

Summary Report of the Overview Mapping of Archaeological Resource Potential in the Kalum Forest District

Summary Report
Prepared for

The Ministry of Forests
Kalum Forest District

by

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INTRODUCTION

This report provides a summary of the objectives, methods, background, and results of a study of the archaeological resource potential in the Kalum Forest District. The following report is written in non-technical language. For more information and detailed bibliography, readers are advised to consult the detailed report, *Overview mapping of archaeological resource potential in the Kalum Forest District* by Eldridge *et al.* 1995.

Objectives and Limitations

The Ministry of Forests, Kalum Forest District, requested that Millennia Research map the archaeological resource values in the Kalum Forest District at 1:250,000 scale. The resulting study provides mapped information for two categories of heritage resources: prehistoric archaeological resource potential (**dataset I**); and the location of known archaeological sites (**dataset II**). For **dataset II**, archaeological sites are defined as locations where physical evidence of past human use exists. Traditional Use Sites such as medicinal plant gathering areas, places associated with traditional history, or places used for spiritual and religious purposes **often** do not leave material remains which can be considered archaeological sites. Traditional Use Site studies should be incorporated into resource land use and the present product is not a substitute.

The potential map and known site locations are part of an electronic Geographic Information System (GIS). The GIS can be used to help in land management. For example, the GIS can combine areas of high archaeological potential with sensitive locations in other databases, such as fish habitat and ungulate winter range, to find areas of highest sensitivity. These areas could then be combined with areas identified in five year logging plans to show the places likely to have the most conflicts. The GIS can be extremely useful in helping to resolve or avoid conflict.

An additional benefit of GIS is the ease with which the map bases can be modified as new information that affects archaeological potential becomes available. New information could include data from Traditional Use Studies regarding historical and contemporary First Nations use of the land and information resulting from new archaeological surveys,

The potential map identifies areas as having “low” archaeological potential. This **does not mean** that such areas contain no archaeological sites, nor that aboriginal people never or even seldom used these lands, Low ratings are assigned to lands where a variety of factors suggest that material remains of past human activities (archaeological sites) will seldom have been preserved.

The map is intended for strategic planning. Project-specific or tactical planning requires a mapping scale much larger than the 1:250,000 scale used in the present project, such as 1:20,000 or 150,000 scale.

As mentioned above, a parallel Traditional Use Study inventory is needed to manage heritage resources but was not a part of the scope of the present study. Traditional Use Studies require extensive consultation with First Nations. Such inventories would collect data on food harvesting, traditional history, cultural landforms, ceremonial and sacred locations, and other categories of traditional use (**Bouchard et al.** 1993). Some of these places may have archaeological remains (physical evidence of human activities), but others may not. The present mapping *confines* itself to attempting to accurately identify the landforms in which prehistoric

archaeological sites are predicted to be located. It does not attempt to map the potential for historic period sites, nor of overall aboriginal land use, past or present,

Study Area

The Kalum North Forest District encompass a large part of west-central British Columbia, including the **Nass** River drainage **from** Greenville to its headwaters. The present study occurred within the northern part of this forest district.

Study Team

The study team consisted of employees of Millennia Research, an independent consultant, Commonwealth Historic Resources Management Ltd. Millennia Research personnel who worked on the project included Morley Eldridge, M.A., who has conducted field work in the study area on several occasions. He produced some of the first archaeological potential maps in the province, developing a system compatible with the Canadian Land Inventory (Eldridge and Eldridge 1980). Mr. Eldridge directed work on the project. He was assisted by **Tina** Christensen, B.A., **D'Ann** Owens-Baird, B.A., Pamela Smith, M. Phil., and Bert Wilson. All brought their archaeological experience **from** various areas of the province and abroad. Ms. Christensen and Ms. Owens-Baird drew most of the polygons and Mr. Wilson did most of the data entry and error trapping.

Dana **Lepofsky**, Ph.D., conducted the ethnographic overview and summarized the environment of the area, assisted by **D'Ann** Owens-Baird and Pamela Smith. Dana Lepofsky has extensive experience in archaeology, ethnoarchaeology, ethnobotany, and palaeoethnobotany in British Columbia and Oceania. Bert Wilson also assisted with identifying, compiling, and tabulating ethnographic information from Benyon and **Barbeau** sources.

Craig Dixon, B.A., of Commonwealth, digitized maps and produced draft check plots in **MicroStation** 5. Commonwealth has extensive experience conducting management and overview studies and **Mr.** Dixon has worked for several years with different GIS systems.

Methods

The following section discusses the methods used to gather information about the environment, the ethnography, and previous archaeology. The mapping process itself is also discussed, from compilation of data used through the potential rating process to how this data was used to create the polygons.

Physical Setting

The background information regarding the modern and **palaeoenvironment** was compiled from published sources, including books, journal articles, and maps. A small number of unpublished or “in press” sources were also examined.

Ethnographic Summary

Several types of sources were accessed in order to produce a summary of the ethnography of the **Kalum** study area. Ethnographic research focused on those aspects of aboriginal life which might be reflected in the archaeological record. The summary is largely based on published ethnographic sources with contributions from primary, unpublished sources. Dana Lepofsky conducted an exhaustive review of ethnographic research pertaining to the study area.

To access published and unpublished material, five different institutions were approached for archival and library information. The computer catalogue of the Culture Library of the Ministry of Small Business, Tourism, and Culture was searched for relevant information. The holdings of the University of Victoria and University of British Columbia main libraries and Special Collections were also reviewed. The Canadian Museum of Civilization was contacted specifically to obtain maps that should accompany the **Barbeau** and Benyon ethnographic material, but which were missing from the BC Provincial Archives (which holds copies of the notes themselves).

Previous Archaeological Research

Millennia Research conducted an exhaustive review of archaeological research within the study area. We first searched the *Annotated Bibliography* (Archaeology Branch 1994) in order to locate inventory survey, impact assessment, and excavation reports. Another search was made of the published and unpublished reference fields of recorded sites in CHIN. We found that about one third of the reports included in the CHIN database did not appear in the *Annotated Bibliography*. The resulting combined list of archaeological sources was used to find documents in the Cultural Library of the Ministry of Small Business, Tourism, and Culture. As a final check, the bibliographies of these documents were **all** searched for additional sources.

First Nations Consultation

First Nation Tribal Councils and Bands who reside in or have some claim to the Kalum Forest District were contacted before the research portion of this project began. We hoped to discuss details of the project, First Nations knowledge of the distribution of archaeological sites, traditional land use in the study areas, and any areas of concern by the First Nations involved. Consequently we drafted a letter and faxed it, on December 14th, to the First Nations’

representatives concerned. Please see Table 1 below for a list of people we contacted. Due to an oversight, two First Nation groups were missed on our first contact attempts. We subsequently (January 18) sent the same drafted letter to the Tahltan Tribal Council and the Nisga'a Tribal Council. We received no response to any of these letters.

On the advice of Stuart Rush, the lawyer for the Gitksan Wet'suwet'en, we contacted Lou **Skoda**, head cartographer for the Gitksan Wet'suwet'en, and Sterritt Consulting Ltd. to request access to the "atlas" of traditional Gitksan-Wet'suwet'en land use. This "atlas" was compiled for the Delgamuukw court challenge, Neil Sterritt promptly replied to our request, suggesting that it would be appropriate to pay for this information, which was compiled at great expense by the First Nations. This information is legally in the (free) public domain, having been entered as evidence in the court challenge. Since we were publicly funded, and since we were unwilling to use the information without the permission of the First Nations, we elected to not use the "atlas" at this time. With the GIS system, changing the rating of specific lands and the accompanying database is quite easy. The mapping can be modified at any future date if specific areas appear to be misclassified in comparison to the atlas information.

We attempted to arrange attendance at a meeting between Gordon Sebastian of the Office of the Gitksan Wet'suwet'en Hereditary Chiefs and another archaeological consultant involved in the **LRMP** process, the standards of which were followed in the **Kalum** potential mapping. This meeting was arranged to discuss the archaeological potential mapping with the Gitksan First Nation. Unfortunately, it seemed likely that the meeting might not take place and we decided not to attend. **Arcas**, who had scheduled meetings with a number of first Nations in central British Columbia, agreed to pass on the results of the discussion. We also made it clear that we were willing to attend any other meeting that could be scheduled.

Marvin George, Lands and Resources Negotiator for the Wet'suwet'en Hereditary Chiefs Treaty Office gave the only response from the First Nations. He contacted Millennia Research by phone with major concerns about the entire report process. It was **Mr.** George's position, and we believe that it is a commonly held view by First Nations representatives in the region (see **Mackie** and Eldridge 1992: 114), that it is inappropriate for consultants to initiate contact with the First Nations after the process has started. Rather, contact should take place at the inception of the project and should originate from the client (i.e., the BC Government) rather than from the consultant. First Nations should be involved in primary research and reporting, rather than as token suppliers of data. Mr. George also was unhappy with the concept of archaeological potential, given the virtually complete ownership and use of land by the Wet'suwet'en people. After our initial conversation, Dana **Lepofsky** left numerous messages at the contact number with no response.

Table 1. List of First Nations representatives contacted from the Kalum Forest District

Tribal Council/Band Contacted	Individual Contacted	Date Contacted	Type of Contact	Response
Office of the Gitksan Wet'suwet'en Hereditary Chiefs	Stuart Rush, lawyer	December 6, 1995	letter fax	Stuart Rush responded by phone to discuss the letter.
Gitwangak Band	Chief Henry Harris Tait	December 14, 1995	letter fax	none
Gitwinksihlkw Band	Chief Perry Azak	December 14, 1995	letter fax	none
Gitlakdamix Band	Chief Herbert Morven	December 14, 1995	letter fax	none
Gitanyow Band	Chief Guy Morgan	December 14, 1995	letter fax	<i>none</i>
Kincolith Band	Chief Stuart Doolan Sr.	December 14, 1995	letter fax	none
Laxqalts'ap Band Council	Chief Nelson Leeson	December 14, 1995	letter fax	none
Tsimshian Tribal Council	Robert Hill, President	December 14, 1995	letter fax	none
Tahltan Tribal Council	Chris Rattray, President	January 18, 1995	letter fax	none
Office of the Gitksan Wet'suwet'en Hereditary Chiefs	not specified	January 18, 1995	letter fax	Phone contact by Marvin George , February 6, 1995.
Nisga'a Tribal Council	Joseph Gosnell, Resident	January 18, 1995	letter fax	none
Gitksan Treaty Office	Neil Sterritt	January 26, 1995	fax letter	Reply from Neil Sterritt January 31 (see appended letter).
Office of the Gitksan Wet'suwet'en Hereditary Chiefs	Gordon Sebastian	February 9-12, 1995	phone calls	To arrange to attend meeting between another archaeological consulting firm and Mr. Sebastian.

Mapping Methodology

Dataset I: Archaeological Resource Potential

Lines were drawn on maps that defined those areas (polygons) that might have similar potential for sites being present. The specific location of the lines was determined by eleven types of information (variables). Most polygons are confined to major topographic units and many boundaries are based on distinctions such as the change from valley bottom to mountain side. In areas of similar terrain, information on reach boundaries and spawning grounds of several fish species and on winter range boundaries of ungulates and waterfowl was also used to define the boundaries.

The eleven variables used in drawing boundaries and determining the potential rating of each polygon are:

1. slope
2. **landform/terrain**
3. distance to major bodies of water
4. aquatics biophysical values
5. ungulate capability
6. presence of known ethnographic sites
7. ethnographic use of similar biophysical areas
8. presence of recorded archaeological sites
9. accessibility
10. presence of sub-alpine resources
11. presence of old-growth forest.

The following table shows how these variables increase or decrease the possibility of sites being present.

Table 2: Table of variables correlated with potential

VARIABLE LANDFORM	POTENTIAL		
	INCREASES	DECREASES	NEUTRAL
Steep Slope		X	
Shallow Slope	X		
Moderate Slope			X
GENETIC MATERIALS			
Anthropogenic (land fill)		X	
Colluvial		X	X
Fluvial Terracing	X		
Fluvial Level	X		
Fluvio-glacial			X
Ice		X	
Morainal			X
Organic		X	
Organic Bog			X
Bedrock	X	X	
Marine			X
TEXTURES			
bouldery		X	
mbbly, pebbly, gravelly, sandy, silty, clayey, fines			X
mbbly, blocky		X	

MODIFYING PROCESSES

Avalanched		X	
Cryoturbated			X
Kettled	X		
Channelled		X	X
Channelled by meltwater channels	X		
Failing		X	
Nivated/Soliflucted			X
Gullied		X	

QUALIFYING DESCRIPTORS

glacial			X
bog, fen			X
Active		X	
Inactive		X	

SURFACE EXPRESSION

apron		X	
blanket			X
fan	X		
hummocky	X		
level	X		
subdued	X		
ridged		X	
steep		X	
terraced	X		
veneer			X

SPECIAL SITES

Esker	X		
Glacial Meltwater Channel	X		
Escarpment	X		
Cirque		X	
Avalanche Track		X	
Landslide Scar		X	

AQUATICS/ WILDLIFE	POTENTIAL		
	INCREASES	DECREASES	NEUTRAL
Dolly Varden			X
Salmon (five varieties)	X		
Trout	X		
Spawning Beds	X		
Class 3w to 1 ungulate capability	X		
Class 7-4 ungulate capability			X

FLORA	POTENTIAL		
	INCREASES	DECREASES	NEUTRAL
Cedar, Hemlock, Spruce, Balsam, or Pine (8 & 9 age class, 5+height class)	X		
Logging		X	
"Disturbed" forests		X	X

ETHNOHISTORIC/ ARCHAEOLOGICAL	POTENTIAL		
	INCREASES	DECREASES	NEUTRAL
Presence of known archaeological sites	X		
"Grease" trails	X		
Hunting grounds	X		
Fishing grounds	X		
Plant gathering areas	X		

As polygons were drawn, the variables which contributed to the potential rating were recorded. If slopes are steep, the slope variable is recorded as a "1", meaning that the variable decreased archaeological potential. A gentle slope increases potential, and this is recorded as "2". If the slopes are moderate, or if there is a mix of steep and gentle slopes, this has no net effect on potential, and is recorded as a "0". All variables were coded on a sheet. By scanning across the sheet, the relative number of "1s" and "2s" can be compared to the potential assigned. Many "2s" should be present in a High potential polygon, whereas many "1s" should be present in a "Low" potential polygon. This allows for corrections and checking. If a "Low" potential polygon contains many "2s", the potential rating should be re-examined.

Some variables are more important than others for determining the potential rating of a polygon. For instance, the presence of known archaeological sites and the presence of an ethnographic village is more important than the ungulate capability in assigning a high potential. We recorded the relative importance of each variable as well as the rating of the variable itself. All these ratings are available in an electronic database that is linked to the mapped polygon, so that the rating criteria can be instantly examined for any polygon that is selected using the GIS.

We are quite sure, in some locations, that our predictions of potential are accurate. However, in other places there has never been any archaeological survey in this or in similar locations. There may also be conflicting variables (for example good fishing areas but landforms such as river sand bars which are unlikely to preserve archaeological remains). We deal with these situations by recording our confidence in the prediction. The confidence is also available in the database, and is also depicted in the map by differing amounts of colour.

Dataset II: Known Archaeological Sites

Information about known archaeological sites was obtained from the Canadian Heritage Information Network (CHIN) available with permission of the BC Archaeology Branch. The database was downloaded and then converted to a standard Forest District format. The locational

data was compared mathematically to a separate database of locational data for the same sites obtained **from** the Archaeology Branch. Duplicate or missing sites were noted, and the locational discrepancies between the two **datasets** calculated mathematically.

Density

The density of sites per square kilometre was calculated from archaeological survey results wherever the reports gave sufficient information about the specific size of area and density of area involved.

Digitizing

Digitizing refers to the process of transferring locational points or shapes (polygons) into a digital format that a Geographic Information System (**GIS**) can use. In the case of the potential polygons, the paper map was “traced” by a technician moving a “puck” along the lines. The “puck” translated the locations into a mathematical representation of the lines and curves on the paper, and stored **this** information in a computer. As each shape was completed, a number was entered that tied this particular polygon to the database that stored information on potential, density, and variables. In this particular case, the digitizing was conducted using a program called “**MicroStation V**”.

RESULTS

Land Use Zones and Expected Archaeological Sites

For the ethnographic section of the overview assessment, the Nisga’a, Tahltan, and Tsetaut land was divided into four broad land use zones. These zones, Valley Bottom, **Montane/Plateau**, Subalpine, and Alpine were chosen to represent the seasonal subsistence land use cycle as described in ethnographies. Following is a summary of the conclusions pertaining to the type of archaeological sites that are associated with each land use zone.

Valley Bottoms were extensively and intensively used, producing a myriad of site types. Sites to be expected are: villages with house features, sweat lodge and smoke house features, ritual seclusion lodges, caches, **midden** deposits, hearths, earth ovens, and burials; fishing camps with temporary shelters, hearths, drying racks, cache pits, roasting features, weirs, and fish traps; rock art sites, pictographs, and petroglyphs associated with trade, ritual, and ceremonial activities; **lithic** scatters, hearths, earth ovens from berry and plant collection and processing; lithic scatters and hearths resulting from hunting activities; various types of culturally modified trees; special sites used for puberty and menstrual huts; and fortress sites in defensive locations.

In Montane areas, culturally modified trees and evidence of tree falling may be expected, Harvesting and processing of inner bark was extensively conducted along lakes and rivers in this zone. Scars **from** inner bark collection should therefore be visible. Lithic scatters, earth ovens, cache pits, and hearths resulting from hunting and gathering activities may be present. Grease trails still remain. Salmon harvesting sites might occur on upriver runs. Permanent villages were associated with the best Montane fishing locations and remains of these villages may still be evident. Finally, remains of camps to harvest abundant waterfowl may be present along lakes.

Sites to be expected within the Subalpine zone, especially in the meadows, are: high elevation berry and plant processing locations, including berry drying houses, earth ovens, roasting pits, and hearths; and earth ovens for baking animals from hunting sites. Sites associated with hunting might also include hunting blinds, deer fences, butchering remains, and caches. Subalpine sites associated with forays into the alpine might also be expected: base camps, smudge pits, sweathouse lodges, staging areas, and trails.

In the Alpine zone, isolated finds, driving lines, hunting blinds, and cairns may indicate hunting excursions. Hearths, earth ovens, and lithic scatters may also be present from root crop gathering or hunting activities. Prehistoric trade trails are still evident and prehistoric quarry sites and evidence of resource extraction may be found.

Dataset 1 (Potential)

Using the data and criteria discussed above, polygons were drawn and a supporting database entered for approximately 3 1 1:50,000 maps within the Kalum Forest District. Table 3 lists the number of polygons for the study area and the percentage of high, medium, and low areas.

Table 3: Polygons in the Kalum Forest District

	Number Polygons	Number High	Number Medium	Number Low
Kalum	192	64	66	62

Using the format with which the maps were produced, it was not possible to obtain the percentages of land area for polygon type. Most of the highly rated polygons are found along the valley bottoms of large river drainages and in subalpine areas. Moderate potential polygons often border these high rated areas. Low potential polygons area usually associated with elevated, ice-capped locations.

Dataset 2 (Known Sites)

Site Types

The Kalum Forest District has a total of 52 previously recorded archaeological sites. Each archaeological site may contain many different site types. As in the adjacent **Bulkley** and Kispiox Forest Districts, the recorded sites contain mostly “subsistence features”. “Subsistence features” are generally cache pits in this region. “Habitation” sites are the second largest category of site types for the Kalum region. “Cultural materials” also make up a large portion of the site types, The term “cultural material” covers a large range of functional site types which may include shell middens, lithic scatters associated with temporary camps, or modified trees. Table 4 presents the total count for different site types. The Archaeology Branch’s **typology** for the BC Archaeological Site Inventory is followed. The database provides information on site type, subtype, and descriptor. Only the type and subtype are summarized in the table.

The Archaeology Branch Site Inventory **typology** is different from the functional types used above in the sections discussing ethnography and correlation between ethnographic land use zones and archaeological sites. It is simplest to describe archaeological sites as “villages”, “Camps”, “earth ovens”, or “roasting pits” in the context of ethnographic information. However, one of the standardizations of the LRMP and forest district land use process involves the use of Site Inventory **typology**. Table 5 assists the reader in associating the two typologies.

Table 4: Known site types in the Kalum Forest District.

Site Type (Subtype and Descriptor not shown)	Kalum
Subsistence Feature	29
Habitation	25
Cultural Material	12
Ethnological	13
Pictograph/Petroglyph	2
Human Remains	8
Earthwork	2
Modified Tree	3
Transportation (trail)	13

Over half of the site types contain subsistence features. These features are usually storage features, such as cache pits, that are highly visible, especially in locations close to salmon fishing stations or winter villages. They appear to be underrepresented in the study area, compared to site type distributions in the adjacent forest districts. In the Bulkley, 71% of the sites contain pit features and in the Kispiox, the percentage is 61%. Whereas, 6% of the North Coast Forest District (**NCFD**) sites contain subsistence features. Most of these are fish traps rather than cache pits. To the east, 32% of the 2,590 sites in the Prince George Forest District (**PGFD**) contain subsistence features. This percentage is much higher than the NCFD percentage but still nothing close to the Kalum, Bulkley, or Kispiox districts (data from CHIN).

“Habitation” sites make up 48 % of the site types in the Kalum Forest District, This is quite high as compared to only 7% of the sites in the adjacent Bulkley region, 20% of sites in the North Coast, and 12% in Prince George. However, many of the Kalum “Habitations” are in fact historic First Nations cabins. The presence of historical cabins increases the percentage for this site type.

As compared to the forest districts to the east, the percentage of recorded transportation trails within the Kalum Forest District is quite significant. A **figure** of 13% in the district triples

that of the **Bulkley** region and no transportation trails have been recorded within the Kispiox **region**. This may be due to the fact that the southern border of the Kalum Forest District runs along the **Nass** River where trails converge from the north and east.

Table 5: Correlation of site and feature types expected from ethnographic sources and predicted site types.

Ethnographically correlated site or feature type	BC Site Inventory site type (Type and subtype)
Fortified site	Habitation, refuge; Cultural Material
Village	Habitation platform, depression; Cultural Material
Pithouse village	Habitation, depression; Cultural Material
Midden deposit	Cultural Material, subsurface
Wet site (preserved organics)	Cultural Material, subsurface
Campsite	Cultural Material surface or subsurface; possibly Habitation, rock shelter
Smoke house	Subsistence Feature, fish; Cultural Material
Berry drying house, berry drying rack	Subsistence Feature, other; Cultural Material
Cache pit	Subsistence Feature, depression;
Hearths	various
Earth oven	Subsistence Feature, depression
Sweat lodge	Habitation, depression
Puberty or birth huts	poss. Habitation, depression
Weirs or fish traps	Subsistence Feature, fish
Scaffolding	Subsistence Feature, fish
Deer fences, driving lanes, hunting blinds	Subsistence Feature, land mammal
Lithic scatter from hunting event	Cultural Material, surface or subsurface
Butchering site	Subsistence Feature, land mammal; Cultural Material, surface or subsurface
Smudge pit	Subsistence Feature, depression
Cairn	Petroform
Trail	Trail
Burial, cremation platform, gravehouse	Human Remains
Lithic quarry	Cultural Material, surface or subsurface
Bark-stripped tree, cambium-stripped tree, stump, culturally modified tree	Cultural Material, surface
Rock art site, pictograph, petroglyph	Pictograph; Petroglyph

A site type that seems to be underrepresented is “Cultural Material”. “Cultural Material” can mean a wide range of cultural materials, including shell middens, fire-altered rocks, and/or lithic scatters. This site type is present in only 23% of the sites in the Kalum North region. By comparison, the value for North Coast is 72%, Prince George is 63%, and Kispiox is 50%. The Bulkley region is comparable with 29%. This is probably because cultural material is more difficult to locate in the archaeological record as compared to village sites or subsistence features.

Pictograph/Petroglyph, earthwork, and modified tree categories are all below 10% of the known site types. Both the pictograph/petroglyph and modified tree categories seem to be grossly underrepresented. Modified Trees, although sometimes classed in the BC Inventory as “Cultural Material”, have been given their own category in this report. We consider Modified Trees a unique type of site. This type is obviously in the Kalum sample. Only three are recorded. In comparison, 13% of the Kispiox sites contain Modified Trees. This compares with 13% of the NCFD and 23% of the PGFD.

Density

Using the existing survey coverage of the study area, we were able to derive some estimated values for archaeological site density, in terms of sites per square kilometre in the various potential classes. The survey coverage in the area combined with analogy with other areas of the province (Eldridge and Mackie 1992) suggests site densities will be about five or more sites per square kilometre in the high potential polygons. There are few examples from the Kalum region due to the limited number of archaeological surveys conducted there. By analogy, the Babine Lake shoreline has a density of 6.17 sites per square kilometre and the canyons of the salmon bearing rivers in the South Kalum area have even higher densities - over 50 per square kilometre at Kitselas Canyon. Moderate potential polygons will have lower site densities of about one or two per square kilometre. Low density areas are expected to have less than 0.5 sites/sq. km.

These values do not hold for the special case of culturally modified trees. CMTs occur over very large areas and are not easily equated with other archaeological sites. The density of these features is better expressed as CMTs per hectare than as sites per square kilometre (see Mobley and Eldridge 1992; Strydom and Eldridge 1993). Some moderate potential lands could contain high densities of CMTs, but these polygons are not expected to have many other site types. CMT density is not assessed and is not reflected in the database linked to the polygons,

RECOMMENDATIONS

Recommendations fall under two principal headings: political liaison with First Nations; and revisions to the map and future field work.

First *Nations* Involvement in *the* Study

The present project involved liaison with the First Nations. However, there was a very low response rate to our letters explaining the goals, objectives, and methods of the study. From conversations with First Nations representatives in several areas of the province, we understand that most First Nations are dissatisfied with several aspects of the process.

There seems to be a widespread misunderstanding regarding archaeological potential mapping versus Traditional Use Site studies in the First Nations communities. Many First Nations spokespersons do not accept the definition of an archaeological site as being limited to physical remains. They feel it is wrong to classify areas as having low archaeological potential where there is or was significant amounts of use. Often, Traditional Use Sites such as fishing stations or areas used for ceremonial or religious uses are of higher immediate significance to First Nations than are archaeological sites. If archaeological studies are done without the support of Traditional Use studies, it leaves an impression that First Nations concerns are not being seriously considered by government planners. Only when Traditional Use Site studies are undertaken concurrently with archaeological overviews are First Nations likely to accept the concept of archaeological potential maps.

Map Revision and Further Work

The maps and the model on which they are based need to be ground-truthed. The model of site potential could be further refined to be much more precise, both in terms of a reduction of the area considered to have potential, and in the types of sites expected. It is very difficult to predict the presence of **CMTs**, since there has been virtually no survey of these lands in the study area. It is recommended that surveys take place in representative areas of all environmental zones as soon as possible, in order for results to be incorporated into map revisions.

An inventory of native Traditional Use Sites should be created. A discussion of this inventory is beyond the scope of the present study, but all places with significance to the aboriginal community would be identified, irrespective of whether archaeological remains could be expected. This information could obviously greatly improve the archaeological model and mapping.

The potential maps should be updated on a regular basis to take into account information derived from new surveys. In particular, systematic surveys of previously underrepresented areas should be tracked and the potential ratings for similar areas reviewed in light of the findings.

Potential mapping at 1:20,000 or 1:50,000 scale should be undertaken in order to provide data for tactical planning and resource impact assessment. The 1:250,000 scale of the forest district does not allow for **sufficient** detail for potential mapping. In the Cariboo Forest Region, Bussey and Alexander (1992) predicted that almost 100% of the known sites would occur in about 25% of the land base. **CMTs** were not included in this value. Using a more sophisticated model at 1:50,000, Eldridge and Eldridge (1979) predicted 75% of the sites in the Dean River

valley would occur in only 6% of the land area. Virtually the entire Dean River study area was contained in the 25% of the 1:250,000 study area assigned "potential", showing the increase in accuracy introduced by scale. It should be noted that these studies were able to predict site location with some accuracy only because a number of well-designed, probabilistic site surveys had been conducted in the region.

The impact assessment process should take into account previous studies when determining which areas should receive priority for survey. For instance, areas with high or moderate potential in the subalpine or Montane zones should receive priority, in order to ground-truth survey the potential map and to obtain real data on site distribution and density.

The location of **all** new archaeological surveys **Kalum** Forest District should be mapped by the Archaeology Branch's Inventory Section, in order to track the distribution and intensity of survey work. At the present time, there is no way to tell if there has been previous work that found no sites in a particular area, without conducting an exhaustive library search.

Future studies could also include a provision to map existing archaeological survey coverage (incorporating a third database that would include information on the persons conducting the survey, year of survey, and survey design and methodology). It should be recognized that it is impossible to map survey coverage for many poorly reported studies.

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