

APPENDIX SEVEN
HERITAGE COMPLIANCE PLAN FOR WESTFRASER
MILLS LTD. ALBERTA FORESTRY OPERATIONS



BLUE RIDGE LUMBER INC.
A SUBSIDIARY OF WEST FRASER MILLS LTD.

DFMP

DETAILED FOREST MANAGEMENT PLAN

TEXT REPORT

November 5, 2001

Blue Ridge Lumber (1981) Ltd.
P.O. Box 1079
Whitecourt AB
T7S 1P9

Dear forest products manufacturer:

On November 14th, 2000, the Assistant Deputy Minister of the Cultural Facilities and Historical Resources Division of Alberta Community Development informed all Alberta forest products manufacturers by letter about the need for compliance with the Alberta *Historical Resources Act*. The letter explained that engaging a professional consultant to produce an historical resources overview, including an evaluation of heritage potential, can be an efficient first step towards *Act* compliance. All forest products manufacturers were to demonstrate that they have this or an analogous process in place by July 1st, 2001.

I note you have committed to *Historical Resources Act* compliance by retaining an approved archaeological consultant, who has completed or will soon complete an historical resources management plan for your company. These plans are reviewed by my staff when your consultant applies for an Historical Resources Mitigative Research Permit from Alberta Community Development in advance of fieldwork. Please bear in mind that *Act* compliance is attained and maintained only when groundtruthing of the heritage potential model by a professional consultant, and subsequent agreement by Alberta Community Development with the consultant's recommendations, form part of the overall heritage management system.

Thank you for your cooperation in preserving Alberta's past. My staff and I look forward to working with your company over the coming years. Please feel free to contact Dr. Jack Ives at (780) 431-2302 or Dr. David Link at (780) 431-2316 if you have further concerns or questions.

Sincerely,

Original Signed

Les Hurt
Director

cc: D. Sklar, Director, Forest Management Division, Land and Forest Service,
Alberta Sustainable Resource Development

J. Ives
D. Link



BLUE RIDGE LUMBER (1981) LTD.

A DIVISION OF WEST FRASER MILLS LTD.
P.O. BOX 1079
WHITECOURT, ALBERTA, CANADA T7S 1P9
PHONE: (780) 648-6200 FAX: (780) 648-6396

June 20, 2001

Mr. Gerry Ward
Alberta Community Development
Old St. Stephens College
8820 - 112 Street
Edmonton, Alberta
T6G 2P8

Dear Mr. Ward:

Re: Heritage Compliance Plan for West Fraser Mills Ltd. Alberta Operations

West Fraser Mills Ltd. has two Forest Management Agreement areas in Alberta. The two companies operating in Alberta are Blue Ridge Lumber (1981) Ltd. and Slave Lake Pulp. Jointly the two companies have retained the services of Mr. Terry Gibson, Alberta Western Heritage Inc. to develop a Heritage Compliance Plan to ensure that we are in compliant to the provisions of the Alberta Historical Resources Act.

Please find attached the Heritage Compliance Plan for your approval. If you have any questions please do not hesitate to contact me at (780) 648-6340.

Yours truly,

Original Signed

Daryl D'Amico
Management Forester
Blue Ridge Lumber (1981) Ltd.

Cc Mr. Gordon Sanders, Slave Lake Pulp
Mr. Ray Hilts, Millar Western Forest Products
Mr. Arnie Mostowich, Mostowich Lumber Ltd.
Ms. Margarete Hee, Sustainable Resource Development, Northern East Slopes Region.
Mr. Terry Gibson, Alberta Western Heritage Inc.

**HERITAGE COMPLIANCE PLAN FOR WEST FRASER MILLS LTD.
ALBERTA FORESTRY OPERATIONS IN THE
BLUE RIDGE LUMBER AND SLAVE LAKE PULP FMA'S**

prepared for

Alberta Community Development

by

Terrance H. Gibson, Ph.D.
Alberta Western Heritage
St. Albert, Alberta

on behalf of

Blue Ridge Lumber (1981) Ltd. and Slave Lake Pulp

Blue Ridge and Slave Lake, Alberta

May, 2001

INTRODUCTION

West Fraser Mills Ltd. operates two Forest Management Agreement areas in its Alberta operations. The companies operating these mills, Blue Ridge Lumber (1981) Ltd. and Slave Lake Pulp, have retained Alberta Western Heritage Services Inc. to produce a heritage resources management component for each of their FMA's which is designed to ensure that their operations will be compliant to the provisions of the Alberta Historical Resources Act.

A significant aspect of this heritage management process is its explicit self-regulatory approach, which permits forestry planners to anticipate potential heritage resource conflicts associated with proposed developments, allowing them to formulate avoidance or impact reduction solutions at the planning stage. Both companies are aware that heritage protection requires trained resource management expertise to augment their planning at certain times. This document represents an updated historical resources overview of the Blue Ridge and Slave Lake Pulp FMA areas and a compliance plan for both operations. Individual FMA operational heritage management plans will be produced for regulatory review with each company's Annual Operating Plan (AOP).

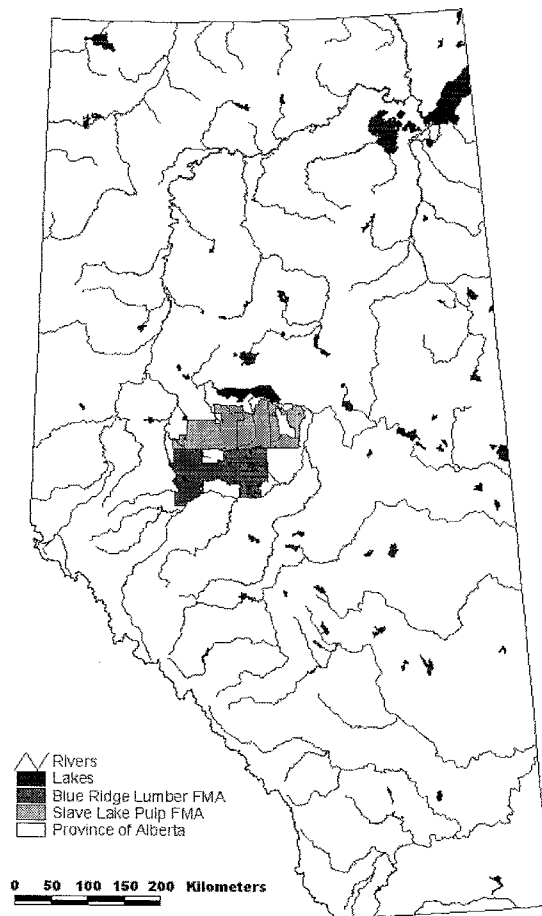


Figure 1. Location of Blue Ridge Lumber and Slave Lake Pulp FMA's in central Alberta.

PROCEDURES FOR REVIEWING HERITAGE RESOURCES AND OBTAINING HERITAGE COMPLIANCE

The proposed compliance approach is very similar in scope and operation to the process already in use by Millar Western Forest Products Ltd., which itself grew out of the Whitecourt/Lesser Slave Lake Heritage Management Study (Gibson et. al 1999). Both Blue Ridge Lumber and Slave Lake Pulp were participants in that study. The results of this study were refined as part of the Millar Western Forest Products' DFMP, completed in 2000. The Heritage Management Process consists of a number of interrelated components, each of which provides specific data for managing concerns within a particular forestry operation. The overall approach involves predicting where heritage resources are located, determining what forestry practices will harm them and devising a solution to prevent or minimize the chances of damaging those resources.

COMPONENT 1: HERITAGE POTENTIAL MODEL AND HERITAGE DATABASES

Precontact Heritage Potential Evaluation

A digital model of heritage potential was produced for a large area south of Lesser Slave Lake as part of the Whitecourt/Lesser Slave Lake Heritage Management Study (Gibson et. al. 1999). The model was created using quantifiable environmental and geographic information, then manipulated statistically using a Geographic Information System. In generating this model, Blue Ridge Lumber, Slave Lake Pulp and other forestry companies provided digital data sets of elevation, classified hydrology, soils, surficial geology, forest cover and ecological/landform unit data.

The current model (3B) expresses heritage potential in terms of High, Medium and Low values. Since each hectare of land in the modelled area has a potential value assigned to it, it is possible to predict fairly precisely where heritage sites are most likely to occur and take remedial action as required. The Whitecourt/Lesser Slave Lake Heritage Potential Model 3B is described in detail in Gibson et. al. 1999. The model is currently resident on the GIS's of both woodlands operations and will be used for evaluating precontact heritage potential of the landscape where developments are proposed by each operation. The heritage potential model will be provided to other timber operators embedded within the two FMA's so that they can incorporate the heritage potential and companion data sets in the harvest and silviculture planning of their Annual Operating Plan areas.

When the model was created, certain portions of the Slave Lake Pulp and Blue Ridge Lumber FMA's were not available for modelling (Figure 2). For areas where the heritage potential model is not available, or where its predictions are considered questionable after professional archaeological inspection, a manual heritage potential evaluation system has been devised, focused on specific development locations. This Development-Specific evaluation approach is described below

Development-Specific Heritage Potential Scoring System

The W/LSL heritage potential model expresses landscape heritage potential in terms of high, medium and low values. For areas where heritage potential model values are not available, or where its predictions are considered questionable after professional archaeological inspection, a Development-Specific evaluation will be used. Although any individual with some mapping experience can make their own heritage evaluations using this system, for regulatory considerations Alberta Community Development will not consider them reliable unless they are validated by an archaeologist qualified to hold a provincial research permit and with some familiarity with the region being evaluated.

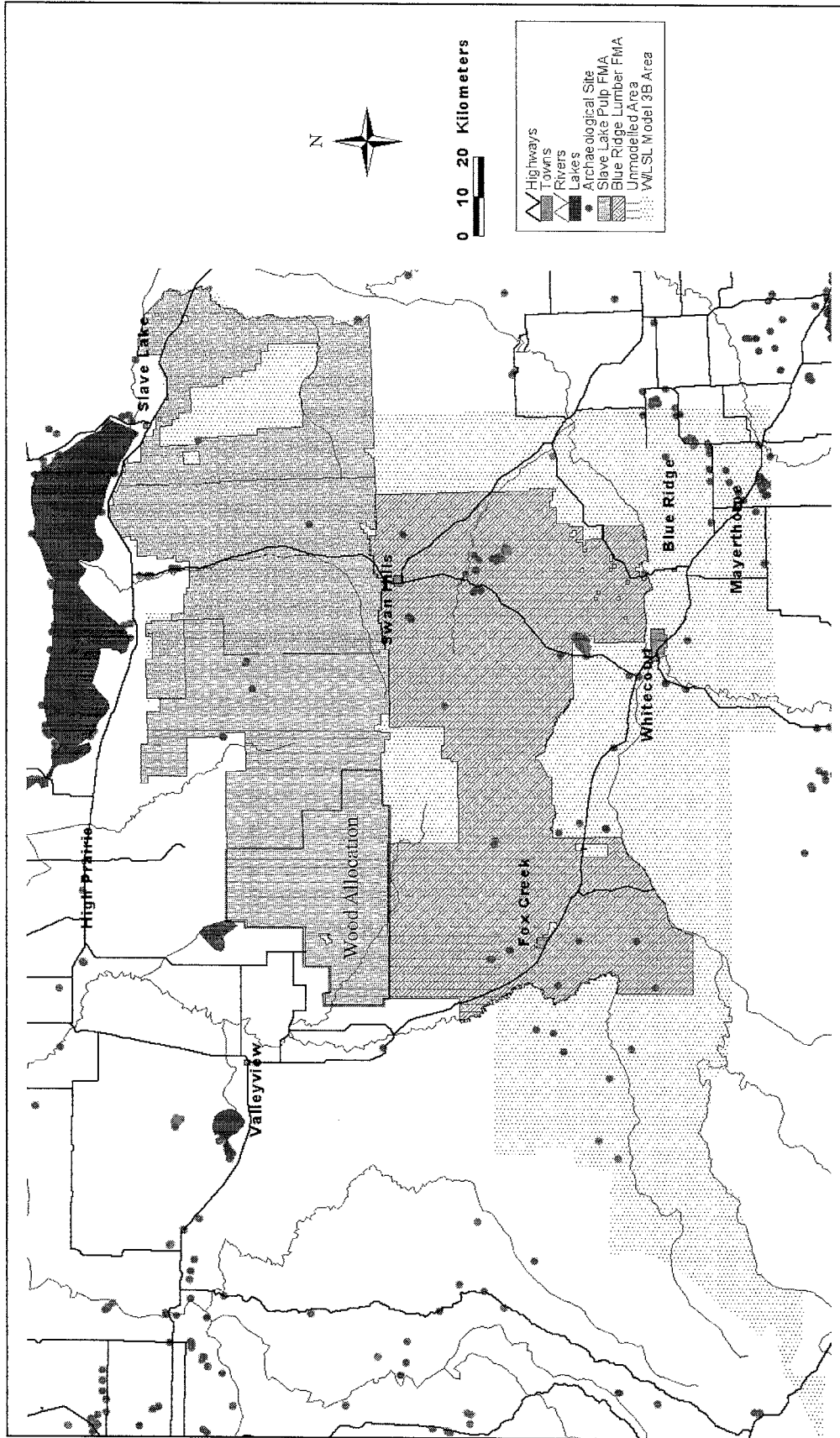


Figure 2. Blue Ridge Lumber and Slave Lake Pulp FMA's, showing extent of Heritage Potential Model.

Drawing upon criteria established for other forestry-related heritage potential evaluation studies, and from the results of the digital heritage potential model, several objective site potential criteria are used in the Development-Specific evaluation process. The criteria are: Drainage, Situation, Terrain Conditions, Cultural Content and Local Context. Each criterion is applied to a specific development, yielding a score. The scores are accumulated then applied to an ordinal scale to determine High, Moderate or Low heritage potential for the area of that development.

Drainage

Drainage proximity is based on edges of habitable landforms. For example, if a habitable landform is located 250 m from a shoreline, but the intervening land is actually bog or otherwise uninhabitable, the bog is considered part of the drainage. The margin of potential extends back from its edge and not from the existing shoreline.

Identifying margins can cause problems when using GIS map data, even at relatively fine scale, since it is not always possible to discern former shorelines, terraces and crests where only 10 m elevation increments are available. It is expected that on-site visits will sometimes be required to determine if an area needs assessment. Alternatively, orthophoto evaluation can be used if the information is available.

Drainage Scoring (Maximum Score=2):

- 1) Within 250 m of headwaters of drainage: Score=1
- 2) Within 250 m of muskeg areas: score=1
- 3) Within 250 m below headwaters: score=2
- 4) Confluence of drainages: score=2

Situation

This refers to a landform that exhibits localized features which may have attracted people, such as prominent knolls, ridges, shoreline terraces or features conducive to travel.

Again, such features are difficult to identify on standard 10 m contoured GIS data, and brief on-site visits or orthophoto examination may be required.

Situation Scoring (Maximum Score=2):

- 1) Apparent crests or terraces marking drainage margins: score=2
- 2) Topographic change: score=1
- 3) Abrupt topographic change (escarpment): score=2
- 4) Localized geographic features (knoll, esker): score=2
- 5) Valley edge within 500 m of drainage: score=2

Terrain Conditions (Ecozone)

Terrain Conditions criteria represent local conditions that are believed to be amenable to human habitation, such as soil type or presence of special conditions making habitation more likely. Consequently, it is referred to here as *Ecozone* data. Experience elsewhere suggests that human habitation is

more likely to occur in forest cover dominated by jackpine, and sites are often found on well-drained soils, especially sandy soils. Although there are many such conditions that can be identified, terrain condition data are not usually available for use in determining habitation potential. However, if classified digital vegetation cover data are available (AVI), the information can be used to deduce current vegetation conditions, and by extension, soil type. Unfortunately, AVI data can require considerable reprocessing to be useful for screening, and are often incomplete for certain areas. A useful replacement is Landsat thematic mapper imagery, if available. Experience elsewhere has shown that simple classifications identifying wetlands and softwood and hardwood stands can greatly assist in the differentiation of areas of high and low heritage potential.

Ecozone Scoring (*Maximum Score=2*):

- 1) Jackpine stands: score=1
- 2) Sandy terrain: score=2

Cultural Factors

This refers to a landform which contains evidence of historic human modification (structures such as cabins, extant or remnant trails, archaeological sites etc.). This information is available from companion heritage data sets described elsewhere in this document.

Cultural Scoring (*Maximum Score=1*):

- 1) Cabin: score=1
- 2) Within 50 m of non-linear trail: score=1
- 3) Within 250 m of recorded archaeological site: score=2
- 4) Within 100 m of recorded archaeological site: score=3

Context

This refers to a landform located adjacent to an area containing known sites, especially where both areas exhibit similar topographic features

Context Scoring (*Maximum Score=2*):

- 1) Suitable landforms within 500 m of site: score=2

Companion Heritage Data Sets

In addition to the model data set (and site-specific evaluations where needed), there are five other data sets that will be used for managing historical resources in the FMA. They are represented as separate digital GIS data themes.

- 1) Sensitive Heritage Areas, defined by the Significant Historical Sites and Areas List compiled by ACD and updated to January 1, 2001. These areas are identified in one square mile (1600 metres x 1600 metres) units (Figure 3).
- 2) Paleontological Sensitivity Areas, defined by the 1984 Palaeontological Resource Sensitivity Zone Map produced by Alberta Culture. These areas are identified in one square mile (1600 metres x 1600 metres) units (Figure 3).

- 3) Registered Archaeological Sites, updated to January, 2000 from data supplied by ACD. The estimated accuracy of individual site locations is plus or minus 100 metres (Figure 3).
- 4) Historical Trails, compiled from late 19th and early 20th century forest reserve and sectional description maps of the Whitecourt/Lesser Slave Lake region. The estimated accuracy of these trails is plus or minus 1000 metres (Figure 4).
- 5) Historic cabins, also compiled from late 19th and early 20th century forest reserve and sectional description maps of the Whitecourt/Lesser Slave Lake region. Since these cabin locations have not been relocated, their estimated locational accuracy is plus or minus 1000 metres. More cabin information is expected to be forthcoming from other sources in the future, with nominal locational accuracy of plus or minus 100 metres or better (Figure 4).

GENERAL SCREENING PROCEDURES

For most localities, heritage potential can be evaluated in terms of local topography and proximity to drainage systems. The focus is on identifying those geographical features which may have served to funnel groups into a region where developments are planned.

For every cutblock evaluated, priority is normally assigned to those areas which adjoin drainage systems, especially at their junctures: either of rivers/creeks or the inlets/outlets of lakes. Greater potential is judged where the local topography suggests features suitable for campsites or land travel: for example, terraces or valley crests. Priorities are also assigned to “inland” geographical features that could be used for land travel or lookout/hunting stations. Such features include prominent ridges and isolated knolls and hills. Attention is also given to the possibility of travel between drainage systems: e.g. a narrow height of land between a lake and a neighbouring river.

Because most GIS data only indicate 10 m contours, they present an incomplete picture of the local land relief. For example, a three meter high ridge may exhibit local prominence but not be indicated on the maps. To ensure such potential areas are not being inadvertently missed, it is recommended that subsequent field evaluations, if required, collect data on microtopography so that the heritage screening process can be improved for each locality.

The outcome of the screening process is that, although preliminary evaluations of developments are decided in the screening lab, many judgmental decisions may have to be made in the field.

The scoring criteria are converted into Heritage Potential Coefficients using the following formula:

Screening Score	Heritage Potential	Screening Coefficient
0-2	Low	0
3-4	Moderate	2
>4	High	3

Summary

In addition to the manual heritage potential evaluations, the companion data sets are also used for determining heritage potential in cutting and road construction areas. The description of how these data sets are incorporated into the heritage potential evaluation system is provided in a later section.

COMPONENT 2: DEVELOPMENT IMPACT STUDY

Although a detailed heritage impact study has not been conducted for West Fraser Alberta forestry operations, results of other studies can be used to provide information about what forestry practices are expected to disturb potential heritage sites during the harvest and ground scarification program, and

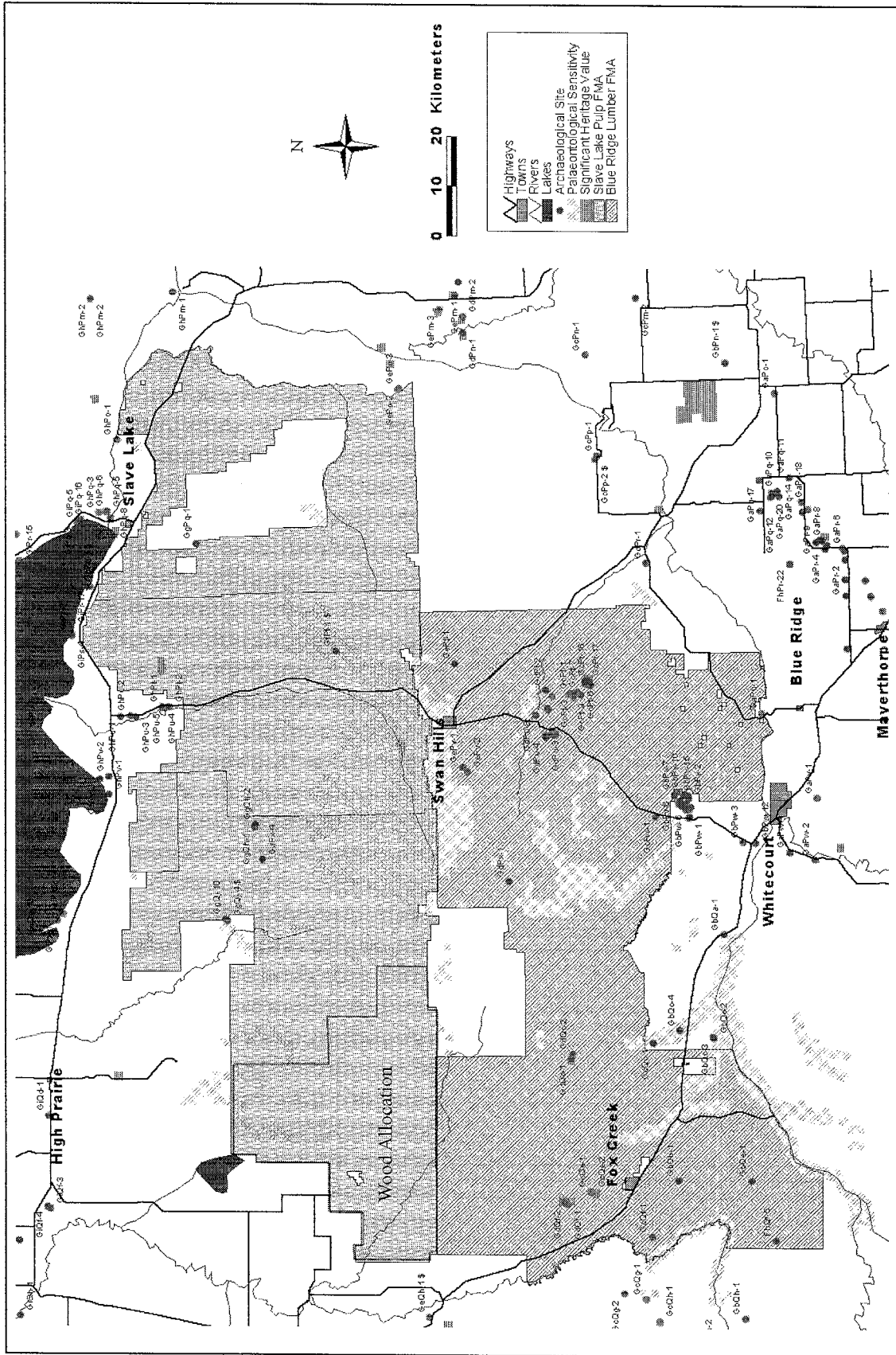
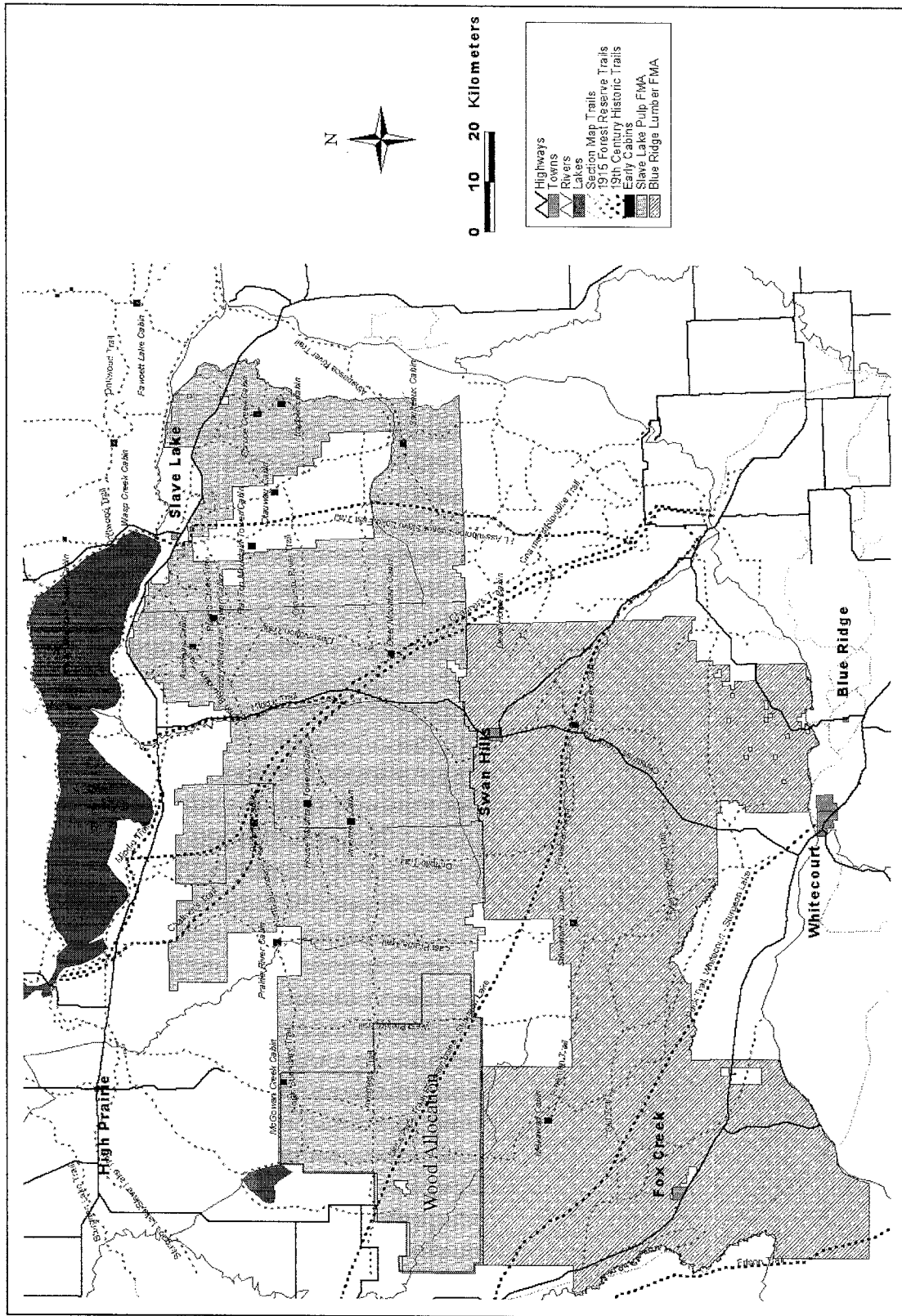


Figure 3. Location of sensitive palaeontological and heritage locations in the Blue Ridge Lumber and Slave Lake Pulp FMA's.



9 Figure 4. Location of historic trails and cabins in the Blue Ridge Lumber and Slave Lake Pulp FMA's.

under what conditions such disturbances can be minimized or eliminated. All proposed cutblock and road developments are rated according to a specially devised impact measurement scale called CRICS (Cultural Resources Impact Classification System). Since CRICS values for a given forestry practice change under different environmental conditions (organic cover, soil firmness, landscape slope for example), a CRICS classification calculator is used on a development specific basis to determine what practices pose a threat to heritage resources in high and moderate heritage potential zones. A summary of CRICS is included here for reference. A graphical summary of CRICS is shown in Figure 5.

CRICS Description

CLASSIFICATION 0 - No Impact

Activities which do not physically disturb the surface organic or subsurface mineral soil of a site, or implanted features within its boundaries, are defined as Class 0 impacts. People walking across well-consolidated unfrozen ground or vehicles driving across frozen or snow-covered ground would produce Class 0 impacts, if surface features were not disturbed.

CLASSIFICATION 1 - Incidental Contact

This classification would apply to any activity which impacted the organic surface of a site but did not disturb the integrity of the subsurface mineral soil. If the organic, “protective” soil layer is removed, either mechanically or naturally, exposing but not disturbing mineral soil, this would be considered Class 1 Impact. Such impacts are found when vehicle ruts are left in the organic layer of a forest soil, or minor compaction occurs in mineral soils, which later rebounds. Also, if the ground is firmly frozen, certain normally high impact forestry practices can produce only Class 1 Impact. Forest fires can naturally remove the organic horizon. However, although mineral soil is often exposed, natural forest revegetation tends to rebury it before it becomes significantly weathered.

Unburied, implanted features, such as structure remnants, foundation remains or fire pit rocks, may be pushed partially into the ground or shifted in place, but not physically moved. This kind of Class 1 impact can occur when a wheeled or treaded vehicle passes over unfrozen forest floor or when vehicles bump up against a standing structure.

CLASSIFICATION 2 - Incidental Impact

This kind of impact is present when the organic soil layer of the forest floor is removed, exposing and compressing the mineral layer which can contain a cultural deposit. However, even if the cultural layer is located on the surface of the mineral layer, artifacts are not regularly moved out of position. Occasional gouging or the organic layer may reveal some mineral soil, which may also be noticeably compacted or rutted.

This kind of impact is seen in its most severe form when larger naturally downed trees are pushed aside or into piles by a bladed vehicle such as a loader or a bulldozer working in dry unfrozen conditions. Repeated traffic by lighter vehicles over soft ground, causing incipient rutting, can also produce the most serious form of Class 2 Impact. Human occupation activity can also cause Class 2 Impact by eroding away the mineral horizon, and preventing a new, protective organic layer from forming over the mineral soil.

For implanted surface features, Class 2 Impact results in standing structures being knocked askew, or exposed foundations receiving superficial surface damage.

CLASSIFICATION 3 - Regular Impact

This class of impact applies to any kind of activity which regularly exposes and disturbs the mineral

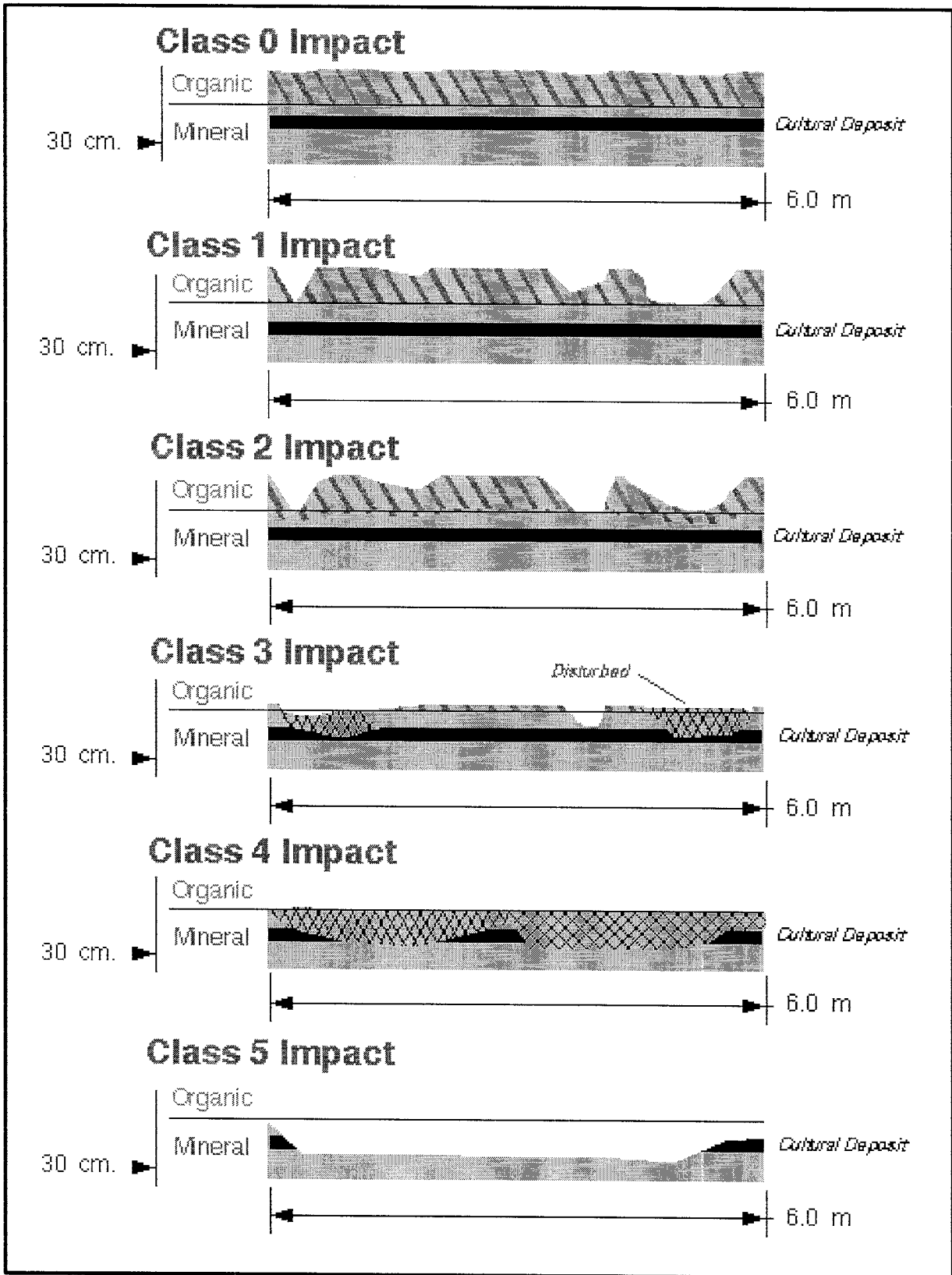


Figure 5. Summary of the CRICS six-part heritage impact classification system.

soil layer. Not infrequently, if the mineral soil contains artifacts and features, they will also be disturbed. In such cases, artifacts would be found scattered locally over the disturbed area, but with some indication of where they came from on the site. Buried features may be found in place, but deformed and truncated (partially removed).

Class 3 Impacts can occur in the course of some wood cutting operations, particularly on soft, poorly consolidated ground. However, most Class 3 Impacts are related to ground clearing activities and some ground preparation for silviculture. The former occurs where uneven ground is smoothed over to produce a level surface or where tree roots are pulled up, leaving pits in the forest floor. This is especially prevalent where cutblock access trails and wood landings have been constructed. For silviculture, certain shallow ground treatments, usually involving organic removal or displacement (screefing), can produce Class 3 Impact.

Implanted surface features will generally be knocked over or partially dismantled, although their original location can usually be determined.

Classification 4 - Severe Impact

When the near-surface mineral soil subsurface is completely modified, with virtually no evidence of the original surface present, this would be considered a Class 4 Impact. Artifacts from a shallow buried archaeological site would be found scattered about with no indication of where they came from within an impacted area. No recognizable buried features would be encountered, and no reconstructible subsurface stratigraphy would be present indicating where the artifacts originated.

An example of this impact would be wholesale clearing of a forest floor for the preparation of a wood landing or truck turnaround, or clearing and landscaping of terrain for a stream crossing or a raised grade road. Skidding of wood over rough terrain with a thin organic overlay can also result in significant Class 4 impact in a cutblock.

Although Class 4 Impacts are usually related to activities of small areal extent under wood procurement operations, they are probably the most common kind of disturbance associated with silviculture ground preparation. Ground treatments such as disc trenching would create this kind of impact over a large area.

Implanted surface features, such as structural remains, would be entirely moved out of position at this level of impact. Remnants would probably appear in debris piles.

CLASSIFICATION 5 - Total Impact

If all or portions of a potential or known archaeological site contained within the mineral soil horizon are removed, this would constitute the most serious kind of impact, Class 5. Class 5 impact would occur if parts of a site were entirely removed by road grade construction, mining activity (gravel quarrying) or completely obscured through burial by fill. The latter case is not the same as *capping* a site, which in certain instances can be considered a form of protective mitigation.

Class 5 impact occurs naturally as well. An archaeological site situated on the edge of a river bank or on the margin of a lake can be eroded away and the exposed materials either washed downstream or inundated, producing Class 5 impact. Erosion is not a requirement, however. If all or parts of a site are rendered completely inaccessible by flooding, theoretically this would be considered Class 5 level disturbance, especially if the site were made permanently inaccessible.

Entirely separating a structure from its location, and being unable to determine where the original location was, would be equivalent to Class 5 impact.

CRICS Summary

As can be seen in the examples, the preceding six classes of impact apply to all kinds of heritage resources, including historic and ethnographic sites. Although they are broad in scope, each class represents a threshold of resource integrity which directly relates to its amenability to archaeological interpretation. From a forestry management perspective, the goal is to keep the interpretability threshold as high as possible by inflicting less severe impacts. For example, a critical shift in management focus occurs between Class 2 and Class 3 impact. In the case of the former, archaeological remains become exposed and can be degraded, especially if subjected to more impact from artificial or natural agents. However, the resources can be stabilized, or data recovered, without significant loss if particular management strategies are employed. At the Class 3 level, loss will be inflicted, and the management focus changes from protection to pre-impact mitigative recovery of data (if feasible), or avoidance.

For most West Fraser Alberta harvest operations, current CRICS impacts are expected to range between Class 1 and Class 3. Road construction, however, will usually be at Class 4 or 5 levels. Since some form of ground preparation is proposed for many harvest blocks, it is expected that impacts will extend up to Class 4 in some locations. However, West Fraser planners are considering ways of reducing ground impacts related to silviculture ground preparation, including increasing the use of herbicides in order to minimize the need for ground scarification in some localities.

COMPONENT 3: HERITAGE MANAGEMENT PLAN

Once the heritage potential of a given area is known (using information from the heritage potential evaluation and other heritage databases) and various levels of forestry practice impacts are understood, heritage management prescriptions are produced for each of the defined harvest cutblocks and road corridor developments. For planning purposes, an objective method is used to determine what level of archaeological inspection is required for each cutblock. The CRICS classification scheme and the heritage potential evaluation process have been designed to produce results in combination to provide direct prescription evaluations. This is done by adding the calculated CRICS score of a proposed practice in an area to the Heritage Potential score (obtained from the Manual Heritage Potential Scoring system and associated databases), yielding a coefficient that is equated to a recommended heritage mitigation approach, referred to as a Heritage Prescription.

Alberta Community Development generally applies three basic heritage prescriptions to any kind proposed development taking place in the province. These are:

- | | |
|-------------------------------|--|
| <u>No Assessment-</u> | The proposed development will not require any form of archaeological field inspection. Development may proceed. |
| <u>Preimpact Assessment-</u> | The proposed development requires an archaeological field inspection before it can proceed. |
| <u>Postimpact Assessment-</u> | The proposed development requires an archaeological field inspection after it has been completed. Development may proceed. |

For the West Fraser Alberta operations, a more comprehensive set of prescriptions can be applied because detailed data regarding operation impacts and local heritage potential are available for heritage screening, enabling informed decisions to be made about specific practices that can be taken in particular situations. In this regard, the fundamental change to the ACD heritage prescriptions is the differing application of field inspections to developments that exceed Class 3 impacts when heritage potential warrants.

For most operations, five heritage mitigation procedures (prescriptions) can be defined, all related to field inspection of developments by a qualified archaeologist. They are:

- 1) No Assessment The proposed development will not require any form of field inspection. Development may proceed up to Class 5 impacts.
- 2) Postimpact Heritage Audit This kind of inspection will take place after a development has been completed. Impacts up to Class 4 are permitted for area developments such as cutblock harvesting and reclamation. Up to Class 5 construction can also be undertaken for linear developments such as roads.
- 3) Moderateimpact Assessment This kind of archaeological inspection takes place after a development has been initiated but before development impacts exceed CRICS Class 3. In a forested environment, this will normally permit trees to be harvested and removed from a cutblock or proposed right-of-way. Any other kind of development, such as ground preparation, in-block road/wood landing reclamation, or road grade construction, which normally exceeds Class 3 impact, cannot proceed until this inspection has been completed.
- 4) Lowimpact Assessment This kind of archaeological inspection takes place after a development has been initiated but before development impacts exceed Class 2. In a forested environment, this will permit trees to be harvested, skidded and piled (under normal operating conditions) but the wood cannot be removed from a cutblock or proposed right-of-way until an archaeological inspection is undertaken. Any other kind of development, such as wood piling (at a wood landing as opposed to a wood deck), wood loading, in-block road/wood landing reclamation, or road grade construction, which normally exceeds Class 2 impact, cannot proceed until this inspection has been completed.
- 5) Preimpact Assessment This kind of archaeological field inspection must take place before any kind of development can proceed. Preimpact Assessment procedures are used in the HRIA process administered by ACD. Under normal circumstances, the boundary of the development must be defined with markers (stakes or ribbons) to ensure that all of the proposed development area can be examined. Preimpact inspections of road right-of-ways in heritage sensitive zones will be the most common employment of this level of archaeological work.

In order to apply these prescriptions to a development based on its predicted level of impact and potential for harbouring heritage resources, the prescriptions are indexed on a scale referred to as the Heritage Prescriptions Index. This index is shown in Table 1.

APPLYING THE PRESCRIPTIONS TO FORESTRY DEVELOPMENTS

During the initial overview, heritage prescriptions for any development are determined automatically by evaluating the heritage potential of the area where a development takes place with its predicted level of impact. The two values are combined, then correlated with an indexed scale of Heritage

Heritage Prescription	HPI
No Assessment	0-5
Postimpact Heritage Audit	6
Moderateimpact Assessment	7
Lowimpact Assessment	8
Preimpact Assessment	9

Table 1. Applying the Heritage Prescription Index to individual prescriptions.

Prescriptions. The Development Specific screening process divides heritage potential into three categories: Low, Moderate and High potential. These three categories are equated to three Heritage Potential coefficients (Low=0, Moderate=2, High=3). Development impacts are evaluated using CRICS coefficients, ranging in value from 0 to 5. The prescription index for each development is calculated by adding the Heritage Potential Coefficient (HPC) of the road segment to the corresponding CRICS Coefficient of the development, yielding a number between 0 and 8 (see Table 2 for an example).

During the initial overview, heritage prescriptions for any development are determined automatically by evaluating the heritage potential of the area where a development takes place with its predicted level of impact. The two values are combined, then correlated with an indexed scale of Heritage Prescriptions. Heritage potential for each hectare of land is obtained from Heritage Potential Model 3B GIS file and the companion databases. The model is divided into three categories: Low, Moderate and High potential. These three categories are equated to three Heritage Potential coefficients (Low=0, Moderate=2, High=3). Development impacts are evaluated using CRICS coefficients, ranging in

Heritage Pot	HP Coeff	CRICS Level	CRICS Coeff	HP Index	Heritage Prescription
Low	0	No Impact	0	0	No Assessment
Moderate	2	Incidental Contact	1	3	No Assessment
High	3	Incidental Impact	2	5	No Assessment
Low	0	Severe Impact	4	4	No Assessment
Moderate	2	Total Impact	5	7	Moderateimpact Assessment
Moderate	2	Severe Impact	4	6	Postimpact Heritage Audit
High	3	Total Impact	5	8	Lowimpact Assessment
Moderate	2	No Impact	0	2	No Assessment
Low	0	Total Impact	5	5	No Assessment

Table 2. Calculating Heritage Prescriptions using Heritage Potential and CRICS values under various conditions.

value from 0 to 5. The prescription index for each development is calculated by adding the Heritage Potential Coefficient (HPC) of the area the development is taking place to the corresponding CRICS Coefficient of the development, yielding a number between 1 and 9 (Table 2).

The companion databases also provide input to the evaluation by raising the Heritage Prescription Index for a given area, depending upon their influence. Their affect on the index is as follows:

Sensitive Heritage Area - Based on a provincially maintained listing, a locality with this designation will have its Heritage Prescription Index value raised to 9, ensuring that any kind of development in a zone of this type will receive a Preimpact Assessment, or at least a detailed records review. This is in accordance with the policy of ACD. ACD has acknowledged that these defined zones may be subject to revision over time as the heritage potential of a particular “sensitive” area is investigated more fully. It is possible that more detailed evaluation may determine the sensitive zone was defined too broadly. In such cases it may be possible to undertake various kinds of development within the broadly defined zone, providing that actual sensitive zones are flagged for avoidance. It is recommended that any development planned in an SHA zone undergo a secondary review so that the heritage resource triggering the designation of the SHA can be located and characterized more precisely.

Registered Archaeological Site - Any development located within a 250 m radius of a registered site will have its HPI raised by one level. Any development located within a 100 m radius will have its HPI raised an additional three levels (total of 4 levels).

Historic Trail - All historic trails, because of their poor recorded accuracy, have their widths buffered to 500 metres. Any development which falls within 500 m of a trail will have its HPI raised by one level.

Historic Cabins - Like trails, historic cabins that have been recorded from old historical maps will have 500 m buffer applied to them. Any development which falls within a buffered cabin zone will have its HPI raised by one level.

Palaeontological Sensitivity - The CRICS approach does not appear to apply to such heritage resources, so it doesn't seem appropriate to change the HPI index of a designated palaeontological zone in order to trigger some sort of enhanced management response. A standard procedure of having the consulting archaeologist being alert to the presence of exposed fossiliferous deposits will be followed, unless ACD directs that a qualified palaeontologist be retained.

The effect of these resources on calculation of heritage prescriptions is shown in Table 3.

Development	SHA	RAS	HT	HC	HPC	CRICS	HPI	Heritage Prescription
Road A	0	4	0	0	4	4	8	Lowimpact Assessment
Road B	0	4	0	0	4	5	9	Preimpact Assessment
Road C	0	1	0	1	2	5	7	Moderateimpact Assessment
Road D	0	0	0	0	0	5	5	No Assessment
Block A	9	0	0	0	9	2	9	Preimpact Assessment (record review)
Block B	0	0	1	1	2	3	5	No Assessment
Block C	0	4	0	0	4	2	6	Postimpact Heritage Audit
Block D	0	1	1	1	3	3	6	Postimpact Heritage Audit
Block E	0	4	0	0	4	0	4	No Assessment
Block F	0	4	0	0	4	1	5	No Assessment

Table 3. Example of Heritage Prescription designation for roads and cutblocks based on presence of various heritage features and anticipated impact. SHA=Sensitive Heritage Area; RAS=Registered Archaeological Site; HT=Historic Trail; HC=Historic Cabin; HPC=Heritage Potential Coefficient (total of 4 variables to left - if a heritage potential value from a digital model is available, it is added to this value); CRICS=Cultural Resources Impact Classification System (impact level); HPI=Heritage Potential Index.

HERITAGE OVERVIEW APPROVAL, MINISTERIAL DIRECTION AND COMPLIANCE AUDITING

PLAN SUBMISSION

The yearly planning cycle is where the majority of heritage impacts are anticipated and mitigated in most forestry operations. Forestry planning during this time period addresses issues dealing with access to harvest areas (development of transportation corridors), actual tree harvesting and wood collection, and forest renewal. Planners make use of various planning tools (normally through the GIS management process) to prescribe various forestry practices for an AOP. Many potential planning conflicts can be intercepted at this phase of the planning process, if heritage planning tools such as impact calculators and heritage potential models and associated databases are available, and an approved heritage prescription calculator is used.

When a finalized AOP is produced, a small subset of the plan must be submitted to ACD for review. What ACD is interested in is the mitigative options that the developer is proposing for those developments that are threatened by the proposed developments, as determined by their proximity to sensitive heritage zones. The forestry planning office must furnish information about development location, proposed level of impacts, schedule of impacts, location heritage potential, distance of development from known historical resources and mitigative options that will be taken if heritage conflicts are expected. This information should be provided in tabular format for ease of compliance recording. Also, the developments should be placed on maps at a scale that is sufficient for determining how heritage sensitivity values were determined.

Alberta Community Development has indicated that the most effective way of ensuring that AOP plans are submitted acceptably and can be processed in an expeditious manner is to have them pre-

pared and submitted by a professional archaeologist qualified to hold an archaeological permit. This individual must review the proposed AOP developments and approve the assignment of heritage prescriptions (or do this for the forestry planning office) for each development, adjusting them as needed, based on professional expertise. In essence, the archaeologist will synthesize the AOP into a heritage overview document conforming to standard ACD specifications. The submitted document represents the forestry developers plan for protection of heritage resources for that operating year.

ENSURING COMPLIANCE

When a developer's AOP Heritage Overview document is submitted, it is necessary to ensure that compliance to the document's provisions will be maintained. Alberta Community Development does not have the resources to monitor regulatory compliance for the many developments taking place in the province on an annual basis. Instead, monitoring is done on a self-regulatory basis, through a system of permits granted to qualified professional archaeologists. Under this system, the professional archaeologist who submits the AOP Heritage Overview applies for and is granted a permit to undertake all archaeological field mitigation that is identified in the submission. In many cases no mitigation will be required, but certain developments will require some kind of professional archaeological assessment. Occasionally, unplanned archaeological assessment related to the AOP process may be required, and is also done under auspices of this permit.

It is the responsibility of the retained professional archaeologist to ensure that all developments specified in the overview are in compliance with the Historical Resources Act, under reasonable and safe working conditions. It is the responsibility of the developer to ensure that the archaeologist is provided with the information necessary to demonstrate development compliance with the act, and the resources to ensure compliance is maintained. Permit obligations require that the professional archaeologist produce a report on the field work undertaken, and also demonstrates through management reporting that the forestry developer exercised due diligence in protecting heritage resources (compliance).

Archaeological reporting standards are addressed under existing permit requirements set forth by ACD. Archaeological reporting is the sole responsibility of the permit holding archaeologist, with resources required to produce the report being provided by the forestry developer. Compliance reporting is a joint responsibility. A compliance report usually consists of a review of the developments that were proposed in the plan (cutblocks and road segments for the most part), including a determination that their level of impact was of the magnitude predicted. Also, a report is produced on the level of any archaeological mitigation that was required. Impact information can be collected from the forestry developer and does not require first hand observation by the archaeologist. However, all archaeological monitoring and inspections must have been done by the archaeologist following standard permit requirements. The compliance and archaeological report can be combined as a single submission. Normally, both reports should be submitted prior to a new AOP summary being submitted to ACD for approval.

REFERENCES

Gibson, Terrance, James Finnigan and Dale Russell.

- 1999 A Heritage Management System for the Forest Industry in the Whitecourt/Lesser Slave Lake Region, Alberta: Report on file, Alberta Community Development, Edmonton.