THE CAMP RAYNER SITE (EgNr-2):
TERMINAL/LATE PALEOINDIAN AND EARLY MIDDLE PERIOD TRANSITIONS
ON THE NORTHERN PLAINS

A Thesis Submitted to the College of
Graduate Studies and Research
In Partial Fulfillment of the Requirements
For the Degree of Master of Arts
In the Department of Archaeology and Anthropology
University of Saskatchewan
Saskatoon

By

Jennifer N. Rychlo

© Copyright Jennifer N. Rychlo, May, 2016. All rights reserved.
PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis/dissertation work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis/dissertation or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis/dissertation.

Requests for permission to copy or to make other uses of materials in this thesis in whole or part should be addressed to:

Head of the Department of Archaeology and Anthropology
University of Saskatchewan
55 Campus Drive
Saskatoon, Saskatchewan
S7N 5B1
ABSTRACT

The Camp Rayner site (EgNr-2) is a multicomponent site located on the northern shores of Lake Diefenbaker in central Saskatchewan. Excavations at the site were carried out from 1987 to 1997 as part of the Saskatchewan Archaeological Society’s public field school and complete analysis of the materials recovered took place in 2012 as part of Nathalie Cahill’s M.A. Thesis. Using diagnostic lithic tools to reconstruct the cultural occupations at the site, Cahill (2012) determined that the site was repeatedly occupied from the Terminal/Late Paleoindian period to the Late Precontact period. The earliest components at the site, Cultural Zones 7 and 6, have been radiocarbon dated to the Terminal/Late Paleoindian period (8,500 to 7,500 BP) and the Early Middle Precontact period (7,500 to 5,000 BP), respectively. This era in the Northern Plains cultural chronology corresponds to a climatic event known as the Hypsithermal, which affected the Northern Plains from approximately 9,000 to 5,000 years BP. Sites dating to this time period are comparatively rare on the Northern Plains. As such the cultural transitions between the Terminal/Late Paleoindian and Early Middle periods and the adaptations to the Hypsithermal climates remain poorly understood.

A detailed reanalysis was carried out of the lithic and faunal assemblages from the Terminal/Late Paleoindian and Early Middle Precontact period components at the Camp Rayner site. The assemblages from both time periods reflect broad based subsistence approaches and restricted mobility patterns, based on the presence of a variety of faunal species and predominance of locally sourced lithics. This pattern is apparent at other assemblages dating to these time periods from various sites on the Northern Plains. From these assemblages, it is clear that broad range subsistence approaches and a focus on local lithics characterizes both the Terminal/Late Paleoindian and Early Middle periods. Furthermore, these sites indicate that humans restricted their movements to regions with abundant food and water resources such as the major drainage systems and the peripheries of the Northern Plains.

In addition to the research component for this thesis, a Heritage Resource Management Plan has been formulated for the Camp Rayner site. Overall, the site contains a significant degree of historical, cultural, and scientific value for the Province of Saskatchewan. Unfortunately, numerous impacts such as shoreline erosion, pedestrian activity, and the potential for future development are impacting the site’s intact components. Through consultation with
adjacent landowners and communities, recommendations and policy options for site preservation and management have been put forward. From these, it is the hope that the long term preservation and survival of the Camp Rayner site’s historic and Precontact components is ensured.
ACKNOWLEDGEMENTS

I can certainly say that writing this thesis was a marathon in and of itself and without the patient guidance and care from a select number of individuals, this project would certainly not have been possible. First and foremost, I would like to thank my graduate supervisor, Dr. Ernie Walker. His dedication and careful supervision helped to keep me on track and overcome all of the hurdles I faced throughout the course of this project. Thanks also goes out to my committee members, Dr. Margaret Kennedy and Dr. Glenn Stuart, whose invaluable perspectives and guidance helped to create a thesis of which I can be proud. I can truly say that I am honoured to have been a part of a department full of such dedicated and intelligent individuals. Thank you to Dr. Avi Akkerman from the Department of Geography and Planning for being the external examiner in my defense.

To my wonderful friends, peers, and colleagues (you know who you are!) thank you for the endless laughter, the innumerable rant sessions and “coffee breaks”, and for your endless support and guidance as well. Whether I’ve known you since elementary school, undergrad, or I’ve gotten to know you in the past three years of my graduate studies, I’ll cherish all of the fond memories you’ve all given me. I look forward to the future and hope you are all in it for the long term!

Thank you to my family. I’d never have gotten to this point without all of you. Mom and Dad, thank you for everything. There are no words to express how grateful I am for all of the support, love, and guidance you both have given me. The same goes to my brothers, Zach and Jordan, and to my cousins (though I’m pretty sure we’re actually sisters), Chelsea and Megan. Love you all!

Special thanks goes out to the Saskatchewan Archaeological Society and to the Saskatchewan Heritage Foundation for their financial support, and to Maggie Schwab and Rob Crosby from Crosby Hanna and Associates for their guidance in developing the Heritage Resource Management Plan portion of this thesis. I would also like to express a heartfelt thank you to the caretakers of the Camp Rayner site, Reinie and Barbara Janke, to the Hitchcock’s Bay Development Corporation, and to Elaine Gunsch from the F.T. Hill Museum. The information they provided proved invaluable in formulating this thesis.
# TABLE OF CONTENTS

**PERMISSION TO USE** ......................................................................................................................... i

**ABSTRACT** ........................................................................................................................................... ii

**ACKNOWLEDGEMENTS** ....................................................................................................................... iv

**TABLE OF CONTENTS** ........................................................................................................................... v

**LIST OF TABLES** ................................................................................................................................... x

**LIST OF FIGURES** ................................................................................................................................. xi

**Chapter 1**.................................................................................................................................................... 1

1.1 Introduction ............................................................................................................................................. 1

1.2 Thesis Outline ......................................................................................................................................... 4

1.3 Thesis Methodologies .......................................................................................................................... 4

1.3.1 Lithic Analysis ..................................................................................................................................... 5

1.3.2 Faunal Analysis .................................................................................................................................. 6

1.3.3 AMS Dating ....................................................................................................................................... 6

1.3.4 Inter-site Comparison ....................................................................................................................... 7

**Chapter 2**..................................................................................................................................................... 8

2.1 Introduction ............................................................................................................................................. 8

2.2 The Sand Hills Region of Saskatchewan ............................................................................................... 8

2.3 Soils and Sedimentology ...................................................................................................................... 9

2.4 Climate and Precipitation of the Northern Plains ................................................................................ 10

2.4.1 Climate ............................................................................................................................................... 10

2.4.2 Precipitation ...................................................................................................................................... 11

2.5 Geochronology and Glacial History of the Northern Plains ................................................................. 11

2.6 Flora and Fauna of the Mixed Grasslands Ecoregion ......................................................................... 12

2.6.1 Flora .................................................................................................................................................... 12

2.6.2 Fauna ................................................................................................................................................ 13

**Chapter 3**..................................................................................................................................................... 15

3.1 Study Area: Lake Diefenbaker and the South Saskatchewan River Valley ............................................. 15

3.2 The Camp Rayner Site: A History of Research .................................................................................... 17

3.2.1 South Saskatchewan River Project Heritage Study 1958-1960 ....................................................... 17

3.2.2 South Saskatchewan River Basin Study 1989 .................................................................................. 17
3.2.3 Archaeological Reconnaissance of the Lake Diefenbaker Region: 1995-1996
3.2.4 Camp Rayner Public Field School
3.2.5 Proposal for Reservoir Development and ARM In-House Field Inspection: 2008 & 2010
3.2.6 Final Reporting and Analysis of Camp Rayner Assemblage: 2011 & 2012
3.3 Conclusions

Chapter 4
4.1 Introduction
4.2 Paleo-ecological Evidence for the Hypsithermal on the Northern Plains
4.2.1 Lake-bed Cores and Terrestrial Sediments
4.2.2 Stable Isotope Levels in Bison Remains
4.2.3 Discussions
4.3 Cultural Adaptations to the Hypsithermal on the Northern Plains
4.3.1 Models for Hypsithermal Adaptations
4.4 Terminal/Late Paleoindian and Early Middle Period Lifeways
4.4.1 The Late/Terminal Paleoindian Period (8,500 to 7,500 BP)
4.4.2 Early Middle Precontact Period (7,500 to 5,000 BP)
4.5 Discussion and Conclusions

Chapter 5
5.1 Introduction
5.2 Cultural Zone 6 Lithic Analysis
5.2.1 Projectile Points
5.2.2 Biface
5.2.3 Utilized Flakes
5.2.4 Grinding Stone
5.2.5 Cores
5.2.6 Lithic Material Distribution
5.3 Cultural Zone 6 Faunal Assemblage
5.3.1 Order Artiodactyla
5.3.2 Order Carnivora
5.3.3 Order Rodentia
5.3.4 Burned Bone Distribution
5.3.5 Cut Mark Distribution
<table>
<thead>
<tr>
<th>Chapter 6</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Introduction</td>
<td>62</td>
</tr>
<tr>
<td>6.2 Cultural Zone 7 Lithic Analysis</td>
<td>62</td>
</tr>
<tr>
<td>6.2.1 Projectile Points</td>
<td>63</td>
</tr>
<tr>
<td>6.2.2 Bifaces</td>
<td>64</td>
</tr>
<tr>
<td>6.2.3 Uniface</td>
<td>66</td>
</tr>
<tr>
<td>6.2.4 Scrapers</td>
<td>67</td>
</tr>
<tr>
<td>6.2.5 Graver</td>
<td>68</td>
</tr>
<tr>
<td>6.2.6 Gouge</td>
<td>69</td>
</tr>
<tr>
<td>6.2.7 Grinding Stones</td>
<td>70</td>
</tr>
<tr>
<td>6.2.8 Utilized Fragments</td>
<td>72</td>
</tr>
<tr>
<td>6.2.9 Lithic Material Distributions</td>
<td>73</td>
</tr>
<tr>
<td>6.3 Cultural Zone 7 Faunal Assemblage</td>
<td>75</td>
</tr>
<tr>
<td>6.3.1 Order Artiodactyla</td>
<td>77</td>
</tr>
<tr>
<td>6.3.2 Family Canidae sp</td>
<td>78</td>
</tr>
<tr>
<td>6.3.3 Order Lagomorpha</td>
<td>78</td>
</tr>
<tr>
<td>6.3.4 Order Rodentia</td>
<td>79</td>
</tr>
<tr>
<td>6.3.5 Order Primates</td>
<td>80</td>
</tr>
<tr>
<td>6.3.6 Burned Bone Distribution</td>
<td>81</td>
</tr>
<tr>
<td>6.3.7 Cut Marks</td>
<td>82</td>
</tr>
<tr>
<td>6.4 Discussion and Interpretations</td>
<td>82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 7</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Introduction</td>
<td>86</td>
</tr>
<tr>
<td>7.2 Terminal/Late Paleoindian Sites on the Northern Plains</td>
<td>87</td>
</tr>
<tr>
<td>7.2.1 The Boss Hill Site, Locality 2 (FdPe-4)</td>
<td>87</td>
</tr>
<tr>
<td>7.2.2 The Tuscany Site (EgPn-377)</td>
<td>89</td>
</tr>
<tr>
<td>7.2.3 The Hawkwood Site (EgPm-179)</td>
<td>90</td>
</tr>
<tr>
<td>7.2.4 The St. Louis Site (FfNk-7)</td>
<td>91</td>
</tr>
<tr>
<td>7.3 Comparison of Terminal/Late Paleoindian Sites</td>
<td>93</td>
</tr>
<tr>
<td>7.3.1 Site Locality</td>
<td>93</td>
</tr>
<tr>
<td>7.3.2 Faunal Assemblages and Subsistence Practices</td>
<td>94</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>7.3.3</td>
<td>Lithic Assemblages and Mobility Patterns</td>
</tr>
<tr>
<td>7.4</td>
<td>Early Middle Period Sites on the Northern Plains</td>
</tr>
<tr>
<td>7.4.1</td>
<td>The Hawkwood site (EgPm-179)</td>
</tr>
<tr>
<td>7.4.2</td>
<td>The St. Louis Site (FfNk-7)</td>
</tr>
<tr>
<td>7.4.3</td>
<td>The Below Forks Site (FhNg-25)</td>
</tr>
<tr>
<td>7.4.4</td>
<td>The Dog Child Site (FbNp-24)</td>
</tr>
<tr>
<td>7.4.5</td>
<td>The Atkinson Site (DiMe-27)</td>
</tr>
<tr>
<td>7.4.6</td>
<td>The Stampede Site (DjOn-26)</td>
</tr>
<tr>
<td>7.4.7</td>
<td>The Gowen I and II Sites (FaNq-25, FaNq-32)</td>
</tr>
<tr>
<td>7.5</td>
<td>Comparison of Early Middle Period Sites on the Northern Plains</td>
</tr>
<tr>
<td>7.5.1</td>
<td>Site Locality</td>
</tr>
<tr>
<td>7.5.2</td>
<td>Faunal Assemblages</td>
</tr>
<tr>
<td>7.5.3</td>
<td>Lithic Assemblages and Mobility Patterns</td>
</tr>
<tr>
<td>7.6</td>
<td>Discussions and Conclusions</td>
</tr>
<tr>
<td>8</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>8.1</td>
<td>Introduction</td>
</tr>
<tr>
<td>8.2</td>
<td>Methods</td>
</tr>
<tr>
<td>8.3</td>
<td>Significance of the Camp Rayner Site</td>
</tr>
<tr>
<td>8.3.1</td>
<td>Historical Value of the Camp Rayner Site</td>
</tr>
<tr>
<td>8.3.2</td>
<td>Cultural and Spiritual Value of the Camp Rayner Site</td>
</tr>
<tr>
<td>8.3.3</td>
<td>Scientific Value of the Camp Rayner Site</td>
</tr>
<tr>
<td>8.4</td>
<td>Impacts to the Camp Rayner Site</td>
</tr>
<tr>
<td>8.4.1</td>
<td>Shoreline Erosion</td>
</tr>
<tr>
<td>8.4.2</td>
<td>Pedestrian Activity</td>
</tr>
<tr>
<td>8.4.3</td>
<td>Future Development</td>
</tr>
<tr>
<td>8.5</td>
<td>Strategy Recommendations for Long Term Site Management</td>
</tr>
<tr>
<td>8.5.1</td>
<td>Recommendation #1: Formulation of an Official Community Plan</td>
</tr>
<tr>
<td>8.5.2</td>
<td>Recommendation #2: Provincial Heritage Designation</td>
</tr>
<tr>
<td>8.5.3</td>
<td>Recommendation #3: Shoreline Stabilization</td>
</tr>
<tr>
<td>8.5.4</td>
<td>Recommendation #4: Systematic Survey</td>
</tr>
<tr>
<td>8.5.5</td>
<td>Recommendation #5: Burial Management and First Nations Consultation</td>
</tr>
<tr>
<td>8.5.6</td>
<td>Recommendation #6: Public Education and Outreach</td>
</tr>
</tbody>
</table>
8.5.7 Recommendation #7: Continued Archaeological Analysis of the Camp Rayner Site. 143
8.6 Policy Recommendations for Long Term Site Management ........................................144
  8.6.1 Future Land Use and Development ........................................................................144
  8.6.2 Provincial Heritage Designation ...........................................................................144
  8.6.3 Camp Rayner Site Management and Restoration ....................................................145
  8.6.4 Public Access to the Camp Rayner Site ................................................................145
  8.6.5 Burial Management and First Nations Consultation .............................................146
8.7 Conclusions ................................................................................................................146

Chapter 9 ........................................................................................................................148

REFERENCES CITED .......................................................................................................151

Appendix A. Cultural Zone 6 Projectile Point Non-metric Analysis ..............................170
Appendix B. Cultural Zone 6 Projectile Point Metric Analysis ......................................170
Appendix C. Cultural Zone 6 Worked Tool Non-Metric Analysis .................................170
Appendix D. Cultural Zone 6 Worked Tool Metric Analysis ........................................171
Appendix E. Cultural Zone 7 Projectile Point Non-Metric Analysis ..............................171
Appendix F. Cultural Zone 7 Projectile Point Metric Analysis ......................................171
Appendix G. Cultural Zone 7 Worked Tool Non-Metric Analysis .................................172
Appendix H. Cultural Zone 7 Worked Tool Metric Analysis ........................................173
Appendix I. Cultural Zone 6 Faunal Analysis ................................................................175
Appendix J. Cultural Zone 7 Faunal Analysis ................................................................177
LIST OF TABLES

Table 4.1: Paleoecological studies of the Hypsithermal on the Northern Plains ..........................31
Table 5.1: Cultural Zone 6 NISP and MNI Totals ........................................................................53
Table 5.2: Cultural Zone 6 Burned bone distributions ...................................................................57
Table 6.1: Cultural Zone 7 NISP and MNI Totals ........................................................................75
Table 6.2: Cultural Zone 7 Burned Bone Distributions ...................................................................82
LIST OF FIGURES

Figure 1.1: Location of the Camp Rayner site (EgNr-2) .................................................................2
Figure 3.1: Satellite image of the Camp Rayner site and surrounding area (Information Services Corporation 2016) .....................................................................................................................15
Figure 3.2: Camp Rayner public field school site map (Belsham 2011) ........................................20
Figure 5.1: Cultural Zone 6 projectile points. a) Cat. #6734 b) Cat. #6733 .................................46
Figure 5.2: Cultural Zone 6 biface (Cat. #2063) ............................................................................47
Figure 5.3: Cultural Zone 6 utilized flakes a) Cat. #969 and 1990 b) Cat. #2065 ...........................48
Figure 5.4: Cultural Zone 6 Grinding Stone (Cat. #2388) ..............................................................49
Figure 5.5: Cultural Zone 6 Cores. a) Cat. #954 b) Cat. #4982 ......................................................50
Figure 5.6: Cultural Zone 6 Cores. a) Cat. #959 b) Cat. #7970 ......................................................50
Figure 5.7: Cultural Zone 6 lithic debitage material distribution ..................................................51
Figure 5.8: Cultural Zone 6 lithic tool material distribution ...........................................................52
Figure 5.9: Cultural Zone 6 Number of Identifiable Specimens Species Distribution .................53
Figure 5.10: Minimum Number of Individuals Species Distribution ...........................................54
Figure 5.11: Proximal canid humerus (Cat. #5945) from Cultural Zone 6 ..................................56
Figure 5.12: Cut marks (indicated by red arrows) exhibited on long bone fragments from a large mammal. a) Cat. #2923 b) Cat. #7917 ........................................................................................................58
Figure 6.1: Terminal/Late Paleoindian projectile points from Cultural Zone 7. a) Cat. #5155 b) Cat. #1932 c) Cat. #5156 d) Cat. #5154 .................................................................64
Figure 6.2: Cultural Zone 7 bifaces. a) Cat. #7435 b) Cat. #1903 c) Cat. #1904 d) Cat. #2682 ..............................66
Figure 6.3: Cat. #2995, Uniface recovered from Cultural Zone 7 ..................................................67
Figure 6.4: Scrapers recovered from Cultural Zone 7. Spurred Endscraper: a) Cat. #2853; Endscrapers b) Cat. #7450 c) Cat. #5126; End/sidescraper d) Cat. #2854 ..................................................68
Figure 6.5: Graver (Cat. #5159) recovered from Cultural Zone 7 ................................................69
Figure 6.6: a) Gouge (Cat. #2952) recovered from Cultural Zone 7 b) Gouge recovered from the Gowen II site ......................................................................................................................70
Figure 6.7: Grinding stone (Cat. #2857) recovered from Cultural Zone 7 ........................................71
Figure 6.8: Grinding stone (Cat. #1893) recovered from Cultural Zone 7 ..................................72
Figure 6.9: Utilized fragments recovered from Cultural Zone 7 a) Cat. #4798 b) Cat. #5157 c) Cat. #2975 d) Cat. #2944 ......................................................................................................................73
Figure 6.10: Cultural Zone 7 lithic debitage material distribution .................................................74
Figure 6.11: Cultural Zone 7 lithic tool material distribution ..........................................................74
Figure 6.12: Cultural Zone 7 Number of Identified Species Distribution ......................................76
Figure 6.13: Cultural Zone 7 Minimum Number of Individuals Species Distributions .............76
Figure 6.14: Lepus americanus specimens from Cultural Zone 7. a) Cat. #1849 b) Cat. #1848 c) Cat. #2043 ......................................................................................................................78
Figure 6.15: Specimen from immature Castor canadensis (Cat. #2962) ........................................79
Figure 6.16: Specimens identified as Homo sapiens. a) Cat. #671 b) Cat. #651 ..............................81
Figure 7.1: Locations of Terminal/Late Paleoindian and Early Middle Period sites on the Northern Plains .........................................................................................................................87
Figure 8.1: View West, Jack Hitchcock’s cabin at the Camp Rayner site ........................................120
Figure 8.2: View north, shoreline collapse along beachline immediately south of Camp Rayner site.

Figure 8.3: View west, shoreline collapse at western boundary of Camp Rayner site approximately 50 meters south of the burial site.

Figure 8.4: View west, photo indicating the proximity of the shoreline collapse to the David Greene Chapel.

Figure 8.5: View west, Hitchcock Bay community in relation to Camp Rayner site.

Figure 8.6: View north, Hitchcock’s Hideaway campground located north-west of the Camp Rayner site.

Figure 8.7: View west, established walking trail on the Camp Rayner site for pedestrian use.

Figure 8.8: Eastern side of Hitchcock’s cabin exhibiting degraded chinking.

Figure 8.9: Hitchcock’s cabin ceiling showing degradation.

Figure 8.10: Personal effects of Jack Hitchcock on display inside Hitchcock’s cabin.

Figure 8.11: Lithic scatter on beachline south of Camp Rayner site.

Figure 8.12: Astragalus from Large Ungulate located on the beachline south of Camp Rayner site.

Figure 8.13: Location of the Camp Rayner site (EgNr-2) in relation to EgNr-3, EgNr-4, EgN4-5, and EgNr-8 (Image source: Belsham 2011: Ch.1, p.2).

Figure 8.14: Floor plan of Camp Rayner burial; Unit 9 at 130 cmbs (Cahill 2012: 165).

Figure 8.15: Photo of the Camp Rayner burial (Cahill 2012: 166).
Chapter 1
INTRODUCTION: OUTLINE, OBJECTIVES, AND METHODOLOGIES

1.1 Introduction

The Camp Rayner site (EgNr-2) is a multicomponent archaeological site located on a former terrace of the South Saskatchewan River valley. Today, this terrace is a portion of the northern shores of Lake Diefenbaker, lying within central Saskatchewan in the Northern Plains region of North America (Figure 1.1). The site was first discovered during archaeological surveys of the South Saskatchewan River Basin Project, which set out to identify and record heritage resources which were to be impacted by the inundation of the South Saskatchewan River valley and the creation of Lake Diefenbaker (Mayer-Oakes and Pohorecky 1969).

Archaeological investigations at the site did not take place until 1987, when the Saskatchewan Archaeological Society (hereafter, SAS) used the site to host its annual public archaeological field school. Over the course of 11 field seasons, the SAS excavated a total of 54 m$^2$ units and recovered well over 39,000 artifacts. In 2012, Nathalie Cahill completed the analysis of the entire assemblage as part of her Master of Arts thesis, using the lithic and ceramic artifacts to reconstruct the cultural sequence at the site. Her analysis found that occupations at the Camp Rayner site ranged from the Terminal/Late Paleoindian period through to the Historic, or Post-Contact, period and provided a first look at the peoples occupying the site throughout time (Cahill 2012). Unfortunately, the methodologies utilized by the SAS field school limited Cahill’s stratigraphic analysis and recreation of the cultural sequence. This problem was compounded by the lack of natural stratigraphic separation and mixing of cultural materials in the upper four components at the site. Fortunately, the site’s lowest levels, Cultural Zones 6 and 7, which date to the Early Middle period and the Terminal/Late Paleoindian period respectively, were not affected by stratigraphic mixing and are well separated (Cahill 2012).
The Terminal/Late Paleoindian and Early Middle periods on the Northern Plains are considered to represent a culturally transitional time period within the Northern Plains cultural chronology. However, due to reasons which remain unclear to researchers, archaeological sites from this era are relatively rare, thus the cultural transitions which took place remain poorly understood. From data that is available, it would appear that earlier Paleoindian groups practiced the communal procurement of large-game fauna, such as bison (Bamforth 2002; Frison 1998). Further, lithic resource selection at this time reflects a preference for fine-grained, high quality stone, which was often transported from distant, or non-local sources (Bamforth 2002). By the Early Middle period, these practices have largely disappeared in favor of broad spectrum subsistence approaches and the utilization of locally available lithic materials (Frison 1998; Robertson 2004). Typically, archaeologists regard the environmental conditions at this time as the driving factor behind the cultural transition between the Early and Middle Precontact periods. From approximately 9,000 years before present (hereafter, BP) to 5,000 years BP a climatic event known as the Hypsithermal caused increased warmth and aridity on the Northern Plains (Yansa 2007). Accordingly, it is hypothesized that humans were forced to adapt to these new conditions and adopt new strategies to deal with decreased resource availability in the region.
While the role of the Hypsithermal is likely significant with regards to the transition between the Terminal/Late Paleoindian and Early Middle periods, the focus of this thesis is to compare the cultural lifeways between the two time periods in order to provide a comprehensive analysis of the manner in which this transition occurred. Given that the Camp Rayner site contains cultural components belonging to these two time periods, this site offers a rare opportunity to study this topic. Although these levels have been previously analyzed by Cahill (2012), the goal of this thesis is to reanalyze the Cultural Zones 7 and 6 materials in order to investigate the complex nature of the cultural transition between the Terminal/Late Paleoindian and Early Middle Precontact periods. By specifically focusing on the lithic and faunal remains recovered from these occupational components at the Camp Rayner site, the subsistence strategies and mobility patterns at the end of the Paleoindian period and the beginning of the Middle Precontact period can be better understood. Further, through comparing the Camp Rayner site to other sites from these time periods, the general patterns of cultural trends (ie: site location, subsistence strategies, lithic choice, mobility patterns) will be made apparent. Overall, through this study, the cultural processes of these time periods will become more fully understood and this “grey area” within the Northern Plains cultural chronology will be clarified.

Given the nature of the Camp Rayner site, it holds high value for the province of Saskatchewan, its First Nations cultures, and the discipline of archaeology as a whole. Sites which contain intact levels from the Terminal/Late Paleoindian and Early Middle periods, let alone an almost complete record of Northern Plains Precontact history, are comparatively rare on the Northern Plains. Furthermore, the historic components at the site represent the early Euro-Canadian settlers in Saskatchewan, who populated the region from the 18th to the early 19th centuries. As such, in addition to the research component for this thesis, a Heritage Resource Management Plan was formulated in an effort to establish recommendations and policies which will aid in ensuring the site’s long term survival. This plan focuses on the site’s provincial value as established by Saskatchewan’s Provincial Heritage Conservation Branch. It outlines the current natural and anthropogenic impacts affecting the site, and makes recommendations to mitigate future damage to the site. The ultimate intention for this portion of the thesis is to provide supporting documentation for the site’s heritage value, the impacts it faces, and guidelines to aid in its current and future preservation.
1.2 Thesis Outline

As described above, the first chapter of this thesis focuses on introducing the Camp Rayner site and the research that has been conducted so far. A brief outline of the components at the site has been provided, and the general objectives and goals for this thesis have been outlined. Chapter 2 details the biophysical environment of the region within which the Camp Rayner site is situated and describes the local geography and various floral and faunal species present in the area. Chapter 3 provides a more in-depth discussion of the history of research conducted at the Camp Rayner site, from its initial discovery in the 1960s to the full analysis of the cultural material recovered from the site’s multiple assemblages by Cahill (2012). Following this, Chapter 4 provides a full discussion of the paleoenvironmental context of the Hypsithermal-era on the Northern Plains and the various hypotheses regarding human adaptations to these changing environments. Included in this discussion is a general description of the lifeways and diagnostic artifacts of the Terminal/Late Paleoindian and Early Middle periods. An analysis of the faunal and lithic assemblages is provided for Cultural Zones 6 (Early Middle Precontact period) and Cultural Zone 7 (Terminal/Late Paleoindian period) in Chapters 5 and 6, respectively. This is followed by a comparative discussion in Chapter 7 regarding other sites with components dating to these two time periods in order to contextualize the Camp Rayner site assemblages and establish the specific cultural patterns in the Terminal/Late Paleoindian and Early Middle periods on the Northern Plains. Chapter 8 contains the Heritage Resource Management Plan for the site and details its heritage value, the impacts which are affecting its components, and makes recommendations for its future management. Finally, in Chapter 10, the findings of this thesis are summarized and conclusions regarding the findings are presented.

1.3 Thesis Methodologies

The Camp Rayner site collection is currently being housed at the Saskatchewan Archaeological Society’s office in Saskatoon, Saskatchewan. As this thesis is only focusing on Cultural Zones 6 and 7, only these materials were retrieved for analysis. Cultural Zone 6 materials ranged in depth between 75 and 85 cm below surface, whereas the depth range for Cultural Zone 7 is between 95 and 115 cm below surface. Accordingly, all lithic and faunal material recovered from 75 cm below surface and deeper was retrieved from the collection and organized into a catalogue based on the respective cultural zones. This catalogue was adapted
from the master catalogue created for the site using Microsoft Excel 2013. Given that the master catalogue provides only a basic analysis of the faunal and lithic material recovered from the Camp Rayner site, it was necessary to reanalyze the material to record the qualitative and quantitative data needed for the goals of this thesis. Furthermore, although Cahill (2012) provided a comprehensive analysis of materials recovered from these levels, this analysis was relatively broad and focused on the entire assemblage recovered from the Camp Rayner site. Thus, a reanalysis of the materials recovered from Cultural Zones 6 and 7 was deemed necessary in order to provide a more in-depth look at these occupational components.

1.3.1 Lithic Analysis

The lithic materials recovered from Cultural Zones 6 and 7 at the Camp Rayner site were identified as either debitage, fire-cracked rock (FCR), cores, or worked tools. Material types were identified using Johnson’s (1986) Properties and Sources of Some Saskatchewan Lithic Materials of Archaeological Significance and the University of Saskatchewan’s Department of Archaeology and Anthropology’s comparative lithic collection. For the entire lithic assemblage, including debitage and worked tools, the material types identified were then quantified.

Qualitative and quantitative analyses of flaked tools and projectile points were adapted from Cahill (2012). Qualitative analyses of projectile points included noting the portions present, the lithic material type and colour, material modifications, the longitudinal and transverse cross section of the point, its symmetry, type of notching present (if any), basal margin modification, and basal margin shape. Metric, or quantitative, analysis of projectile points included measuring the point’s maximum length, width, and thickness, as well as the maximum body length, width, and thickness. Additional measurements of projectile points included the inter-notch width, the notch depth, as well as notch width, and length from the base. Some of these measurements were inapplicable depending on the morphology of the projectile point being analyzed. Worked tools other than projectile points also underwent qualitative analysis, which noted the lithic material used to construct the tool, the tool type and portion present, its shape, method of manufacture, location of the working edge, and the shape of its longitudinal and transverse cross sections. Quantitative measurements taken of worked tools included the maximum length, width, and thickness, as well as the length of the tool’s working edge.
1.3.2 Faunal Analysis

All faunal material recovered from Cultural Zones 6 and 7 was analyzed in order to determine the presence and frequencies of taxa in these assemblages. When possible, the corresponding element was identified and sided, and all complete elements and partial fragments were counted and weighed. Where necessary, identification was aided through consultation with the Department’s comparative collection and through the guidance of Dr. Ernest G. Walker. All faunal specimens were sorted into the most specific taxonomic categories possible. When possible, for taxonomic categories broader than Family or Genus, specimens were further subdivided based on size (large, medium, or small). Following the identification of the faunal assemblages from Cultural Zone 6 and 7, quantities such as Minimum Number of Individuals (MNI) and Number of Identifiable Specimens (NISP) were calculated in order to determine the relative frequencies of each taxa within the collection. Qualities such as cultural modifications in the form of cut marks and burning were also recorded. This was done in order to determine the frequencies of burned versus non-burned specimens, as well as bones exhibiting butchering marks versus those that do not. The presence or absence of such markers is indicative of activities taking place at the site.

1.3.3 AMS Dating

Two bone samples were sent in to Beta Analytic Radiocarbon Dating lab in Florida for standard AMS radiocarbon dating of Cultural Zones 6 and 7. These components had been previously radiocarbon dated by Cahill (2012), however, it was determined that additional AMS dating was necessary to more accurately establish the time frame for these occupational layers. Unfortunately, the sample which was submitted for Cultural Zone 6 produced a date which did not conform to the time frame of the Early Middle period. Instead, the date produced was much earlier and fell within the established time frame for the Terminal/Late Paleoindian period. Therefore, the two samples submitted for AMS dating were incorporated into the established dates for Cultural Zone 7. Cahill’s (2012) radiocarbon dates were also incorporated into the analysis.
1.3.4 Inter-site Comparison

Lastly, in order to understand the general cultural trends taking place during the Terminal/Late Paleoindian and Early Middle Precontact periods, it is necessary to compare the components of the Camp Rayner site to other archaeological sites dating to these time periods. Characteristics such as site location, and the frequencies of faunal species and lithic material types will be considered in this comparison. These attributes of a site will reveal much regarding the complexities of this cultural transition and the degree to which the cultural practices from the Terminal/Late Paleoindian differed from the Early Middle period. It must be noted that comparative sites must be of similar type to the Camp Rayner site. Consequently, only sites identified as habitation sites and situated within the Northern Plains region are included for comparison.
Chapter 2

BIOPHYSICAL RESOURCES OF THE LAKE DIEFENBAKER AREA

2.1 Introduction

The Camp Rayner site is located within the northern-most extent of the Great Plains of North America, known as the Northern Plains. The region of the Northern Plains where the site is situated is called the Mixed Grassland ecoregion of Saskatchewan which is characterized by mid-grasses, such as wheatgrass and speargrass, and short-grass, such as blue grama grass (Acton et al. 1998). In total, the Northern Plains covers 1,530 kilometers (km) running north to south and 800 km east to west, occupying the area between the foothills of the Rocky Mountains of the west and the 100th meridian in the east. The North Platte River of Wyoming and Nebraska marks the southern-most extension of the Northern Plains, where the northern boundary is located at the transition between the grasslands and the Boreal Forest in Alberta, Saskatchewan, and Manitoba (Barker and Whitman 1998). Lake Diefenbaker is located in the heart of the Northern Plains in the South Saskatchewan River valley sitting at an elevation of 1,000 feet above sea level, and surrounded by uplands extending 2,000 feet above sea level (Richards and Fung 1969).

Underlying the topology and influencing the general layout of the Lake Diefenbaker region of the Northern Plains is Cretaceous bedrock belonging to the Bearpaw Formation consisting of sandstone, shale, marine and non-marine conglomerates, coal, and bentonite (Richards and Fung 1969). The flat, hummocky terrain, also referred to as “dead-ice moraine”, overlying the bedrock is indicative of the glacial processes which affected the region during the Pleistocene (Klassen 1988). Much of the modern topography of the Northern Plains and the local area surrounding what is now Lake Diefenbaker is a result of such processes, where large amounts of rock and soil were transported and deposited upon the landscape as glacial till, stratified drift, and large, unsorted erratics (Barker and Whitman 1998).

2.2 The Sand Hills Region of Saskatchewan

The sand hills of Saskatchewan represent a key component of the study area and are located on the southern side of the South Saskatchewan River valley. As such, they warrant further discussion to establish the biophysical resources of the Camp Rayner archaeological site.
The sand hills are a unique feature of the Northern Plains landscape, containing varied resources which supplement those already found in prairie habitats (Cahill 2012). Covering an area of 1,911 km$^2$ in southwestern Saskatchewan, this sub-region within the Northern Plains is quite dry and precipitation rarely produces surface run-off, percolating instead through the soils to the underlying water table. Despite this, the sand hills support a wide variety of floral and faunal species within a contained area (Townley-Smith and Epp 1980).

The sand hills were formed approximately 4,000 years ago and are an accumulation of large grained sedimentary particles initially deposited through post-glacial delta formation processes and then shaped by aeolian forces (Christiansen 1995). Some of these features continue to expand and move even today, where lack of vegetative cover prevents the stabilization of sediment. These sand hills are referred to as active, whereas sand hills which support plant life and are thereby inhibited by root growth are stabilized. The latter type predominate the Saskatchewan sand hills region, supporting a wide variety of floral and faunal resources. Plant life contained in the sand hills region consists of native prairie grasses (Poaceae), creeping juniper (Juniperus horizontalis), cacti (Cactaceae), and small shrubs such as saskatoon (Amelanchier alnifolia), chokecherry (Prunus virginiana), and silver sage brush (Artimisia cana). Animal life supported by the sand hills is also unique and varied, consisting of large mule deer populations (Odocoileus hemionus), sharp-tailed grouse (Tympanuchus phasianellus), antelope (Antilocapra americana), Ord’s kangaroo rat (Dipodomys ordii), Common poorwill (Phalaenoptilus nuttallii), and Plain’s spadefoot toad (Spea bombifrons) (Townley-Smith and Epp 1980). As such, the Saskatchewan sand hills represent stable islands on the Northern Plains (Neal 2006).

2.3 Soils and Sedimentology

The Mixed Grassland ecoregion of Saskatchewan primarily consists of brown chernozemic soils, characterized by relatively low levels of organic matter resulting from rapid rates of decomposition in this relatively arid region of the province (Acton et al. 1998). A gray reddish-brown layer, void of calcium and magnesium carbonates, separates this upper layer from its parent material, which is a grayish-brown layer (Acton et al. 1998). Soils tend to differ between areas of high and low elevation. On upper slopes, soils are generally thinner and lower in organic matter, and tend to consist of dark brown soils. However, on lower slopes, soils
become progressively thicker and higher in organic matter, as a result of higher levels of moisture and plant growth. Dark brown soils are also present on these lower slopes (Acton et al. 1998).

Throughout the Lake Diefenbaker region, three separate sedimentary layers are characterized based on their grain size and structure. The deepest of these, extending 4 to 5 m below the surface, is described as sandy gravels mixed with clay. Above this layer, extending 3 to 4 m below the surface, are stratified silts which are covered by the third layer of unstructured silts and sands (Hendry 1995). These sediments are typical of grassland environments and are sourced from glacial, alluvial, and aeolian processes.

Areas of distinct sedimentary type can be differentiated based on numerous influencing factors within the Lake Diefenbaker region. On the upland plains surrounding the river valley, sediments of variable texture predominate. These are separated into differential layers of strata representing separate deposition over long periods of time. Along the southwestern border of the South Saskatchewan River valley, undifferentiated sand and gravel characterize this region. In this area, very little profile and soil development has occurred. Finally, in areas of depression overlain by aspen and willow trees, bluff podzols predominate and are variable based on their development and parent material (Mitchell et al. 1944).

2.4 Climate and Precipitation of the Northern Plains

2.4.1 Climate

The climate regime within which Lake Diefenbaker and the Camp Rayner site are situated falls between the sub-humid continental climate and the semi-arid climatic regime (Barker and Whitman 1998; Richards and Fung 1969). As this region predominantly consists of low relief landscape, there are no natural barriers that aid in controlling the weather. Accordingly, this region experiences a wide variety of weather patterns with marked seasonal variation controlled by both maritime and continental systems (Hare and Thomas 1979). Temperatures tend to be higher on plains at lower elevations to the north than the higher plains and plateaus located to the south (Acton et al. 1998). Annually, the mean daily temperature averages at 4°C and ranges from a mean temperature of 18.9°C in July and -12.6°C in January (Acton et al. 1998). However, it is not unusual for summertime maximums to hit 38°C and wintertime lows to drop to -40°C (Hare and Thomas 1979). Along with summer, both fall and spring are relatively short seasons on the
Northern Plains with variable temperatures consistent with transitional seasons (Hare and Thomas 1979).

2.4.2 Precipitation

Given that the climatic environment within which Lake Diefenbaker is situated is not characterized by high humidity, precipitation levels are relatively light. The highest levels of precipitation occur in the summer, however, periods of drought are not uncommon on the Northern Plains (Barker and Whitman 1998). Annually, the Mixed Grasslands ecoregion of the Northern Plains sees approximately 352 mm of rainfall, with an average of 219 mm falling between May and September (Acton et al. 1998). The winter months mark the driest time of the year for the Northern Plains where precipitation levels can drop to less than 12 mm on average (Hare and Thomas 1979).

2.5 Geochronology and Glacial History of the Northern Plains

Approximately 600 million years ago, the surface of this region was composed primarily of Precambrian bedrock formed from igneous lithic materials sourced from volcanic activity. From that time, up until 100 million years ago, a series of inundations by the surrounding sea deposited layers of sedimentary rock and evaporites over the Precambrian bedrock to a thickness of 1,500 to 1,700 meters (Pentland 1980). The Cretaceous sea which covered the Northern Plains and the Rocky Mountains region 100 million years ago spread from the Arctic Ocean to the Gulf of Mexico (Barker and Whitman 1998). It was at this time, from the Mesozoic to the Cenozoic eras, that the present geological formation underlying Lake Diefenbaker, known as the Bearpaw Formation, was formed. This formation is composed of alternating layers of deposits originating from both marine and non-marine sources. From the sea, finely grained deposits of clay and soil formed impervious shales. During times when the region was exposed above sea level, coarser grained materials such as sand and silt formed layers of pervious sandstone. During the Tertiary period of the Cenozoic era, additional layers of sediment were deposited over the Bearpaw Formation, resulting in the present form of this geological feature (Pentland 1980).

After the Tertiary period, global climates began to deteriorate resulting in a series of glaciations during the Quaternary period. These glaciations scoured the landscape, picking up
and depositing the present day sedimentary layers of the Northern Plains (Pentland 1980). This period is generally separated into two major epochs: the Pleistocene, beginning 3 million years ago and lasting until approximately 10,000 years ago, and the Holocene, which began at the end of the Pleistocene and marked the end of glaciations in North America (Kupsch 1969).

During the Pleistocene, the periods of glaciation are subdivided into the Nebraskan, Kansan, Illinoian, and the Wisconsinan. Each of these are separated based on interglacial periods of ice-sheet retreat and advance (Kupsch 1969). During the period of the Wisconsinan glaciation, the Laurentide ice-sheet covered much of the Canadian Shield and extended as far south as the present day Ohio and Missouri Rivers. This period reached its maximum 23,000 to 17,000 years before present, after which withdrawal of the Laurentide glacier began (Christiansen 1995; Klassen 1994). According to Klassen (1994), the withdrawal of the Late Wisconsinan Laurentide ice-sheet from southwestern Saskatchewan can be separated into four major phases, the first of which began approximately 18,000 years ago. At this time, the maximum extent of the ice sheet followed the moraine belts which bordered the uplands of the Cypress Hills and Wood Mountains. Between 18,000 and 15,000 years before present, the ice-sheet readvanced near to its original position prior to deglaciation, after which it retreated back to the western portion of the Cypress Hills and the southern margin of the Frenchman Plain by 15,000 BP (Klassen 1994). By 14,000 BP, which represents the third phase of deglaciation, average temperatures had begun to increase resulting in extensive downmelting and retreat of the ice sheet from the uplands and surrounding plains region. Finally, by approximately 13,500 years BP, southwestern Saskatchewan was mostly ice-free, apart from the northwestern portion of the Cypress Lakes region and the northeastern portion of the Wood Mountains region (Klassen 1994). The events of this deglaciation created the present day landforms which characterize this region of Saskatchewan (Acton et al. 1998).

2.6 Flora and Fauna of the Mixed Grasslands Ecoregion

2.6.1 Flora

In the Mixed Grasslands ecoregion of the Northern Plains, mid-grasses and short grasses are the predominant plant type. Loamy soils tend to support both types of grasses, whereas sandy landscapes are characterized by a unique mix of grasses and shrub (Acton et al. 1998). Species
which proliferate in the Lake Diefenbaker region include porcupine grass (*Stipa spartea*), wheatgrass (*Agropyron dasystachyum*), spear grass (*Stipa comata*), blue grama (*Bouteloua gracilis*), June grass (*Koeleria cristata*), and fescue (*Festuca scabrella*) (Acton et al. 1998; Coupland and Rowe 1969).

Given the sandy nature of the soils where the Camp Rayner site is located, the area is also populated with species of forbs, shrubs, and various trees. Forbs species include sage (*Artemisia frigida*), Canada anemone (*Anemone canadensis*), dotted blazingstar (*Liatris punctata*), sarsaparilla (*Aralia nudicaulis*), skeleton weed (*Lygodesmia juncea*), and northern bedstraw (*Galium boreale*). Of the shrubs, creeping Juniper (*Juniperus horizontalis*), Saskatoon berry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), and rose (*Rosa woodsii*) predominate. Finally, dominant tree species include Manitoba maple (*Acer negundo*), willow (*Salix interior*), green ash (*Fraxinus pennsylvanica*), and common juniper (*Juniperus communis*) (Abouguedia et al. 1981; Brown 1985; Richards and Fung 1969).

### 2.6.2 Fauna

Due to modern farming practices, grassland animals in the Lake Diefenbaker area have found refuge in the South Saskatchewan River valley composing a diverse and unique faunal population. After European contact on the Northern Plains, a number of these animal species were driven from the region or to extinction. Former inhabitants include bison (*Bison bison*), wolf (*Canis lupus*), bear (*Ursus spp.*), wolverine (*Gulo gulo*), moose (*Alces alces*), and wapiti (*Cervus elaphus*) (Banfield 1974; Dyck and Morlan 1995). Bison proliferated on the Northern Plains in droves prior to European arrival on the plains, as documented in the Louis and Clark expedition in the early 19th century (Kirby 2010).

Modern species inhabiting the Lake Diefenbaker region are highly typical of prairie grassland environments, characterized by a mix of mammalian, avian, reptilian, and fish species. Mammalian species represented include herbivores, insectivores, and carnivores. Herbivorous species are represented by ungulates, and include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and pronghorn (*Antilocapra americana*) (Acton et al. 1998; Wapple 1999). Insectivores are represented by species of shrews, bats, and various rodents and are too numerous to mention individually. Carnivorous mammals represented on the plains include the coyote (*Canis latrans*), swift fox (*Vulpes velox*), red fox (*Vulpes vulpes*), striped
skunk (*Taxidea taxus*), least weasel (*Mustela nivalis*), and cougar (*Felis concolor*) (Acton et al. 1998; Dyck and Morlan 1995; Wapple 1999).

Avifauna populations inhabiting the plains include numerous migratory and non-migratory species. Migratory birds include the grebe (*Podiceps* sp.), Canada goose (*Branta canadensis*), and duck (*Anas* sp.) (Godfrey 1966). Of the non-migratory birds, various Northern Plains species inhabit the Lake Diefenbaker region. Raptors include the red-tailed hawk (*Buteo jamaicensis*), Swainson’s hawk (*Buteo swainsoni*), bald eagle (*Haliaeetus leucocephalus*), and snowy owl (*Bubo scandiacus*). Of the non-carnivorous, non-migratory species on the Northern Plains, the American bittern (*Botaurus lentiginosus*), black-capped chickadee (*Poecile atricapillus*), cliff swallow (*Hirundo pyrrhonota*), killdeer (*Charadrius vociferus*), and piping plover (*Charadrius melodus*) can also be found in the Lake Diefenbaker region (Godfrey 1966).

Species of fish found in Lake Diefenbaker and the South Saskatchewan River include the lake sturgeon (*Acipenser*), goldeye (*Hiodon alosoides*), sauger (*Sander canadensis*), burbot (*Lota lota*), northern pike (*Esox lucius*), walleye (*Sander vitreus*), and yellow perch (*Perca flavescens*) (Acton et al. 1998). Regarding reptiles and amphibians inhabiting this region of the Northern Plains, five species of snake, six species of frog and toad, one species of turtle, and one species of salamander can be found (Acton et al. 1998). Species which are specific to the Lake Diefenbaker region include the tiger salamander (*Ambystoma tigrinum*), plains spadefoot (*Scaphiopus bombifrons*), western garter snake (*Thamnophis elegans*), and bull snake (*Pituophis catenifer sayi*) (Didiuk 1999).
3.1 Study Area: Lake Diefenbaker and the South Saskatchewan River Valley

Prior to discussing the Precontact components of the Camp Rayner site, it is important to understand the history of development of the region and the discovery of the site itself. The land on which the Camp Rayner site is situated spans portions of LSD 9 and 16 of 13-24-7-W3M and LSD 12 and 13 of 18-24-6-W3M (Belsham 2011). This land is currently provincial Crown land which is leased and cared for by Reinie and Barbara Janke. The Jankes own a parcel of land situated immediately northwest of the Camp Rayner site, where they run a private campground known as “Hitchcock’s Hideaway (Figure 3.1).

Figure 3.1 Satellite image of the Camp Rayner site and surrounding area (Information Services Corporation 2016)

Known as the largest lake in southern Saskatchewan, Lake Diefenbaker is a long, narrow body of water confined within the valleys and coulees of the South Saskatchewan River system (Saskatchewan Water Security Agency 2012). The lake covers an approximate area of 17,400 km², with a mean depth of 22 meters and a maximum depth of 58 meters in certain areas (WaterWolf Planning Commission 2008; Saskatchewan Water Security Agency 2012).
Currently, it acts as a tourist destination, irrigation reservoir, hydroelectric power source, water source for municipalities and industries, and means of flood control (Saskatchewan Water Security Agency 2012).

Lake Diefenbaker is a modern component within the South Saskatchewan River system, formed from the implementation of the South Saskatchewan River Project (hereafter, SSRP) which began in 1958 and was completed in 1970 (Saskatchewan Water Security Agency 2012). The project was proposed by Saskatchewan’s Prairie Farm Rehabilitation Administration (PFRA), with the intentions of utilizing the South Saskatchewan River for irrigation, hydroelectric power, and supplying surrounding municipalities with water (Kulshreshtha et al. 1988). The region of Saskatchewan within which Lake Diefenbaker is situated was historically arid and the inhabitants of the region depended on the South Saskatchewan River as a reliable water source (Kulshreshtha et al. 1988). Thus, the South Saskatchewan River Project would improve the quality of the land by raising its production capacity with a stable supply of irrigation from the resulting reservoir of Lake Diefenbaker (Pentland 1980).

From 1943 and 1957 to 1960, the PFRA conducted numerous studies along the South Saskatchewan River to determine the location and design for the earth filled dams (Himour 1997). The first, named the Gardiner Dam, was to be constructed approximately 100 km upstream from Saskatoon, and the second, the Qu’Appelle Dam, was to be constructed 19 km east of the town of Elbow, Saskatchewan (Pentland 1980). In 1950, the PFRA submitted the final reports to the Canadian Government and in 1958, an agreement was reached which began the 10 year construction period and development of the South Saskatchewan Reservoir, later renamed Lake Diefenbaker (Himour 1997).

The waters of the Saskatchewan River system originate in the Rocky Mountains and Foothills of southern Alberta and northern Montana and are carried by three river systems, the Oldman River, the Bow River, and the Red Deer River, before joining with the South Saskatchewan River (Pentland 1980). Prior to the implementation of the SSRP, the South Saskatchewan River followed a perennial course that flowed in a general southwest to northeast direction (Himour 1997). The valley itself was characterized by a flat floor and slopes formed from colluvial debris resulting in banks that are easily eroded (Rasid 1974). The walls of the valley extended between one to several kilometers in width and certain locations were characterized by large floodplains and oxbow lakes (Germann 1989). Following the construction
of the dams, the regime of the South Saskatchewan River was greatly changed. The implementation of the reservoir caused the inundation of over 10 vertical meters of land within the South Saskatchewan and Aitkow Creek valleys, along with complete flooding of tributary channels and gullies (Himour 1997).

3.2 The Camp Rayner Site: A History of Research

3.2.1 South Saskatchewan River Project Heritage Study 1958-1960

As the flooding of the South Saskatchewan River basin was to affect a considerable amount of land, one of the goals of the SSRP was to identify and record heritage sites which were situated within the area. Mandates from the National Museum of Canada and the Saskatchewan Museum of Natural History sought to record archaeological sites to be affected and provide a record to aid in the interpretation of the Precontact history of southern Saskatchewan (Mayer-Oakes and Pohorecky 1969). From 1958 to 1960, field crews from both the national and provincial museums utilized various multi-disciplinary approaches to locate and record heritage resources situated within the affected area (Mayer-Oakes and Pohorecky 1969). Though roughly 2,500 sites had previously been recorded in the area, a considerable amount had yet to be identified. Over three successive field seasons, 181 archaeological sites were recorded within the 500 km² area encompassed by the SSRP and two salvage operations were conducted. According to Himour (1997), the extensive area of land to be surveyed placed severe limitations on the degree to which sites could be tested or identified. At the close of the project, the identified cultural components ranged from approximately 9,000 BP to the late 19th century (Mayer-Oakes and Pohorecky 1969). Though the SSRP could not undertake in-depth analysis of every site, many of those identified are considered potential candidates for future analysis (Himour 1997).

3.2.2 South Saskatchewan River Basin Study 1989

In 1986, Environment Canada and the Saskatchewan Water Corporation agreed to undertake a planning study of the South Saskatchewan River basin following the implementation of the SSRP and inundation of Lake Diefenbaker. As part of this planning study, it was agreed that a more thorough understanding was needed regarding the effects of water management strategies on the heritage resources located in the area (Germann 1989). The intentions of this
report were to “enable reasonable determinations concerning whether or not, how, and to what extent, water management practices and future developments might affect heritage sites” (Germann 1989: 3). Overall, this study was guided by three objectives:

1. “generally describe the heritage sites of the basin, including their common characteristics and current or potential uses;
2. Identify how present and future water management practises affect heritage sites;
3. Identify and map the heritage resource potential of the basin based on current knowledge; and
4. For each heritage-sensitive zone, define appropriate management objectives including what level of treatment may be needed to locate, conserve, or salvage sites in advance of development.” [Germann 1989: 2-3].

Using predictive modelling of prehistoric human settlement, along with information from bison behaviour studies, and biological, geological, ethnohistoric, and ethnographic sources, the report outlined zones within the area which were likely to be heritage sensitive. Additionally, the report provided a summary of resources which were already known in the area and an assessment of impacts affecting the sites with management strategies for heritage sensitive zones (Germann 1989).

### 3.2.3 Archaeological Reconnaissance of the Lake Diefenbaker Region: 1995-1996

From 1995 to 1996, Himour (1997) conducted a 35 km survey along the eastern margins of Lake Diefenbaker in an attempt to assess the impact of the lake on the heritage resources in the region and provide strategies to aid in the preservation of these sites. In total, he identified 18 additional archaeological sites, consisting of 12 Precontact and six Post-Contact components, and provided an updated reconstruction of the cultural history of the region. As with the SSRP heritage study, Himour’s survey demonstrated that cultural occupations in this region extend from the Paleoindian to the Post-Contact period. This includes cultural components dating to time periods within the Northern Plains cultural chronology that remain poorly understood.

Based on Himour’s study, the region surrounding Lake Diefenbaker has high potential to aid in filling in the gaps of knowledge regarding North America’s Precontact past. Unfortunately, the lake itself threatens the integrity of many of these sites, including the Camp
Rayner site. Prior to the construction of the Gardiner and Qu’Appelle dams, the South Saskatchewan River valley was relatively stable, however, this was greatly changed following the inundation of Lake Diefenbaker. Erosion of the lake’s shoreline is a continual process and threatens to damage or destroy many of the sites in its vicinity. Accordingly, ongoing mitigation and monitoring of these sites by provincial government and corporations is necessary in order to prevent the loss of the region’s heritage resources (Himour 1997).

3.2.4 Camp Rayner Public Field School

From 1987 to 1997, the Saskatchewan Archaeological Society hosted their annual public field school at the Camp Rayner site (Belsham 2011). Given the need for an extensive salvage archaeology operation, and with the facilities needed to house participants located a convenient distance away from the operations, the Camp Rayner site was well suited for this purpose. The SAS’s archaeological investigations and public field school at the Camp Rayner site were guided by three objectives. The first was to provide an opportunity for avocational archaeologists to excavate and handle in situ archaeological materials, allowing them to increase their awareness of the importance of these heritage resources, and develop skills which are useful to Saskatchewan archaeology (Jones et al. 1998: 28). Secondly, the Camp Rayner public field school aimed to “discover scientific, contextual information about a large and important Saskatchewan archaeological site which has been subjected to severe erosion and undocumented collecting activities” (Jones et al. 1998: 28). Lastly, the public field school was to undertake a “salvage or rescue archaeology” program at the Camp Rayner site, carrying out “excavation, limited surface selection, and locating and documenting previously amassed collections from the site” (Jones et al. 1998: 28).

The public field school was under the leadership of Tim Jones who was the Executive Director of the SAS at the time and the permit holder for the project. Over the course of 11 field seasons and 88 days of field work, a total of 325 people excavated 54 one meter square units to an average depth of 110 cm below surface (Belsham 2011). These units were contained within 11 subareas, which were determined based on the topographical setting (See Figure 3.2). According to Belsham (2011), this type of sampling selection was not completely random, nor was it completely judgemental. Levels were excavated in 5 cm or 10 cm arbitrary increments and
screened with ¼ inch mesh. Excavators were not entirely consistent with their usage of arbitrary levels, switching between 5 cm and 10 cm increments within the same unit (Cahill 2012).

Figure 3.2: Camp Rayner public field school site map (Belsham 2011)

In total, the field school at the Camp Rayner site amassed approximately 39,713 artifacts which were catalogued and stored at the SAS office in Saskatoon, Saskatchewan. From these excavations, it was determined that the occupation layers at the site represent approximately 9,000 years of North American history (Belsham 2011; Jones et al. 1998). It is not currently known how expansive the Camp Rayner site is, or whether or not archaeological sites located within close proximity (EgNr-3, EgNr-4, and EgNr-5) are interconnected in some manner (Belsham 2011; Jones et al. 1998). From Jones et al.’s (1998) report on the Camp Rayner excavations, it is believed that the site may extend approximately 500 meters east to west and 200 to 300 meters north to south. However, no systematic survey has ever been completed to determine the true site boundaries (Belsham 2011).

3.2.5 Proposal for Reservoir Development and ARM In-House Field Inspection: 2008 & 2010

In the September 20, 2008 issue of the Saskatoon Star Phoenix, a Notice of Intention was printed outlining a proposal to change the land on which Camp Rayner is situated from an “Institutional Recreation Zone” to a “Residential Recreation Zone”. According to a letter sent
from the Saskatchewan Archaeological Society to the Honourable Nancy Heppner, Provincial Minister of Environment, there were concerns that this change of status would adversely affect the Camp Rayner site (SAS President Jeff Baldwin to Honourable Nancy Heppner, letter, 30 September 2008, Saskatchewan Archaeological Society, Saskatoon). Initially, the Notice of Intention was misinterpreted to mean that the change in land status would lawfully allow for large-scale development without approval from the Saskatchewan Heritage Branch (Belsham 2011). Such was not the case, as clarified by the Saskatchewan Heritage Branch, and any development which was proposed to take place on the land would still “be required to proceed with the Branch’s approval process…[depending] on the nature of the development” (SAS President Jeff Baldwin to Honourable Nancy Heppner, letter, 2 October 2008, Saskatchewan Archaeological Society, Saskatoon).

In 2010, Nathan Friesen, Senior Archaeologist for the Saskatchewan Heritage Resources Branch, conducted an Archaeological Resource Management In-House Field Inspection of the Camp Rayner site following a proposal by Barbara and Reinie Janke to purchase the parcel of land, Parcel A (NE 13-24-7-W3M), lying adjacent to the site. As the Camp Rayner site is considered a Site of Special Nature (SSN), which grants it certain legislative protection, the Saskatchewan Heritage Branch required that an archaeological assessment be conducted for this purchase to be approved (Friesen 2010). In particular, the Heritage Branch was concerned that the human burial uncovered in 1987 by the SAS public field school was located within the boundaries of the parcel of land to be sold. Following his inspection, Friesen concluded that Parcel A did not contain extensive archaeological material and the burial was located approximately three meters south of the parcel boundary (Friesen 2010). As such, no sufficient evidence was found to deny the sale of this parcel of land, though it would continue to remain heritage sensitive and any development proposals would require approval by the Heritage Resources Branch of Saskatchewan (Friesen 2010).

3.2.6 Final Reporting and Analysis of Camp Rayner Assemblage: 2011 & 2012

Given budgetary constraints and limited resources, complete analysis and reporting of the Camp Rayner assemblage was not undertaken for some time after the close of the Camp Rayner public field school (Cahill 2012). In 2011, Leanne Belsham, with assistance from Tim Jones, completed the final report for the Camp Rayner site public field school. This report provides a
technical synthesis of the archaeological excavations carried out between 1987 and 1997 and a brief overview of the environmental and historical context of the South Saskatchewan River basin. This includes a comprehensive, but primary level of investigation of the artifacts recovered during the public field school (Belsham 2011). Belsham (2011) also underlined the importance of the Camp Rayner site and formulated recommendations regarding the future management of this heritage resource. These include conducting a comprehensive and systematic heritage resource impact assessment, allowing access to the assemblage for future and more in-depth research, and undertaking consultation with local First Nations groups (especially with regards to the human burial). Further recommendations include stabilizing the Lake Diefenbaker shoreline, and nominating the Camp Rayner site for Provincial Heritage Site status (Belsham 2011).

The first in-depth analysis of the Camp Rayner assemblage was conducted by Nathalie Cahill (2012). As cultural levels for the site were not established during the public field school, Cahill undertook the substantial task of organizing the lithic, ceramic, and faunal assemblages into “Cultural Zones” based on their depth and associated diagnostic artifacts. This goal was particularly difficult as the stratigraphy for the site was not determined across the entire area and the depths of occupation levels varied between units. Using ceramic artifacts and lithic tools as proxy indicators, Cahill reconstructed the entire cultural sequence at the Camp Rayner site. Based on these findings, cultural occupations at the Camp Rayner site span most of the Northern Plains cultural chronology, with the lowest levels, labelled Cultural Zone 7, dating to the Terminal/Late Paleoindian period (Cahill 2012). The author provides some initial interpretations for each level and offers the first look at the cultural components within the Camp Rayner site. Like Belsham (2011), Cahill (2012) concludes by outlining the cultural, scientific, and historical importance of the Camp Rayner site, and offers recommendations and strategies to aid in its long-term preservation.

3.3 Conclusions

Overall, the history of the Camp Rayner site indicates the importance of this heritage resource and its potential for revealing aspects of the Northern Plains cultural chronology which remain unknown. From the excavations undertaken during the SAS public field school and the analysis by both Belsham (2011) and Cahill (2012) of the archaeological materials recovered, it is
clear that research on this site and its components should continue. Although all of the site’s components have the potential to add to our understandings of Precontact cultures on the Northern Plains, this is especially true for the site’s deepest components which are the most stratigraphically intact.
4.1 Introduction

The deepest components at the Camp Rayner site represent a time period within the Northern Plains cultural chronology that is comparatively lacking in archaeological data. From what is known, by approximately 9,000 years BP the archaeological record reflects a marked shift in the technologies and lifeways of human groups occupying the Northern Plains. Within the Northern Plains Precontact cultural chronology, this transition occurs between the Late/Terminal Paleoindian (8,500 to 7,500 BP) and Early Middle Precontact (7,500 to 5,000 BP) periods and coincides directly with a period of environmental change characterized by episodic aridity and warmth first described by Swedish geologist, Ernst Antevs, in 1948. Initially, Antevs (1952) divided this time period into three climatic phases: the Anathermal (7,000 to 5,000 BC), the Altithermal (5,000 to 2,500 BC), and the Medithermal (2,500 BC to present). The term “Altithermal” was first used by Antevs (1952) to describe this period of increased warmth and aridity on the Plains, however, more recently, the term “Hypsithermal” has seen more common usage (Deevey and Flint 1957). Further, while Antevs (1952) posited that the Hypsithermal lasted only between approximately 5,000 and 2,500 years BC, or 7,000 and 4,500 BP, more recent studies have extended this time-frame to between 9,500 to 4,500 BP (Schiele and Walker 2013; Yansa 2007). Thus, in order to fully understand the behaviours of human groups occupying the Northern Plains during the Late/Terminal Paleoindian and Early Middle period, it is necessary to understand the environmental context of the region during this time.

Since the mid-century onwards, the Hypsithermal has presented numerous problems for archaeological interpretations. Initially, it was believed that Hypsithermal conditions reduced the Northern Plains region to an uninhabitable wasteland abandoned by humans and animals alike (Forbis 1992; Husted 2002; Wedel 1964). However, based on current paleoecological studies from lake sites on the Northern Plains and isotopic analysis of faunal remains dating to this time period, it is now believed that Hypsithermal conditions were not so severe that they necessitated the widespread abandonment of this region. Rather, the environmental context of the time was
much more complex and variable than it was originally thought. Furthermore, the presence of a number of sites on the Northern Plains dating to the Hypsithermal era lends credence to the notion that the region remained inhabited during this time with human groups adapting to these new environments. The following provides a detailed analysis of paleoecological studies on the Northern Plains to establish the environmental and temporal context of the Hypsithermal, as well as the cultures inhabiting the region during this time.

4.2 Paleo-ecological Evidence for the Hypsithermal on the Northern Plains

4.2.1 Lake-bed Cores and Terrestrial Sediments

The occurrence of the Hypsithermal is well supported by numerous paleoecological studies from lake sites scattered across the Northern Plains region. Using proxy indicators, such as pollen and microfossils preserved in lakebeds, or levels of carbon, hydrogen, oxygen, and nitrogen isotopes recorded in bison tooth enamel, researchers have been able to rebuild a chronological timescale of Holocene climatic events. In Alberta, a study by Anderson et al. (1989) of cores retrieved from two lakes, Moore Lake and Lofty Lake, offers insight into the climatic history of the region. From Moore Lake, shifting pollen species and increases in charcoal and pyrite frequencies between 9,200 and 5,800 BP indicates widespread drought in the region during this time span (Anderson et al. 1989). Sediments in this interval also show increases in epipelic diatoms demonstrating a reduction in water level and the proliferation of vegetation normally limited to the phototropic zone on the lakebed. Based on this, lake levels at Moore Lake during this period likely reached a maximum of 12 meters, 18 meters below present day levels (Anderson et al. 1989). From Lofty Lake, approximately 100 km west of Moore Lake, palynological evidence from lake bed cores suggest desiccation between 8,700 and 6,300 BP. During this interval, plants favoring shallow, saline water conditions flourished, which includes species belonging to the family Cyperaceae and the genera *Typha*, *Myriophyllum*, and *Ruppia* (Anderson et al. 1989). As Hypsithermal conditions peaked on the Northern Plains, water sources became increasingly rare, drying to saline ponds or salty pans which support species such as ditch grass (*Ruppia* sp.) or grasswort (*Salicornia* sp.). From this study, Hypsithermal conditions affected this region of the Northern Plains between 9,200 BP and 5,800 BP causing widespread drought and associated ecological changes (Anderson et al. 1989).
Barnosky’s (1989) study from Guardipee Lake and Lost Lake in Montana demonstrates that Hypsithermal conditions in this region began as early as 9,500 BP and lasted until approximately 6,000 BP. Lake bed cores retrieved from Guardipee Lake show increases in pollen belonging to Chenopodiaceae/Amaranthaceae species (hereafter, Cheno/Am sp.) and Poaceae species after 9,500 years BP. Cheno/Am species are comprised of perennial herbs and shrubs, whereas Poaceae species include a variety of grasses. As each of these plant families favor warm and arid conditions, increases in their pollen frequencies is strong evidence for shifts in environmental regimes during the Hypsithermal. Following 8,300 years BP, Barnosky (1989) reports fluctuations of Ruppia and Cheno/Am pollen relative to Poaceae and Artemisia pollens. Such a pattern is interpreted as indicating drought-like conditions (Barnosky 1989). From Lost Lake, Cheno/Am pollen is present in high quantities between 8,300 and 6,000 years BP further suggesting warm and dry conditions during this period (Barnosky 1989). Overall, Barnosky’s (1989) study suggests that Hypsithermal conditions affected this region of Montana between 9,500 and 6,000 years BP.

In the Cypress Hills region of Saskatchewan, a study by Sauchyn and Sauchyn (1991) of lake bed sediments in Harris Lake establishes the prevalence of Hypsithermal conditions between 7,700 and 5,000 radiocarbon years BP (hereafter, rcybp). Formed in a meltwater channel approximately 12,000 years ago, Harris Lake has been continuously present throughout the Holocene period. Based on the overall results, the strata from the lakebed cores were divided into five zones, with Zone I (960 to 840 cm below surface; 9,120 to 7,700 rcybp) and Zone II (840 to 485 cm below surface; 7,700 to 5,000 rcybp) containing evidence for Hypsithermal conditions (Sauchyn and Sauchyn 1991). The pollen profile for Zone I is dominated by Populus (20-30%) and Cheno/Am species (10-25%), which is characteristic of a mixed forest-grassland environment. Zone II’s pollen profile marks a sharp change from tree and aquatic taxa towards species favoring saline and dry conditions and the dominance of grassland taxa (Sauchyn and Sauchyn 1991). These conditions indicated by the pollen record from Zone II represent the driest in the profile. As such, from 7,700 to 5,000 rcybp. Hypsithermal conditions are believed to have affected the Cypress Hills region of Saskatchewan with beginnings of warmth and aridity evidenced as early as 9,120 rcybp (Sauchyn and Sauchyn 1991).

From Vance et al.’s (1992) study of saline lake sediments from Chappice Lake in southeastern Alberta, a period of increased warmth in this region of the Northern Plains has been
established between 7,300 and 4,400 years BP. Chappice Lake occupies a meltwater channel on an upland surrounded by mixed-grass prairie and cores retrieved from its lakebed have allowed for the establishment of a composite record spanning approximately 7,300 years of the Northern Plains environmental history. Sediments from the lowest recovered zone in the lakebed cores, dated to pre-6,000 years BP, reflect the complete desiccation of Chappice Lake with sedimentary layers oscillating between fine sand and silt and massive silty clay (Vance et al. 1992). These layers indicate alternating climatic period between warm and dry conditions, and cool, wet conditions (Vance et al. 1992). Interestingly, between 6,000 and 4,400 years BP, the authors note that this period of desiccation of Chappice Lake coincides with increased lake levels at other sites in southern Saskatchewan. The authors conclude that, between 7,300 and 4,400 years BP, this region of Alberta experienced increasingly warm and dry conditions (Vance et al. 1992).

In Kettle Lake, North Dakota, Clark et al. (2002) report evidence of climatic change after 8,200 years BP, indicating the onset of Hypsithermal climates in this region. Two 50 cm lake core sections, dating to the mid-Holocene (between 8,500 and 7,900 years BP), were retrieved from Kettle Lake for analysis (Clark et al. 2002). Based on the mineralogy, pollen, and charcoal samples recovered from these cores, the authors conclude that the “mid-Holocene arid interval”, or Hypsithermal, occurred between 8,500 and 7,900 years BP, with recurring drought cycles within a 100 to 130 year period (Clark et al. 2002). The results demonstrate a large, sustained decline in warm season C4 grasses in relation to cool season C3 grasses and forbs. Cool season C3 taxa tend to proliferate during periods of drought given their ability to exploit early season moisture that is not available during the later season, where C4 plants would otherwise dominate (Clark et al. 2002). Such a pattern has also been recorded during the 1930s drought, indicating that by approximately 8,500 years before present drought-like conditions were widespread on the Northern Plains (Clark et al. 2002).

The Stampede site (DjOn-26) in the Cypress Hills region of Saskatchewan yielded paleoecological evidence for the pervading climate regime in the region from approximately 6,100 years BP onward (Klassen 2004). Of the total 14 paleosols, phytoliths recovered from Paleosols 6 through 8, dated to approximately 6,100 years BP, reflect a dominance in grassland taxa which peak in the abundance in Paleosol 7 (Klassen 2004). Klassen (2004) interprets this shift in the phytolith assemblage at the Stampede site as indicative of the pervading climate at the time with decreased effective moisture and increased temperature. These findings coincide well
with paleo-ecological studies from sites elsewhere on the Northern Plains, such as at Elkwater Lake (Vance and Last 1994) and Harris Lake (Sauchyn and Sauchyn 1991).

In her analysis of two lake sites in North Dakota, Coldwater Lake and the Wendel site, Yansa (2007) provides evidence for regional climate regimes from two difference physiographic areas of the Northern Plains region. Coldwater Lake is a kettle lake situated on the Missouri Coteau uplands containing a complete fossil record of Holocene climates dating as early as 6,000 radioarbon years BP (Yansa 2007). The Wendel site, once a paleo-lake within a meltwater-saturated landscape, is an ephemeral wetland today with a truncated fossil record spanning from 11,500 to 8,000 rcybp (Yansa 2007). From these records, and others, Yansa (2007) provides a more complete record of the climate regimes occurring on the Northern Plains from approximately 9,000 to 5,000 rcybp.

Additionally, Yansa’s (2007) study provides a more accurate picture of how the Northern Plains region experienced Hypsithermal conditions and supports the position that the Hypsithermal did not occur as a prolonged drought as once previously thought. Rather, Hypsithermal conditions were much more variable in both space and time (Yansa 2007). The increased warming and drying of the Northern Plains region began approximately 9,000 rcybp, and peaked by roughly 8,000 rcybp. Conditions ameliorated between 7,700 and 6,000 rcybp, with the frequency of droughts decreasing during this time (Yansa 2007). By 6,000 rcybp, conditions deteriorated again until approximately 5,000 rcybp. Hypsithermal conditions were most severe during this particular time period with maximum salinities indicated in numerous cores retrieved from lakes at various locations on the Northern Plains (Yansa 2007). Thus, from circa 9,000 BP to 5,000 rcybp, Hypsithermal conditions occurred at varying degrees of intensity across the Northern Plains (Yansa 2007).

4.2.2 Stable Isotope Levels in Bison Remains

In addition to paleoecological analysis of lakebed sediments, some researchers have utilized other lines of evidence to rebuild ancient climate regimes. In particular, Leyden (2004) and Schiele (2011) have undertaken the analysis of bison tooth and bone which contain isotopic data that can inform paleoenvironmental reconstructions. Stable isotopes of carbon, oxygen, and hydrogen are absorbed by animals from food and water sources and deposited in their tissues. Bone and tooth enamel are most useful for paleoecological reconstructions as these tissues
preserve for longer periods of time (Leyden 2004; Schiele 2011). The various concentration levels of these stable isotopes contained within food and water sources, and consequently animal tissues, are directly related to the prevailing local environments at the time the isotopes were absorbed. It is not necessary to discuss the mechanisms which determine concentrations of hydrogen and oxygen isotopes in plants and water. Generally, higher concentrations of these stable isotopes occur in regions which experience hotter and drier climates, and vice versa (Schiele 2011). In the case of carbon stable isotopes, the concentration value is directly related to the photosynthetic pathway (C3/cool season plants vs. C4/warm season plants vs. CAM plants) undertaken by a particular species of plant. Again, the specifics of these photosynthetic pathways will not be discussed in this thesis. Each of these pathways are adaptations to the local environment and each corresponds to a specific value for carbon stable isotope concentrations. By determining the overall concentrations for stable isotopes of carbon, it is possible to reconstruct the diet and, thus, the prevailing habitat of the animal that consumed the plant (Schiele 2011).

Through analysis of bone recovered from numerous archaeological sites in Saskatchewan, Leyden (2004) concluded that by as early as 7,900 BP, the overall climatic trend for the Northern Plains was that of increased warmth and aridity. Of the nine archaeological sites included in his study, five contained levels which dated to the Hypsithermal (Leyden 2004). Overall, the levels of stable isotope concentrations for carbon, oxygen, and hydrogen matched well with patterns established by other paleoecological studies of this time period. However, bone samples retrieved from the Gowen sites near Saskatoon produced values which reflect cooler and drier temperatures characteristic of a temperate, desert-like environment (Leyden 2004). At first glance, this result appears to be contradictory to the general climatic trends established by previous paleoecological studies, however, Leyden (2004) argues that this simply reveals the variable nature of Hypsithermal climates. In general, the environmental regime during this time had a significant impact on the carrying capacity of the Northern Plains, affecting bison herds and human groups alike (Leyden 2004).

Using isotopic signatures in tooth enamel as a proxy for prevailing climates over the last 9,000 years, Schiele (2011) reconstructed the general environmental trends which occurred during the Hypsithermal. Interestingly, as with Leyden’s (2004) results, Schiele’s (2011) conclusions contradict the trends established by various other paleoecological studies. The
isotopic data demonstrated from the samples of bison tooth enamel indicate that conditions may have been more temperate, although seasonal fluctuations also appear to have been more extreme during this time (Schiele 2011). Summer temperatures during the Hypsithermal appear to have been warmer and drier, whereas winter conditions tended to be cooler and wetter (Schiele 2011). From Schiele’s study, Hypsithermal conditions produced highly variable climates on the Northern Plains. Increased aridity and warmth appears to be the general trend during this time period, accompanied by greater fluctuations in seasonal temperature and precipitation.

4.2.3 Discussions

From these studies, and others, it is well established that Hypsithermal conditions began affecting the Northern Plains region from as early as 9,500 years BP and lasted until approximately 4,400 years BP (Table 4.1). These changes initiated various ecological changes to the Northern Plains region, demonstrated by the proliferation of vegetation related to warm, dry climes during this time period (Anderson et al. 1989; Barnosky 1989; Clark et al. 2002; Klassen 2004; Leyden 2004; Schiele 2011; Sauchyn and Sauchyn 1991; Yansa 2007). Though Hypsithermal climates may have begun as early as 9,500 years BP, it is most likely that the height of warmth and aridity occurred on the Northern Plains between 8,000 and 5,000 years BP (Yansa 2007).

The warm and dry climates were variable in both time and space, affecting different regions of the Plains at different times (Leyden 2004; Schiele 2011; Vance et al. 1992; Yansa 2007). While many of the lake sites studied show an overall decrease in water level, very few lakes in the included studies underwent complete desiccation during the Hypsithermal (Anderson et al. 1989; Barnosky 1989; Sauchyn and Sauchyn 1991; Vance et al. 1992; Clark et al. 2002; Yansa 2007). This climatic variation is also present within the stable isotope signatures recorded in bison bone and teeth (Leyden 2004; Schiele 2011). As such, Hypsithermal conditions on the Northern Plains were not as extreme as previously thought and did not necessitate the widespread abandonment of the region, a fact that is highly important from an archaeological perspective. While temperatures would have been on average considerably warmer and drier, the pollen record shows that these periods of drought would have been broken by cooler and wetter intervals (Clark et al. 2002; Yansa 2007). Overall, it is clear that the Hypsithermal climatic event on the Northern Plains is much more complex and variable than previously thought and did not
homogenously affect the region. Further, it is more likely that both human and animal groups simply adapted to these changes on the Northern Plains, moving into regions less affected by Hypsithermal climates, rather than migrating from the region entirely. From understanding this, archaeologists and other researchers can make more informed hypotheses regarding the behaviours of human groups during the Terminal/Late Paleoindian and Early Middle period on the Northern Plains.

### Table 4.1: Paleoecological studies of the Hypsithermal on the Northern Plains

<table>
<thead>
<tr>
<th>Author</th>
<th>Locality</th>
<th>Hypsithermal Time Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al. (1989)</td>
<td>Moore Lake, Lofty Lake; Alberta</td>
<td>9,200 and 5,800 years BP</td>
</tr>
<tr>
<td>Barnosky (1989)</td>
<td>Guardipee Lake, Lost Lake; Montana</td>
<td>9,500 and 6,000 years BP</td>
</tr>
<tr>
<td>Sauchyn and Sauchyn (1991)</td>
<td>Harris Lake; Saskatchewan</td>
<td>7,700 and 5,000 rcybp</td>
</tr>
<tr>
<td>Vance et al. (1992)</td>
<td>Chappice Lake; Alberta</td>
<td>7,300 and 4,400 years BP</td>
</tr>
<tr>
<td>Clark et al. (2002)</td>
<td>Kettle Lake; North Dakota</td>
<td>8,500 and 7,900 years BP</td>
</tr>
<tr>
<td>Klassen (2004)</td>
<td>Stampede Site (DjOn-26); Alberta</td>
<td>6,100 years BP (onset)</td>
</tr>
<tr>
<td>Yansa (2007)</td>
<td>Coldwater Lake, Wendel site; North Dakota</td>
<td>9,500 and 5,000 rcybp</td>
</tr>
<tr>
<td>Leyden (2004)</td>
<td>Saskatchewan</td>
<td>7,900 years BP (onset)</td>
</tr>
<tr>
<td>Schiele (2011)</td>
<td>Saskatchewan</td>
<td>9,000 years BP (onset)</td>
</tr>
</tbody>
</table>

### 4.3 Cultural Adaptations to the Hypsithermal on the Northern Plains

As established from the paleoecological studies discussed in the previous section, the Northern Plains experienced episodic drought intervals between 9,500 BP and 4,400 BP which affected the native flora and fauna inhabiting the region. In the Northern Plains cultural chronology, the beginning of the Hypsithermal marks the end of the Paleoindian, or Early Precontact period and coincides directly with the Early Middle period (Kornfeld et al. 2010; Meyer et al. 2011; Peck 2011). Consequently, human groups occupying the Northern Plains
during this time were affected by the ecological changes brought on by Hypsithermal climates. Subsistence and settlement practices during the Early Middle period show a marked shift from the Paleoindian period, and the beginnings of this transition are evident by the Terminal/Late Paleoindian period (Frison 1990; Robertson 2004).

The exact mechanisms behind the transition between the two time periods has been the subject of much debate among archaeologists since the mid-century onward, when Antevs (1948) first introduced the notion of the Hypsithermal into scientific discourse (Schiele and Walker 2013). As established in the previous section, modern paleoecological studies have created a much more nuanced picture of the environmental context on the Northern Plains during the Hypsithermal era. Models which argued for the abandonment of the Plains have largely been rejected in favor of models focusing on adaptation to these new environments (Frison 1975; Hurt 1966; Jennings 1957; Reeves 1973; Walker 1992; Yansa 2007). The following is a discussion of the various models which have been formulated over the years in an attempt to make sense of human adaptations to the Hypsithermal. Once this historical context is established, a broad outline of Terminal/Late Paleoindian and Early Middle period cultures will be discussed.

4.3.1 Models for Hypsithermal Adaptations

Following Schiele and Walker (2013), hypotheses for Hypsithermal adaptations can be generally categorized into four schools of thought. The first, termed the “Hiatus Model” was introduced by Mulloy (1958) to account for the perceived lack of archaeological sites dated from between 7,000 BP and 5,000 BP. This period of time is known as the Early Middle Precontact period in the Northern Plains cultural chronology (Schiele and Walker 2013). Mulloy (1958) included a cultural hiatus in his cultural history for the Northwestern Plains arguing for an abandonment of the region in response to environmental desiccation. Although this hypothesis is supported by other researchers (Forbis 1992; Husted 2002; Wedel 1964), Mulloy (1958) himself cautioned that the paucity of sites dating to the Hypsithermal time period may be due to sampling bias and not the actual abandonment of the Plains.

The second school of thought put forward by Schiele and Walker (2013) is the “Refugium Model”. Hurt (1966) is the primary author of this hypothesis and argues that only the most severe drought episodes during the Hypsithermal would have forced human and animal groups to migrate into regions less affected by these conditions. These areas, termed “refugia” by Hurt
(1966: 107), would have included major drainages such as the Missouri River and the North and South Saskatchewan Rivers, as well as the cooler and wetter northern and eastern peripheries of the Plains and the mountainous western periphery. Rather than abandoning the Plains region during the Hypsithermal, humans simply migrated to these areas which retained the necessary food and water resources for survival during times of extreme drought and resource depletion (Hurt 1966). Consequently, groups would have needed to broaden their subsistence bases and adjust their settlement practices in order to account for the resources which were available in these “refugia” (Hurt 1966).

Advocates of the “Refugium Model” include Frison (1975), Walker (1992), and Yansa (2007) (Schiele and Walker 2013). Frison (1975) maintains that Hypsithermal conditions would have affected the quality and yield of short-grass prairie vegetation. In turn, this would have reduced the carrying capacity for bison herds and forced animals into areas less affected by increased warmth and aridity. Humans would have been forced to follow suit and shift their settlement patterns in accordance with the movement of the herds to the peripheries of the Plains and refugial areas within the region (Frison 1975). Walker’s (1992) study of the Gowen I and II sites, located on a terrace of the South Saskatchewan River, lends support for at least sporadic occupation of the Plains region during the Hypsithermal (Schiele and Walker 2013). Like Hurt (1966), Walker (1992) argues that refugial areas would only have been necessary during the most severe droughts of the Hypsithermal. Finally, according to Yansa (2007), intermittent periods of higher precipitation during the course of the Hypsithermal would have mitigated against the effects of extreme drought. During periods of extreme aridity, mid-Holocene lake “oases” and river systems would have remained reliable water sources for human and animals alike (Yansa 2007).

In opposition to the tenants of the “Refugium Model” and the “Hiatus Model”, the “Bison Focus Model” contends that the carrying capacity of the Plains was not reduced during the Hypsithermal allowing for continued occupation and unabated bison hunting (Reeves 1973; Schiele and Walker 2013). According to Reeves (1973), the perceived gap in the archaeological record between 7,000 and 5,000 BP is due to factors other than the actual abandonment of the Plains or movement into refugial areas. Citing as factors archaeological sampling bias, typological visibility, and erosion of landforms upon which sites dating to this time period are likely to be located, Reeves (1973) maintains that human and animal groups were minimally
affected by Hypsithermal climates. Further, increased warmth and aridity would have expanded short-grass prairie environments. As bison thrive on these grasses, the carrying capacity on the Plains would have been unaffected and human groups could have continued to exploit bison throughout the Hypsithermal (Reeves 1973).

Although the “Bison Focus Model” is supported from faunal assemblages of various sites across the Northern Plains, such as the Stampede site (Falzarano 2014), Atkinson site (Nicholson and Playford 2009), the Norby site (Zurburg 1991), the Gowen I and II sites (Walker 1992) and the Below Forks and St. Louis sites (Johnston 2005), several archaeologists are critical of Reeves’ (1973) arguments. Frison (1975) contends that, while short-grass prairie may have expanded during the Hypsithermal, its quality and yield would have been reduced, thus affecting bison herd numbers. Sheehan (2002) cites data from modern droughts during the 1930s, where the carrying capacity of the Plains was greatly reduced due to conditions which would have resembled Hypsithermal droughts. Further, the dwarfing of the bison species alone suggests that herds faced considerable environmental pressures during the Hypsithermal climate interval. Prior to the Hypsithermal, humans hunted extinct species of bison known as *Bison occidentalis* and *Bison antiquus*. These species were much larger than their modern counterparts and are thought to have been less gregarious, living in much smaller herds (Johnston 2005). Adaptation of this nature may have been a result of decreased resource abundance brought on by the Hypsithermal, where smaller individuals gained an evolutionary advantage over larger animals (McDonald 1981). Regardless, based on the evidence gathered from the aforementioned sites, it would appear that Hypsithermal-era groups continued to focus on bison for subsistence purposes, although perhaps on a smaller scales than in the Paleoindian period. Whether this is due to behavioural differences in earlier species of bison, or caused by ecological stress placed on herds during the Hypsithermal has yet to be fully established, however, bison continued to be an important subsistence resource for human groups (Oetelaar 2011; Schiele and Walker 2013).

Finally, Schiele and Walker’s (2013) last general category for Hypsithermal adaptation models is termed the “Plains Forager Model”. In reaction to Mulloy’s (1958) hiatus hypothesis, Jennings (1957) argued that at no time were the warm, arid conditions of the Hypsithermal so extreme that they forced human groups from the Plains region. Rather, human groups adapted to these new environments, adopting what Jennings (1957: 6-7) referred to as the “Great Basin Desert Culture”. This culture was specifically adapted for survival in desert-like environments,
with highly mobile settlement practices and broad-range subsistence strategies which exploited both floral and faunal resources (Jennings 1957). While researchers do not necessarily accept that human groups adopted Jennings’ “Desert Culture”, efforts have been made to uncover evidence for shifting subsistence strategies from the procurement of large game fauna towards the exploitation of smaller species (Schiele and Walker 2013). According to Sheehan (1995), this does not necessarily signify the end of bison procurement in the Early Middle period, rather, that assemblages should reflect increases in smaller mammals and other vertebrates indicating increased diet-breadth (Sheehan 1995). In addition to the faunal assemblage, tool assemblages may point to shifting subsistence strategies as evidenced by the presence of grinding tools for the processing of floral resources (Schiele and Walker 2013).

In light of paleoecological reconstructions of the Northern Plains environment during the Hypsithermal, it follows that the abandonment of the region was not a necessary strategy to ensure survival (Frison 1975; Reeves 1973; Walker 1992; Yansa 2007). Although some argue that evidence is lacking to state otherwise (Forbis 1992; Husted 2002), the idea of a cultural hiatus during the Hypsithermal is largely rejected by North American archaeologists (Schiele and Walker 2013). Based on the archaeological evidence at hand, the Northern Plains region saw continual occupation during the Hypsithermal period. Increased warmth and aridity may have had an overall negative impact on the flora and fauna of the region. However, at no time were the Northern Plains so decimated by these changes that they necessitated abandonment by human groups (Yansa 2007). Characteristics of Hypsithermal-era sites tend to follow similar patterns as open campsites reflecting short occupation with limited spatial extent, located in close proximity to reliable water sources. Faunal assemblages recovered from these sites suggest that subsistence strategies continued to focus on the exploitation of bison, although in some areas these strategies adapted to include smaller game and plants (Walker 1992). Against this background, the discussion will now move towards outlining the broad cultural trends of the Terminal/Late Paleoindian and Early Middle periods on the Northern Plains, which coincide with the Hypsithermal. A more in-depth discussion of archaeological sites dating to these time periods will take place in Chapter 7 of this thesis which compares the cultural patterns established from these sites with the Camp Rayner site.
As Hypsithermal conditions intensified on the Northern Plains, lifeway adaptations were necessary to suit these changes, resulting in a cultural transition between the Early Precontact, or Paleoindian, and Middle Precontact periods. The Terminal/Late Paleoindian period is the final phase of the Paleoindian period in the Northern Plains cultural chronology which occurred from approximately 11,300 and 10,800 years before present (Hofman & Graham 1998; Meyer et al. 2011; Peck 2011). Based on the presence of high concentrations of exotic raw lithic material found at sites from this time period, Paleoindian groups are thought to have been highly mobile travelling far distances and settling for only brief periods of time (Bamforth 2002). By the Early Middle period, beginning by approximately 7,500 BP, these practices have largely disappeared in favor of more broad-based subsistence strategies, although with a continued focus on bison procurement (Sheehan 2002). Given the environmental context of the time, it is likely that this shift is a direct result of Hypsithermal conditions (See Chapter 7 for a more in-depth discussion of Terminal/Late Paleoindian and Early Middle period sites and assemblages on the Northern Plains).

4.4.1 The Late/Terminal Paleoindian Period (8,500 to 7,500 BP)

4.4.1.1 Late/Terminal Paleoindian Lifeways on the Northern Plains

Based on paleoecological data, Hypsithermal conditions are believed to have occurred as early as the Late/Terminal Paleoindian period on the Northern Plains. Sites dating to this time period are relatively rare on the Northern Plains, although from those which have been discovered, there is an apparent shift from the hunting economies in the earlier Paleoindian period to those practices in the Terminal/Late Paleoindian. Artifact assemblages from these sites indicate that, along with a continued reliance on bison for subsistence purposes, groups were expanding their resource bases to exploit smaller mammals (Peck 2011). Bison is present in most Late/Terminal Paleoindian assemblages although in low quantities. Likely, these large ungulates remained a staple food source during the Late/Terminal Paleoindian, but were hunted more on an individual basis rather than communally as in the earlier Paleoindian period (Van Dyke and Stewart 1985; Peck 2011). Further, bison remains recovered from assemblages dating to this time period appear to be more highly fragmented. This may indicate more intensive processing of these animals in an effort to extract as much as possible from the carcass (Kornfeld et al.
Additionally, it should be noted that bone tools have also been recovered from Terminal/Late Paleoindian assemblages with functions ranging from hide scraping to lithic tool manufacture (Doll 1982).

Late/Terminal Paleoindian lithic assemblages reflect a diversity of tool types which are predominantly constructed from locally available resources, such as cherts and quartzites, indicating regionally focused mobility patterns (Meyer et al. 2011; Peck 2011). Along with projectile points (discussed below), the lithic tool kits of this time period include a wide range of artifacts, such as spurred endscrapers and grinding stones. Spurred endscrapers, named for the lateral pointed projections found on the distal edge of the artifact, are believed to be a diagnostic tool of the Paleoindian period (Peck 2011; Rogers 1986). Grinding stones are of particular interest for this time period as they may be indicative of the exploitation and processing of plant remains. This practice is thought to have taken place during the Late/Terminal Paleoindian period and the presence of tools associated with plant processing lends credence to this hypothesis (Robertson 2004).

Based on these data, it is apparent that the transitions between the Paleoindian and Early Middle period began in the Terminal/Late Paleoindian period. Faunal assemblages reflect broad subsistence bases and lithic material assemblages indicate that local sources were preferred over exotics (Peck 2011). Bison remain an important food resource, though they are hunted in lower quantities. Further, though very little investigation has taken place regarding the usage of plants during this time period, this type of activity may be inferred from the presence of tools associated with the processing of plant seeds and fibers (Robertson 2004). It is possible that, as Hypsithermal conditions began to take hold on the Northern Plains, human groups started to restrict their movements and adapt to the region’s local environments. These changes mark the beginning of the lifeways which define the Early Middle Precontact period.

4.4.1.2 Late/Terminal Paleoindian Projectile Point Typologies

Prior to discussing the various typologies for projectile points belonging to this and other time periods, it is necessary to establish some of the nomenclature used to describe the Northern Plains cultural chronology. Specifically the use of the terms “component”, “series”, “complex”, and “tradition”. Archaeological “components” are the smallest taxonomic unit within a site and generally represent a single occupation (McKern 1939; Willey and Phillips 1958). “Series” are
often used to organize archaeological components prior to analyzing their sites, features, and artifacts for reclassification into complexes and traditions. A “complex” is a composite archaeological unit used to describe numerous interconnected sites, features, and artifacts related by similarities in cultural behaviours such as technology, subsistence and settlement practices, and artifact form and function (Dyck 1983). Sites within a complex are found within common geographic locations and time-frames (Dyck 1983). Often, it is used to connote components which share common space but occupy different segments of time (Dyck 1983). Finally, “traditions” within archaeology are used to define technologies or cultural traits which show some manner of continuation throughout sequential complexes (Dyck 1983).

In accordance with the diverse lifestyles from the Terminal/Late Paleoindian period, projectile points from this time period show a wide variation in style and represent a distinct break from the preceding typologies towards a more lanceolate shape exhibiting parallel-oblique flake patterns (Frison 1991; Kornfeld et al. 2010; Meyer et al. 2011). These point styles are labelled Frederick/James Allen, Lusk, Lovell Constricted, and Pryor Stemmed.

According to Frison (1991) and Kornfeld et al. (2010), radiocarbon dates for the Frederick/James Allen complex range from 8,400 to 8,000 years BP, although Pitblado (2003) extends this range from 9,350 to 7,900 BP. James Allen projectile points, discovered in a bison bone bed at the James Allen site in Wyoming, provided the first example of lanceolate points exhibiting parallel oblique flake patterns (Hofman and Graham 1998). Frederick points were first noted at the Hell Gap site in Wyoming and closely resemble James Allen projectile points, although the latter tends to have greater basal concavity than the former (Hofman and Graham 1998; Kornfeld et al. 2010; Pitblado 2003). As such, each are considered to belong to the same complex (Pitblado 2003).

The Lusk complex continues the trend of lanceolate, parallel-oblique flaked projectile points similar to the Frederick/James-Allen projectile points. Data from this complex have primarily originated from the Betty Greene site near the Wyoming-Nebraska-South Dakota tristate border. From this site, a radiocarbon date of 7,900 years BP has been obtained although radiocarbon dates for this complex extend between 9,700 and 7,550 BP (Kornfeld et al. 2010; Pitblado 2003). Overall point morphology exhibits smaller width-to-thickness ratio than Frederick points with more concave bases and blade edges varying from convex to having pronounced lateral restrictions (Kornfeld et al. 2010). Bases tend to exhibit grinding, which may
extend to the lateral sides, and the greater thickness ratio and convergent basal sides may be reflective of hafting technology (Pitblado 2003). Frison (1991) includes the Lusk complex within the Foothills Mountain tradition, which contains a variety of projectile point complexes specific to this region (Pitblado 2003).

Named by Husted (1969) after the town of Lovell, Wyoming, Lovell Constricted points often exhibit crude, parallel-oblique flake patterns, with constricted basal edges and concave bases (Kornfeld et al. 2010; Peck 2011; Pitblado 2003). Projectile points from this complex display characteristic stems, which give them a “waisted” appearance (Pitblado 2003: 100). Lovell Constricted points have been found in Level 14 from the Mummy Cave site in Wyoming as well as the Pictograph Cave site in Montana (alongside Pryor Stemmed points) (Husted and Edgar 2002; Peck 2011). Radiocarbon dates for Lovell Constricted range between 9,350 and 7,700 BP (Pitblado 2003). Generally, these points are found in association with a broad range of faunal resources such as bighorn sheep, mule deer, and bison, and have also been found in association with grinding implements (Peck 2011).

Often associated with the Lovell Constricted complex, the Pryor Stemmed complex projectile points represent a unique technology from the Late/Terminal Paleoindian period. The Pryor Stemmed complex was initially believed to be restricted to the Big Horn Mountain region, however, recent studies have shown that the range for this complex extends to the North Platte River in Wyoming and to the Laramie Range (Kornfeld et al. 2010). According to Pitblado (2003), radiocarbon dates for the Pryor Stemmed complex range from 8,450 BP to 7,800 BP. Morphologically, these projectile points are stemmed and range in size from large to medium, although they are generally larger in size than Lovell Constricted projectile points (Peck 2011; Pitblado 2003). Additionally, points of this style are uniquely bevelled on alternate blade edges which produces a lenticular cross-section (Pitblado 2003). The outline for these point may be lanceolate in form, or have expanding, parallel-sided or slightly contracting stems with a basal concavity (Kornfeld et al. 2010). It is believed that these points were coeval with Lovell Constricted points, although at some sites, such as the Medicine Lodge Creek site, Pryor Stemmed points have been found stratigraphically above Lovell Constricted points (Peck 2011).
4.4.2 Early Middle Precontact Period (7,500 to 5,000 BP)

4.4.2.1 Early Middle Precontact Period Lifeways on the Northern Plains

The beginning of the Middle Precontact period on the Northern Plains corresponds directly with the height of Hypsithermal conditions overtaking the region. Generally, Plains archaeologists separate the Middle Precontact period into three sub-categories: the Early Middle Precontact period, the Middle Middle Precontact period, and the Late Middle Precontact period. Given the focus on this thesis, discussion will only center on the first phase known as the Early Middle Precontact period, dating from approximately 7,500 to 5,000 years BP (Walker 1992). Compared to earlier and later periods on the Northern Plains, there is a distinct scarcity of archaeological sites dating to the Early Middle period. As discussed above, there are numerous theories in place to explain the apparent lack of sites from this time period. Current thought tends to accept sampling bias, erosional activity, shifts in settlement patterns, and the inability of researchers to differentiate Early Middle period diagnostic artifacts from those dating to a later period as reasons to explain the paucity of Early Middle period sites on the Northern Plains (Reeves 1973; Schiele and Walker 2013; Walker 1992).

The spatial distribution of Early Middle period sites on the Northern Plains indicates a tendency to concentrate in the peripheral areas of this region, as well as along major river systems (Oetelaar 2011; Walker 1992). As the warming and drying trends of the Hypsithermal became more pronounced during the Early Middle period, potable surface water and plant and animal resources would have become increasingly rare (Oetelaar 2011). As such, these areas would have been extremely important to groups occupying the region at this time and would have contained constant and reliable water sources essential for plant and animal life during periods of extreme drought. Early Middle period sites are strategically located in close proximity to these “refugia”, closely following the settlement patterns hypothesized by Hurt (1966), Walker (1992), and Yansa (2007). Furthermore, the sites tend to reflect short occupational duration with limited spatial extent and contain cultural assemblages which are relatively lacking (Walker 1992).

As with the Terminal/Late Paleoindian period, the faunal assemblages from Early Middle period sites reflect a diverse array of species, including bison, smaller mammals, and birds, demonstrating broadened subsistence practices (Oetelaar 2011; Robertson 2004; Walker 1992). Apart from the presence of grinding stones, there is very little evidence to suggest that humans were exploiting plant resources for subsistence purposes (Oetelaar 2011). From what has been
recovered in the faunal assemblages from Early Middle period sites, bison is the dominant species represented and animal carcasses tend to reflect high fragmentation, indicating increased levels of processing (Oetelaar 2011).

In contrast with earlier and later Precontact periods, there is a decreased frequency of communal bison kill sites on the Northern Plains which date to the Early Middle period. So far, three multi-animal kill sites have been discovered: the Norby site, located on a terrace of the South Saskatchewan River within the city limits of Saskatoon, Saskatchewan (Zurburg 1991), the Everblue Springs site (Vivian 2007), and the lower levels of Head-Smashed-In Buffalo Jump (Reeves 1978), each located in Alberta. Each of these bison kills contain artifacts affiliated with the Mummy Cave series, a cultural series belonging to the Early Middle period defined by a wide variety of medium sized, side-notched projectile points (see below for an in-depth discussion of Early Middle period projectile point typologies). Additionally, it is worth mentioning that bison are not the only species represented at the Norby site and the Everblue Springs site. Two adult rabbits and the mandible of a wolf-sized canid was recovered in association with 26 adult male bison at the Norby site (Zurburg 1991). At the Everblue Springs bison kill, the faunal assemblages is much more diverse, and includes deer, antelope, rabbit, beaver, several species of bird, and a large canid (Peck 2011; Vivian 2007). Overall, it is clear that, although humans are continuing to focus on the procurement of bison during the Early Middle period, their subsistence bases are expanding to include smaller animals as well.

The lithic assemblages from the Early Middle period reflect a primary focus on locally available material over materials which would be considered exotic (Oetelaar 2011). For example, Walker (1992) reports that the lithic material distribution from the Gowen I site, located in south-central Saskatchewan, is 90% local and approximately 10% exotic (see also Kasstan 2004). As with the Terminal/Late Paleoindian time period, this would suggest a regionalized focus on mobility patterns during the Early Middle period. Projectile point styles from this time period are generally notched and reflect a high degree of variation (Peck 2011; Walker 1992). Using statistical analyses to organize these styles, Walker (1992) defined five projectile point types from the Early Middle period, each representing distinct temporal and spatial distributions (See below for in-depth discussion of these types).

Based on the assemblages from the sites listed above, the lifeways of the Early Middle period can be defined by broad-based subsistence practices and the exploitation of locally
available lithic sources. Humans appear to have shifted their mobility patterns and focused their movements within regions less affected by increased aridity, where dependable food and water sources were readily available. Bison remain an important food source for these groups, though communal procurement appears to have taken place on an opportunistic level. The presence of smaller animal remains is indicative of broadened subsistence bases, and the presence of tools associated with plant processing may further this notion. Overall, evidence from the few sites belonging to this time period support these hypotheses and readily show that human groups did not abandon the Northern Plains during the Hypsithermal as previously thought (Oetelaar 2011; Walker 1992).

4.4.2.2 Early Middle Period Projectile Point Typologies

Projectile point styles from the Early Middle period have shifted overall from the lanceolate form of the Paleoindian period to smaller, side-notched varieties (Kornfeld et al. 2010). This shift in projectile point style is a direct reflection of the changes in technology occurring with the introduction of atlatl technology to the Northern Plains (Dyck 1983). There is a large diversity of projectile point styles dating to this time which are categorized under a variety of complexes. Understanding these projectiles points and their context within the Northern Plains chronology has been problematic. Only recently has quantitative analysis allowed for researchers to sort the points into standardized groups based on morphological, spatial, and temporal characteristics (Dyck 1983; Peck 2011; Walker 1992). Walker’s (1992) analysis of Early Middle period projectile points has been largely accepted among Northern Plains archaeologists and organizes a number of projectile point styles under the Mummy Cave series. Peck (2011) has added several other complexes to the Early Middle period chronology. The Country Hills complex predates the Mummy Cave series, which is followed by the Maple Leaf complex and the Calderwood complex (Peck 2011).

The Country Hills complex includes large, barbed projectile points which have been recovered from sites such as the Wimpey site (Wright 1983), the Jensen Spring site (Ronaghan 1992), EgPn-230 (Vivian et al. 1998), the Everblue Springs site (Vivian 2007), and the Maple Leaf site (Landals 1986; Peck 2011). These points have been labelled the Burmis Barbed point by Ronaghan (1992) and are characterized by their pronounced tangs with deep corner-notches,
creating a stemmed-like appearance (Peck 2011). Radiocarbon dates for this complex concentrate around 7,500 years BP (Peck 2011).

The Mummy Cave series chronologically begins with Blackwater Side-Notched points, followed by Bitterroot Side-Notched points (or Northern Side-Notched points), Hawken Side-Notched points, Gowen Side-Notched points, and lastly, Mount Albion Corner-Notched points (Walker 1992). The Blackwater Side-Notched point type is based on a composite sample from the Mummy Cave site (Husted and Edgar 2002) and the Stampede site (Gryba 1976), where points of this style appear at both and are thus considered a point type, with chronological and geographical significance. Radiocarbon dates for this type span from 7,600 years BP to 7,200 BP (Walker 1992).

The Bitterroot Side-Notched point has wide geographical distribution, and has been recovered from the Gap site (Reeves and Dormaar 1972; Walker 1992), the Lookingbill site (Frison 1978; Walker 1992: 132), the Mummy Cave site (Husted and Edgar 2002; Walker 1992), and the Stampede site (Gryba 1976; Walker 1992). The time-span for this point type ranges from 7,200 to 6,000 years BP (Walker 1992).

The Hawken Side-Notched projectile point has been recovered from the Hawken site (Frison et al. 1976; Walker 1992) and the Mummy Cave site (Husted and Edgar 2002; Walker 1992). The estimated date range for this point type is between 6,500 and 5,300 years BP (Walker 1992).

The Gowen Side-Notched point has been recovered from the Gowen sites in Saskatchewan (Walker 1992), the Sorenson site (Husted 1969), the Welsh site (Van Dyke et al. 1991), the Head-Smashed-In buffalo jump site (Reeves 1978; Walker 1992), the Atkinson site (Nicholson and Playford 2009), and the Dog Child site (Pletz 2010). Radiocarbon dates for this point type range between 6,000 and 5,500 BP (Walker 1992).

Finally, the Mount-Albion Corner-Notched point is the latest representation of projectile points from the Mummy Cave series, with examples recovered from numerous sites along the Colorado Front Range (Walker 1992). The time span for this point type begins around 5,700 years BP and ends at 4,500 years BP (Walker 1992).

The Maple Leaf complex has been established from materials recovered from the Maple Leaf site (Landals 1986), the Mona Lisa site (Wilson 1980), the Sara site (Ronaghan 1992), and the Anderson site (Quigg 1984; Peck 2011). Projectile points belonging to this complex are
referred to as Salmon River Side-Notched points which are characterized by their flat bases and shallow side-notches. These points can come in large and small varieties, although points recovered in Alberta tend to be much larger than those recovered further south (Peck 2011). Radiocarbon dates for this complex range from 6,300 BP to 5,200 BP (Peck 2011).

4.5 Discussion and Conclusions

The increase in paleoecological studies has allowed for a more complete understanding of Hypsithermal conditions on the Northern Plains and the continued recovery of archaeological sites dating to this time period has furthered our understanding of the lifeways during the Terminal/Late Paleoindian and Early Middle periods. As evidenced by the sites discussed above, the Terminal/Late Paleoindian period marks a transitional time period between the Paleoindian and Middle Precontact periods. When Hypsithermal conditions begin affecting the Northern Plains, groups began to adapt and shift their subsistence patterns in a manner which ensured continual occupation and survival in an increasingly arid region (Doll 1982; Oetelaar 1998; Van Dyke and Stewart 1985). As Terminal/Late Paleoindian period transitions into the Early Middle period, these characteristics become increasingly marked in reaction to heightened warmth and aridity on the Northern Plains.

In reality, the cultural context of the Northern Plains region was much more complex than any individual model gives it credit. Rather than abandoning the region as previously thought, groups adapted to new conditions, shifting their settlement patterns and restricting their movements to areas with abundant food, lithic, and water sources. As pointed out by paleoecological studies of the region, Hypsithermal conditions on the Northern Plains did not necessitate abandonment of the region by human groups (Yansa 2007). The intentions of this chapter were to provide environmental and cultural context for the Terminal/Late Paleoindian and Early Middle period components at the Camp Rayner site. Now that this has been established, the discussion will now move to the cultural components at the Camp Rayner site which are dated to the Terminal/Late Paleoindian and Early Middle Precontact periods. Overall, when taking these aspects into consideration, a more complete understanding of the transition between the Terminal/Late Paleoindian period and Early Middle period will be achieved.
Chapter 5
CULTURAL ZONE 6

5.1 Introduction

All faunal and lithic material recovered from Cultural Zone 6 was analyzed to ascertain patterns which may reveal mobility and subsistence behaviours of the groups occupying the Camp Rayner site during the Early Middle Precontact period. Based on Cahill’s (2012) analysis of the entire Camp Rayner site assemblage, Cultural Zone 6 lies between 75 and 85 cm below surface. A radiocarbon date was obtained from a charcoal sample (Cat. #1997) recovered from this depth range which yielded a conventional age of 6850 +/- 40 years BP (Beta-321402) (Cahill 2012). This date falls well within the established age range for the Early Middle Precontact period, specifically within the Mummy Cave series, on the Northern Plains (7,700-5,700 years BP). The age for Cultural Zone 6 is further supported by the presence of projectile points which are associated with this time period. The following is a discussion and analysis of the lithic and faunal material recovered from Cultural Zone 6 at the Camp Rayner site.

5.2 Cultural Zone 6 Lithic Analysis

In total, 678 pieces of lithic material, weighing 7,585.2 grams, were recovered from the Cultural Zone 6 levels at the Camp Rayner Site. These materials were identified as debitage, tools, cores, and fire-cracked rock, representing a wide variety of locally available lithic material. Debitage composes 86.4% of the lithic assemblage, followed by fire-cracked rock at 10.6%. Approximately 3% of the lithic assemblage consisted of a variety of lithic tools. In total, 12 lithic tools were identified in the Cultural Zone 6 lithic assemblage and include two projectile points, a biface, two utilized flakes, a grinding stone, and four cores. The following discussion is a description of these lithic tools and their qualities (Appendices A and B for Non-Metric and Metric Projectile Point Analysis, and Appendices C and D for Non-Metric and Metric Worked Tool Analysis).
5.2.1 Projectile Points

Two projectile points were recovered from Cultural Zone 6 levels each from Unit 47 at a depth of 82 cm. The first (Cat. #6734; Figure 5.1) is incomplete, representing only the basal portion of a side-notched projectile point knapped from a heat-treated, brown and grey mottled chert. The projectile point fragment exhibits convex lateral margins, moderately shallow side-notches, and a thinned and straight basal edge. Flaking appears random with no overall pattern exhibited on the ventral and dorsal surfaces. Basal grinding is evident on this point as well as slight retouching on the upper portion of the right lateral margin on the dorsal surface. Based on the overall shape and characteristics of this point fragment, it has been identified as a Gowen Side-Notched point belonging to the Mummy Cave series (Cahill 2012).

The second projectile point identified (Cat. #6733; Figure 5.1) represents a complete projectile point fabricated from red, heat treated Swan River chert. This point is slightly asymmetrical with moderately convex lateral margins and moderately deep side notches. The basal margin is slightly concave, and has been thinned by retouch flaking. Overall, the workmanship exhibited on this point is of good quality. Initial identification by Cahill (2012) categorized the point as a Bitterroot Side-Notched, however it is more morphologically similar to a Gowen Side-Notched (Ernest Walker, personal communication 2016). Calcium buildup is exhibited on the ventral and dorsal surfaces.

![Figure 5.1: Cultural Zone 6 projectile points. a) Cat. #6734 b) Cat. #6733](image-url)
5.2.2 Biface

A single bifacial tool (Cat. #2063) was recovered from the Cultural Zone 6 levels (Figure 5.2), originating from Unit 14 at a depth of 84 cm below surface. This tool is triangular-shaped and composed of white Swan River chert. The dorsal surface displays randomized flake patterns. Retouch flaking is exhibited bifacially along the distal edge and unifacially along the lateral edges. Multiple working edges are present on this tool, one on the distal edge, and another on the left lateral edge. Based on its overall morphology, it is possible that this tool is a preform.

Figure 5.2: Cultural Zone 6 biface (Cat. #2063)

5.2.3 Utilized Flakes

Two utilized flakes were recovered from Cultural Zone 6. Two fragments (Cat. #s 969 and 1990; Figure 5.3), recovered from Unit 14 at a depth of 84 cm, join together to form a single utilized flake composed of light brown silicified wood. The dorsal surface of this artifact exhibits signs of flaking while the ventral surface exhibits a bulb of percussion and ripple marks. The distal end of this artifact is convex and exhibits retouch flaking. The right lateral edge is straight and also exhibits signs of retouch flaking, forming a working edge. White patination is present on the left lateral edge which it has been retouched to form a moderately concave working edge.

The second utilized flake (Cat. #2065; Figure 5.3) recovered from Cultural Zone 6 levels is composed of red feldspathic siltstone exhibiting a moderate polish on the dorsal surface. This
artifact was recovered from Unit 14 at a depth of 87 cm. The overall shape of this artifact is triangular, with the distal end forming the peak and the broken proximal edge forming the straight base. The dorsal surface shows the removal of a large longitudinal flake as well as retouch flaking along its right lateral edge.

Figure 5.3: Cultural Zone 6 utilized flakes a) Cat. #s 969 and 1990 b) Cat. #2065

5.2.4 Grinding Stone

A large, polymorphic grinding stone composed of dark grey gabbro was recovered from Unit 21, at a depth of 81 to 86 cm (Cat. #2388; Figure 5.4). The dorsal and left lateral surfaces are dome-shaped with no signs of use-wear present, while the ventral and right lateral surfaces are flattened. Use-wear, exhibited in the form of peck marks and transverse and longitudinal striations, is present on the ventral surface. Beyond this, there is no evidence for the intentional modification of this tool. The overall size of the implement is well suited to fit in the hand of the user and it does not appear that this artifact was hafted. Based on the use-wear patterns present, this tool was likely used for grinding purposes.
5.2.5 Cores

Four cores were identified in the lithic assemblage from Cultural Zone 6 (Figures 5.5 and 5.6). Three of these are polymorphic, one of which is composed of Swan River chert (Cat #4982), one of silicified wood (Cat. #959), and one of quartzite (Cat. #954). One core is a unifacial core composed of quartzite (Cat. #7970).
5.2.6 Lithic Material Distribution

Overall, the lithic artifacts recovered from Cultural Zone 6 are constructed from a wide array of locally sourced materials. For debitage from Cultural Zone 6, the lithic material
distribution is as follows: 28.2% consists of Swan River chert, 21.7% is miscellaneous cherts, 21.1% is silicified peat, 15.2% is quartzite, 5.1% is brown chalcedony, 3.8% is large-grained quartz, 1.5% is silicified wood, 1.1% is siltstone, 1.2% is basalt, and 1.1% consists of miscellaneous chalcedonies (Figure 5.7).

![Cultural Zone 6 Debitage Material Distribution](image)

**Figure 5.7:** Cultural Zone 6 lithic debitage material distribution

Regarding the lithic material distributions for worked tools, 36.4% consists of Swan River chert, 27.3% is silicified wood, 18.2% is quartzite, 9.1% is grey and white mottled chert, and 9.1% consists of gabbro (Figure 5.8).
5.3 Cultural Zone 6 Faunal Assemblage

The faunal assemblage from Cultural Zone 6 consists of 9335 faunal specimens, weighing 8584.02 grams total. Over 99% (n = 9241) of the faunal assemblage consisted of unidentifiable fragments. Approximately 0.01% of the recovered fragments were identifiable, with the number of identifiable specimens (NISP) count totalling to 94 and the minimum number of individuals (MNI) equalling seven. These were sorted into the most specific taxonomic categories possible (Table 5.1, Figure 5.10, and Figure 5.11 for a breakdown of NISP and MNI distributions). Specimens which lacked characteristics which could identify them to Species were classified based on their Genus, Family, or Class. These latter categories were further subdivided by size (ie: large, medium, and small). Each of these taxonomic categories and their representative specimens are discussed in detail below (Appendix I for a complete list of identified faunal specimens and their associated taxonomic categories).
### Table 5.1: Cultural Zone 6 NISP and MNI Totals

<table>
<thead>
<tr>
<th>Species</th>
<th>NISP</th>
<th>MNI</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bison</em> sp.</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td><em>Canis</em> sp.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rodentia</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Medium Ungulate</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Large Ungulate</td>
<td>61</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>93</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

### Figure 5.9: Cultural Zone 6 Number of Identifiable Specimens Species Distribution
3.1 Order Artiodactyla

3.1.1 Bison sp. (NISP = 19; MNI = 2).

A total of 19 faunal specimens and fragments were identified to the Genus Bison comprising 0.2% of the total faunal assemblage, and 51.2% of the identified faunal assemblage. Two axial elements were recovered from the assemblage and include one left-sided petrous portion of the temporal bone (Cat. #1061) and one left-sided maxillary molar (Cat. #8626). The majority of the specimens are appendicular, with six identified as right-sided elements, and six identified as left-sided elements. The right-sided appendicular elements include one fused central and 4th tarsal (Cat. # 4986), one distal humerus fragment (Cat. #4970), one internal carpal (Cat. #2908), two lateral malleoli (Cat. #s 7953 and 10319), and one glenoid fossa portion of a scapula (Cat. #2803). Elements originating from the left side include one astragalus (Cat. #8005), one lateral malleolus (Cat. #8598), one metatarsal (Cat. #5087), and one ulnar carpal (Cat. #5104). Based on the presence of two right-sided lateral malleoli, a minimum of two adult individuals are represented in the Cultural Zone 6 faunal assemblage.
5.3.1.2 Ungulate - Medium (NISP = 7; MNI = 1)

A total of seven fragments were identified as belonging to a medium-sized ungulate. These include two phalangeal elements (Cat. #s 2934 and 5931) and five tooth fragments (Cat. #964). As these elements are fragmentary, a more specific taxonomic designation could not be made. Overall, these fragments represent the presence of at least one individual from this category in the Cultural Zone 6 assemblage.

5.3.1.3 Ungulate - Large (NISP = 61; MNI = 1)

At least one adult, large-sized ungulate is represented by 61 elements and fragments recovered from the Cultural Zone 6 levels. These specimens include mostly appendicular elements, along with 33 tooth fragments which could not be more specifically identified (From Cat. #s 987, 1046, 1065, 1075, 2808, and 3130). A total of two appendicular elements, an internal carpal (Cat. #983) and an astragalus fragment (Cat. #8006), were identified as originating from the right side, and two elements, a fused 2nd and 3rd carpal (Cat. #5926) and a fused central and 4th tarsal (Cat. #5105), were identified as left-sided. The remaining appendicular elements could not be sided, and include a fused 2nd and 3rd carpal (Cat. #7986), one 1st phalanx (Cat. #7922), eight metapodial fragments (Cat. #s 2798, 4976, 5939, 7915, 7925, 7940, 7941, and 7951), two phalangeal fragments (Cat. #s 4977 and 7936), two superior sesamoids (Cat. #s 5143 and 5374), and eight sesamoid fragments (Cat. #s 980, 2937, 2938, 5089, and 5962).

5.3.2 Order Carnivora

5.3.2.1 Canis sp. (NISP = 3; MNI = 1).

Specimens identified as belonging to the Genus Canis include two miscellaneous tooth fragments (Cat. #8004) and one right-sided proximal humerus fragment (Cat. #5945; Figure 5.9). A more specific taxonomic placement was not possible due to the lack of definable attributes on the teeth and the humerus. However, based on the overall size of the humerus, the individual represented by this element is likely a wolf-sized adult canid. Overall, a minimum of one adult individual is represented in Cultural Zone 6.
5.3.3 *Order Rodentia* (*NISP = 3; MNI = 1*)

Three specimens, a left-sided mandible (Cat. #666), one complete vertebrae (Cat. #988), and one tooth fragment (Cat. #8009), represent the Order Rodentia in the Cultural Zone 6 levels. Given the lack of identifiable characteristics associated with these elements, a more specific taxonomic designation could not be made. Overall, these specimens represent a minimum of a single individual.

5.3.4 *Burned Bone Distribution*

Of the total faunal assemblage recovered from Cultural Zone 6, approximately 7.3% (*n = 675*) show evidence of burning in the form of blackening or charring, partial calcination, or total calcination. Approximately 34.8% of the total burned bone assemblage consists of fragments which exhibit only blackening or charring, 29.9% exhibits partial calcination, and 35.3% of the burned bone assemblage has been completely calcined.

The remaining burned bone assemblage (0.01%, *n = 5*) consisted of remains representing a *Bison* sp., a large-sized ungulate, and a large-sized mammal (Table 5.2). Bison is represented by one right-sided lateral malleolus (Cat. #7953), the large-sized ungulate by two sesamoid fragments (Cat. #s 2938 and 5374) and one astragalus fragment (Cat. #8006), and the large-sized...
mammal by one femur fragment (Cat. #1982). Of the total identified burned bone assemblage, 100% of the remains exhibit only blackening or charring.

**Table 5.2: Cultural Zone 6 Burned bone distributions**

<table>
<thead>
<tr>
<th>Species</th>
<th>Carbonized</th>
<th>Partially Calcined</th>
<th>Calcined</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bison</em> sp.</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large Ungulate</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large Mammal</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unidentified Bone</td>
<td>230</td>
<td>202</td>
<td>238</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>235</strong></td>
<td><strong>202</strong></td>
<td><strong>238</strong></td>
</tr>
</tbody>
</table>

**5.3.5 Cut Mark Distribution**

From the Cultural Zone 6 faunal assemblage, 0.21% (n = 20) of the remains exhibited cut marks. Of this total, 12 elements were identifiable, representing *Bison* sp., a large-sized ungulate, and a large-sized mammal. Specimens exhibiting cut marks and identified as belonging to *Bison* sp. include a right-sided internal carpal (Cat. #2908), and a 2nd phalanx (Cat. #4971). Faunal remains identified as originating from a large-sized Ungulate include a left-sided fused central and 4th carpal (Cat. #5105), a fragment from a phalangeal element (Cat. #7936), and a right-sided astragalus fragment (Cat. #8006). Lastly, specimens identified only as a large-sized mammal which exhibit cut marks include five miscellaneous long bone fragments (Cat. #s 2923, 4995, 7917, 7924, 10266, and 10317), and two rib fragments (Cat. #s 1493 and 10266) (Figure 5.12).
Figure 5.12: Cut marks (indicated by red arrows) exhibited on long bone fragments from a large mammal. a) Cat. #2923 b) Cat. #7917

5.4 Discussion and Interpretations

Two projectile points belonging to the Mummy Cave series and a radiocarbon date of 6,850 +/- 40 years BP places this occupation level well with the Early Middle period (Cahill 2012). The recovery of tools related to hunting and processing of animal remains, in association with FCR and large game fauna, demonstrates that the groups occupying Cultural Zone 6 were utilizing the Camp Rayner site as a habitation site. The season of occupation for the site during this time period cannot be ascertained. Based on the faunal and lithic assemblages, the occupants were using resources which were locally available within the South Saskatchewan River valley and the surrounding open plains. Further, they were actively hunting game which was readily available in these two ecozones (ie: large ungulates, primarily bison) and transporting these animals back to the site to be processed. Additionally, based on the lithic material distributions for this cultural zone, groups were primarily making use of locally available lithic sources for the construction of their stone tools. The Camp Rayner site’s vicinity to the South Saskatchewan River would have been strategically important for groups, especially during the onset of Hypsithermal conditions on the Northern Plains. Its location allowed for groups inhabiting the
site to efficiently utilize resources which were locally available making it an important habitation site for groups during the Early Middle period.

Identified remains in the faunal assemblage from Cultural Zone 6 are dominated by species belonging to the Order Artiodactyla and, given the size of many of these specimens and the habitat of the Northern Plains at this time, it is likely that a majority of them are bison. According to the MNI counts for this level, a minimum of two adult bison are present in the Cultural Zone 6 faunal assemblage. Bison likely occupied the surrounding plains habitat and may have ventured into river valleys and coulees for shelter during winter. As the Camp Rayner site is situated within easy access of each of these habitats, both would have been exploited by groups inhabiting the site during the Early Middle period, and ungulates were the preferred game.

The presence of one wolf-sized canid humerus in the faunal assemblage is difficult to explain and it is not immediately possible to draw conclusions regarding its presence. This is not uncommon for Early Middle period sites as the faunal assemblages from the Gowen I and II sites (Walker 1992) and the Dog Child site (Pletz 2010) have produced canid remains of variable size. It is possible that this animal was killed for subsistence purposes, however, no evidence is exhibited to indicate that this is the case. According to ethnographic sources, canids have served a wide variety of practical and ideological functions for Northern Plains cultural groups. Primarily, dogs were utilized as draft animals, hauling wood and other goods through the use of travois, or two long poles that were attached to the animal’s back (Morey 1986). Among some Northern Plains cultures, such as the Arikara and Arapahoe, dogs and other wild canids were exploited as a food resource, though often this was only done in ceremonial contexts (Morey 1986). Additionally, wild canids were readily exploited for their skins which were used for clothing, as well as their bones which were used in the making of ornaments and tools (Morey 1986). The exact function of the wolf-sized canid recovered from Cultural Zone 6 at Camp Rayner is not readily apparent, however, given the historical context of canids among Native American groups, its role as a source of labour, food, clothing, or other materials should not be ruled out.

From the lithic assemblage discussed above, the materials utilized by groups occupying Cultural Zone 6 consist solely of those which are locally available with a high preponderance of Swan River chert followed by miscellaneous cherts, silicified peat, and quartzite. According to Eldon Johnson’s Properties and Sources of Saskatchewan Lithic Materials (1986), Swan River
chert has been utilized throughout the Precontact period by various groups, excepting those belonging to the fluted point traditions. Though specific the source of this material is not known, Swan River chert flakes and nodules can be found throughout southern Saskatchewan. The same is true for silicified peat, silicified wood, and quartzite (Johnson 1986). Exotic materials were not readily identified in the lithic tool assemblage, thus it is clear that a focus was on locally available lithic materials. This may be due to the restrictive nature of the Hypsithermal climates at this time, as the height of warmth and aridity affected the Northern Plains between 8,000 and 5,000 years BP (Yansa 2007).

The presence of a grinding stone recovered from Cultural Zone 6 has interesting implications for the subsistence strategies at the Camp Rayner site during the Early Middle period. Though it is difficult to make any conclusions regarding the specific use of this implement, grinding stones can be used for a variety of purposes including the processing of floral and faunal resources. These implements have been recovered from various other Early Middle period sites on the Northern Plains, though their intended use has yet to be determined (Frison 1998). Some researchers hypothesize that the occurrence of grinding tools in the Early Middle period is evidence for the exploitation of plant resources (Frison 1998; Robertson 2004). Unfortunately, very little in-depth analysis has been conducted on plant resource utilization during the Early Middle period and there is no direct evidence that these grinding implements were intended as plant processing devices (Frison 1998). Use-wear patterns in the form of peck marks and striations indicate that the grinding stone recovered from Cultural Zone 6 was used for both grinding and crushing purposes. As such, it is difficult to conclude that the intended use for this implement was plant processing. However, given the site’s vicinity to the river valley and coulees, which would have supported plant species that could have been exploited by human groups, this activity should not be completely ruled out. Overall, further analysis is needed before conclusions can be made regarding Early Middle period plant utilization at the Camp Rayner site.

Based on the faunal and lithic material recovered from Cultural Zone 6, the Camp Rayner site played an important role for Early Middle period groups inhabiting the site. Given the site’s close proximity to the South Saskatchewan River, this site would have maintained adequate quantities of floral and faunal resources which could have been exploited by groups during this time. The presence of large-game fauna indicates that groups were able to continually exploit
these animals throughout the onset of the Hypsithermal on the Northern Plains. Further, the predominance of locally available lithics in the stone tool assemblage may be indicative of two possibilities. As Hypsithermal conditions peaked during the Early Middle period, it may be that groups were forced to restrict their movements to areas with constant and reliable food and water sources. The predominance of locally available lithics in the assemblage may indicate the restriction of group movements as conditions on the Northern Plains deteriorated. Alternatively, lithic resources, such as Swan River chert, are of adequately good quality and see usage throughout the Precontact period (Johnson 1986). Thus, it may simply be that groups at the Camp Rayner site preferentially chose locally available lithics rather than exerting energy and effort to collect exotic materials. Overall, the Camp Rayner site acted as an important campsite during the Early Middle period, where the necessities for survival were readily attainable.
Chapter 6
CULTURAL ZONE 7

6.1 Introduction

For each cultural level, faunal and lithic remains were analyzed to ascertain their relative abundances and potential patterns which may indicate the subsistence and mobility practices of the group (or groups) occupying the Camp Rayner site during the Terminal/Late Paleoindian period. According to Cahill (2012), Cultural Zone 7 spans a depth range between 95 cm to 115 cm below surface. A total of three radiocarbon dates were obtained for this level. Two of these were obtained from bone samples (Cat. #1823 and #5087) taken from Cultural Zone 7, yielding conventional radiocarbon dates of 7890 +/- 30 BP (Beta-414918) and 7820 +/- 30 BP (Beta-414914). The third was established by Cahill (2012) which produced a radiocarbon date of 7880 +/- 40 BP (Beta-321403). These dates fall well within the established age range for the Terminal/Late Paleoindian period (7,500 to 8,800 years B.P.), which is further supported by the presence of projectile points associated with this period. The following is a discussion of the lithic and faunal materials recovered from Cultural Zone 7 at the Camp Rayner site.

6.2 Cultural Zone 7 Lithic Analysis

From the Cultural Zone 7 levels, a total of 1,855 pieces of lithic material, weighing 2,045 grams, was recovered and includes fragments of debitage and fire-cracked rock (FCR), along with cores and a variety of tools. Debitage composes 93.2% of the lithic assemblage and approximately 5.2% of the assemblage consists of FCR. The remaining 2.6% of the recovered lithics consists of worked tools which include projectile points, bifaces, endscrapers or sidescrapers, gravers, unifaces, and utilized flakes. The following is a discussion of these tools and their attributes (Appendices E and F for Projectile Point Metric and Non-Metric Analysis; Appendices G and H for Worked Too Metric and Non-Metric Analysis).
6.2.1 Projectile Points

In total, four projectile points were recovered from the Cultural Zone 7 levels from Units 6 and 28 (Figure 6.1). Based on their overall morphology, each of these specimens have been identified as belonging to the Terminal/Late Paleoindian period.

6.2.1.1 Lovell Constricted Projectile Point

The first projectile point (Cat. #5155) recovered from the Cultural Zone 7 levels has been identified as a Lovell Constricted projectile point composed of white and grey, heat-treated Swan River chert. This particular point is morphologically distinct in the assemblage, displaying large side notches on the lower lateral margins which extend from below the mid-point to the basal margin. This results in a basal stem with a concave basal margin that exhibits thinning and retouch. The distal end of this projectile point is not triangular or pointed, as would be expected, but has been reworked into a rounded, convex shape. Overall, the quality of workmanship on this point is moderately good, however it is likely that it was impeded due to the poor quality of the Swan River chert.

6.2.1.2 Lusk Projectile Points

Three of the recovered projectile points (Cat. #1932, 5154, 5156) were identified as belonging to the Lusk complex, as indicated by their lanceolate-shape and overall morphology. Each of these projectile points are incomplete, with only the lower and basal portions remaining, and each exhibit good quality workmanship consistent with Paleoindian projectile points.

Catalogue #1932 consists of the body and basal portion of a broken lanceolate projectile point constructed of white, heat-treated Swan River chert. The base of this projectile point is concave and asymmetrical, and has been thinned by retouch flaking. Each of the lateral edges are moderately convex and the point has been broken transversely immediately proximal to the midway point of the body. Overall, the quality of workmanship on this projectile point is good, although limited by the poor quality of the material used.

The second projectile point (Cat. # 5156) identified as belonging to the Lusk complex consists of the basal fragment of a lanceolate point constructed from brown chalcedony. This projectile point has been broken transversely and a hinge fracture is present along the ventral
surface of the right lateral edge. Based on the remaining portion of this point, the lateral sides of this artifact are moderately convex and lacking notches. The basal edge is convex with no signs of grinding or deliberate retouch flaking. As with the previous projectile points, this artifact also exhibits high quality workmanship.

The last projectile point identified as belonging to the Lusk complex (Cat. #5154) consists of a basal fragment constructed of a mottled blue and white, heat-treated Swan River chert. Overall, the remaining portion of this projectile point is lanceolate in morphology with lateral edges that are moderately convex and lacking notches. The base of this point is straight and has been thinned with pressure flaking. The quality of knapping exhibited on this artifact is good, with transverse pressure flake scars present along the lateral edges of the dorsal and ventral surface.

![Image](image_url)

**Figure 6.1**: Terminal/Late Paleoindian projectile points from Cultural Zone 7. a) Cat. #5155 b) Cat. #1932 c) Cat. #5156 d) Cat. #5154

### 6.2.2 Bifaces

Four bifaces (Cat. #s 7435, 1903, 1904, and 2682) were recovered from the Cultural Zone 7 lithic assemblage (Figure 6.2), and, of these four, three are incomplete (Cat. #s 7435, 1903, and 1904). Catalogue #7435 is constructed from pink, heat-treated Swan River chert with the distal and lateral ends broken from the main body. The remaining lateral edges range from straight to
moderately convex. The transverse cross section of this biface is biconvex and the knapping quality reflects relatively fine workmanship. Bifacial retouch is present on both lateral edges. Give its overall morphology and the quality of knapping exhibited, it is possible that this artifact represents a projectile point preform.

Fabricated from silicified peat, Catalogue #1903 is the proximal half of a biface that has been broken diagonally, leaving the distal end which is convex in shape and exhibits retouch flaking. The remaining lateral edges of this biface are relatively convex. The transverse cross sections of this biface is biconvex. There is a significantly greater degree of knapping present on the dorsal surface than on the ventral. Given its overall morphology, it is possible that this biface represents a projectile point preform or a scraping tool.

Similar to Catalogue #1903, Catalogue #1904 also is the proximal end of a biface, though is constructed of grey and white Swan River chert. Overall, the quality of workmanship is rather rough and retouch flaking is present along the left lateral edge. The lateral sides of this artifact are moderately convex along with its proximal end. The transverse cross section of this artifact is biconvex, although the dorsal surface is significantly more convex than the ventral surface. As there is no evidence of use wear, it is likely that this artifact represents a bifacial preform.

Finally, constructed of red, heat-treated Swan River chert, Catalogue #2682 is a triangular-shaped biface. Overall, this artifact has been roughly flaked along its lateral edges and ventral and dorsal surfaces. Retouch flaking is present along the left lateral edge which is moderately straight. The right lateral edge is convex and distal edge are convex with no evidence of retouch flaking. The longitudinal cross section of this artifact is biconvex as is the transverse cross-section. Each of the lateral sides merge at the proximal end to form a rough V-shape, though a portion of this end has been broken off. Based on the artifact’s overall morphology, it likely represents a bifacial preform.
6.2.3 Uniface

A single uniface (Cat. #2995) was identified within the Cultural Zone 7 assemblage (Figure 6.3). This artifact is constructed of a grey-brown quartzite and is roughly ovoid in shape with a convex distal edge and a diagonal, straight proximal edge. Large flakes have been removed from the dorsal surface and a small amount (<25%) of the cortex remains intact. Some retouch flaking is present along the dorsal surface of the lateral and distal edges. The transverse and longitudinal cross sections of this artifact are plano-convex and the lateral and distal edges are moderately convex. The intended use for this artifact is unclear, although given its overall shape and morphology, it may have been utilized for scraping purposes.
6.2.4 Scrapers

One spurred endscraper (Cat. #2853), two endscrapers (Cat. #s 7450 and 5126) and one end/sidescraper (Cat. #2854) were recovered from the Cultural Zone 7 lithic assemblage (Figure 6.4). Catalogue #2853 is a spurred endscraper constructed of white and yellow, heat-treated Swan River chert. Flaking is unifacially restricted to the dorsal surface and retouch flaking is present along the distal and lateral edges. The distal edge is convex in shape and each of the lateral edges meet at the proximal end to form a point, resulting in an overall “inverted teardrop” shape. The left and right lateral edges of this endscraper have been uniquely reworked to form spurred projections.

Constructed of grey, heat-treated Swan River chert, Catalogue #7450 has also been identified as an endscraper. The proximal half of this artifact has been broken off and the edge of the remaining distal end is convex. The left lateral edge is moderately concave, while the right lateral edge is straight. This artifact has been unifacially flaked, and a longitudinal, flute-like scar is exhibited on the dorsal surface. Retouch flaking is present along the distal edge.

Catalogue #5126 has been identified as a small endscraper constructed of brown chalcedony. Overall, this endscraper is moderately rectangular, with a distal working edge that is convex and wider than the proximal end. This tool has been unifacially flaked and retouch is
present on the distal and lateral edges. Overall, the quality of workmanship on this tool is good. The proximal end exhibits polish and is smooth, as is the right distal corner, indicating use-wear.

Catalogue #2854, constructed of brown chert, has been interpreted as both an endscraper and a sidescraper based on its overall morphology. This artifact is asymmetrically rectangular in shape with a distal end that is longer than the proximal, and a right lateral edge longer than the left. The left lateral edge is slightly concave and the right is convex as is the distal end. This artifact has been unifacially shaped and retouch flaking is present along the distal and lateral edges.

![Figure 6.4: Scrapers recovered from Cultural Zone 7. Spurred Endscraper: a) Cat. #2853; Endscrapers b) Cat. #7450 c) Cat. #5126; End/sidescraper d) Cat. #2854](image)

### 6.2.5 Graver

One graver (Cat. #5159), constructed of heat-treated Swan River chert was recovered from the Cultural Zone 7 levels (Figure 6.4). The overall shape of this artifact is triangular. Flaking is unifacially restricted to the dorsal surface and retouch flaking is exhibited along each of the lateral sides and is most apparent near the distal tip of the graver. The left lateral edge is moderately straight, whereas the right lateral edge is concave near the distal tip and rounds to convex nearer to the proximal edge. The proximal edge is convex and in profile is perpendicular, displaying moderate polish which may indicate use-wear. Given the retouch flaking on the distal
end to form a pointed tip and the use-wear exhibited along the artifact’s proximal edge, this artifact was likely utilized as a graver and a scraper.

![Image of Graver](image)

**Figure 6.5:** Graver (Cat. #5159) recovered from Cultural Zone 7

### 6.2.6 Gouge

Roughly ovoid in shape, with a straight to moderately concave distal edge, Catalogue #2952 is constructed of red and brown quartzite. Flakes have been removed from the ventral and dorsal surfaces, with cortex still intact on each surface, and no additional retouch flaking is present. The distal edge shows considerable wear, especially along the right lateral half, indicating that this tool was used for scraping or cutting purposes. No other wear is present on this tool, and there is no evidence that it was hafted. Based on its overall morphology, and resemblance to gouges recovered from the Gowen I and II sites (Walker 1992), this artifact has also been interpreted as a gouge (Figure 6.6).
Figure 6.6: a) Gouge (Cat. #2952) recovered from Cultural Zone 7 b) Gouge recovered from the Gowen II site

6.2.7 Grinding Stones

Two grinding stones (Cat. #s 2857 and 1893) were recovered from the Cultural Zone 7 levels. The first (Cat. #2858; Figure 6.7) is constructed of large-grained quartz sandstone that is of relatively poor quality. This grinding stone is polymorphic in shape with no discernable evidence for intentional modification. The ventral surface is flat and exhibits use-wear in the form of peck marks, striations, and polish, making it considerably smoother than the other surfaces. As such, it is likely that this tool was used for both grinding and crushing purposes.
Catalogue #1893 (Figure 6.8) is an enigmatic ground stone tool constructed from orange quartzite. Regarding its overall shape, the artifact can best be described as a quartered sphere, or “orange wedge”. The dorsal surface is longitudinally and transversely convex, and consists entirely of cortex. The ventral surface is straight longitudinally, and triangular from a transverse perspective, with no cortex present. The ventral surfaces which form the sides of the triangle are completely flat and smooth. It is difficult to discern the manner in which this artifact was shaped as there is a general lack of evidence to indicate whether it was flaked or ground. It is possible that the shape of this artifact is simply a product of nature, where a cobble was broken and smoothed over time through erosional processes. Overall, the intended use for this artifact is difficult to interpret. Use wear in the form of transverse striations are present on the ventral surface and the lateral edges are moderately rounded. Given this, it is most likely that this artifact was utilized as a grinding stone.
6.2.8 Utilized Fragments

In total, four utilized fragments (Cat. #s 4798, 5157, 2975, and 2944; Figure 6.9) were identified in the Cultural Zone 7 lithic assemblage. Constructed of blue Swan River chert, Catalogue #4798 is a polygonal-shaped utilized flake. The right and left lateral edges, as well as the distal edge of this artifact are straight, while the proximal edge is convex. Bifacial flaking is exhibited on this utilized flake in addition to retouch flaking along the proximal edge. From a transverse perspective, the artifact is plano-convex in profile, with a convex dorsal surface and a moderately concave ventral surface.

Catalogue #5157 is a polymorphic utilized flake fabricated from heat-treated Swan River chert. The artifact has been roughly knapped into its present shape and its current condition can be attributed to the poor quality of the Swan River chert utilized. Retouch flaking is present along the proximal and right lateral edges. The proximal edge has been reshaped to form a concavity that has been interpreted as a spokeshave.

Catalogue #2975 is constructed of yellow, heat-treated Swan River chert. The left lateral edge is straight and the right lateral edge is convex. The distal and proximal edges are each convex. Retouch is exhibited along the distal edge and the left lateral edge. Flaking is restricted to the dorsal surface.
Finally, Catalogue #2944 is constructed of Swan River chert and is roughly rectangular in shape. The right lateral edge is moderately convex while the left lateral edge is moderately concave. The distal and proximal edges are moderately convex. Unifacial flaking is present on the dorsal surface with retouch flaking exhibited along the right lateral edge.

![Image of utilized fragments recovered from Cultural Zone 7](image)

**Figure 6.9:** Utilized fragments recovered from Cultural Zone 7a) Cat. #4798 b) Cat. #5157 c) Cat. #2975 d) Cat. #2944

### 6.2.9 Lithic Material Distributions

As mentioned, the majority (93.2%) of the lithic material recovered from Cultural Zone 7 consists of debitage. Regarding the lithic material distribution for debitage, 46.1% consists of silicified peat, 22.6% is miscellaneous chert, 14.8% is brown chalcedony, 11.2% is Swan River chert, 0.66% is silicified wood, 0.22% is siltstone, 0.22% is miscellaneous chalcedonies, 0.11% is basalt, 0.05% is large crystal quartz, and 0.05% is sandstone (Figure 6.10). For the remaining 2.6% of the assemblage, consisting entirely of worked tools, the material distribution is as follows: 55.6% are Swan River chert, 18.5% consist of quartzite, 18.5% are chert, 3.7% are silicified peat, and 3.7% consist of brown chalcedony (Figure 6.11).
Figure 6.10: Cultural Zone 7 lithic debitage material distribution

Figure 6.11: Cultural Zone 7 lithic tool material distribution
6.3 Cultural Zone 7 Faunal Assemblage

In total, 6,421 faunal specimens, weighing 5,693.8 g, were recovered from Cultural Zone 7, 98.5% (n = 6329) of which consisted of unidentifiable fragments. Fragments which could be identified were sorted into the most specific taxonomic category possible based on the characteristics exhibited. If specimens lacked identifiable characteristics which would indicate their Species, and could only be identified to Genus, Family, or Class, they were further subdivided based on size (ie: large, medium, and small). As the class Mammalia is broad and not necessarily indicative of species present in the region, these were excluded from the discussion. The number of identifiable specimens (NISP) amounts to 95, representing a minimum of 13 individuals (Table 6.1 and Figure 6.15 for a breakdown of NISP counts; Table 6.1 and Figure 6.16 for MNI counts and their distributions). Each of these taxonomic categories and their respective specimens are discussed in detail below (Appendix K for identified faunal remains and their associated taxonomic categories).

Table 6.1: Cultural Zone 7 NISP and MNI Totals

<table>
<thead>
<tr>
<th>Species</th>
<th>NISP</th>
<th>MNI</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bison</em> sp.</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Cervidae - Large</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ungulate - Large</td>
<td>67</td>
<td>2</td>
</tr>
<tr>
<td>Canidae sp.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Castor canadensis</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Homo sapiens</em></td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Leporidae sp.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><em>Lepus americanus</em></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><em>Spermophilus richardsonii</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Thomomys talpoides</em></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>
Figure 6.12: Cultural Zone 7 Number of Identified Species Distribution

Figure 6.13: Cultural Zone 7 Minimum Number of Individuals Species Distributions
6.3.1 Order Artiodactyla

6.3.1.1 Bison sp. (NISP = 12; MNI = 2)

A total of 12 specimens, consisting of mostly appendicular elements, were identified as belonging to the Genus *Bison*. Axial elements are composed primarily of teeth, and include the left 2\textsuperscript{nd} and 3\textsuperscript{rd} mandibular molars (Cat. #1879), as well as the right 2\textsuperscript{nd} maxillary premolar (Cat. #2037). Left-side appendicular elements include one calcaneus (Cat. #s 1606 and 1823), one astragalus (Cat. #1608), a fused central and 4\textsuperscript{th} tarsal (Cat. #1609), a distal tibia fragment (Cat. #1855), an ulnar carpal (Cat. # Cat. #1870), a distal humerus fragment (Cat. #2039), and a fused 2\textsuperscript{nd} and 3\textsuperscript{rd} carpal (Cat. #3148). A single element, a fused 2\textsuperscript{nd} and 3\textsuperscript{rd} carpal (Cat. #1879) was identified as a right-side element. Lastly, only one element, an unfused femoral head (Cat. #1830) could not be sided. The MNI count for *Bison* sp. in the Cultural Zone 7 levels is two, representing one adult and one immature individual.

6.3.1.2 Cervidae – Large (NISP = 1; MNI = 1)

A single specimen was attributed to the taxonomic category of large-sized Cervids and was identified as a right-side 2\textsuperscript{nd} mandibular molar (Cat. #2145). This specimen represents a minimum of one adult individual belonging to this taxonomic category in the Cultural Zone 7 faunal assemblage.

7.2.1.3 Ungulate – Large (NISP = 67; MNI = 2)

A total of 67 whole and partial bone fragments make up the taxonomic category of large-sized ungulates, and include a mix of appendicular and axial elements. Axial elements include 54 miscellaneous tooth fragments (Cat. #s 1861, 1891, 2159, 2160, 2161, and 2967), two vertebral fragments (Cat #s 1874 and 2004; Cat. #2004 is represented by an unfused articular facet), one right 1\textsuperscript{st} incisor (Cat. #2038), and one left-sided 2\textsuperscript{nd} maxillary molar (Cat. #2009). The remaining appendicular elements could not be sided, but include a 3\textsuperscript{rd} phalanx (Cat. #2965), a 2\textsuperscript{nd} phalanx (Cat. #1831), an unfused epiphyses from a distal humerus (Cat. #s 2026, 2027, and 2028), two superior sesamoids (Cat. #s 2020 and 10453), one inferior sesamoid (Cat. #2021), and three unidentified sesamoids (Cat. #10491, 6951, and 2014). Based on the presence of both mature
and immature specimens, the MNI count for this category is two and consists of one adult and one immature individual.

6.3.2 Family Canidae sp. (NISP = 1; MNI = 1)

The Family Canidae is represented by a single caudal vertebrae (Cat. #1856). This specimen represents a minimum of one adult canid in the Cultural Zone 7 faunal assemblage.

6.3.3 Order Lagomorpha

6.3.3.1 Lepus americanus (NISP = 3; MNI = 2)

In total, 3 specimens represent the species Lepus americanus, or snowshoe hare, in the Cultural Zone 7 faunal assemblage (Figure 6.12). These include two left mandibles (Cat. #s 1848 and 2043) and one right maxilla (Cat. #1849). Overall, these specimens represent a minimum of two adult individuals belonging to this species.

Figure 6.14: Lepus americanus specimens from Cultural Zone 7. a) Cat. #1849 b) Cat. #1848 c) Cat. #2043
6.3.3.2 *Leporidae* sp. (*NISP* = 3; *MNI* = 1)

Specimens which could only be identified to the Family Leporidae include three lophodont tooth fragments (Cat. #2877). As these specimens are incomplete and do not have identifiable landmarks, they could not be more specifically identified. These tooth fragments are representative of at least one individual.

**67.3.4 Order Rodentia**

6.3.4.1 *Castor canadensis* (*NISP* = 1; *MNI* = 1)

A single specimen, identified as a left, unfused distal portion of a tibia (Cat. #2962) was identified as belonging to the species *Castor canadensis*, or North American beaver (Figure. 6.13). This element represents a minimum of one immature individual of this taxonomic category recovered from the Cultural Zone 7 faunal assemblage.

![Figure 6.15: Specimen from immature Castor canadensis (Cat. #2962).](image)

6.3.4.2 *Spermophilus richardsonii* (*NISP* = 1; *MNI* = 1)

An incomplete cranium (Cat. # 1839) was identified to the species *Spermophilus richardsonii*, or Richardson’s ground squirrel. This specimen represents a minimum of one adult
individual, however, given the subterranean behaviour of this species, it is likely that this specimen is intrusive into the Cultural Zone 7 levels.

6.3.4.3 Thomomys talpoides (NISP = 2; MNI = 1)

Two mandibles, one right (Cat. #1840) and one left (Cat. #1852), represent the species Thomomys talpoides, or Northern pocket gopher, in the Cultural Zone 7 faunal assemblage. These elements indicate that at least one adult individual is present in the assemblage, though based on the subterranean behaviour of the Northern pocket gopher, it is likely that this individual is intrusive.

6.3.5 Order Primates

Homo sapiens (NISP = 4; MNI = 1)

Specimens identified as human include a right pisiform (Cat. #671), a right 4th metacarpal, a fragment from a metacarpal, and a fragment of a vertebrae (Cat. #651) (See Figure 6.14). The presence of human bones in the assemblage is attributed to the burial located in the northwestern corner of the Camp Rayner site. These specimens were recovered from Unit 9, Levels 12, 13, and 14, where the human interment was uncovered and subsequently reburied during the 1987 field season. It is likely that these elements were misidentified as belonging to a species other than human, and were not reburied with the individual. This small collection indicate that the individual to which they belong is an adult.
6.3.6 Burned Bone Distribution

Approximately 6.3% of the Cultural Zone 7 faunal assemblage exhibits evidence of burning in the form of carbonization, partial calcination, or complete calcination. Of this total, 15.9% of the burned bone assemblage has been burned, or carbonized, 40.3% has been partially calcined, and 43.8% has been completely calcined.

The majority of the burned bone assemblage (99.5%) consists of remains which are unidentifiable. The remaining identifiable assemblage is represented by a tooth fragment (Cat. #2160) and a superior sesamoid (Cat. #10514), each identified as belonging to a large-sized Ungulate. These specimens exhibit only carbonization and no calcination (See Table 6.2).
### Table 6.2: Cultural Zone 7 Burned Bone Distributions

<table>
<thead>
<tr>
<th>Species</th>
<th>Carbonized</th>
<th>Partially Calcined</th>
<th>Calcined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Ungulate</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unidentified bone</td>
<td>62</td>
<td>162</td>
<td>176</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>64</strong></td>
<td><strong>162</strong></td>
<td><strong>176</strong></td>
</tr>
</tbody>
</table>

### 6.3.7 Cut Marks

In total, 18 specimens (or 0.3% of the faunal assemblage) exhibited cut marks. Of these, six were identifiable, and include the taxonomic categories of large-sized ungulates and large-sized mammals. One specimen, an inferior sesamoid (Cat. #2021), was identified as originating from a large-sized ungulate. The remaining specimens, two rib fragments (Cat. #s1885 and 2149) and a tibia fragment (Cat. #2959), could only be identified as belonging to a large-sized mammal.

### 6.4 Discussion and Interpretations

Based on the projectile points typologies identified and radiocarbon dates established for Cultural Zone 7, the lowest occupation levels at the Camp Rayner site are firmly set within the Terminal/Late Paleoindian period. From the lithic and faunal assemblages recovered from Cultural Zone 7, it would appear that the group (or groups) were utilizing the Camp Rayner site as a habitation site. The presence of fauna traditionally known as prey species (large ungulates, rabbit, and beaver) indicates that the occupational group(s) were actively hunting these animals and transporting their remains back to the site to be processed. The presence of tools associated with tool making, hunting, and animal butchering demonstrates that the Camp Rayner Site acted as a “base of operations” where groups not only prepared for the hunt, but processed the products of that hunt. Furthermore, the species represented in the faunal assemblage point towards a broadened subsistence base where smaller animals were exploited alongside bison. Regarding lithics, the predominance of locally available materials present in the assemblage indicates that Terminal/Late Paleoindian groups made active use of resources which were found within the South Saskatchewan River basin. With faunal and lithic resources readily available at the Camp
Rayner site, and the site’s close proximity to the South Saskatchewan River, this occupation would have been strategically beneficial to Terminal/Late Paleoindian groups on the Northern Plains.

Species represented in the Camp Rayner faunal assemblage from Cultural Zone 7 were readily available in the South Saskatchewan River basin. Bison and other ungulates occupied the surrounding plains habitats and may have ventured into the river valleys and coulees for shelter. Small mammals, such as snowshoe hare (Lepus americanus) and beaver (Castor canadensis), tend to occupy more sheltered habitats such as valleys and coulees. Beavers more specifically occupy riverine or wetland environments. As such, based on these remains, Terminal/Late Paleoindian groups at the Camp Rayner site were exploiting both the open plains and river valley environments for subsistence purposes. Further, given the variety of species present in the assemblage, it does not appear that these groups were focusing their efforts on large-game fauna alone. While there is considerable representation of large ungulates in the assemblage, smaller mammals are also present. Lower NISP counts for small mammal specimens can be attributed to differential preservation of small elements versus large elements, where large-sized specimens are more likely to preserve than small-sized specimens (Grayson 1984). Based on MNI counts, there is equal representation of both large-sized ungulates and small-sized mammals. As such, rather than focusing their efforts on one species of animal, groups occupying the Camp Rayner site during the Terminal/Late Paleoindian were practicing more of a broad-range approach, exploiting bison and small mammals with equal emphasis.

Based on the lithic material types recovered from Cultural Zone 7, the distributions reflect a primary utilization of locally sourced raw lithic materials. A significantly high proportion of the recovered lithic debitage consists of silicified peat (46.1%), and the majority of worked lithic tools recovered from these levels consist of Swan River chert (52.4%). Each of these material types are known to occur in high concentrations along what are now the western shores of Lake Diefenbaker and all of the material types identified are locally available in Saskatchewan (Johnson 1986). The lack of exotic materials demonstrates that groups either preferred to use lithics which were locally available, or were forced to restrict their movements to within the river valley and the immediate area. Overall, the lithic assemblage at the Camp Rayner site’s Cultural Zone 7 occupation indicates primary utilization of locally available raw lithic materials. This is a
departure from the practices of earlier Paleoindian cultures, where exotics were preferentially chosen in the formation of lithic tools (Bamforth 2002).

Tools of particular interest recovered from the Cultural Zone 7 levels include the gouge (Cat. #2952) and the grinding stones (Cat. #2857 and #1893). Artifacts interpreted as gouges have been recovered from the Gowen I and II sites located on the South Saskatchewan River, near Saskatoon, Saskatchewan (Walker 1992). These artifacts share morphological similarities with the gouge recovered from the Cultural Zone 7 levels at the Camp Rayner site. Walker (1992) describes gouges as having a straight to convex working edge which exhibits distinctive use-wear. These tools are typically manufactured from either quartzite cobbles or split chert pebbles. Based on the use-wear patterns exhibited by these tools it is believed that they functioned as scrapers for non-pliable material, such as wood or bone (Walker 1992). As the gouge recovered from the Camp Rayner Site shares the characteristics exhibited by the gouges recovered from the Gowen Sites, it is possible that this tool had a similar function.

The grinding stones recovered from the Cultural Zone 7 levels have interesting implications for the activities occurring at the Camp Rayner Site during the Terminal/Late Paleoindian period. As with the grinding stone recovered from the Cultural Zone 6 levels, it is possible that these implements were also utilized for purposes which include the processing of floral and faunal resources. Plant species which could have been exploited, such as berries and roots, are readily available in the river valleys and coulees of the South Saskatchewan River and it is possible that these resources were also available in this area during the Terminal/Late Paleoindian period. Accordingly, it is not unlikely that these resources were exploited by groups who occupied the site during this era. Further, it may be that as Hypsithermal conditions began forcing groups to adapt to decreased resource availability, plant utilization became commonplace in the Terminal/Late Paleoindian period, onwards (Frison 1973; Robertson 2004). Again, as with the grinding stone recovered from Cultural Zone 6, it is difficult to draw conclusions regarding the intended use for the Cultural Zone 7 grinding stones.

Based on the material, both faunal and lithic, recovered from Cultural Zone 7, it is clear that the Camp Rayner site acted as an important habitation site for groups during the Terminal/Late Paleoindian on the Northern Plains. Floral, faunal, and lithic resources were readily available in the South Saskatchewan River basin and surrounding plains and based on the assemblage, these sources were actively exploited. Further, the presence of a human burial
within these levels reinforces this notion, indicating the Camp Rayner site retained some level of significance for Terminal/Late Paleoindian groups. It is possible that as Hypsithermal conditions began taking hold on the Northern Plains, the strategic placement of this site would have been highly beneficial for survival during times of resource scarcity.
7.1 Introduction

The Camp Rayner site is one of few archaeological sites containing components which date to the Late/Terminal Paleoindian and Early Middle periods. Accordingly, the data from this site are of high scientific importance as they can aid in providing a clearer understanding of the various patterns of human activity taking place on the Northern Plains at this time. As mentioned, there are comparatively few sites on the Northern Plains dating to these time periods. However, data which have been gathered from Terminal/Late Paleoindian and Early Middle period sites indicate a shift in settlement patterns, mobility, and subsistence practices. Furthermore, these adaptations reveal the manner in which groups were reacting to Hypsithermal climates. Of the four models discussed in Chapter 3 of this thesis, no single one can fully explain the adaptations undertaken by human groups during the Hypsithermal. Rather, as suggested by the data, it would appear that the reality is a mix of the “Refugium Model”, first introduced by Hurt (1966), and the “Plains Forager Model”, a hypothesis that has developed over the years from the works of Jennings (1957), Frison (1975), Walker (1992), and Yansa (2007). The tenets of these models is reflected in the data gathered from Hypsithermal-era sites, where groups are focusing their movements in regions less affected by Hypsithermal conditions and broadening their subsistence bases to account for reduced resource availability (Schiele and Walker 2013). Notably, these adaptations which are more often associated with the Early Middle period on the Northern Plains are clearly present in the earlier, Terminal/Late Paleoindian period.

In this portion of the thesis, the data gathered from a wider range of sites will be expanded upon as they are vital in providing a clearer understanding of the transition between the Terminal/Late Paleoindian and Early Middle periods on the Northern Plains. These data will be compared to those which were gathered from the Camp Rayner site in an effort to provide context for the Cultural Zones 6 and 7 assemblages and situate them within the broader patterns of human behaviour established from other contemporaneous archaeological sites. Terminal/Late Paleoindian sites chosen for comparison include the Boss Hill site (Doll 1982), the Tuscany site...
(Oetelaar 1998), the St. Louis site (Amundson et al. 2005), and the Hawkwood site (Van Dyke and Stewart 1985). The St. Louis site (Amundson et al. 2005; Johnston 2005) and the Hawkwood site (Van Dyke and Stewart 1985) also contain components dating to the Early Middle period and will be included in the list of comparative sites for this time period. Early Middle period comparative sites will also include the Below Forks site (Johnston 2005), the Dog Child site (Pletz 2010), the Atkinson site (Nicholson and Playford 2009), the Stampede site (Falzarano 2014), and the Gowen I and II sites (Walker 1992) (Figure 7.1). Though sites dating to the Terminal/Late and Early Middle periods are not limited to these alone, their regional and functional similarities to the Camp Rayner site make them appropriate for comparison.

![Map](image.png)

**Figure 7.1:** Locations of Terminal/Late Paleoindian and Early Middle Period sites on the Northern Plains.

### 7.2 Terminal/Late Paleoindian Sites on the Northern Plains

#### 7.2.1 The Boss Hill Site, Locality 2 (FdPe-4)

The lowest component at the Boss Hill site, Locality 2 has been dated to well within the Terminal/Late Paleoindian period. This site is located within the Buffalo Lake region of south-central Alberta at the base of Boss Hill which stretches for approximately 2 km along the northeastern shore of Buffalo Lake (Doll 1982). The stratigraphic profile indicates that the occupation site was located within a meltwater basin that contained a brackish pond, based on the
recovery of botanical remains, gastropods, and ostracods (Doll 1982). In total, 19 units were excavated for archaeological investigations, and of this total, nine units were excavated to a total depth of 320 cm (Doll 1982). The lowest occupation level has been radiocarbon dated to 7,875 +/- 130 years BP (S-1251) and 7,750 +/- 105 years BP (S-1371) and averaged a depth of 230 cm below surface (Doll 1982).

In total, 90 artifacts were recovered from the excavations and include 10 projectile points, nine bifaces, seven endscrapers, a spokeshave, 13 unifacial fragments, four pièce esquillées, four hammerstones, four anvils, and a large number of other ground and chipped stone tools. Of the 10 recovered projectile points, two were identified as “Parkhill Lanceolate” points, five as “Boss Hill Corner Notched”, and three were unclassifiable (Doll 1982). Artifacts identified as pièce esquillées are somewhat problematic regarding classification and it is possible that these represent exhausted cores, or wedges. Flakes have been removed from the dorsal and ventral surfaces and these tools often exhibit crushed and battered surfaces. If these artifacts, in fact, represent wedge tools, then they were likely utilized for creating grooves or splintering bone or wood (Doll 1982). Lithic materials utilized are primarily local and include varieties of quartzite and chert, brown and white chaledonies, mudstone, and black chert pebbles. At least one example of Knife River flint has been reported in the lithic tool assemblage (Doll 1982).

Faunal remains recovered from the lowest occupation level at Boss Hill reflect a large diversity of animals, with a total of 28 individuals represented. At least five bison (Bison sp.) are present in the assemblage and, along with one elk (Cervus canadensis), the bones from these large ungulates reflect a significant degree of breakage. Other mammals within the Boss Hill faunal assemblage include black bear (Ursus americanus), red fox (Vulpes vulpes), badger (Taxidea taxus), beaver (Castor canadensis), muskrat (Ondatra zibethicus), white-tailed jackrabbit (Lepus townsendii), snowshoe hare (Lepus americanus), an unidentified canid (Canis sp.), and a variety of rodents (Doll 1982). A large number of birds were also present, including a blue-winged teal (Anas discors), lesser scaup (Aythya affinis), snow goose (Chen caerulescens), and white-fronted goose (Anser albifrons). At least one fish is present in the assemblage represented by a single vertebral centrum (Doll 1982). Additionally, two non-lithic tools, a bone scraper and an antler tine pressure flaker, were recovered from the lower-most levels (Doll 1982).

Based on the materials recovered from the Boss Hill site, Doll (1982) concludes that the site was likely occupied by a small hunter-gatherer group who took advantage of the shelter
provided by the basin. The environment within which the site is situated would have contained a wide range of fauna to be exploited for subsistence purposes, as reflected in the faunal assemblage. The lithic assemblages reflects a focus or preference for locally available raw material. The site was likely only occupied in the short term and, though animals remains appear to have been processed at the site, lithic tools do not appear to have been fashioned here (Doll 1982).

7.2.2 The Tuscany Site (EgPn-377)

The Tuscany site is a multicomponent site located within the city of Calgary, at the edge of a terrace overlooking the Bow River. This site was discovered during backhoe trenching which uncovered cultural material at depths between 45 and 60 cm. Over the course of three field seasons, students from the Department of Archaeology at the University of Calgary, along with local volunteers, excavated a total of 92 square meters. These excavations uncovered a minimum of four cultural deposits located between 20 and 60 cm below surface, as well as 120 and 180 cm below surface. The lowest of these deposits was dated to approximately 8,500 BP (Oetelaar 1998).

The lithic assemblage recovered from the Tuscany site includes one projectile point, identified as belonging to the “Plano” tradition, along with two bifaces, several hammerstones and one retouched flake (Oetelaar 1998). The projectile point is constructed from Knife River flint and exhibits a concave base and a lenticular cross section. Blood residue analysis was performed on the projectile point and the results indicate trace amounts of blood originating from a canid (Oetelaar 1998). A large degree of fire-cracked rock was also recovered from these levels which may be the products of stone boiling pits, oven roasting, or sweat baths (Oetelaar 1998).

A large variety of fauna was recovered from the lowermost levels at the Tuscany site, including ungulates such as bison (Bison sp.), elk (Cervus canadensis), mountain sheep (Ovis canadensis), deer (Odocoileus sp.), and antelope (Antilocapra americana). Other mammals identified include black bear (Ursus americanus), mountain lion (Felis concolor), hare (Lepus sp.), cottontail (Sylvilagus sp.), muskrat (Ondatra zibethicus), vole (Microtus sp.), and lemming (Lemmus sp.). Avifauna were also identified and include species such as grouse (Tetraonidae) and duck (Anatidae) (Oetelaar 1998). The large diversity in the faunal assemblage is entirely consistent with the grassland and forest environments which would have existed 8,500 years
before present (Oetelaar 1998). Although not explicitly stated by Oetelaar (1998) in the Tuscany site report, the site assemblage indicates that this occupation level was likely used for habitation purposes, where faunal processing and tool making took place.

7.2.3 The Hawkwood Site (EgPm-179)

Covering an area of several hundred square meters, the Hawkwood site was located within the city of Calgary on Nose Hill, within two basin depressions situated to the east and the west. The Nose Hill Uplands in Alberta are a linear geological formation which run north-west along the Bow River and are dominated by fescue grasslands which have been present in the region for the last 10,000 years. Archaeological site densities in this area are relatively high and represent approximately 7,000 years of cultural occupation (Van Dyke and Stewart 1985). One of these sites is the Hawkwood site which has a total of six cultural components spanning from the Terminal/Late Paleoindian period to the Middle Precontact period. Radiocarbon dating places the first occupational component of the Hawkwood site at 8,250 +/- 330 years BP (RL-1554; Van Dyke and Stewart 1985).

Between February and April of 1981, 132 square meters were excavated at the Hawkwood site. Excavations were separated between the east and west basins with 79 units located in the west basin and 62 in the east. The lowest component uncovered is affiliated with the Plains/Mountain cultural complex and was located primarily within the east basin. A wide variety of artifacts were uncovered from this component, including three projectile points, three projectile point fragments, three bifaces and one bifacial fragment, an endscraper, two spall tools, three chopper tools, and six retouched flakes. Projectile point styles discovered at the Hawkwood site include a Lusk point, a Salmon River Side-Notched point, and a Stemmed Atlatl point (Van Dyke and Steward 1985). The Lusk point and the Salmon River Side-Notched point are each constructed from heat-treated chert. Lithic materials utilized for these tools are primarily local and include quartzite, quartz crystal, pebble chert, Paskapoo chert, chalcedony, and silicified wood (Van Dyke and Stewart 1985).

Faunal remains recovered at the lowest component of the Hawkwood site solely consist of bison (Bison sp.) with one mature individual identified from the assemblage. Elements which were identified are typically associated with having a high meat yield. As such, it is likely that the bison was killed at another location and only the meatiest portions were transported back to
the occupation area for further processing (Van Dyke and Stewart 1985; Peck 2011). The remaining 1,479 unidentified and highly fragmented faunal remains are possibly indicative of marrow extraction. Calcined and burned faunal fragments found in association with two hearth features suggests the utilization of bone as a fuel source (Peck 2011). Overall, it appears that occupants of this site used the location as a short term campsite and stalked small herds of bison for subsistence purposes (Van Dyke and Stewart 1985).

7.2.4 The St. Louis Site (FfNk-7)

The St. Louis site is located on a terrace of the South Saskatchewan River in central Saskatchewan. The site was discovered by Leslie J. Amundson and Kristine Enns-Kavanagh in 2002 during a heritage resource impact assessment resulting from the construction of a new traffic bridge. From eight shovel tests, bison bone and debitage was recovered to a depth of over two meters. Two bone samples retrieved from the deepest components of these shovel tests were radiocarbon dated to 7,960 +/- 60 BP (Beta-168388) and 7,670 +/- 80 BP (Beta-168842), indicating that the site contained occupational layers dating to the Terminal/Late Paleoindian period (Amundson and Meyer 2003). In collaboration with the SCAPE project, a 67 meter square block excavation exposed cultural occupation layers dating from the Late/Terminal Paleoindian period through to the Middle Precontact period (Amundson et al. 2005).

With an average radiocarbon age of approximately 8,400 years BP, Cultural Layer VIII is the earliest cultural component at the St. Louis site (Amundson et al. 2005). Materials from this component are relatively sparse and the lithic assemblage consists of two cores, a single biface, and one utilized flake. Lithic material is primarily local and Swan River chert is the predominant material utilized (Amundson et al. 2005). At least three artifacts are made of organic material such as shell or bone and exhibit modification in the form of V-shaped incisions or drilled holes. One of these is a circular shaped shell bead resembling a “sequin” with a small hole drilled through its center (Amundson et al. 2005). The faunal assemblage from Cultural Layer VIII is relatively diverse and contains two bison (Bison sp.; one of which is immature), one snowshoe hare (Lepus americanus), one unidentified rabbit (Leporidae), a least chippmunk (Eutamis minimus), and an unidentified rodent (Rodentia) which may be intrusive. Additionally, avifauna represented in the assemblage include a northern shoveller (Anas clypeata), prairie chicken (Tympananchus), sharptailed grouse (Tympanuchus phaslanellus), and ruffed grouse (Bonasa...
At least one unidentified species of fish is also present. Despite the scant artifactual evidence from this cultural component, the material recovered reflects broad range subsistence approaches and a focus on locally available lithic resources (Amundson et al. 2005).

Spanning a depth range of approximately 129 cm to 141 cm below surface, Cultural Layer VII is represented by a thin paleosol containing cultural deposits which include faunal remains, fire-cracked rock, and debitage. Two features were found to be associated with this material and include a hearth feature characterized by orange stained earth and a concentration of five cobbles, and a chipping station consisting of 1,300 pieces of Swan River chert (SRC)debitage located immediately southwest of the hearth (Amundson et al. 2005). A single basal portion of a lanceolate projectile point constructed of SRC was recovered from these levels, along with a bifacial preform also constructed of SRC. Additionally, the distal portion of another lanceolate point was recovered during backhoe excavations at the site and likely originates from Cultural Layer VII (Meyer et al. 2011). As with Cultural Layer VIII, the lithic distribution for this cultural component consists mainly of locally available materials, primarily SRC, with the exception of one Knife River flint (KRF) flake (Amundson et al. 2005).

Faunal remains in Cultural Layer VII are fragmentary and represent a variety of mammals and avifauna. Overall, the assemblage consists of three bison (Bison sp.), with one immature individual represented, a deer (Odocoileus sp.), a small unidentified carnivore, an unidentified species of rodent (Rodentia), a meadow vole (Microtus pennsylvanicus), a green winged teal (Anas crecca), as well as unspecified species of bird and fish (Amundson et al. 2005). Based on the size of the bison crania recovered from Cultural Layer VII, Amundson et al. (2005) argues that the species represented is Bison antiquus. This layer was radiocarbon dated to 7,810 +/- 70 BP (Beta-17609) placing Cultural Layer VII well within the Terminal/Late Paleoindian period for the Northern Plains (Amundson et al. 2005). The nature of the artifacts and faunal remains recovered indicate that this cultural occupation is a brief habitation event. As with the previous occupation level, a broad range subsistence approach is indicated by the species represented in the faunal assemblage. Furthermore, according to Amundson et al. (2005), the presence of a single KRF flake suggests that, though the occupants were comfortable using locally available lithic resources, there was knowledge of lithic materials which could be obtained through trade and travel.
7.3 Comparison of Terminal/Late Paleoindian Sites

As established, most of the sites which are appropriate for comparison from this time period come from Alberta as very few in situ components have been discovered in Saskatchewan. Given the small sample size, it is difficult to ascertain the exact patterns of human behaviour. However, there are certain characteristics that each of these sites share which provide evidence for some for human adaptations to the Hypsithermal during the Terminal/Late Paleoindian period.

7.3.1 Site Locality

Each of the sites dating to the Late/Terminal Paleoindian period on the Northern Plains are located in close proximity to areas which would have provided abundant resources during the Hypsithermal period. The Hawkwood site and the Tuscany site are each located near the Bow River, and the St. Louis site is located on a terrace of the South Saskatchewan River (Oetelaar 1998; Van Dyke and Stewart 1985). Though the Boss Hill site is not located near a prominent river system, it neighbours Buffalo Lake which is a kettle lake formed from a remnant ice block from the Laurentide or Keewatin ice sheet (Doll 1982). Each of these regions are archaeologically rich, indicating their importance for Precontact groups, and fall within Hurt’s (1966) definition of “refugia” which includes the northern, eastern, and western peripheries of the Northern Plains, as well as major river systems. Generally, these areas would have contained richer and more abundant resources for these groups to exploit and would have withstood the overall effects of the Hypsithermal (Hurt 1966; Yansa 2007). According to paleoecological data, Hypsithermal conditions have only just begun to affect the Northern Plains by the Terminal/Late Paleoindian period (Yansa 2007). Yet, the settlement patterns reflect that humans have begun adapting their movements to suit these new conditions and inhabiting areas which are ecologically rich, even during the Hypsithermal.

The locality of the Camp Rayner site would also have acted as a “refugial” area during the Hypsithermal on the Northern Plains during the Terminal/Late Paleoindian period. Prior to the inundation of the South Saskatchewan River valley, the habitation site would have remained in close proximity to the South Saskatchewan River. Further, the site would have been situated at the top of a large coulee, where animals would have sheltered during times when Hypsithermal conditions made the open plains less habitable. Flora and faunal resources would have
proliferated within the habitats of the valley and its tributary coulees, supported and maintained
by the waters of the South Saskatchewan River. As with other sites dated to the Terminal/Late
Paleoindian period, the Camp Rayner site further supports a movement from the open plains into
these “refugial” areas during the Hypsithermal (Hurt 1966).

7.3.2 Faunal Assemblages and Subsistence Practices

In general, the faunal assemblages from sites dating to the Late/Terminal Paleoindian
period on the Northern Plains contain a diversity of animals which are not solely restricted to
bison. The Boss Hill site and the Tuscany site contain by far the most abundant and diverse
assemblages of the sites selected for comparison. Along with bison, species present in these
assemblages include a mix of ungulates such as elk, deer, antelope, and mountain sheep, as well
as smaller mammals like canid, rabbit, beaver, and muskrat (Doll 1982; Oetelaar 1998). Though
canid remains are not present at the Tuscany site, as they are at the Boss Hill site, blood residue
analysis from a projectile point indicates the possibility that one of these animals was hunted
(Oetelaar 1998). Along with a diversity of small and large mammals, various species of bird and
fish are also present in the faunal assemblages at the Boss Hill site and the St. Louis site
(Amundson et al. 2005; Doll 1982). The Hawkwood site and the St. Louis site contain
comparatively smaller faunal assemblages than the other two. Only bison are present at the
Hawkwood site, whereas the St. Louis site contains a mix of bison, deer, bird, and fish
(Amundson et al. 2005; Van Dyke and Stewart 1985). In all sites, bison are by far the most
abundant species present demonstrating a continued focus on these animals during the
Terminal/Late Paleoindian period. However, the relative diversity of these assemblages indicates
a broadened subsistence approach (Amundson et al. 2005; Doll 1982; Oetelaar 1998; Van Dyke
and Stewart 1985). Further, these patterns may reflect a more opportunistic style of hunting,
where animals were exploited based on their availability. As such, while there is a definite focus
on the exploitation of bison for subsistence purposes, these groups are not restricting their efforts
on bison alone, but are incorporating a diversity of faunal species into their diet and adopting a
more broad-based subsistence approach. These patterns of subsistence practice are most in line
with the “Plains Forager Model” introduced by Schiele and Walker (2013), and supported by
Frison (1975), Walker (1992), and Yansa (2007).
Comparatively, the Terminal/Late Paleoindian component at the Camp Rayner site fits well with this pattern of diverse and broad-ranged faunal assemblages. As with the above mentioned sites, the faunal assemblage from this period is dominated by bison, however, smaller mammals such as cervids, canids, rabbit, and beaver are also present. Accordingly, as discussed above, subsistence practices at this site during the Terminal/Late Paleoindian period are opportunistic and broadly-based, incorporating a diversity of animals. As groups begin inhabiting these ecologically diverse, “refugial” areas, in reaction to the Hypsithermal conditions on the Northern Plains, they appear to be adapting their subsistence bases and incorporating resources which were readily available. Bison likely remained a staple food source for the inhabitants of the Camp Rayner site, however, their diets were supplemented by smaller mammals as well.

7.3.3 Lithic Assemblages and Mobility Patterns

The lithic assemblages from these sites consists primarily of locally available materials and normally contain a wide diversity of tools. By far, the most diverse assemblage comes from the Boss Hill site, with a total of 90 artifacts consisting of a variety of tool types, including at least two bone tools (Doll 1982). Various projectile point styles are represented in these assemblages and are predominantly lanceolate. Points exhibiting side or corner notches were also recovered from the Boss Hill site and the Hawkwood site (Doll 1982; Van Dyke and Stewart 1982). As notched points become more predominant in later period assemblages, this may support the notion of the transitional nature of the Terminal/Late Paleoindian period. Apart from the St. Louis site assemblage, hammerstones and/or anvils are commonly found. Such tools are normally associated with the processing of bone, although it is possible that these implements were also used for the processing of floral remains. Given that the regions where these sites are located would have been ecologically rich in floral resources, this possibility should not be discounted. Overall, the tool assemblage at the Terminal/Late Paleoindian sites reflect a wide variety of activities normally associated with habitation sites such as butchering, hide processing, and tool making.

Lastly, the raw materials recovered from these lithic assemblages are predominantly local, with exotic materials appearing only in miniscule amounts. From the Tuscany and Boss Hill sites in Alberta, materials which are considered local include quartzites, pebble cherts, and
chalcedonies. In Saskatchewan, lithics recovered from the St. Louis site are primarily Swan River chert, which can be found in glacial till deposits throughout the province (Johnson 1986; Low 1996). The only material which would be considered exotic in these assemblages is Knife River flint, originating from the Knife River flint Quarries in North Dakota (Johnson 1986; Kirchmier 2011). Unfortunately, as pointed out by Bubel (2014) and Kirchmier (2011), there is a tendency by archaeologists to identify KRF based on the colour of the material alone. In Saskatchewan and Alberta, lithic materials such as silicified wood, silicified peat, and brown chalcedonies are often mistaken for KRF based on their superficial similarities to the exotic material (Kirchmier 2011). It is possible that this is the case for these Northern Plains Terminal/Late Paleoindian assemblages, although conclusions cannot be drawn without further analysis. Two methods have proven effective in identifying KRF, the first requiring microscopic analysis in order to identify fossilized organic particles in the material. The second method utilizes ultraviolet (UV) light to differentiate KRF from other brown chalcedonies, as KRF will fluoresce a faint orange when held under UV light (Bubel 2014). None of these methods were reported in the lithic identification process for the Terminal/Late Paleoindian assemblages. Overall, the patterns suggested by the primarily local lithic materials indicate restricted movements within the immediate area and very little, if any, long-distance trade or travel to acquire exotic lithics. Again, such a pattern fits well into the “Refugium Model” (Hurt 1966; Schiele and Walker 2013).

The Camp Rayner site assemblage from the Terminal/Late Paleoindian period also contains a wide variety of lithic tools, indicating a diverse suite of activities taking place at the site. One tool of particular interest is the gouge (Cat. #2952) which shares morphological similarities to tools recovered from the Gowen I and II sites dating to the Early Middle period. Though this gouge is from an earlier time period, its presence, like the notched projectile points, may support the transitional nature of the Terminal/Late Paleoindian cultures. Lithic materials at the site are primarily local, although one tool, an endscraper (Cat. #7450), may be constructed from Knife River flint. UV light analysis was undertaken to determine whether this material is truly KRF, however, the results proved inconclusive and the material was reported as brown chalcedony. Overall, the lithic materials identified indicate a primary focus on locally available materials to be used for tool making at the Camp Rayner site.
7.4 Early Middle Period Sites on the Northern Plains

7.4.1 The Hawkwood site (EgPm-179)

In addition to a Terminal/Late Paleoindian cultural occupation at the Hawkwood site, there are at least three cultural layers dating to the Early Middle period. Cultural Components 2 and 3 did not produce any artifacts with a particular cultural affiliation, but radiocarbon dating and the location of these components beneath a layer of Mazama Ash places them well within the Early Middle period. Cultural Component 4, which overlies the Mazama Ash layer, produced a total of two projectile points identified as the Bitterroot Side-Notched type belonging to the Mummy Cave series (Van Dyke and Stewart 1985).

Cultural Component 2 is situated within the west basin at the Hawkwood site and has been radiocarbon dated to 7,030 +/- 210 years BP (RL-1276) and 6,820 +/- 280 BP (RL-1277). The lithic assemblage for the site consists of mostly debitage with formed tools constituting only 5.8% of the assemblage. In total, three bifaces, five scrapers, one spall tool, 11 large cobbles chopper tools, five retouched flakes, and one hammerstone have been recovered from this occupation layer. The majority of the lithic material utilized is comprised of various types of quartzite, followed by pebble chert, siltstone, chalcedony, petrified wood, quartz crystal, and one possible specimen of Swan River chert (Van Dyke and Stewart 1985). Faunal remains in this layer consist of bison (Bison sp.) and deer (Odocoileus sp.), with deer represented by the tip of an antler tine and three cervical vertebrae fragments. Four bison were identified in the assemblage, two of which were identified as mature, one as immature, and one as fetal. Based on the presence of this fetal specimen, the occupation of this site took place in the winter (Van Dyke and Stewart 1985). No hearths or other notable features were present in this cultural layer. Based on the lithic and faunal assemblage, the authors conclude that Cultural Component 2 was used as a winter hunting camp occupied by one or more families (Van Dyke and Stewart 1985).

Similar to Cultural Component 2, Cultural Component 3 did not contain any artifacts which are characteristic of a particular archaeological culture. No radiocarbon dates were established for this occupation layer, however, its location between Cultural Component 2 and a layer of Mazama Ash dated at 6,600 years BP places its age somewhere in between (Van Dyke and Stewart 1985). The lithic assemblage is similar to Cultural Component 2 and consists of one unidentified projectile point tip, three bifaces, a side scraper, seven spall tools, three large cobbles choppers, 25 retouched flakes, and four hammerstones. The lithic material distribution
demonstrates a primary focus on locally available resources such as quartzite, varieties of chert, porcellanite, and agate. Quantities of non-local material are relatively minute, with only three examples (two pieces of Montana chert and one piece of Avon chert) identified in the assemblage (Van Dyke and Stewart 1985). The faunal assemblage is less diverse than the former cultural layer, consisting of at least one canid (Canis sp.) and one bison (Bison sp.). There is very little indication of intensive butchering and processing (Van Dyke and Stewart 1985). As with Cultural Component 2, Cultural Component 3 was likely utilized as a hunting camp where small herds of bison were exploited for subsistence (Van Dyke and Stewart 1985).

Based on the presence of two Bitterroot Side-Notched projectile points, Cultural Component 4 is a Mummy Cave series manifestation at the Hawkwood site (Van Dyke and Stewart 1985). As with Cultural Component 3, no radiocarbon dates were established for Cultural Component 4. Rather, its position immediately above the layer of Mazama Ash and below a cultural component identified as Oxbow gives an estimated age range of between 6,600 and 4,500 years BP (Van Dyke and Stewart 1985). In addition to the aforementioned projectile points, two bifaces, one scraper, three wedges, seven spall tools, and nine retouched flakes comprise the Cultural Component 4 lithic assemblage. Lithic materials are primarily local, and include varieties of quartzites, such as Beaver Creek quartzite, quartz crystal, siltstone, pebble chert, and chalcedonies. A higher quantity of non-local material has been recovered in Cultural Component 4 than in previous occupational layers, though this quantity is still relatively miniscule. These materials include Etherington chert, from the Livingstone Range in the Rocky Mountains, Avon chert, from the Avon Quarry in Montana, and Ignimbrite, which may have been sourced from Yellowstone National Park (Van Dyke and Stewart 1985). Lastly, the faunal assemblage for Cultural Component 4 is relatively small and includes two mature bison (Bison sp.) and one mature elk (Cervus canadensis). Only light butchering is exhibited on these remains and approximately 7% of the faunal assemblage exhibits burning and calcination (Van Dyke and Stewart 1985). The site likely served a similar function in this cultural layer as it did in the previous occupational components, where lithic manufacturing and secondary butchering took place (Van Dyke and Stewart 1985).
7.4.2 The St. Louis Site (FfNk-7)

Following the Terminal/Late occupational components at the St. Louis site, Layer IV has been dated to 6,220 +/- 70 years BP (Beta-173611) and is believed to be affiliated with the Mummy Cave series. Thus far, very little reporting has been done on this component of the St. Louis site and that which has been studied is limited only to the faunal assemblage (Johnston 2005). As such, very little can be said regarding the component’s lithic assemblage.

Of the total site assemblage, faunal remains recovered from Cultural Layer IV are by far the most diverse (Johnston 2005). In total, five taxa are represented in this occupational layer and include bison (Bison sp.), large canid (Canis sp.), snowshoe hare (Lepus americanus), sharp-tailed grouse (Tympanuchus phasianellus), and fish (Osteichthyes sp.). Bison and other large-sized mammals constitute the majority of the assemblage and the MNI count for bison totals to two (Johnston 2005). Seven specimens identified to this taxa exhibit cut, chop, or scrape marks. Based on the presence of five immature specimens, the Cultural Layer IV occupation likely took place in late winter/early spring (Johnston 2005). Two large-sized canids are also present in the assemblage and, given their size, they likely represent Canis lupus or a large domestic dog (Johnston 2005). There are no cultural modifications present on these remains. Given the high degree of fragmentation of the faunal remains and the presence of a bifacial knife, Johnston (2005) concludes that this site likely represents a campsite where secondary processing took place. Furthermore, although no diagnostic artifacts were recovered, the age established for this component places it within the Mummy Cave series of the Early Middle period (Johnston 2005).

7.4.3 The Below Forks Site (FhNg-25)

The Below Forks site is located approximately 2.5 km east of the confluence of the North and South Saskatchewan Rivers on an abandoned terrace. A total of 52 m² excavation units were opened, however, these were separated into two main excavation blocks known as the central block and the eastern block (Meyer 2003). Four additional units were opened in the northwest corner of the site, two in 1980 and two more in 2001. The lowest occupation levels from the Below Forks site have been dated to the Early Middle period with cultural affiliation to the Mummy Cave series. Of the entire site assemblage, the Mummy Cave materials are by far the most abundant and diverse (Meyer 2003; Kasstan 2004).
Kasstan’s (2004) analysis of the lithic assemblage at the Below Forks site did not differentiate between the eastern and central excavation blocks. Lithic materials from the Early Middle period levels at the site are the most diverse and abundant of the entire site assemblage. The total lithic assemblage is as follows: two hammerstones, one anvil, 10 bifacial knives, three projectile points, one pièce esquillées, six endscrapers, three sidescrapers, one multipurpose implement, one chithos/techua, 23 retouched flakes, and five unifaces. The projectile points recovered in this assemblage are an Early Side-Notched type belonging to the Mummy Cave series and are most reminiscent of Gowen Side-Notched (Kasstan 2004). The raw material distributions for this cultural occupation point to a primary reliance on sources which were locally available. Swan River chert is the most abundant material present in the assemblage, along with quartzite, various cherts, ironstone, and sandstone.

In the central excavation block, the faunal assemblage consists of bison (Bison sp.), a large-sized and a medium-sized canid (possibly Canis lupus and Canis latrans, respectively), snowshoe hare (Lepus americanus), white-tailed jack rabbit (Lepus townsendii) and beaver (Castor canadensis). Approximately 48% of the faunal assemblage exhibited burning, however, no hearth features were identified in this cultural component (Johnston 2005). Bison were the most abundant species in this assemblage, totalling three individuals. The specimen representing a large-sized canid was identified as the diaphyseal portion of an ulna, which appears to have been culturally modified into a rod or pin. Based on the overall size of this specimen, it is possible that it belongs to a wolf, coyote, or a domestic dog (Johnston 2005). A single bone tool, identified as an antler tine belonging to a cervid was also recovered in the central block excavations and may have been utilized as a pressure flaker (Johnston 2005). The seasonality of this site was determined based on the presence of immature bison remains, indicating occupation during the fall, late winter, and early summer (Johnston 2005).

The faunal assemblage from the eastern excavation block is more abundant than the assemblage recovered from the central excavation block, and includes such taxa as bison (Bison sp.), a large sized canid (Canis sp.), snowshoe hare (Lepus americanus), beaver (Castor canadensis), and a variety of rodents (Rodentia). Additionally, one bivalve shellfish, a catfish (Ictalurus sp.), and an unidentified large-sized bird were also identified in this assemblage. As with the central excavation block, a majority of these remains were burned and bison is the most abundant taxa, represented by two individuals (Johnston 2005). The recovered canid remains
exhibit cut marks and burning, suggesting that this animal was butchered for subsistence purposes. The overall size of these elements indicate that the individual represented was slightly smaller than a male *Canis lupus* (Johnston 2005). Lastly, a Mummy Cave occupation was uncovered from the 1980 excavation block and included the remains of two bison (*Bison* sp.), along with a variety of miscellaneous mammal bones (Johnston 2005).

Overall, the faunal and lithic materials recovered from the Early Middle period levels at the Below Forks site are comparatively more diverse and abundant than in other cultural components. Based on the entirety of this assemblage, a diverse suite of activities were taking place during the Early Middle period at the St. Louis site, including hunting, butchering, hide-working, and (possibly) plant processing. The abundance of faunal resources further corroborates this and indicates that the occupants partook in a broad-based subsistence practice, with a primary focus on bison (Johnston 2005).

### 7.4.4 The Dog Child Site (FbNp-24)

The Dog Child site is part of a large complex of cultural occupation sites located within the Opimihaw Creek valley in Wanuskewin Heritage Park. Six occupation levels were uncovered at the Dog Child site, dating from the Early Middle Precontact period to the Late Precontact period. The lowest level at this site is affiliated with the Mummy Cave series and, of the entire site assemblage, materials recovered from this occupational component are the most rich and diverse (Pletz 2010). Two radiocarbon dates have been obtained from the Mummy Cave series levels. One from Cyr (2006) established a radiocarbon date of 5,530 +/- 50 years BP (BGS-2662) and the second, from Pletz (2010), established an age of 5,890 +/- 45 years BP (BGS-2892). The difference between these two dates may be a result of the composite sample utilized by Cyr (2006) for radiocarbon dating, or from cultural mixing between two of the cultural levels at the site (Pletz 2010). Regardless, the recovered artifacts and the radiocarbon dates for the lower level at the Dog Child site places it well within the Early Middle period.

In total, 68 lithic tools were recovered from these levels, consisting of 24 projectile points, four projectile point preforms, seven bifaces, 22 unifacial scrapers, 13 endscrapers, five sidescrapers, four end/sidescrapers, four unifaces, one perforator, five retouched flakes, one hammerstone, and two ground or pecked stone tools (Pletz 2010). Additionally, 53 pieces of FCR were recovered. Of the 24 projectile points, 22 were identified as Gowen Side-Notched.
The remaining two are likely also Gowen Side-Notched, however, they are incomplete and could only be definitively identified as Early Side-Notched type projectile points (Pletz 2010). Lithic material types used are primarily local, with Swan River chert the most abundant material recovered at the site, followed by quartzite, and silicified peat. One projectile point was constructed from Knife River flint and this material is not known to be local to Saskatchewan (Pletz 2010).

As with the lithic assemblage, the faunal assemblage from the Early Middle period levels that the Dog Child site are rich and diverse. Approximately 11 taxa and 24 individuals are represented in the Early Middle period occupation at the Dog Child site. Bison (*Bison* sp.) are the most abundant, followed by wolf (*Canis lupus*), swift fox (*Vulpes velox*), beaver (*Castor canadensis*), red-tailed hawk (*Buteo jamaicensis*), Swainson’s hawk (*Buteo swainsonii*), bald eagle (*Haliaeetus leucocephalus*), a medium to large-sized canid (*Canis* sp.), a variety of rodents (*Rodentia*), and other unidentified birds (Pletz 2010). The majority of the faunal assemblage is unburned, with 16% exhibiting burning and 13% calcined (Pletz 2010). The MNI count for bison totalled to 10, with seven adults, one juvenile, and two fetal individuals identified, making bison the most abundant species present in the assemblage. Based on the occurrence of fetal bison elements, this component was likely occupied during the winter (Pletz 2010). Lastly, recovery of eight bone tools is of particular interest. Most of these implements have been shaped to have pointed or spatulate ends and, though their intended use is not immediately apparent, they may have been utilized as scraping or piercing tools. One implement in particular is formed from a cervid antler tine and exhibits polish and use wear forming a rounded distal end. Based on the use wear patterns on this object, this artifact was likely used as a pressure flaker (Pletz 2010).

Given the richness of this cultural layer and the sheer diversity of the faunal and lithic assemblages, it is likely that the Early Middle period occupation at the Dog Child site is a long term or repeatedly used habitation site (Pletz 2010).

### 7.4.5 The Atkinson Site (DiMe-27)

On the north bank of the Souris River in southwestern Manitoba is the Atkinson site, which contains an Early Middle period occupation that has been radiocarbon dated to 5,280 +/- 50 years BP (TO-13365) (Nicholson and Playford 2009). Located in an area rich in archaeological resources, the Atkinson site was identified from the discovery of a lens of charcoal
eroding from the bank of the Souris River during a SCAPE survey of the shoreline stratigraphy. Fragments of burned bone and debitage were recovered from this hearth and it was determined that excavations of this site would provide an opportunity to study Early Middle period lifeways. From 2003 to 2006, 11 m² units were excavated adjacent to the hearth feature, yielding an abundance of faunal and lithic material (Nicholson and Playford 2009).

The lithic assemblage for the Atkinson site consists of a mix of projectile points and bifacial tools. A total of 15 projectile points, seven of which are definitively Gowen Side-Notched, were recovered from the Atkinson site representing a range of both local and exotic lithic materials (Nicholson and Playford 2009). At least one of the projectile points may be from the McKean complex, but this is uncertain. Along with these, two asymmetric bifacial knives and two bifaces were recovered in the assemblage and these are primarily constructed from Swan River chert (Nicholson and Playford 2009). Of the entire lithic assemblage, exotic materials compose 39% of the materials identified at the site represented primarily by Knife River flint. Locally available lithic materials consist mostly of Swan River chert, however, various quartzites and cherts were identified as well, though in smaller quantities (Nicholson and Playford 2009).

In total, 30,392 fragments of bone were recovered from excavations of the Early Middle period levels at the Atkinson site. A minimum of three mature and one fetal bison (Bison sp.) are present in the assemblage, along with a cervid (possibly moose (Alces alces) or elk (Cervus canadensis)), a fox (Vulpes sp.), a porcupine (Erethizon dorsatum), two rabbits (Leporidae), three unidentified canids (Canis sp.) and a mixture of indeterminate large, medium, and small mammals (Nicholson and Playford 2009). Seasonality for the site was determined based on the presence of a fetal bison, which placed occupation of the site in the late winter and early spring (Nicholson and Playford 2009). From the concentration of bone and lithic materials surrounding the hearth, it appears that the Atkinson site represents a temporary winter occupation where stone tools were constructed and reworked and animal bones were processed (Nicholson and Playford 2009).

7.4.6 The Stampede Site (DjOn-26)

Located within the Cypress Hills of southeastern Alberta, the Stampede site is a deeply stratified, multicomponent campsite with evidence of recurrent occupation dating from the Early Middle Precontact to the Late Precontact period (Falzarano 2014). The Cypress Hills region is an
archaeologically rich and ecologically diverse area of the Northern Plains. Archaeological investigations of the site were first conducted in 1972 and 1975 as part of a heritage resource impact assessment examining the right of way for a new road. From a series of test pits reaching a depth of approximately four meters, a total of 14 paleosols containing cultural materials were initially uncovered, the deepest of which was dated between 7,000 and 7,500 years BP (Falzarano 2014). These initial excavations indicated that the Stampede site represented an important heritage resource for Alberta, as such additional analysis was conducted from 2000 to 2005 by Dr. Gerald Oetelaar as part of the SCAPE project. In total, 18 paleosols contained cultural material, with Paleosols 6 through 10 roughly corresponding to the Hypsithermal and Paleosols 7 through 10 with the Early Middle period. Paleosol 10 was radiocarbon dated to 5,990 +/- 50 BP (Beta-254780) and 6,110 +/- 90 years BP (TO-10924), and Paleosol 7 was radiocarbon dated to 4,660 +/- 38 BP (OxA-11579), 5,230 +/- 100 BP (TO-10922), and 5,290 +/- 40 BP (Beta-254777) (Falzarano 2014). In 2014, Kristin Falzarano provided a synthesis of the activity areas within the paleosols for her Ph.D. dissertation utilizing statistical analysis to explore the relationships between these levels. The following is a synthesis of her interpretations of the activity areas in the site as they relate to the Early Middle period and the Hypsithermal.

The lithic and faunal assemblages from Paleosols 10 through 6 at the Stampede site represent a domestic campsite, where tool making and repair took place alongside secondary processing of procured animals. Heavily processed bones tended to be found in association with hearths and boiling pits, whereas lithic debitage concentrations were found frequently only in association with hearths. Falzarano (2014) interprets the presence of lithic debitage surrounding hearths as representing the social nature of this activity. Stone tools recovered from Paleosols 7 through 10 include projectile points identified as Bitterroot and Gowen Side-Notched, indicating a Mummy Cave occupation, along with cores and hammerstones (Falzarano 2014). Lithic materials from these paleosols primarily consist of quartzites from the Cypress Hills formation, reflecting a focus on locally available raw lithic material. Though in lower frequencies, more exotic or non-local materials include Swan River chert, Montana chert, and Knife River flint. Falzarano (2014) suggests that these material distributions reflect limited communication and trade during this time period.

Regarding the faunal remains recovered from Paleosols 7, 8, 9, and 10, the majority consisted of small, unidentifiable fragments. Those which could be identified were primarily
bison (*Bison* sp.), suggesting a primary focus on these animals for subsistence purposes (Falzarano 2014). Floral remains recovered from hearth and pit features consisted of those which were available within the Cypress Hills region and can still be found in modern times. Based on the absence of elements which are lower in meat yield and nutritional value, the Stampede site likely served as a secondary butchering location, where meatier portions and limbs were transported back to the site from the kill locale. Boiling pits, FCR, and heavily fragmented bone reinforce this notion and suggest adaptations in food preparation which include marrow and grease extraction. These activities may be indicative of pemmican production (Falzarano 2014).

Throughout Paleosols 10 through 7, features and artifact distributions suggest similar activities taking place, however Paleosols 10 and 9 may represent occupations of shorter duration. The assemblages from these paleosols reflect continued and repeated occupation of the Stampede site for approximately 1,000 to 1,500 years, from the Early Middle to the Middle Middle Precontact periods, providing a complete record of the various adaptations of the occupants during the Hypsithermal (Falzarano 2014).

7.4.7 The Gowen I and II Sites (*FaNq*-25, *FaNq*-32)

Located approximately 70 meters apart, the Gowen I and II sites represent two Early Middle period occupations with radiocarbon dates averaging to approximately 5,900 years BP (Walker 1992). These sites are located on a terrace of the South Saskatchewan River, within the city limits of Saskatoon, Saskatchewan. The Gowen I site was first discovered in 1977 after its deposits were exposed by earth-moving equipment and the Gowen II site was discovered three years later approximately 70 meters to the west (Walker 1992). Projectile points recovered from these sites have been used to define the Gowen Side-Notched point within the Mummy Cave series and have provided a clearer understanding of this time period on the Northern Plains (Walker 1992).

The lithic assemblage for the Gowen I site included a variety of lithic tools, FCR, and debitage. In total, 226 stone tools were recovered consisting of 23 projectile points, one preform, four hafted bifaces, 15 bifacial knives, 35 endscrapers, five sidescrapers, 11 unifaces, 23 gouges, six gravers, three drills, two spokeshaves, five anvils, five hammerstones, and 88 retouched flakes (Walker 1992). Quartzites and cherts are the most common lithic materials utilized in the Gowen I lithic assemblage. Chalcedony and petrified wood is present, though to a lesser degree,
and exotics such as Knife River flint and agates are in very low frequencies. The Gowen II lithic assemblage is larger than the Gowen I assemblage, with 87 projectile points, five projectile point preforms, three hafted bifaces, 23 bifacial knives, 55 endscrapers, 18 unifaces, 37 gouges, five gravers, three drills, one anvil, three hammerstones, and 110 retouched flakes (Walker 1992). As with the Gowen I assemblage, quartzites and cherts are the most common material used in the Gowen II lithic assemblage.

Faunal taxa recovered from the assemblages at the Gowen I and II sites reflect a fair amount of diversity, however, there is a definite focus on the procurement of bison (*Bison* sp.). A minimum of nine bison were present at the Gowen I site, and 14 at the Gowen II site (Walker 1992). Other animals present in the Gowen I assemblage include one pronghorn (*Antilocapra americana*), a gray wolf (*Canis lupus*), two medium sized canids (*Canis* sp.), one northern pocket gopher (*Thomomys talpoides*) (possibly intrusive), and an American crow (*Corvus brachyrhynchos*). At the Gowen II site, the faunal assemblage also includes at least one gray wolf (*Canis lupus*), one coyote (*Canis latrans*), one red or swift fox (*Vulpes* sp.), two medium sized canids (*Canis* sp.), a least chipmunk (*Tamias minimus*), one northern pocket gopher (*Thomomys talpoides*; possibly intrusive), a deer mouse (*Peromyscus maniculatus*), and one muskrat (*Ondatra zibethicus*) (Walker 1992). The majority of these remains exhibit a high degree of fragmentation and the high number of appendicular versus axial elements indicate that these animals were killed at another location and their more desirable elements were transported back to the sites for further processing (Walker 1992). Seasonality was determined through the analysis of eruption and occlusal wear patterns on bison cheek teeth, which demonstrated that the occupation took place in the late summer. This conclusion is compounded by the presence of immature bison remains and the recovery of *Chenopodium* seeds, which are generally only available in this season (Walker 1992).

Additionally, 10 bone tools were recovered from the Gowen I assemblage, most of which exhibited signs of intentional modification or use wear. One of these consisted of a pronghorn metacarpal with the medullary cavity drilled out, creating a bone tube with an unknown function (Walker 1992). Significantly more bone tools were identified in the Gowen II assemblage. Five of these were identified as awls or perforators, and two as knapping tools. One bone tool is thought to be associated with the mixing of pigments given that one end is heavily stained with red ochre, and another has been formed into a shape that is reminiscent of a hook. The function
of at least four tools is not immediately known. Two of these consist of bison rib segments with distal ends that have been cut and polished, and one is a bison long bone fragment exhibiting a high polish and a bevelled distal end. Lastly, a single long bone fragment identified as avian also exhibits polish and microscopic examinations revealed striations running along the long axis of the bone (Walker 1992).

Given the similarities between the Gowen I and II sites, Walker (1992) concludes that these likely represent two short duration bison hunting camps occupied at simultaneous, or closely contemporaneous, time periods. Activities at these sites included the processing of animal remains and the manufacturing of stone and bone tools (Walker 1992). Overall, the subsistence strategies reflect a broad range subsistence approach and the lithic materials utilized are primarily local at these two sites (Walker 1992).

7.5 Comparison of Early Middle Period Sites on the Northern Plains

Each of the above sites dating to the Early Middle period on the Northern Plains share characteristics which reveal patterns of human behaviour occurring at this time. Sites from this time period are more numerous than from the Terminal/Late Paleoindian period, and their localities and lithic and faunal assemblages reveal much with regards to settlement, subsistence, and mobility behaviours.

7.5.1 Site Locality

As with the Terminal/Late Paleoindian, all of the sites dating to the Early Middle period on the Northern Plains are located in close proximity to localities which would be considered “refugial”. The Hawkwood site (Van Dyke and Stewart 1985), the Dog Child site (Pletz 2010), the Atkinson site (Nicholson and Playford 2009), the St. Louis and the Below Forks sites (Johnston 2005; Kasstan 2004) and the Gowen I and II sites (Walker 1992) are each located nearby or on terraces of major drainage systems such as the Bow River, Souris River, and South Saskatchewan River. The Stampede site, although not located in close proximity to a major drainage system, is located within the Cypress Hills Uplands of Alberta, which were less likely to have been affected by Hypsithermal climates on the Northern Plains (Falzarano 2014). Additionally, the area where the Stampede site is located contains natural springs fed by aquifers,
which would have acted as a constant and reliable source of water during times of resource depletion (Falzarano 2014). Each of these regions would have provided subsistence resources and a constant supply of water during the height of warmth and aridity on the Northern Plains during the Early Middle period. As the carrying capacity for the open plains region became depleted and bison herds were forced to migrate into areas with abundant floral resources, human groups followed suit, occupying these “refugial” areas on the Northern Plains (Hurt 1966; Schiele and Walker 2013; Yansa 2007).

The Camp Rayner site is no different with regards to site settlement patterns during the Early Middle period. As with other sites dated to this time period, the Camp Rayner site would have been in close proximity to a major river system which would have provided a dependable supply of water during times of drought. Further, the large coulee environment neighbouring the habitation site would have sheltered floral and faunal resources from such climates, supplying a reliable subsistence base for the human groups occupying the site during this time. Like other sites dating to the Early Middle period, the Camp Rayner site’s locale indicates a movement from the open plains region during the Hypsithermal into the “refugial” areas defined by Hurt (1966).

7.5.2 Faunal Assemblages

Overall, the faunal assemblages from sites dating to the Early Middle period are relatively rich and diverse, however, at the majority of the above mentioned sites, bison are the most abundant taxa present in the assemblages (Falzarano 2014; Johnston 2005; Nicholson and Playford 2009; Pletz 2010; Walker 1992). Species present in these assemblages typically consist of deer, elk, rabbits, canids, large and small rodents, as well as a variety of birds and fish (Johnston 2005; Nicholson and Playford 2009; Pletz 2010; Van Dyke and Stewart 1985; Walker 1992). Bison have been consistently identified in all of the assemblages, and at the Stampede site in particular, the entire faunal assemblage consists primarily of these large ungulates (Falzarano 2014). Given this, Early Middle period subsistence practices were broadly based to include smaller animals, although bison remained a dietary staple at this time. This is further reinforced by the presence of at least three multi-animal kill sites, the Norby site (Zurburg 1991), the Everblue Springs site (Vivian 2007), and the lowest levels of the Head-Smashed-In site (Reeves 1978), mentioned earlier in Chapter 4 of this thesis. The Early Middle period coincides with the height of the Hypsithermal on the Northern Plains, and as conditions worsened, bison herds likely
concentrated their migrations to these refugial areas. Accordingly, humans would have been able to continue to exploit this resource and opportunistically hunted the small herds inhabiting the “refugial” areas. Given that bison were not the only species present in these areas, it is logical that humans readily exploited smaller animals as well as reflected in the Early Middle period faunal assemblages.

At the Camp Rayner site, the faunal assemblage recovered from Cultural Zone 6 exhibits relatively similar patterning to other sites on the Northern Plains dated to the Early Middle period. Large ungulates, specifically bison, dominate the faunal assemblage and there is a presence of canid remains, which are commonly found in the assemblages at the above mentioned Early Middle period sites. Overall, this assemblage is much less diverse than many of the other sites from this time period and is more comparable to the assemblage recovered from the Hawkwood site (Van Dyke and Stewart 1985). As the assemblage consists primarily of bison, it appears that groups occupying the site were preferentially exploiting these animals for subsistence purposes. The presence of one canid humerus may indicate that smaller mammals were also included in their subsistence bases, however, the distinct lack of cultural modification present on this specimen makes this difficult to conclude. Further, when compared to the assemblage recovered from the Terminal/Late Paleoindian period, Early Middle period subsistence practices at the Camp Rayner site appear to be much less diverse and broadly-based. It is possible that the environment present within the South Saskatchewan River basin at this time afforded enough resources to support bison herds, allowing human groups to continually exploit this resource. Overall, the Camp Rayner site faunal assemblage from the Early Middle period is not necessarily out of the norm, based on the assemblages from other sites from this time period. However, the broad-based subsistence strategies are not as readily reflected in its Early Middle period components as they are at other comparable sites.

7.5.3 Lithic Assemblages and Mobility Patterns

The lithic assemblages from Early Middle period sites on the Northern Plains reflect a large diversity of tool types consisting primarily of locally sourced lithic materials. Apart from the St. Louis site, which, to date, has had no reporting done on its Early Middle period lithic assemblage, the tool assemblages for each of these sites include a variety of projectile points, scrapers, bifacial and unifacial tools, grinding stones, hammerstones, and retouched flakes.
Given that each of these sites are temporary habitation sites, this diversity in the tool assemblage reflects the types of activities which may be expected to occur such as animal butchering, hide processing, and bone and lithic tool making. As with the Terminal/Late Paleoindian period, the presence of grinding stones in Early Middle period assemblages may be reflective of floral processing, although it is possible that these were simply used to breakdown animal carcasses.

Based on the predominance of locally available lithic resources present in the lithic assemblages, it appears that the movement patterns of these groups were fairly restricted. At Early Middle period sites in Saskatchewan and Manitoba, locally available lithics include Swan River chert, quartzites, silicified peat, and various cherts and chalcedonies (Kasstan 2004; Nicholson and Playford 2009; Pletz 2010; Walker 1992). In Alberta, local lithics also include quartzites, cherts, and chalcedonies, however Swan River chert is reported to be more of an exotic material. Indeed, this may be the case for sites in central and western Alberta, such as the Hawkwood site, where one possible piece of Swan River chert is reported (Van Dyke and Stewart 1985). However, Swan River chert is designated an exotic material at the Stampede site (Falzarano 2014), though this may not be the case as its distributions extends within southeastern Alberta (Low 1986). As in the Terminal/Late Paleoindian assemblages, Knife River flint has been reported in many of the Early Middle period assemblages. Again, caution must be taken with regards to these identifications as it is possible that locally available materials are being misidentified as KRF (Bubel 2014; Kirchmier 2011). Overall, there is very little conclusive evidence to suggest that extensive trade or travel was being undertaken during the Early Middle period, given the predominance of locally available raw lithics. Based on what has been recovered from these sites, the lithic assemblages indicate that groups were restricting their movements to the immediate area, possibly due to the conditions resulting from the Hypsithermal.

The lithic assemblage from the Camp Rayner site is fairly similar to other assemblages on the Northern Plains from the Early Middle period, although, as with its faunal assemblage, it is less abundant than the lithic assemblage from the Terminal/Late Paleoindian period. This may be reflective of a smaller habitation site than what was found in the previous period and it is difficult to draw conclusions regarding this. As with other Early Middle period sites, the recovery of a
grinding implement indicates the processing of animal remains, and, potentially, floral remains. The lithic materials used are primarily local, indicating restricted movements within the immediate area and no evidence of long-distance travel or trade. Swan River chert, silicified peat, and quartzite are readily found in Saskatchewan, especially within the region of the South Saskatchewan River basin. As with other Early Middle period sites, the occupants inhabiting the Camp Rayner site at this time are preferentially using locally available lithics.

7.6 Discussions and Conclusions

Overall, sites from the Terminal/Late Paleoindian period on the Northern Plains exhibit characteristics which suggest that groups were already adapting to Hypsithermal conditions (Amundson et al. 2005; Doll 1982; Oetelaar 1998; Van Dyke and Stewart 1985). Assemblages from sites dating to earlier phases of the Paleoindian period indicate that groups preferentially utilized high quality lithic materials which were often retrieved from exotic localities, whether through trade networks or long-distance travel (Bamforth 2002). Furthermore, these groups primarily exploited large game fauna, such as bison, through large-scale communal kill events (Frison 1998). However, by the Terminal/Late Paleoindian period on the Northern Plains, these practices have largely changed in favor of more locally based movements and subsistence practices. Sites frequently occur in regions which would be considered “refugia”, according to Hurt’s (1966) definition. Faunal assemblages, though still dominated by bison, reflect a more broad-based subsistence approach which includes smaller mammals such as beaver, rabbit, and canids, as well as birds and fish. To date, no multi-animal kill sites dating to the Terminal/Late Paleoindian have been discovered on the Northern Plains. Furthermore, the presence of hammerstones and grinding stones may indicate plant processing taking place at these sites, though until more analysis is undertaken, it is uncertain whether this is the case. Exotic lithic materials are rare or non-existent, indicating a preference for lithic materials available within the local area. From these sites listed above, as well as the Camp Rayner site, it is apparent that human groups have already undertaken new lifeways in reaction to the increasingly warm and arid Northern Plains region (Amundson et al. 2005; Doll 1982; Oetelaar 1998; Van Dyke and Stewart 1985). Movements have become restricted to areas less affected by Hypsithermal climates, and, as such, groups have begun utilizing resources which are locally available.
These characteristics continue within the Early Middle period on the Northern Plains where sites are commonly located in close proximity to water sources, or in regions less affected by Hypsithermal environments. As with in the Terminal/Late Paleoindian period, faunal assemblages reflect a broadly based subsistence approaches, incorporating smaller mammals, birds, and fish, along with a continued focus on bison. The lithic assemblages reflect restricted movements within the local area, exploiting materials which were immediately available such as quartzites, cherts, and Swan River chert (Falzarano 2014; Johnston 2005; Kasstan 2004; Nicholson and Playford 2009; Pletz 2010; Walker 1992). Thus, the transition between the Terminal/Late Paleoindian period and the Early Middle period is less clear cut than previously thought. The adaptation which supposedly characterized the Early Middle period are present in the Terminal/Late Paleoindian period as groups are restricting their movements to areas with abundant floral, faunal, and water sources, and undertaking broad-based subsistence approaches. These patterns are common in most, if not all, Terminal/Late Paleoindian and Early Middle period sites on the Northern Plains, including the Camp Rayner site.

From the data that have been recovered, these patterns are well suited to the “Refugium Model” introduced by Hurt (1966), as well as the “Plains Forager Model”, where groups are inhabiting areas less affected by Hypsithermal climates and expanding their subsistence bases and mobility patterns to suit these localities. As Sheehan (1995) argues, this does not mean that humans are no longer procuring bison in favour of other resources. In fact, bison are continually being exploited through the Terminal/Late Paleoindian and Early Middle periods, though not to the extent hypothesized in the “Bison Focus Model” (Reeves 1978; Schiele and Walker 2013). It should be emphasized that the sample of sites dating to this time period is comparatively small, given the relative paucity of Hypsithermal-era archaeological sites. Accordingly, as the sample size grows, our understanding of human adaptations to changing climates may change. However, given what is currently available, it would appear that human groups are shifting their mobility and settlement patterns to areas less affected by Hypsithermal climates and expanding their resource bases beyond the exploitation of bison.
8.1 Introduction

From this study and others (Belsham 2011; Cahill 2012), it is well established that the Camp Rayner site (EgNr-2) is a multicomponent archaeological site containing cultural levels dating from the Early Precontact or Paleoindian period to the Late Precontact period. The intact occupation levels at the site record the long history of human occupation prior to European contact and aid in our understanding of these ancient lifeways in this region of North America. In total, the Camp Rayner site shows repeated occupation for over 7,800 years of human history and artifacts found on the surface of the adjacent beach may extend this to approximately 11,000 years (Belsham 2011). In addition to the Precontact components of the site, a historic cabin structure built in 1903 by Orville Arthur (Jack) Hitchcock, remains standing to this day and exemplifies the lifeways of early Euro-Canadian settlers in Saskatchewan. Hitchcock’s cabin is one of the oldest original log cabins in southern Saskatchewan and exhibits an architectural style that is unique to the region (Belsham 2011). The colourful character of Jack Hitchcock and the material remains of his lifestyle are of considerable cultural and heritage value to the province. Though much is yet to be known about the occupation levels at the Camp Rayner site, the analysis conducted so far has shown it to be significant to Northern Plains archaeology.

Currently, the Camp Rayner site faces numerous threats from natural and anthropogenic forces which are affecting the integrity of its components. Lake Diefenbaker, as one of the largest lakes in southern Saskatchewan, is a centre for tourism and other activities which have concentrated in numerous areas around the lake. Hitchcock’s Bay is one of these areas and has attracted cabin development and tourism-related industries, as well as the establishment of a Girl Guides’ Camp. Human activity in the area, paired with the erosive forces from the lake, are impacting the Camp Rayner site to such a degree that its status as a Site of Special Nature (SSN) is no longer effective for its preservation. Given the importance of this heritage resource and its cultural, historical, and environmental context, the creation of a Heritage Resource Management Plan is a necessary step in ensuring the site’s current and future protection. Overall, the goals of this plan are to identify both current and potential future impacts to the Camp Rayner site, and
provide recommendations and policy options that may help minimize any negative effects on the
site going forward. The Resource Management Plan for the Camp Rayner site is designed to
integrate the interests and concerns of the stakeholders and balance these concerns with the needs
of the site. The objectives for the Camp Rayner site Resource Management Plan are as follows:

1. To minimize impacts to the Camp Rayner site from current and future land uses and
development.
2. To minimize the future erosional effects to the Camp Rayner site.
3. To integrate the concerns, interests, and knowledge of local landowners into policy and
land use strategy recommendations.
4. To support local and regional development while not forfeiting the protection of the
Camp Rayner site.
5. To promote effective legislation on both local and provincial levels for the Camp Rayner
site’s protection and preservation.
6. To promote awareness and education regarding heritage resources found within the Lake
Diefenbaker area and Saskatchewan as a whole.
7. To provide the necessary documentation to aid in the Camp Rayner site’s nomination as a
Provincial Heritage Site.

With these goals and objectives in mind to guide this Heritage Resource Management Plan’s
trajectory, it is the hope that the recommendations and strategies offered will aid in ensuring the
long term survival of the site for present and future generations.

8.2 Methods

Methods undertaken for this Heritage Resource Management Plan were varied and
involved background research of previous reports of the site, a pedestrian reconnaissance survey,
consultation with Maggie Schwab and Rob Crosby from Crosby Hanna & Associates, and
interviews with neighbouring landowners. Though the Camp Rayner site has been the focus of
few in-depth investigations, those which have been completed have underlined the site’s
importance to Saskatchewan archaeology. The authors have provided their perspectives
regarding the importance of the site and have made recommendations to ensure its preservation
(Belsham 2011; Cahill 2012; Jones et al. 1998). Accordingly, many of the principles of this
Resource Management Plan are guided by these reports. The recommendations offered are intended to be comprehensive and fully address the issues affecting the Camp Rayner site.

Using a Garmin GPS handheld device and Sony A330 DSLR camera, two pedestrian reconnaissance surveys were undertaken in October of 2015 to determine the site’s known spatial extent, its surface features, and the manner in which it is currently being impacted. The surveys were restricted to access trails located throughout the area in accordance with the wishes of the site caretakers (Reinie and Barbara Janke). Visitors are required to stay on the established trails when visiting Jack Hitchcock’s cabin and the David Greene Chapel in order to minimize surficial erosion (Reinie Janke, personal communication 2015). Surface structures and features were recorded on GPS and photographed. In total, the pedestrian survey covered most of the Camp Rayner site and adjacent shoreline.

Consultation with a planning firm was deemed a necessary component for this Heritage Resource Management Plan, given the complexities in formulating such a report and making recommendations for site management. This consultation helped to ensure that proper steps were taken to produce a final document which appropriately addressed the requirements for the management of this heritage resource. Maggie Schwab and Rob Crosby, from the Saskatoon landscape architecture and planning firm Crosby Hanna & Associates, voluntarily offered their time and services to guide the formulation of this document.

Lastly, in order to determine the full extent of the impacts affecting the Camp Rayner site, semi-formal interviews were conducted with neighbouring landowners and community members. Participants included Reinie and Barbara Janke, who are the owners of Hitchcock’s Hideaway and leasees of the land upon which the site is situated, as well as members of the Hitchcock Bay Development Corporation and Hamlet Board, and Lindsay Hargrave, administrator for the RM of Coteau. In these interviews, inquiries were made regarding local development and land use activities in the area, as well as the public’s general knowledge of heritage resources in the Lake Diefenbaker region. Participants were also given the chance to ask questions regarding the project and express their concerns. Additionally, interviews were also conducted with Nathan Friesen, Senior Archaeologist of the Saskatchewan Heritage Branch, Tomasin Playford, current Executive Director for the Saskatchewan Archaeological Society, and Elaine Gunsch, curator of the F.T. Hill Museum in Riverhurst, Saskatchewan. As these participants had previous experience with the Camp Rayner site, their guidance and input was necessary for the project.
8.3 Significance of the Camp Rayner Site

In determining the significance of an archaeological site, governing heritage management bodies normally establish several criteria by which to judge heritage resources. In Cultural Resource Management (CRM), these criteria are necessary in determining if heritage sites are worthy of preservation. Arguably, all archaeological sites have varying levels of significance, whether it is scientific, historical, or cultural. However, given limited resources, the preservation of every archaeological site is not possible and CRM archaeologists must have some means by which the value of cultural resources can be determined in both present and future contexts (Lipe 1984). These criteria are most often derived from professional interests and social concerns and there is no universal or absolute methodology established to measure heritage value. Given that these values are at least partially dependent on the social, political, and cultural context within which they are established they will vary throughout time and across geographic boundaries (Lipe 1984; Moratto and Kelly 1978).

In Saskatchewan, the Heritage Conservation Branch (2013) has provided guidelines that are to be used when determining the value of a heritage resource. These guidelines discuss the many facets which must be considered when determining the importance of an archaeological or palaeontological site. For example, a site may be considered significant when it is associated with the development of a region, or representative of the lifeways of its people, both past and present (Heritage Conservation Branch 2013). In Saskatchewan, areas to consider include the historical value, cultural and spiritual value, architectural value, scientific value, and aesthetic value of a site (Heritage Conservation Branch 2013).

For a site to contain historical value in Saskatchewan, it must be associated with “people, events, places or themes that are important in the human, geological, or palaeontological history and development” of the province (Heritage Conservation Branch 2013: 8). Such examples include Petite Ville, which represents one of the best preserved examples of a Metis hivernant, or wintering settlement site in Canada. The historic value of this site lies in its association with the history and lifeways of the Metis culture during a period of transition from nomadic bison hunters to sedentary farmers (Heritage Conservation Branch 2013).

The cultural and spiritual significance of a heritage resource in Saskatchewan is based on a site’s association with lifeways and practices which are considered to be culturally and/or spiritually significant, or are reflective of a culture’s values and belief system (Heritage
Wanuskewin Heritage Park has high cultural and spiritual significance as it contains a large complex of seasonal camps, bison jumps, and a medicine wheel. This site is representative of the ancestral lifeways of today’s First Nations Peoples and stands as a sacred gathering place today, “playing a prominent role in the expression and development of First Nations culture” (Heritage Conservation Branch 2013: 9).

Typically, heritage properties with high architectural significance reflect innovative and influential architectural styles and/or technology which exhibit creativity in design and excellence in craftsmanship (Heritage Conservation Branch 2013). Sites of this nature are primarily structural. The Balfour Apartments in Regina, which were commissioned by James Balfour, a prominent lawyer, in 1930 exemplify heritage properties containing high architectural significance. The value of this property lies not only in its attractive Moorish design, and attention to detail, but also in its association with a prominent figure in the history of Regina (Heritage Conservation Branch 2013).

Scientific value is based on a heritage site’s potential to contribute material which can be helpful in answering scientific inquiries regarding past processes. Significance of this type is normally only associated with archaeological, palaeontological, or geological sites and objects. Additionally, a heritage property is considered to have higher scientific value if it can be associated with other heritage sites, such that patterns of land use or lifeways during a particular time period can be determined (Heritage Conservation Branch 2013). Along with its spiritual and cultural value, Wanuskewin Heritage Park also has a high level of scientific value. With archaeological material dating to as early as 5,000 BP, this heritage resource has contributed to our understanding of Precontact lifeways to a significant degree (Heritage Conservation Branch 2013).

Finally, the aesthetic value of a heritage site may also be used when measuring a site’s significance in Saskatchewan. Properties exhibiting high aesthetic value are commonly those which “display exceptional or innovative craftsmanship, style, technical skill, [and] quality of design and beauty” (Heritage Conservation Branch 2013: 12). This value is not restricted to landscapes and site complexes and may also be applied to traditional objects and art. The Swift Current Creek Petroglyph Boulder is an example of a heritage property exhibiting high aesthetic value given the collection of ancient rock art in numerous styles which have been painted and carved onto its surface (Heritage Conservation Branch 2013).
Though the measure of a heritage site’s significance is not limited to the above listed criteria, these categories are useful in outlining the overall importance of the Camp Rayner site. Not every category is appropriate or applicable to this particular heritage property, as such the following will only detail the site’s historical, cultural and spiritual, and scientific value as these are most strongly exhibited.

8.3.1 Historical Value of the Camp Rayner Site

The Camp Rayner site’s Post-contact and Precontact components retain historical value for the province of Saskatchewan in a variety of ways. The Precontact components at the site record the lifeways of the first peoples who inhabited North America and contributed to the development of the continent. Based on archaeological investigations at the Camp Rayner site, multiple habitation levels have been uncovered which indicate repeated occupation of the site for most of the Precontact cultural chronology (Cahill 2012). Two aspects of these Precontact components are of significant historical value to Saskatchewan. First, archaeological sites containing intact components dating to the Early Precontact, or Paleoindian, period are relatively rare on the Northern Plains. Although there is archaeological evidence for occupation of Saskatchewan during this early time period, these are mostly limited to surface finds (Dyck 1983). Intact Early Precontact sites which have been discovered are primarily located within Alberta and only two (apart from the Camp Rayner site), the Fenton Ferry site and the St. Louis site, are from Saskatchewan (Meyer et al. 2011; Peck 2011). The Fenton Ferry site, located in the Greater Forks region of Saskatchewan, contains an Agate Basin component dating to approximately 10,000 years BP and the earliest cultural components at the St. Louis site have been radiocarbon dated to approximately 8,400 years BP (Amundson et al. 2005; Meyer et al. 2011). There are likely to be more archaeological sites dating to this time period in Saskatchewan, however, they have yet to be discovered. The Camp Rayner site joins a small sample of known archaeological sites dating to the Early Precontact period in Saskatchewan, which are integral in rebuilding the cultural lifeways of ancient groups on the Northern Plains. Secondly, the site’s repeated occupation from the Early Precontact period through to the Late Precontact period is unique among archaeological sites in Saskatchewan. Although the Camp Rayner site may not be the oldest known archaeological site in Saskatchewan, it does contain one of the longest stratified sequences of occupation levels. Comparable sites are
relatively rare and include the Mummy Cave site (Wedel et al. 1968) from Wyoming and the Stampede site (Falzarano 2014) from the Cypress Hills region of Alberta. The Mummy Cave site contains archaeological components which date to as early as 9,000 years BP and extend throughout most of the Precontact chronology (Wedel et al. 1968). The Stampede site is of similar nature, with occupational layers spanning approximately 8,000 years total (Falzarano 2014). The Camp Rayner site is the only known archaeological site in Saskatchewan which contains occupations representing a considerable time span of the Northern Plains Precontact history. Sites of this nature are important in understanding the lifeways of Precontact peoples who first populated North America. In this manner, the Precontact components of the Camp Rayner site readily contribute to the history of the peoples of Saskatchewan.

The historic value of the Camp Rayner site is not solely limited to its Precontact components. Jack Hitchcock’s cabin and his personal belongings are also of considerable historic value to the province of Saskatchewan as they are a product of the Euro-Canadian settlement of the west. The log cabin itself is a relatively simple, single room dwelling constructed in 1904 by Orville Arthur (Jack) Hitchcock (Figure 8.1). According to Belsham (2011), very few, if any historic log cabin structures from this time period remain standing in this region of the province. Through inquiries made into the Canadian Registry of Historic Places database, there is one other historic cabin site, a trapper’s cabin located in the southern region of Saskatchewan near the town of Gravelbourg. This structure was constructed in the 1930s by Norman Poulin, a Métis farmer and trapper, and was recognized in 1993 as a Municipal Heritage site (Canadian Register of Historic Places 2016). Other historic cabin structures may be present in this region of Saskatchewan, however, unless they have been recognized as historic by the province, it is difficult to identify them.

Such structures are historically valuable to the province as they represent the hard work and ingenuity of the European and Canadian settlers who populated the West. Like many settlers from this time period, Hitchcock tirelessly worked to establish a home for himself in Saskatchewan. Born in Voden Centre, Quebec in 1870, Hitchcock migrated west in 1902 after purchasing a homestead located near the Elbow of the South Saskatchewan (N1/2 18-26-6 W3M) (Gunsch 2014). Much of the food he ate, the clothing he wore, and the tools he used were products of his own resourcefulness and are currently on display within the cabin or are housed in the F.T. Hill Museum in Riverhurst (Gunsch 2014). It is worth noting that Jack Hitchcock is a
well-remembered character within the oral history of the region. From personal communication with Elaine Gunsch (2016), curator of the F.T. Hill Museum, “every person in the area has a story of [him]” and: “Jack became well known on both sides of the River. He was a frequent visitor with friends and neighbours in the Elbow, Riverhurst, Macrorie, Birsay areas, sometimes travelling as far as Long Lake and usually arriving at meal time” (Gunsch 2014: 62). Thus, the cabin of Jack Hitchcock is a historically important structure for the province of Saskatchewan and stands as an example of the Euro-Canadian settlement of the region. Given this, and the fact that this cabin is one of few which are left standing in the province, structures of this nature are worth preserving.

Figure 8.1: View West, Jack Hitchcock’s cabin at the Camp Rayner site.

8.3.2 Cultural and Spiritual Value of the Camp Rayner Site

Ultimately, the cultural and spiritual value of the Camp Rayner site lies in its continued utilization throughout most of the Precontact period and through the presence of a human interment located at the west end of the site. As mentioned previously, archaeological analysis of the multiple components uncovered at the Camp Rayner site indicate that Precontact groups repeatedly used the site from the end of the Paleoindian period to the Late Precontact period, representing 7,800 years of Precontact history. Furthermore, from ethnohistoric evidence obtained in an interview with Jack Hitchcock in 1963 this site utilization did not end with
European colonization of North America. The interview was conducted by D. Bocking of the Saskatchewan Provincial Archives, G. Mitchell from the South Saskatchewan Reservoir Development Commission (SSRDC), and D. Lockwood from the Department of Natural Resources (Belsham 2011; Gunsch 2014). According to Hitchcock, there

“was a tribe [that] used to come down and visit [him] every summer…from Onion Lake and Saddle Lake up around Fort Pitt…[They] used to make canoes and hunted buffalo and other game down [there], gather chokecherries and load the canoes and go back down stream by Saskatoon then portage over to the North River…They used to come down and have about twelve teepees and after the settlers started coming in – at the last they came down with only four and then never came again.” [J. Hitchcock in Gunsch 2014: 20].

From this, it can be concluded that the Camp Rayner site represented a significant area for First Nations groups on the Northern Plains, where they gathered and made ready use of the plentiful floral and faunal resources available in the coulee and adjacent river valley. Pairing this with the archaeological data, it is clear that the Camp Rayner site was an important location as it provided the resources necessary for their cultural lifeways throughout the Precontact and into the Post-Contact period. Though these lifeways were threatened with European colonization of North America, sites such as the Camp Rayner site acted as gathering areas for these groups to continue their traditional cultural practices.

The presence of a human burial at the Camp Rayner site compounds the important role the site played for First Nations groups during the Precontact period and may reflect some spiritual value associated with this locality. Within most ancient and modern cultures, the impact of death is, or has been, met with a variety of beliefs and practices which provide meaning to the experience (Chapman and Randsborg 1981). Accordingly, interments can carry a high degree of ideological and spiritual significance to cultural groups. The exact age of the Camp Rayner burial has not yet been established, however, its location beneath the Cultural Zone 7 levels may indicate that the burial is associated with this time period. Without further investigation of the burial, very little can be said regarding the ideological beliefs and practices with which it may be associated. Regardless, it is very likely that some manner of ritual or spiritualism was associated
with the death and subsequent interment of this individual. According to Belsham (2011), burial sites can carry a significant degree of spiritual importance for First Nations people in North America and the Camp Rayner site burial is no exception. When pairing the presence of the burial with the continued utilization of the site throughout much of the Precontact history on the Northern Plains, it is undoubtable that the Camp Rayner site carries a significant degree of cultural and spiritual value to First Nations groups in Saskatchewan.

8.3.3 Scientific Value of the Camp Rayner Site

Much of the characteristics which establish the Camp Rayner site as historically important can also be applied to the scientific value of the site. As mentioned, the Camp Rayner site represents a relatively rare archaeological resource for Saskatchewan, with approximately 7,800 years of Precontact history contained in its levels (Cahill 2012). This alone is scientifically valuable as it affords a rare opportunity to study most of the Precontact cultures inhabiting this region of the Northern Plains. Furthermore, these levels are some of the oldest found in the province, where intact Paleoindian sites are comparatively rare. Currently, there are a number of grey areas within the Northern Plains Precontact chronology. This includes the transitional time between the Terminal/Late Paleoindian and Early Middle Precontact periods. The Camp Rayner site provides a rare opportunity to study this transition as it has taken place within a single locality. As previously mentioned, the only other site within Saskatchewan which contains components dating to this time period is the St. Louis site, located in north-central Saskatchewan on a terrace of the South Saskatchewan River (Amundson et al. 2005; Johnston 2005). The Terminal/Late Paleoindian and Early Middle period levels at the Camp Rayner site have provided additional data regarding the transition between these two time periods and the effects of the Hypsithermal on human groups on the Northern Plains. As more archaeological sites containing occupational components dating to these time periods are discovered and more data is acquired, these ambiguities become better understood.

Overall, the scientific value of the Camp Rayner site is not limited to its earliest components. There is significant potential for additional archaeological programmes to study the intact components to the site and contribute to the knowledge of the Northern Plains Precontact history. Sites which span the majority of the Precontact time period are relatively rare on the
Northern Plains. Based on this, the material provided is highly valuable for the scientific analysis of the first peoples in North America.

8.4 Impacts to the Camp Rayner Site

In determining impacts to the Camp Rayner site, it is necessary to look at both natural and anthropogenic causes. The Lake Diefenbaker area is a hub of human activity, acting as a tourist destination, irrigation reservoir, hydroelectric power source, water source for local municipalities and industries, and a means of flood control (Water Security Agency 2012). Natural forces impact archaeological sites indiscriminately, however, when combined with anthropogenic activity, the effects can be exacerbated.

8.4.1 Shoreline Erosion

After the construction of the Gardiner and Qu’Appelle dams, the flow regime of the South Saskatchewan River was greatly changed. The implementation of the reservoir caused the inundation of over 10 vertical meters of land within the South Saskatchewan and Aiktow Creek Valleys along with complete flooding of tributary channels and gullies (Himour 1997). The inundation of these valleys and change in the flow regime of the South Saskatchewan River has resulted in higher shoreline erosion rates than before the implementation of the reservoir. According to a study conducted in various locations along Lake Diefenbaker and the South Saskatchewan River, erosion rates averaged approximately 3 meters per year and were expected to stabilize approximately 30 years after the completion of the reservoir (Rasid 1974). The Himour (1997) study from 1995-1996 conflicted with this conclusion by showing that erosion rates had not slowed and far exceeded the expectations of Rasid’s (1974) study.

The adjacent shoreline to the Camp Rayner site is currently undergoing significant slope failure where the stability of the bank has been compromised from loading and undercutting caused by ice and wave action from Lake Diefenbaker (Figures 8.2, 8.3, and 8.4). This type of erosion causes the bank to collapse and slump, and sediments are subsequently washed away by fluvial activity (Rideau Valley Conservation Authority 2011). As Lake Diefenbaker water levels increase and decrease in relation to the local precipitation regime, this erosional process continues. Consequently, the waters of Lake Diefenbaker are destroying the intact components
of the Camp Rayner site and it is common to find archaeological material that has eroded from the bank. From observations noted during the October 2015 pedestrian survey, archaeological material is heavily scattered along the adjacent shoreline for the approximate length of the site. The inundation of the South Saskatchewan Reservoir has created a shoreline that is in a state of disequilibrium and though this is expected to stabilize over time, this process will continue for a long period (Water Security Agency 2012). As such, the fluvial destruction of the land on which Camp Rayner is situated will continue to threaten the site until this process is halted or slowed.

![Figure 8.2: View north, shoreline collapse along beachline immediately south of Camp Rayner site.](image)
Figure 8.3: View west, shoreline collapse at western boundary of Camp Rayner site approximately 50 meters south of the burial site.

Figure 8.4: View west, photo indicating the proximity of the shoreline collapse to the David Greene Chapel.
8.4.2 Pedestrian Activity

The area within which the Camp Rayner site is situated is a hotspot for human activity and tourism which is at its height in the summer and fall months. Lake Diefenbaker is one of the largest lakes in south-central Saskatchewan and attracts numerous visitors who utilize the lake and shoreline for a variety of water-related activities (Lake Diefenbaker Tourism Destination Area Planning Committee 2008). Specific to the Camp Rayner site area, the resort village community of Hitchcock’s Bay is located approximately 1 km to the west (Figure 8.5). This community is composed of 168 cabin lots and has an approximate population of 300 people, though this changes seasonally (personal communication, Mel Karlson 2015).

![Figure 8.5: View west, Hitchcock Bay community in relation to Camp Rayner site.](image)

Additionally, a private camp ground and resort, known as Hitchcock’s Hideaway, lies adjacent to the Camp Rayner site (Figure 8.6). Hitchcock’s Hideaway operates from May 1st until the end of September and offers space and amenities for a maximum of 200 people, with highest numbers usually in July and August. Although no recreational activities are offered beyond providing rental boats, visitors are welcome to use the beach line and visit the Camp Rayner site. Given the sensitive nature of the sandy soil present in the area, visitors are required to stay on the established walking trails (Reinie Janke, personal communication 2015).
Unrestricted pedestrian activity at the site has many unintended and negative side-effects on heritage resources. At the Camp Rayner site, the integrity of the historical structures and the site itself is being impacted by visitors from the neighbouring Hitchcock’s Hideaway and Hitchcock’s Bay cabin resort, as well as the surrounding region. Currently, with the permission from the Hitchcock’s Hideaway owners, visitors are allowed access to Hitchcock’s cabin and the David Greene Chapel where artifacts and the personal effects of Jack Hitchcock are on display. The cabin and the chapel each require a key to gain entry which is available in the Hitchcock’s Hideaway lodge (Reinie Janke, personal communication 2015). Though visitors are required to stay on the established walking trails when accessing the site, continued trampling of vegetation can expose the soil and exacerbate the effects of natural erosion (Ingle et al 2003; McAtee and Drawe 1981). During the pedestrian survey in October 2015, the walking trails and overall conditions of the site were observed. The underlying soil is exposed in some portions of the trail, although this does not appear to be extensive (Figure 8.7). No artifacts were discovered on the trails during this particular survey, however, according to Nathan Friesen’s (2010) ARM In House Field Inspection, a cluster of fire-cracked rock was observed eroding from the walking
trail which leads to the chapel and cabin. As such, despite the best efforts from the caretakers of the site, pedestrian activity is eroding some portions of the Camp Rayner site, although this is restricted only to the established paths.

![Established walking trail on the Camp Rayner site for pedestrian use.](image)

**Figure 8.7:** View west, established walking trail on the Camp Rayner site for pedestrian use.

Regarding the structural integrity of the historical buildings, the current structural state of Hitchcock’s cabin cannot handle unrestricted access and visitation as these are compounding the negative effects from natural erosion. The materials used to construct the cabin are in a fragile state and continued manipulation by visitors is speeding the degeneration of this historic structure. Currently, the cabin’s chinking is crumbling and missing in places and the wood used to construct the roof of Hitchcock’s cabin is degrading and in need of replacement (Figure 8.8 and 8.9). The interior of the cabin is in need of restoration and the artifacts which are on display inside are exposed to variable and uncontrolled climates which are negatively affecting their integrity (Figure 8.10). Although it is hoped that visitors will respect the cabin and the artifacts inside, it is necessary to apply certain restrictions to access as the current state of the structure and its artifacts cannot handle continued exposure and manipulation.
Figure 8.8: Eastern side of Hitchcock’s cabin exhibiting degraded chinking.

Figure 8.9: Hitchcock’s cabin ceiling showing degradation.
Lastly, the unlicensed collection of artifacts exposed by shoreline erosion is speeding the loss of Camp Rayner materials. The beachline in front of the Camp Rayner site is scattered with archaeological materials which have eroded from the shoreline (Figure 8.11 and 8.12). As local knowledge of the site is spreading, the site is becoming well known for the artifacts which can be found along the adjacent beachline (Elaine Gunsch, personal communication 2016). As mentioned previously, these artifacts are integral to understanding Saskatchewan Precontact history and as they continued to be collected without documentation, the potential knowledge they can provide is lost. Though visitors should not be discouraged from visiting the Camp Rayner site and learning about its Pre and Post-contact history, it is clear that unrestricted pedestrian activity is exacerbating the erosion of the site. As such, affirmative action must be taken to negate these effects.
**Figure 8.11:** Lithic scatter on beachline south of Camp Rayner site.

**Figure 8.12:** Astragalus from Large Ungulate located on the beachline south of Camp Rayner site.
8.4.3 Future Development

Given the Camp Rayner site’s vicinity to a resort community and private camping facility, development in these areas has high potential to negatively affect the heritage resources. As mentioned, Lake Diefenbaker is a significant tourist attraction within Saskatchewan. As this industry grows, so too will the neighbouring communities and resorts. According to a tourism and destination area plan formulated in 2008 by the Lake Diefenbaker Tourism Destination Area Planning Committee, tourism in the region has been steadily increasing and there is high demand for the development of recreational properties. Hitchcock’s Bay and Hitchcock’s Hideaway are two areas which will likely be affected by growth in the tourism industry, accordingly, it is necessary to review potential plans for development to determine whether there is potential for the Camp Rayner site to be impacted.

Regarding the Hitchcock Bay cabin resort, there are no current plans for major development of the community. Based on interviews with the Hitchcock Bay Development Corporation Board, the community has experienced a fair amount of growth in the last five years. However, this has recently stalled and there are no official plans for future growth or development beyond replacing and repairing the current infrastructure (Mel Karlson and Diane Rhodes, personal communication 2015). Overall, it is unlikely that new development from Hitchcock’s Bay will impact the Camp Rayner site as significant growth of the community and subsequent alteration of the surrounding region in the near future is unlikely.

As Hitchcock’s Hideaway is within close proximity to the Camp Rayner site, any further development of this establishment will impact the heritage resource in the area. Like the Hitchcock Bay community, there are no current or future plans to develop Hitchcock’s Hideaway. In fact, the owners of the campground, Reinie and Barbara Janke, are downsizing their business and have plans to retire in the near future and sell the property to their daughter, who may take over its management (Reinie Janke, personal communication 2015). If there are any plans to develop the property in the future, current heritage legislation will require that a Heritage Resource Impact Assessment be conducted. As such, threats to the Camp Rayner site from development of the Hitchcock Bay community and Hitchcock’s Hideaway is minimal. Should this change, then the level of threat to the site from this source will increase.
8.5 Strategy Recommendations for Long Term Site Management

Given the significance of the Camp Rayner site and the natural and anthropogenic impacts to its integrity, necessary affirmative action must be taken in order to ensure the site’s long term survival. As it currently stands, the Camp Rayner site is degenerating at a fairly rapid rate as a result of the above listed impacts. The following recommendations and strategies developed for the Camp Rayner site accounts for these impacts and outlines the actions needed to aid in the site’s preservation on regional and local levels. Overall, this will require cooperation from the provincial government and the RM of Coteau, as well as community members, adjacent landowners, First Nations groups, and interested parties of the Camp Rayner site. The protection and preservation of important archaeological sites in Saskatchewan is most effective when these groups assume responsibility for the province’s heritage resources. While it is understood that only a limited amount of time and money can be imparted by each party, mutual cooperation between the provincial government and local stakeholders can ensure effective protection of the Camp Rayner site in the long term.

8.5.1 Recommendation #1: Formulation of an Official Community Plan for the Organized Hamlet of Hitchcock’s Bay

Currently, the organized hamlet of Hitchcock’s Bay and the RM of Coteau do not have an Official Community Plan in place to guide the physical, environmental, economic, social, and cultural growth of the community. According to the Community Planning Branch of the Saskatchewan Ministry of Municipal Affairs (2011), an Official Community Plan (hereafter, OCP) acts as an official policy document which guides growth in a manner befitting the ultimate vision of the community or the municipality. Such documents are designed to address current and future land use or development, the economic development of a community, public works, hazard lands, environmentally sensitive lands, source water protection, and policy implementation. An OCP acts as a safeguard to prevent unwanted development and is a tool that can be used by potential developers to create proposals that best befit the community’s interests (Community Planning Branch 2011). Communities and municipalities can outline specific areas where development can and cannot take place, and can formulate policies and bylaws which will aid in implementing these goals. Ideally, this is determined through a process of consultation with local landowners and stakeholders in the area. OCPs can be formulated specific to a
community, or they can outline a more regionally based plan for current and future development, depending on the manner in which a community or municipality wishes to address current and future development plans and issues (Community Planning Branch 2011). As mentioned previously, Lake Diefenbaker stands as a tourist attraction and recreation area for the province of Saskatchewan and it is likely that this will grow in the future, especially within the vicinity of Hitchcock’s Bay. As such it is necessary that communities in this area have an Official Community Plan in place which will help foster effective and planned growth that is in line with their community vision.

With regards to the Camp Rayner site, the establishment of an OCP can help mitigate the negative effects of future development against the site’s heritage resources by controlling development in the immediate vicinity of the site. Any development which involves surface disturbance in close proximity to the Camp Rayner site has the potential to affect the site’s intact components. Should a proposal for development of this nature occur within this area in the near future, it is then recommended that the site and the land immediately surrounding it be designated an Environmental Reserve or a Municipal Reserve, pursuant to the requirements listed in The Planning and Development Act (2007: Clause 181). According to the Act (2007), designations of this nature will help to ensure that this land will be left in its natural state and will not be sold or developed, unless otherwise directed by the Minister. Given the sensitive nature of this site, and the requirements established within The Planning and Development Act (2007), each of these options should be carefully considered within the recommended OCP. It should also be noted that, prior to any designations of this land, proper consultation be undertaken with the adjacent landowners regarding permitted and prohibited land use and activities on and near the site. The same shall apply for any person or group who is leasing the land at the time of the development of this OCP.

8.5.2 Recommendation #2: Provincial Heritage Designation

Designating the Camp Rayner site a Provincial Heritage Property will afford the site certain protective measures and support which are not associated with its current status. Realistically, much of the future management and restoration of the site will center on its potential status as a Provincial Heritage Property. Though Sites of Special Nature (SSN) are protected from destructive activities under the Heritage Property Act (2014), this type of
protection is passive and there are no active measures in place to preserve the site for the long term. Under this label, landowners are not required to maintain the heritage resource and no financial support is offered for the property’s preservation (Heritage Property Act 2014: Clause 64 (1-2)). Unfortunately, this offers little incentive to actively preserve and restore heritage resources under this designation and it does not protect the site from natural erosive forces. In designating the Camp Rayner site a Provincial Heritage Property:

“notwithstanding any other Act, no person shall destroy, alter, restore, repair, disturb, transport, add to, change or move, in whole or in part, real property designated pursuant to this Part or remove any fixtures from any such property…without written consent of the minister” [Heritage Property Act 2014: Clause 44 (1)].

From this designation, those who are deemed responsible for the site will be lawfully required to protect and preserve the site to the best of their abilities. Costs incurred during restoration of the site are borne by the Minister of Parks, Culture, and Sport and financial support is available for those seeking to preserve a Provincial Heritage Property (Heritage Property Act 2014: Clause 51(3)). Unlike a SSN, a Provincial Heritage Property designation is more specific to the needs of the site and has greater legislative support regarding the site’s preservation and protection. The Camp Rayner site is in need of such a designation given the immediate need for the restoration of Hitchcock’s cabin and action to preserve the in situ components of the site. Realistically, this designation is key to the long term preservation of this site as such a label has legislative, political, and social ramifications which will aid in preserving, restoring, and managing this heritage resource.

For this designation to effectively take place, there must be support and cooperation amongst landowners and interested parties within the RM of Coteau and the surrounding region. Two previous attempts have been made to designate the Camp Rayner site with greater provincial heritage status, once as a Municipal Heritage Property and once as a Provincial Heritage Property (Reinie Janke, personal communication 2015; Elaine Gunsch, personal communication 2016). The Municipal Heritage Property nomination focused only on the historic structures of Hitchcock’s cabin and the David Greene chapel and was rejected by the Saskatchewan Heritage
Branch given that the chapel is not original to the property (Reine Janke, personal communication 2015). Nomination for the site as a Provincial Heritage Property also focused on the historic components of the site, however, this was also rejected as there were no parties willing to manage the site (Elaine Gunsch, personal communication 2016). From personal communication in February of 2015 with Nathan Friesen, senior archaeologist with the Saskatchewan Heritage Branch, the provincial government is supportive of a Provincial Heritage Nomination. Previous efforts for heritage nominations have shown that the towns of Outlook and Elbow, Waterwolf Planning Inc., the RM of Maple Bush, and the neighbouring landowners and caretakers of the site are also supportive of such action.

While this support is important in designating the Camp Rayner site a provincial heritage site, there must be a party would be deemed responsible to care for this heritage resource as required by The Heritage Property Act (2014). Currently, this responsibility falls to Barbara and Reinie Janke, who lease the land on which the site is situated. Much has been done on their part to uphold this responsibility and it should be emphasized that their care and dedication has furthered the preservation of the Camp Rayner site. However, as mentioned previously, the Jankes are planning to retire in the near future and, following this, it is uncertain who will claim responsibility for the site’s management. Given that the site is located on provincial Crown property, it is the author’s opinion that the province of Saskatchewan be identified as the entity responsible for the Camp Rayner site. However, it is entirely possible that another party, including the new owner of Hitchcock’s Hideaway, can claim this responsibility. Ultimately, unless there is a party willing to claim long-term responsibility for the Camp Rayner site, it is unlikely that it will be designated a Provincial Heritage Property. Accordingly, this will be a necessary step in implementing the recommendation of nominating the Camp Rayner site for Provincial Heritage Property status.

8.5.3 Recommendation #3: Shoreline Stabilization

As mentioned above, the erosion of the shoreline by the waters of Lake Diefenbaker poses an immediate and serious threat to the intact components of the Camp Rayner site. In order to slow or stall this process it is necessary to stabilize the adjacent shoreline. Though there are a number of strategies which can be used to stabilize shorelines, the use of bioengineering techniques which utilize natural materials will likely prove to be the most effective and
inexpensive (Rideau Valley Conservation Authority 2011). Such techniques are also less invasive than conventional methods of shoreline stabilization and this is an important factor given the sensitive nature of the heritage resource. Ultimately, the end goal of this process is to produce a shoreline which is self-repairing with stable sediments, minimal erosion, and a healthy vegetative buffer (Rideau Valley Conservation Authority 2011).

Choosing the best method of shoreline stabilization will require the expertise of a consultant engineer, however, from information provided by the Rideau Valley Conservation Authority (2011), one method which utilizes a “live crib wall” may prove most effective. This involves the construction of a log wall and planting vegetation between the seams of each layer. This method is most effective for shorelines with low to high bank profiles and protects against slope failure (which is present at the Camp Rayner site), ice scouring, and other water-related erosion (Rideau Valley Conservation Authority 2011). Though this method is considered to be more expensive than other bioengineering techniques, with higher development and labor costs, it will provide the best protection against continued slope failure and erosion of the Camp Rayner soils.

8.5.4 Recommendation #4: Systematic Survey

Given that the spatial extent of the site is unknown and predicted to lie far beyond the boundaries that were established during the 1987-1997 field school investigations, it is necessary to determine these characteristics in order to understand the true size and density of the Camp Rayner site. Thus far, a very limited portion of the site has been excavated and sampled, primarily restricted to the shoreline and under 100 meters inland (Belsham 2011). Rather than placing excavation units based on the results of sub-surface testing, placement of units was established in order to sample the varying types of terrain present at the site (Belsham 2011; Jones et al. 1998). As such, the exact boundaries of the Camp Rayner site were not properly determined. Additionally, though Friesen’s (2010) field inspection attempted to locate the northern boundaries of the site, this goal could not be achieved. From Jones et al.’s (1998) report, it is theorized that the Camp Rayner site is much larger than currently recognized with an east-west extent estimated to 500 meters and a north-south extent estimated at 200-300 meters.

Until the full spatial extent of the site is properly established, the Camp Rayner site cannot be effectively preserved from future impacts. The Camp Rayner site is bordered to the
north, east, and west by properties which may be developed in the future and it is necessary to
know the full spatial extent of the site to prevent impact. Furthermore, this will help to establish
the relationship between the Camp Rayner site and other heritage resources which are located in
the immediate area (EgNr-3, EgNr-4, EgNr-5, and EgNr-8) (Figure 8.13). Current reports have
assumed that the Camp Rayner site represents a single, large site, however, this can only be
confirmed through systematic testing. There are many unknowns regarding the true nature of this
heritage resource and this will remain until a full, systematic survey is conducted to clear these
grey areas.

![Figure 8.13: Location of the Camp Rayner site (EgNr-2) in relation to EgNr-3, EgNr-4, EgNr-5,
and EgNr-8 (Image source: Belsham 2011: Ch.1, p.2).](image)

8.5.5 Recommendation #5: Burial Management and First Nations Consultation

The Camp Rayner site burial is located in the northwestern corner of the site from Unit 9
at a depth of 130 cm (below Cultural Level 7). Excavations uncovered the intact lower half of an
individual placed in a flexed, upright sitting position (Figures 8.14 and 8.15). No diagnostic
artifacts or faunal remains were found to be associated with the interment. Upon visual inspection of photos taken of the skeletal remains, Dr. Ernest Walker, Forensic Anthropologist for the RCMP and professor of Archaeology at the University of Saskatchewan, issued the following preliminary assessment:

“The burial is indeed flexed and is in a sitting position…This is not unusual for Archaic or Middle period interments although [at this time age and cultural affiliation is unknown]. The left pubic symphysis is exposed and although the image is grainy, the symphyseal surface indicated that the individual was at least a middle-aged adult. I cannot be more specific than that in this instance. In one image there appears to be the perimeter of a burial pit (darker colouration than the surrounding yellowish sand). In this instance, the head was on the west and the feet on the east given the placement of the north arrow in the photo. I would suggest we are dealing with a male because the linea aspera running down the posterior shaft of the left side femur is very robust indicating extensive musculature and by association likely a male. Finally, there seems to be some arthritic changes (osteophytic lipping and a porous appearance to the lateral aspects of both distal femora) indicating some degenerative changes consistent with the age at death assessment.” [E. Walker in Cahill 2012: 166].
Figure 8.14: Floor plan of Camp Rayner burial; Unit 9 at 130 cmbs (Cahill 2012: 165).

Figure 8.15: Photo of the Camp Rayner burial (Cahill 2012: 166).
Under the Heritage Property Act (1980), there are a number of stipulations required when dealing with human skeletal materials. Legally, when human remains are accidentally discovered, the RCMP must be contacted in order to determine whether or not the remains represent a crime scene. This protocol may be waived if the skeletal remains are clearly within an archaeological context (Heritage Conservation Branch 2003). From this point, the Heritage Resource Branch must then be notified of the discovery in order to determine the proper procedure for dealing with the remains. Generally, within 48 hours, the burial is assessed and the relative age and cultural affiliation is determined. If the burial is historical or archaeological in nature, involvement from law enforcement is no longer necessary (Heritage Conservation Branch 2003). It is then determined whether or not it is necessary to excavate and repatriate the remains and this is dependent on

“the circumstances of the discovery, degree of disturbance or damage to the burial, the probability of future disturbance, completeness of the remains, long term preservation options, scientific significance, and the sensitivities and concerns of direct descendants.” (Heritage Conservation Branch 2003: 6).

From the reports compiled by Jones et al. (1998) and Belsham (2011), there is no indication that the above listed procedures were followed upon the burial’s discovery in 1987. Instead, upon determining that the skeletal material was, in fact, human, the burial was mapped, photographed, and promptly reburied, with no consultation with the Heritage Resources Branch. Moving forward with the management of this burial, it is necessary to note that it is in no immediate danger from development or shoreline erosion. The burial is located at the top of a small knoll and is approximately 50 meters from the beachline. During Friesen’s (2010) ARM field inspection, he determined that the burial lies approximately 3 meters from the Jankes property line. As the Jankes have no immediate plans for development and the burial is a safe distance away from the collapse of the shoreline for the time being, there is no immediate need to move or repatriate it.

As burial sites are considered sacred to First Nations groups in North America, consultation with a local First Nations band should take place in order to gain their perspective regarding how the site should be further managed. Ultimately, it will be necessary to work with
First Nations bands in order to determine whether the burial can and should be assessed, repatriated, or left alone. Typically, consultation with First Nations groups is only required during the repatriation and reburial process (Heritage Conservation Branch 2003). However, First Nations consultation should be a necessary component in all steps of archaeological management of sacred sites and their cultural perspectives are highly significant when formulating plans for sites of this nature. Furthermore, it is highly likely that the Camp Rayner site represents a traditional gathering area for First Nations groups, given the ethnographic and archaeological evidence presented earlier. Accordingly, it is recommended that local First Nations groups be contacted and their perspectives be integrated into the management of the Camp Rayner burial and the site as a whole.

8.5.6 Recommendation #6: Public Education and Outreach

Ultimately, it is the general public who decides the fate of heritage resources. Avocational groups, such as the Saskatchewan Archaeological Society, recognize this fact and make it their mandate to involve and educate the public in archaeological endeavours. As such, it is essential that an outreach and education programme be formulated in order to disseminate and educate the public about the importance of archaeology in Saskatchewan in general, and specific to the Camp Rayner site. Currently, through conversation with local landowners and Hitchcock Bay community members, knowledge of Saskatchewan archaeology (both Historic and Precontact) is limited in the area. Generally, there is some awareness of the archaeology in this region, given the plethora of artifacts discovered on the beaches of Lake Diefenbaker, however, there is very little knowledge regarding the artifacts’ origins or function (Mel Karlson and Diane Rhodes, personal communication 2015). Despite this, there is a genuine interest in learning more about the archaeology of Saskatchewan and the history of the Camp Rayner site (Diane Rhodes, personal communication 2015).

Given the lack of awareness of the archaeology among the public within the Hitchcock Bay area, it is essential that this information is disseminated in order to establish a full appreciation and awareness of the Camp Rayner site. So far, a public presentation of this research at the Camp Rayner site was given at the Saskatchewan Archaeological Society’s Annual General Meeting, held at Wanuskewin Heritage Park in April, 2016. It is recommended that these efforts continue in order to gain as much support and appreciation for the site as
possible. Though the aforementioned efforts only involve dissemination of information through presentation, outreach and education can also take the form of public involvement in archaeological programming through field schools. These efforts can most effectively be accomplished through partnership with local avocational groups such as the Saskatoon and Saskatchewan Archaeological societies. It must be emphasized that these endeavours are undertaken with full support and permission from the current caretakers of the Camp Rayner site, Barbara and Reinie Janke. Overall, it is the hope that through these efforts the Camp Rayner site becomes recognized as an essential part of Saskatchewan’s heritage and an important component for scientific research of North America’s past. Such an awareness will do much to protect and preserve the site in the long term.

8.5.7 Recommendation #7: Continued Archaeological Analysis of the Camp Rayner Site

Finally, given the scientific value of the Camp Rayner site, analysis and research of this resource is recommended to continue. To date, only this thesis and Nathalie Cahill’s (2012) thesis have undertaken analysis of the cultural materials recovered from the Camp Rayner components during the 1987-1997 field school seasons. However, archaeological analysis should not be limited to these materials alone. As mentioned previously, there are many unknowns regarding the true spatial and temporal depth of the site. Though this can be established through a systematic survey of the site, the true nature of these characteristics can be better understood through an archaeological research programme. There are a number of potential research trajectories which can take place at the Camp Rayner site. Of particular interest would be the spatial analysis of artifact distributions and features recorded at the site, specific to Cultural Zones 6 and 7. As an intersite comparison of Terminal/Late Paleoindian and Early Middle Period lifeways has already been accomplished with this thesis, it is now necessary to investigate intrasite specific activities and site utilization. This is only one of many research agendas which can be undertaken at the Camp Rayner site, and as these are completed, a fuller understanding and appreciation of the complexities of this site can be established.
8.6 Policy Recommendations for Long Term Site Management

The ultimate goal of this heritage resource management plan is the long term protection, preservation, and management of the Camp Rayner site. Currently, as outlined above, numerous anthropogenic and natural forces are impacting the site’s integrity and eroding its intact components. A number of strategies have been recommended which are designed to ensure the longevity of the site and mitigate the effects from current and future impacts. However, these strategies are relatively broad and will require guidance regarding their implementation. The following recommended policies are designed to do just that and can be integrated into future development plans or used as guidelines for developing future land use and development policies.

8.6.1 Future Land Use and Development

Although there are no current plans for development in the immediate area, Lake Diefenbaker is a well-known tourist destination and the communities and land surrounding it will likely see growth and development in the near future. Given this, the following policies are recommended to aid in the long term management and preservation of the heritage resources found at the Camp Rayner site:

- Preceding any development in the immediate vicinity of the Camp Rayner site, a heritage resource impact assessment shall be conducted in full pursuant to the requirements outlined in *The Heritage Property Act* (2014).
- In the event that development is proposed, the owner of the development shall dedicate the land surrounding the Camp Rayner site a Municipal Reserve or an Environmental Reserve, pursuant to the requirements outlined in *The Planning and Development Act* (2007: Clause 181).

8.6.2 Provincial Heritage Designation

The following recommended policy shall apply in regards to nominating the Camp Rayner site a Provincial Heritage Property:
- In the event that no party has claimed responsibility for the maintenance and management of the Camp Rayner site property, the responsibility shall default to the province of Saskatchewan, given that the site is located on provincial Crown land.
- Pursuant to *The Heritage Property Act* (2014), the party responsible to the Camp Rayner site will be required to restore and maintain the archaeological components and historic structures located on the site.

8.6.3 Camp Rayner Site Management and Restoration

The following policies are recommended in order to implement strategies for maintenance and preservation of the Camp Rayner site.

- Given that the shoreline adjacent to the Camp Rayner site is undergoing active erosion and collapse, the party deemed responsible for the site shall ensure that proper consultation is undertaken in order to determine the best possible strategy or technique for shoreline stabilization.
- The responsible party shall ensure that proper stabilization is undertaken and actively maintained for the long-term.
- Proper restoration and management of the site and its historic structures shall be undertaken in full by the party deemed to be responsible for the site, pursuant to *The Heritage Property Act* (2014).
- The responsible party shall also ensure that any activities taking place on the Camp Rayner site land will not affect the overall integrity of the site. This will include prohibiting intensive recreational activity which will heavily impact the site, or result in surface disturbance.

8.6.4 Public Access to the Camp Rayner Site

The following policies are recommended in order to manage public access to the Camp Rayner site:
- Pedestrian access to the Camp Rayner site shall be permitted, provided that access does not inflict on the property of adjacent landowners, and shall be restricted to the established walking trails.
- Any visitors to the site should be made aware of the regulations concerning artifact collection, excavation, or any other unauthorized disturbances to heritage resources.
- Motorized vehicle access is prohibited, unless intended for maintenance and upkeep purposes only. In this case, only light vehicles such as ATVs, lawnmowers, or golf carts are permitted and use will be restricted to the established nature trails wherever possible.

8.6.5 Burial Management and First Nations Consultation

Although there is no immediate need to take action with regards to the Camp Rayner burial, the sensitive nature of this component requires that policies be recommended regarding its management. Ultimately, these will be dependent on whether current land use activity changes, as at this time, there is no threat to the burial from erosion or human-related activity.

- In the event that there is an increase in anthropogenic land use activity (recreation and/or development) or shoreline erosion is affecting the integrity of the burial, burial management shall take place in accordance with the Archaeological Burial Management Policy (2010).
- As this burial is most likely to be ancestrally related to modern First Nations groups, the Saskatchewan Indian Cultural Centre shall be consulted to determine proper management strategies of the burial, pursuant to the Archaeological Burial Management Policy (2010).

8.7 Conclusions

Overall, the Camp Rayner site is a historically, scientifically, culturally and, perhaps, spiritually, valuable heritage resource for the province of Saskatchewan and for North America as a whole. Its cultural components represent the various cultures and lifeways of the people who first colonized this continent and acted as a campsite for First Nations groups until the early 20th century. Settlement at the Camp Rayner site continued when Jack Hitchcock purchased and occupied the land on which the site was situated, building his cabin in 1904 and establishing
permanent homestead. Despite its value, this site is being lost due to the erosive effects of Lake Diefenbaker and the pedestrian activity from those who visit the site. Acting upon the recommendations offered in this Resource Management Plan can do much to preserve the site and their immediate implementation is, therefore, recommended. Through the site’s designation as a Provincial Heritage Property, and as public awareness and interest for the Camp Rayner site increases, support for the site’s preservation will be enhanced, helping to ensure its long term survival. Further, as archaeological analysis of the site continues, a fuller appreciation for its temporal and spatial extent will be achieved. Overall, the Camp Rayner site is a valuable heritage resource worth preserving and this Resource Management Plan provides a guideline for achieving this goal.
Chapter 9
CONCLUDING REMARKS

The intentions of this study were to analyze the lithic and faunal assemblages from the deepest components at the Camp Rayner site in order to understand the cultural transitions between the Terminal/Late Paleoindian and Early Middle Precontact periods. These two time periods remain poorly understood within the Northern Plains cultural chronology and the Camp Rayner site provided a rare opportunity to study these transitions. Further, through comparing the components at this site with other contemporaneous archaeological sites on the Northern Plains, these patterns of human behaviour have been made clearer and contextualized within the broader region.

From the analysis of the faunal assemblages between Cultural Zones 6 and 7 (or the Early Middle period and Terminal/Late Paleoindian, respectively), it is clear that human groups are expanding their resource bases to practice broad-based subsistence approaches. Cultural Zone 7 is, perhaps, more diverse and abundant than Cultural Zone 6, and is dominated by large ungulates, as well as rabbit, beaver, and canid. Cultural Zone 6 also shows some variability, with large ungulate predominating the assemblage, along with a single canid. From this, it is apparent that human groups are not solely focusing their efforts on procuring bison, though this practice does continue throughout both time periods. These patterns of procurement are present at other contemporaneous sites on the Northern Plains, thus the Camp Rayner site is not unique with regards to broad based subsistence strategies at this time.

The lithic assemblages recovered from Cultural Zones 6 and 7 are predominantly represented by locally sourced lithic materials, which is indicative of a restricted movements within the immediate area. Rather than travelling long distances to exploit exotic and, often, higher quality lithic materials, groups occupying the Camp Rayner site were making use of lithics which were locally available. In Cultural Zone 7, silicified peat and Swan River chert are the primary lithic materials being utilized. Cultural Zone 6 reflects a similar distribution in lithics, with Swan River chert, silicified peat, and miscellaneous cherts dominating the assemblage. None of the lithics recovered are considered to be exotic in either assemblage. The lithic material distributions at other sites from these time periods on the Northern Plains are similarly
constructed. However, many sites report the presence of Knife River flint, a material which originates from North Dakota. As discussed previously, it is difficult to determine whether this material is actually KRF, or represents a form of brown chalcedony which is local to Saskatchewan and Alberta. Overall, each of the assemblages reflect consistent utilization of locally sourced lithics and, from this, it appears that groups are restricting their movements to within the immediate area.

Unfortunately, certain difficulties were encountered in this analysis which were related to the initial excavations at the site. Given that many of the excavation units were scattered throughout the site, rather than concentrating to a particular area, activity areas could not be reconstructed. This problem is compounded by the inconsistent utilization of arbitrary levels of 5 or 10 cm, and by the fact that features such as hearths were not recorded during these excavations, despite their presence being indicated in field notes (Cahill 2012). Due to these inconsistencies, reconstructing the stratigraphic record and the cultural chronology for the site was relatively difficult, as outlined by Cahill (2012). Despite the best efforts from the previous analysis, it is apparent that this reconstruction is not entirely consistent across the site. This resulted in using samples for radiocarbon dates which did not originate from the correct level, producing dates which were out of sync for the established time period. This problem can be corrected through continuous excavation and research at the site which use consistent recording methods.

Overall, this analysis provided much with regards to understanding how patterns of human behaviour compared between the Terminal/Late Paleoindian and Early Middle Precontact periods. Initially, it was believed that human groups abandoned the region in reaction to increasingly warm and arid environments (Mulloy 1958; Wedel 1964). However, from this analysis and others, it is clear that this was not the case and human groups adapted their subsistence and settlement practices to suit decreased resource availability on the open plains. This is not only supported by the lithic and faunal assemblages recovered from these sites, but also in their spatial distributions, where occupations appear to be concentrating to areas which would have maintained abundant resources in times of scarcity. Future directions for research should include intra-site analysis within Cultural Zones 6 and 7 in order to reconstruct the various activities taking place at the site and their spatial distributions. This will involve continued excavation of the Camp Rayner site, which has not occurred since the last public field school.
which took place in 1997. These excavations will add to the data set and it is hoped that additional knowledge can be gained regarding the lifeways during these time periods.

Lastly, it is hope that the Heritage Resource Management Plan for the Camp Rayner site will allow for continued preservation and proper management of this important heritage resource. As shown, the Camp Rayner site is a historically, scientifically, and culturally valuable heritage resource for the province of Saskatchewan. The anthropogenic and natural impacts affecting the site have been effectively outlined and strategies have been formulating to mitigate these forces. Ultimately, this document will act as a resource for those responsible for the management of the Camp Rayner site. Through collaboration with the adjacent landowners and communities in the region, it is the hope that the Camp Rayner site will continue to stand as an important heritage resource worthy of preservation.
REFERENCES CITED

Abouguendia, Z., R. Goodwin, and S. Lamont

Acton, Donald F., Glenn A. Padbury, and Colette T. Stushnoff
1998 The Ecoregions of Saskatchewan. Canadian Plains Research Centre, Regina.

Amundson, Leslie J. and David Meyer
2003 Late-Plano Occupation at the St. Louis Site (FfNk-7), Central Saskatchewan. Current Research in the Pleistocene 20: 1-2.

Amundson, L.J., N.P. Friesen, K.M. Enns-Kavanagh
2005 Archaeological Investigations at the St. Louis Site FfNk-7: An Early To Mid Holocene Occupation of the Lower South Saskatchewan River Valley. Stantec Consulting Ltd. Submitted to Saskatchewan Highways and Transportation, Permit No. 02-114. Copies available from Stantec Consulting Ltd., Saskatoon.

Anderson, T.W., R.W. Mathewes, and C.E. Schweger

Antevs, Ernst

Axelrod, Daniel I.

Bamforth, Douglas B.

Barker, William T. and Warren C. Whitman

Banfield, A.W.F

Barnosky, Cathy W.

Belsham, Leanne

Barker, William T. and Warren C. Whitman
Brown, Lauren

Bubel, Shawn

Budd, Archibald C. and Keith F. Best

Byers, A.R., W.G.E. Caldwell, and W.O. Kupsch

Cahill, Nathalie

Canadian Register of Historic Places
2016 Trapper’s Cabin Site. Electronic document

Chapman, Robert and Klavs Randsborg
Christiansen, E.A.


Community Planning Branch


Coupland, R.T. and J.S. Rowe


Cyr, Talina

2006 The Dog Child Site (FbNp-24): A 5,500 Year-Old Multicomponent Site on the Northern Plains. Unpublished Master’s Thesis, Department of Archaeology, University of Saskatchewan, Saskatoon.

Deevey, R.F. Jr. and R.F. Flint


Didiuk, Andrew B.

Doll, Maurice F. V.

Dyck, Ian

Dyck, Ian and Henry T. Epp (editors)

Dyck, Ian and Richard Morlan (editors)

Falzarano, Kirsten Lynne

Forbis, Richard G.
Friesen, Nathan


Frison, George C.


Frison, George C., Michael Wilson and Diane J. Wilson


Germann, Carlos (editor)

Godfrey, Earl W.

Grayson, Donald K.

Gryba, E.

Gunsch, Elaine

Hare, Kenneth F. and Morley K. Thomas

Hendry, Hugh

Heritage Conservation Branch


Himour, Bradley


Hofman, Jack L. and Russell W. Graham


Hurt, W. R.


Husted, Wilfred M.


Husted, Wilfred M. and Robert Edgar

Ingle, Christine, Yu-Fai Leung, Christopher Monz, and Heather Bauman


Jennings, Jesse D.


Johnson, Eldon Arthur


Johnston, Jenna

2005 The St. Louis Site (FjNk-7) and the Below Forks Site (FhNg-25): The Faunal Analysis of Two Mummy Cave Series and Oxbow Complex Sites in Central Saskatchewan. Unpublished Master’s thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Jones, Tim and Donald L. McCann

Jones, Tim, Donald L. McCann, and Tom Stevenson

Kantrude, Harold A. and Russell L. Kologiski

Kasstan, S. C.
2004  *Lithic Technology at the Below Forks Site, FhNg-25: Stratagems of Stone Tool Manufacture*. Unpublished Master’s thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon

Kirby, Don

Kirchmier, Peter F.R.

Klassen, Judith
Klassen, Rudy


Kornfeld, Marcel, George C. Frison, and Mary Lou Larson

2010  *Prehistoric Hunter Gatherers of the High Plains and Rockies*. Left Coast Press, Walnut Creek.

Kulshreshtha, Suren N., K. Dale Russell, and Kurt K. Klein


Kupsch, W.O.


Landals, Alison


Lake Diefenbaker Tourism Destination Area Planning Committee

2008  *Lake Diefenbaker Tourism Destination Area Plan*. Outlook, Saskatchewan.

Leyden, Jeremy James

Lipe, William D.


Low, Bruce


Mayer-Oakes, William and Zenon Pohorecky

1969 *Archaeological Surveys in the South Saskatchewan Reservoir and Vicinity*. Unpublished manuscript on file, University of Saskatchewan, Saskatoon.

McDonald, Jerry N.


McKern, W. C.


Meyer, David


Meyer, David, Alwynne B. Beaudoin, and Leslie J. Amundson

Mitchell, J., H.C. Moss, and J.S. Clayton  

Moratto, Michael J., and Roger R. Kelly  

Morey, Darcy F.  

Mulloy, William T.  

Neal, Barbara  

Nicholson, B.A. and Tomasin Playford  

Oetelaar, Gerald A.  

Peck, Trevor R.

Pentland, R.S.

Pitblado, Bonnie L.

Pletz, Jody Raelene

Quigg, J. Michael

Rasid, Harunur
1974 *The Effects of the Gardiner Dam on Geomorphology Processes and Morphology in the South Saskatchewan River Valley: Riverhurst to Outlook*. Unpublished Ph. D. dissertation, Department of Geography, University of Saskatchewan, Saskatoon.
Reeves, Brian  


Reeves, Brian, and J. F. Dormaar  

Richards, Howard J. and K.I. Fung  

Rideau Valley Conservation Authority  

Robertson, Elizabeth C.  

Ronaghan, Brian  
Saskatchewan Water Security Agency


Sauchyn, Mary A. and David J. Sauchyn


Schiele, Bradley M.


Schiele, Bradley M. and Ernest G. Walker


Sheehan, Michael S.


Swanson, E.H. Jr.

Townley-Smith, L. and Henry Epp

Vance R.E., R.W. Mathewes, and J.J. Clague

Vance, R.E., and R.W. Last

Van Dyke, Stanley, and Sally Stewart

Van Dyke, S., S. Hanna, W. Unfreed, and B. Neal

Vivian, Brian C.
Vivian, Brian C., K. Bosch, and Brian O.K. Reeves

Wapple, Robert

Walker, Ernest G.

WaterWolf Planning Commission
2008  *Lake Diefenbaker Tourism Destination Area Plan*. Outlook, Saskatchewan.

Wedel, Waldo R.

Willey, G. R., and P. Phillips

Wilson, Michael C.
Wright, Bruce W.

Yansa, Catherine H.

Zurburg, Suzanne C.
# Appendix A. Cultural Zone 6 Projectile Point Non-metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Portion Present</th>
<th>Material Type</th>
<th>Colour</th>
<th>Material Modification</th>
<th>Longitudinal Cross Section</th>
<th>Transverse Cross Section</th>
<th>Symmetry</th>
<th>Notches</th>
<th>Basal Corner Shape</th>
<th>Basal Margin Modification</th>
<th>Basal Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>6733</td>
<td>Complete</td>
<td>Swan River Chert</td>
<td>Red</td>
<td>Heat Treatment</td>
<td>Asymmetrical Biconvex</td>
<td>Biconvex</td>
<td>Asymmetrical</td>
<td>Side-notch</td>
<td>Convex</td>
<td>Thinning, thinning</td>
<td>concave</td>
</tr>
<tr>
<td>6734</td>
<td>Basal portion</td>
<td>Chert</td>
<td>Brown and Grey</td>
<td>Heat Treatment</td>
<td>Asymmetrical Biconvex</td>
<td>Biconvex</td>
<td>Asymmetrical</td>
<td>Side-notch</td>
<td>Convex</td>
<td>thinning,</td>
<td>straight</td>
</tr>
</tbody>
</table>

# Appendix B. Cultural Zone 6 Projectile Point Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Max. Length (mm)</th>
<th>Max. Width (mm)</th>
<th>Max. Thickness (mm)</th>
<th>Body Length (mm)</th>
<th>Max. Body Width (mm)</th>
<th>Max. Base Width (mm)</th>
<th>Max. Base Length</th>
<th>Internotch Width (mm)</th>
<th>Left Notch Depth (mm)</th>
<th>Left Notch Width (mm)</th>
<th>Dist. Left Notch from Base (mm)</th>
<th>Right Notch Depth (mm)</th>
<th>Right Notch Width (mm)</th>
<th>Dist. Right Notched from base (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6733</td>
<td>25.5</td>
<td>19.0</td>
<td>5.1</td>
<td>19.0</td>
<td>18.9</td>
<td>15.0</td>
<td>6.0</td>
<td>11.0</td>
<td>3.2</td>
<td>2.1</td>
<td>6.0</td>
<td>4.1</td>
<td>3.0</td>
<td>5.9</td>
</tr>
<tr>
<td>6734</td>
<td>18.2</td>
<td>21.0</td>
<td>5.5</td>
<td>-</td>
<td>21.0</td>
<td>19.1</td>
<td>10.0</td>
<td>16.0</td>
<td>2.3</td>
<td>6.0</td>
<td>10.8</td>
<td>2.0</td>
<td>6.8</td>
<td>10.8</td>
</tr>
</tbody>
</table>

# Appendix C. Cultural Zone 6 Worked Tool Non-Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Material</th>
<th>Tool Type</th>
<th>Portion Present</th>
<th>Modification</th>
<th>Shape</th>
<th>Working Edge</th>
<th>Longitudinal Cross Section</th>
<th>Transverse Cross Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>969/1990</td>
<td>Agatized Wood</td>
<td>Utilized Flake</td>
<td>Distal portion</td>
<td>retouch</td>
<td>rectangle</td>
<td>right lateral margin</td>
<td>Plano-convex</td>
<td>Asymmetrical triangle</td>
</tr>
<tr>
<td>2063</td>
<td>Swan River Chert</td>
<td>Biface</td>
<td>Complete</td>
<td>retouch</td>
<td>triangle</td>
<td>Distal margin</td>
<td>Plano-convex</td>
<td>Plano-convex</td>
</tr>
<tr>
<td>2065</td>
<td>Feldspathic Siltstone</td>
<td>Utilized Flake</td>
<td>Distal portion</td>
<td>retouch</td>
<td>triangle</td>
<td>left lateral</td>
<td>Plano-convex</td>
<td>Plano-convex</td>
</tr>
<tr>
<td>2388</td>
<td>Gabbro</td>
<td>Grinding Stone</td>
<td>complete</td>
<td>grinding</td>
<td>polymorphic</td>
<td>Inferior surface, right lateral</td>
<td>Plano-convex</td>
<td>Plano-convex</td>
</tr>
</tbody>
</table>
### Appendix D. Cultural Zone 6 Worked Tool Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Manufacture</th>
<th>Working Edge length</th>
<th>Maximum Length (mm)</th>
<th>Maximum Width (mm)</th>
<th>Maximum Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>969/1990</td>
<td>Utilized Flake</td>
<td>38.0</td>
<td>28.9</td>
<td>17.1</td>
<td>5.0</td>
</tr>
<tr>
<td>2063</td>
<td>Biface</td>
<td>25.7</td>
<td>38.0</td>
<td>26.0</td>
<td>6.0</td>
</tr>
<tr>
<td>2065</td>
<td>Utilized Flake</td>
<td>20.0</td>
<td>21.0</td>
<td>21.0</td>
<td>4.0</td>
</tr>
<tr>
<td>2388</td>
<td>Grinding Stone</td>
<td>87.0</td>
<td>104.9</td>
<td>91.8</td>
<td>60.2</td>
</tr>
</tbody>
</table>

### Appendix E. Cultural Zone 7 Projectile Point Non-Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Portion Present</th>
<th>Material Type</th>
<th>Colour</th>
<th>Material Modification</th>
<th>Longitudinal Cross Section</th>
<th>Transverse Cross Section</th>
<th>Symmetry</th>
<th>Notches</th>
<th>Basal Corner Shape</th>
<th>Basal Margin Modification</th>
<th>Basal Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1932</td>
<td>Body/base</td>
<td>Swan River Chert</td>
<td>White and Blue</td>
<td>Heat Treatment</td>
<td>Asymmetrical biconvex</td>
<td>biconvex</td>
<td>asymmetrical</td>
<td>none</td>
<td>straight</td>
<td>thinning</td>
<td>asymmetrical concave</td>
</tr>
<tr>
<td>5154</td>
<td>Basal</td>
<td>Swan River Chert</td>
<td>Blue and White</td>
<td>Heat Treatment</td>
<td>Asymmetrical biconvex</td>
<td>biconvex</td>
<td>asymmetrical</td>
<td>none</td>
<td>straight</td>
<td>thinning</td>
<td>straight</td>
</tr>
<tr>
<td>5155</td>
<td>Complete</td>
<td>Swan River Chert</td>
<td>White</td>
<td>Heat Treatment</td>
<td>Asymmetrical biconvex</td>
<td>biconvex</td>
<td>asymmetrical</td>
<td>side notches</td>
<td>convex</td>
<td>thinning</td>
<td>concave</td>
</tr>
<tr>
<td>5156</td>
<td>Basal</td>
<td>Chalcedony</td>
<td>Brown</td>
<td>none</td>
<td>Asymmetrical biconvex</td>
<td>biconvex</td>
<td>asymmetrical</td>
<td>none</td>
<td>convex</td>
<td>none</td>
<td>convex</td>
</tr>
</tbody>
</table>

### Appendix F. Cultural Zone 7 Projectile Point Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Max. Length (mm)</th>
<th>Max. Width (mm)</th>
<th>Max Thickness (mm)</th>
<th>Body Length (mm)</th>
<th>Max. Body Width (mm)</th>
<th>Max. Base Width (mm)</th>
<th>Max. Base Length</th>
<th>Internotch Width (mm)</th>
<th>Left Notch Depth (mm)</th>
<th>Left Notch Width from Base (mm)</th>
<th>Dist. Left Notch from Base (mm)</th>
<th>Right Notch Width (mm)</th>
<th>Dist. Right Notched from Base (mm)</th>
</tr>
</thead>
</table>
## Appendix G. Cultural Zone 7 Worked Tool Non-Metric Analysis

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Material</th>
<th>Tool Type</th>
<th>Portion Present</th>
<th>Modification</th>
<th>Shape</th>
<th>Working Edge</th>
<th>Longitudinal Cross Section</th>
<th>Transverse Cross Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1893</td>
<td>Quartzite</td>
<td>Grinding Stone</td>
<td>Complete</td>
<td>grinding</td>
<td>ovoid wedge</td>
<td>left lateral</td>
<td>plano-convex</td>
<td>plano-triangular</td>
</tr>
<tr>
<td>1903</td>
<td>Silificied peat</td>
<td>Biface</td>
<td>Distal</td>
<td>retouch</td>
<td>-</td>
<td>distal convex</td>
<td>biconvex</td>
<td>biconvex</td>
</tr>
<tr>
<td>1904</td>
<td>Swan River Chert</td>
<td>Biface</td>
<td>Proximal</td>
<td>retouch</td>
<td>rectangle</td>
<td>-</td>
<td>biconvex</td>
<td>biconvex</td>
</tr>
<tr>
<td>2682</td>
<td>Swan River Chert</td>
<td>Biface</td>
<td>Complete</td>
<td>retouch</td>
<td>triangle</td>
<td>left lateral</td>
<td>biconvex</td>
<td>biconvex</td>
</tr>
<tr>
<td>2853</td>
<td>Swan River Chert</td>
<td>Spurred Endscraper</td>
<td>Complete</td>
<td>retouch</td>
<td>amorphic triangle</td>
<td>distal and lateral edges</td>
<td>plano-convex</td>
<td>plano-convex</td>
</tr>
<tr>
<td>2854</td>
<td>Brown Chert</td>
<td>End/Side scraper</td>
<td>Complete</td>
<td>retouch</td>
<td>amorphic triangle</td>
<td>distal end</td>
<td>plano-convex</td>
<td>plano-convex</td>
</tr>
<tr>
<td>2857</td>
<td>large grained quartz sandstone</td>
<td>Grinding Stone</td>
<td>Complete</td>
<td>grinding</td>
<td>polymorphic</td>
<td>ventral surface</td>
<td>polymorphic</td>
<td>polymorphic</td>
</tr>
<tr>
<td>2944</td>
<td>Swan River Chert</td>
<td>Utilized Fragment</td>
<td>Complete</td>
<td>retouch</td>
<td>amorphic rectangle</td>
<td>left lateral</td>
<td>plano-convex</td>
<td>plano-convex</td>
</tr>
<tr>
<td>2952</td>
<td>Brown Quartzite</td>
<td>Gouge</td>
<td>Complete</td>
<td>grinding</td>
<td>ovoid</td>
<td>distal</td>
<td>biconvex</td>
<td>biconvex</td>
</tr>
<tr>
<td>2975</td>
<td>Swan River Chert</td>
<td>Utilized Fragment</td>
<td>Complete</td>
<td>retouch</td>
<td>rectangle</td>
<td>distal edge</td>
<td>plano-convex</td>
<td>plano-convex</td>
</tr>
<tr>
<td>Cat. #</td>
<td>Manufacture</td>
<td>Working Edge length</td>
<td>Maximum Length (mm)</td>
<td>Maximum Width (mm)</td>
<td>Maximum Thickness (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>--------------------</td>
<td>------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1893</td>
<td>Grinding Stone</td>
<td>62.2</td>
<td>64.0</td>
<td>50.0</td>
<td>28.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1903</td>
<td>Biface</td>
<td>25.0</td>
<td>27.0</td>
<td>15.9</td>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1904</td>
<td>Biface</td>
<td>-</td>
<td>45.0</td>
<td>36.0</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2682</td>
<td>Biface</td>
<td>63.0</td>
<td>76.0</td>
<td>45.0</td>
<td>16.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2853</td>
<td>Spurred Endscaper</td>
<td>17.5</td>
<td>23.0</td>
<td>18.9</td>
<td>6.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2952</td>
<td>end/side scraper</td>
<td>45.5</td>
<td>46.0</td>
<td>31.0</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2854</td>
<td>grinding stone</td>
<td>15.0</td>
<td>19.4</td>
<td>16.1</td>
<td>4.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix H. Cultural Zone 7 Worked Tool Metric Analysis
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2857</td>
<td>Utilized Fragment</td>
<td>10.1</td>
<td>11.4</td>
<td>7.6.0</td>
<td>8.5</td>
</tr>
<tr>
<td>2944</td>
<td>Gouge</td>
<td>49.5</td>
<td>53.3</td>
<td>32.8</td>
<td>11.1</td>
</tr>
<tr>
<td>2975</td>
<td>Utilized Fragment</td>
<td>38.0</td>
<td>43.0</td>
<td>30.8</td>
<td>9.0</td>
</tr>
<tr>
<td>2995</td>
<td>Uniface</td>
<td>35.5</td>
<td>54.7</td>
<td>40.0</td>
<td>11.0</td>
</tr>
<tr>
<td>4798</td>
<td>Utilized Fragment</td>
<td>27.0</td>
<td>27.0</td>
<td>25.0</td>
<td>8.0</td>
</tr>
<tr>
<td>5126</td>
<td>Endscraper</td>
<td>12.1</td>
<td>18.2</td>
<td>12.3</td>
<td>4.2</td>
</tr>
<tr>
<td>5157</td>
<td>Utilized Fragment</td>
<td>25.5</td>
<td>46.5</td>
<td>28.1</td>
<td>15.1</td>
</tr>
<tr>
<td>5159</td>
<td>Graver</td>
<td>-</td>
<td>34.0</td>
<td>28.9</td>
<td>6.1</td>
</tr>
<tr>
<td>7435</td>
<td>Biface</td>
<td>-</td>
<td>18.0</td>
<td>17.0</td>
<td>5.0</td>
</tr>
<tr>
<td>7450</td>
<td>Endscraper</td>
<td>23.2</td>
<td>23.2</td>
<td>16.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>
### Appendix I. Cultural Zone 6 Faunal Analysis

**Bison sp.**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrous Portion</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Maxillary Molar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Scapula</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Humerus</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Internal Carpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Ulnar Carpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Astragalus</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Fused Central &amp; 4th Tarsal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Lateral Malleolus</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Metatarsal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>1st Phalanx</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>2nd Phalanx</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>3rd Phalanx</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19</td>
<td>2</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Canis sp.**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandible</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Tooth</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rodentia spp.**
<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandible</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Vertebræ</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tooth</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ungulata – Medium**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Phalanx</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>1</td>
</tr>
<tr>
<td>Phalanx (UID)</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tooth</td>
<td>5</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ungulata – Large**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Carpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Fused 2nd and 3rd Carpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Astragalus</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Fused 2nd and 3rd Tarsal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Fused Central &amp; 4th Tarsal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Superior Sesamoid</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Metapodial</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1st Phalanx</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>Phalanx</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sesamoid</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### Appendix J. Cultural Zone 7 Faunal Analysis

**Bison sp.**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>% MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Maxillary Premolar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>2nd Mandibular Molar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>3rd Mandibular Molar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Humerus</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Ulnar Carpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Fused 2nd and 3rd Carpal</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Unfused Femoral Head</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Tibia</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Calcaneous</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Astragalus</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Fused central and 4th</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Canidae sp.**

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caudal Vertebrae</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NISP</td>
<td>MNI</td>
<td>MNE</td>
<td>MAU</td>
<td>%MAU</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td><strong>Castor canadensis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibia</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cervidae - Large</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Mandibular Molar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Homo sapiens</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pisiform</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td>4th Metacarpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td>Metacarpal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vertebrae</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mammalia – Large</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basi-cranium</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Occipital Condyle</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>0.5</td>
</tr>
<tr>
<td>Rib</td>
<td>51</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tibia</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.50</td>
<td>0.5</td>
</tr>
<tr>
<td>Teeth</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>58</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Ungulata – Large

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st incisor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2nd maxillary molar</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Humerus (distal epiphyses)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Superior sesamoid</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Inferior Sesamoid</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>2nd phalanx</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>3rd phalanx</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>Sesamoid</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Molar</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Teeth</td>
<td>53</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vertebrae</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Leporidae sp.

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teeth</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Lepus americanus

<table>
<thead>
<tr>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxilla</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.50</td>
</tr>
<tr>
<td>Mandible</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>NISP</td>
<td>MNI</td>
<td>MNE</td>
<td>MAU</td>
<td>%MAU</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>Rib</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tooth</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rodentia spp.</th>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranium</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maxilla</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Mandible</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>tooth</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spermophilus richardsonii</th>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranium</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thomomys talpoides</th>
<th>Element</th>
<th>NISP</th>
<th>MNI</th>
<th>MNE</th>
<th>MAU</th>
<th>%MAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandible</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>