

C5 FOREST MANAGEMENT PLAN 2006–2026

APPENDIX 4B. ARCHEOLOGICAL RESOURCE
MANAGEMENT MODEL FOR THE C5 FORESTRY
MANAGEMENT UNIT

**ARCHAEOLOGICAL RESOURCE
MANAGEMENT MODEL
FOR THE
C5 FORESTRY MANAGEMENT UNIT**

**ARCHAEOLOGICAL RESOURCE MANAGEMENT MODEL
FOR THE
C5 FORESTRY MANAGEMENT UNIT**

prepared for :

**Archaeology and History Section,
Alberta Community Development
8820 - 112 Street
Edmonton, Alberta T6G 2P8**

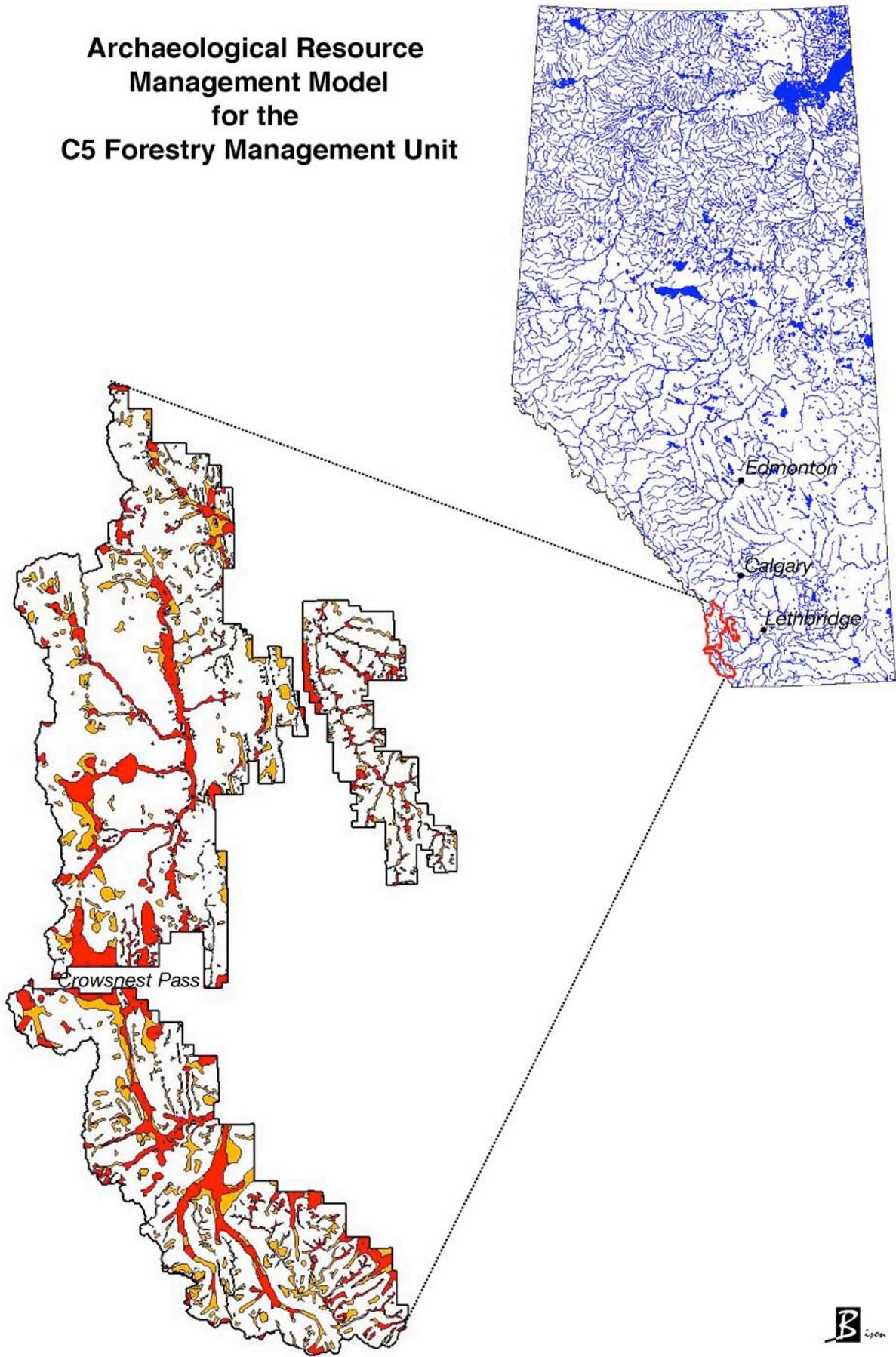
by

Don Hanna, M.A.

Bison Historical Services Ltd.
1A-215 36th Avenue NE
Calgary, Alberta
T2E 2L4

May 20th, 2005

**Archaeological Resource
Management Model
for the
C5 Forestry Management Unit**



EXECUTIVE SUMMARY

The C5 Forestry Management Unit encompasses approximately 3,513 square kilometres of the Rocky Mountain Forest Reserve Lands north of Waterton National Park and south of Kananaskis Country in the southwest corner of the province of Alberta. This area is the subject of considerable debate on a broad range of land management issues. To address these issues calls for a comprehensive land management strategy that minimizes impacts and ensures sustainability must be developed and implemented for this region. An important part of this strategy is the development of an effective set of mechanisms for dealing with heritage resources. In order to address this need, the Heritage Resource Management Branch of Alberta Community Development requested that Bison Historical Services Ltd. develop a model of archaeological potential that would distinguish areas of high, moderate and low archaeological potential.

The goal of this program was to develop a land management basis for structuring archaeological investigations in conjunction with future land developments of many different types. The required endproduct is a set of GIS-based map layers and associated databases that can be used to evaluate the archaeological potential of any proposed development footprint.

The approach employed to develop this model was largely subjective and followed traditional forms of archaeological assessment, involving interpretation of stereo aerial photographs and contour maps. However, specific and systematic criteria were employed to systematize and regularize the definition of high potential lands. Criteria employed in this analysis focused on relatively level landforms and edges of landforms in reasonably close proximity to water. Both valley bottom and upland areas were targeted. Areas targeted include likely terrain in the vicinity of known sites, confluences, ridge intersections, passes, well-defined terrace or benchlands within river valleys, bottomland areas with well-defined meander scars or oxbows, tarn and cirque lakeshores, isolated knolls, upland plateaus and certain peaks.

The final product is a map-model depicting four categories of archaeological potential. These four categories are extreme, high, moderate and low potential. Areas of extreme potential, denoting areas in close proximity to known significant sites, constitute 219 hectares, or 0.1% of the total C5 FMU. Areas of extreme potential are those areas in close proximity (within 30 metres) of known significant sites. It is recommended that all ground disturbing developments that encroach upon areas of “Extreme” archaeological potential should be preceded by an HRIA.

Areas of high potential, denoting areas with a strong probability for the presence of unrecorded significant sites, constitute 46,119 hectares, or 13.1% of the total C5 FMU. All ground disturbing developments that encroach upon areas of “High” archaeological potential should be preceded by an HRIA or by an HRO justifying why such an HRIA should not be required.

Areas of moderate potential, denoting areas with a possibility of the presence of unrecorded significant sites, constitute 40,642 hectares, or 11.9% of the total C5 FMU. All other areas, constituting 264,023 hectares or 75.2% of the FMU, are deemed to have limited potential for the presence of unrecorded significant sites. Ground disturbing developments that encroach upon areas of “Moderate” or “Low” archaeological potential should be permitted to proceed without any further review.

CREDITS

Report Author:	Don Hanna, M.A.
Archaeological Advisor:	Tom Head M.A.
GIS & Mapping:	Chris Green, B.A.
Site Research & Background:	Courtney Cameron, B.A.
Data Entry & Management:	Chris Green, B.A.

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY.....	i
CREDITS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES.....	vi
LIST OF TABLES.....	vii
INTRODUCTION.....	1
THE STUDY AREA.....	1
Southern Block.....	3
Northern Block.....	4
Eastern Block	4
Environment	4
Geographical History.....	6
CULTURAL HISTORICAL BACKGROUND.....	7
Early Period.....	10
Middle Period	11
Late Period.....	13
Proto-Historic Period	14
Historic Period	15
STANDARDS AND APPROACHES.....	17
MAP GRIDS AND DATUMS	17
PROJECTIONS AND GRID ZONES.....	18
GIS APPROACHES AND IMPLEMENTATION	20
PROCEDURES AND DATA LAYERS.....	24
KNOWN ARCHAEOLOGICAL SITES.....	25
HISTORIC SITES	28
DEPOSITION POTENTIAL.....	30

TABLE OF CONTENTS

	Page
LANDFORMS WITH ARCHAEOLOGICAL POTENTIAL	33
PREVIOUS INVESTIGATIONS	36
DISTURBED LANDS	41
ARCHAEOLOGICAL POTENTIAL.....	44
Criteria for Identification as High Potential Lands.....	44
Proximity to Known Sites	44
Confluences.....	46
Ridge Intersections	47
Special Areas of High Potential.....	47
Criteria for Identification as Extreme Potential Lands.....	48
Summary of Archaeological Potential Data Layer	48
SUMMARY AND CONCLUSION.....	52
REFERENCES CITED	57
APPENDIX 1: Known Archaeological Sites within the C5 FMU	63
APPENDIX 2: Known Historic Sites within the C5 FMU.....	64
APPENDIX 3: Archaeological Studies within the C5 FMU	65

LIST OF FIGURES

	Page
Figure 1: The C5 Forestry Management Unit	2
Figure 2: View of valley setting in the C5 FMU.....	5
Figure 3: View of alpine setting in the C5 FMU.	5
Figure 4: Earliest projectile points	10
Figure 5: Early stemmed spear points.....	11
Figure 6: Early Middle period notched points.	11
Figure 7: Middle period "dart" points	12
Figure 8: Late Middle period "dart" points.	12
Figure 9: Late period arrow points.....	13
Figure 10: Known archaeological sites in the C5 FMU.....	26
Figure 11: Known historic sites in the C5 FMU	29
Figure 12: Deposition Potential in the C5 FMU	31
Figure 13: Landform areas with archaeological potential	37
Figure 14: Previous archaeological studies.....	39
Figure 15: Previous Disturbances	43
Figure 16: Overall Archaeological Potential within the C5 FMU	50

LIST OF TABLES

	Page
Table 1: Summary of data sources.....	24
Table 2: Deposition potential.....	32
Table 3: Landforms with archaeological potential	36
Table 4: Land disturbance categories	42

INTRODUCTION

The C5 Forestry Management Unit (FMU) is in the southwest corner of the province of Alberta and encompasses approximately 3,513 square kilometers of the Rocky Mountain Forest Reserve Lands north of Waterton National Park and south of Kananaskis Country (Figure 1). This area has received considerable attention with respect to a broad range of land management issues. Public opinion, recent Environment Utility Board hearings and large scale planning reviews (e.g. Natural Resources Conservation Board report for Vacation Alberta) have indicated that new approaches and a comprehensive land management strategy that minimizes impacts and ensures sustainability must be developed and implemented for this region. In keeping with this, in November 2004, the Heritage Resource Management Branch of Alberta Community Development issued a call for proposals seeking the development of a model characterizing archaeological potential to assist in the management of proposed development activities in C5 FMU. This model would distinguish areas of high, moderate and low archaeological potential as outlined in a letter to the forestry industry in December 2003 issued by Les Hurt, Director of the Heritage Resource Management Branch. The contract was subsequently awarded to Bison Historical Services Ltd. in December, 2004.

THE STUDY AREA

The C5 FMU is a broad area spanning a diversity of ecological districts and comprised of three distinct and physically separate blocks or areas: a large southern area, between Waterton National Park and the Municipal District of Crowsnest Pass (120,161 ha.), a larger northern area between the Crowsnest Pass and Kananaskis Country (191,802 ha.), and a smaller eastern block encompassing substantial portions of the Porcupine Hills (39,345 ha). The northern and eastern blocks are sometimes referred to collectively as the “northern zone” or “northern

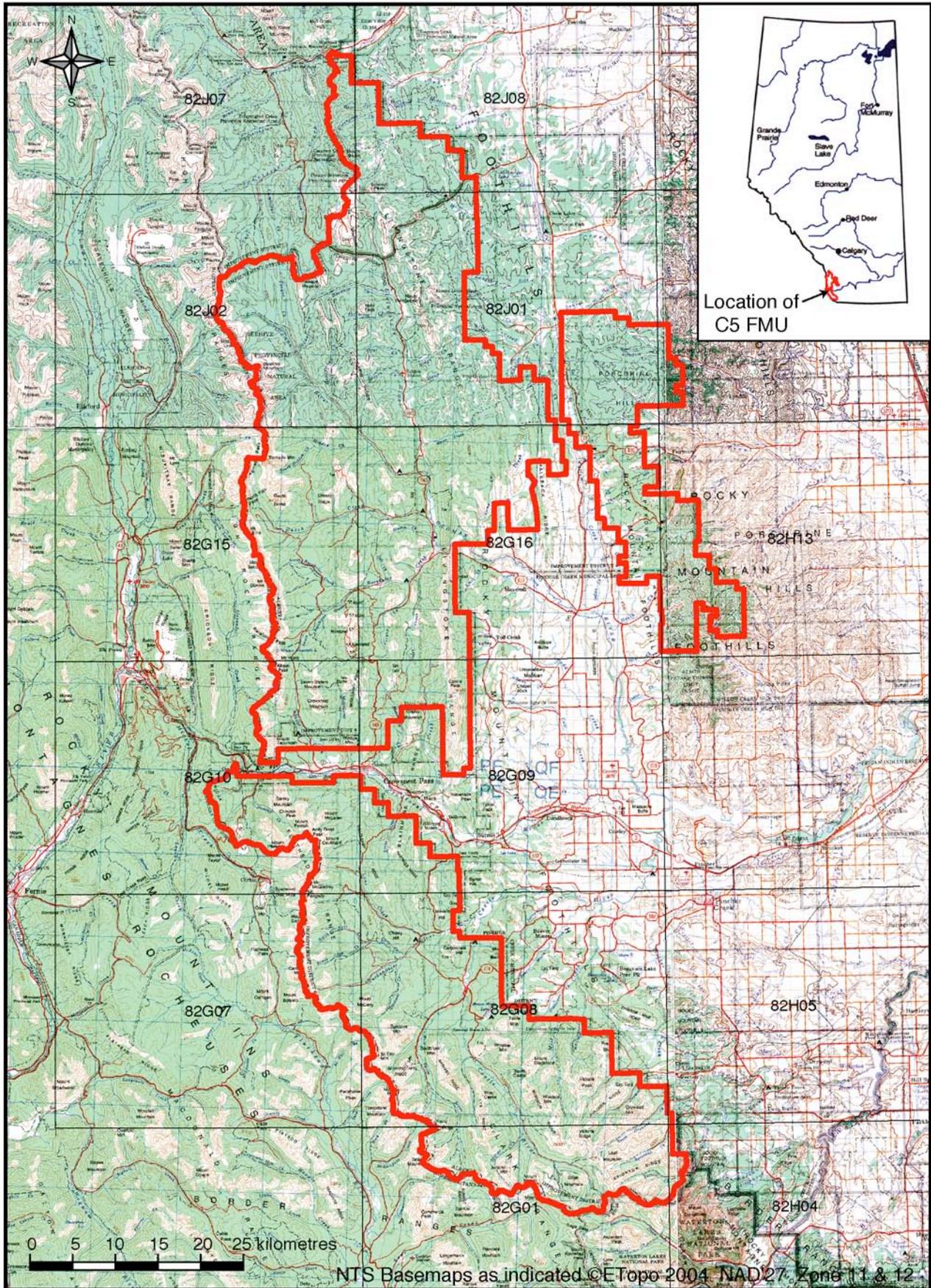


Figure 1: The C5 Forestry Mangement Unit

sub-region”, while the southern parcel is referred to as the “southern zone” or “southern sub-region”.

The entire C5 FMU is drained by the South Saskatchewan River system. The vast majority of the FMU empties through the Oldman River, flowing generally to the south and east. However, the most northerly portions of the C5 FMU are drained by various small tributary creeks of the Highwood River, which flows north and east out of the study area and enters the Bow River, ultimately flowing southeast to join the Oldman River, thereby forming the South Saskatchewan River.

Southern Block

The southern block of the C5 FMU covers the area between Waterton National Park in the south and the Municipality of Crowsnest Pass in the north, the Alberta-British Columbia border in the west and the transition between foothills and Plains on the east. This southern sub-region is drained by the Castle and Carbondale Rivers, which join east of and outside the C5 study area. Mountain Ranges include portions of the Clark, Flathead, and Blairmore Ranges. In the south of this sub-region, the topography is dominated by a series of northeast-southwest running ridges and low peaks that separate the river and creek valley systems.

The major drainage of the southern zone is the Castle River, which flows northwest, away from the northern boundary of Waterton National Park, between the Flathead Range (the summit of which constitutes the boundary between Alberta and B.C.) and the paralleling Windsor Ridge with major peaks at Table, Whistler, North Castle, Windsor and Loaf Mountain. The forks of the Castle River are separated by northward running ridges at Lys Ridge and Barnaby Ridge, which are marked by the summit of West Castle. The Carbondale River flows northeast, draining a relatively broad basin and constitutes an important element in access to passes into the Elk River drainage to the west.

Northern Block

The northern block stretches north from the Municipality of Crowsnest Pass to the south boundary of Kananaskis Country, roughly marked by Highway 540, and from the peaks of the High Rock Range (the Alberta-B.C. border) to the eastern foot of the Livingston Range and the Whaleback. The northern sub-region is drained by the Livingston River and the upper reaches of the Oldman River, which mingle before leaving the project area.

The Whaleback is a classic montaine setting, with windswept grassy ridges, stands of Douglas Fir and Limber Pine, and thickly wooded, moist valleys and coulees, constituting a critical resource area for wildlife, particularly during the transitional seasons of Spring and Fall.

Eastern Block

The eastern block of the C5 FMU encompasses much of the Porcupine Hills and consists of a broad, convoluted upland defined by the drainages of the Oldman River on the west and south, and by the Willow Creek drainage on the north and east. It is separated from the North unit by the valley of Callum Creek and Chain Lakes, marked by Highway 22. This upland is dissected by many small creeks and coulees, and is extremely rugged in nature.

The north and east margins of the Porcupine Hills are drained by various ephemeral to permanent creeks feeding into Willow Creek, most notably Trout, Meadow, Kyiskam, Muddy Lake, Beaver, Nine Mile, Five Mile, Olsen, Cripple, Burke, Lyndon, South Fork and Nelson Creeks.

Environment

The C5 FMU lies almost entirely in the Rocky Mountain Natural Region of Alberta (AEP 1994) and encompasses lands in the Alpine, Subalpine, Montaine, Aspen Parkland and Fescue Grassland ecoregions (Strong and Leggat 1992), with the bulk falling in the Subalpine ecoregion. The area is dominated by well-defined valley systems (Figure 2) and striking upland settings (Figure 3).



Figure 2: View of valley setting in the C5 FMU.



Figure 3: View of alpine setting in the C5 FMU.

Lands of the C5 FMU include parts of four of the seven Natural Regions of Alberta. These include the Rocky Mountain, Parkland, Grassland and Foothills Natural Regions. In the Rocky Mountains, represented sub-regions include the Alpine, Sub-Alpine and Montaine, while in the Parkland, small areas of the Foothills Parkland sub-region are represented. Large portions of the northern portion of the C5 FMU lie in Montaine sub-regions. Relatively limited portions of the C5 FMU are in Alpine settings, constituting less than 10%. Much larger portions lie in the Sub-Alpine sub-region. Limited portions of Parkland and Grassland are also represented.

Despite this ecological diversity, the C5 FMU shares certain historical, ecological and topographic features. The dominant industrial land disturbance has been forestry and modification of the landscape for agriculture has been limited, resulting in large tracts of land that retain their original ecological characteristics. The dominant tree species in well-drained areas is the lodgepole pine, which provides a thick forest canopy that retards understory growth (Figure 3). More poorly drained areas are characterized by white and black spruce, and the valley bottomlands and very poorly drained zones are more open, with ground cover provided by mosses, willows, and sedges (Strong and Leggat 1992).

Geographical History

The study area lies within the Rocky Mountains Foothills subdivision of the Cordilleran Region of Canada. Bedrock formations along the foothills of the Rocky Mountains are typified by sedimentary materials of Mesozoic (largely Jurassic and Cretaceous) origin, such as shales, sandstones, and conglomerates (Clayton *et al.* 1977). These contrast with the massive uplifted Palaeozoic formations of limestone and quartzite that characterize the front range of the Rocky Mountains proper. Broad U-shaped valleys are the dramatic remnant of Pleistocene glaciation, and in some cases have filled to form long linear lakes.

The surficial geology of the C5 FMU is a reflection of both the glacial history and bedrock geology the region. The eastern slopes was subjected to a long period of glacial advances and recessions during the Pleistocene Epoch which ended around 15,000 years ago (Clayton *et al.* 1977). Surficial sediments in the region are consequently largely glacial in origin, reflecting modification of the underlying bedrock. In the Cordilleran region, glaciation deposited a mantle of till over the bedrock substrate. Postglacial erosional processes have modified this surface with the addition of colluvial materials on lower slopes and along valley floors (Clayton *et al.* 1977:68).

CULTURAL HISTORICAL BACKGROUND

The Eastern Slopes include portions of the Montane, Subalpine and Alpine and major portions of the Fescue Grass Ecoregions. The principal drainages of the Eastern Slopes are the Oldman, Bow-Red Deer, North Saskatchewan, Athabasca, Smoky and Peace Rivers. In the south, ecological transitions are complex and closely spaced moving from east to west. In the north, transitions are more subtle and broadly spaced. Site types and locations also display a marked difference between the southern and northern portions of the Eastern Slopes. In the southern valley systems, site types are consistent with the pattern recorded for the Plains, while northern sites are more consistent with boreal forest distributions. Quarries, kills, cairns and alignments, effigies, wheels, and rock art sites are much more common in the south, while large, lake and riverside camps and small, scattered special-use sites are more common in the northern drainages (Ronaghan 1986).

An important way to understand the prehistory of the Eastern Slopes is in terms of environmental diversity. The region exhibits a topographic diversity which promotes zonation of vegetation and consequently, of wildlife. This close juxtaposition of a variety of food plants and game animals is particularly suited to

societies with broadly based, scheduled economies. Such areas are also attractive on a seasonal basis for people with more specialized economies and technologies.

By virtue of its limited size (less than 10% of the province) and the relatively high demands for recreational use imposed upon these lands, the Eastern Slopes has been the subject of search (see Ronaghan 1986), much of it directed toward the study of the Montane districts in Jasper, Banff, Crowsnest Pass and Waterton.

The Rockies have traditionally been viewed as obstacles to movement, and as a place to travel through, rather than as a place to live. This is a recent perception, and is closely allied to colonial history and the importance of railroads in developing national identities (Vivian 1997). This bias has been propagated in research, where the Eastern Slopes are usually described in terms of seasonal use by peoples of the Plains or Interior Plateaus.

The prehistoric record for the Eastern Slopes was originally formulated on the basis of research in Waterton Lakes National Park (Reeves 1972). Significant work was subsequently carried out in conjunction with highway and pipeline studies in the Crowsnest Pass (Driver 1978). Parks Canada began archaeological investigations in the mountain parks in the late 1960s and early 1970s. In the past decades, Parks Canada has revitalized their program of archaeological investigations to provide updated 'Archaeological Resource Descriptions' for each of their administrative units.

Mountain prehistory is particularly difficult to unravel because of the nature of archaeological sites in the region. Many sites are shallow and the occupations mixed. Others are deeply stratified but lie in fan deposits with complex vertical and horizontal stratigraphy. Although the systematics of the Crowsnest Pass and Waterton National Parks as described by Reeves (1972), Kennedy (Kennedy et al. 1982) and Driver (1978) appear robust, there exists considerable typological variability, even within defined Sub Phases.

More recently, the archaeology of Waterton-Glacier International Peace Park has been the subject of a major re-assessment by Reeves (2003) in a Technical Report prepared for the National Park Service of the United States of America. In this

study, Reeves has reworked and expanded his cultural-historical sequence and has identified two settlement patterns, or distributions of site types: “Valley Patterns and Alpine Patterns”. As the name suggests, the valley “Valley Pattern” consists of lower elevation sites within mountain valleys and consists of sites distributed on valley floors, terraces, benches, moraines, hill tops, swales, and edges of marshes and lakeshores. Sites found in these settings, include campsites, killsites, game and fish-trapping sites, and plant acquisition and processing sites. The “Alpine Pattern” consists of sites found in the alpine zone, which are generally associated with mountain and ridge tops, high benches, along trails, next to springs and lakes, at the foot of cirques, and on side-slopes. Sites found in these settings are generally small, and reflect a strong seasonal bias. Small campsites, kill sites and special purpose resource acquisition sites are most common. Quarries and tool-stone acquisition locales are often found in these alpine settings, as are vision quest and eagle trapping sites.

Another complicating factor in understanding mountain prehistory is the general paucity of faunal assemblages and the homogeneity of lithic assemblages. Faunal materials are seldom well preserved in the generally acidic soils of the region. Lithic materials available throughout the Rockies are generally very similar in geological origins and appearance. Most are darkly coloured bedded cherts, usually black or dark grey, often banded, and are derived from Mesozoic dolomites. This lack of faunal remains, and the general similarities of locally available materials make assemblage comparisons difficult.

In general terms, the reconstructed prehistory for the Mountain region has been abstracted from that of the Northern Plains. Wormington and Forbis (1965) provide the first outline for Alberta’s prehistory, followed by a more detailed construct presented by Reeves (1969) and further refined to reflect the particulars of the mountain setting (2003). This framework was reviewed by Vickers (1986) but in broad outline no challenges to the basic form have been proposed. This

reconstruction accommodates recent discoveries and hypotheses, but builds upon Reeves' previous studies (1972).

Early Period

The Eastern Slopes of Alberta is one of two hypothesized pathways for the initial colonization of the Americas. However, little direct evidence for this early migration has been found. Consequently the Eastern Slopes are a critically important area for answering a globally important cultural-historical question.

Occasional finds of Clovis and triangular, basally thinned points, some at high elevations in mountain passes, suggest this earliest occupation (Figure 4). The Pink Mountain site in Northeastern BC is a surface collection in a pro-glacial lake edge setting. Large fluted and lanceolate projectile points were recovered here (Wilson 1987). Charlie Lake Rockshelter in Northeastern BC (Fladmark et al 1988) and the Sibbald Creek site west of Calgary (Gryba 1983) are important for the presence of basally thinned triangular

projectile points in contexts dated at up to 10,500 years ago (Fladmark et al 1988). The Lake Minnewanka site in Banff has yielded a number of large, fluted, lanceolate, stemmed and notched projectile points in deposits exposed by the eroding lakeshore edge. The Vermilion Lakes site, also in Banff, is a well-dated, stratified site. Earliest components here were dated at close to 11,000 years ago (Fedje 1995), but no diagnostic projectile points were recovered. Subsistence information in association with this Early Pre-contact period is largely lacking, although indications of specialized hunting of big game, specifically bighorn sheep, is present in Banff (Fedje et al 1995) and the Crowsnest Pass (Driver 1982). Sites seem associated with high mountain pass settings, benchland edges or with the margins of pro-glacial lakes. This distribution likely reflects both the nature of the Late Pleistocene/early Holocene landscape and of subsequent trends in both erosion and deposition.

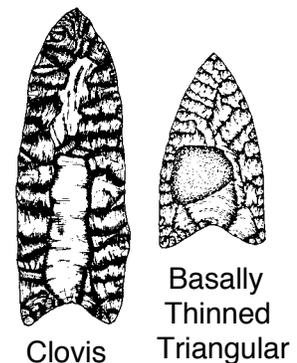


Figure 4: Earliest projectile points

The first intensive colonization of the Eastern Slopes is attributed to Plains related groups and dated at about 10,000 years ago. This colonization is identified as the Plains/Mountain 'culture' (Reeves 1978). This tradition is reputedly derived from Plains inhabitants who sought refuge from the onset of the mid-Holocene drought on the Plains. Although loosely defined, it is known to exhibit diagnostic specimens shared with specialized mountain cultures to the south (see Husted 1991). Typical projectile point types representative of Plains/Mountain include: Agate Basin, Lusk, Castle River and Cowley (Figure 5). A notable defining element, particularly for earlier materials may be the presence of well executed parallel-oblique flaking on projectile points.

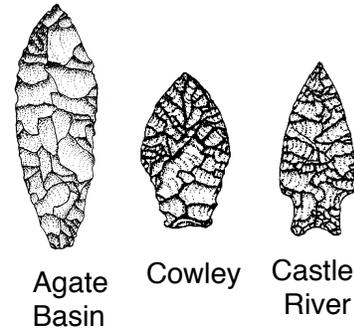


Figure 5: Early stemmed spear points

As argued by Reeves (1978) an early immigration of Agate Basin led to a persistence of these groups (Plains/Mountain) in the mountains.

The poorly defined Mummy Cave complex that follows may have persisted as late as Burmis Subphase times, circa 2400 years ago (Kennedy et al. 1982).

Middle Period

While the Early Period is characterized by stemmed spear points, the Middle Precontact sees the appearance of notched projectile points associated with the introduction of the spearthrower or "atlatl". This tool combination has a throwing stick and a light spear or "dart". The atlatl is a simple lever that allows the hunter to propel the dart further and with increased velocity.

Generally associated with the introduction of the spearthrower is the earliest appearance of notched projectile points (Figure 6).

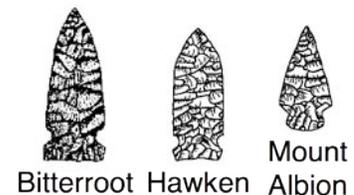


Figure 6: Early Middle period notched points.

The Middle Precontact begins about 8000 B.P. and in Alberta initially includes the spotty appearance of a

variety of un-named notched and stemmed point forms. Subsequently the Mummy Cave Complex makes its appearance. This complex, named for a rockshelter site in Wyoming, is represented by a geographically structured, chronological series of points including, Bitterroot (Northern Side-Notched), Hawken and Mount Albion Corner-notched (Walker 1992). At several locations along the mountain front there is also evidence for an un-named, large, barb eared, corner-notched point style that occurs in pre-Mazama (6850 B.P.) contexts (Ronaghan 1992, Kennedy et al. 1982).

These forms are replaced or supplemented by McKean Complex materials characterized by the lanceolate McKean, and stemmed Duncan and Hanna style points (Figure 7). This shift happens between 5,000 and 3,300 years B.P. and closely parallels developments on the Plains and Plateau (Spurling and Ball 1981; Richards and Rousseau 1987).

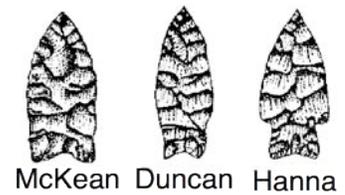


Figure 7: Middle period "dart" points

By 3300 B.P. a point with sharply tanged shoulders marks the appearance of what is called Pelican Lake (Figure 8). Pelican Lake is believed to be a development out of McKean. Rocky Mountain derived lithic materials are generally a major component of most Pelican Lake assemblages. Later still, Besant style points, possibly developing from Sandy Creek and Oxbow style points, also appear. Both styles appear to coexist on the plains for over a millennium. Groups using Pelican Lake style points exist until about 2000 years ago while Besant style points continue in use until about 1750 years ago. Pelican Lake points are widely distributed throughout the Eastern Slopes, particularly in the southern drainages. Besant style points are less common but large Besant site assemblages are known from the Bow corridor in particular.

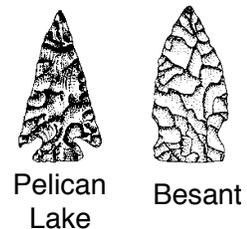


Figure 8: Late Middle period "dart" points.

The Middle Precontact Period ends with the introduction of the bow and arrow about 2,000 years B.P. Although the "atlatl dart" continued in use for a time by

groups using Besant style points, a basic change had occurred. Accompanying this change is the first use of ceramics in this area.

Late Period

This period is characterized by a florescence in communal bison hunting technologies on the Plains, although little is known of mountain adaptations. Two major point styles are recognized, Avonlea and Old Women's, with the latter including both Prairie and Plains styles (Figure 9). Avonlea style points first occur about 2000 years B.P. and persist for a millennium or more. Old Women's phase materials include a developmental sequence of point styles present from about 1000 years B.P. until the arrival of Europeans (Forbis 1962). The presence of an Eastern Slopes variant of Plains points with notches positioned high on the margins indicates the probable development of regional styles. Possibly associated with this development is evidence for fishing in the form of net sinkers in Waterton National Park (Milne-Brumley 1971) and the Upper Oldman River (Kennedy et al 1984). Fish remains have also been recovered from the Echo Creek site in association with small side-notched arrow points, and the Second Lake site in association with deeply corner-notched styles (Fedje 1986). The absence of fish remains at other sites is likely a result of excavation methods. Available radiocarbon dates suggest an age of between 1,300 and 1,600 years ago for this adaptation.



Figure 9: Late period arrow points

An as yet poorly documented occurrence is the presence of pithouse sites in the upper Bow and Red Deer river valleys (Smith 1914). It is likely that these sites are related to the Plateau Pithouse Tradition (Richards and Rousseau 1987). Available dates on these pit houses suggest an occupation between 600 and 1,600 B.P. (Magne 1994: personal communication). House pits are the remains of semi-subterranean winter dwellings, commonly observed in the interior of BC. They are frequently found in large “village” sites and individual house pits can be very large.

The Alberta pithouse sites have limited numbers of features, and the house pits themselves are very small in comparison with those of the Canadian Plateau. The presence of Canadian Plateau cultural elements is also evident in the Jasper region in the presence of microblades and microblade cores in association with contracting stemmed and notched projectile points at the Patricia Lake site (Pickard 1986).

The developmental sequence outlined above suggests a complex set of interrelationships. As Pelican Lake influence on the Plains wanes in favour of Besant groups after the Middle Precontact, the introduction of the bow and arrow marks the beginning of the Late Period and the rise of mountain-based Avonlea groups. In turn, the later adoption of the bow and arrow by Besant groups results in the appearance of the Samantha style arrow point and eventually the ascendancy of Old Women's groups on the Plains. The presence of Plateau related sites and artifacts and evidence for more generalized subsistence patterns further complicates this picture of cultural transformation.

These changes are, however, minor compared to the introduction of European metal trade goods and eventually, the horse and gun. The appearance of these items in the archaeological record marks the end of the Late Precontact and the beginning of the Proto-Historic Period.

Proto-Historic Period

The Proto-historic lasts for just over a century beginning about 200 B.P. (A.D. 1750) and ends with the coming of the North West Mounted Police in A.D. 1874. The appearance of metal trade goods (including the gun) and the horse greatly affect the native groups in the area. Few sites are known from this period. It is during this period that information becomes available to infer a relationship between existing First Nations and the pre-contact archaeological cultures that characterize the previous eleven millennia. At the time of early historic contact, the Eastern Slopes was an area used, at least on a seasonally specific basis, by a number of First Nations groups. In the south, the upper reaches of the Oldman River was used

on a seasonally inter-digitating basis by the Piegan, the Kutenai, and the Stoney. The Bow-Red Deer drainage was used by the Blackfoot, Sarsi, Stoney, Kutenai and Shuswap. The Athabasca and Smoky are known to have been used by the Stoney, Beaver and Shuswap. However, the distribution of First Nations at the time of European contact remains contentious. Some argue that the southern Eastern Slopes was occupied by the Shoshoni or "Snake" Indians, now living well to the south. The Proto-historic Period closes with the coming of the North West Mounted Police.

Historic Period

Alberta's historic record spans about the last two and a half centuries. On September 11, 1754, Anthony Henday crossed what was to be the boundary of the Province of Alberta and was the first non-native to visit the area (MacGregor 1972). Later in the same year he became the first non-native to see the Rocky Mountains. Fuelled by competition for furs, trading groups like the North West Company and Hudson Bay Company built trading posts across the northern part of the province during the latter half of the 18th century. Exploration continued with this economic exploitation (Newman 1985).

Exploration by various individuals including Alexander MacKenzie (1789 - 1793), Peter Pond (1775 - 1778), and David Thompson (1786 - 1808) resulted in the examination of many areas including what is now the Province of Alberta. By the early 1800's, the northeastern half of the province was well-known, but only the briefest of forays had been made into southern Alberta (Fidler 1792).

By the mid 1800's, government sponsored scientific expeditions like the Palliser Expedition (1857 - 1860) led to an increasing awareness of western lands. Beginning in 1871 the construction of a transcontinental railway brought steadily increasing settlement. Between 1872 and 1874, the North American Boundary Commission surveyed the 49th parallel between the Pacific coast and Lake of the

Woods, delineating the boundary separating Canada and the United States of America.

Following Confederation in 1867, and in order to exert control over what are now the western provinces, the North West Mounted Police was created. Fort Macleod was built in 1874 and Fort Calgary a year later. In order to encourage the opening of the west to immigration, Treaties were signed with the major Indian groups, including Treaty No. 7 in 1877 at Blackfoot Crossing. With the disappearance of the Buffalo and the influx of European settlers, the face of Alberta's history was changed forever.

STANDARDS AND APPROACHES

Mapping standards in Alberta archaeology have been the subject of a long process of evolution, with a slowly increasing emphasis upon standardization. This evolution has been driven largely by changes in the “Archaeological Inventory Site Data Form” employed by Alberta Community Development. Use of the current version of this form is required for all archaeological investigations carried out under permit in the Province of Alberta. The evolution of this form has resulted in more consistent and detailed reporting and presentation of archaeological site data in more recent studies, but, unfortunately, the bulk of existing data is still not entirely consistent in nature. Nowhere is this lack of standardization more apparent than in the recording of site locational information.

MAP GRIDS AND DATUMS

With the exception of sites recorded in the very early stages of Alberta archaeology, archaeological data in Alberta has typically been collected and referenced using the Universal Transverse Mercator coordinate system (UTM). Prior to 1983 most grid locations were referenced to the the North American Datum of 1927 (NAD’27), which was in turn related to the Clarke spheroid of 1866. Moreover, these grid coordinates were normally derived from visual inspection of the appropriate 1:50,000 scale National Topographic Series (NRS) mapsheet. Subsequent to the introduction of the North American Datum of 1983 (NAD’83) based upon the Global Reference Standard of 1980 spheroid (GRS’80), grid locations on archaeological site forms and in reports were usually referenced to the datum of whatever NTS mapsheet was convenient to the area, gradually migrating from NAD’27 to NAD’83 as newer mapsheets became available. With the general availability of civilian GPS units and the shift to more accurate geodetic reference systems and datums, site locations have typically been recorded in both NAD’27 and NAD’83. Unfortunately, coordinate conversion methods between NAD’27 and

NAD'83 have not been consistently applied, resulting in some internal discrepancies in recorded site locations. The difference between the Clarke and GRS'80 spheroids is that the former was based upon local datums, with compounding errors or shifts as one moved further away from the central datum in Kansas, while the latter is geodetically derived datum. The principal source of the discrepancies in translation stems from the use of two different approaches to datum transformation. Hand-held GPS units use an internal approximation formula to derive the relation between NAD'27 and NAD'83 coordinates. However, the Geodetic Survey Division of Natural Resources Canada has developed a much more accurate transformation based upon corrections applied to individual local datum locations. This National Transformation (version 2) is the most accurate method available for transforming between datums in Canada. Consequently, the Ntv2 approach was employed for all transformations of locational data carried out in connection with this study.

PROJECTIONS AND GRID ZONES

Regardless of the datum and the spheroid employed, virtually all archaeological information in the Province of Alberta has been presented using a single map projection, and a single set of grid coordinates derived from a universal application of that projection. The Transverse Mercator (TM) projection is a common and readily understood projection that maintains a straightforward relationship between direction and distance at mapping scales useful for field investigations. Originally developed for use by military ground forces for field operations, the Universal TM (UTM) projection is based on zones that are six degrees wide and incorporates a grid reference system that is intuitively easy to operationalize. Use of the UTM grid coordinate system has become almost universal for field scientists working throughout North America.

Unfortunately, both the Province of Alberta, and the C5 FMU lie within two UTM zones (11 and 12). Maps that are projected in different zones and with different UTM grids will not align at their margins and there is no simple

correspondence between the grids of adjacent zones. Consequently, use of either Zone 11 or Zone 12 as the mapping standard for this project area would be inappropriate and could lead to potential confusion and inaccuracies. However, there is a suitable projection for dealing with this issue. The 10TM projection permits the portrayal of the entire Province of Alberta within a single zone. The 10TM zone covering Alberta is Zone 7, centered on the 5th Meridian (115° West), and extending 5° in either direction to the eastern and western margins of the province. Although this necessarily involves a slightly greater degree of apparent distortion near the margins of the province, these distortions are relatively minor and the benefits of a single grid reference system outweighs these drawbacks. The 10TM map projection provides a consistent mapping standard across the province, but is of limited utility in the field, as it is a non-standard projection and is not available as a preset on any hand-held GPS unit. Fortunately it is also possible to program most GPS units to display coordinates in a “customized” coordinate system simply by indicating the projection the central meridian associated with the project area, the scale factor and any false easting values. Values associated with a 10TM coordinate system are a Transverse Mercator projection, with a central meridian of –115°, a scale factor of 0.9992 and a false easting of 500,000.

The 10TM projection has been adopted as a *de facto* standard for many, but not all, Province of Alberta maps and GIS data systems. This lack of systematization was abundantly apparent in the background data supplied by Alberta Community Development in support of this C5 FMU archaeological potential project. Datasets in mixed UTM (Zone 11 and 12), re-projected UTM (all Zone 12 data re-projected into Zone 11) and 10TM were all provided. For the purposes of this study, all data layers, imagery and datasets were re-projected into 10TM, resulting in a continuous and consistent body of data. Fortunately, should circumstances demand, the data components can all be re-projected if necessary.

GIS APPROACHES AND IMPLEMENTATION

Geographical Information Systems (GIS) are powerful resource management and research tools that have only become available in the past two decades as more powerful computers become increasingly more available. Put simply, A GIS is a map linked to one or more databases. Unlike a paper map, however, it can be a dynamic and flexible document, a potentially infinite series of maps that can be reconfigured as needs dictate. It is an instantly modifiable and updatable representation of many different aspects of the physical world that are held together by the glue of a common, geographical presentation. GIS is not *a priori* statistical in nature, although the storage and manipulation of information makes statistical analysis inherently easy to carry out. A GIS can also consist of purely subjective information, as long as that information is arranged in geographical space. Much archaeological raw data is inherently geographical in nature and Alberta archaeologists have repeatedly addressed geographical themes in their research. However, the adoption of GIS systems and techniques has been slow and only a restricted group of large-scale studies have been attempted. The emphasis in archaeological GIS implementations in Alberta to date has been as a land management tool, and has been largely aimed at developing predictive models for forestry lands. Earliest of these was the Millar-Western Forestry Management Area archaeological predictive model developed by Gibson (1998). Subsequent large-scale studies have been largely restricted to the Green Zone of Alberta and include the Weldwood, Sunpine and Alberta Newsprint FMAs carried out by Lifeways of Canada Ltd. the Slave Lake (Gibson and Berezuk 2003), Spray Lakes FMA (Grant 2001) and CEMA (FMA 2002) projects.

These studies have generally adopted two fundamentally different approaches to the development of archaeological predictive models. The first of these techniques is explicitly statistical in nature and relies upon the extensive manipulation of digital information to reduce and present geographical information that is deemed relevant to archaeological site distributions. Leading proponents of

this approach in Alberta are Gibson and Berezuk of Western Heritage Services Inc. The second approach is more “traditional” in archaeological terms, and relies heavily upon the experience and insight of archaeologists in “reading” landscapes. Foremost advocates of this approach are Reeves and Meyers of Lifeways of Canada. Both approaches have strengths and weaknesses that render them less than perfect.

The statistical analytical approach is consistent and verifiable and is easily modified to conform to new data. However, this approach is relatively new, and the relationships between site locations and characteristics of the landscape are by no means clearly formulated. Consequently model builders have attempted to derive the significant environmental variables from the physical setting of known sites within their respective project areas. Unfortunately, most of these studies are derived from areas where there has been little previous research and few sites are known. The result has been models that are predicated on logical constructs with limited empirical verification.

Moreover, the statistical analytical approach is handicapped by its reliance upon the availability of high quality landscape information at a suitable scale. Not all landscape information is available in digital formats, and some available digital information is at inappropriately gross scales. Most noticeable in this respect is the digital elevation model (DEM). Although DEMs are critical elements in most digital analytical attempts to model archaeological potential, fine-grained DEMs suitable for archaeological modeling are relatively rare. Available DEMs for large areas of the Province of Alberta are limited to a ground cell size of one hectare (100 metres by 100 metres). Average archaeological site size in Alberta is considerably less than this ground cell size. Use of such coarse DEM information will fail to identify most of the micro-topographic detail that seems to dictate the distribution of archaeological sites.

The second or “traditional” approach has the virtue of being well established and demonstrably successful. For decades archaeologists have employed informal

landscape analytical techniques to identify areas of archaeological potential through the mechanism of the Historical Resources Overview, or through focused field investigations as are common in all Historical Resource Impact Assessments. The success of this form analysis generally rests on the analysis of airphotos, topographic maps and the experience and insight of the analyst. However, the weaknesses of this approach are the subjective nature of the process and the lack of replicability that this subjectivity imparts. Key to this approach is the depth of experience and the strength of the insight displayed in classification.

In developing a protocol for building an archaeological potential model for the C5 FMU, both the statistical analytical approach and a more traditional intuitive approach were considered. A review of the quality of available digital and physical data resources led to the conclusion that the available digital elevational information was not sufficiently fine-grained to permit the depth of analysis required. The extremely rugged terrain found in much of the C5 FMU simply could not be well represented by a one-hectare ground cell size. Consequently, a wholly statistical landscape analysis was not adopted for the C5 FMU.

The review of available digital and physical resources also indicated that high quality, stereo aerial photographs and detailed topographic maps and corresponding digital data were available for the entire project area. Consequently, a more “traditional” approach, consisting of the review of aerial photos and maps was deemed prudent for identifying lands with archaeological potential. At the same time it was clear that the structured approach inherent in the statistical analytical approach helps create a consistent set of rules for defining archaeological potential. Consequently, it was also deemed prudent to implement a set of automatic “rules” for defining nuances in archaeological potential that would be consistently applied across the study area.

The final approach implemented for determining archaeological potential within the C5 FMU may be termed a “synthetic” approach. Traditional forms of archaeological terrain analysis were employed to identify areas deemed to have

archaeological potential. This initial airphoto analysis indicated that 86,761 hectares or 25% of the total C5 FMU was deemed to have archaeological potential.

Subsequent analysis, consisting of both airphoto study and more mechanistic approaches, was employed to identify high potential zones within these areas of archaeological potential. This final phase of analysis identified 45,669 hectares, or approximately 13% of the total C5 FMU, as having high archaeological potential. Detailed discussion of the procedures employed in identifying these lands follow.

PROCEDURES AND DATA LAYERS

The goal of this study is to develop a land management basis for structuring archaeological investigations in conjunction with future land developments of many different types. The end product is a set of GIS based, map layers that can be used to evaluate the archaeological potential of any proposed development footprint.

Information employed in this study is derived from a number of digital and hardcopy sources. All information was supplied either directly or indirectly through Alberta Community Development and/or Alberta Sustainable Resource Development. Information elements used in this study are summarized in Table 1.

Table 1: Summary of data sources

Digital Information	How information was employed
C5 FMU Boundary	Definition of project limits
Archaeological Sites Data	Basic digital data source for archaeological sites layer
Historic Sites Data	Basic digital data source for historic sites layer
Alberta Vegetation Inventory	Basic digital data for disturbances layer
Surficial Geology Alberta Foothills	Basic digital data for deposition potential layer
Bedrock Geology	General background information
Cultural Base Features (including roads, railways, pipelines, powerlines, cutlines, cities, towns, villages and hamlets)	Location verification
Hydrological Features (including streams, rivers, ponds, lakes, ditches, canals and reservoirs)	Location verification, assessment of aspects of archaeological potential
Drainage Basins	General background information
Contour lines	Location verification, assessment of aspects of archaeological potential
Digital Elevation Model (province-wide)	Not used
Legal Grid with Land Ownership	Location verification
Digital Orthomosaics	Location verification, assessment of aspects of archaeological potential
Ecological Land Classification	General background information
Natural Regions	General background information
Physical Information	
Aerial photographs	Terrain evaluation, Assessment of aspects of archaeological potential
NTS maps	Terrain evaluation, Assessment of aspects of archaeological potential
Reports and Sites Forms	Primary data collection

These information sources were employed in the construction of six independent data layers. Several of these layers are necessary repositories for basic research and management data, while others were employed in the construction of a seventh and final data layer. These data layers are:

- 1) archaeological sites
- 2) historic structures and areas
- 3) areas with potential for deep deposits and buried sites
- 4) archaeological potential of landform/areas
- 5) lands subjected to previous anthropogenic disturbances
- 6) areas previously examined by an archaeologist
- 7) Overall archaeological potential

Data layers one through four can be viewed as “positive” layers, indicating that they contribute in a positive sense to the formulation of overall archaeological potential. Data layers five and six are largely “negative” in their influence upon the evaluation of overall archaeological potential. Data layer seven, “overall archaeological potential” is the ultimate product of this study. The procedures and standards employed in constructing each of these seven data layers are described separately in the following sections.

KNOWN ARCHAEOLOGICAL SITES

The first, and perhaps the most important data layer in this study is a data linked, vector-based layer depicting the location of all known heritage sites (Figure 10). This layer can be employed as the basic medium for adding new site information to the system, and as a basic planning tool for details of site avoidance. Data linkage permits the interactive display of relevant site variables for query, research and planning purposes.

An important caveat attached to the use of this site data is that all site locational information is subject to a degree of error or inexactness. As discussed earlier, the digital site data files provided by Alberta Community Development are a

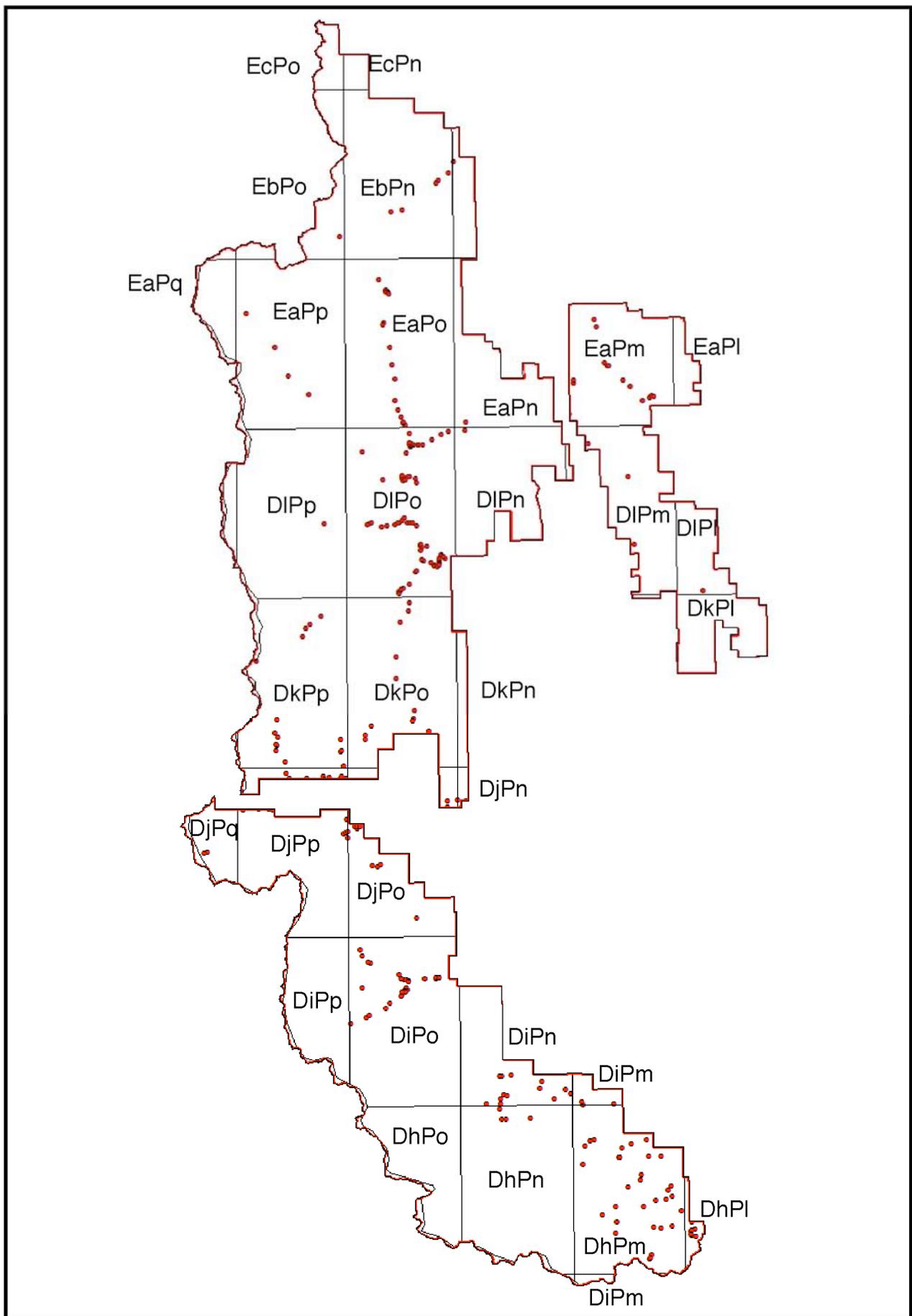


Figure 10: Known Archaeological Sites in the C5 Forestry Mangement Unit

compilation of site information collected by many researchers over many decades. As such, site information is, in many cases, dated, incomplete and prone to error. In particular, site locations recorded in this database should be treated as approximations only. Many locations in this database were recorded prior to the general availability of detailed mapping and GPS receivers. Still other sites were recorded using GPS units, but during the period prior to 2000, when selective availability intentionally increased inaccuracies in the use of civilian GPS units. Another compounding error in locational recording has been widespread confusion in coordinate datum usage and translations between map datums. Consequently the inherent uncertainty in site location coordinates necessitates caution in employing recorded site coordinates as the only basis for avoidance. Where possible, ground-truthing should be an integral element in all close avoidance planning.

All digital archaeological site data provided by Alberta Community Development was proofed against copies of original site data and corrected for apparent errors and omissions. Geographical coordinates were re-projected in 10TM as discussed previously.

Where possible, the actual site limits are depicted as an irregular polygon on the archaeological sites data layer. This polygon was either based upon site sketch maps, the Borden block master map maintained by Alberta Community Development, or other maps gleaned from relevant project maps. Decisions as to which source polygon to use were made on a case by case basis. Where physical limits were not recorded or could not be determined, a circle scaled to site size estimates indicated by the original site recorder was substituted. In cases where site size was not recorded but the site was identified as an isolated find or a small find, the depicted site polygon was arbitrarily extruded out ten metres in all directions from the central recorded UTM.

The final product for this data layer consists of a sites database and associated shape file of sites polygons that depicts the known location and probable

extent of all archaeological sites. This database consists of 265 sites. These sites are summarized in Table form in Appendix 2.

HISTORIC SITES

A vector-based layer depicting historic sites, was constructed using a combination of information sources supplied through Alberta Community Development (Figure 11). This information consisted of a preliminary, but very incomplete data layer depicting the location of historic sites to the smallest known legal subdivision, and a complete set of historic standing structure forms falling within the C5 FMU. Unfortunately, historic site data files maintained by the Heritage Survey Program of Alberta Community Development are highly variable as to data quality. In particular, the locational information for historic sites is variable in quality, with most sites recorded at the level of Section only, and some sites recorded only to the Township. Given the relatively “coarse” nature of this locational information, it was deemed advisable to exclude these historic sites from the modeling process. However, this was not the only reason to exclude historic sites from the modeling process.

While the parameters that guided ancient settlement are not necessarily easily modelable – these parameters are often fundamentally different from many of the parameters that guided historic settlement practices. Consequently it was deemed advisable to exclude historic sites from inclusion in the modeling process.

Despite these issues, historic sites constitute a heritage resource that requires management by Alberta Community Development. Consequently, in order to satisfy the necessity for management of historic sites, an independent and separate data layer, consisting of historic sites polygons was constructed. Each site is represented by a polygon conforming to the size and shape of the smallest legal subdivision known for that site. In some cases this means a site is represented by square enclosing a single LSD (40 acres or 16 hectares). In other cases a polygon enclosing a quarter-section (160 acres or 65 hectares) or section (640 acres or 259

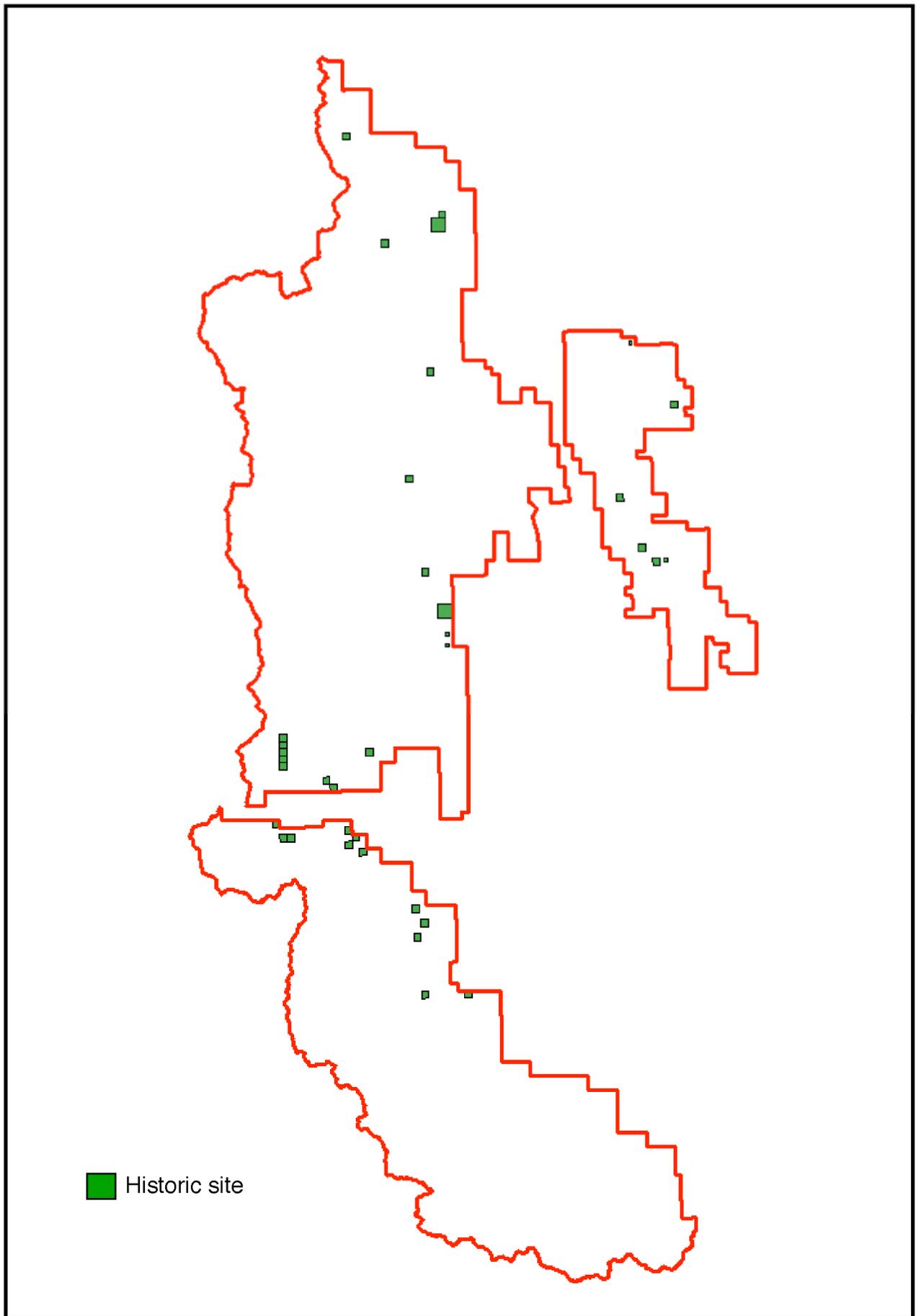


Figure 11: Known Historic Sites in the C5 FMU

hectares) was constructed. In cases where only the Township and Range were known, a covering polygon was **not** constructed. Although this means that some historic structures will not be represented in this data layer, this omission is deemed acceptable in light of the alternative, which would be to construct historic sites polygons encompassing entire Townships (23,040 acres or 9,324 hectares). Use of polygons of this size would constitute an unreasonable constraint placed on land managers and developers.

The final product for this data layer consists of a sites database and associated shape file of sites polygons that depicts the known location of all historic sites where the location is known to the nearest Section or better. This database consists of 43 sites, the bulk of which are located within and around the Crowsnest Pass. These sites are summarized in Table form in Appendix 2.

DEPOSITION POTENTIAL

A vector-based layer was created to depict the potential for relatively deep Holocene and Late Pleistocene deposits within the study area (Figure 12). This layer was based on existing surficial geomorphological mapsheets that have been digitized. The source for this data was the Surficial Geology of the Alberta Foothills and Rocky Mountains compiled by Bayrock and Reimchen in 1974 and 1975, which covers virtually the entire project area. More recent and more detailed surficial geological information is available for limited portions of the project area in the form of the NATMAP surficial geology GIS databases derived from the southeastern Cordilleran mapping project of the Geological Survey of Canada (Shimamura et al. 2000). Unfortunately this data is incomplete for the C5 area, constituting less than one third of the total C5 FMU. Consequently the NATMAP surficial geology information was not employed in this study. It is recommended that, when NATMAP data for the entire C5 area becomes available, that the deposition potential layer be replaced by a similar recoding of the NATMAP data, and this should then be incorporated into the overall archaeological potential model.

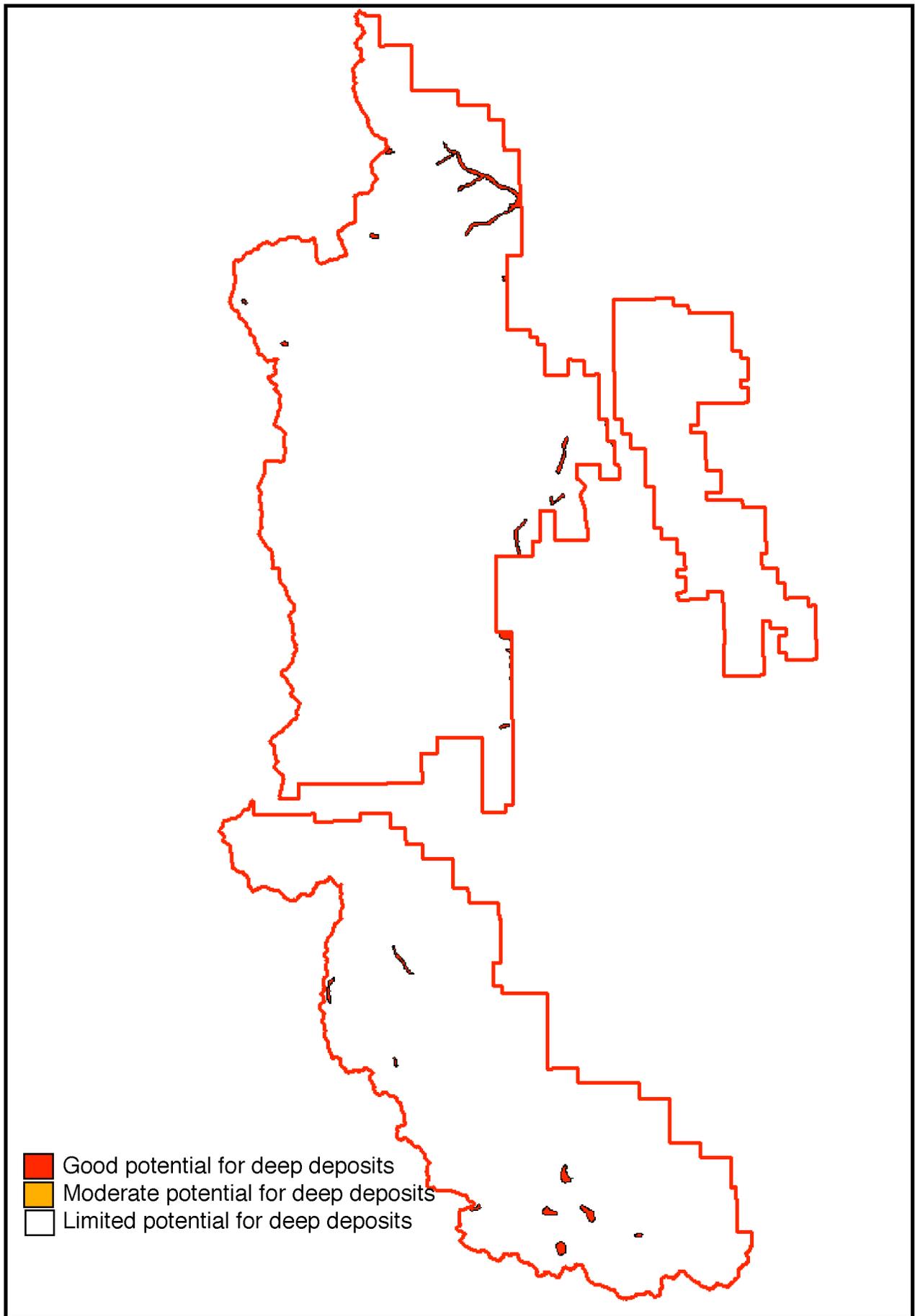


Figure 12: Deposition Potential in the C5 FMU

Using the Bayrock and Reimchen data, terrain blocks were classified on a three-point scale indicating the potential for deep accumulations of sediment based upon the inferred potential for that particular type of landform (high, medium and low). The actual recoding values assigned are listed in Table 2.

Table 2: Deposition potential

UNIT_NAME and number	Deposition Potential
Alluvial Fans and Apron (23)	Good
Bedrock (1)	Poor
Cirque tills (18)	Poor
Coarse Stream Alluvium (21)	Poor
Colluvium (24)	Poor
Deeply leached till, Cordilleran provenance (2)	Poor
Eolian Deposits (16)	Good
Eskers (10)	Poor
Fine stream alluvium (22)	Moderate
Glaciers (20)	Poor
Glaciolacustrine deposits (15)	Poor
Kames, kame terraces and kame moraines (9)	Poor
Lag Gravel (14)	Poor
Landslide deposits (27)	Poor*
Meltwater channel deposits (8)	Poor
Moderately leached till, Continental provenance (3, 3a)	Poor
Moderately leached till, Cordilleran provenance (4)	Poor
Organic deposits (17)	Moderate
Outwash plains (11)	Poor
Patterned ground (24a)	Poor
Pitted outwash deposits (12)	Poor
Rock glaciers (19)	Poor
Rockslide deposits (26)	Poor*
Slightly leached till, Continental provenance (5)	Poor
Slightly leached till, Cordilleran provenance (7, 7a, 7b)	Poor
Talus (25)	Poor
Valley train (13)	Poor
Water (55)	Poor

For the most part these classifications are relatively straightforward and do not require specific justifications. Aeolian and some alluvial and fluvial deposits were identified as having good potential for deposition, while other types of alluvial and organic deposits were identified as having moderate potential. Most fluvial and all glacial deposits, colluvium and bedrock were identified as having “Poor” potential lands. This includes areas of landslide, rockslide and colluvial flows that may actually have some potential for buried sites, but which are normally beyond the

range of all but the most intensive of industrial impacts and/or conventional means of archaeological detection. Although there is actually potential for intact archaeological sites beneath these mass-wasting deposits, they form a significant obstacle to conventional investigation and have consequently been designated as having “Poor” potential.

Upon completion, the deposition potential data layer was overlaid on the general archaeological potential layer. In areas where moderate or high potential for deep deposits corresponded with lands identified as having archaeological potential, the coding for these areas was elevated to “high” archaeological potential. In areas where the potential for deposition was moderate or high and the general archaeological potential was limited, the coding for these areas was elevated to “moderate” archaeological potential. In summary, the potential for deposition layer was used in an “additive” sense to elevate the assessed archaeological potential of lands with moderate or high potential for deep deposits.

LANDFORMS WITH ARCHAEOLOGICAL POTENTIAL

For the purposes of this study, “traditional” archaeological methods of inquiry were employed to identify landform areas with archaeological potential. These traditional techniques included examination of topographic information and review of stereo aerial photographs. The decision to employ a “traditional” method to derive a model of archaeological potential was based upon an assessment of the strengths and weaknesses of available datasets, and was predicated largely on the recognition that available digital elevation models for the C5 FMU are simply not at a sufficiently detailed scale to adequately reflect the micro-topographic features that are frequently associated with archaeological sites (see previous discussion).

Analysis of site distributions within the broader area of the eastern slopes indicates that archaeological site distributions reflect two basic patterns. These patterns have been recognized by previous researchers (Driver 1978, Duke 1978, Reeves 1969, 1972) but are discussed in some detail by Reeves (2003). These

patterns are described as “valley pattern” and “alpine pattern” sites (Reeves 2003: vii-xi). Precontact period archaeological sites can be assigned to one of these two patterns based on location or setting, and upon site type or function. In order to evaluate the relative contribution of these two patterns to the total archaeological sites database, archaeological site information from a large area encompassing the C5 FMU was considered.

Site information for a total of 670 Precontact period sites was coded as “valley pattern” or “alpine pattern” based upon location and site type parameters. This included sites from both within and outside the C5 FMU, although sites from within the Municipal District of the Crowsnest Pass were intentionally excluded from consideration for this analysis. The unique physical character of the Crowsnest Pass as the major east-west corridor through this portion of the Rocky Mountains, coupled with the unique history of intensive archaeological investigations in the Pass and the extremely high densities of recorded sites there would all have conspired to give inordinate weight to the “valley pattern” sites. Of the 670 sites within the broader study area (excluding the Crowsnest Pass proper), sites that conform to the valley pattern constitute approximately 74% of the total, while sites that conform to the alpine pattern account for approximately 26% of the known sites in the database under consideration. It was determined that maintaining these proportions in the lands identified as exhibiting archaeological potential was advisable. Consequently, the relative proportions of valley versus upland settings were monitored throughout the airphoto examination and digitization process and were constantly adjusted to approximately conform to a 3:1 ratio of valley versus upland settings. A final consideration in this intuitive evaluation of archaeological potential was an attempt to encompass landforms with known significant sites. As discussed elsewhere, the presence of known sites is generally a powerful predictor of the presence of other sites nearby. Consequently, inclusion of known significant sites is only sensible. Furthermore, the fact that an informed archaeologist has chosen to undertake investigations in a particular area would normally indicate that they regard this area

as having potential. Ignoring the expertise of multiple generations of field archaeologists would not be a wise course. Consequently, areas of archaeological potential were often “stretched” to ensure that they encompassed significant sites in the close vicinity.

Relevant NTS 1:50,000 topographic maps were reviewed and selected areas were targeted for more detailed assessment, while other areas were excluded from further study. Areas were selected on the basis of informal criteria known to have a profound influence on site location. Some of these criteria would have influenced the selection criteria employed by ancient peoples, while other criteria are influenced by where sites are known to have potential for preservation. Criteria included landform type and configuration, slope, aspect, and proximity to streams, lakes and rivers. Initial assessment identified lands as having either limited or moderate/high potential. Based upon this preliminary assessment, areas identified as having moderate/high potential were examined in greater detail using a complete series of stereo aerial photographs supplied by Alberta Sustainable Resource Development. These panchromatic prints were flown between 1949 and 1951 and are generally of very high quality. These airphotos served as a guide to refining the margins or extent of areas deemed to have archaeological potential or eliminating areas identified as having limited archaeological potential. Areas identified as having archaeological potential by photo analysis were sketched on copies of maps or orthophotos and annotations regarding the perceived strength of this potential were recorded (eg: high vs. moderate potential, disturbances noted, etc.). Also recorded was the general category of the landform. These categories conform to the recognized site distribution “patterns” articulated by Reeves (2003). Upland ridges, peaks, passes and high benchland sites were identified as “alpine areas”. Valley bottom, river terrace and low benchland areas were identified as “valley areas”. Upon completion of this phase of examination, the identified areas were digitized as a layer in the GIS, maintaining accuracy by tracing them atop the projected orthomosaic, contour and other basemap features. Areas were digitized as multiple

closed polygons. These polygons were then “trimmed” to correspond to the limits of the C5 FMU. Alpine and valley area zones were digitized separately.

Final proportions of lands recognized as having moderate or higher archaeological potential are summarized in Table 3 and depicted in Figure 13. Valley areas identified as having moderate or higher archaeological potential constitute approximately 65,744 hectares, or approximately 19% of the total area encompassed by the C5 FMU. Upland areas identified as having moderate or higher potential constitute approximately 21,017 hectares, or approximately six percent of the total area encompassed by the C5 FMU. The relative proportions of these lands are 3.1:1, or very close to the target ratio of 3:1 determined through analysis of the sites around the C5 FMU. The total of lands identified as exhibiting moderate or higher potential for archaeological resources is 86,761 hectares, or approximately 25% of the entire C5 FMU.

Table 3: Landforms with archaeological potential

Settlement Pattern	Number of Sites		Area Type	Archaeological Potential		Portion of C5 Area
Valley Pattern	496	74%	Valley Areas	65,744 ha	76%	19%
Alpine Pattern	174	26%	Alpine Area	21,017 ha	24%	6%
Total	670 sites		Total	86,761 ha		25%

PREVIOUS INVESTIGATIONS

An important element in managing heritage resources is managing the negative information that stems from unsuccessful archaeological investigations. Archaeological investigations have been carried out in the C5 FMU for more than four decades and logic would seem to dictate that certain areas have been examined in sufficient detail to preclude the necessity for any further archaeological investigations. Furthermore, a complete understanding the distribution of known sites cannot be developed unless the relationship between examined and unexamined areas is also understood. Unfortunately, researchers have not been particularly conscientious in documenting the extent or the intensity of their

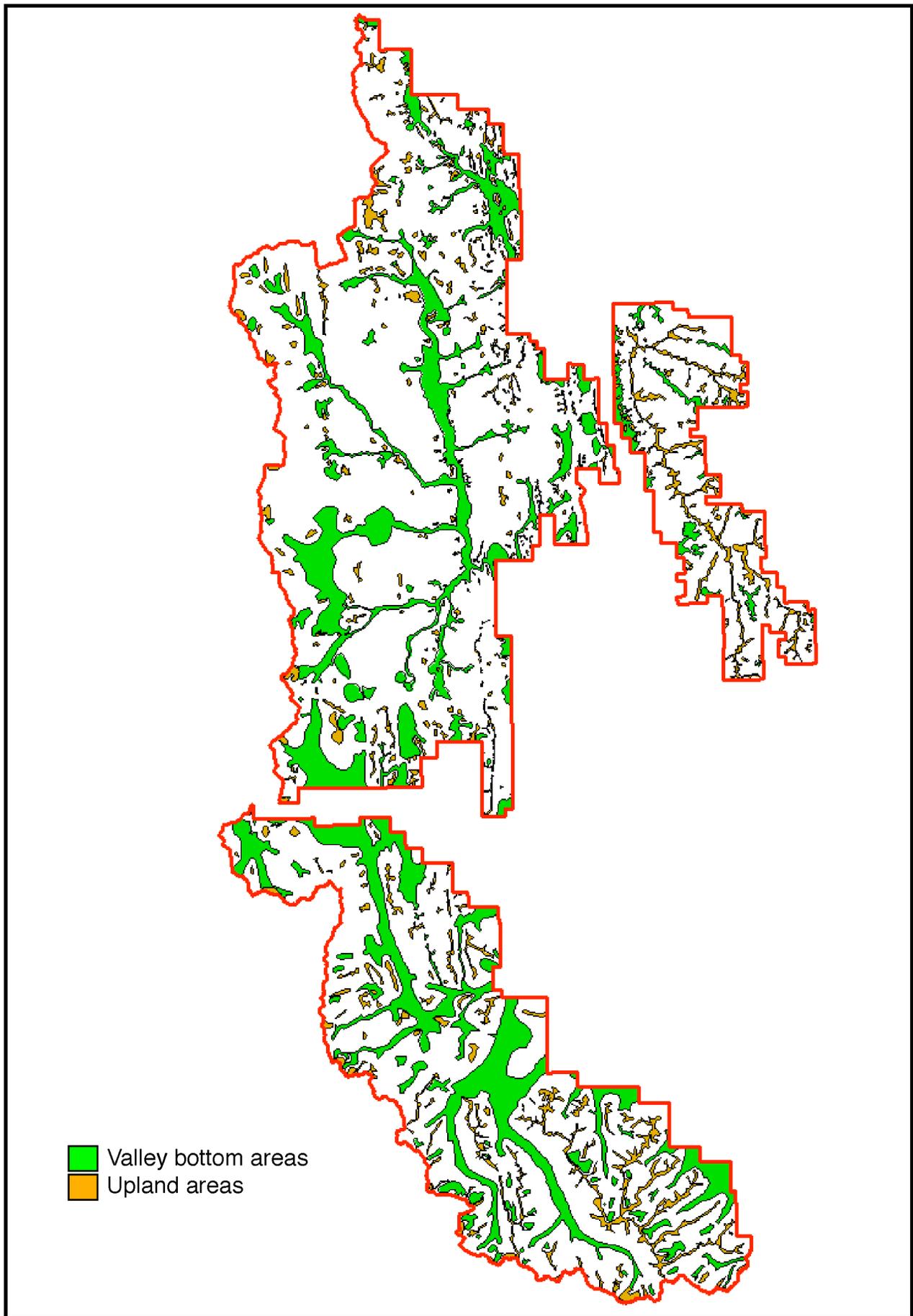


Figure 13: Landform areas with archaeological potential in the C5 FMU

investigations. Furthermore, attempts to collect and manage such information by Alberta Community Development have been neither consistent nor systematic. Nevertheless, the record of areas examined is a useful, albeit limited, management tool.

For the purposes of the C5 FMU study, all relevant archaeological studies and reports were reviewed to identify figures or maps that indicated the extent of the areas examined in the course of that study. The principal source material for this phase of investigations was derived from the Borden block site information master sheets and the microfiche file of permit reports supplied and maintained through Alberta Community Development, coupled with a comprehensive bibliographic database of archaeological studies. These studies and reports were also reviewed to determine the relative intensity of investigations associated with each study. This data was then coded and digitized on one of two data layers with corresponding databases. The corresponding databases record full bibliographic information for each of the digitally rendered project areas. Studies that had covered large areas were rendered as polygons that generally conformed to the area reportedly examined. Studies that were linear in nature, like a pipeline or road development project, were digitized on a separate layer as complex lines, from which a polygon was created with an arbitrary width of 20 metres. In the case of most consulting studies, the area of the development was taken to correspond to the area examined. While this assumption is almost certainly an over-generalization, as few development-related historical resource impact assessments actually comprehensively cover a development area, it is nevertheless a valid procedure, as development clearances are generally granted on the basis of such studies. A further compounding complication in recording these project footprints was the recognition that the levels of examination associated with archaeological investigations have been extremely variable. Some studies were clearly superficial in nature, consisting of reconnaissance of large areas but no sub-surface testing, while other studies were clearly very intensive, consisting of comprehensive

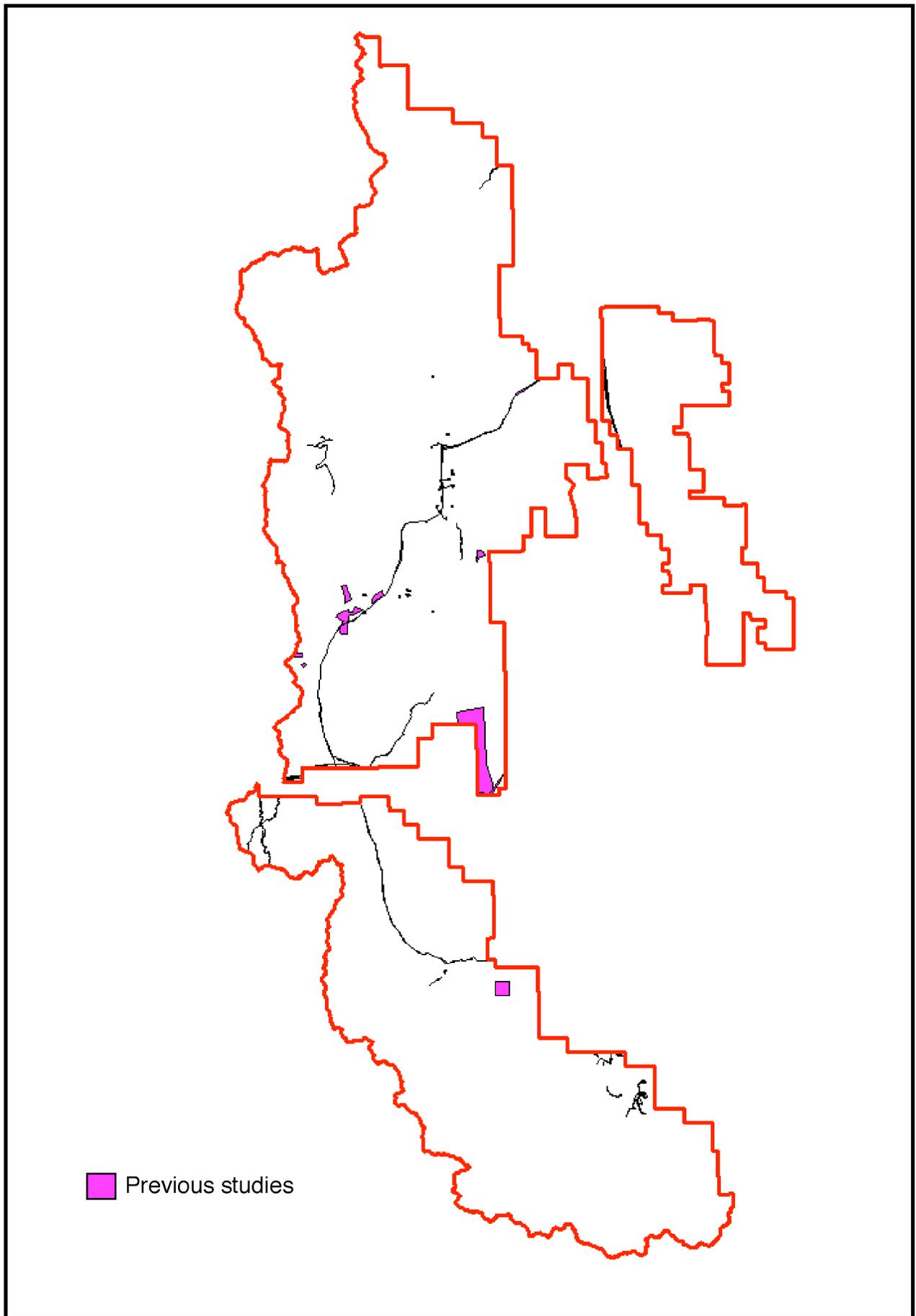


Figure 14: Previous Archaeological Studies in the C5 FMU

reconnaissance and testing to depth. In cases where no report was available or for which no indication of the area examined or the development area were presented, no attempt was made to create a digital footprint.

Within the C5 FMU a total of 45 heritage study footprints were incorporated into the two digital data layers. This is only 35% of the total number of heritage studies believed to have been carried out within the C5 FMU over the last four decades. This low proportion reinforces the observation that earlier research and consulting studies were generally deficient in their reporting of the areas examined during the course of investigations.

As originally conceived, the layers depicting these areas of previous archaeological investigation were intended to be immediately employed as “subtractive” layers, indicating zones of limited potential for the identification of previously unrecorded heritage sites. These zones of limited potential would have been “subtracted” from all areas that were otherwise targeted as “high potential”. However, in light of the unsystematic degree of investigation associated with previous studies, and in light of the unsystematic nature of the reporting of the areas that actually were examined, a different approach is indicated. More appropriate than automatically excluding all previously examined lands from the possibility of subsequent investigations is a case-by-case approach, where a newly proposed development footprint is compared against the footprint of previous investigations. In cases where substantial overlap is indicated, a review of the previous investigation is in order before determining whether further studies are warranted. Consequently, the previously examined areas defined by these data layers were not “subtracted” (clipped) from the overall archaeology potential layer. It is recommended that these data layers be maintained independently and employed as an independent review mechanism for proposed developments in tandem with the overall archaeological potential model. All previous archaeological studies in the C5 FMU are summarized in table form in Appendix 3.

DISTURBED LANDS

Disturbed Lands were identified based upon the categories reported in the Alberta Vegetation Inventory (1991, updated annually). The Alberta Vegetation Inventory is a provincially maintained GIS-based database of vegetation distributional information derived from remotely sensed and ground-truthed sources. However, encoded within the AVI is a partial record of land disturbances as reflected by surface land cover. The field variable LCOV6 (land cover) in the AVI was employed to identify areas that had been disturbed by previous anthropogenic activities. Types of disturbances recognized in the AVI include: mining, forestry, agricultural, urban, oil, gas, hydroelectric and other ground disturbing activities. Unfortunately, this database is not comprehensive in terms of its recognition of all land disturbances. Relatively recent land disturbances are well recognized, but older disturbances, particularly those associated with forestry practices, are not. In short, the AVI constitutes an imperfect but nevertheless valuable record of larger scale disturbances.

Three categories of disturbed land were recognized. Surface disturbances are those lands that have been disturbed by anthropogenic activities but the disturbances are either localized or are limited to the upper 30 centimetres of the sedimentary profile. Surface disturbed lands include cultivated lands and improved pasture, clear-cut logged areas, and small-scale residential areas. Surface and shallowly buried sites in such areas are expected to be badly disturbed or destroyed. However, deeply buried sites would still be relatively intact. Completely disturbed lands (surface and sub-surface disturbed lands) are those lands that have been subjected to relatively intensive and deep disturbance by anthropogenic activities such that intact heritage sites are not expected to be preserved. Completely disturbed lands would include gravel pits and surface mines, industrial areas and sewage lagoons. A complete listing of the relevant Alberta Land Inventory land categories for variable LCOV6 and their corresponding disturbance coding are listed in Table 4 and depicted in Figure 15.

Table 4: Land disturbance categories

LCOV6 classification	Disturbance Coding
Annual Crops	Surface Disturbance
Aspen	Undisturbed
Balsam Poplar	Undisturbed
Balsam Poplar Mixedwood	Undisturbed
Birch	Undisturbed
Black Spruce Wetland	Undisturbed
Cutbank/Sand	Undisturbed
Douglas Fir	Undisturbed
Douglas Fir Mixedwood	Undisturbed
Farmsteads	Surface Disturbance
Flooded	Undisturbed
Forb Meadow	Undisturbed
Grassland Dry	Undisturbed
Grassland Mesic	Undisturbed
Gravel Pits/Surface Mine	Completely Disturbed
Hamlets, Villages and Towns	Surface Disturbance
Herbaceous Clearcut	Surface Disturbance
Herbaceous Clearing	Undisturbed
Industrial Reclamation-Vegetated	Surface Disturbance
Lakes/Ponds	Undisturbed
Larch Tamarack	Undisturbed
Mixed Conifer (Douglas Fir)	Undisturbed
Mixed Conifer (Larch Tamarack)	Undisturbed
Mixed Conifer (Pine-Lodgepole/Jack)	Undisturbed
Mixed Conifer (Subalpine/Western Larch)	Undisturbed
Mixed Conifer True Fir	Undisturbed
Mixed Conifer (White/Engelmann Spruce)	Undisturbed
Mixed Conifer (Whitebark/Limber Pine)	Undisturbed
Non-Veg ROWs	Surface Disturbance
Partial Cut/Regenerating Clearcut	Surface Disturbance
Perennial Forage Crops	Surface Disturbance
Permanent Ice/Snow	Undisturbed
Pine (Lodgepole/Jack)	Undisturbed
Pine (Lodgepole/Jack) Mixedwood	Undisturbed
Plant Sites/Sewage Lagoons	Completely Disturbed
River	Undisturbed
Rock Barren	Undisturbed
Rough Pasture Closed Dry	Undisturbed
Rough Pasture Closed Mesic	Undisturbed
Rough Pasture Open Dry	Undisturbed
Rough Pasture Open Mesic	Undisturbed
Rural Residential	Undisturbed
Shrub Meadow Closed Dry	Undisturbed
Shrub Meadow Closed Mesic	Undisturbed
Shrub Meadow Open Dry	Undisturbed
Shrub Meadow Open Mesic	Undisturbed
Shrub Wetland	Undisturbed
Subalpine/Western Larch	Undisturbed
True Fir	Undisturbed
True Fir Mixedwood	Undisturbed
Unclassified	Undisturbed
Wet Graminoid	Undisturbed
White Spruce Wetland	Undisturbed
White/Engelmann Spruce	Undisturbed
White/Engelmann Spruce Mixedwood	Undisturbed
Whitebark/Limber Pine	Undisturbed

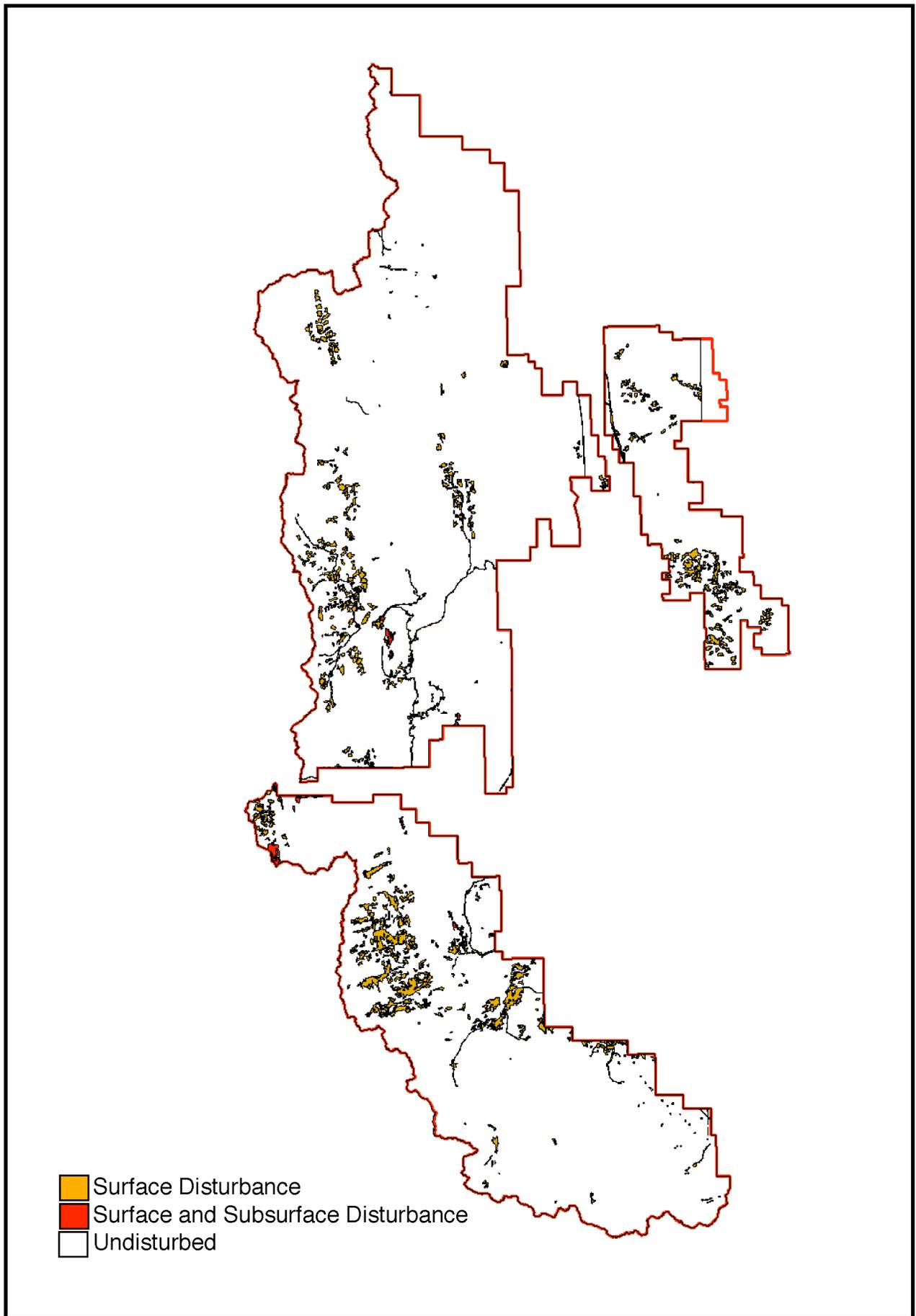


Figure 15: Previous Disturbances within the C5 FMU

ARCHAEOLOGICAL POTENTIAL

The seventh and final data layer is a composite of information presented in previous data layers. Using the landform archaeological potential layer as a base, archaeological potential was added to, or subtracted from, according to the following criteria. These criteria are discussed in detail in the following.

Criteria for Identification as High Potential Lands

Within the lands identified in the landform potential layer as exhibiting moderate or higher archaeological potential, certain areas were further identified as high potential lands based entirely upon one or two elements of the immediate physical environment. Criteria employed in the identification of high potential lands include: proximity to significant sites, proximity to confluences, proximity to topographic congruencies in upland ridges or plateaus, areas with special topographic circumstances (eg: hummocky terrain, extensive upland plateaus, valley bottom areas with well-defined terraces, benches or remnant channel scars, cirque-head lakes, passes and narrow valley gaps). As outlined previously, some of these determinations were made on an entirely subjective basis, while other determinations were carried out using automatically defined criteria. The nature of the criteria and the rationale for use of these criteria are discussed in detail in the following.

Proximity to Known Sites

Proximity to known significant sites is one of the most powerful predictors of archaeological potential in most settings. This relationship is tacitly admitted in management policies implemented by Alberta Community Development through the “Listing of Significant Sites”, where land parcels known to contain significant heritage sites are indicated with an HRV of 4, triggering closer scrutiny. Archaeological sites are not randomly distributed across the landscape, they occur in groups and

clusters. This clustering is at least partially the result of the physical constraints of the environment, the selection criteria employed by past peoples, and a result of the taphonomic processes that lead to site preservation. Whatever the cause, the phenomena is real and has been employed in attempts to model archaeological site distributions in other areas (see ref). The presence of a significant site is frequently a powerful indicator that there are other sites in the vicinity. Two techniques are normally employed in incorporating this variable into predictive models, either a simple distance measure, or a weighted, or distance based measure. A distance weighted measure was contemplated for this study, but was rejected as misplaced quantification given the non-quantified, intuitive basis of the observed relationship between sites. Furthermore, given the constraining effect of the extreme topography encountered in the C5 FMU and the other analytical techniques employed in this study, a simple distance cutoff was deemed sufficient. The distance selected was one kilometre from the recorded location of a known significant site. The one kilometre distance was selected upon purely arbitrary grounds, but is defensible for as both a mathematical convenience and in practical terms.

A one-kilometre radius circle around all identified significant sites (regardless of whether they are still intact or not) was extruded from the recorded coordinates for the site. This circle was then “trimmed” to conform to the previously determined landform potential. For example, if a significant site in a constrained valley setting where the valley bottom is only 500 metres across and the entire valley floor was deemed to have archaeological potential, the extruded area of high potential would be “clipped” to conform to the previously evaluated area of archaeological potential.

For the purposes of this portion of the analysis significant sites were defined as all sites with sufficient size and complexity to merit subsequent investigation, regardless of the current site condition. Hence a site that has been identified as an isolated find would not be identified as significant, unless previous investigators had recommended further investigation. However, a disturbed campsite would be identified as significant, even though previous investigators may have recommended

no further work. This distinction is important, as we are attempting to predict the potential for archaeological sites on this layer, whereas actual site significance and disturbance levels are handled on separate layers. Hence the degree to which a site is disturbed should not be a factor in the prediction of the presence of unidentified sites nearby. Consequently the identification of significance in this circumstance is merely a measure of whether a site surpasses a minimum level of size and complexity. Isolated Finds and Small Scatters (fewer than ten items within the same artifact category) were treated as not significant. All other sites were identified as significant.

Confluences

Landform areas that were also targeted for automatic inclusion as high potential lands include confluences between non-ephemeral streams. A review of the distribution of known sites within the C5 FMU clearly indicates that significant “clustering” of archaeological sites are often associated with larger stream and river confluences. However, not all confluences exhibit such “clustering”. This absence is likely the result of limited previous investigation at these confluences, and not a reflection of actual site distribution. Consequently, confluences between rivers and/or streams were identified based upon a review of the hydrological information base layers supplied by Alberta Sustainable Resource Development. Confluences between major rivers were tagged, and catchments with a radius of three kilometres were extruded. For confluences between a Major River and a Permanent Stream, or between a Major River and a Permanent Lake, or between a Permanent Lake and Permanent Streams, a catchment with a radius of two kilometres was extruded. For confluences between two Permanent Streams, or between a permanent stream and a Recurrent Lake, a catchment with a radius of only one kilometre was extruded. No catchment was defined for confluences involving Recurrent or Indefinite Streams. Other variable classes in the Feature-Type field of the hydro layers that were

excluded from consideration as confluences were junctions between manufactured drainages (aqueducts, canals, dugouts, lagoons, quarries, reservoirs and spillways), oxbows, arbitrary flow lines and icefields. As with the extruded high potential zone around known significant sites, these extruded circular catchments were then “clipped” to the limits imposed by the Archaeological Potential base layer.

Ridge Intersections

Intersection areas between upland ridge complexes were treated in a very similar fashion to confluences. Ridge landforms that had been identified as having archaeological potential during airphoto analysis were scanned for intersection points with other ridge complexes. Where such intersection points were identified, a circle with a radius of one kilometre was overlaid on the intersection point such that the centre of the circle coincided with the approximate centre of the intersection point. This circle was then trimmed to conform to the general archaeological potential layer created earlier. In other words, all lands identified as having moderate to high potential lying within one kilometre of an identified ridge intersection were upgraded to high potential.

Special Areas of High Potential

Special areas of high potential were also identified during the course airphoto examination. These special areas include: passes, well-defined terrace or benchlands within river valleys, bottomland areas with well-defined meander scars or oxbows, tarn and cirque lakeshores, isolated knolls, plateau uplands, certain peaks and other landforms. Where these landforms were identified during the first phase of airphoto analysis, special notations were made and the landform or area was subsequently upgraded to high potential. This procedure was entirely subjective in nature, and occasionally constituted a difficult decision. In general

identification was guided by the same principles as those which would govern an Historical Resources Overview.

Criteria for Identification as Extreme Potential Lands

The final addition to the archaeological potential layer was the category of extreme potential lands. For the purposes of this study, extreme potential lands are defined as a “buffer zone” extending outward from the perimeter of all known significant sites to a distance of 30 metres in all directions. In other words, extreme potential lands encompass all known significant sites and include a 30 metre “safety zone”. The rationale for this safety margin is simple. There is a significant error factor associated with the location of any and all of these sites. This error factor reflects difficulties in locating sites in a pre-GPS world, and allows for errors created as a result of selective availability and other issues. A buffer zone of 30 metres in all directions would constitute an effective minimum trigger for field investigations in association with any ground disturbing development.

Summary of Archaeological Potential Data Layer

The seventh and final data layer is a composite of information presented in the other data layers. Using the landform potential layer as a base, archaeological potential was added to, or subtracted from, according to the following criteria.

A circle centered on each known significant site was extruded outward for a distance of one kilometre. This circle was then trimmed to conform to the limits defined in the landform potential layer, and all overlapping circles were merged. This site catchment zone was then coded as high potential lands.

In a similar fashion, the areas around confluences and ridge intersections were identified as high potential lands. Appropriately sized circles were extruded outward, overlapping circles were merged and then trimmed to conform to the limits defined in the landform potential layer.

The previous disturbances layer was then overlaid on the deposition potential layer to determine the potential for intact sites. In cases where only shallow sediments were expected, and where surface and/or subsurface disturbances were recorded, the archaeological potential was reduced to limited. In cases where deeper sediments were anticipated and where deep subsurface disturbances were recorded, the archaeological potential was likewise reduced to limited. However, in cases where deeper sediments were anticipated and where only shallow disturbances were recorded, the archaeological potential was increased to high. In cases where deeper sediments were anticipated and where no disturbances were recorded, the archaeological potential was likewise increased to high. In other words, where an undisturbed landform with potential and an area of deep deposits overlap, the overlap area is coded as having high potential.

Special areas of high potential were also defined upon the basis of observations made during review of aerial photographs and maps. These special areas included; passes, well-defined terrace or benchlands within river valleys, bottomland areas with well-defined meander scars or oxbows, tarn and cirque lakeshores, isolated knolls, upland plateaus, certain peaks and other landforms. All such special areas were superimposed on the existing landform potential layer and coded as high potential lands.

Taken collectively, areas identified as high potential lands make up just over half of the landform areas originally identified as having archaeological potential. The total area identified as high potential is 46,020 hectares, or 13.1% of the entire C5 FMU.

The final phase in the construction of the overall archaeological potential layer was the creation of zones of extreme potential around known significant sites. This consists of a 30 metre buffer zone encircling the site.

The completed seventh and final data layer consists of a series of irregular polygons depicting areas of moderate, high and extreme potential for the entire C5 FMU (Figure 16). Areas of extreme potential, denoting areas in close proximity to

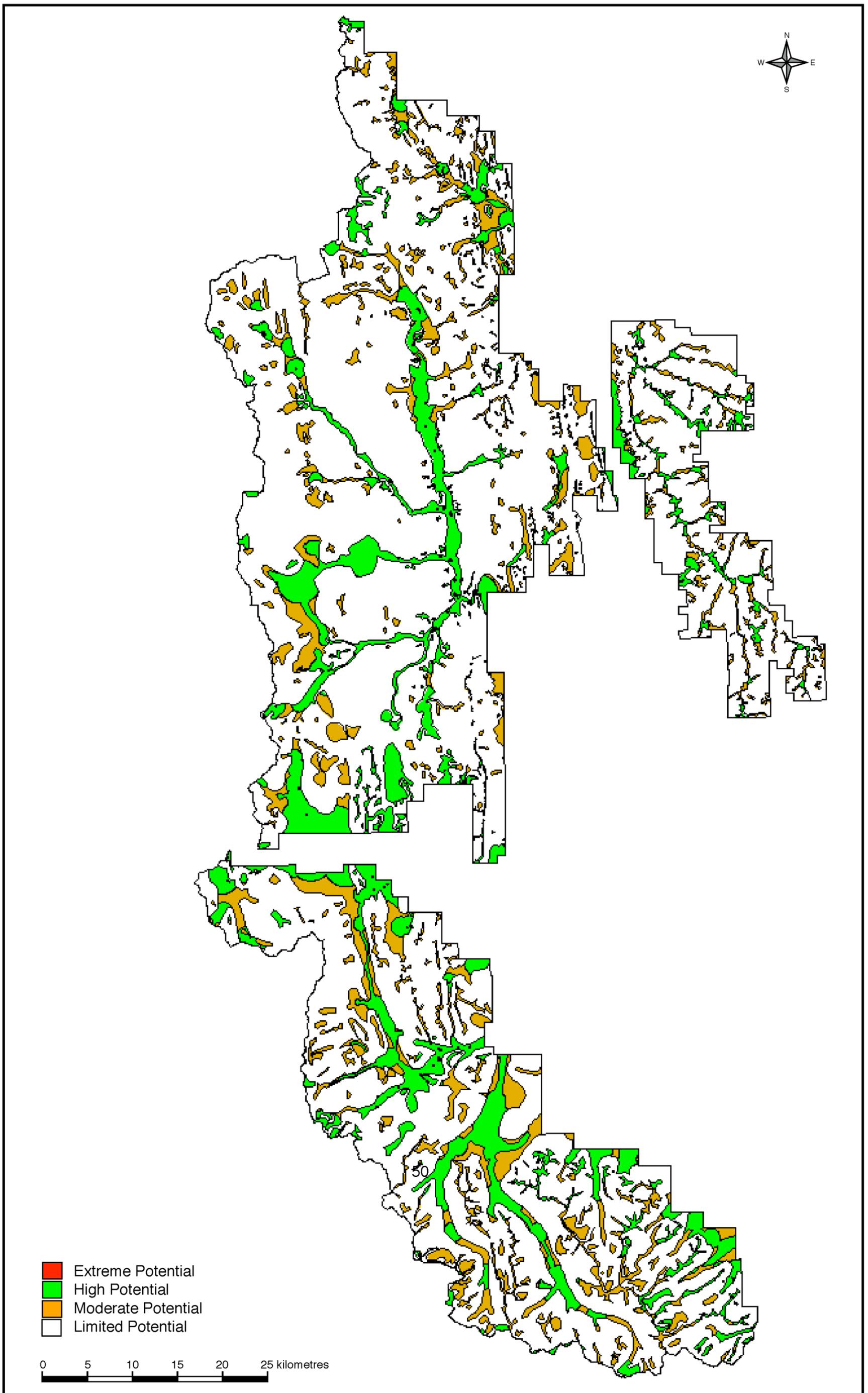


Figure 16: Overall Archaeological Potential within the C5 FMU

known significant sites, constitute 219 hectares, or 0.1% of the total C5 FMU. Areas of high potential, denoting areas with a high probability for the presence of unrecorded significant sites, constitute 46,119 hectares, or 13.1% of the total C5 FMU. Areas of moderate potential, denoting areas with a possibility of the presence of unrecorded significant sites, constitute 40,642 hectares, or 11.9% of the total C5 FMU. All other areas, constituting 264,023 hectares or 75.2% of the FMU, are deemed to have limited potential for the presence of unrecorded significant sites.

SUMMARY AND CONCLUSION

The C5 Forestry Management Unit encompasses approximately 3,513 square kilometres of the Rocky Mountain Forest Reserve Lands north of Waterton National Park and south of Kananaskis Country in the southwest corner of the province of Alberta. This area is the subject of considerable debate on a broad range of land management issues. To address these issues calls for a comprehensive land management strategy that minimizes impacts and ensures sustainability must be developed and implemented for this region. An important part of this strategy is the development of an effective set of mechanisms for dealing with heritage resources. In order to address this need, the Heritage Resource Management Branch of Alberta Community Development requested that Bison Historical Services Ltd. develop a model of archaeological potential that would distinguish areas of high, moderate and low archaeological potential.

The goal of this program was to develop a land management basis for structuring archaeological investigations in conjunction with future land developments of many different types. The endproduct is a set of GIS-based map layers and associated databases that can be used to evaluate the archaeological potential of any proposed development footprint.

The approach employed to develop this model was largely subjective and followed traditional forms of archaeological assessment, involving interpretation of stereo aerial photographs and contour maps. However, specific criteria were employed to systematize and regularize the definition of high potential lands.

Six independent map and data layers were developed from a variety of sources and by a variety of methods. Several of these layers are necessary repositories for basic research and management data, while others were employed in the construction of the seventh and final data layer. These data layers are:

- 1) archaeological sites
- 2) historic structures and areas

- 3) areas with potential for deep deposits and buried sites
- 4) archaeological potential of landform/areas
- 5) lands subjected to previous anthropogenic disturbances
- 6) areas previously examined by an archaeologist
- 7) Overall archaeological potential

Data layers one through four are “positive” layers, contributing in a positive sense to the formulation of overall archaeological potential. Data layers five and six are largely “negative” in their influence upon the evaluation of overall archaeological potential. Data layer seven, “overall archaeological potential” is the ultimate product of this study.

The first, and perhaps the most important data layer in this study is the data linked, vector-based layer depicting the location of all known heritage sites. This layer can be employed as the basic medium for adding new site information to the system, and as a basic planning tool for details of site avoidance. Data linkage permits the interactive display of relevant site variables for query, research and planning purposes.

The second data layer is a data linked, vector-based layer depicting the location of historic sites at the level of LSD or Section. As with the previous layer, the historic sites information can be employed as the basic medium for adding new site information to the system, and as a basic planning tool for details of site avoidance. Data linkage permits the interactive display of relevant site variables for query, research and planning purposes.

The third data layer is a vector-based layer depicting the potential for relatively deep Holocene and Late Pleistocene deposits within the study area. This layer was based on digitized maps of surficial geomorphology that were re-coded to conform to expectations for their potential for deep deposits.

The fourth data layer is a preliminary vector-based layer that depicts landforms and areas evaluated as having archaeological potential. A large body of sites in the eastern slopes were analyzed within the settlement framework

delineated by Reeves (2003). These sites indicated the relative proportions of valley bottom (3) versus upland (1) terrain that were appropriate components of the C5 FMU archaeological potential model. Aerial photographs and contour maps were reviewed to identify landforms with potential for archaeological resources and these landforms were digitally “sketched” and assigned to either the valley bottom or upland categories. The total area of lands assigned to the valley bottom category was 65,744 hectares, or approximately 19% of the total area of the C5 FMU. The total area of lands assigned to the alpine/upland category was 21,017 hectares, or approximately 6% of the total area of the C5 FMU. The relative proportions of these two assignments closely approximates the 3:1 target ratio. The terrain identified in this preliminary data layer is the basic framework for all subsequent assignments to high, medium and low potential in the final model.

The fifth data layer is a vector-based layer depicting disturbed lands within the study area. This layer was based on digital data contained within the Alberta Vegetation Inventory that was re-coded to isolate areas of surface and sub-surface land disturbance.

The sixth data layer is a vector-based layer depicting lands within the study area that have been the subject of previous archaeological investigations. This layer was based on a review of all available archaeological reports and maps.

The seventh and final data layer is a combination of the preceding data layers with additional information. This layer depicts overall archaeological potential coded as one of four categories.

The seventh and final data layer is a composite of information presented in the other data layers. Using the landform potential layer as a base, archaeological potential was added to, or subtracted from, according to the following criteria.

The previous disturbances layer was then overlaid on the deposition potential layer to determine the potential for intact sites. In cases where only shallow sediments were expected, and where surface and/or subsurface disturbances were recorded, the archaeological potential was reduced to limited. In cases where

deeper sediments were anticipated and where deep subsurface disturbances were recorded, the archaeological potential was likewise reduced to limited. However, in cases where deeper sediments were anticipated and where only shallow disturbances were recorded, the archaeological potential was increased to high. In cases where deeper sediments were anticipated and where no disturbances were recorded, the archaeological potential was likewise increased to high. In other words, where an undisturbed landform with potential and an area of deep deposits overlap, the overlap area is coded as having high potential.

To reflect the observation that sites tend to occur in clusters a circle centered on each site was extruded outward for a distance of one kilometre. This circle was then trimmed to conform to the limits defined in the landform potential layer, and all overlapping circles were merged. This site catchment zone was then coded as high potential lands.

In a similar fashion, the areas around confluences and ridge intersections were identified as high potential lands. Appropriately sized circles were extruded outward, overlapping circles were merged and then trimmed to conform to the limits defined in the landform potential layer.

Special areas of high potential were also defined upon the basis of observations made during review of aerial photographs and maps. These special areas included: passes, well-defined terrace or benchlands within river valleys, bottomland areas with well-defined meander scars or oxbows, tarn and cirque lakeshores, isolated knolls, upland plateaus, certain peaks and other landforms. All such special areas were superimposed on the existing landform potential layer and coded as high potential lands.

Taken collectively, areas identified as high potential lands make up just over half of the landform areas originally identified as having archaeological potential during review of aerial photography. The total area identified as high potential is 46,020 hectares, or 13.1% of the entire C5 FMU. The proportion of valley bottom versus upland settings is roughly 3:1, reflecting the proportions of known sites.

The final phase in the construction of the overall archaeological potential layer was the creation of zones of extreme potential around known significant sites. This consists of a 30 metre buffer zone encircling the site.

The completed seventh and final data layer consists of a series of irregular polygons depicting areas of moderate, high and extreme potential for the entire C5 FMU. Areas of extreme potential, denoting areas in close proximity to known significant sites, constitute 219 hectares, or 0.1% of the total C5 FMU. Areas of high potential, denoting areas with a high probability for the presence of unrecorded significant sites, constitute 46,119 hectares, or 13.1% of the total C5 FMU. Areas of moderate potential, denoting areas with a possibility of the presence of unrecorded significant sites, constitute 40,642 hectares, or 11.9% of the total C5 FMU. All other areas, constituting 264,023 hectares or 75% of the FMU, are deemed to have limited potential for the presence of unrecorded significant sites.

Implementation of this archaeological potential model as a resource management tool should be directed along the following avenues:

- 1) All ground disturbing developments that encroach upon areas of “Extreme” archaeological potential (within 30 metres) of a known significant site should be preceded by an HRIA.
- 2) All ground disturbing developments that encroach upon areas of “High” archaeological potential should be preceded by an HRIA or an HRO justifying why such an HRIA should not be required.
- 3) Ground disturbing developments that encroach upon areas of “Moderate” or “Low” archaeological potential should be permitted to proceed without any further review.

REFERENCES CITED

- Alberta Environmental Protection
1994 Natural Regions of Alberta. Alberta Environmental Protection, Edmonton.
- Archaeological Survey of Alberta
1989 Guidelines for Archaeological Permit Holders in Alberta. Archaeological Survey of Alberta, Historical Resources Division Alberta Culture and Multiculturalism, Edmonton.
- Berezuik, Darryl A. and Terrance H. Gibson
2003 An Historical, Descriptive and Statistical Evaluation of the South Peace Digital Heritage Potential Model of Western Alberta. Unpublished manuscript on file with the author.
- Clarke, Grant
- Clayton, J.S. W.A. Ehrlich, D.B. Cann, J.H. Day, and I.B. Marshall
1977 Soils of Canada, Volume I, Soil Report. Research Branch, Canada Department of Agriculture, Ottawa.
- Duke, Phillip G.
1978 The Pelican Lake Phase in the Crowsnest Pass: a Locational Analysis. Unpublished M.A. thesis, Department of Archaeology, University of Calgary.
- Driver, Jonathan C.
1976 Report of excavations and survey, Crowsnest Pass, 1976 (ASA Permit Number 75-024), unpublished consultants report on file with the Archaeological Survey of Alberta.
1978 Holocene Man and Environments in the Crowsnest Pass, Alberta. Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary.
1982 Early prehistoric killing of bighorn sheep in the southeastern Canadian Rockies. In: *Plains Anthropologist* 27(98), pp. 165-171.
- Fedje, Daryl
1986 Banff Archaeology 1983-1985. In: Eastern Slopes Prehistory: Selected Papers, edited by Brian Ronaghan. Archaeological Survey of Alberta Occasional Paper No. 30. Alberta Culture, Edmonton, pp. 25-62.

Fedje, Daryl W., James M. White, Michael C. Wilson, D. Erle Nelson, John S. Vogel, and John R. Southon

1995 Vermilion Lakes Site: Adaptations and Environments in the Canadian Rockies During the Latest Pleistocene and Early Holocene. American Antiquity, Vol. 60, No. 1, pp. 81-108

Fidler, Peter

1792 Journal and Journey Overland from Buckingham House to the Rocky Mountains. Unpublished manuscript on file in the Alberta Provincial Archives, Edmonton

Fladmark, K.R., J.C. Driver, and D. Alexander

1988 The Paleoindian Component at Charlie Lake Cave (HbRf 39), British Columbia. American Antiquity, Vol. 53, No. 2, pp. 371-384.

Forbis, Richard G.

1962 The Old Women's Buffalo Jump, Alberta. In: National Museum of Canada, Bulletin 180, Contributions to Anthropology, 1960. Pt. 1, Ottawa, pp. 56-123.

Gibson, Terrance H.

2000 Detailed Forest Management Plan 1997-2006. Millar Western Forest Products Ltd., Edmonton, Alberta.

Gryba, Eugene M.

1983 Sibbald Creek: 11,000 years of Human Use of the Alberta Foothills. Archaeological Survey of Alberta Occasional Papers No. 22. Alberta Culture, Edmonton, 219 p.

Hardy, W.G. Editor-In-Chief

1975 Alberta, A Natural History. M.G. Hurtig, Edmonton

Husted, W.M.

1991 Bighorn Canyon Archaeology. Smithsonian Institution River Basin Surveys, Publications in Salvage Archaeology 12. Washington.

Kennedy, Margaret and Bea A. Loveseth

1984 Conservation studies at DjPo-63 (ASA Permit Number 83-020), unpublished consultants report on file with the Archaeological Survey of Alberta.

Kennedy, Margaret, B. Loveseth, T. Smith and B.O.K. Reeves

1982 DjPq-1: An 8000 Year Record of Human Occupation in the Crowsnest Pass, British Columbia. Report on file, Alberta Natural Gas Co. Ltd., Calgary.

Loveseth, Bea A.

1976 Crowsnest Pass lithic source survey: preliminary report 1975 (ASA Permit Number 75-021), unpublished consultants report on file with the ASA.

MacGregor, James G.

1972 A History of Alberta. Hurtig Publishers, Edmonton.

Meyer, Daniel A., Brian O.K. Reeves and Claire Bourges

2002 Historical resources impact assessment Shell Canada Limited
Carbondale pipeline expansion project: final report (ASA Permit Number 01-258), unpublished consultants report on file with the Archaeological Survey of Alberta.

Milne-Brumley, Laurie N.

1971 The Narrows Site: A fishing station - campsite on the eastern flanks of the Rocky Mountains. In Aboriginal man and his Environments on the Plateau of Northwest North America, edited by A.H. Stryd and R.A. Smith. Archaeological Association of the University of Calgary, pp. 75-125.

Newman, Peter C.

1985 Company of Adventurers. Penham Books, Markham.

Pickard, Rod

1986 An Archaeological Assessment of the Patricia Lakes Site Jasper National Park. In: Eastern Slopes Prehistory: Selected Papers, edited by Brian Ronaghan Archaeological Survey of Alberta Occasional Paper No. 30. Alberta Culture, Edmonton, pp. 99-132.

Reeves, Brian O. K.

1969 The Southern Alberta Paleo-Cultural - Paleo-Environmental Sequence. In: Post-Pleistocene Man and His Environment on the Northern Plains, edited by R.G. Forbis, L.B. Davis, O.A. Christensen, and G. Fedirchuk. University of Calgary Archaeological Association, Calgary, pp. 6-46.

1972 The Archaeology of Pass Creek Valley, Waterton Lakes National Parks. Manuscript Report Number 61, National and Historic Parks Branch, Department of Indian Affairs and Northern Development.

1978 Men, Mountains and Mammals: A view from the Canadian Alpine. Paper presented at the Plains Conference, Denver.

2003 Mistakis, the Archaeology of Waterton-Glacier International Peace Park. Unpublished consultants report on file with the National Park Service, Denver, Colorado.

- Reeves, Brian O. K. and Claire Bourges
2002 Wledwood (Hinton Division) Forestry Management Area Historical Resources Overview/Assessment and Proposed Management Plan. Unpublished consultants report on file with the author.
- Richards, Thomas H. and Michael K. Rousseau
1987 Late Prehistoric Cultural Horizons on the Canadian Plateau. Department of Archaeology, Simon Fraser University, Publication Number 16, Burnaby
- Ronaghan, Brian M.
1986 The Status of Prehistoric Research in Alberta's Eastern Slopes. In: Eastern Slopes Prehistory: Selected Papers, edited by Brian Ronaghan. Archaeological Survey of Alberta Occasional Paper No. 30. Alberta Culture, Edmonton, pp. 269-338.
1992 An Archaeological Assessment of the Burmis Lundreck corridor, Southern Alberta Foothills (ASA Permit 85-043). MS on file, Archaeological Survey, Edmonton.
- Shetsen, I.
1990 Quaternary Geology, Central Alberta [Map]. Alberta Research Council.
- Shimamura, K., Jackson, L.E., Jr., Hicock, S.R., Holme, P.J., Leboe, E.R., and Little, E.C.
2000 Digital Surficial Geology of Southeastern Cordillera NATMAP; Geological Survey of Canada Open File D3948
- Smith, Harlan I.
1914 Antiquities of the Rocky Mountain Parks. In: Handbook of the Rocky Mountain Park Museum, Ottawa, pp. 108-109.
1915
- Spurling, Brian E. and Bruce F. Ball
1981 On some Distributions of the Oxbow 'Complex'. In: Canadian Journal of Archaeology, Volume 5, pp. 89-102.
- Strong, W.L. and K.R. Leggat
1992 Ecoregions of Alberta. Alberta Forestry, Lands and Wildlife. Edmonton.
- Vickers, J. Roderick
1986 Alberta Plains Prehistory: A Review. Archaeological Survey of Alberta Occasional Paper No. 27, Edmonton.

Vivian, Brian C.

1997 Filling in the Blanks: Exploration and Prehistory in Banff National Park.
Paper presented at the 50th Annual NW Conference.

Walker, Ernest Gordon

1992 The Gowen Sites. Cultural Responses to Climatic Warming on the Northern Plains (7500-5000 B.P.). Archaeological Survey of Canada Mercury Series Paper 145. Canadian Museum of Civilization, 208 p.

Wilson, Ian R.

1987 The Pink Mountain Paleo-Indian Site. In: Archaeological Survey of Alberta Occasional Paper No. 31, Alberta Culture and Multiculturalism, Edmonton, pp. 217-219.

Wilkinson, Kathleen

1990 Trees and Shrubs of Alberta. Lone Pine Publishing, Edmonton.

Wormington, H.M and Richard G. Forbis

1965 An Introduction to the Archaeology of Alberta, Canada. Proceedings No. 1, Denver Museum of Natural History.

APPENDIX 1: KNOWN ARCHAEOLOGICAL SITES WITHIN THE C5 FMU

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DhPI Borden Block					
DhPI-16	Reeves, B.O.K. 1989 Reserved; 04-195	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DhPI-17	Reeves, B.O.K. 1989 Reserved; 04-195	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DhPI-18	Reeves, B.O.K. 1989 Reserved; 04-195	historic	stone feature	stone initials	HRV 4
DhPI-19	Reeves, B.O.K. 1989 Reserved; 04-195	historic	stone feature	cairn	HRV 4
DhPI-20	Reeves, B.O.K. 1989 Reserved; 04-195	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DhPI-23	Reeves, B.O.K. 1989 Reserved; 04-195	pre-contact	stone feature	cairn	HRV 4
DhPI-65	04-195 reserved	historic	trail	trail scars	HRV 4
DhPm Borden Block					
DhPm-1	86-059; CRM 128; PC WRA / CRM 160; 03-084	pre-contact	stone feature; ceremonial	stone circle; cairn; vision quest	HRV 3
DhPm-3	Reeves, B.O.K. 1989 Reserved; 04-195	pre-contact	stone feature	cairn	HRV 4
DhPm-4	Reeves, B.O.K. 1989 Reserved; 04-195	historic	stone feature	cairn	HRV 4
DhPm-5	Reeves, B.O.K. 1989 Reserved; 03-084; 04-195	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DhPm-6	Reeves, B.O.K. 1990 Reserved; 03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DhPm-7	Reeves, B.O.K. 1989 Reserved; 03-084	historic	stone feature	stone line; stone wall	HRV 4
DhPm-8	Reeves, B.O.K. 1990 Reserved; 04-195	indigenous historic; contemporary	stone feature; ceremonial/religious	vision quest	HRV 4
DhPm-9	Reeves, B.O.K. 1995 Reserved; 04-195	historic; contemporary	stone feature	cairn	HRV 4
DhPm-10	Reeves, B.O.K. 1995 Reserved; 04-195	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DhPm-11	Reeves, B.O.K. 1995 Reserved; 04-195	historic	stone feature	cairn	HRV 4
DhPm-12	Reeves, B.O.K. 1995 Reserved; 04-195	pre-contact	stone feature ceremonial/religious	vision quest	HRV 4
DhPm-13	97-031	pre-contact	isolated find		HRV 0
DhPm-14	97-031	pre-contact	killsite		HRV 4
DhPm-15	98-132 reserved; CRM 128	pre-contact	scatter <10; campsite		HRV 4
DhPm-16	98-132 reserved; CRM 128	pre-contact	campsite		HRV 4
DhPm-18	03-084	pre-contact	stone feature; ceremonial	eagle catching pit	HRV 4
DhPm-19	03-084	pre-contact	stone feature; ceremonial	cairn	HRV 4
DhPm-20	03-084	undetermined	stone feature; ceremonial	cairn; vision quest	HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DhPm-21	03-084	pre-contact	stone feature	stone circle	HRV 4
DhPm-22	03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DhPm-23	03-084	pre-contact	stone feature; ceremonial	stone wall; vision quest	HRV 4
DhPm-24	03-084	pre-contact	stone feature; ceremonial	vision quest oval	HRV 4
DhPm-25	03-084	pre-contact	stone feature; ceremonial	vision quest oval	HRV 4
DhPm-26	03-084	pre-contact	campsite		HRV 4
DhPm-27	03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DhPm-28	03-084	historic; indigenous historic	stone feature	cairn	HRV 4
DhPm-29	03-084	historic; indigenous historic	stone feature	cairn	HRV 4
DhPm-30	03-084	historic	stone feature	cairn	HRV 4
DhPm-31	03-084	pre-contact; contemporary	stone feature	cairn, vision quest	HRV 4
DhPm-32	04-195 reserved	pre-contact	stone feature; ceremonial/religious	cairn	HRV 4
DhPm-33	04-195 reserved	pre-contact	stone feature	cairn	HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DhPm-34	04-195 reserved	pre-contact	stone feature	cairn	HRV 4
DhPm-35	04-195 reserved	pre-contact	stone feature	stone arc	HRV 4
DhPm-36	04-195 reserved	pre-contact	stone feature; ceremonial/religious	cairn	HRV 4
DhPm-37	04-195 reserved	pre-contact	stone feature ceremonial/religious	vision quest	HRV 4
DhPm-38	04-195 reserved	pre-contact	stone feature	cairn	HRV 4
DhPm-39	04-195 reserved	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DhPm-40	04-195 reserved	pre-contact	stone feature; ceremonial/religious	vision quest	HRV 4
DiPm Borden Block					
DiPm-19	03-084	undetermined	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn Borden Block					
DiPn-3	Reeves, B.O.K. 1990 Reserved; 03-084	historic	stone feature	cairn	HRV 4
DiPn-4	Reeves, B.O.K. 1990 Reserved; 03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn-5	Reeves, B.O.K. 1990 Reserved; 03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn-6	Reeves, B.O.K. 1990 Reserved; 03-084	pre-contact, historic	stone feature; ceremonial	cairn; vision quest	HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DiPn-24	03-084	pre-contact, historic, contemporary	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn-25	03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn-26	03-084	indigenous historic; contemporary	stone feature	cairn	HRV 4
DiPn-27	03-084	pre-contact	stone feature; ceremonial	cairn; vision quest	HRV 4
DiPn-28	03-084	historic	stone feature	cairn	HRV 4
DiPn-29	03-084	historic	industrial; camp (logging)		HRV 4
DiPn-30	03-084	historic	mine; stone feature; copper prospect, trail	cairn; prospect tests	HRV 4
DiPn-31	03-084	historic	mine, stone feature	cairn	HRV 4
DiPn-32	03-084	historic	mine, copper prospect	prospect tests	HRV 4
DiPo Borden Block					
DiPo-1	Glenbow 1958; 78-053; 79-066; 80-126; CRM 128; 04-325	pre-contact	campsite		HRV 4
DiPo-2	97-031; CRM 128	pre-contact	campsite		HRV 4
DiPo-3	97-031; CRM 128	pre-contact	campsite		HRV 4
DiPo-10	97-031; CRM 128	pre-contact	scatter >10		HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DiPo-11	97-031; CRM 128	pre-contact	isolated find		HRV 0
DiPo-14	97-031; CRM 128	pre-contact	scatter <10; workshop		HRV 4
DiPo-15	97-031	historic	trapping; trail	trap (fur)	HRV 0
DiPo-16	97-031	historic	structure remains	cabin; dump	HRV 0
DiPo-17	97-031; CRM 128	pre-contact	isolated find		HRV 4
DiPo-18	01-258	pre-contact	campsite		HRV 4
DiPo-19	99-016	pre-contact	scatter >10		HRV 4
DiPo-20	99-016	pre-contact	scatter >10		HRV 4
DiPo-21	99-016; 04-325	pre-contact	scatter <10; campsite		HRV 0
DiPo-22	99-016; 04-325	pre-contact	scatter <10; campsite		HRV 0
DiPo-23	99-016; 04-325	pre-contact	scatter <10		HRV 0
DiPo-24	99-016	pre-contact	scatter <10		HRV 0
DiPo-25	04-325	pre-contact	campsite	hearth	HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DiPo-26	04-325	pre-contact	campsite		HRV 4
DiPo-27	04-325	pre-contact	isolated find		HRV 0
DiPo-28	04-325	pre-contact	isolated find		HRV 0
DiPo-29	04-325	pre-contact	campsite		HRV 4
DiPo-30	04-325	pre-contact	isolated find		HRV 0
DiPo-31	04-325	pre-contact	scatter <10		HRV 4
DiPo-32	04-325	pre-contact	scatter <10; campsite		HRV 4
DjPo Borden Block					
DjPo-128	U of C 1974; 75-021	pre-contact	quarry		HRV 0
DjPo-167	89-075	historic	settlement	structure (log); pile (ash); debris	HRV 4
DjPo-168	89-075	historic	settlement	structure (log); pile (cut pole); debris	HRV 4
DjPo-169	89-075	pre-contact; historic	settlement	structure (log); refuse; debris	HRV 4
DjPo-170	89-075	pre-contact	scatter		HRV 0
DjPo-171	89-075	pre-contact	scatter (lithic)		HRV 4

Borden Number	Reference/Permit Numbers	Site Class	Site Type	Feature Types	HRV
DjPo-172	89-075	pre-contact	scatter (lithic)		HRV 4
DjPo-200	04-325	pre-contact	isolated find		HRV 0
DjPo-201	04-325	pre-contact	scatter <10		HRV 0
DjPo-202	04-325	pre-contact	campsite		HRV 4
DjPo-203	04-325	pre-contact	scatter <10		HRV 0
DjPp Borden Block					
DjPp-12	U of C 1972; U of C / CRM 003; 75-040; 78-075; 79-140; 84-033; 84-040	pre-contact	campsite		HRV 4
DjPp-19	U of C 1972; U of C / CRM 003		campsite		HRV 0
DjPp-24	U of C 1972; U of C / CRM 003		stone feature	cairn	HRV 4
DjPp-31	U of C 1973	pre-contact	campsite		HRV 0
DjPp-38	U of C 1973		scatter; campsite ?		HRV 0
DjPp-43	U of C	historic	trail		HRV 4
DjPp-48	75-024	historic	mine	sluice; entrance	HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DjPp-56	75-042; 78-075; 79-140; 89-040	pre-contact	scatter (lithic); campsite		HRV 4
DjPp-62	84-033; 84-040	historic	industrial (forestry)	flume (wood)	HRV 4
DjPp-63	84-033; 84-040	pre-contact	isolated find		HRV 0
DjPp-64	84-033; 84-040		campsite		HRV 4
DjPp-65	84-040; 89-075	historic	mine	prop pit; remains	HRV 4
DjPp-70	89-075	historic	settlement	depression; debris	HRV 4
DjPp-71	89-075	historic	mine	entrance; depression	HRV 4
DjPp-72	89-075	historic	camp	depression; debris; platform	HRV 0
DjPp-73	89-075	historic	mine	fan house; entrance; debris	HRV 4
DjPp-74	89-075	historic	mine	bridge (wooden); foundation (concrete); depression; shaft; well	HRV 4
DjPp-86	89-075	pre-contact ?	palaeontological (bone)		HRV 4
DjPq Borden Block					
DjPq-29	76-036	historic	mine		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DjPq-34	76-036	historic	mine		HRV 4
DkPo Borden Block					
DkPo-1	U of C 1968; U of C 1971; U of C / CRM 003		campsite		HRV 4
DkPo-2	U of C 1968; U of C 1971; U of C / CRM 003		campsite		HRV 4
DkPo-3	U of C 1971; U of C / CRM 003		campsite		HRV 4
DkPo-11	U of C 1973; 74-029		workshop		HRV 0
DkPo-13	U of C 1973; 74-029		scatter		HRV 0
DkPo-14	U of C 1973; 74-029		campsite		HRV 4
DkPo-15	U of C 1974; 75-021		quarry		HRV 4
DkPo-17	75-040	historic	homestead	structure; foundation; fence	HRV 4
DkPo-18	75-040	historic	industrial (forestry)	sawmill	HRV 4
DkPo-19	75-040	historic	industrial	flume (log)	HRV 0
DkPo-21	82-036	pre-contact	campsite		HRV 4
DkPo-22	82-036		isolated find		HRV 0

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DkPp Borden Block					
DkPp-1	U of C 1974		campsite		HRV 4
DkPp-2	75-042	historic	transportation	bridge (log); road (logging)	HRV 4
DkPp-3	75-042; 78-075	historic	transportation; forestry	bridge (logging)	HRV 4
DkPp-4	75-042; 78-075	historic	industrial	dam (log)	HRV 4
DkPp-5	75-042	historic	industrial (forestry)	cribbing (log)	HRV 0
DkPp-6	75-042; 78-075	historic	industrial (forestry); camp (forestry)	foundation; depression (cellar)	HRV 4
DkPp-7	78-075	historic	industrial (forestry)	flume (log)	HRV 4
DkPp-8	78-075; 89-075	historic	mine (coal)	foundation; mining remains	HRV 4
DkPp-9	81-107		workshop		HRV 4
DkPp-10	81-107	pre-contact	workshop		HRV 4
DkPp-11	81-107; 82-036	pre-contact	campsite		HRV 4
DkPp-12	81-107		quarry		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DkPp-13	81-107		isolated find		HRV 0
DkPp-16	89-075	historic	scatter		HRV 0
DkPp-17	89-075	pre-contact	scatter		HRV 0
DkPp-18	89-075	historic	dwelling	structure	HRV 0
DIPm Borden Block					
DIPm-1	U of A 1966	pre-contact; historic	scatter (lithic); structure	cabin	HRV 4
DIPm-2	U of A 1966		campsite		HRV 4
DIPm-9	78-075; 79-096		isolated find		HRV 0
DIPn Borden Block					
DIPn-3	75-042	historic	settlement	corral; fence	HRV 0
DIPo Borden Block					
DIPo-1	Glenbow 1958; U of C / CRM 003		campsite		HRV 4
DIPo-2	Glenbow 1958; U of C / CRM 003		campsite		HRV 4
DIPo-3	Glenbow 1958; U of C / CRM 003		burial ?		HRV 0
DIPo-4	Glenbow 1960; U of C / CRM 003; 82-036		campsite		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DIPo-5	Glenbow 1960; U of C / CRM 003; 85-086		scatter; campsite		HRV 0
DIPo-6	Glenbow 1960; U of C / CRM 003; 85-086	historic	industrial	kiln (lime)	HRV 4
DIPo-7	Glenbow 1960; U of C / CRM 003; 98-162	historic	stone feature	stone line; stone rectangle; depression	HRV 4
DIPo-8	Glenbow 1960; U of C / CRM 003; 98-162	pre-contact	campsite; stone feature	cairn; stone line; hearth	HRV 4
DIPo-9	Glenbow 1965; U of C / CRM 003; 82-036	pre-contact; historic	campsite		HRV 4
DIPo-10	Glenbow 1965; U of C / CRM 003	pre-contact	campsite	hearth	HRV 4
DIPo-11	Glenbow 1965; U of C / CRM 003; 82-036; 82-072C	pre-contact	campsite		HRV 4
DIPo-12	Glenbow 1965; U of C / CRM 003	pre-contact	scatter		HRV 4
DIPo-13	Glenbow 1965; U of C / CRM 003; 75-042; 78-075	pre-contact	campsite		HRV 4
DIPo-14	Glenbow 1965; U of C / CRM 003; 75-042; 78-075; 89-099 / 89-102	pre-contact	campsite		HRV 4
DIPo-15	Glenbow 1965; U of C / CRM 003; 75-042; 78-075	pre-contact	campsite		HRV 4
DIPo-16	Glenbow 1965; U of C / CRM 003; 75-042; 78-075	pre-contact	campsite		HRV 4
DIPo-17	Glenbow 1965; U of C / CRM 003	pre-contact; historic	scatter		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DIPo-18	Glenbow 1965; U of C / CRM 003	undetermined	stone feature	cairn	HRV 4
DIPo-19	Glenbow 1965; U of C / CRM 003	pre-contact	burial		HRV 4
DIPo-20	Glenbow 1965; U of C / CRM 003	pre-contact	campsite		HRV 0
DIPo-21	Glenbow 1965; U of C / CRM 003		campsite		HRV 4
DIPo-22	Glenbow 1965; U of C / CRM 003		campsite		HRV 4
DIPo-23	Glenbow 1965; U of C / CRM 003; 02-093	pre-contact	campsite		HRV 4
DIPo-24	Glenbow 1965; U of C / CRM 003; 02-093	pre-contact	campsite		HRV 0
DIPo-25	Glenbow 1965; U of C 1972 / CRM 001; U of C / CRM 003; 75-042; 78-075	pre-contact; historic	campsite		HRV 4
DIPo-26	Glenbow 1965; U of C / CRM 003; 75-042; 78-075	pre-contact	campsite		HRV 4
DIPo-27	Glenbow 1965; U of C / CRM 003; 75-042; 78-075	pre-contact; historic	campsite		HRV 4
DIPo-28	Glenbow 1965; U of C / CRM 003	pre-contact	campsite		HRV 4
DIPo-29	Glenbow 1965; U of C / CRM 003	pre-contact	campsite		HRV 4
DIPo-30	U of C 1972; U of C / CRM 003	pre-contact	campsite		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DIPo-31	U of C 1972; U of C / CRM 003		campsite		HRV 0
DIPo-33	75-042; 78-075		scatter (lithic); campsite		HRV 4
DIPo-34	75-042; 78-075		campsite		HRV 4
DIPo-35	75-042; 78-075		campsite		HRV 4
DIPo-36	75-042; 78-075		campsite		HRV 4
DIPo-37	75-042		isolated find		HRV 0
DIPo-38	75-042; 78-075		campsite		HRV 4
DIPo-39	75-042; 78-075; 02-093	pre-contact	scatter <10; campsite		HRV 0
DIPo-40	75-042; 78-075		campsite		HRV 0
DIPo-41	75-042; 78-075		campsite		HRV 4
DIPo-42	75-042		isolated find		HRV 0
DIPo-43	75-042		campsite		HRV 4
DIPo-44	75-042; 78-075		campsite		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DIPo-45	75-042		campsite		HRV 4
DIPo-46	75-042		campsite		HRV 4
DIPo-47	75-042		isolated find		HRV 0
DIPo-48	75-042		campsite; workshop		HRV 4
DIPo-49	75-042		stone feature	cairn	HRV 4
DIPo-50	75-042; 78-075	historic	homestead	structure (wood); trailer (house); corral (log)	HRV 4
DIPo-51	75-042; 78-075		campsite		HRV 4
DIPo-52	75-042		campsite; killsite		HRV 4
DIPo-53	78-075		isolated find		HRV 4
DIPo-54	Brink, J.W. 1979		campsite; stone feature	stone circle	HRV 4
DIPo-55	Brink, J.W. 1980		campsite		HRV 4
DIPo-56	Brink, J.W. 1981		scatter (lithic)		HRV 4
DIPo-58	82-072	pre-contact	campsite		HRV 4

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
DIPo-59	82-072	pre-contact	campsite		HRV 4
DIPo-60	82-036	pre-contact	campsite		HRV 4
DIPo-61	82-036	pre-contact	scatter		HRV 4
DIPo-62	82-036	pre-contact	scatter		HRV 4
DIPo-63	82-036; Klassen, M.A. 1992	pre-contact	rock art	pictograph	HRV 3
DIPo-64	85-086	pre-contact	campsite		HRV 4
DIPo-65	85-086	pre-contact	campsite		HRV 4
DIPo-66	85-086	pre-contact	campsite		HRV 0
DIPo-67	02-093	pre-contact	scatter <10		HRV 0
DIPo-68	02-093	pre-contact	scatter <10		HRV 0
DIPo-69	02-093	pre-contact	scatter <10		HRV 0
DIPp Borden Block					
DIPp-1	78-075		campsite; lookout		HRV 0

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
EaPm Borden Block					
EaPm-4	78-075		isolated find		HRV 0
EaPm-5	86-039	pre-contact	scatter		HRV 4
EaPm-6	86-039	pre-contact	scatter		HRV 4
EaPm-7	86-039; 02-051	pre-contact	scatter		HRV 4
EaPm-8	86-039; 02-051	pre-contact	scatter		HRV 4
EaPm-9	86-039; 02-051	pre-contact	scatter		HRV 4
EaPm-10	86-039	pre-contact	scatter		HRV 0
EaPm-11	86-039	pre-contact	scatter		HRV 0
EaPm-12	86-039	pre-contact	scatter		HRV 0
EaPm-13	86-039		scatter		HRV 0
EaPm-15	93-010	pre-contact	campsite		HRV 0
EaPm-23	02-051	pre-contact	scatter <10		HRV 0

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
EaPm-24	02-051	pre-contact	scatter <10		HRV 4
EaPm-25	02-051	pre-contact	scatter >10		HRV 0
EaPn Borden Block					
EaPn-1	75-042		campsite		HRV 4
EaPo Borden Block					
EaPo-1	U of C 1973		campsite	hearth	HRV 4
EaPo-2	U of C 1973		campsite		HRV 4
EaPo-3	U of C 1973		campsite		HRV 4
EaPo-4	U of C 1974; 02-093	pre-contact	scatter <10; campsite		HRV 4
EaPo-5	U of C 1973		campsite	hearth ?	HRV 4
EaPo-6	U of C 1973		campsite		HRV 4
EaPo-7	U of C 1973		campsite		HRV 0
EaPo-8	U of A 1966	historic ?	stone feature	stone wall; foundation ?; pit ?	HRV 4
EaPo-9	78-075		campsite		HRV 0

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
EaPo-10	78-075	pre-contact	campsite		HRV 4
EaPo-11	78-075	pre-contact	campsite		HRV 4
EaPo-12	78-075	pre-contact	campsite		HRV 4
EaPo-13	78-075		scatter <10		HRV 0
EaPo-14	78-075		campsite		HRV 0
EaPo-15	78-075		campsite		HRV 4
EaPo-16	78-075	historic	homestead	cabin; dump (garbage)	HRV 0
EaPo-17	Head, T.H. 2000	pre-contact	scatter <10		HRV 4
EaPo-18	02-093	pre-contact	campsite	roasting feature	HRV 4
EaPp Borden Block					
EaPp-4	U of C 1972; U of C / CRM 003		campsite		HRV 0
EbPo Borden Block					
EbPo-1	77-044		campsite		HRV 0
EbPo-2	78-075		isolated find		HRV 0

Borden Number	Reference/Permit Number	Site Class	Site Type	Feature Types	HRV
EbPo-3	78-075		isolated find		HRV 0
EbPo-4	80-096		isolated find		HRV 0
EbPo-5	87-067	pre-contact	stone feature	cairn	HRV 4
EbPp Borden Block					
EbPp-63	74-006; 76-048; 77-027	pre-contact; natural	scatter; palaeontological	cave	HRV 4

APPENDIX 2: KNOWN HISTORIC SITES WITHIN THE C5 FMU

Meridian	Range	Township	Section	Quarter	Name
5	3	10	2	SE	
5	3	8	18	NW	Lille Mine #2
5	3	8	18	SE	AGTL 3B/29
5	2	16	16	SE	Senator Hay's Ranch / Last Chance School
4	28	5	26	NW	Mine #1405
4	27	9	5	SW	Homestead
5	4	8	18	SE	McGillivray Creek Coal & Coke Company
5	3	8	8	NW	WCC - Hoist House
5	4	8	9	SE	Michalsky, Teddy
5	3	8	11	SE	West Canadian Collieries (Greenhill)
5	3	8	6	NE	Log Cabin
4	27	8	18	SE	Roman Catholic Mission (foundation)
5	3	8	2	NE	Milvain Site #1
5	4	8	3	NE	Blairmore Dairy
5	3	8	5	SW	Shed
5	3	8	1	SW	S. Dziedzic Log House
5	3	8	2	SW	G. Forish Mine Office
5	2	7	34	NE	Gillingham Post Office
5	4	7	36	SW	Factory
5	3	7	17	NE	Hillcrest Coal Mine #40 & #133
5	1	7	2	SW	Castle River Dairy (Former Buffalo Ranche)
5	3	6	36	SE	Log Cabin
5	3	6	30	NW	Adanac Mines - Historic Debn's
5	3	6	25	SE	Hank Herron
5	1	6	10	SE	
5	2	5	22	SE	
4	27	12	10	NE	Harry Smith Homestead
4	28	12	3	NW	A.A. King Farm House
4	28	11	12	SW	Walter Morris Homestead/Carnforth Post Office
4	28	6	14	NE	Maunsell Farm
4	29	6	18	SE	Peltier Farm House
4	30	7	27	SE	glacier Park Ranche Headquarters
4	28	7	30	SE	
4	29	7	21	NW	Gifford Farm - Harold Gifford's House
4	29	7	14	SE	Summerview Bridge
4	30	6	16	NW	Francis Willock 'The Poplars'
4	28	6	12	NW	Beere Residence

Meridian	Range	Township	Section	Quarter	Name
4	27	6	6	NW	Mr. Larsen Sr.
4	29	5	31	NE	
4	28	4	24	NE	Cemetery
4	30	3	35	SW	Jack Bechtel
4	29	3	22	NE	Eklund Farm House
4	30	3	21	SW	Ray Marshall Place
4	27	12	32	SE	Charlie Anderson Homestead
4	27	12	28	SW	Edward Strangways Residence
4	27	11	31	SE	William Quail Homestead
4	27	11	17	NW	Lee Elgin Homestead
4	29	4	2	NE	Bonertz Farm House
4	28	16	15	SE	
4	28	16	16	SE	
5	2	9	22	SE	Hugh Lynch- Stannton
4	27	14	8	NW	I.O.O.F. Cemetery
4	28	12	36	NW	
5	4	8	19	NW	Frank/Grassy Mountain Railway Line
5	4	8	14	NE	Icehouse (?)
5	3	15	9	SE	Willow Creek Ranger Station
4	27	12	27	NE	Residence near Claresholm
4	27	12	28	SE	Gustav Benson Homestead
4	29	12	23	NE	Brand '44' Ranch
5	3	7	28	SW	WCC
5	2	7	28	SE	
5	3	7	24	SE	Reedman 4
5	3	7	16	NW	House Foundation
5	3	7	15	NW	Hillcrest Mohawk: Access Road
4	27	6	18	SW	John Robert Krewatch Barn
5	2	10	13	NE	Black Mountain Ranch
5	3	9	12	SE	Pisony
5	1	8	33	SW	
5	4	8	25	SE	Abandoned Mine Entrance
5	1	8	29	SE	Bort
5	3	8	14	NE	L. & C. Dupret House
5	4	8	8	NE	McGillivray Creek Coal & Coke Company
5	5	8	11	NE	Farm
5	5	8	9	SE	CPR - Chinese Cemetery
5	3	8	1	SE	Homestead
5	3	7	32	NE	Cement Block Building

Meridian	Range	Township	Section	Quarter	Name
5	4	7	36	SE	Canadian-American Coal Co. Equipment Graveyard
5	2	7	26	NW	
5	3	7	9	NE	Leitch Collieries
5	2	6	32	SW	Farm
5	1	6	14	NW	
5	1	6	7	NW	
5	2	5	35	NW	
5	1	5	29	SE	James Whittford Grave
5	2	5	23	SE	Gladston Valley Bridge over Gladstone Creek
5	1	5	16	SW	
4	29	8	19	NW	House
4	29	8	22	SE	Frantz Homestead
4	29	8	12	NE	Wm. Allen Hamilton Barn
4	29	8	11	SE	Wm. N. Ball
4	28	8	6	NE	Outbuildings
4	29	7	28	NW	Tennessee Creek
4	30	7	25	SW	Gelisler Farm
4	30	6	15	NE	
4	30	6	23	SE	
4	29	6	4	NW	
4	28	6	2	NW	Thomas Talbot Farm Site
4	30	5	34	SE	Theodore P. Neuman
4	29	5	31	SW	John & Rita Bruns Farm Site
4	28	5	27	NW	Achilles Rouleau/Wm.H. Metzler Farm Site
4	29	5	23	NE	Robert Kerr Farm Site
4	29	5	20	NE	
4	28	4	30	SW	
4	29	4	3	SW	Twin Butte School
4	29	3	35	SW	
4	29	3	26	NE	Schrempp Farm House
4	27	12	15	NE	Westersund Homestead
4	30	11	23	NW	
4	27	12	27	SE	John M. Soby Homestead
5	3	7	30	NW	Coal Mine #48
4	27	12	2	SE	House
4	28	8	13	NE	N.W.M.P. Post
4	29	6	16	SW	James Russell Farm House

Meridian	Range	Township	Section	Quarter	Name
4	29	6	1	NW	Dase Farm Granary
4	30	5	36	NW	Ramsey Home
4	29	6	7	SW	Adolphe Cyr Barn
4	28	6	12	SW	James McNellis Farm Site
5	2	17	1	NE	E.P. Ranch - Residence / Prince of Wales Ranch
5	3	12	6	NW	
5	2	6	21	SW	Farm
5	2	6	14	NE	Guillaume Biron
4	28	16	15	NW	
4	28	16	11	SW	Nanton Cemetery
5	3	10	25	NE	Farm
5	2	10	19	NW	Heaton
5	3	9	14	SW	
5	5	9	3	SW	Bridge # 2
5	2	8	34	NE	Terrill Ranch
5	4	8	14	SE	West Canadian Collieries - Cougar Valley
5	4	8	2	NE	WCC - Greenhill Mine - #3 Level Double Drum
5	4	8	2	NW	WCC - Greenhill Mine - Mine Entry (?)
5	4	8	5	SE	International Coal & Coke Co. (York Creek) - Fan House
5	4	8	2	SE	St. Anne's Roman Catholic Cemetery
5	4	7	36	NW	Rocky Mountain Cement Company
5	4	7	33	NW	International Coal & Coke Co. (York Creek)
5	2	7	34	NW	Henry St. George Burn, R.H. Burn House
5	1	7	32	SE	John Reners - House
5	3	7	20	NW	Old Crowsnest Trail Foundations
5	3	7	21	SE	Coal Mine #133
5	3	7	13	NE	Coal Mine #1199
5	3	7	15	SE	Leitch Collieries - Power House / Machine Shop
5	2	7	7	SE	Bush Corral
5	1	7	10	SW	R.D. Boldt
5	1	7	7	SE	Maloff Farm (Originally 'Bozhiya Milost' Doukhobor Colony)
5	2	7	4	SE	Cabin B
5	1	6	19	SE	Mrs. Pope
5	1	6	13	SW	George Hodgkins C.D. Bowder
5	2	6	8	SW	H.B. Co. - Kulkowsky House

Meridian	Range	Township	Section	Quarter	Name
5	1	6	4	SW	John Brown Place
5	1	5	27	SE	George Beauvais Davis
5	1	5	24	NE	Alberta Ranch
4	30	6	2	SE	S of Pincher Creek
4	30	11	25	NE	Hardwick Ranch
4	29	11	17	NW	William Stew Art / S. Ewing Homestead
4	28	11	18	SE	Meadow Creek Post Office
4	27	9	6	NE	Head-Smashed-In Buffalo Jump Archaeological Site
4	29	8	13	SE	Waldron Cow Camp
4	28	8	5	SW	
4	28	7	28	NW	Thibert Farm House
4	29	7	24	NW	E. Trodden
4	29	7	15	SE	Summerview Ferry
4	29	7	12	SE	Industrial
4	29	7	1	NE	Starlight Ranch
4	30	6	35	NE	Trinity Lutheran Graveyard
4	28	6	14	NW	Boucher Farm
4	30	6	11	SW	S.P. Hunter
4	29	5	31	SE	John & Rita Bruns Farm House
4	28	5	26	SW	
4	28	5	10	SW	Old Charles George Thomas Farm House
4	29	4	30	SW	
4	28	4	19	SW	The Yarrow School
4	29	3	4	SW	
5	3	7	29	NE	Coal Mine #87
5	1	7	12	NW	Glenburn Ranche
5	1	6	34	NE	Beauvais School Site
4	29	5	27	NE	Mine #1382
4	28	5	29	NE	
4	29	5	21	NW	
4	29	8	13	SW	John Lillico
4	29	4	2	NW	Bonertz Farm House
4	29	4	4	SW	Twin Butte Trading Post
4	29	3	32	NW	
5	2	17	20	NW	Riverbend Ranch Bert Sheppard
5	2	16	7	NE	Lloyd Wambeke
4	29	18	15	SE	Riley Real Estate Office On Reg Evans Farm
4	28	12	21	NW	William Day Farm House

Meridian	Range	Township	Section	Quarter	Name
5	3	6	31	NE	Adanac Miners - Adit 'A'
4	29	7	2	SW	
5	5	9	3	NW	Bridge # 1
5	2	9	3	NW	Peigan Burial
5	2	8	36	NW	Thomason & Sons
5	4	8	19	SE	Cougar Valley Mine
5	1	8	22	SE	Louis Boudier
5	3	8	17	NW	Coal Mine Lille #2
5	3	8	18	SW	Lille Cemetery
5	1	8	16	SE	Brockwell Farm
5	3	8	13	SW	Lafayette French
5	4	8	7	NE	McGillivray Creek Coal & Coke Company Tiple Site
5	5	8	8	SE	Cairn Marker
5	5	7	34	NW	Mother Crow Mines
5	2	7	25	NE	
5	3	7	19	SW	Giesbrecht
5	3	7	13	SW	Burmis Mine Entry
5	3	6	23	NW	Young
5	1	6	16	SE	
5	2	6	8	NE	Homestead Buildings
5	3	6	6	NE	Ernest and Lil Beasley
5	3	6	3	NE	Mine Coal
5	1	5	34	SE	Beauvais House Originally. Graveyard
5	2	5	25	NW	Henson, Richardson Place
5	1	5	26	NE	
5	1	5	24	SW	
4	28	12	7	SW	
4	29	11	20	NE	
4	27	11	20	NE	Northern Light School
4	28	11	24	SW	John Bowie Homestead
4	28	11	17	NE	Robert Bissett Farm House
4	30	3	28	SE	Anderson Family Cemetery
4	27	8	21	NE	L.N.I.D. Headworks
4	27	8	17	SW	Grave
4	30	7	34	SW	Fink Farm
4	29	7	27	NW	Pat Watson
4	29	4	28	SW	
4	29	4	24	NE	St. Henry's Cemetery

Meridian	Range	Township	Section	Quarter	Name
4	29	6	17	SE	The Pincher Creek Mennonite Brethren Cemetery
4	28	6	14	SE	
4	28	6	10	NE	Miller Farm Site
4	28	6	12	SE	
4	30	5	34	NW	Charles Schoeming
4	30	5	36	NE	Grandfather Bruns
4	29	5	34	NE	John Fairbairn Farm Site
4	30	5	35	SW	Gorge
4	30	5	36	SW	Bruns
4	29	5	22	SW	Dennis Therriault Farm House
4	30	5	24	SE	Soren Peter Larsen
4	29	5	15	SW	Robert Kerr School
4	28	5	15	SW	Fishburn United Church
4	29	4	28	SE	
4	27	2	18	NW	Mountain View Cemetery
4	28	12	14	NW	
5	4	7	36	NE	Turtle Mountain Motel
4	29	18	10	NW	Homestead
5	2	6	34	NW	Johnson
5	2	5	32	NE	
5	1	5	11	SW	Neumann Brothers
5	4	3	2	NW	Greenhill Mines - Shed
4	28	5	34	SE	
4	28	5	36	NW	James J. Reed Farm Site
4	29	5	16	SE	
5	1	5	34	NE	
5	4	17	23	SE	Nelson and Earl
5	2	17	1	NW	E.P. Ranch / Prince of Wales Ranch
5	4	16	4	NW	Adderson
5	5	15	18	NE	Old Cabin Floor
4	28	16	16	NE	
5	1	5	24	NW	Routhier Place
5	1	5	22	SW	T.M. Sorge
4	28	11	30	NW	Kelsie Dawson Farm House
4	27	12	21	NE	R.A. Shearer Homestead
5	4	7	32	SE	International Coal & Coke Co. (York Creek)
5	1	11	11	NW	
4	27	12	10	SE	John W. Drollinger Residence

Meridian	Range	Township	Section	Quarter	Name
5	3	8	24	SE	Poach Place
5	5	8	16	SW	NWMP Post
5	3	8	7	NE	Farm
5	4	8	9	NW	R. Phillips
5	5	8	12	SW	AGTL-3B/3 - Fleming Ranch
5	1	8	10	SW	Robert Day Farm
5	5	8	2	NW	Bohomelec Ranch
5	2	7	32	SE	
5	2	10	12	SE	Waldron House
5	2	9	22	SW	Richard, Now Frank, Lynch
5	5	8	27	NW	Loading Platform
5	1	8	30	SE	W.C. Elton
5	4	8	24	NW	Building Foundation
5	4	8	23	SE	Boisjoli Mine
5	6	8	12	SW	Community Hall
5	1	6	18	NE	
5	1	7	31	SE	Lightharts / Reners Farms Ltd.
5	3	7	25	NW	Marcel Comprino
5	2	7	24	NW	United Doukhobors of Alberta Cemetery
5	2	7	20	NW	Farm
5	3	7	18	SW	Hillcrest Mine - Adit (?)
5	3	7	6	NW	Hillcrst #5 - Unknown Structure
5	2	6	32	SE	Johnson's Place
5	1	5	35	NW	Bridge
5	2	5	13	SW	Charlie Vent
5	1	5	14	SW	J.H. Good
5	1	5	17	SW	
5	4	3	1	SE	Bluff Mountatin
4	28	12	12	SW	C. Sharples Homestead
4	27	11	10	NW	A. Suenson Homestead
4	30	6	23	NW	Old Cemetery
4	30	6	24	NW	Fairview Public Cemetery (Includes St. John's Anglican Cemetery & R.C. Cemetery)
4	27	11	6	NE	W.J. Houlding Homestead (residence)
4	27	11	2	SE	Otto Henker Homestead
4	29	8	28	SE	Enes Homestead
4	28	8	13	SW	
4	29	7	14	NE	

Meridian	Range	Township	Section	Quarter	Name
4	30	7	15	SW	Stoutenberg House
4	29	6	36	SW	Lewis Farm Site
4	29	6	30	SW	Lavasseur Farm House
4	28	6	15	SE	
4	29	6	8	SW	
4	28	6	8	SE	Halifax School
4	29	5	4	NW	
4	29	4	35	NW	Robert Kerr
4	29	4	3	SE	Jim Hillier Farm House
4	29	3	30	SW	Spread Eagle Barn
4	29	3	16	NW	
5	4	17	10	SE	Mel Nelson Old I Brand (Used I)
5	3	8	4	SE	Hillcrest - Mohawk Collieries
5	1	6	34	SE	Reuin Beavais House
4	29	6	9	NW	Geitz Farm House
4	28	5	28	SW	Fishburn Town Site
4	28	5	28	NE	Fishburn Store
4	28	2	36	NE	Cemetery
5	5	8	12	SE	AGTL-3B/2
5	4	8	10	SW	Kubica, M
5	5	8	4	NE	
5	5	7	34	NE	Sentinel Mine - Unknown Concrete Foundation(s)
5	1	7	35	SW	Reno Welsch Farm (Former Snyder Farm) - Welsch Farm House
5	2	5	29	SW	
5	4	17	25	SE	Stampede Ranch
5	4	17	11	NE	Eden Valley Indian Reserve
5	4	16	27	SE	Cartwright D. Ranch - Cabin
4	29	17	24	NE	Near Cayley
4	28	16	22	SE	Cemetery
4	27	12	20	NE	E.A. Carey Homestead #1
4	27	12	23	SW	Claresholm Cemetery
4	28	4	24	NW	Gulf Oil Company
4	27	4	18	NE	Hillspring Cemetery
5	2	10	2	NE	Lane House
5	5	8	34	NW	Allison Creek Lumber Camp
5	4	8	34	NW	Log Flume
5	2	8	36	SE	Morning Bright Ranch. Wilson Started it
5	3	8	20	SW	Lille #3

Meridian	Range	Township	Section	Quarter	Name
5	3	8	18	NE	Lille - Coke Testing Building
5	1	8	15	NE	Bill Werurich
5	3	8	17	SE	WCC - Greenhill Mine
5	4	7	28	NE	International Coal & Coke Co. (York Creek)
5	3	7	20	NE	Hoist House - Rope Run
5	1	7	24	NW	Verigin Farm - Verigin House
5	2	7	24	SW	
5	3	7	15	NE	Leitch Collieries - Hoist
5	3	7	14	SW	Burmis (Roman Catholic) Church
5	1	7	13	SW	Roy Buchanan Farm
5	2	7	8	SE	Shed
5	1	7	2	NE	Godsal Forth
5	1	7	5	SW	James Bennett
5	2	6	32	NW	Frank Herman
5	1	6	34	NW	Martin and Mary Schatz
5	2	6	25	SW	Butte Ranch
5	1	6	13	NE	A.H. Lynch Staunton
5	2	6	16	SW	Frank Lucy
5	1	6	18	SE	T.F. Pope
5	1	6	14	SW	Arrhut Edgar Cox
5	1	6	13	SE	Albert Andrew McCullough
5	2	5	34	SE	John Babin Jr.
5	1	5	30	NW	McKenzie Cabin
5	1	5	30	SW	Smith Homestead
5	2	5	22	NE	Noble Farm
4	27	12	15	SE	Jim Stuenkel
4	27	11	3	NE	Louis Audette Homestead
4	29	11	2	SW	John R. Craig House
4	28	11	2	SW	
4	27	10	28	SW	Cemetery
4	29	8	19	SW	O'Neill's Place
4	29	5	28	SE	Prim Therriault Farm House
4	29	5	28	SW	
4	29	5	22	SE	John Taylor Farm Site
4	30	7	35	NW	CPR Station
4	29	7	26	SE	Summerview Hall
4	30	7	24	NE	Ashvale School [District 2082]
4	29	7	15	SW	Vehicle Bridge

Meridian	Range	Township	Section	Quarter	Name
4	29	7	4	SE	F. Austin Farm House
4	28	6	16	NE	
4	28	6	14	SW	
4	30	6	12	NW	
4	29	6	12	NE	Cemetery
4	29	5	18	NW	
4	28	4	33	NE	Utopia School
4	29	4	34	SE	
4	29	3	19	SE	
4	29	4	4	SE	Lloyd Hillier Farm House
5	2	16	14	SE	Pekisko Store
5	3	9	14	SE	Barn
5	2	8	14	NE	Ross Ranch
5	2	8	13	SW	Farm
5	2	6	10	NW	
5	1	5	32	NE	Wilber and Mery Lang
4	29	5	22	NW	Charles Smith Farm Site
4	30	1	25	NW	Waterton Park Cemetery
4	28	12	31	NE	
4	27	12	27	SW	Barn near Claresholm
4	27	12	29	SW	C.R. Wilhite Barn
5	3	7	14	NE	Coal Mine #153
5	3	7	18	NE	Hillcrest Coal Mines #40 & #133
5	2	5	35	SW	Bardenes Henson
5	2	5	32	SE	
4	28	12	14	SW	Greenbank School
5	2	17	36	SW	Loch Sloy
5	4	17	25	SW	Stampede Ranch (Guy Weadick)
5	3	16	12	SE	St. Aidan's Anglican Church
4	27	12	17	NE	J. Carlson Homestead
4	28	18	12	NE	George Blake Estate
4	28	18	8	NW	R.A. Wallace Barn
4	29	18	3	SW	Farmhouse
4	28	15	2	SE	Hutterian Brethren of Parkland Cemetery
4	28	13	28	SE	
5	1	9	6	SE	George Scotton
5	5	8	34	SW	Dam
5	1	8	28	NW	John Nelson Cemetery
5	4	8	18	NE	McGillivray Creek Coal & Coke Company

Meridian	Range	Township	Section	Quarter	Name
5	5	8	9	SW	
5	4	8	4	NE	AGTL-3B/1
5	3	7	35	SE	Mike Michalsky Place
5	1	7	34	SE	Lawrensons
5	1	7	34	SW	Barn
5	1	7	33	SE	Massacre Butte (Cairn)
5	3	7	29	SE	Shed
5	3	7	29	SW	Farm
5	2	7	26	SW	
5	1	7	30	SE	
5	3	7	21	SW	Mohawk Collieries
5	1	7	17	SW	House
5	2	7	6	SE	Paul Schultz Place
5	2	6	33	NE	Wallace Thurston Eddy
5	3	6	36	SW	Homestead
5	3	6	23	SW	Harry Davison Place
5	2	6	16	NE	Ora Albert Eddy - W.D. Eddy
5	1	6	18	SW	
5	2	6	5	NW	John Pirtz [House No. 2]
4	28	12	10	SW	John Enticknap Farm House
4	28	11	32	NW	William Weech Homestead
4	28	11	7	NE	Meadow Creek School
4	27	11	9	NW	Bert Clarke Old House
4	27	11	4	NE	Dick Henker Homestead (House)
4	30	5	12	SW	Christopher Bendek
4	29	4	8	SE	Yarrow Creek Campsite
4	29	8	18	NE	Middleton Homestead
4	28	8	12	SW	
4	29	7	33	SE	Dansey House
4	29	7	28	NE	Tennessee Creek
4	29	7	12	NW	
4	28	7	7	NW	
4	29	7	9	SE	Henry Hammond Place
4	30	6	25	SW	N.F.M. Scobie - Vogelaar Farm
4	30	6	22	SW	Peter Provost Site
4	29	6	10	SW	Baptiste Dionne Farm House
4	27	6	7	SW	Spring Menonite Church
4	28	6	2	NE	Dixon Farm House
4	30	6	1	SW	Augustus M. Nanton T.M. Sorge

Meridian	Range	Township	Section	Quarter	Name
4	30	5	23	NE	Evangelical Lutheran Trinity Cemetery
4	28	4	26	SW	Mine #1470
4	28	4	7	NE	Bob Wright Farm House
4	29	3	20	SW	
4	29	3	18	NE	
4	29	2	32	NE	Keith Enterprises
4	29	2	33	NW	Park View School
4	29	2	20	SW	Waterton Homestead Campground
4	27	12	14	NE	Ira Wannamaker Homestead
4	30	12	2	NW	Burke Creek Ranch
4	27	11	4	SW	Jake Merkle Homestead
5	3	13	17	SE	AGTL-3/20 - Cabin
5	3	11	5	SW	Livingstone Ranger Station
5	2	9	14	NW	Dezall Ranching Company Cabin
5	2	6	11	NW	Coalfield School
4	27	12	9	SW	Randall Harriman Homestead
4	27	11	19	SE	Tom Gustman Homestead
4	30	5	13	SE	House
4	27	14	17	SE	Catholic Cemetery near Stavely
4	29	17	9	NE	Cayley Colony Hutterite Cemetery
5	1	17	11	NW	Macmillan Hutterian Brethren Cemetery
5	4	16	25	SE	Cartwright D. Ranch
5	4	16	14	SW	Burke Family - Stable
5	4	14	35	SE	
4	29	17	35	NW	Old Women's Buffalo Jump Archaeological Site
5	2	10	11	NE	
5	1	8	30	NE	Livingstone Cemetery (Formerly St. Martin's)
5	4	8	25	SW	West Canadian Collieries
5	4	8	23	NE	Coal Mine
5	4	8	24	NE	Frank/Grassy Mountain Railway Line
5	4	8	17	NW	McGillivray Creek Coal & Coke Company
5	4	8	13	SW	Greenhill Mine
4	28	13	14	NE	Oxley Ranch House
4	30	12	35	NE	E.H. Arlt Cabin
4	29	12	27	NE	William Lyndon Homestead
5	5	8	16	SE	Homestead (?)
5	4	8	8	NW	Farm
5	4	8	8	SE	International Coal & Coke Company

Meridian	Range	Township	Section	Quarter	Name
5	3	8	1	NW	William Lee
5	4	8	2	SW	WCC - Greenhill Mine
5	2	8	4	SW	Second Lee School House
5	2	8	2	SW	Barn
4	30	6	17	SE	
5	2	10	18	SE	
5	1	7	25	SW	J.M. Easterbrook House
5	2	7	20	SE	
5	2	7	27	NE	
5	1	7	29	NE	Cowley Cemetery
5	2	7	30	SE	
5	1	7	13	NW	Schuratoff Farm [Last Owner: L. Bougerolle]
5	1	7	11	SE	Godsal Forish
5	2	7	3	SW	
5	1	6	17	SE	George Hodkins
5	2	6	7	SE	Log Cabin
5	2	6	3	NW	Andy Wojtyla Residence
5	2	6	6	SW	Ed McIntee
4	27	12	2	NE	Claresholm Hospital Nurses' Residence
4	27	12	4	NW	Jim Brown Homestead
4	27	12	4	SW	David McEwan Homestead
4	27	11	17	NE	Residence near Granum
4	29	11	3	SW	John Nelson Homestead
4	28	3	13	NW	Big Bend N.W.M.P. Post
4	29	7	12	NE	Victoria Jubilee Home
4	29	7	4	NE	Maunsell Crossing
4	30	6	14	SE	
4	29	6	4	NE	William Berry Residence
4	28	6	1	NE	George Snider Farm House
4	29	5	34	NW	Adam Lees Freebairn Farm Site
4	30	5	34	SW	Gus Newmann
4	29	5	35	SE	Stuckey House
4	28	5	3	NW	Wes & Dora Thomas Farm Site
4	30	4	21	SE	Mrs. Smith's Homestead
4	27	4	19	SW	Hillspring Chute
4	29	4	17	NW	Mongeon Farm House
4	29	4	13	SE	
4	29	4	4	NW	

Meridian	Range	Township	Section	Quarter	Name
4	28	4	3	SE	Mine #455
4	29	3	36	NW	McKown Farm Site
4	29	3	32	NE	Shannon Farm Site
4	29	3	27	NE	
5	1	7	31	NE	J. Reners Barn A
5	1	7	8	NE	Cowley Ridge
5	3	6	24	NE	Bridge Over Castle River
5	3	6	22	NE	Harry Orr
4	29	5	36	SE	
4	30	9	23		Peigan IR 147B
5	1	13	27	SE	Streeter Basin Project Cabin
5	3	15	4		Coal Mine #735

APPENDIX 3: ARCHAEOLOGICAL STUDIES WITHIN THE C5 FMU

ARCHAEOLOGICAL STUDIES WITHIN THE C5 FMU

Apland, Brian C.

- 1979 Heritage resource inventory and assessment, Alaska Highway gas pipeline stockpile sites, Alberta zone 7, "the western leg" (ASA Permit Number 79-081), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1981 Historical resources impact mitigation Alaska Highway gas pipeline Alberta zone 7 - "the western leg" - DkPm-22 : final report (ASA Permit Number 80-138), unpublished consultants report on file with the Archaeological Survey of Alberta.

Balcom, Rebecca J.

- 1984 Historical resources impact assessment Hidden Creek forestry trunk road : final report (ASA Permit Number 83-108), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1990 Historical resources impact assessment Chinook Coal project volume I; Historical resources impact assessment Chinook Coal project volume II. ASA Permit Number 89-075), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1991 Historical resources impact assessment and mitigation Canhunter Coleman 4-18-11-3: final report (ASA Permit Number 89-102), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1996b Historical resources impact assessment Burmis wellsite and access road : final report (ASA Permit Number 94-125), unpublished consultants report on file with the Archaeological Survey of Alberta.

Brink, John

- 1975 Research progress report, 1974 (ASA Permit Number 74-006), unpublished consultants report on file with the Archaeological Survey of Alberta.

Brulotte, Russell K.

- 1982 Report on preliminary survey, 81-107 (ASA Permit Number 81-107), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1983 Zooarchaeological interpretation of two sites in southwestern Alberta (thesis) (ASA Permit Number 82-036), unpublished Masters Thesis on file with the Archaeological Survey of Alberta.

Calder, J.M.

1987 Historical resources impact assessment, 500 kV transmission line, Langdon to B.C. border, sections I-IV, and impact mitigation (ASA Permit Number 84-040), unpublished consultants report on file with the Archaeological Survey of Alberta.

Connolly, C.E. and K. Gee

1975 Archaeological investigations Rock and Connelly, Cow and Ross Creek areas, Livingstone foothills, Crowsnest Pass area (ASA Permit Number 74-022), unpublished consultants report on file with the Archaeological Survey of Alberta.

Driver, Jonathan C.

1976 Report of excavations and survey, Crowsnest Pass, 1975 (ASA Permit Number 75-024), unpublished consultants report on file with the Archaeological Survey of Alberta.

Gorham, L.R.

1997 Historical resources impact assessment Morrison Petroleums Ltd. Racehorse Creek well (16-16-10-4 W5M) (ASA Permit Number 96-014), unpublished consultants report on file with the Archaeological Survey of Alberta.

1999 Historical resources impact assessment Canadian 88 Energy Corporation Canadian 88 Burmis 2-25-7-3-W5 well pad project (ASA Permit Number 98-033), unpublished consultants report on file with the Archaeological Survey of Alberta.

Graspointner, Andreas, Jonathan C. Driver, P. Duke and Brian M. Ronaghan

1978 U of C field school and salvage excavations, Crowsnest Pass (ASA Permit Number 77-022), unpublished consultants report on file with the Archaeological Survey of Alberta.

Green, D'Arcy C.

2003 Historical resources impact assessment for the Beauvais Lake Dam rehabilitation project: final report (ASA Permit Number 03-147), unpublished consultants report on file with the Archaeological Survey of Alberta.

Gryba, Eugene M.

1980 Highway archaeological salvage projects in Alberta (ASA Permit Number 79-066), unpublished consultants report on file with the Archaeological Survey of Alberta.

1983 The 1982 archaeological survey of Alberta highways and recreation area developments : final report (ASA Permit Number 82-072), unpublished consultants report on file with the Archaeological Survey of Alberta.

Gryba, Eugene M. (cont.)

- 1988 Historical resources impact assessment of secondary roads 532 and 533 in southwestern Alberta (ASA Permit Number 87-067), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1998b Historical resources impact assessment proposed DeGraaf Excavating Ltd. gravel pit development in LSDs 5 & 12-34-10-3-W5M near Burmis, Alberta (ASA Permit Number 98-002), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1999a Historical resources impact assessment proposed Mohawk Meadows subdivision in NW 21-7-3-W5M in Bellevue in Southwestern Alberta (ASA Permit Number 99-110), unpublished consultants report on file with the Archaeological Survey of Alberta.

Gryba, Eugene M., Lewis, C.R.

- 2000 Historical resources impact assessment Canadian 88 Energy Corp Burmis pipeline project Lees Lake re-route and flowline and well sites 2-36-6-3 W5M and 6-24-7-3 W5M: final report [volume 1]; Historical resources impact mitigation Canadian 88 Energy Corporation Burmis pipeline project [volume 2] (ASA Permit Number 98-109), unpublished consultants report on file with the Archaeological Survey of Alberta.

Hanna, Donald T.

- 1998 Historical resources impact assessment Lost Creek Heritage Survey (ASA Permit Number 04325), unpublished consultants report on file with the Archaeological Survey of Alberta.

Head, Thomas

- 1991 Historical resources impact assessment NPS 36 Western Alberta system mainline loop - ABC section: final report (ASA Permit Number 89-040), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1996 Historical resources impact assessment and monitoring NPS 42 Western Alberta system mainline upgrade (Crownsnest section), Western Alberta system mainline loop (Lundbreck section), (North Creek section), (Nelson section), (Dogpound section) (ASA Permit Number 93-010), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 2003 Historical resources impact assessment NPS 20 Waterton Montana Lateral Loop (Castle River section): final report (ASA Permit Number 01-239), unpublished consultants report on file with the Archaeological Survey of Alberta.

Heitzmann, Roderick J.

1978 Historical resources inventory and assessment, proposed southern Alberta highway construction projects, 1978 (ASA Permit Number 78-053), unpublished consultants report on file with the Archaeological Survey of Alberta.

1980 Historical resources inventory and assessment: proposed southern Alberta highway construction projects 1980, (ASA Permit Number 80-096), unpublished consultants report on file with the Archaeological Survey of Alberta.

Kennedy, Margaret

1987c TransAlta Utilities transmission line 1201L, Section V 500 historical resources impact assessment and conservation excavation DjPo 107, 156, 137 (ASA Permit Number 84-033), unpublished consultants report on file with the Archaeological Survey of Alberta.

Kulle, Barbara J.

1998 Historical resources impact assessment Novagas Canada Ltd. East Porcupine gas processing project (ASA Permit Number 96-101), unpublished consultants report on file with the Archaeological Survey of Alberta.

Landals, Alison J.

1999 Historical resources impact assessment Canadian 88 Energy Corp. Burmis pipeline project (ASA Permit Number 96-090), unpublished consultants report on file with the Archaeological Survey of Alberta.

Light, James A.

1989 Historical resources impact assessment Porcupine Hills pipeline: final report (ASA Permit Number 86-080), unpublished consultants report on file with the Archaeological Survey of Alberta.

Loveseth, Bea A.

1976 Crowsnest Pass lithic source survey: preliminary report 1975 (ASA Permit Number 75-021), unpublished consultants report on file with the Archaeological Survey of Alberta.

McCullough, Edward J.

1980 Historical resources impact assessment Kananaskis Country development projects: final report (ASA Permit Number 79-125), unpublished consultants report on file with the Archaeological Survey of Alberta.

McCullough, Edward J. (cont.)

1986 Historical resources impact assessment TransAlta Utilities Corporation 240 kV 942L/943L transmission line (ASA Permit Number 86-086), unpublished consultants report on file with the Archaeological Survey of Alberta.

1996 Historical resources impact assessment Shell Canada Limited Waterton Corner Mountain pipeline project phase II Waterton 50 & Waterton 53 tie-in (ASA Permit Number 90-005), unpublished consultants report on file with the Archaeological Survey of Alberta.

McCullough, Edward J. and B.O.K. Reeves

1978a Archaeological conservation studies, Waterton - Cochrane ethane pipeline: final report (ASA Permit Number 78-064), unpublished consultants report on file with the Archaeological Survey of Alberta.

1978b Historical resources impact assessment Dome Petroleum Ltd., Waterton - Cochrane ethane pipeline (ASA Permit Number 78-020), unpublished consultants report on file with the Archaeological Survey of Alberta.

Mcfee, Ron D.

1978 Archaeological salvage investigations in the Rocky Mountains-Foothills interface Alberta Highways and Transportation construction projects [permits 78-74 and 78-105] (ASA Permit Number 78-074), unpublished consultants report on file with the Archaeological Survey of Alberta.

1979a Heritage resources inventory and impact assessment, Alaska Highway Gas Pipeline, Alberta zone 7, the western leg (Livingstone Rise to British Columbia border): final report (ASA Permit Number 79-140), unpublished consultants report on file with the Archaeological Survey of Alberta.

1979b Heritage resources impact assessment, Alaska highway gas pipeline, Alberta segment 7, the western leg (ASA Permit Number 78-075), unpublished consultants report on file with the Archaeological Survey of Alberta.

Meyer, Daniel A.

2003 Historical resources impact assessment Crowsnest claims summit area quarry and access road metallic and industrial mineral permit no. 9302060002: final report (ASA Permit Number 02-264), unpublished consultants report on file with the Archaeological Survey of Alberta.

2004a Historical resources impact assessment Devon Canada Corporation 2002 coal bed methane exploration (permits 02-93 and 03-50): final report (ASA Permit Number 03-050), unpublished consultants report on file with the Archaeological Survey of Alberta.

Meyer, Daniel A. and Brian O.K. Reeves (cont.)

2002a Historical resources impact assessment Marathon Callum 10-24-12-2-W5M wellsite and access road: final report (ASA Permit Number 02-116), unpublished consultants report on file with the Archaeological Survey of Alberta.

2002b Historical resources impact assessment Polaris Ricks Livingstone 11-32-10-2-W5M well site and access road: final report (ASA Permit Number 02-008), unpublished consultants report on file with the Archaeological Survey of Alberta.

2003 Historical resources impact assessment Devon Canada Corporation (Northstar Energy Corporation) Livingstone-Racehorse Creek coalbed methane project: final report (ASA Permit Number 01-256), unpublished consultants report on file with the Archaeological Survey of Alberta.

2004a Historical resources impact assessment Shell Canada Limited Burmis Prospect well site and access road (permits 02-263 and 04-140): final report (ASA Permit Number 04-140), unpublished consultants report on file with the Archaeological Survey of Alberta.

2004b Historical resources impact assessment Shell Canada Limited Burmis Prospect well site and access road (permits 02-263 and 04-140): final report (ASA Permit Number 02-263), unpublished consultants report on file with the Archaeological Survey of Alberta.

2004c Historical resources impact assessment Devon Canada Corporation (Northstar Energy Corporation) 2001 Gold Creek coalbed methane project: final report (ASA Permit Number 01-064), unpublished consultants report on file with the Archaeological Survey of Alberta.

Perry, Bill; Gwyn Langeman and Brian Reeves

1997 Archaeological Description Waterton Lakes National Park. unpublished report on file with the Archaeological Survey of Alberta (CRM 160)

Pollock, John

1986 Historical resources impact assessment of seven aggregate pits in southern Alberta (ASA Permit Number 86-015), unpublished consultants report on file with the Archaeological Survey of Alberta.

1985 Historical resources impact assessment Spring Creek reroute foothills mainline extension (ASA Permit Number 85-036), unpublished consultants report on file with the Archaeological Survey of Alberta.

Quigg, J. Michael

1981 1980 Highway assessment program in southern Alberta (ASA Permit Number 80-126), unpublished consultants report on file with the Archaeological Survey of Alberta.

Reeves, Brian O.K.

- 1972 Archaeological Resource Inventory Department of Highways and Transport Proposed Construction Projects. unpublished consultants report on file with the Archaeological Survey of Alberta. (CRM 001)
- 1973 Archaeological Resources in the Rocky Mountains, Edson, Grande Prairie Forest Reserves, Including Areas of Local Improvement Districts No. 5 (Crowsnest Pass) and No. 46 (Row Corridor) Alberta. (CRM 003)
- 1976 Heritage site impact report, proposed Arctic gas pipeline system, section 2C Caroline-Crowsnest (ASA Permit Number 75-042), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1976a Heritage impact assessment, AGTL Co. Ltd. 10 3/4" OD sour gas pipeline, North Coleman field to Saratoga pipeline [volume 1]; Archaeological investigations McGillivray Creek prehistoric campsite, the Alberta Gas Trunk Line Company Limited, North Coleman lateral [volume 2] (ASA Permit Number 75-040), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1978a Historical resources impact assessment Coleman Collieries Limited Racehorse Creek area (ASA Permit Number 78-066), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1978b Historical resources impact assessment, Tent Mountain, Coleman Collieries Limited (ASA Permit Number 76-036), unpublished consultants report on file with the Archaeological Survey of Alberta.
- 1988a Historical resources impact assessment Shell Canada Resources Ltd. Shell Waterton field Prairie Bluff development (ASA Permit Number 86-059), unpublished consultants report on file with the Archaeological Survey of Alberta.

Ronaghan, Brian M.

- 1985 The Burmis-Lundbreck Corridor Project: Archaeology in the Context of Planning in the Crowsnest Pass. In: *Archaeology in Alberta 1984*, Archaeological Survey of Alberta Occasional Paper No. 25, pp. 118-156.
- 2000 Historical resources impact assessment Ranger Oil'S Willow Creek tie in pipeline township 13, range 28 W4M (ASA Permit Number 99-112), unpublished consultants report on file with the Archaeological Survey of Alberta.

Unfreed, Wendy J.

- 1999 Historical resources impact assessment Northstar Energy Corporation Racehorse Creek wellsites (Twp 10, Rge 4, W5M) (ASA Permit Number 97-104), unpublished consultants report on file with the Archaeological Survey of Alberta.

Vivian, Brian C.

1998 Historical resources impact assessment Crownsnest pipeline project (ASA Permit Number 97-031), unpublished consultants report on file with the Archaeological Survey of Alberta.

Wondrasek, Rob J.

2004 Historical resources impact assessment Dynergy Midstream Services Ltd. Little Bow River pipeline crossing 3-18-28-W4 (ASA Permit Number 99-156), unpublished consultants report on file with the Archaeological Survey of Alberta.

Wood, Barry P

2000 A Multi-Regional Analysis of Heritage Management: An Approach to Building New Partnerships. Unpublished MA Thesis, Department of Environmental Design, University of Calgary. (CRM 128)

Wright, Bruce W.

1979 Heritage resources impact mitigation, Alaska Highway Gas Pipeline (Alberta zone 7 - "the western leg"): final report (ASA Permit Number 79-096), unpublished consultants report on file with the Archaeological Survey of Alberta.

Yanicki, Gabriel M.

2002 Old Man's Playground: Contexts of Rediscovery and Interpretation [volume 1], Old Man's Playground: Contexts of Rediscovery and Interpretation Appendix I: Tables [volume 2]. (ASA Permit Number 98-162), unpublished consultants report on file with the Archaeological Survey