally larger on outer coast than inner coast
- potential for preservation of organic artifacts due to basic soil conditions

INTERPRETATION

- household refuse deposits resulting from extended use of a habitation site
- shellfish harvesting location



CORRELATES/ASSOCIATIONS

- level, well-drained ground, above beach level
- middens associated with habitations are typically located in protected locations near sources of freshwater
- common locations are bays or coves, tidal lagoons, islands, small points, river mouths
- frequently found in association with other site types, including habitations, burials, canoe runs and culturally modified trees
- on the outer coast, middens appear to be correlated with productive salmon streams

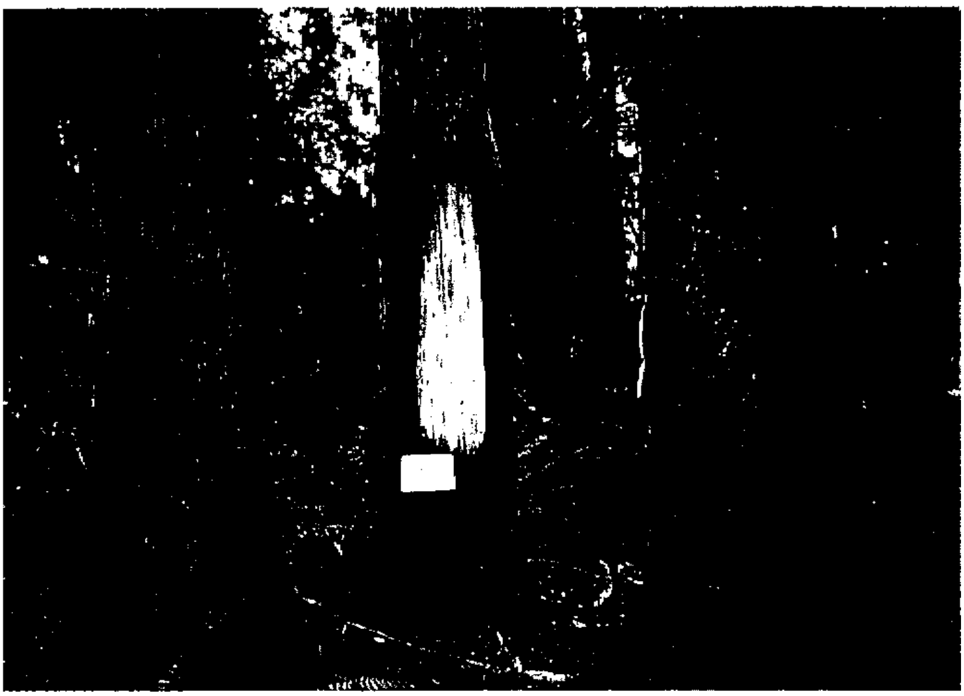
BARK-STRIPPED TREES

DESCRIPTION

- a tree from which bark has been partially removed by aboriginal people
- characterized by one or more areas of exposed wood, known as bark removal scars
- most commonly occur on western redcedar, yellow cedar, spruce and hemlock were also stripped
- scars are most commonly rectangular or tapered in an inverted 'V' shape
- toolmarks may or may not be visible and healing lobes may obscure all or part of the scar
- detailed description in Stryd (1997)

INTERPRETATION

- bark was used for a variety of traditional purposes, including weaving mats, clothing and baskets
- severely under represented in the existing site inventory due to past site recording standards



CORRELATES/ASSOCIATIONS

- often found in association with other site features, particularly trails, but also middens, habitations and canoe hauls and traditional resource harvesting areas such as berry patches
- have been recorded on a variety of landforms, in virtually all types of slope and forest cover conditions, including steep shoreline and areas of poor forest cover
- in steep areas, bark strip scars tend to located on the upslope side of the tree
- found up to 2 km from the ocean or rivers and up to 450 m above sea level
- apparently more common on the inner channels/fjords than in the more exposed outer coast
- majority of preserved examples are located in stands of old growth western redcedar
- particular effort was made to access stands of yellow cedar

STONE WALL FISH TRAPS

DESCRIPTION

- stone wall fish traps consist of one or more tidal ponds enclosed by constructed stone walls
- sometimes utilize natural rock outcrops
- may show complex histories of repair and expansion
- some stone fish traps may have incorporated perishable components such as stakes, nets or basket traps
- some traps consist of long walls which follow beach contours on open shoreline, while others are shorter and are built at stream or river mouths, across lagoons or at the heads of shallow coves

INTERPRETATION

- stone wall fish traps built in the tidal reaches of small streams were used to capture salmon entering the streams to spawn
- other traps consisting of long walls following beach contours were used to capture any species of fish that came in to shore to spawn or feed at high tide

CORRELATES/ASSOCIATIONS

- found in relatively protected locations associated with small streams
- occur at elevations within the range of normal tides
- may be visible only at half tide or lower

PICTOGRAPHS

DESCRIPTION

- images painted on rock surfaces
- typically red ochre pigments, although other pigments are known to have been used, including charcoal
- common designs include animal-like or human-like figures, and geometric symbols (e.g., circles, coppers, fish, masks, and whales)
- rows and columns of red dots are a distinctive type of pictograph common in the Bella Bella region

INTERPRETATION

- function and significance is poorly understood
- may commemorate important cultural events or natural phenomena or define traditional rights and land ownership

CORRELATES/ASSOCIATIONS

- typically situated in highly visible locations such as prominent shoreline rock bluffs overhanging the water (up to 40 m above sea level). These bluffs may be too small to appear on maps
- commonly found along channels, lake shores, and inland in association with rockshelters or rock bluffs
- not typically associated with other site types, and have the highest mean distance to others recorded sites

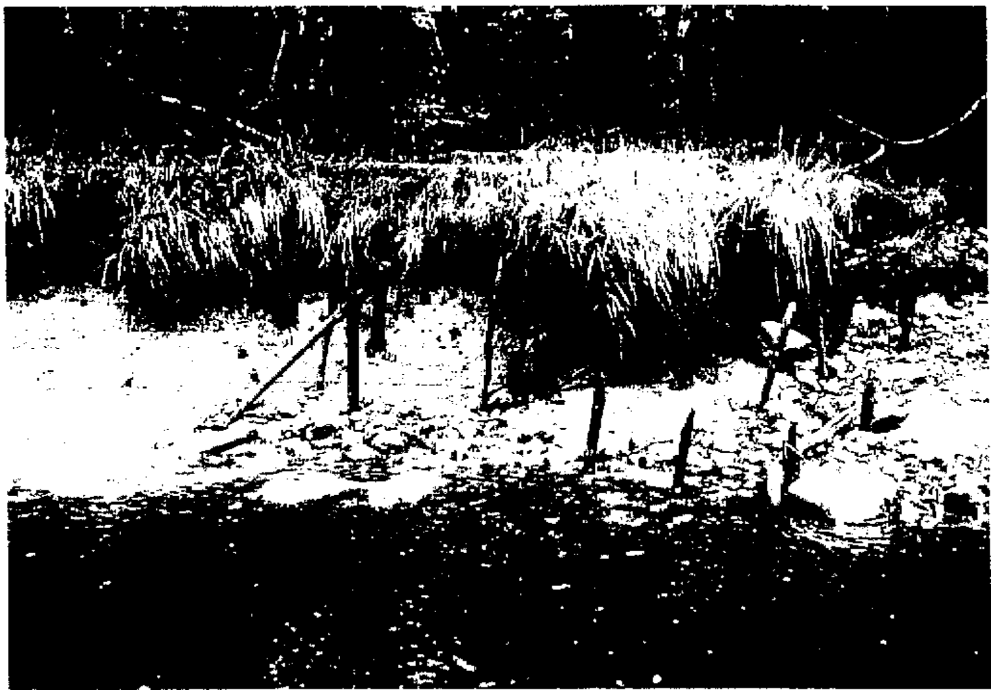
WOODEN FISH WEIRS

DESCRIPTION

- typically consist of a line of stakes protruding from bank to bank above a river bed, and may have additional components such as nets or basket traps

INTERPRETATION

- used to trap spawning fish



CORRELATES/ASSOCIATIONS

- usually located near the mouths of streams
- more common on larger rivers of the inner coast and their tributary streams

ABORIGINALLY-LOGGED TREES

DESCRIPTION

- a tree that has been felled, cut or otherwise modified by aboriginal people to obtain wood
- common types are planked trees (standing or felled), felled trees, stumps, sectioned trees, canoe blanks and trees which have test holes to check heartwood soundness
- common logged species: red and yellow cedar, hemlock, spruce, yew
- significant time expenditure required to fell a large tree using stone/wood tools
- detailed description in Stryd (1997)

INTERPRETATION

- aboriginally-logged trees were utilized in traditional First Nations timber-harvesting activities
- may be severely under represented in the existing site inventory due to past site recording standards

CORRELATES/ASSOCIATIONS

- may have associated hearths/short-term camps
- commonly correlated with coastline or streams
- majority in old growth stands

PETROGLYPHS

DESCRIPTION

- images pecked or carved into a rock surface, sometimes enhanced with pigments
- typical designs include animal-like or human-like figures and geometric symbols (e.g., masks, circles, coppers, fish, whales, boats or crests)
- a common motif is a mask-like face with large eyes encircled several times
- a small number of petroglyphs depict European-style ships

INTERPRETATION

- function/significance is poorly understood
- may commemorate important ceremonial and cultural events or natural phenomena, or define traditional rights or land ownership

CORRELATES/ASSOCIATIONS

- petroglyphs have been recorded in a variety of locales, including villages, intertidal bedrock outcrops and isolated ritual bathing areas
- typically found in the upper intertidal zone and up to 30 m inland on outcrops or boulders of black volcanic rock

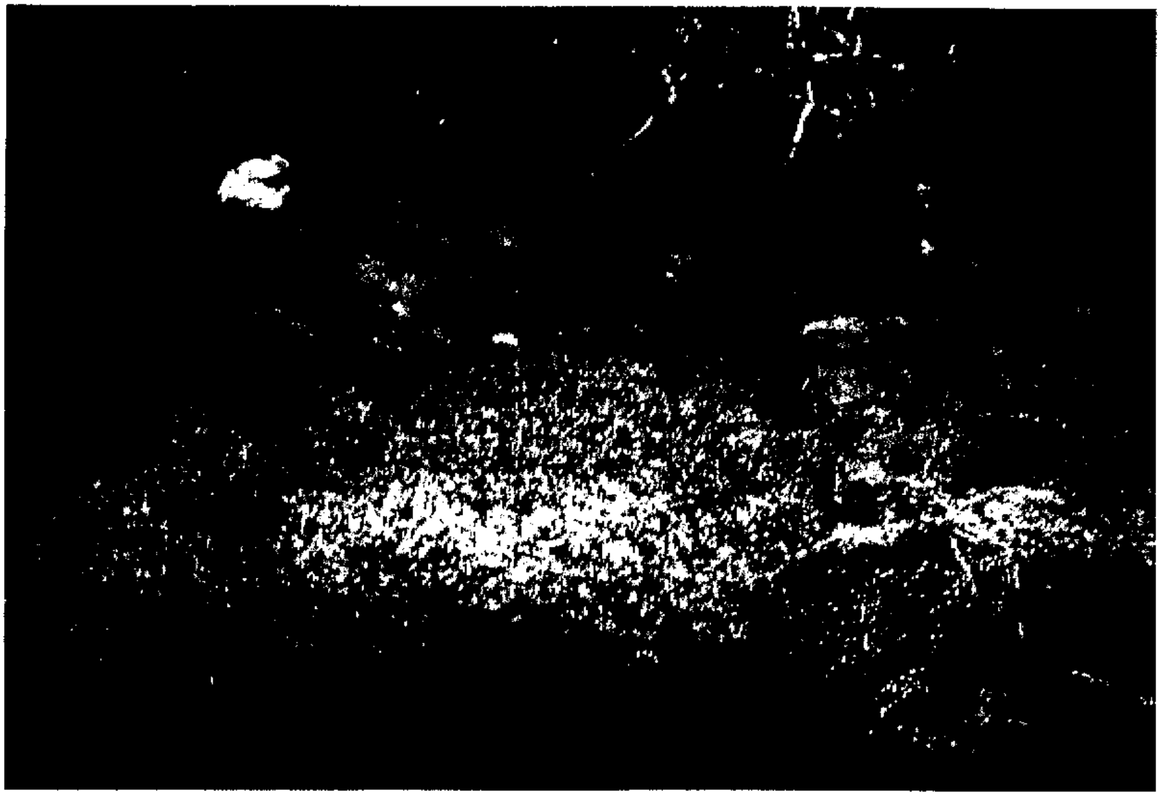
CANOE RUNS

DESCRIPTION

- an artificially cleared beach section which permits the landing of canoes without damage to their hulls
- average about 8 m long and 2 m wide
- vary from simple rough clearings to carefully constructed landing areas
- can occur singly or in numbers

INTERPRETATION

- cane runs were used to facilitate the safe landing of canoes on rocky shores



CORRELATES/ASSOCIATIONS

- usually associated with middens or other evidence of settlement
- tend to be in sheltered areas
- may be associated with resource harvesting areas

TRAILS

DESCRIPTION

- aboriginal travel routes
- may be indicated by linear distributions of archaeological sites

INTERPRETATION

- may represent native trading corridors, sometimes called "grease trails" (a reference to the eulachon oil which was important in traditional exchange systems)
- trails are under-represented in the archaeological record
- key to understanding links between archaeological sites

CORRELATES/ASSOCIATIONS

- correlated with culturally modified trees
- tend to be found along natural access routes (e.g.. ridges and mountain passes)
- often noted in ethnographic and historic records

INTERTIDAL **LITHIC** SITES

DESCRIPTION

- scatters of stone artifacts or the debris of their manufacture, use or modification found in intertidal zones

INTERPRETATIONS

- believed to date to periods of lower sea levels and may be of great age
- alternatively, they may be eroded from midden deposits

CORRELATES/ASSOCIATIONS

- intertidal zones
- gently sloping gravel beaches
- may be located on the foreshore in front of middens

APPENDIX V

CORRECTIONS TO ARCHAEOLOGICAL SITE DATABASE

Central Coast Archaeological Site Database Corrections

ZBN	NTS_50K	DATE EDIT	ERROR-N
FcSn-2	093D/08	Feb24/98	"historic; commercial; building; trading post" reported but not observed
EkSt-7	092M/11	Feb27/98	"rock formation" noted an site form; petroform?; no sketch map
EgSj-4	092N/04	Jan 14/98	"too vague to plot"; no sketch map; exlude from model
EkSs-5	092M/11	Feb27/98	1:50 vague plot; no sketch map
EkSs-4	092M/11	Feb27/98	:50 vague plot; no sketch map
EkSp-1	092M/10	Feb27/98	1:50 vague plot; no sketch map; exclude from model
EhSu-2	092M/06	Feb26/98	1:50 vague plot; vague sketch map; exclude from model
EeSo-14	092L/16	Feb23/98	3 triangles for 1 site (on 3 islets and 1 island); 2 deleted; site type error
EgSq-4	092M/02	Feb23/98	CHIN "historic; CM" not evident from site form, which lists possible house site";
EkSp-5	092M/15	Feb24/98	CHIN site type info. expanded from site form descriptor "fishing station (midden)"?
EkSp-6	092M/15	Feb24/98	CHIN site type info. expanded from site form descriptor "fishing station (midden)"?
EkSv-1	092M/12		close to Heiltsuk boundary; not on Millennia's list: error-checked
EdSp-71	092L/10	Jan06/98	comb. w/EdSp-30
EhSs-5	092M/03	Feb23/98	comb. w/EhSs-1 (pictograph) and EhSs-4 (human remains)?; site type error
EhSs-4	092M/03	Feb23/98	comb. w/EhSs-1 (pictograph) and EhSs-5 (CM; surface)?
EhSs-1	092M/03	Feb23/98	comb. w/EhSs-4 (human remains) and EhSs-5 (CM; surface)?
EiSk-1	092N/05	Jan14/98	dendroglyph; possible trail
EkSp-16	092M/10	Jan11/98	digitally mislabelled
EkSp-17	092M/10	Jan11/98	digitally mislabelled
EkSp-14	092M/10	Jan11/98	digitally mislabelled
FbSr-6	093D/02	Jan18/98	digitally mislabelled
FcSn-6	093D/08	Jan19/98	digitally mislabelled
FcSo-6	093D/08	Jan19/98	digitally mislabelled
EkSr-8	092M/10	Feb24/98	digitally mislabelled; 1:50 vague plot; in CHIN under 92M/11; site type error; no ske
EkSr-1	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-2	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-3	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-4	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-5	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-6	092M/10	Feb27/98	digitally mislabelled; 1:50 vague plot; no sketch map; exclude from model
EkSr-7	092M/10	Feb24/98	digitally mislabelled; in CHIN under NTS 92M/11; site type error; site form: "village
EkSt-2	092M/11	Feb27/98	digitally mislabelled; no sketch map
EkSt-3	092M/11	Feb27/98	digitally mislabelled; no sketch map
EkSt-4	092M/11	Feb27/98	digitally mislabelled; no sketch map

Central Coast Archaeological Site Database Corrections

EkSt-1	092M/11	Feb24/98	digitally mislabelled; site extends river's full length, N&S shores; site form notes "village"; pre-/post-contact?
EdSm-1	092L/09	Feb26/98	EdSm-1, -6, -9, -10, & -11 may be different parts of one large site ("Robbers Nob" landform)?: vague sketch map
FcSm-1	093D/08	Feb24/98	FcSm-7 part of this site?
EjSw-10	092M/12		Heiltsuk
FdSx-9	093D/12		Heiltsuk
ElSq-2	092M/15	Feb27/98	historic human remains are noted on site form as "possible"; no sketch map
FaSq-6	093D/02	Jan18/98	large site; N&S shores of river
EdSk-9	092K/12	Jan06/98	mislabelled as EdSk-11
EdSk-11	092K/12	Jan06/98	mislabelled as EdSk-9
EeSn-2	092L/16	Jan08/98	mislabelled in digital data; CHIN NTS wrong
EcSl-14	092K/05	Jan05/98	misplotted
EcSl-11	092K/05	Jan06/98	misplotted
EcSk-4	092K/05	Jan05/98	misplotted
EcSk-5	092K/05	Jan05/98	misplotted
EcSl-13	092K/05	Jan05/98	misplotted
EeSi-1	092K/11	Jan05/98	misplotted
EdSi-6	092K/11	Jan05/98	misplotted
EdSi-11	092K/11	Jan05/98	misplotted
EdSi-13	092K/11	Mar02/98	misplotted
EeSk-5	092K/12	Jan06/98	misplotted
EdSk-7	092K/12	Jan06/98	misplotted
EdSj-9	092K/12	Jan06198	misplotted
EdSj-2	092K/12	Jan06/98	misplotted
EdSo-43	092L/09	Jan06/98	misplotted
EdSo-12	092L/09	Jan06198	misplotted
EdSn-44	092L/09	Jan06/98	misplotted
EdSn-14	092L/09	Jan06198	misplotted
EdSn-22	092L/09	Jan06/98	misplotted
EdSn-21	092L/09	Jan06/98	misplotted
EeSp-35	092L/10	Jan06/98	misplotted
EeSp-36	092L/10	Jan06/98	misplotted
EdSp-67	092L/10	Jan06/98	misplotted
EdSp-66	092L/10	Jan06/98	misplotted
EeSp-9	092L/10	Jan06/98	misplotted
EfSs-8	092L/14	Jan08/98	misplotted

Central Coast Archaeological Site Database Corrections

EfSs-13	092L/14	Jan08/98	misplotted
EfSr-32	092L/15	Jan08/98	misplotted
EfSr-35	092L/15	Jan08/98	misplotted
EfSr-37	092L/15	Jan08/98	misplotted
EfSr-23	092L/15	Jan08/98	misplotted
EfSr-27	092L/15	Jan08/98	misplotted
EfSr-26	092L/15	Jan08/98	misplotted
EfSr-40	092L/15	Jan08/98	misplotted
EfSr-4	092L/15	Jan08/98	misplotted
EfSr-5	092L/15	Jan08/98	misplotted
EfSq-4	092L/15	Jan08/98	misplotted
EeSq-9	092L/15	Jan08/98	misplotted
EeSq-8	092L/15	Jan08/98	misplotted
EeSp-102	092L/15	Jan08/98	misplotted
EfSp-2	092L/15	Jan08/98	misploned
EfSp-1	092L/15	Jan08/98	misplotted
EgSu-3	092M/03	Jan11/98	misplotted
EhSw-3	092M/05	Jan11/98	misploned
EhSu-5	092M/06	Jan11/98	misplotted
EhSu-3	092M/06	Jan11/98	misplotted
EiSt-1	092M/06	Jan11/98	misplotted’
EkSq-1	092M/10	Jan11/98	misplotted
EkSp-2	092M/10	Jan11/98	misplotted
FbSr-5	093D/02	Jan18/98	misplotted
FaSq-3	093D/02	Jan18/98	misplotted
FaSq-2	093D/02	Jan18/98	misplotted
FbSr-8	093D/02	Jan18/98	misplotted
FcSq-6	093D/07	Jan18198	misplotted
FcSq-1	093D/07	Jan18/98	misplotted
FcSo-2	093D/08	Jan19/98	misplotted
FcSn-1	093D/08	Jan19/98	misplotted
FeTe-1	103A/10	Jan25/98	misplotted
FeTg-3	103A/11	Jan25/98	misplotted
FfTf-1	103A/15	Jan25/98	misplotted
EkSt-12	092M/11	Jan14/98	misplotted & digitally mislabelled

Central Coast Archaeological Site Database Corrections

EkSu-1	092M/11	Jan14/98	misplotted & digitally mislabelled
EkSp-18	092M/15	Jan14/98	misplotted & digitally mislabelled
EkSp-19	092M/15	Jan14/98	misplotted & digitally mislabelled
FcSq-12	093D/07	Feb26/98	misplotted & digitally mislabelled; vague plot; vague sketch map: exclude from model
FcSq-9	093D/07	Feb26/98	misplotted & digitally mislabelled; vague sketch map
EdSi-12	092K/11	Jan05/98	misplotted & mislabelled as EeSo-28
EdSp-72	092L/10	Jan06/98	misplotted in digital data
EdSp-70	092L/10	Jan06/98	misplotted in digital data
EdSp-63	092L/10	Jan06/98	misplotted in digital data
EeSn-3	092L/16	Jan08/98	misplotted in digital data
EhSs-8	092M/03	Jan11/98	misplotted in digital data
FcSr-1	093D/07	Jan19/98	misplotted in digital data
FdSn-1	093D/09	Jan21/98	misplotted in digital data
FdSm-4	093D/09	Jan21/98	misplotted in digital data
FcTe-5	103A/07	Jan25/98	misplotted in digital data
FhTf-1	103H/02	Jan25/98	misplotted in digital data
FcSm-6	093D/08	Feb24/98	misplotted in digital data; FCR may be from FcSm-5; no other CM/features at FcSm-6; is it a site?
FcSr-2	093D/07	Feb27/98	misplotted in digital data; no sketch map
FbSr-4	093D/02	Jan18/98	misplotted in digital data; site form: no CM except FBR; fish trap destroyed, smokehouse could not be found
FcSm-5	093D/08	Feb24/98	misplotted in digital data; site type error
FdSn-2	093D/09	Jan21/98	misplotted in digital data; site type error
FcTe-3	103A/07	Feb24/98	misplotted in digital data; site type error
FdTe-10	103A/10	Feb24/98	misplotted in digital data; site type error
FdTe-8	103A/10	Feb26/98	misplotted in digital data; site. type error; vague sketch map
FbSr-2	093D/02	Feb24/98	misplotted in digital data; site type not actually observed in field; reported village under a landslide
FcSq-2	093D/07	Feb26/98	misplotted in digital data; vague sketch map
FdTe-9	103A/10	Feb26/98	misplotted in digital data; vague sketch map
FcSn-7	093D/08	Jan19/98	misplotted on 1:50; not plotted in digital data
FfTg-2	103A/14	Feb24/98	misplatted; "habitation" may be historic frame house; "plank house" subtype not listed on site form
FcSo-4	093D/08	Feb24/98	misplotted; "mound" probably refers to "midden mounds" noted on site form
FcSo-7	093D/08	Jan19/98	misplotted; 1:50 vague plot
FdTe-12	103A/10	Feb24/98	misplotted; canoe skid listed as "possible" on site form; site type error
EdSl-7	092K/12	Feb22/98	misplotted; comb. w/EdSl-11 (petroglyph) & EdSl-12 (fish trap)?
EdSl-12	092K/12	Feb22/98	misplotted; comb. w/EdSl-7 (midden) & EdSl-11 (petroglyph)?
EiSp-2	092M/10	Jan11/98	misplotted; digitally mislabelled

Central Coast Archaeological Site Database Corrections

EdSl-11	092K/12	Feb22/98	misplotted; EdSl-11 site form lists petroglyph only; comb. w/EdSl-7 (midden) & EdS
EeSp-105	092L/15	Jan08/98	misplotted; may fall w/in EeSq block
EgSu-6	092M/03	Feb23/98	misplotted; may include EgSu-11?; site type error
FfSl-6	093C/13	Feb26/98	misplotted; no site form; locational error determined from CHIN info.
EfSr-8	092L/15	Feb27/98	misplotted; no sketch map
EfSp-4	092L/15	Feb27/98	misplotted; no sketch map
FcSm-17	093D/08	Jan19/98	misplotted; not plotted in digital data; not the same site as FcSm-18 (cf. 1:50 note)
FcSm-19	093D/08	Feb24/98	misplotted; not plotted in digital data; unclear whether "habitation; rock shelter" incl.;
EfSn-5	092L/16	Feb27/98	misplotted; now in EeSn Borden block?; no sketch map
EiSu-1	092M/06	Feb26/98	misplotted; now in EhSu block?; vague sketch map
EhSs-2	092M/03	Jan11/98	misplotted; same site as EhSs-6?
FcSq-11	093D/07	Feb26/98	misplotted; should be N of hwy; vague plot; vague sketch map; exclude from model
FcSq-7	093D/07	Feb26/98	misplotted; site form reports as vague plot; vague sketch map
EkSp-4	092M/15	Feb26/98	misplotted; site on E&W shores of lake; site form notes "etc." under site type; vague sk
EgSv-5	092M/04	Jan11/98	misplotted; site on Turret Rk.
EcSj-5	092K/05	Feb22/98	misplotted; site type error
EdSk-6	092K/12	Feb22/98	misplotted; site type error
EdSo-37	092L/09	Feb22/98	misplotted; site type error
EfSr-30	092L/15	Feb23/98	misplotted; site type error
EfSr-29	092L/15	Feb23/98	misplotted; site type error
EfSr-24	092L/15	Feb23/98	misplotted, site type error
FaSq-1	093D/02	Feb24/98	misplotted; site type error
FcSm-14	093D/08	Feb24/98	misplotted; site type error
misplotted; site type		Feb24/98	error
FcTe-2	103A/07	Feb24/98	misplotted; site type error
EhSu-4	092M/06	Feb23/98	misplotted; site type error; nearby CMTs noted on sketch map
EdSn-38	092L/09	Feb27/98	misplotted; site type error; no sketch map
EfSt-1	092L/14	Feb26/98	misplotted; site type error; vague sketch map
FeTe-2	103A/15	Feb26/98	; site type error; vague sketch map
FcSm-13	093D/08	Feb26/98	misplotted; vague plot; vague sketch map; exclude from model
EdSk-5	092K/12	Feb26/98	misplotted; vague sketch map
FbSm-1	093D/01	Feb26/98	misplotted; vague sketch map
FcSq-10	093D/07	Feb26/98	misplotted; vague sketch map
FcSm-16	093D/08	Feb26/98	misplotted; vague sketch map
FdTe-5	103A/10	Feb26/98	misplotted; vague sketch map

Central Coast Archaeological Site Database Corrections

EkSp-3	092M/15	Feb26/98	misplotted; vague sketch map
EhSu-9	092M/06	Jan11/98	misplotted?; vague sketch map
EkSp-8	092M/10	Jan11/98	misplotted?; vague sketch map
EkSp-9	092M/10	Feb24/98	misplotted?; vague sketch map; site type error
EfSm-1	092L/16	Jan08/98	msiplotted
FcSm-NS1	093D/08	Jan19/98	new site (FcSm 93-10)?; see FcSm-14 site form
FcSn-NS1	093D/08	Jan19/98	new site (FcSn 94-3)?; see FcSn-6 sketch map
EkSp-NS1	092M/10	Jan11/98	new site?; see 1:50
EkSq-NS1	092M/10	Jan11/98	new site?; see 1:50
EkSq-NS2	092M/10	Jan11/98	new site?; see 1:50
EkSq-NS3	092M/10	Jan1 1/98	new site?; see 1:50
EkSq-NS4	092M/10	Jan1 1198	new site?; see 1:50
EkSr-NS1	092M/10	Jan1 1/98	new site?; see 1:50
EkSr-NS2	092M/10	Jan11/98	new site?, see 1:50
EkSs-NS1	092M/11	Jan14/98	new site?; see 1:50
EkSp-NS2	092M/15	Jan14/98	new site?; see 1:50; vague plot
EkSp-NS3	092M/15	Jan14/98	new site?; see 1:50; vague plot
EkSp-NS4	092M/15	Jan14/98	new site?; see 1:50; vague plot
EcSk-NS1	092K/05	Jan05/98	new site?; see EcSk-1sketch map and 1:50
EhSs-NS1	092M/03	Jan11/98	new site?; see EhSs-8 sketch map
EhSs-NS2	092M/03	Jan11/98	new site?; see EhSs-8 sketch map
EjSu-1	092M/11	Feb26/98	no site form
EkSt-10	092M/11	Feb24/98	no site form; no CHIN/site type info.
ElSq-3	092M/15	Feb26/98	no site form; site type info. from CHIN
EeSp-3	092L/15	Feb27/98	no sketch map
EeSp-128	092L/15	Feb27/98	no sketch map
EfSq-5	092L/15	Feb27/98	no sketch map
EgSj-3	092N/04	Feb27/98	no sketch map
FdTe-4	103A/10	Feb27/98	no sketch map
EiSw-13	092M/05	Feb27/98	no sketch map
EiSv-15	092M/05	Feb27198	no sketch map
EiSv-14	092M/05	Feb27/98	no sketch map
EkSt-9	092M/11	Feb27/98	no sketch map
EkSt-8	092M/11	Feb27/98	no sketch map
EkSs-3	092M/11	Feb27/98	no sketch map

Central Coast Archaeological Site Database Corrections

EkSp-10	092M/15	Feb27/'98	/no sketch map
FgTg-1	103H/03	Jan25/98	not plotted
FgTg-2	103H/03	Jan25/98	not plotted
FgTh-1	103H/03	Jan25/98	not plotted
EhSt-5	092M/06	Jan11/98	not plotted in digital data
EhSt-6	092M/06	Jan1 1/98	not plotted in digital data
EiSt-3	092M/06	Jan1 1/98	not plotted in digital data
EiSt-2	092M/06	Jan1 1198	not plotted in digital data
EkSt-5	092M/11	Jan14/98	not plotted in digital data
EkSt-13	092M/11	Jan14198	not plotted in digital data
FbSm-2	093D/08	Jan19/98	not plotted in digital data
FbSm-3	093D/08	Jan19/98	not plotted in digital data
EkSt-11	092M/11	F&24/98	not plotted in digital data; "petroglyph" has been disputed
EgSu-13	092M/03	Feb27/98	not plotted in digital data; 1:50 vague plot; no sketch map; exclude from model
EeSm-4	092L/16	Feb23/98	not plotted in digital data; CHIN lists EeSm-4a, -4b, -4c, but all are same CMT site EeSm-4
EgSu-11	092M/03	Feb23/98	not plotted in digital data; part of EgSu-6?; site type error; site types not in digital data
EgSu-12	092M/03	Feb23/98	not plotted in digital data; site type missing from digital data
EdSl-9	092K/12	Feb22/98	not plotted; location vague; site type error; comb. w/EdSl-1 & EdSl-8?; see EdSl-12 sketch map (not plotted)
EfSq-3	092L/15	Feb26/98	not plotted; no site form; site type info. from CHIN
EfSj-1	092K/13	Feb22/98	not plotted; site type missing from site form; CHIN lists site type as CM, surface; lithics; CHIN NTS wrong
FgTg-3	103H/03	Feb26/98	not plotted; vague sketch map
FcSm-7	093D/08	Jan19/98	pa
FcSl-2	093C/05	Jan14/98	possible trails in area; see 1:50
EhSs-6	092M/03	Jan11/98	same site as EhSs-2?
FcSm-9	093D/08	Jan19/98	should include FcSm-18 (lithic attributes added), which is not plotted digitally (vague plot)
EeSp-14	092L/10	Feb22/98	should this be three sites on three senarate islets?
EeSp-13	092L/10	Feb22/98	should this be three sites on two islets and Gilford Island?
EeSp-12	092L/10	Feb22/98	should this be two sites on two islets?
EkSp-7	092M/10	Jan11/98	site spans two NTS sheets 92M/10 and M/15; plotted on both sides of Owikeno Lake; site type error
EcSl-2	092K/05	Feb22/98	site type error
EcSi-2	092K/06	Feb22/98	site type error
EdSi-5	092K/11	Feb22/98	site type error
EdSi-3	092K/11	Feb22/98	site type error
EeSk-2	092K/12	Feb20/98	site type error
EeSo-1	092L/09	Feb22/98	site type error

Central Coast Archaeological Site Database Corrections

EdSo-34	092L/09	Feb22/98	site type error
EdSo-39	092L/09	Feb22/98	site type error
EdSo-36	092L/09	Feb[redacted]	[redacted]
EeSo-23	092L/09	Feb22/98	site type error
EdSo-22	092L/09	Feb22/98	[redacted]
EdSn-36	092L/09	Feb22/98	site type error
EdSn-23	092L/09	Feb22/98	site type error
EeSq-7	092L/10	Feb22/98	site type error
EeSq-3	092L/10	Feb22/98	site type error
EeSq-1	092L/10	Feb22/98	site type error
EdSp-22	092L/10	Feb22/98	site type error
EdSp-52	092L/10	Feb22/98	site type error
EdSp-83	092L/10	Feb22/98	site type error
EeSp-68	092L/10	Feb22/98	site type error
EeSp-4	092L/10	Feb22/98	site type error
EeSp-92	092L/10	Feb22/98	site type error
EdSp-38	092L/10	Feb22/98	site type error
EeSp-6	092L/10	Feb22/98	site type error
EdSp-40	092L/10	Feb22/98	site type error
EdSp-68	092L/10	Feb22/98	site type error
EdSp-62	092L/10	Feb22/98	site type error
EdSp-60	092L/10	Feb22/98	site type error
EfSs-9	092L/14	Feb26/98	site type error
EfSr-25	092L/15	Feb23/98	site type error
EfSr-39	092L/15	Feb23/98	site type error
EeSp-135	092L/15	Feb23/98	site type error
EeSp-111	092L/15	Feb23/98	site type error
EeSp-112	092L/15	Feb23/98	site type error
EeSo-19	092L/16	Feb23/98	site type error
EeSo-10	092L/16	Feb23/98	site type error
EeSo-13	092L/16	Feb23/98	site type error
EgSq-3	092M/02	Feb23/98	site type error [redacted]
EhSu-7	092M/03	Feb23/98	site type error
EgSu-8	092M/03	Feb23/98	site type error
EgSv-6	092M/04	Feb23/98	site type error

Central Coast Archaeological Site Database Corrections

EhS	092M/05	Feb23/98	site type error
EhSv-7	092M/05	Feb23/98	site type error
EkSp-13	092M/10	Feb24/98	site type error
FcSq-4	093D/07	Feb24/98	site type error
FcSp-1	093D/07	Feb24/98	site type error
FcSp-6	093D/07	Feb24/98	site type error
FcSp-13	093D/07	Feb24/98	site type error
FcSo-1	093D/08	Feb24/98	site type error
FcSm-8	093D/08	Feb24/98	site type error
FeTf-1	103A/10	Feb24/98	site type error
FdTe-6	103A/10	Feb24/98	site type error
EjSr-1	092M/10	Feb24/98	site type error; "camp site" noted on site form; pre-/proto-/post-contact?
EdSp-12	092L/10	Feb22/98	site type error; "CM; subsurface; shell midden" in CHIN is "shell mound fortification'
EdSp-17	092L/10	Feb22/98	site type error; "cultural material; subsurface" in CHIN does not appear on site form
FcSn-3	093D/08	Feb24/98	site type error; "mound"/"habitation; depression" components questionable in the opi
EeSp-5	092L/10	Feb22/98	site type error; "village" descriptor on site form
FcSp-3	093D/07	Feb24/98	site type error; FcSp-3 represented by FBR only; FcSp-4 is earthwork; two componen
EfSr-2	092L/15	Feb27/98	site type error; no sketch map
FcSm-10	093D/08	Feb27/98	site type error; no sketch map
EeSp-67	092L/15	Feb22/98	site type error; site does not appear to be in CHIN; site type info. from site form
FdTe-7	103A/10	Feb24/98	site type error; site form mentions quite clearly that there is "no indication of shell"; r
EgSv-2	092M/04	Feb23/98	site type error; site form: "historic village...extensive midden"; "depressions" not give
EfSr-41	092L/15	Feb26/98	sketch map cannot be read
FcSm-11	093D/08	Feb26/98	Tsini Tsini misplotted; 1:50 vague plot; digitally mislabelled; vague sketch map; exc
FcSn-8	093D/08	Feb26/98	vague plot & digitally mislabelled; vague sketch map; 88 CMTs; exclude from model
FcSp-15	093D/07	Feb26/98	vague plot; no sketch map; exclude from model
FcSq-13	093D/07	Feb26/98	vague plot; vague sketch map; exclude from model
FcSp-9	093D/07	Feb26/98	vague plot; vague sketch map; exclude from model
FcTe-6	103A/07	Feb26/98	vague plot; vague sketch map; exclude from model
FcSq-14	093D/07	Feb26/98	vague plot; vague sketch map; exlude from model
EdSm-11	092L/09	Feb26/98	vague sketch map
EdSm-10	092L/09	Feb26/98	vague sketch map
EdSm-9	092L/09	Feb26/98	vague sketch map
EdSm-6	092L/09	Feb26/98	vague sketch map
EeSp-60	092L/15	Feb26/98	/vague sketch map

Central Coast Archaeological Site Database Corrections

EfSn-9	092L/16	Feb26/98	vague sketch map
EfSn-8	092L/16	Feb26/98	vague sketch map
EhSq-1	092M/02	Feb26/98	vague sketch map
EhSu-6	092M/06	Feb26/98	vague sketch map
FcSp-14	093D/07	Feb26/98	vague sketch map
FcSq-16	093D/07	Feb26/98	vague sketch map
FcSn-5	093D/08	Feb26/98	vague sketch map
FdTe-11	103A/10	Feb26/98	vague sketch map
FeTf-2	103A/15	Feb26/98	vague sketch map
FgTf-2	103H/02	Feb26/98	vague sketch map
EdSl-1	092K/12	Feb26/98	vague sketch map; see EdSl-12 site form
EdSl-8	092K/12	Feb26/98	vague sketch map; see EdSl-12 site form