ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Morice Forest District: Archaeological Potential Model Revisions

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Prepared for

Ministry of Forests
Morice Forest District
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May 2002

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

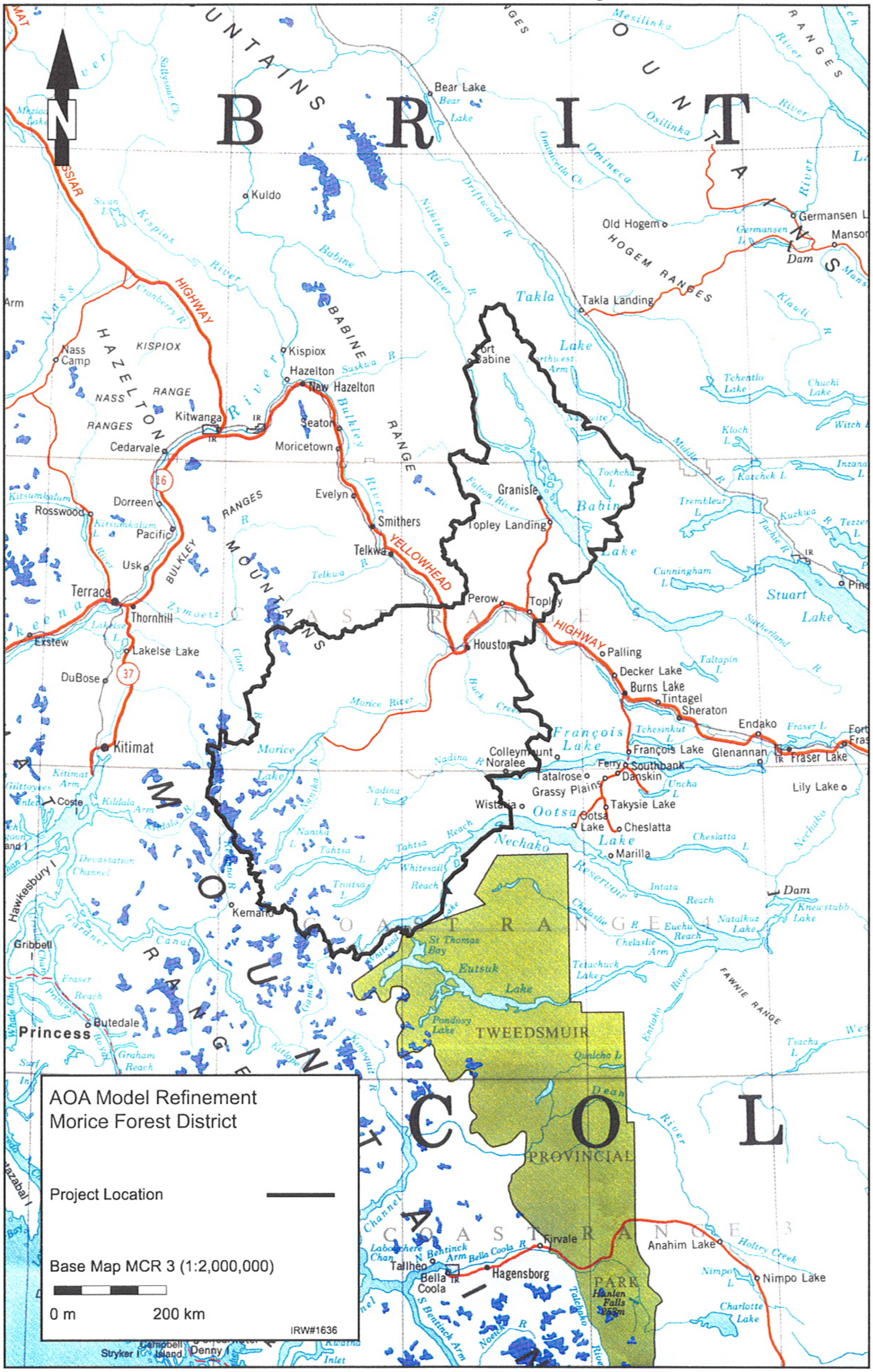
1. INTRODUCTION

The following study was prepared at the request of the Ministry of Forests, Morice Forest District. The study is an Archaeological Overview Assessment (AOA) representing a refinement of the archaeological potential model used in the Morice Forest District (Figure 1). The project is intended to be consistent with Archaeological and Recreational Section guidelines for archaeological overview assessments. The purpose of this study is to refine and test the AOA model for the Morice Forest District and provide written and mapped information on archaeological resource potential as well as information on the locations of known archaeological sites. It is intended to help enable Ministry and industry staff to make appropriate decisions regarding requirements for future Archaeological Impact Assessment (AIA) studies for proposed forestry developments.

Heritage sites and objects on private and Provincial Crown land in British Columbia are protected under the Heritage Conservation Act which is administered by the Archaeological and Recreational Section of the Ministry of Sustainable Resource Management. Heritage resources specifically protected by the Act include Provincial heritage sites, burial places with historical or archaeological value, aboriginal rock paintings or carvings, sites with evidence of human habitation or use before 1846 and heritage wrecks. The Lieutenant Governor in Council may also make regulations to define the extent of types of sites protected by the Act.

Archaeological and historical sites are places which indicate past human occupation or use. Archaeological sites are those which can be investigated primarily by archaeological methods such as excavation whereas historical sites can be studied not only by archaeological methods but also through the analysis of written records.

Heritage resources can be prehistoric in age (the time before European arrival) or they can be historic. They can be of Native Indian, European, Euro-Canadian or other ethnic affiliation. Ethnographic heritage sites are locations reported as having been used or occupied by Native Indian people in the past which may or may not contain any physical evidence for such an occupation or use. A reported ethnographic site found to contain physical evidence changes the site to an archaeological site enhanced by ethnographic information. Ethnographic sites with no corroborative physical evidence are not treated as heritage sites according to present heritage legislation. However, ethnographic sites require proper management as a responsibility of developers.


AOA Model Refinement
Morice Forest District
Project Location
Base Map MCR 3 (1:2,000,000)
0 m
200 km
IRW#1636
N
B R I T
C O L
Bear Lake
Kuldo
Old Hogem
Germansen L
Manson
Dam
HOGEM RANGES
Takla Landing
Takla Lake
Fort Babine
Kispiox
Hazelton
New Hazelton
Nass Camp
KISPIOX
NASS RANGE
RANGES
HAZELTON
Kitwanga
Cedarvale
Seaton
Moricetown
BABINE RANGE
Evelyn
Granisle
Topley Landing
Babine Lake
Smithers
Telkwa
YELLOWHEAD
HIGHWAY
Rosswood
Dorreen
Pacific
Usk
Terrace
Thornhill
Exstew
Lakelse Lake
DuBose
Kitimat
BULKLEY RANGES
MOUNTAINS
Perow
Topley
Houston
Palling
Decker Lake
Burns Lake
Tintagel
Sheraton
Endako
Fraser Lake
Glenannan
Stuart Lake
Cunningham L
Morice River
Morice Lake
Colleymount
Noralee
François Lake
Southbank
Ferry
Danskin
Tatalrose
Grassy Plains
Wistaria
Takysie Lake
Ootsa Lake
Cheslatta
Marilla
Lily Lake
Nechako Reservoir
Kemano
COAST RANGE
Eutsuk Lake
TWEEDSMUIR
PROVINCIAL
PARK
Dam
Gribbell
Hawkesbury I
Butedale
Princess
Kitimat Arm
Firvale
Hagensborg
Bella Coola
Tallheo
Anahim Lake
Nimpo Lake
Charlotte Lake

There are usually three stages to the heritage resource impact assessment and review process including overview assessment, detailed impact assessment and impact mitigation. The overview assessment is intended to identify and assess heritage resource potential or the likelihood that sites are present. The objectives of the detailed impact assessment are the identification and evaluation of heritage resources within a proposed development area and also the assessment of possible impacts by the development on these sites. Impact mitigation is any course of action that results in the reduction or the elimination of the adverse impacts of a development. Mitigation usually involves site protection, project redesign or systematic data recovery, normally involving archaeological excavation.

The present study was designed to satisfy the objectives of an archaeological overview assessment.

2. BACKGROUND

2.1 Environment

The Morice Forest District lies to the south of the Skeena Mountains and east of the Hazelton Ranges in the northern portion of the Nechako and Interior plateaux of British Columbia.

During the Pleistocene, the entire project area was covered with glacial ice. The ice mass had receded by approximately 9,000-10,000 years ago and the Bulkley, Skeena, Babine and Hazelton regions were likely habitable shortly thereafter. Post-glacial climatic conditions, forest cover and vegetation is not well known in the northern regions of British Columbia, but much can be inferred from paleoenvironmental studies conducted in the central interior. Between 12,000 and 10,500 years ago, likely predating human occupation, conditions were cool and moist. The next 3,500 years marked a warmer and dryer period known as the Hypsithermal (Hebda 1982, 1986; Mathewes 1985). Between about 7,000 to 4,500 years before present (B.P.), temperatures remained warm but precipitation increased. A cooler, moister climate than today was in evidence between 4,500 to 3,000 years ago, followed by relatively stable climatic conditions from 3,500 years B.P. onward.

The Morice Forest District today is comprised of five major biogeoclimatic zones: Alpine Tundra (AT) 11%, Coastal Western Hemlock (CWH) 3%, Engelmann Spruce-Subalpine Fir (ESSF) 26%, Mountain Hemlock (MH)1%, and Sub-Boreal Spruce (SBS) 59%. The most dominant biogeoclimatic zone within the Morice Forest District is Sub-Boreal Spruce. The SBS zone is typified by the gently rolling plateau in the center of B.C.'s interior. Intermediate between the dry, southern Interior Douglas fir forests and the northern boreal forests, the Sub-Boreal Spruce zone is climatically severe, with short but cold winters and a moderate growing season. The most common tree species are lodgepole pine (*Pinus contorta* var. *latifolia*), Engelmann spruce (*Picea glauca x engelmannii*) and subalpine fir (*Abies lasiocarpa*), with widespread stands in the drier areas and large cottonwoods (*Populus balsamifera* ssp. *trichocarpa*) in the wetter areas. Poorly drained areas in this biogeoclimatic zone are frequent and characteristically wet.

The most common large mammals in the study area include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), grey wolf (*Canis lupus*), cougar (*Felis*

concolor), elk or wapiti (*Cervus elaphus*) and, at higher elevations, bighorn sheep (*Ovis canadensis*), mountain goat (*Oreamnos americanus*) and caribou (*Rangifer tarandus*). Smaller mammals include coyote (*Canis latrans*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), fox (*Vulpes vulpes*), marten (*Martes americana*), marmot (*Marmota* sp.), hare (*Lepus americanus*) and muskrat (*Ondatra zibethicus*). Salmon (*Oncorhynchus* sp.) and an abundance of fresh water fish can be found in many of the streams, rivers and lakes in the general project area.

2.2 Linguistic and Ethnic Affiliations

Traditionally, the Morice Forest District is within the territory of the Carrier peoples, a Northern Athapaskan speaking linguistic grouping comprised of a number of subtribes. Fourteen subtribes have been identified within the Carrier, all based on socioterritorial units identified from a variety of sources (Jenness 1943; Morice 1893, 1906). It is primarily based on linguistic grouping that the Carrier "tribe", as it is used here, is distinguished from the neighbouring Chilcotin and Sekani, the Gitxsan, Haisla, Bella Coola and Shuswap (Tobey 1981:413).

Traditionally, the Northern Carrier were organized in matrilineal based clans, similar to and possibly based on the social organization of the Gitxsan (Cassidy and Cassidy 1980; Tobey 1981). Following a pattern of seasonal transhumance characterized by summer and winter aggregation and spring and fall dispersal, the most important economic activity of the Carrier peoples was salmon fishing in the late summer and fall. Utilizing tools and equipment such as fish weirs, fish traps, scaffolds, rakes, spears, gaffs, harpoons and nets, the Carrier caught salmon which were eaten fresh or dried and stored in cache pits for the winter months (Magne 1982:8; Tobey 1981:424). Summer settlements would split up in the late fall and early winter, and hunting would begin along established trap lines. During the colder months, the Carrier would congregate in smaller settlements to eat stored foods such as salmon, meats and a variety of plant foods (Tobey 1981:425). Spring was a season of scarcity, when remaining stored foods were utilized supplemented with fish taken from lakes, cambium from stripped pine trees and early spring shoots (Magne 1982:10). The Carrier peoples would congregate again in the summer months to potlatch, an activity likely adopted from the Gitxsan (Cassidy and Cassidy 1981). Potlatching and trading linked the Carrier with neighbouring peoples from as far away as Bella Coola along trail networks that saw goods such as eulachon oil and raw lithic materials carried from the coast to the interior (Tobey 1981).

2.3 Archaeology: General Region

In terms of prehistory, the west-central portion of the province lacks a cohesive regional culture sequence, though a 4,500 year long continuum of cultural evolution has been proposed (Donahue 1977). Culture sequences have been suggested based on a number of well studied Gitxsan sites to the north and west, specifically Githaus, Kitselas Canyon and Hagwilget Canyon (Allaire 1979; Ames 1979; Coupland 1988), but no archaeological culture history has been specifically proposed for the Morice Forest District in general.

The Morice Forest District has seen a number of archaeological studies conducted within or in the immediate vicinity of its boundaries. Borden (1951) recorded 115 sites while surveying Ootsa Lake and the Nechako Reservoir; Sewell (1959) recorded a number of sites in the Nechako River Valley; Elliot (1968), Hewer (1999) and McMurdo (1971) conducted archaeological surveys and Wilson *et al.* (1992) prepared a forestry related archaeological overview of Takla Lake and Takla Landing respectively; Rafferty (1975) conducted a general site survey between Telkwa and Bulkley Lake; Kimble (1978) surveyed throughout the Skeena and Bulkley areas; Bailey and Rousseau (1993) conducted an AIA for a proposed mining development near Houston; Warner (1983, 1984), Wilson (1990) and Hewer (1998a) conducted archaeological projects related to a proposed coal mine near Telkwa; Ham (1988) conducted survey in the vicinity of Dome Mountain to the north of Telkwa; and Richards (1981) recorded 15 new archaeological sites in the Uncha Lake area of the Nechako Plateau. A number of archaeological overviews, surveys and inventories were conducted in the general area in conjunction with the Kemano and Kemano II hydroelectric project (Apland and Wilson 1980; Warner 1979; Warner and Wilson 1982). Various transmission line related surveys (Bussey 1981; Magne 1982; Scott and Bates 1975) and gas pipeline locations (Wilson 1985, 1994) were also conducted. Finally, a number of archaeological inventories and excavations have also been conducted (Albright 1987; Allaire 1979; Ames 1971; Anfossi *et al.* 1999; Carlson and Bussey 1990a,b; Wilson 2000).

Recent archaeological work in the Morice Forest District has generally focused on forestry related survey (Canuel 1997; Carlson 1997, 1998a; Maas 1997; Spafford 1999). Most of these recent surveys were undertaken away from major water bodies and have yielded several subsistence feature, cultural material and, most commonly, CMT sites. The CMT sites typically consist of bark stripped lodgepole pine trees occurring near

creeks and lakeshores and continuing inland. Some have been recorded associated with trails.

2.4 1997 Archaeological Inventory and Overview Refinement

In 1997, an overview assessment refinement was conducted for the Morice Forest District (Hewer 1998b). The project utilized data from the analysis of previously recorded sites, the results of previous archaeological survey in the study area, interviews conducted with *Nedo'ats* (Old Fort) community members, and an intensive archaeological inventory study program. The AIS field program, conducted in two IRM units, was designed to target areas of designated high, moderate and low archaeological potential, with a specific focus on areas deemed moderate, low or unknown. Four prehistoric archaeological sites, GeSm 1, 2, 3 and GbSr 1, and a number of post-1846 culturally modified tree sites were recorded during the AIS programs.

The revised model established a rating system of high archaeological potential zones, moderate archaeological potential zones, low archaeological potential zones and a CMT potential zone. The CMT potential zone included those areas outside high or moderate zones where CMTs were predicted to occur based on the previous data and the results of the AIS. The revised model was necessarily general in its potential zone criteria since it was anticipated that when more archaeological data became available, the model would be easily refined to incorporate new site information and locations.

2.5 1998 Archaeological Inventory and Overview Refinement

Further Archaeological Inventory Study (AIS) was conducted within the Morrison Landscape Unit near Babine Lake in 1998. The AIS was divided into two phases. Phase one involved data collection and stratification of archaeological potential within the project area based on the existing archaeological overview, subsequent refinements to the AOA and First Nation consultation. The second phase of the AIS was the archaeological field inventory. Field inventory resulted in the recording of archaeological features in all but one survey area. A strong correlation between First Nation identified sites/areas of use and physical archaeological remains was confirmed. Two previously unrecorded archaeological sites, GgSp 58 and GgSp 59, were recorded.

Based on this study the Morice Forest District AOA was further refined and incorporated additional First Nations traditional use information.

2.6 Archaeological Sites and Site Types

Site types recorded in the Morice Forest District include habitation sites, subsistence feature sites, lithic scatters, combinations of habitation and/or subsistence features and/or lithic scatters, culturally modified trees, rock art sites, trails, human burial sites and historic sites. Many of these site types are easily recognizable with the exception of wholly and partially buried lithic scatters of stone tools. Sites may be made up of one or several of these components. All site types recorded in the region are discussed below.

2.7 Habitation Sites

Prehistoric habitation sites are most common in locations adjacent to or in the immediate vicinity of bodies of water, most commonly large streams, lakes and rivers but also gullies, creeks and other small drainages. Habitation sites in the study region are typically large, circular depressions or house pits. Pit houses were semi-subterranean winter dwellings traditionally used by a number of aboriginal peoples in British Columbia. Shallow, rectangular depressions, representing the remains of above ground rectangular structures, are also relatively common features indicative of a habitation site. Due to factors of preservation, however, such above ground wooden structures are more difficult to identify in the field.

Habitation sites are important for the study of past lifeways and generally have high heritage significance, particularly in the case of ethnographically documented villages. Habitation sites frequently have more than one functional descriptor since cache pits, CMTs, lithic scatters, human burials and rock art are often present.

2.8 Subsistence Features

Subsistence features most commonly include cache pits, roasting pits and above-ground caches, but fish weirs and subsistence based structures such as drying racks are also included. Like habitation sites, above-ground caches, cache pits (best defined as subterranean storage pits) and roasting pits are often found in the vicinity of a water source, and are frequently a component of larger, multi-function sites. Fish weirs are found in association with water and fishing locales. Subsistence features are often found in association with temporary hunting or fishing camps, often in locations away from principal habitation sites.

2.9 Cultural Material: Lithic Scatters

Lithic scatter sites consist of scatters of stone tools and/or flakes, the result of lithic raw material processing and tool production and/or tool maintenance. Therefore, the category of lithic scatter is not functional but simply a description of the physical remains at a given site. Isolated artifact finds are included in this category. These sites are distinguished from habitation sites because of their lack of structural remains and often by their less diverse artifact assemblages, the result of less intensive and more specialized activities than reflected at village sites. Lithic scatters can reflect camp sites where only transitory dwellings such as summer above-ground structures were present. They can also reflect areas of food processing, tool making, raw material acquisition and others. Lithic scatters are frequently identified by surface lithics, although archaeological subsurface testing is required to establish the boundaries and depth of the scatter.

2.10 Culturally Modified Trees

In the most general sense, culturally modified trees are any trees evidencing human modification. In a more specific and commonly used sense, CMTs are trees that have been intentionally modified by aboriginal people for traditional purposes such as for bark removal, cambium harvesting, use for traditional building material and so on. They represent the physical remains of traditional aboriginal utilization of the forest.

CMTs are automatically protected by the Heritage Conservation Act if they are determined to pre-date 1846; trees post dating 1846 can be protected on a case by case basis. Regardless of their age, CMTs are now all recorded as archaeological sites. In the B.C. Interior and within the general project area, CMTs are most commonly bark-stripped lodgepole pine trees. Lodgepole pine was stripped to collect the inner cambium, the sweet inner bark layer scraped off the tree and eaten fresh or dried and stored.

2.11 Rock Art Sites

Rock art sites can be classified into two basic types: pictographs and petroglyphs. Pictographs are painted images and petroglyphs are pecked or ground images in rock. Pictographs are generally red ochre stained drawings often placed in highly visible locations. Images that have been recorded in the interior include human figures, faces, boats, animals, mythological figures, directional markers and abstract images. Petroglyphs are more rare in the interior than pictographs and depict similar though not identical subjects to pictographs. Petroglyphs tend to be far more difficult to identify but

have a greater potential time depth than pictographs because of factors of preservation. Little is known regarding possible functional, temporal or cultural differences between pictographs and petroglyphs.

2.12 Trails

Trails within the general project area represent transportation corridors utilized by Native people in the past to travel between villages, campsites, fishing locales, hunting and trapping areas, lakes, rivers, creeks and other geographical features. A significant number of well documented aboriginal trails such as "grease trails" originating on the coast and used to carry goods to the interior have been documented within or adjacent to the general project area. Because of their often poorly defined nature, however, smaller trails are rarely identified as archaeological sites, but instead are noted as historic and/or traditional land use features. Trails are frequently recorded in association with other archaeological site types, most notably CMTs and lithic scatters.

2.13 Human Burials

This category includes sites which contain material remains and features associated with prehistoric mortuary practices. However, interments from the historic period are frequently reported in association with recorded archaeological sites. Information about historic cemeteries or individual or family interments can often be acquired through documentary research and consultation with local residents.

Prehistoric burials are difficult to identify because of their generally unmarked nature, although cairns and other related structures can be associated with burials. Burials in the general area are usually associated with larger habitation sites, but are recorded infrequently because of their low archaeological visibility and generally low level of archaeological testing at sites in the present study area.

2.14 Historic Sites

Historic sites relate to human activities during the time period documented by written records. Historic sites in the general study area primarily relate to resource extraction such as logging, mining and agriculture, as well as small scale hunting and fishing activities. Sites can range from large complex sites which represent a wide range of activities to task specific sites which evidence little diversity in activity. Thus, the

scientific, historic, and ethnic significance of this site type varies greatly and should be assessed on an individual basis. Such research should take into account archaeological remains, standing structures, documentary evidence, historic significance (links to important events, individuals and developments in local, regional and national history), ethnic and economic significance. It should be noted that current legislation requires archaeological evaluation of all sites older than 1846 and allows more flexibility with more recent resources. However, post-1846 sites may also require archaeological work and may be protected by legislation depending on the nature and significance of the deposit.

Historic sites within the Morice Forest District tend to be relatively small, activity specific sites such as hunting and fishing camps and/or cabins, or resource extraction sites such as those associated with mines or fishing operations.

3. METHODOLOGY

The purpose of this study is to further refine and test the Archaeological Overview Assessment (AOA) model for the Morice Forest District (Hewer 1998b). The study is intended to help enable Ministry and industry staff to make appropriate decisions regarding requirements for future Archaeological Impact Assessment (AIA) studies for proposed forestry developments.

3.1 Project Goals

The project involves the development of a refined archaeological overview assessment for the Morice Forest District. In summary, the goals of the study are as follows:

1) Develop a revised AOA model that is consistent with Ministry of Forests policy direction and *Heritage Conservation Act* requirements for cultural resource management;
2) Provide a revised AOA model that can be used for operational applications;
3) Provide greater confidence to forest district licensees and MoF staff that the use of the model in determining the level of archaeological management and/or assessment will result in greater accuracy in the prediction of potential archaeological sites;
4) Provide greater confidence to participating First Nations groups that their cultural knowledge is being considered in operational plans;
5) Reduce the risk to MoF of unjustifiably infringing upon First Nation's cultural heritage sites;
6) Increase the confidence with First Nations that the MoF is treating their cultural heritage information with respect and confidentiality (where requested); and,
7) Create a revised baseline of information.

3.2 Site Placement Analysis

The site placement factors for each archaeological site were determined. A large number of geographical, biological, historical and cultural factors can affect site placement. These factors were divided into two broad categories including **physical** (those factors of the physical environment conducive to site placement) and **cultural** (those factors of the cultural environment and landscape which influence the placement of sites). Variables included landform, slope, distance from water (broken down into type of water body and including both present and past features), vegetation and resource abundance (divided

into proximity to resources known or suspected to be of importance to First Nations including faunal, floral and mineral resources). Cultural factors are more complex and less amenable to direct observation. Cultural factors include trails, travel routes and spiritual/mythological places, among others.

This AOA follows the simple yet effective reasoning set out by Carlson (1996) who identified most important variables in terms of site placement are distance to water and slope.

The analysis of site placement factors was completed using GIS based Near Analysis. Near-to run on ArcInfo evaluated the location of each archaeological site in reference to water features, to other archaeological sites and to trails. Each archaeological site type was analyzed for its optimal site placement and its range of variation was noted.

3.3 Rating Archaeological Potential

The AOA separates the forest district into areas of high, moderate and low archaeological potential. These ratings take into account a variety of physiogeographic and cultural variables. They are expressed as buffers surrounding water features, First Nations traditional use areas, and/or recorded archaeological sites. The current system of archaeological buffers is presented below.

3.3.1 Current Archaeological Potential Buffers

3.3.1.1 Water Features

Lakes greater than 5 ha

0-150 m	*High archaeological potential*
150-250 m	*Moderate archaeological potential*
0-150 m	*CMT potential*

Lakes 1 - 5 ha

0-50 m	*Moderate archaeological potential*
0-150 m	*CMT potential*

S1-S3 streams (assumes known fish and > 1.5 m width)

0-100 m *High archaeological potential* (substract slope greater than 40%)

100-200 m *Moderate archaeological potential* (substract slope greater than 40%)

0-150 m *CMT potential*

S4 streams with slope less than 20% or known fish bearing

0-100 m *High archaeological potential*

100-200 m *Moderate archaeological potential*

S4 streams with slope greater than 20%

0-100 m *Moderate archaeological potential*

S5 and S6 streams with slope less than 20%

0-50 m *Moderate archaeological potential*

0-150 m *CMT potential*

All other streams > 20% are identified as low.

Swamps

0-150 m *CMT potential*

3.3.1.2 First Nations Trails

0-100 m *High archaeological potential*

4. RESULTS

The existing AOA model was tested using all of the archaeological sites within the Morice Forest District including those sites recorded since 1998. The results show continued support for the model with 70.14% of known archaeological sites falling within the zone of high archaeological potential (Table 1). CMT locations are more difficult to predict with only 52.86% of CMT sites falling within the high potential buffer.

Table 1

New Archaeological Site Data with Existing Buffers

Site Type	Number	Archaeological Potential					
		High		Moderate		Low	
		Number	%	Number	%	Number	%
Pictograph	4	4	100.00	0	0.00	0	0.00
Human Remains	4	3	75.00	1	25.00	0	0.00
Habitation Site	23	17	73.91	2	8.70	4	17.39
Cultural Material (lithic scatter)	82	72	87.80	1	1.22	9	10.98
Subsistence Features	224	158	70.54	35	15.63	31	13.84
Culturally Modified Tree	210	111	52.86	31	14.76	68	32.38
All Site Types	479	336	70.15	54	11.27	89	18.58

When the model was reviewed, some discrepancies in the model and actual results became apparent. Most importantly, it was noted that the model uses point location for archaeological sites rather than polygons. Even more importantly, the model does not incorporate distance from recorded archaeological sites in predicting potential.

The model was run again with some minor changes including the removal of slope and the addition of a 500 m buffer for recorded archaeological sites. These subtle changes had a dramatic effect on the model's prediction rate. Overall the model now captures 84.76% of sites within the high potential zone and 75.24% of known CMT sites are now within

areas predicted to be of high archaeological potential. All archaeological site types saw improvement in terms of the percentage captured within high potential zones save for pictograph sites, which already were 100% predicted by the existing model (Table 2).

Table 2

New Archaeological Site Data with New Buffers

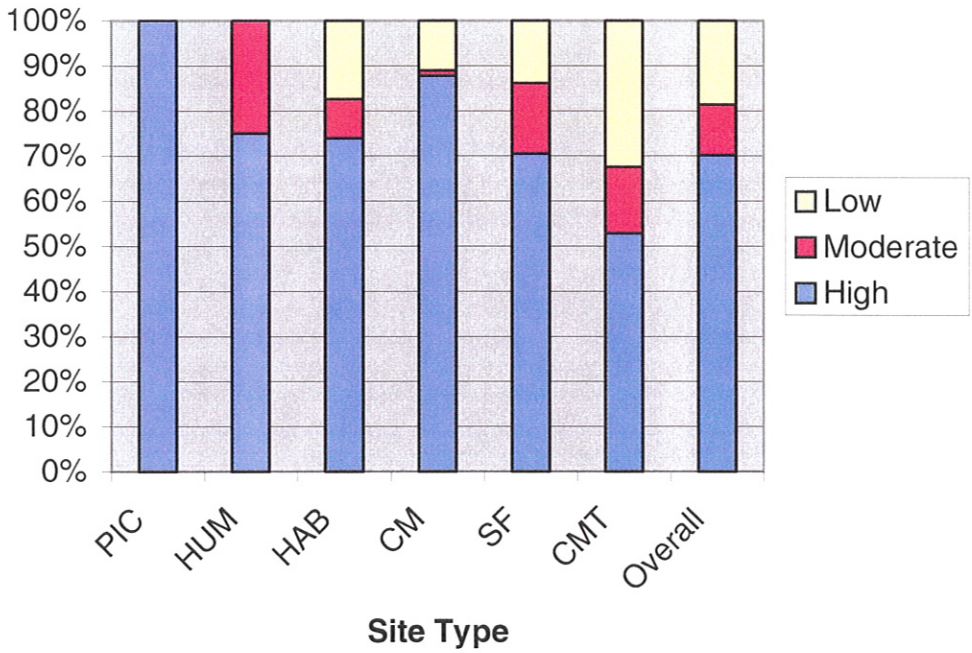
Site Type	Number	Archaeological Potential					
		High		Moderate		Low	
		Number	%	Number	%	Number	%
Pictograph	4	4	100.00	0	0	0	0
Human Remains	4	4	100.00	0	0	0	0
Habitation Site	23	21	91.30	0	0	2	8.70
Cultural Material (lithic scatter)	82	73	89.02	0	0	9	10.98
Subsistence Features	224	188	98.93	17	7.59	19	8.48
Culturally Modified Tree	210	158	75.24	12	5.71	40	19.05
All Site Types	479	406	84.76	19	3.97	54	11.27

Tables 3 and 4 illustrate the capture rates for each site type using the existing model in Table 3 and the proposed revised model in Table 4.

All known sites were analyzed according to their location for each variable used to predict archaeological potential in order to identify which variables were most powerful in determining significance. Results are present in Table 5. It can be seen that 266 sites fall within the high potential zone around lakes larger than 5 ha and 262 sites fall within the 500 m high potential buffer around recorded sites. The next strongest association is with defined or 'definite' rivers. (Wetlands are used only to predict CMT locations). This analysis points out that large lakes were the focus of use compared to other hydrological features. It also shows that the measure of other archaeological sites is a stronger prediction of additional site location than the presence of trails, though the trail program has apparently not yet been finally digitized and mapped.

Table 3

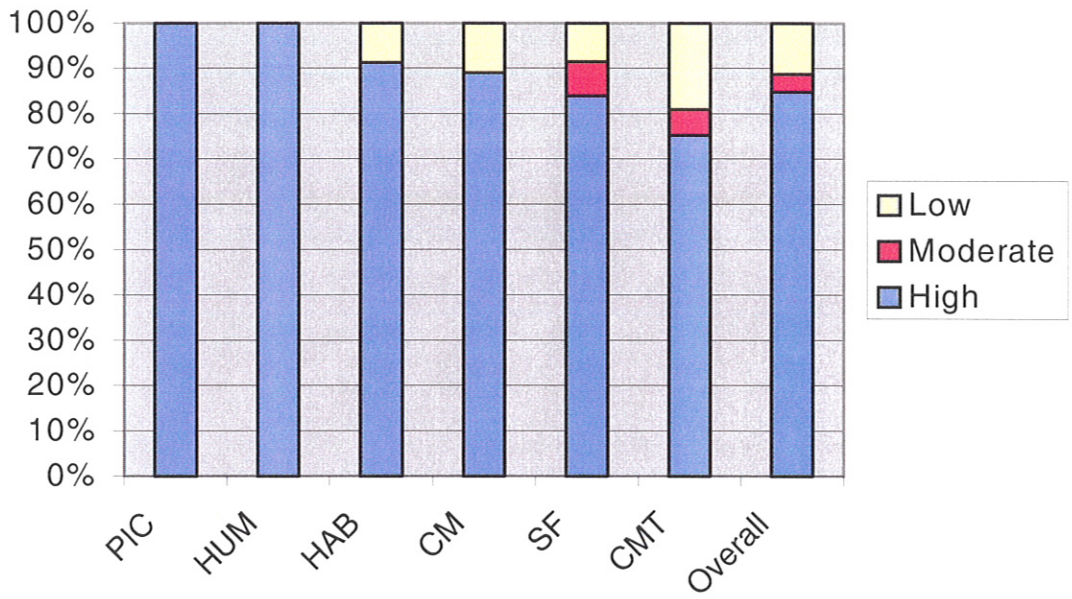
Archaeological Potential: Old Buffers



Legend: PIC – pictograph; CMT – culturally modified tree; CM – cultural material (lithic scatter); HAB – habitation sites; SF – subsistence fixtures; HUM – human remains

Table 4

Archaeological Potential: New Buffers



Legend: PIC – pictograph; CMT – culturally modified tree; CM – cultural material (lithic scatter); HAB – habitation sites; SF – subsistence fixtures; HUM – human remains

Table 5

Known Sites by Potential Variables

		Pictograph	Human Remains	Habitation Site	Cultural Material	Subsistence Features	Culturally Modified Trees	Total
Lake >5 ha	H	4	3	12	59	131	43	266
	M	0	1	2	2	30	20	41
	L	0	0	9	21	63	147	172
Lake <5 ha	H	0	0	0	0	0	0	0
	M	0	0	0	0	2	2	2
	L	4	4	23	82	223	208	477
Wetland >5 ha	C						16	
	L						194	
Wetland <5 ha	C						15	
	L						195	
Double Line River	H	0	0	2	7	1	0	12
	M	0	0	0	1	0	2	5
	L	4	4	21	74	223	208	462
Definite River	H	2	0	5	19	33	49	81
	M	1	0	1	13	39	39	67
	L	1	4	17	50	152	122	331
Indefinite River	H	0	0	0	0	0	0	0
	M	0	0	0	0	0	0	1
	L	4	4	23	82	224	210	478
Trails	H	0	0	1	11	8	12	41
	M	0	0	0	0	0	0	0
	L	4	4	22	71	216	198	438
Archae-ological Sites	H	4	4	16	41	133	99	262
	M	0	0	0	0	0	0	0
	L	0	0	7	41	91	111	217

H – high archaeological potential; M – medium archaeological potential, L –low archaeological potential

5. RECOMMENDATIONS

Some minor changes to the potential buffers are proposed at this time. First it is recommended that a 500 m buffer around recorded archaeological sites be added to delineate zones of high archaeological potential. While this buffer is considered to be large, the rationale for its size is discussed below.

Second, it is recommended that slope be removed from the buffer. Archaeological sites within the Morice Forest District, especially CMT resources, do not seem to vary predictably with the slope classifications. Although more archaeological sites do occur on gentler slopes, a significant number are found on steeper slopes. This variable is not particularly sensitive in predicting archaeological potential at least in terms of the presently known site database.

The validity of the Morice Forest District archaeological predictive model is still limited by poor quality archaeological site data. Each archaeological site within the forest district has been recorded and plotted as a single point. In reality archaeological sites take up space and have an areal extent on the landscape. The use of single point data introduces a suite of potential errors into the overview process, the first being site placement.

Single points have been used to identify the location of all sites including very large archaeological sites which creates two distinct problems. First, large sites may cover significant surface area and may overlap two or more zones of differing potential. The single point obviously can fall within only one zone of potential. In other words, a large site which extends across high, moderate and low potential may be rated as falling within a zone of low potential depending on where within the site the single point location is plotted. When the number of archaeological sites per different potential area was calculated, this potential error cannot be calculated.

The second problem with identifying sites by point location concerns the buffering of archaeological sites. It has been recommended that a 500 m high potential buffer surrounding recorded sites be added to the model. Single point data means every archaeological site in the forest district is represented the same way, a single dot and a 500 m circle around it. It the case of large sites where they extend larger than 500 m, the buffer would not even select the entire archaeological site let alone a buffer surrounding it. The use of single point data greatly under represents the archaeological site buffer

within the forest district. This is why 500 m was chosen as a buffer. If more accurate site boundary information was available then the buffer around each site might be lowered. This can be done by representing known sites as polygons rather than points.

The reason that single point was used in the original AOA construction and in subsequent refinements is largely because it is very time consuming to map archaeological sites as polygons which can be used in GIS especially if original site form information is poorly presented as is the case with many sites recorded in the 1960s and 1970s in the Morice Forest District. Some other forest district AOAs have invested in this process and have had good results (Wilson *et al.* 1998).

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May 15, 2002

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Attention: Mike Buirs

Dear Sir:

Enclosed please find our report titled Archaeological overview assessment Morice Forest District: archaeological potential model revisions.

Sorry for the delay in getting this to you but delays in receiving digital information was largely responsible for the timing.

Trust you find the enclosed satisfactory.

Yours truly,

I. R. WILSON CONSULTANTS LTD.

Ian R. Wilson, MA RPCA
Chief Archaeologist

IRW/nle
Attach.

01-1636-REP-02