PALAEO-INDIANS AND PALAEOENVIRONMENTS OF THE RAINY RIVER DISTRICT, NORTHWESTERN ONTARIO

by

Norman Arthur Haywood

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ABSTRACT

This thesis examines the Palaeo-Indians and their palaeoenvironments in the present-day Rainy River District of Northwestern Ontario. Both primary and secondary sources were utilized. The primary sources include examination of archaeological collections, field work on archaeological sites, and mapping of strandlines left by glacial Lake Agassiz. The secondary sources consist of published and unpublished articles and books.

Evidence is presented which indicates that Palaeo-Indians first entered the Rainy River District about 9,500 years ago. This was either prior to or shortly after the recession of Lake Agassiz from the Campbell level. Links with other areas are suggested by tool types and imported lithic materials. The palaeoenvironment was similar to the present, with a boreal forest setting and a wide variety of animal life, including caribou and possibly bison which are now extinct in the area.

ACKNOWLEDGEMENTS

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Chapter I

INTRODUCTION

Purpose

Glacial Lake Agassiz covered much of the Rainy River District in Northwestern Ontario from about 11,000 years ago to 9,500 years ago. Today the most notable features left by this immense body of water are raised beaches and gravel deposits from the reworked tills. It appears that either shortly before or after the recession of Lake Agassiz from this area, Palaeo-Indians moved into the district. They left behind evidence of their occupation in the form of stone tools, some of which were made from materials imported over great distances. This thesis examines their site selection, links with surrounding areas, and the environment at the time of occupation. The time period involved is from 10,000 to 7,000 years ago, although artifacts dating to the Archaic period, about 7,000 to 3,000 years ago, are also examined.

The Study Area

The study area, located in the Rainy River District, is situated in the most southwesterly part of Northwestern Ontario (Fig. 1). Covering an area of approximately 2,500

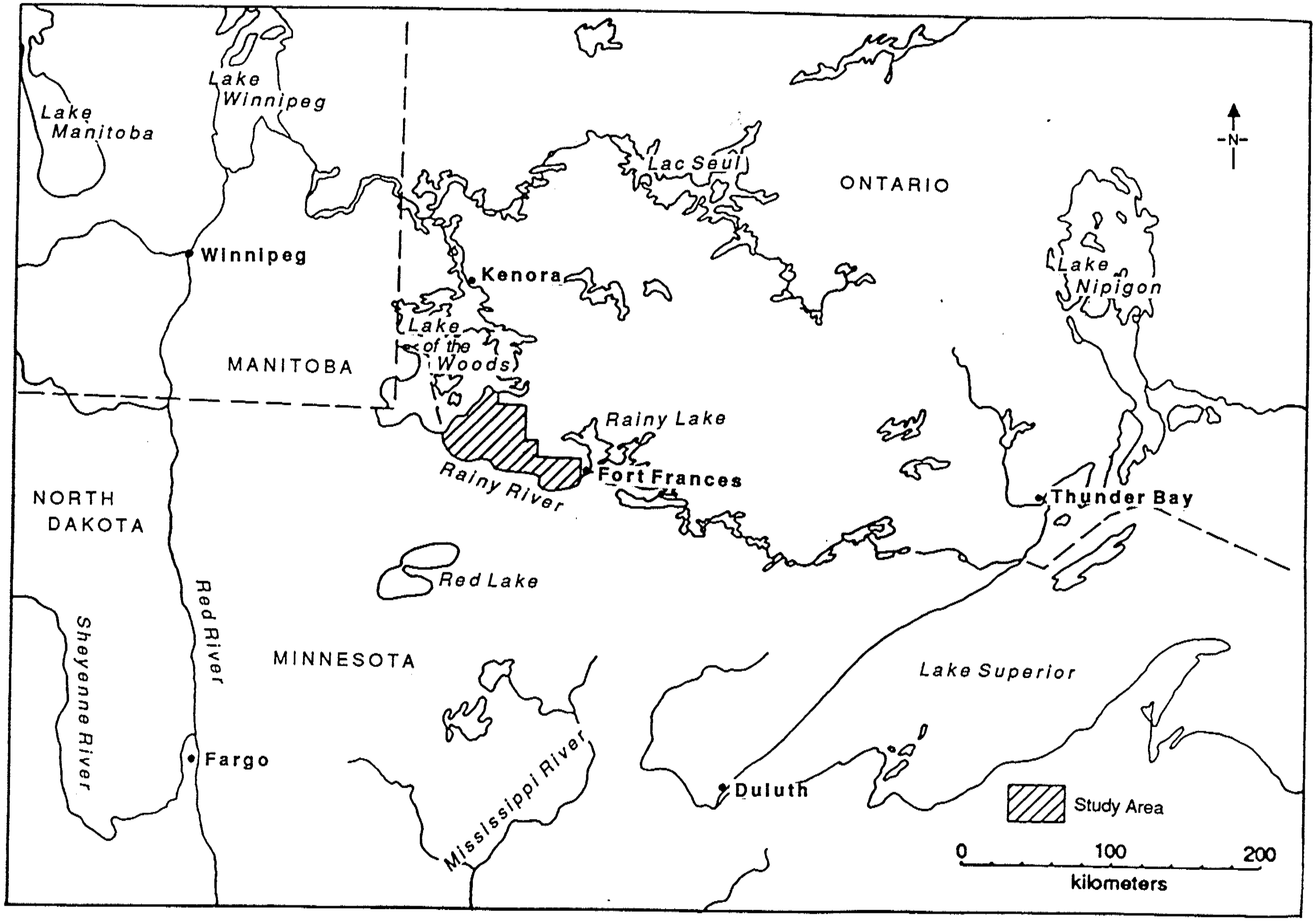


Figure 1: Location of Study Area

square kilometers, it is bounded on the west by Lake of the Woods and on the south by the Rainy River. The east and north boundaries are bounded by township lines (Fig. 2). Fort Frances, located near the eastern boundary, is the largest town in the area. The only other major centers are Emo, near the center of the area, and the town of Rainy River in the western portion.

The terrain conditions can be classified into several broad categories, the majority of which are either glaciolacustrine plains or organic terrain (Hallett and Roed 1980; Roed 1980). The glaciolacustrine plains are comprised of thick deposits of clays and silts. The organic terrain consists of deposits of peat and muskeg. Other land types in the study area are the alluvial plains of the La Vallee River and Pinewood River valleys; aeolian sands in northeastern Aylsworth; and bedrock outcrops scattered throughout the townships. Topography throughout the area is generally gently undulating or nearly flat.

Previous Archaeological Work in the Study Area

Archaeological surveys and studies have been conducted in the area by W. Kenyon, C.S. Reid, and G. Rajnovich. Kenyon worked in the area from 1957 until the early 1970s. Although most of his work focused on the Woodland period, he collected a few artifacts from the Palaeo-Indian period. In addition to an article on a flake tool and worked antler

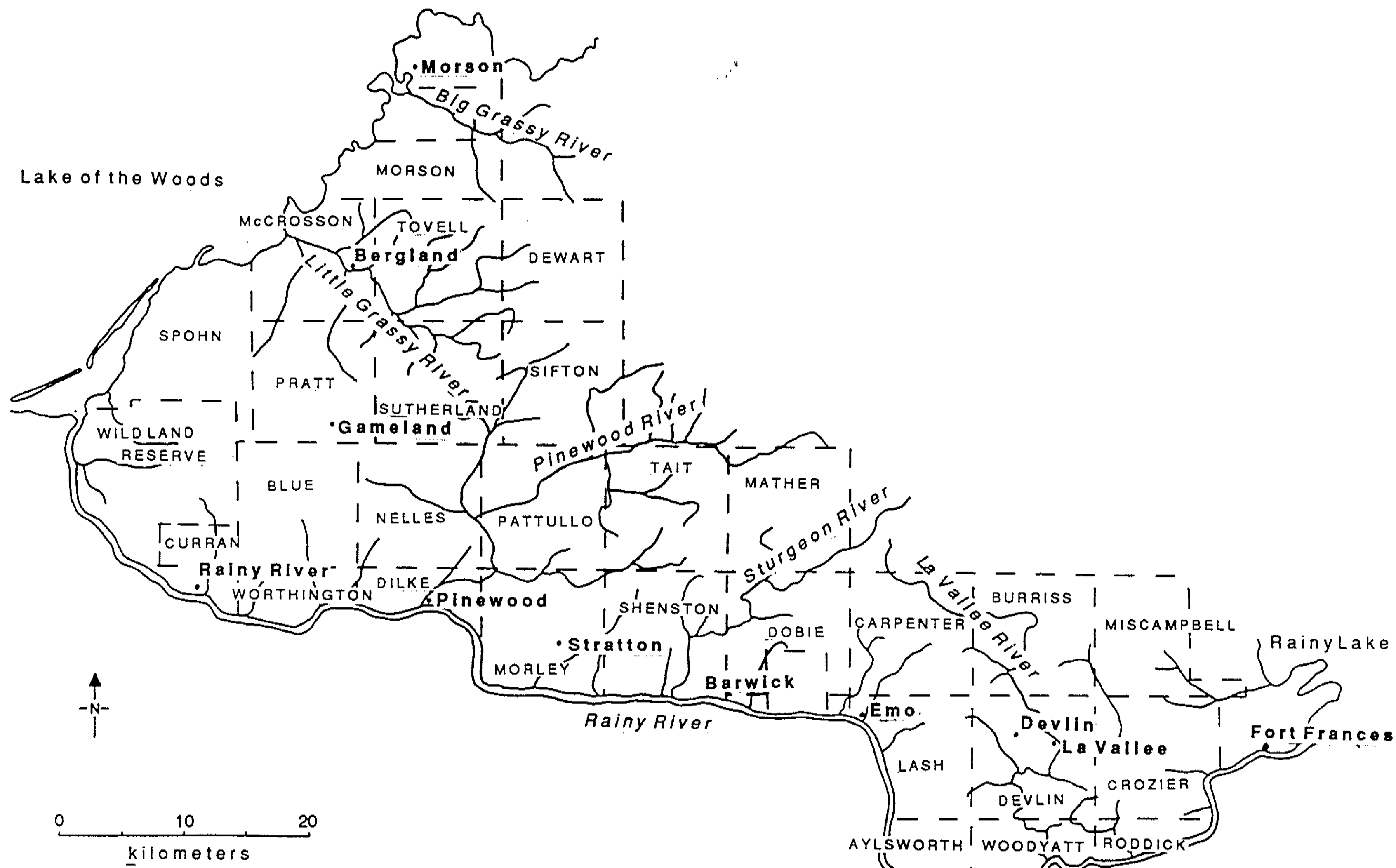


Figure 2: The Study Area

fragment (Kenyon and Churcher 1965), several of the projectile points he collected are depicted in a monograph by Mayer-Oakes (1970:363) and in an article by Storck (1971).

Reid (1980) discusses four Palaeo-Indian artifacts recovered from the Sandmoen site (DfKp-1) in the western part of the study area. The site is a beach ridge at an elevation of 343 m (1125 feet) representing what Reid refers to as a low water stage of the Campbell phase. The Campbell level beach ridges in the Rainy River District occur at an elevation of 350 m (1148 feet) above mean sea level.

During the summer of 1984, a survey was conducted in the area by the Ministry of Citizenship and Culture (G. Rajnovich, personal communication). Site DfKj-4 near Hope Lake, north of the study area, was one of the sites discovered. Although no diagnostics were recovered, several flakes were found. The site is a gravel pit below the Campbell level at an elevation of 335 m (1100 feet) on a high terrace overlooking the lake. It was examined by this writer but only one flake was found. Several years prior to the survey by the Ministry, a Palaeo-Indian projectile point was found in a gravel pit in that area (G. Rajnovich, personal communication).

The Ministry survey also included a stretch of Highway 621 which is within the western part of study area. Several gravel pits from north of Bergland to south of Gameland were examined but no artifacts were recovered.

Methodology

Prior to the field work, maps and aerial photographs, with coverage of Crozier, Devlin, Lash, Roddick, Woodyatt, and Aylsworth townships, covering an area of approxiamately 400 square kilometers, were examined. In this study area, the Lake Agassiz Campbell beach ridges were calculated to occur at approximately 350 m a.s.l. (1,148 ft.) (Teller and Thorleifson 1983:264-265). Aerial photographs of the eastern part of the study area were stereoscopically examined in a lab at the University of Manitoba to locate beach ridges, and those identified were plotted on 1:20,000 maps of the Ontario base map series. Strandlines can be identified on aerial photographs as linear features which can be continuous over a distance of several kilometers. Some of the beaches will oftern have a contrast in tone with less well-drained soils on either side of the beach ridge.

Several problems were encountered during this exercise. Strandlines often became indistinct, not only in forested areas, but also in open fields. Another problem was in attempting to determine which strandlines are at the same altitude. There was even the basic problem of which features were strandlines and which are not.

Field work began at the end of May 1986 and it was hoped that solutions could be found to these problems. However, it soon became apparent that while some problems could be solved, others would persist. Attempting to establish the continuity of strandlines in open fields where they were indistinct on aerial photographs met with some success. However, limited progress was made into forested areas since it was difficult to see elevational changes due to the heavy undergrowth. Altitudinal problems persisted since the altimeter taken into the field did not work and it was impossible to attempt surveying with a transit without an assistant. Also, the size of the study area rendered this method impossible. The practical solution was to use the 1:20,000 maps which have contour intervals of ten meters. Since the Campbell level strandline occurs at an elevation of 350 meters, any land at that elevation was examined for strandlines. Determining which features are strandlines and which are not, occasionally presented a problem. This was most noticeable where it could not be determined if the feature was created by water action or underlying bedrock.

Toward the latter part of the field season, aerial photographs of the area west of Emo and north to Morson, covering an area of approximately 1,900 square kilometers, were examined in the offices of the Ministry of Natural Resources in Fort Frances. This had its advantages and disadvantages. Advantages were that a familiarity had developed with the study area so that features could be readily recognized on the photographs. Also, if questions developed about a feature after examining it either in the field or on an aerial photograph, a visit could be made to the site or the Ministry offices to obtain a better idea of what the feature was about. Disadvantages were that besides not having adequate working facilities at the Ministry, photographs could not be taken into the field.

Archaeological sites were located by talking to local informants, examining gravel pits, and shovel-testing, using a five or ten meter grid where possible. Soil from shovel test pits, typically 30 to 50 centimeters deep, was examined using a trowel. It soon became apparent that while the Fort Frances/Emo area had a large number of well-defined beach ridges, there were very few archaeological finds dating to the Palaeo-Indian period. A decision was then made to extend the study area westward to the Lake of the Woods area where a number of artifacts had been reported (Reid 1980).

During the first week in the extended area, the strategy was essentially the same. It soon became evident that this method was not efficient, so a new technique was established. This involved inquiring at as many farms as possible whether the occupants had found artifacts on their land or in the vicinity. When possible, shovel testing was conducted at each identified site. Black and white and colour photographs were taken at each site.

For the purposes of this thesis, a site is defined as a known location where any number of artifacts has been recovered. Borden numbers were given to sites at which artifacts from a site were donated to a public institution (eg. Fort Frances Museum) or recovered by this writer. Sites represented by private collections have not been given Borden numbers.

After being satisfied that an adequate sample of artifacts and sites was obtained from the extended area, the same strategy was employed in the northern portion of the original study area. This part of the study area consisted of the townships of Carpenter, Burriss, and Crozier, approximately 300 square kilometers in size.

Chapter II

PRESENT ENVIRONMENTAL SETTING

Bedrock Geology

Due to the depth of the till deposits in much of the study area, determination of the bedrock is reliant on rock outcrops and magnetometer readings (Davies 1973; Fletcher and Irvine 1955). Although bedrock reports exist for two thirds of the study area, it is assumed that the unmapped western portion is of similar composition. The bedrock, Precambrian in age, consists mainly of greywackes, schists, basalts, gabbros, and quartz monzonites. There are also numerous diabase dikes of varying lengths and widths trending in a northwest-southeast direction. Two of these dikes are over 32 kilometers (20 miles) long. No consolidated rocks dating between the Precambrian and the Quaternary are represented in the study area.

Glacial History and Surficial Geology

At least four Quaternary glacial advances have been recognized in the region. These have been described by Johnston (1915) and Zoltai (1961). The oldest known glacial movement was from the north-northwest and brought in a distinctive red till. Johnston (1915:38) notes that this till is generally reddish in colour in its upper weathered portion but the lower portion is usually grey. Elson (1961:56) points out that in Minnesota where the ice sheet passed over the iron ranges, the till is deep red. It consists of "unassorted material composed of angular, subangular, and rounded fragments of rocks of all sizes up to several feet in diameter, set indiscriminantly in a matrix of sand and silt or rock flour, with a small amount of material as fine as clay" (Johnston 1915:39). It extends from Lake Winnipeg in the north to about 200 kilometers south of Duluth, Minnesota (Elson 1961:52, fig. 1). The till is usually less than one meter thick but one section near the west side of Rainy Lake is almost 6 meters thick (Johnston 1915:39).

The second ice advance was from the northeast. The till it deposited consists of granite cobbles and boulders, up to several meters in diameter, in a matrix of sand and silt. Associated with this till are irregularly bedded sands and gravels of glaciofluvial origin. At the Armstrong Pit, located west of the town limits of Fort Frances, an exposure of this material measured 10 meters thick (Johnston 1915:39), although it typically is much thinner.

A short ice-free period is indicated after the second glacial advance by the lack of weathering of the till (Ontario Ministry of Natural Resources 1983:10). The third ice advance, from the west, deposited the wide-spread grey till which extends from Manitoba and North Dakota to the western edge of Rainy Lake and, in Minnesota, to about 80 kilometers west of Duluth (Elson 1961:52, Fig. 1). It consists of limestone, sandstone, shale, and occasional pieces of coal. It is characterized by a high proportion of silt and clay and generally a lack of boulders, although in some areas limestone boulders can be numerous and large. For example, Lawson (1913:110) interpreted a large limestone boulder to be a bedrock exposure. Generally three to seven meters in thickness, it is occasionally over 30 meters thick. The fourth ice advance stopped at the Rainy Lake Moraine, 15 kilometers north of the study area, where it deposited a calcareous till.

There are no moraines in the study area. Johnston described what he believed to be a terminal moraine in the area as "a ridge or series of low swells, generally rising not over 10 to 20 feet [three to seven meters] above the adjacent country, [which] extends in a northeasterly direction from a point a few miles west of Fort Frances and forms the divide between streams draining northeasterly and southwesterly" (1915:44). However, Zoltai (1961:69) determined it was merely a ridge entirely controlled by the underlying bedrock.

Glacial Lake Agassiz was produced by the meltwaters of the Laurentide Ice Sheet. During its existence from about 11,700 to 7,500 years ago, it extended from Saskatchewan to

Northwestern Ontario, and as far south as the northeast corner of South Dakota, and north almost to Hudson Bay (Teller and Clayton 1983). The most notable features left by it are the numerous beach ridges. Johnston (1915:56-59) was the first person to accurately record beach ridges in the Rainy River District. He determined that their range in elevation was from 337 to 366 meters above sea level with deposits of maximum thickness of five meters.

The Ontario Ministry of Natural Resources (1983) recently conducted a study on lacustrine beach deposits within the townships of Crozier, Devlin, Roddick, and Woodyatt to determine the potential of the sand and gravel resources present. Their findings indicate that the beaches they identified contain less than 35% gravel. Thickness of the deposits ranged from less than 1.5 meters to between 1.5 and three meters. Many of the deposits with higher gravel content are nearly depleted.

Soils

Since the uppermost till in the Rainy River District is highly calcareous, soils, particularly the subsoils, are calcareous except for areas of swamp muck and peat soils which are naturally acidic (Johnston 1915). The subsoils are typically rich in clay and tend to produce waterlogged conditions where there is inadequate drainage. Gravelly sandy loam soils can generally be found in association with old beach ridges. These soils are usually excessively drained and can become very dry during periods of limited precipitation.

Climate

The Rainy River District is in the climatic zone referred to as Humid Continental, with warm summers, cool winters, and no dry season (Department of Mines and Technical Surveys 1957). Unless otherwise specified, the following climatic information was obtained from records for International Falls, Minnesota (Ruffner 1980), which is directly across the Rainy River from Fort Frances.

The yearly average temperature is 2.5° C with the warmest month, July, averaging 18.8° C and the coldest month, January, averaging -16.7° C. The extremes are 36.7° C and -43.3° C. The average annual precipitation is about 65 centimeters with about 100 centimeters of snowfall. Although frost can occur in every month, there are rarely damaging frosts in June, July, and August (Johnston 1915:14). The last killing frost is usually about May 31 and the first killing frost is about September 10 for a frost free period of between 100 and 110 days (Agriculture Canada 1976). The growing season, however, extends from April until early September for a period of about 180 days.

Vegetation

The natural forest cover in this area is Great Lakes-St. Lawrence Forest (see Fig. 17) (Rowe 1972). It is characterized by white, red, and jack pines (*Pinus strobus*, *P. resinosa*, and *P. bansiana*). Other tree species include coniferous trees such as white and black spruce (*Picea glauca* and *P. mariana*) and balsam fir (*Abies balsamea*), and deciduous trees such as bur oak (*Quercus macrocarpa*), mountain maple (*Acer spicatum*), trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), and white birch (*Betula papyrifera*). Although at the turn of the century much of the District had yet to be settled, Johnston (1915:10) noted that the pine had been largely removed from the area for lumbering purposes.

Fauna

The variety of species of mammals, birds, and fish is relatively diverse in the Rainy River District. There are 51 species of mammals present which are indigenous to Ontario (Dagg 1974). These range from large game animals such as white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), and moose (*Alces alces*), to medium-sized animals, such as raccoon (*Procyon lotor*), American beaver (*Castor canadensis*), river otter (*Lontra canadensis*), and snowshoe hare (*Lepus americanus*), and small animals, such as American red squirrel (*Tamiasciurus hudsonicus*) and meadow vole (*Microtus pennsylvanicus*).

The species of birds is equally numerous. Recent breeding bird surveys indicated this area is host to between 60 and 67 species of birds while Christmas bird counts indicated under 40 different species (Robbins et al. 1986).

Species of fish such as pickerel (Stizostedion vitreum), northern pike (Esox lucius), yellow perch (Perca flavescens), lake sturgeon (Acipenser fulvescens), lake trout (Salvelinus namaycush), and white sucker (Catostomus commersoni) are a few of the 55 species of fish indigenous to the area (Scott and Crossman 1973).

Chapter III

LAKE AGASSIZ AND ITS ENVIRONMENT

Lake Agassiz

Although the time period for the Late Palaeo-Indian lasted from 10,000 to 7,000 years ago, this chapter will examine changing environments of the region from the initiation of Lake Agassiz, about 11,700 years ago, to the present. This will provide background information for the environmental setting which preceded and post-dated the Palaeo-Indian occupation of this area.

As Teller and Clayton (1983:3) stated: "Lake Agassiz was a giant - the king of lakes on the North American continent." During its existence between 11,700 and 7,500 years ago (Fig. 3), its drainage basin extended over nearly two million square kilometers. The lake itself, which stretched from central Saskatchewan to Northwestern Ontario and from the northeastern tip of South Dakota to near Hudson Bay, covered an area of 950,000 square kilometers, although not all this area was covered at any one time (Teller and Clayton 1983).

As the last Laurentide Ice Sheet extended across much of Canada and the northern United States, parts of it branched

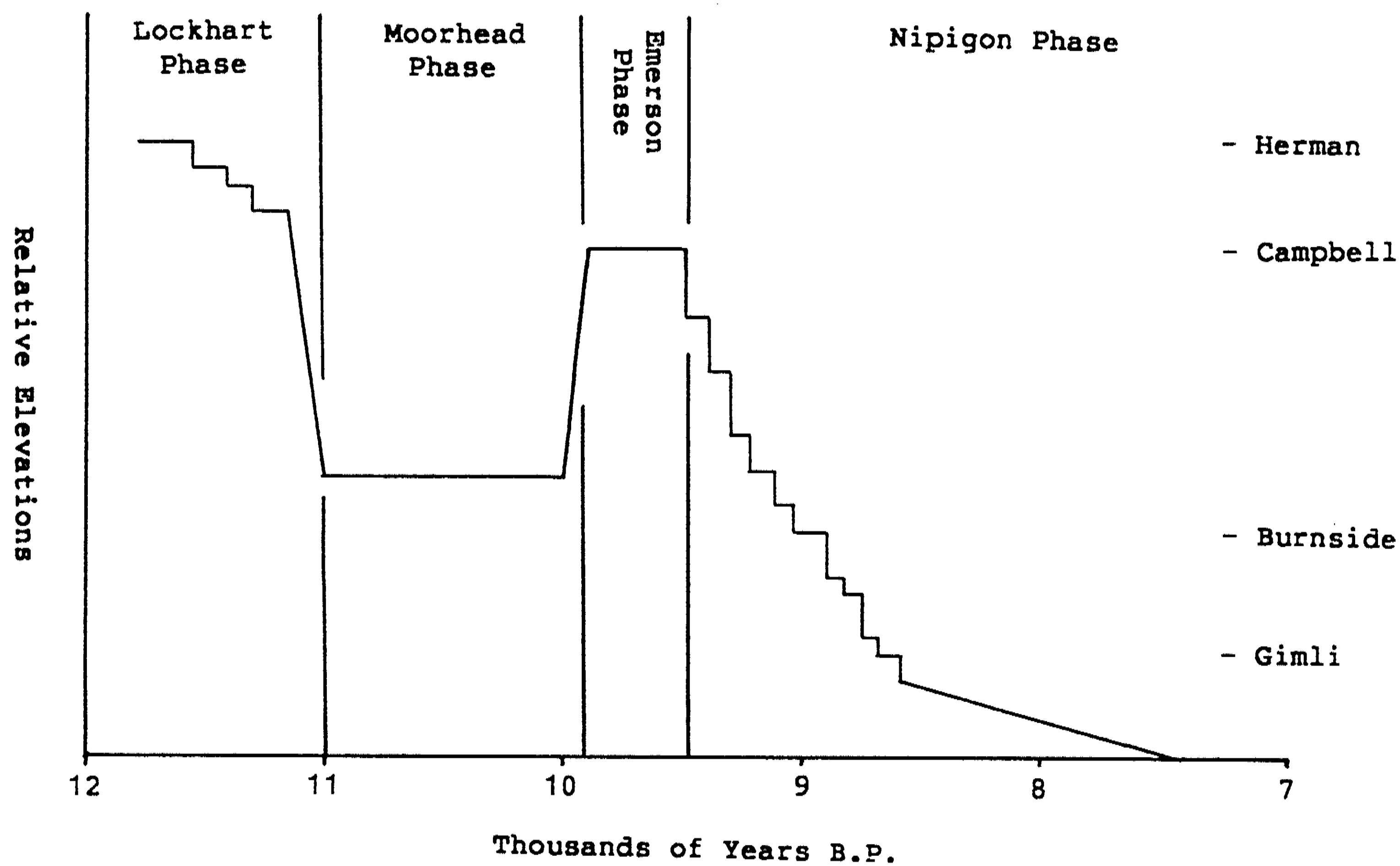


Figure 3: Chronology of Lake Agassiz (after Pettipas 1985)

out as lobes into more southerly areas. One such lobe was the Red River Lobe with its southern extension, the Des Moines Lobe, which went as far south as Iowa. As the ice sheet spread across the land, there were numerous fluctuations as its margin advanced and retreated. During one of these fluctuations, comprising a rapid northward retreat, the earliest stage of glacial Lake Agassiz formed as meltwaters were trapped in the Red River Valley in the area of the northeastern tip of South Dakota, North Dakota, and Minnesota (Fig. 4). Although there is a general consensus on the dates of most of the more recent phases of Lake Agassiz, there is still disagreement on the dates of its origin and events leading up to it.

Dates ranging from 11,500 to 14,000 B.P. (before present) have been proposed for the beginning of Lake Agassiz. Supporters of the 11,500 B.P date have typically accepted only radiocarbon dates obtained from wood samples (eg. Clayton et al. 1980; Nambudiri et al. 1980; Teller and Fenton 1980; Teller et al. 1980; and Fenton et al. 1983). Dates obtained from organic detritus, peat, muck, organic silt and clay, charcoal, bone, and shell were rejected because "there exists a reasonable probability of...contamination" (Clayton et al. 1980:60). Supporters of the dates ranging from 12,000 to 14,000 B.P., on the other hand, have relied on these dates (eg. Elson 1967; Klassen 1972, 1975, 1983a; Teller 1976; and Christiansen 1979). For

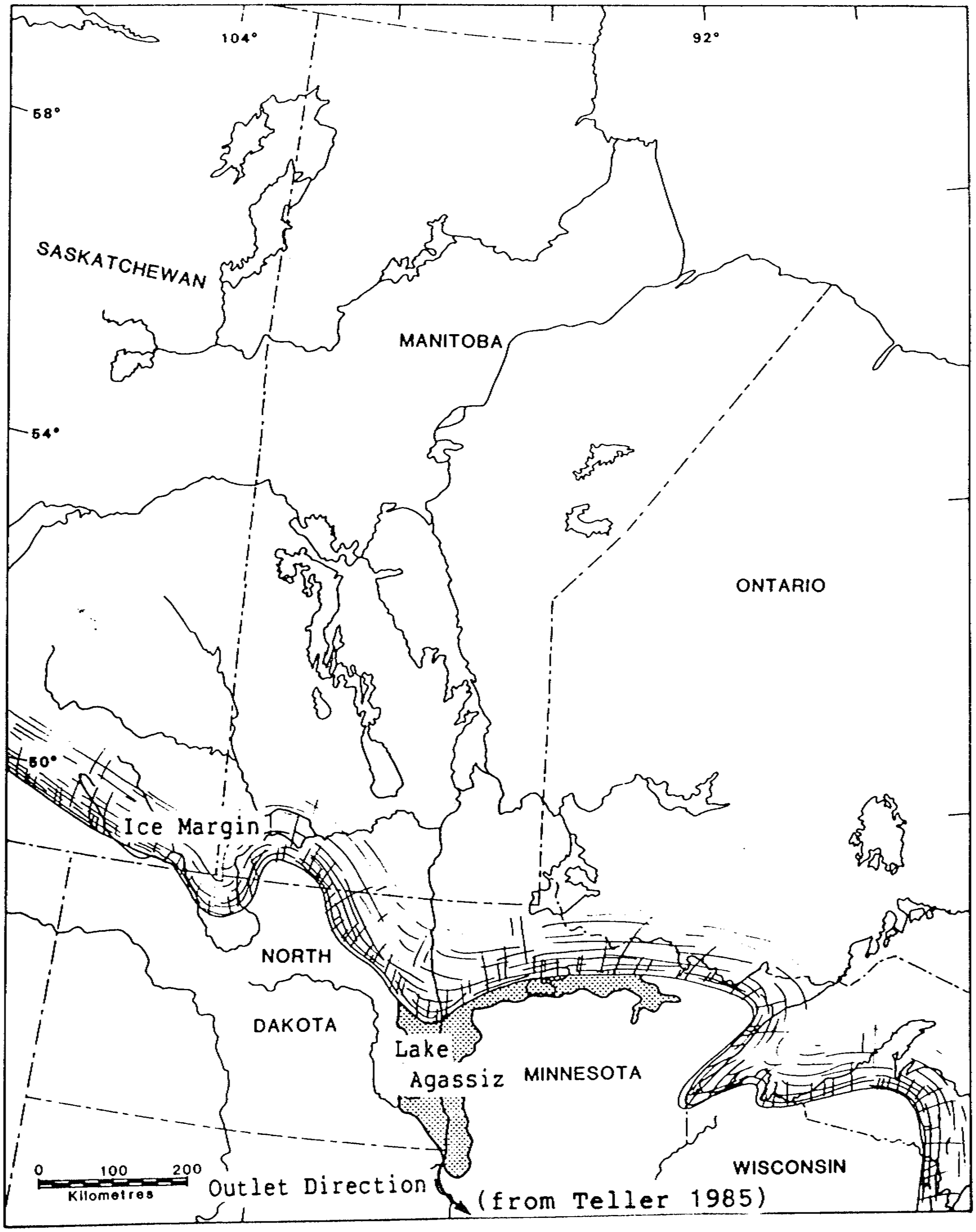


Figure 4: Lake Agassiz About 11,600 B.P., Lockhart Phase

the purposes of this thesis, a date of 11,700 B.P., as proposed by Teller (1985), will be accepted as the origin of Lake Agassiz.

In the southern portion of Northwestern Ontario, deglaciation occurred during the Lockhart Phase about 11,300 to 11,400 years ago. Evidence for this was obtained at Rattle Lake, 90 kilometers northeast of Fort Frances where a radiocarbon date of 11,110±100 B.P. was obtained from an organic layer of a pollen core (Björck 1958:852). This layer is underlain by a series of varves which overlay gravel, which Björck considers to be the bottom varve. He estimates a time span of 200 to 300 years for this deposition. Accompanying deglaciation was flooding by Lake Agassiz to the Herman level (Fig. 5). Even the highest areas in the northern part of the study area were submerged by water up to 50 m deep (calculated from Teller and Thorleifson 1983:265). Toward the latter part of the Lockhart Phase, water levels fell to the Campbell level.

The beginning of the Moorhead Phase, at about 11,000 B.P., was marked by a sudden and dramatic lowering of Lake Agassiz, falling to a level slightly higher than the Burnside level, as the ice sheet continued to retreat and a number of spillways were opened into Lakes Nipigon and Superior (Fig. 6) (Teller and Thorleifson 1983:284). A date of 11,400±410 B.P. was obtained from fossil molluscs recovered from blue clay near the confluence of the La

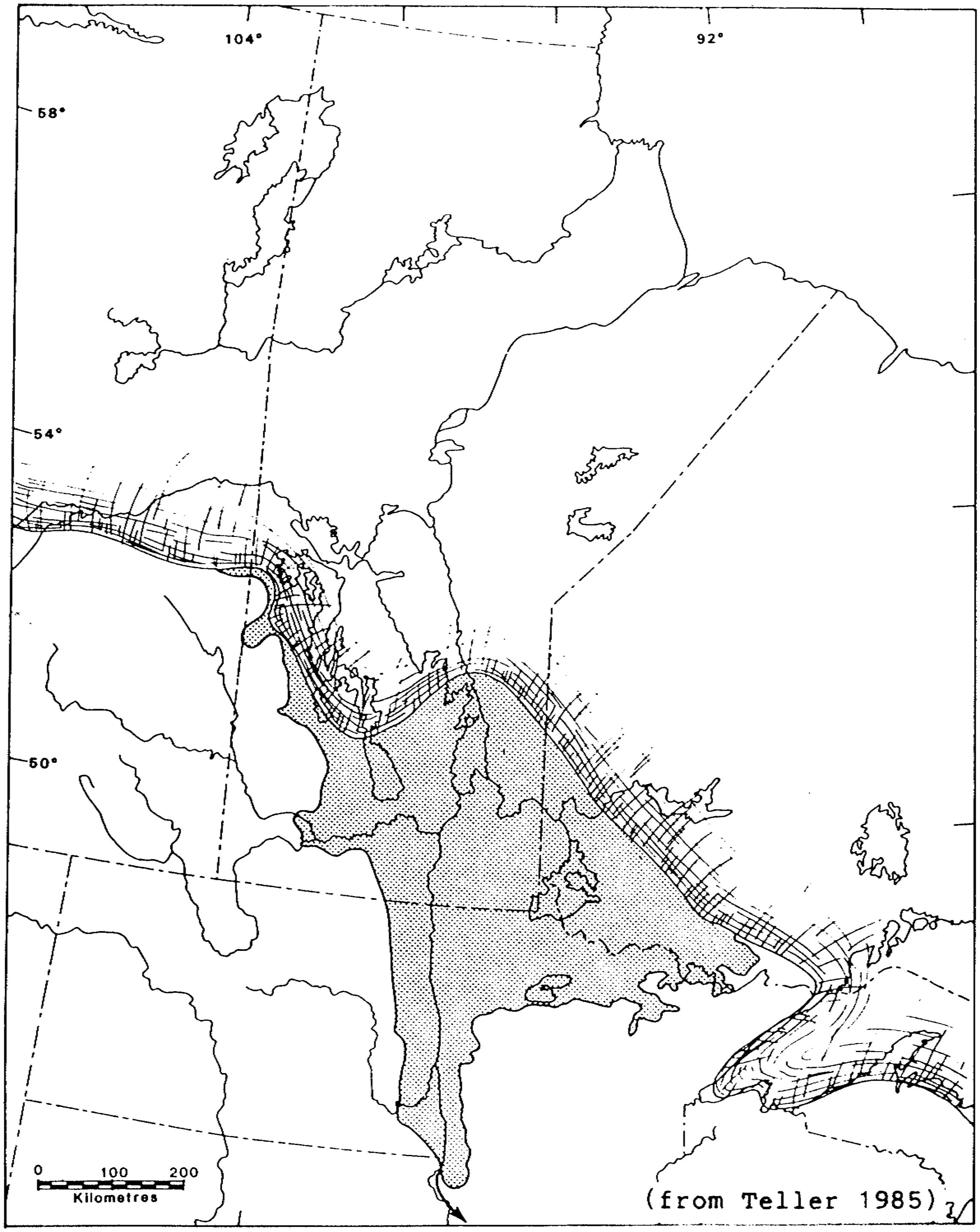


Figure 5: Lake Agassiz About 11,000 B.P., Lockhart Phase

Vallee River with the Rainy River (Nielsen et al. 1982:1935). Due to the incorporation of old carbon into shells, Neilsen et al. (1982) applied a 400 year correction factor to this date changing it to 11,000±410 B.P. This would mark one of the early stages in the lowering of Lake Agassiz toward the end of the Moorhead Phase.

When the ice readvanced, the spillways leading into Lakes Nipigon and Superior were once again blocked off, causing Lake Agassiz to rise again to the Campbell level. This readvancement of the ice around 9900 B.P. marked the beginning of the Emerson Phase (Fig. 7) (Teller and Thorleifson 1983:285). In the study area, lacustrine sediments associated with this phase are generally thin deposits of grey clay which are not usually varved but frequently interbedded with sand. However, at Stanjikoming Bay, six kilometers north of Fort Frances on Rainy Lake, Davies (1973) has indicated that there is a deposit of two meters of varved clays. Throughout much of the region are deposits of a distinct red clay occurring either as varves or discontinuous, massive bands. Thorleifson (1983:65-68) noted the similarity of the colour of this clay with deposits in the Lake Superior basin. He proposed that glacial Lake Kaministikwia, 40 kilometers west of present-day Thunder Bay, Ontario, briefly drained into the Seine River and from there the red clay sediments were dispersed throughout the eastern parts of Lake Agassiz. At

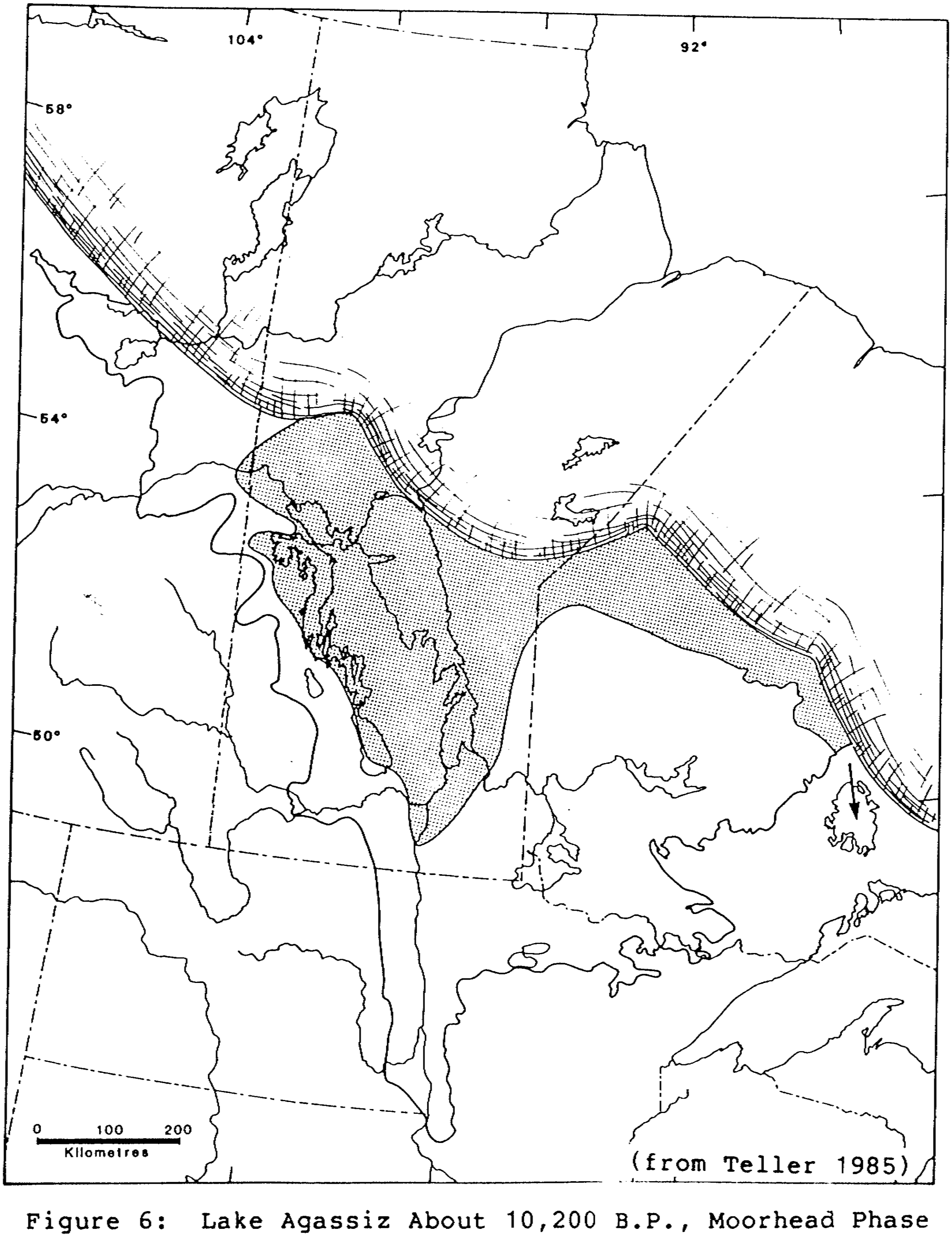


Figure 6: Lake Agassiz About 10,200 B.P., Moorhead Phase

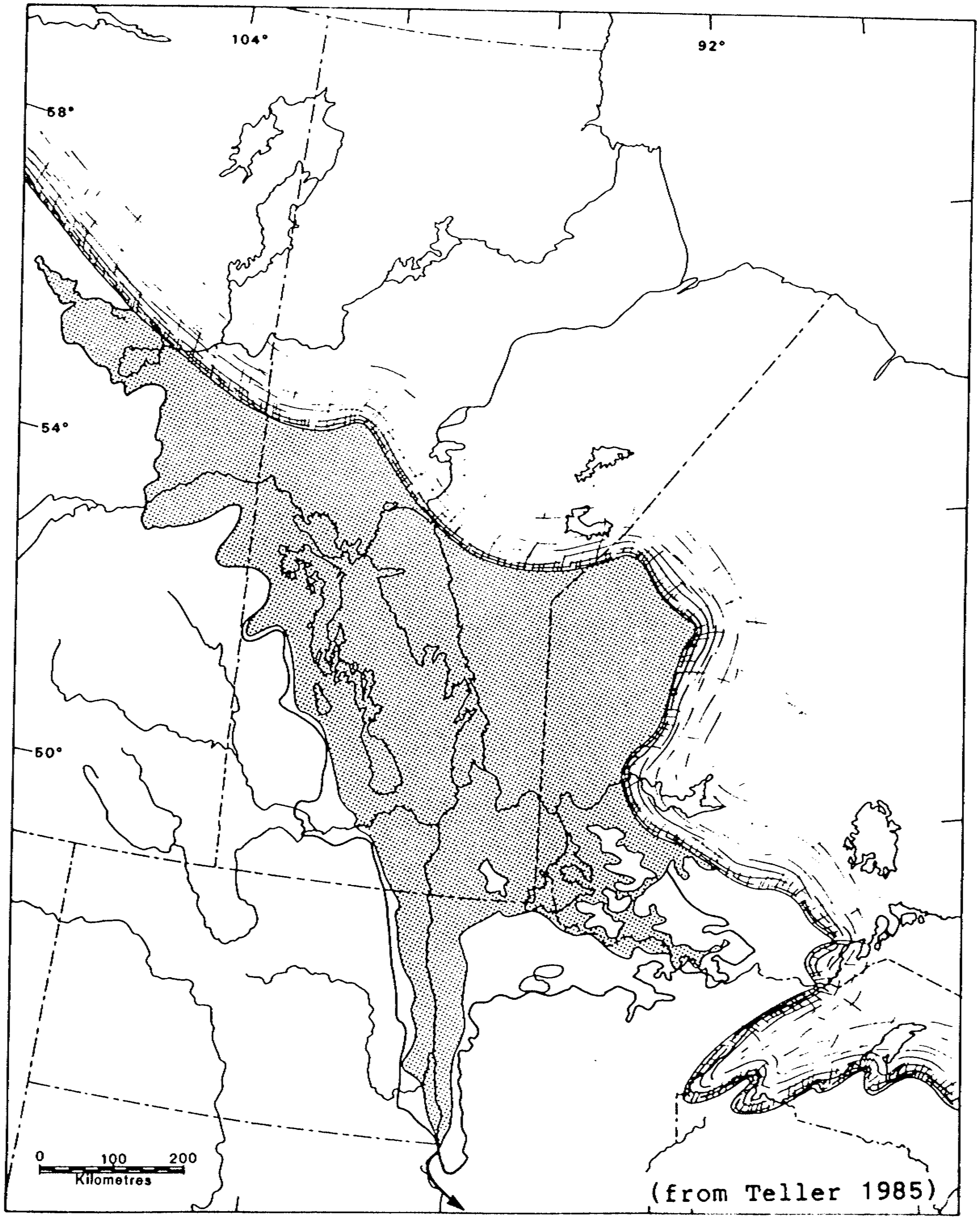


Figure 7: Lake Agassiz About 9,900 B.P., Emerson Phase

Steep Rock Lake, 130 kilometers east of Fort Frances, Antevs (1951) recognized 24 red varves near the top of a deposit containing 1,080 varves. The same number of red varves was also counted in deposits at Wabigoon, 130 kilometers northeast of Fort Frances (Rittenhouse 1934).

At the end of the Emerson Phase, 9,500 B.P., the ice mass again receded, permitting drainage of the lake through Lake Nipigon and into the Lake Superior basin. This marked the beginning of the Nipigon Phase as the water plane lowered to the Burnside level (Fenton et al. 1983:69-70). The ice continued to recede and water levels dropped until 8,500 B.P. when Lake Agassiz lowered to the Gimli level and ceased draining into the Lake Superior basin (Fig. 8) (Fenton et al. 1983:70-71). By 7,500 B.P., the last remnants of the ice had disintegrated and Lake Agassiz drained into the Tyrrell Sea, ending its existence (Klassen 1983b:111).

Lake Agassiz Biota

Remains of fish and molluscs from Lake Agassiz deposits indicate this was not a cold, sterile glacial lake. When Upham wrote his report on Lake Agassiz, he was aware of deposits containing fossil molluscs near Campbell, Minnesota and near Gladstone, Manitoba (1895:237). Fossil mollusc sites appear to be plentiful in North Dakota and Minnesota and are usually associated with various phases of Lake

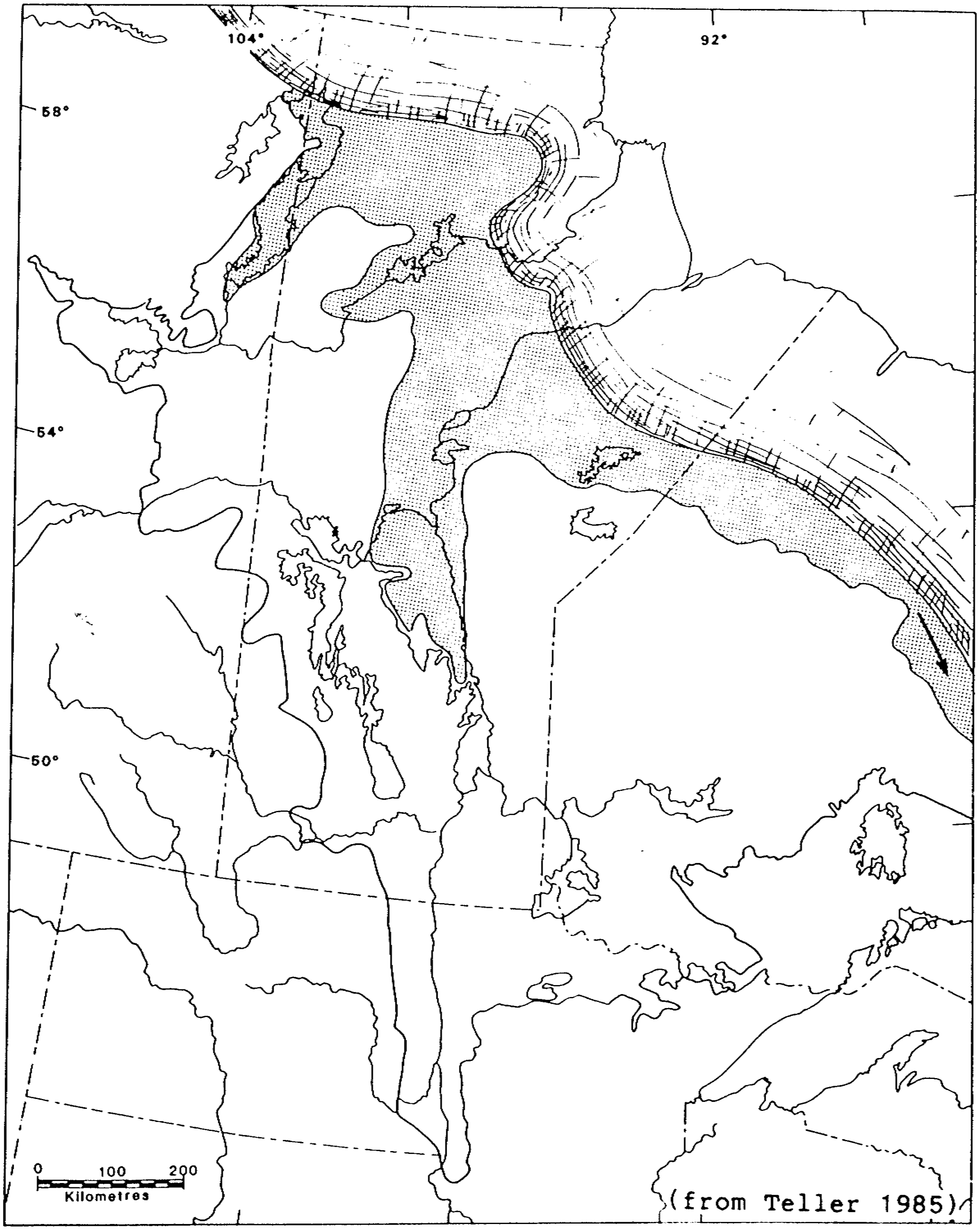


Figure 8: Lake Agassiz About 8,300 B.P., Nipigon Phase

Agassiz. Molluscs were recovered from fluvial sediments associated with the Sheyenne Delta in North Dakota (Cvancara et al. 1976). In Red Lake County, Minnesota, molluscs have been recovered near the Norcross beach (Tuthill 1963). Most molluscan sites appear to be associated with the Campbell beaches. These sites range throughout North Dakota and Minnesota and into Northwestern Ontario (Ashworth and Cvancara 1983:136-137).

Within the study area, there have been numerous finds. Lawson (1888:172) found a large number of fossil molluscs along the Rainy River at its confluence with the Pinewood River in bedded sands and clays. Another early report was by Coleman (1902:147) who found 12 species of molluscs in silt beds in a section just below the falls, which are now dammed, at Fort Frances along the Rainy River. Johnston (1915:55-56) reported finding them primarily between Fort Frances and Emo. He noticed them in great abundance in sandy and gravelly thin beds and lenses near Fort Frances along the Rainy River, and to a lesser degree in a clay pit on the bank 2.5 kilometers below Fort Frances along the Rainy River. He also encountered molluscs in numerous former beach ridges: along the Rainy River 13 kilometers below Fort Frances, in Crozier Township, Aylesworth Township, northwest of Emo, and in Dilke Township. In his study of fossil molluscs recovered from ten sites near the Rainy River, Zoltai determined that "the high number of species and individuals shows that mollusks were most abundant in shallow littoral positions in the lake" (1969:535). A smaller number of species was recovered from a deep water site while another site probably represents empty shells which were washed up on the beach. Shells from a site near Morson were fragmentary suggesting to Zoltai transportation by running water. Also near Morson, Kenyon and Churcher (1965) recovered a moose antler fragment and a flake tool in a sand and gravel deposit which contained a layer of shells. Two assemblages of fossil molluscs collected by Neilson et al. (1982), one associated with the late Moorhead Phase and the other from a Campbell beach ridge, compare favourably with those identified by Zoltai (1969). These molluscs indicate "water depths of less than 5 meters, relatively cold water, little turbidity, and an abundance of vegetation" (Nielsen et al. 1982:1935).

In addition to the molluscs, Coleman also found fragments of two species of fish, one of which was a sturgeon, the other unidentified (1902:147). It is assumed that this was a lake sturgeon, Acipenser fulvescens, which is widespread throughout the eastern half of North America. It usually lives in 5 to 9 meter depths of lakes and large rivers over mud or gravel bottoms (Lee et al. 1980:39). What is particularly important about this find is that it is the only site this author is aware of which contains fish remains associated with Lake Agassiz or a tributary river.

The Siebold site (Bickley et al. 1971; Cvancara et al. 1971) also contains fish remains, but it was a small postglacial lake in North Dakota separated from Lake Agassiz.

Vegetation

Regional environmental change from the period of ice margin retreat to the present has been determined using published data of pollen core analyses of fourteen sites. The data for Qually Pond and Martin Pond (Fig. 9) are included in a regional analysis of northwestern Minnesota, eastern North Dakota, and northeastern South Dakota (Shay 1967). The data for Rattle Lake, Sioux Pond, and Indian Lake are from a regional analysis of Northwestern Ontario (Nielsen et al. 1982), as are the data for Artery Lake and Mordsger Lake (McAndrews 1986a). The reports for Lake Itasca (Shay 1971), Lake of the Clouds (Craig 1972), Myrtle Lake (Janssen 1968), Pass Lake (McAndrews 1976), Hayes Lake (McAndrews 1982), Cummins Pond (McAndrews 1986b), and Weber Lake (Fries 1962) are all individual site reports. Summations of these sites are presented in Appendix A.

The northern and eastern sites - Artery Lake, Cummins Pond, Hayes Lake, Indian Lake, Lake of the Clouds, Mordsger Lake, Pass Lake, Rattle Lake, Sioux Pond, and Weber Lake - all follow a similar pattern. After deglaciation there was a short period of tundra-like vegetation. This was soon replaced by a spruce forest, which in turn was followed by a

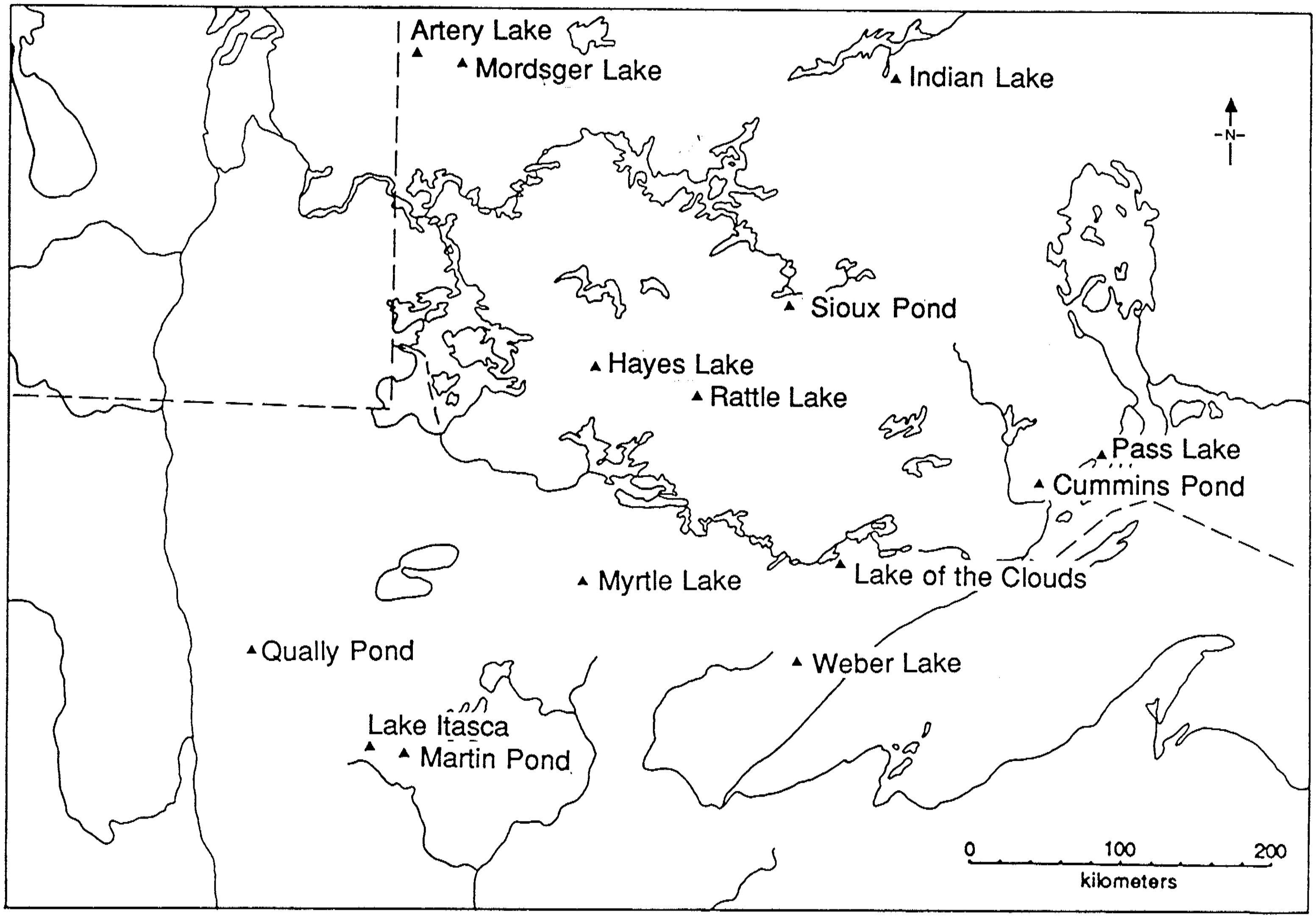


Figure 9: Location of Pollen Core Sites

mixed conifer-deciduous forest which continues to exist to the present.

Four intervals, indicating environmental change, have been established which closely correspond to the regional vegetation history for northwestern Minnesota, eastern North Dakota, and northeastern South Dakota (Shay 1967). The first interval lasted from 12,000 to 10,000 years ago (Fig. 10). During this period, a cool climate is indicated by the spruce forest present at Hayes Lake, Lake Itasca, Martin Pond, Myrtle Lake, and Qually Pond. As the ice retreated (Fig. 11), it was somewhat cooler as tundra-like vegetation was present at Cummins Pond, Lake of the Clouds, Pass Lake, Rattle Lake, Sioux Pond, and Weber Lake, all of which had recently been or were in the process of being deglaciated. About 10,700 years ago, the outlet to the Lake Superior basin was opened as the ice continued to retreat (Fig. 12). The Rainy River District probably had a cool climate during the latter part of this interval and was covered by a spruce forest. This period also coincides with the Lockhart and early Moorhead Phases of Lake Agassiz.

By 9,800 years ago, the ice sheet margin had surged forward again (Fig. 13). However, by 9,000 years ago, it had once again retreated, re-opening the outlet to the Lake Superior basin (Fig. 14). The more southerly region was beginning to warm as evidenced by the establishment of a boreal forest of pine and deciduous trees at Hayes Lake,

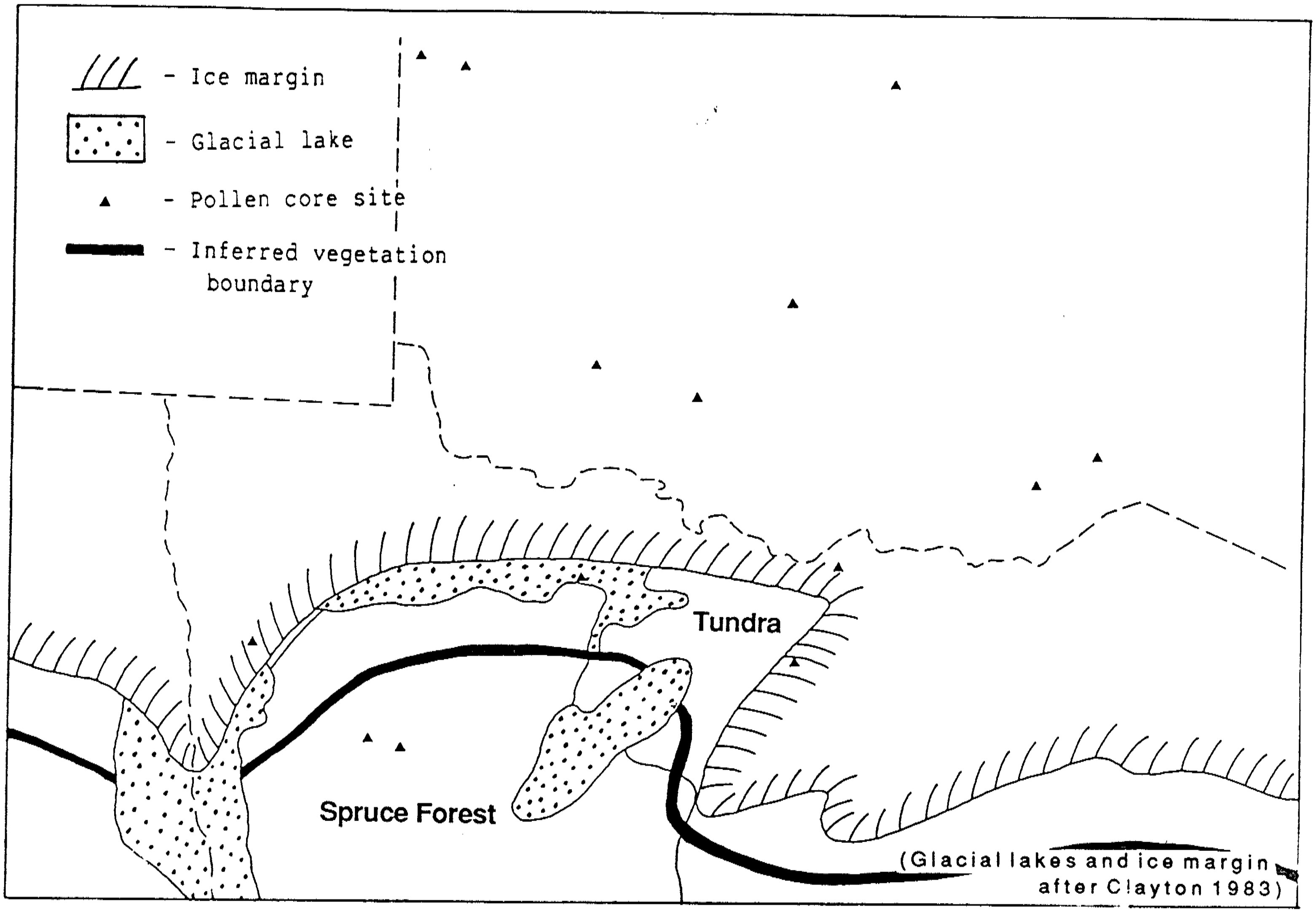


Figure 10: Vegetation Zones, About 11,500 B.P.

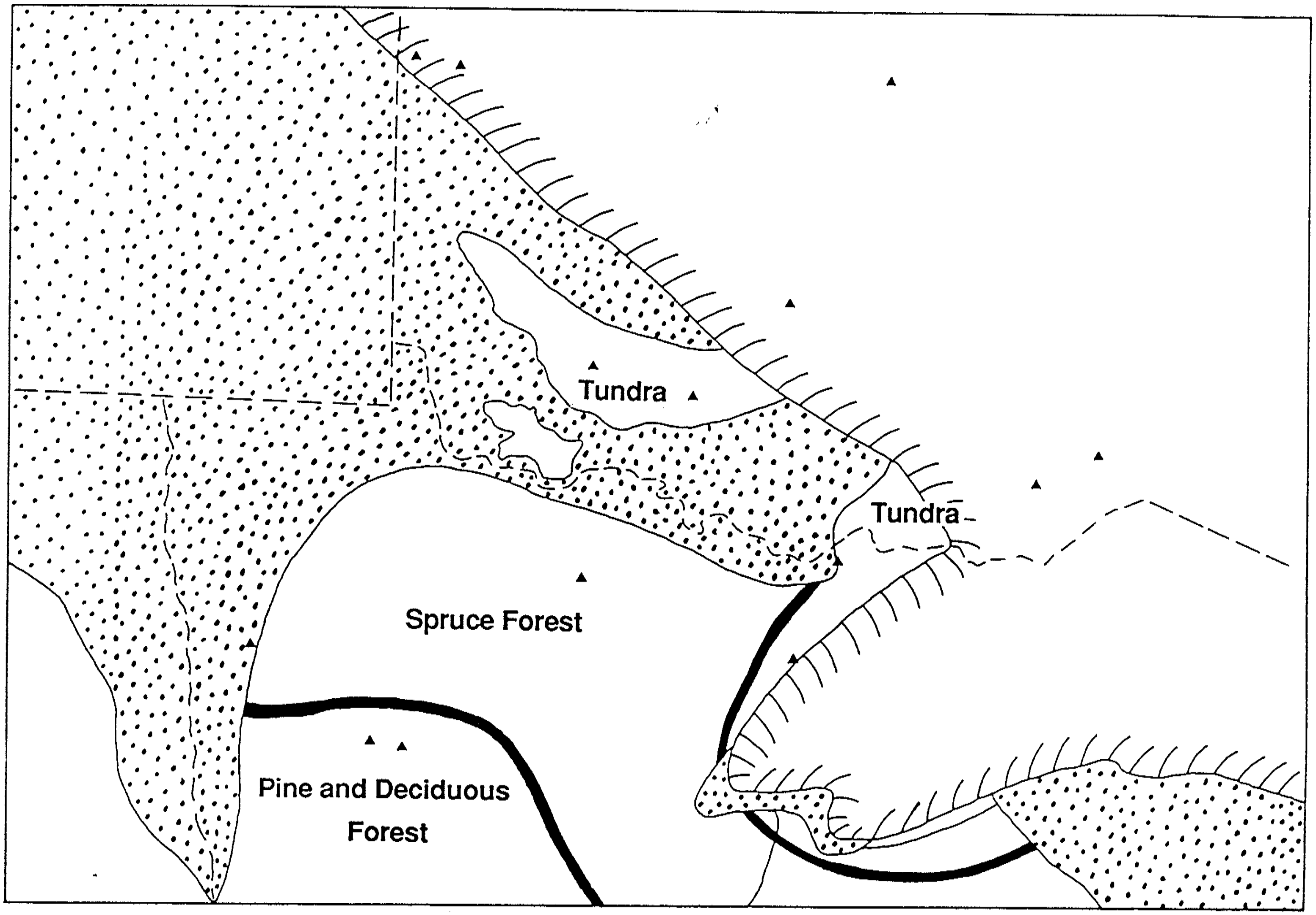


Figure 11: Vegetation Zones, About 11,000 B.P.

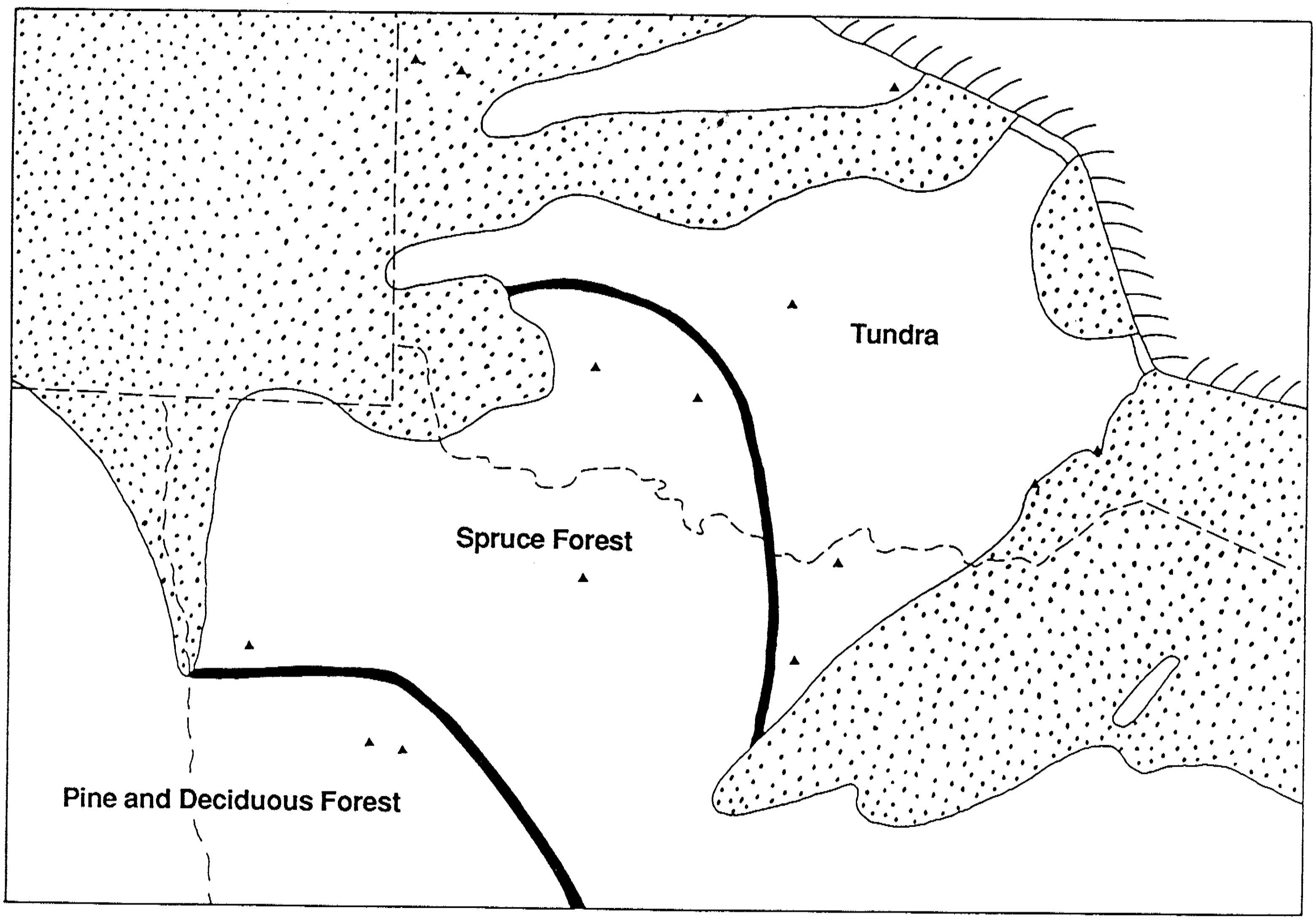


Figure 12: Vegetation Zones, About 10,700 B.P.

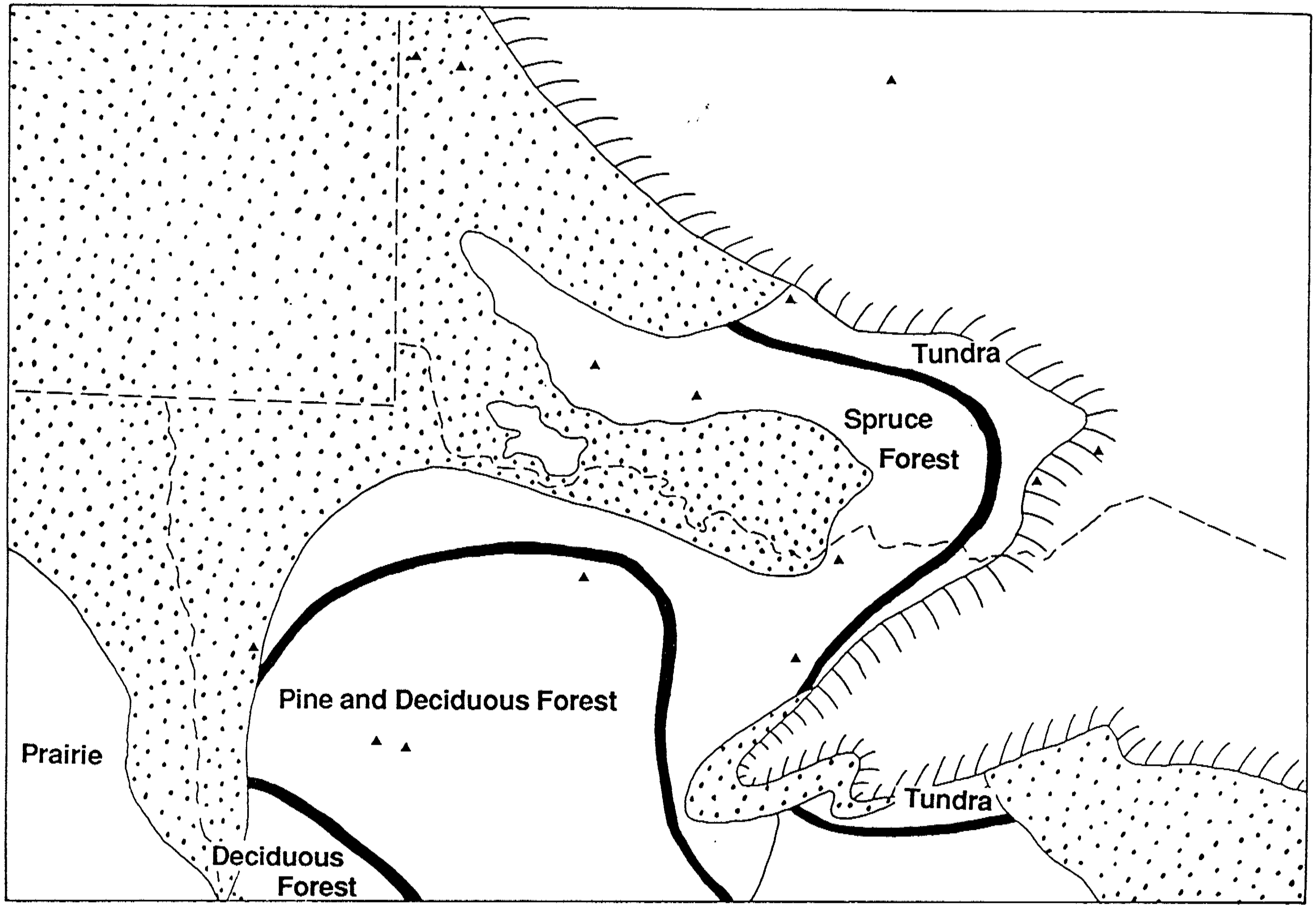


Figure 13: Vegetation Zones, About 9,800 B.P.

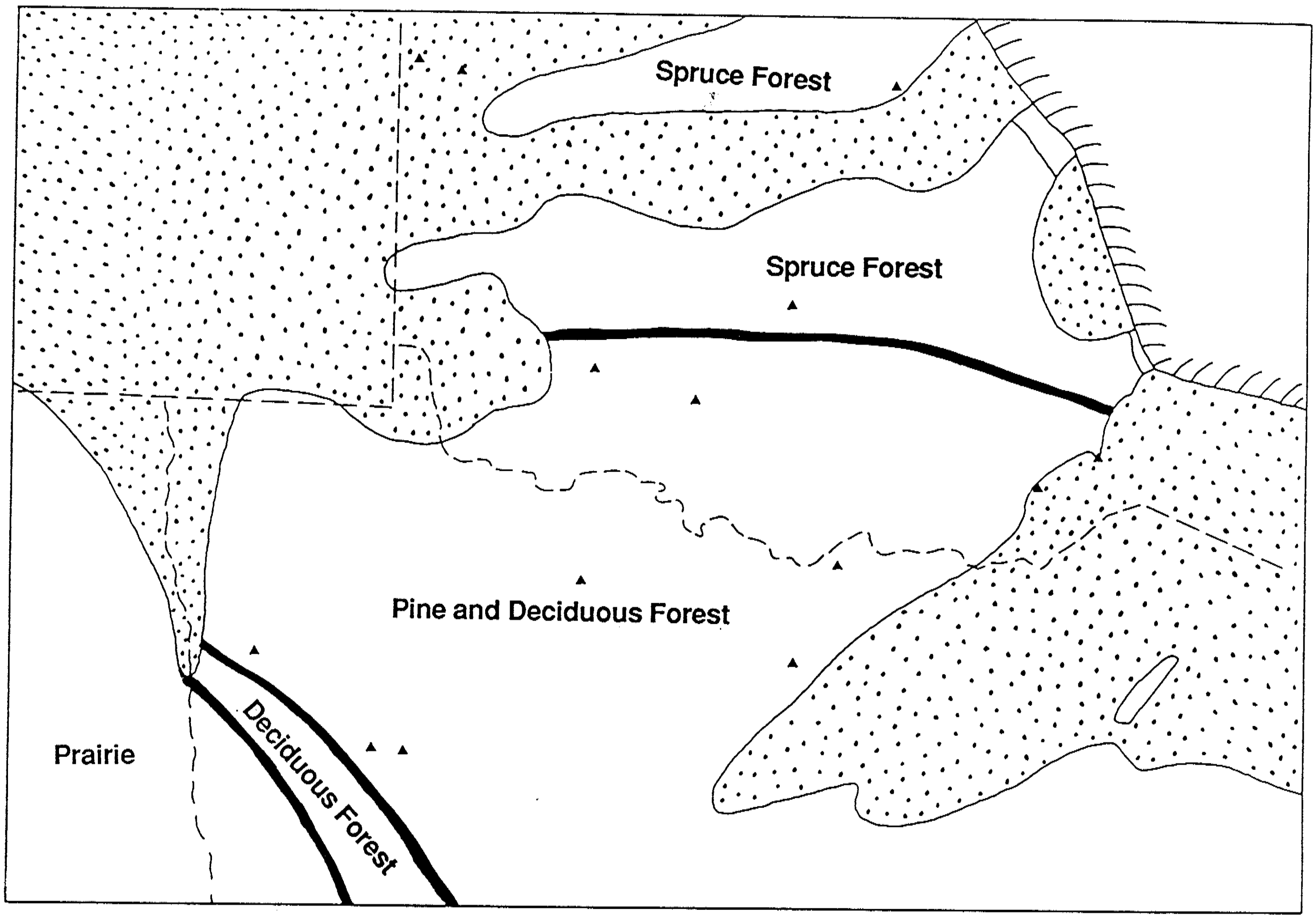


Figure 14: Vegetation Zones, About 9,000 B.P.

Lake Itasca, Lake of the Clouds, Martin Pond, and Myrtle Lake and, towards the end of this period, Sioux Pond and Weber Lake. This warming trend was also in evidence on the Missouri Coteau as suggested by molluscan remains. It was about this time that there was the first appearance of *Amnicola limosa* in the Missouri Coteau, while simultaneously *Valvata sincera*, *Fossaria decampi*, and *Helisoma campanulatum* became extinct in North Dakota (Cvancara 1976). Cvancara adds that *F. decampi* "appears to have shifted its occurrence because of higher temperatures and because of greater dissolved salts" (1976:1690). The area around Qually Pond was also becoming drier as suggested by the prairie vegetation which moved in. It was still cool in the Artery Lake, Cummins Pond, Indian Lake, Mordsger Lake, and Pass Lake areas as indicated by the presence of spruce forests. Near the beginning of this interval the boreal forest probably became dominant in the Rainy River District. This period coincides with the late Moorhead and Nipigon Phases of Lake Agassiz. By the latter part of this interval, Lake Agassiz was at the Gimli level and located in central Manitoba (Fig. 15) (Fenton et al. 1983:70-71).

From 8,500 to 4,000 years ago the boreal forest became firmly established and persists to the present in the eight northern and eastern sites of Artery Lake, Cummins Pond, Hayes Lake, Indian Lake, Mordsger Lake, Pass Lake, Rattle Lake, and Sioux Pond (Fig. 16). A similar forest, but

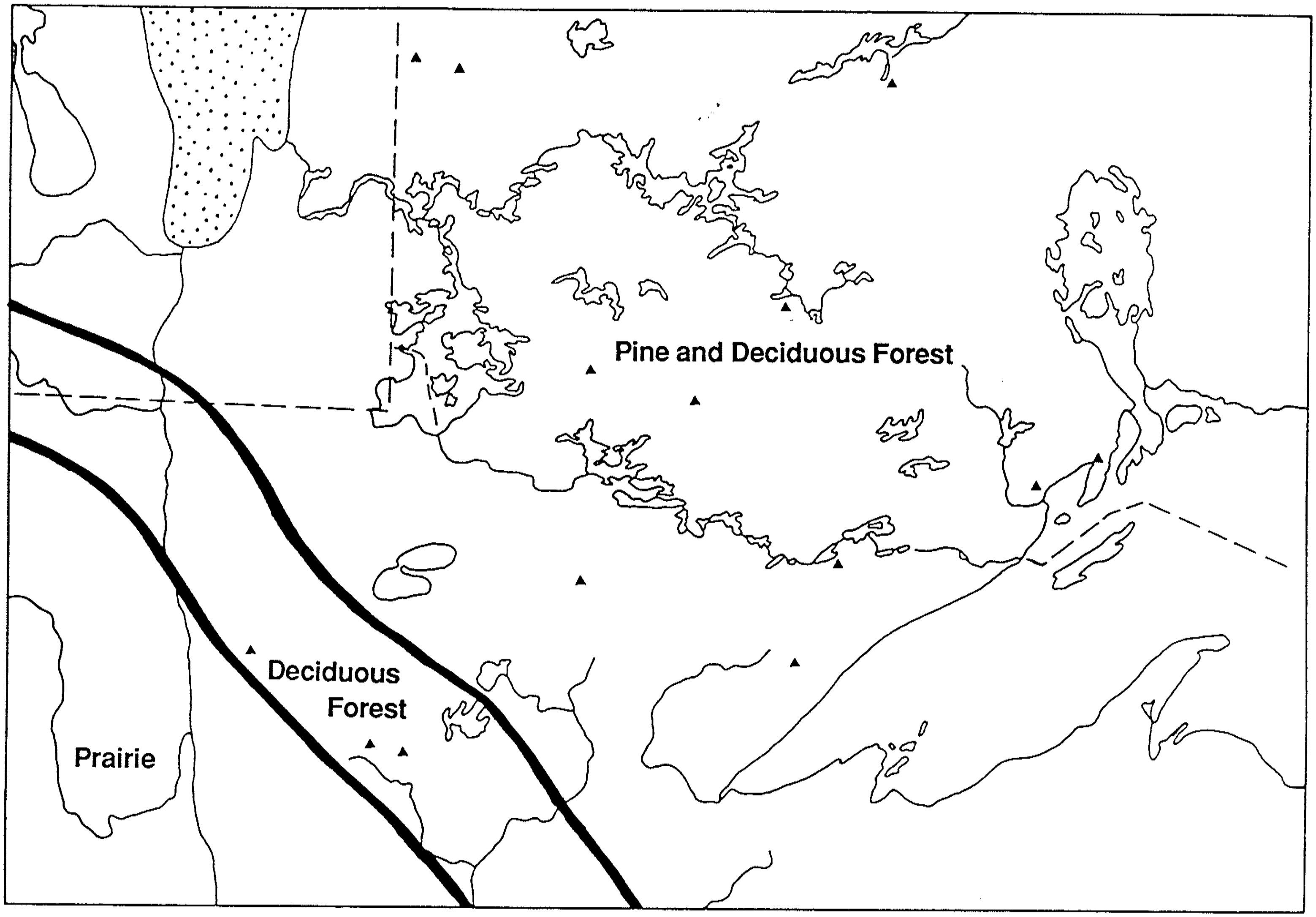


Figure 15: Vegetation Zones, About 8,500 B.P.

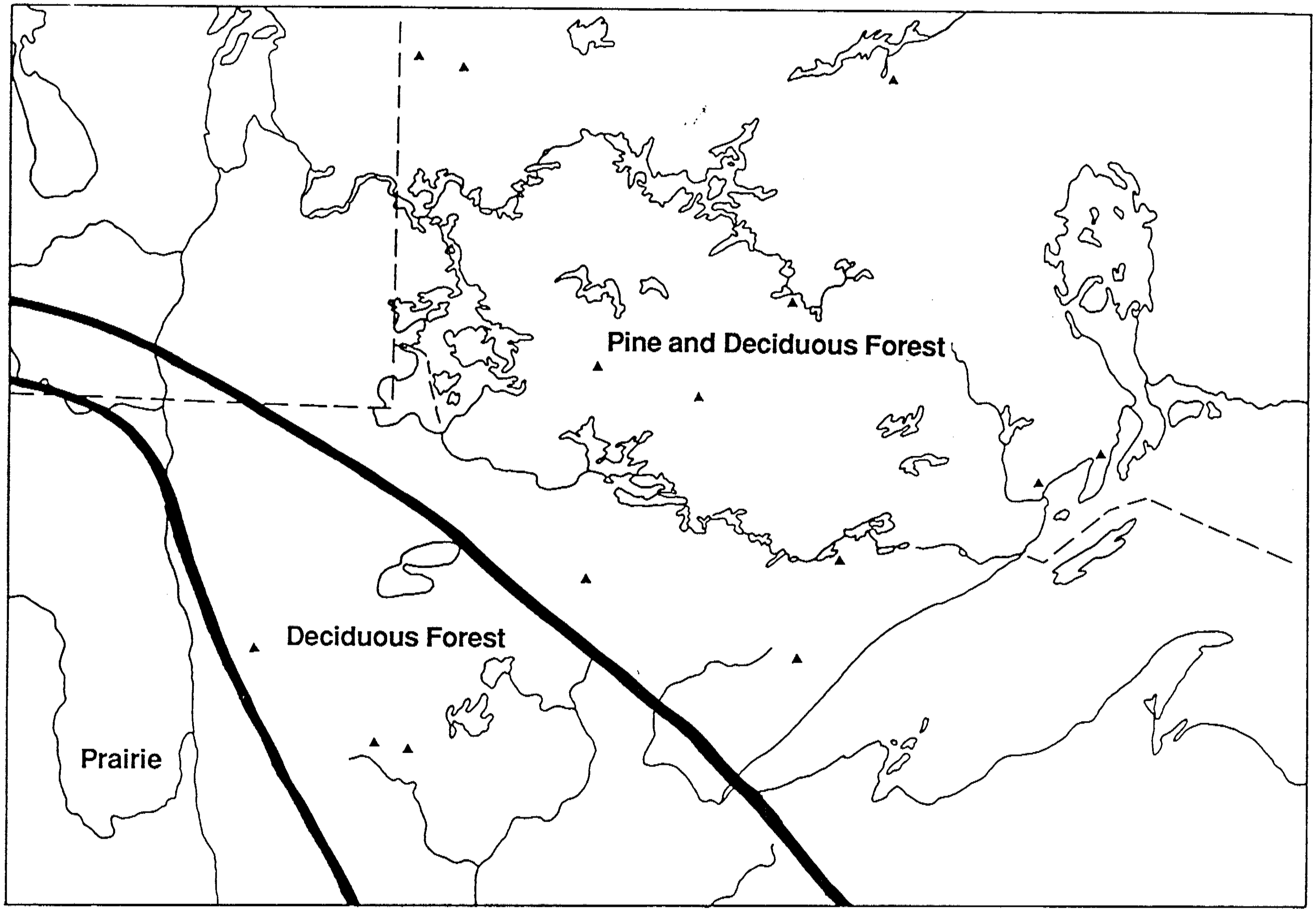


Figure 16: Vegetation Zones, About 4,000 B.P.

predominantly of pine, was present in the Lake of the Clouds and Weber Lake areas. The areas around Lake Itasca, Martin Pond, and Myrtle Lake were continuing to show a slight warming trend as a more open forest persisted. These warmer temperatures and drier conditions continued in the Qually Pond area as the prairie became firmly established. The boreal forest persisted in the Fort Frances/Emo area. During the early part of this interval, Lake Agassiz ceased to exist (Fenton et al. 1983:71).

As boreal forest persisted in the northernmost areas from 4,000 B.P. to the present, Lake Itasca, Martin Pond, and Myrtle Lake reverted to a boreal forest predominantly of pine (Fig. 17). The Lake of the Clouds area also showed a reversion, but from a boreal forest of pine to a spruce- and tamarack-dominated forest. The Qually Pond area showed a change in climate, as suggested by the presence of parkland and savanna. Overall, the change in vegetation suggest that the southern portion of the region underwent a cooling trend but the northern portion remained more or less constant. This coincides with the end of the warm Hypsithermal period which lasted from 9,200 to 3,600 years ago (McAndrews 1982:49).

About 4,000 years ago, the peat deposits began forming in the Rainy River District. Evidence for this comes from radiocarbon dates of 4,850±60 B.P. for bison remains from a peat bog near Kenora (McAndrews 1982), and 3,170±100 B.P.

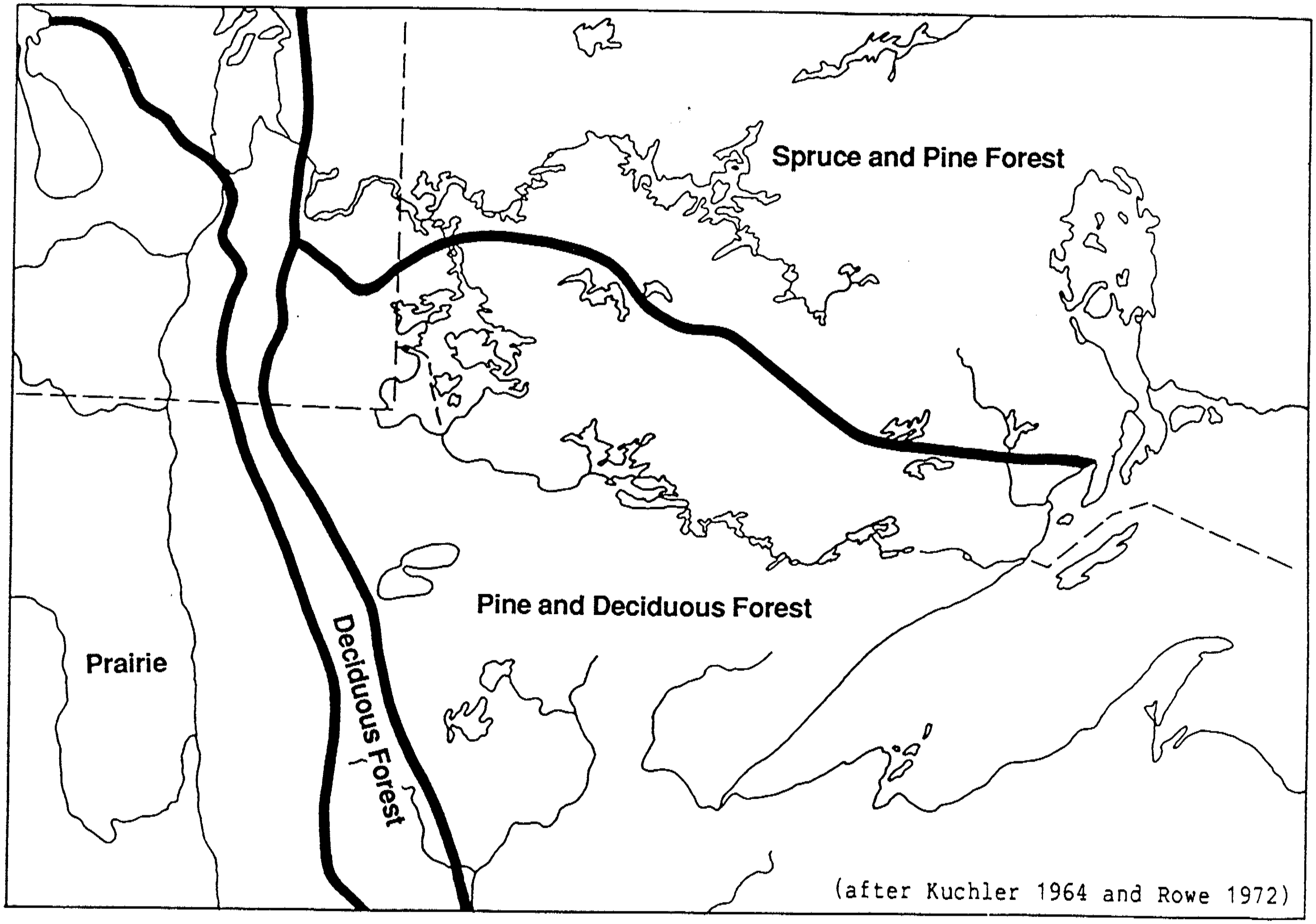


Figure 17: Present Vegetation Zones

from the basal layer of a peat deposit from the Red Lake Peatlands (Griffin 1977) located south of the Rainy River District.

Fauna

Skeletal elements of mammoth, which became extinct about 10,000 years ago, have been recovered in the area of the former southwest shore of Lake Agassiz in North Dakota (Fig. 18). Two of the finds consisted of single teeth (Ashworth and Cvancara 1983:136). The third find consisted of teeth, a tusk, vertebrae, and a number of other bones (Upham 1895:322). The three sites are associated with Herman beaches. Several mammoth and mastodon finds have been recorded in southeastern Manitoba (Leith 1949). These consist of a mastodon tooth found near Moosenose, a tusk fragment near Transcona, a small mammoth tooth at Birds Hill, and a large mammoth molar east of Dufresne. All of these finds were in gravels which were "moderately well rounded and undoubtedly the fossils have been washed in with the gravels from elsewhere and probably some distance from where they were discovered" (Leith 1949:136). These finds of mastodon and mammoth remains suggest that from the beginning of Lake Agassiz to slightly before the Campbell phase, about 10,500 years ago, these large mammals were present along the southwest shores of Lake Agassiz in North Dakota but probably not in southeastern Manitoba nor the study area in Northwestern Ontario.

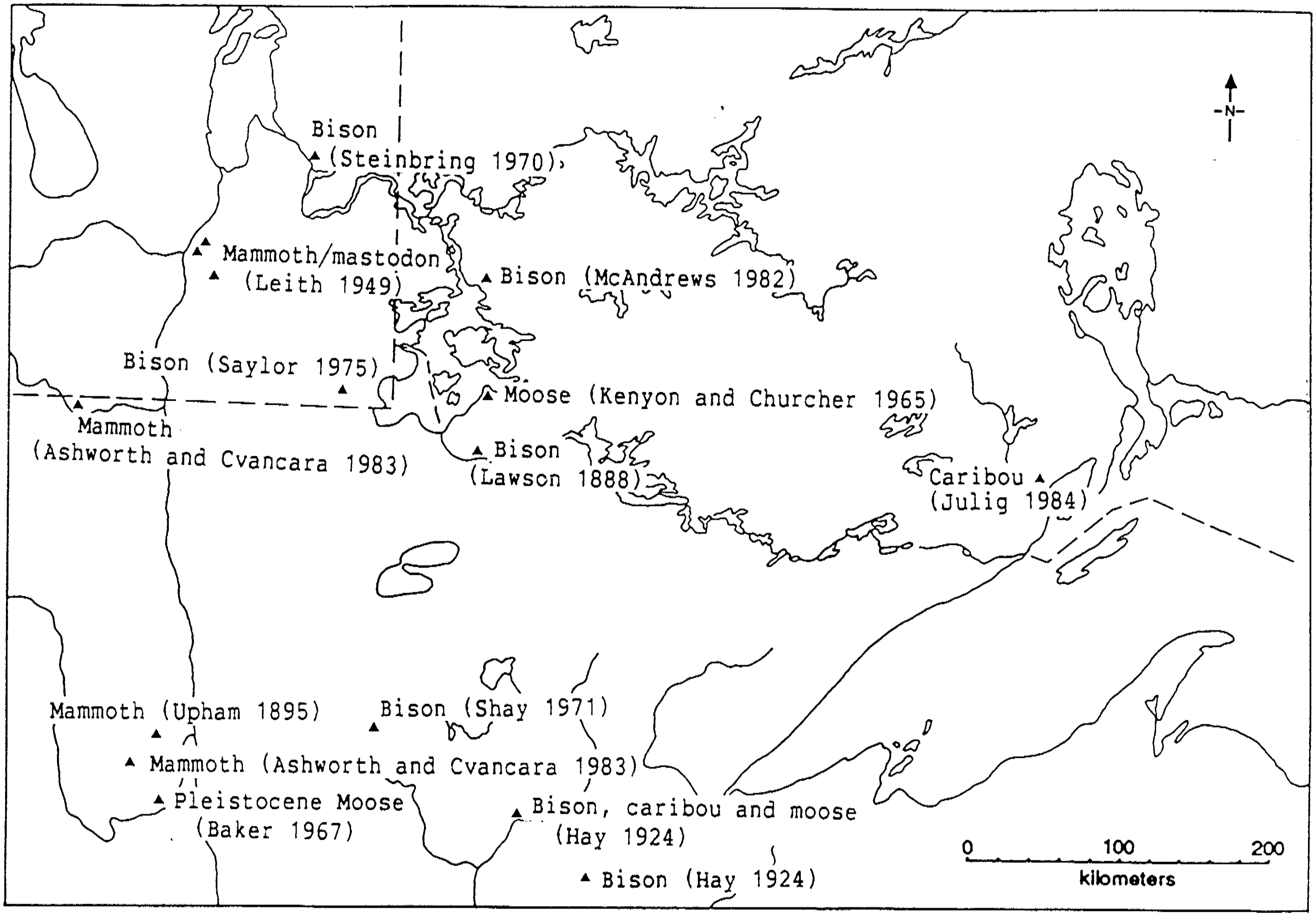


Figure 18: Location of Faunal Sites

Remains of the Pleistocene moose (Cervalces) (Baker 1967) were recovered from Sheyenne delta deposits in North Dakota. As the climate changed and the mammoths became extinct, other species of animals moved into the area. Most notable of these were the bison. Near Great Falls on the Winnipeg River in southeastern Manitoba, remains of Bison crassicornis were recovered (Steinbring 1970). Approximately 24 kilometers west of Lake of the Woods, a skull, long bones, vertebrae, and rib fragments of Bison bison were recovered (Saylor 1975:85). Near Kenora, Ontario, remains of a bison were recovered from a 4.5 m deep peat bog (McAndrews 1982). Based on a radiocarbon date of 4,850±60 B.P., it has been identified as possible Bison antiquus occidentalis.

Within the Rainy River District, Bison remains were also found along the Pinewood River (Lawson 1888:172). They were found in association with fossil molluscs in a gravel bed. The species of bison is unknown. McAndrews (1982:49) believes bison probably occurred in Northwestern Ontario during the Hypsithermal - 9,200 to 3,600 years ago. Following this period, they probably withdrew to more favorable habitats to the west and south. In the northwest part of the study area near Morson, an antler fragment, probably of moose (Alces alces), was found 4 m below the surface in gravelly-sand (Kenyon and Churcher 1965). Although it was dated to 7850±420 B.P., Zoltai (1969:535) believes the date should be about 2000 years older due to its geological context.

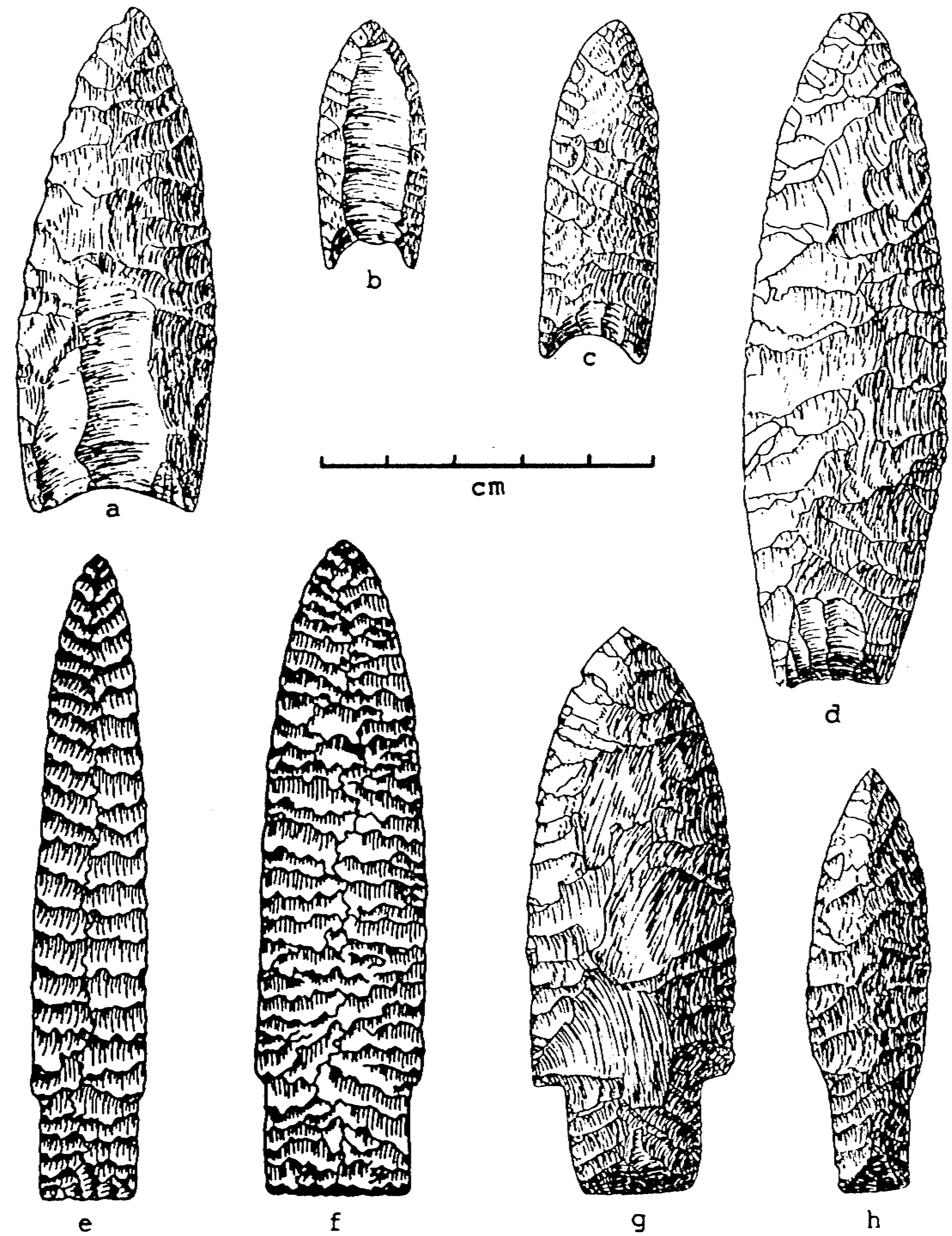
East and southeast of the Lake Agassiz basin, there have been several finds of large mammals. At Itasca in northern Minnesota (Shay 1971), remains of *Bison occidentalis* or *antiquus* have been recovered in association with a wide variety of other mammals, birds, reptiles, amphibians, and fish remains, as well as artifacts. In a peat deposit near Crosby, Minnesota (Hay 1924), the remains of *Bison occidentalis* and *B. bison*, two antlers of probable *Rangifer caribou*, and an antler of the moose *Alces americanus* were found. Near Mora, Minnesota (Hay 1924), remains of *Bison bison* were found in clay. Bone fragments which have been identified as possible caribou were recovered at the Cummins site in Thunder Bay, Ontario (Julig 1984).

Chapter IV

PALAEO-INDIAN INFLUENCES

Palaeo-Indians of the Great Plains

The Palaeo-Indians relied predominantly on large game for their diet. Although there are numerous Palaeo-Indian complexes which date to at least 12,000 years ago, only one appears to play any major role in the Rainy River District - the Plano complex. No evidence of the fluted complexes, the Clovis phase, which dates back to 12,000 years ago, nor the Folsom phase dating from about 11,000 to 10,000 years ago, have been found in this area, although both occur in western Manitoba (Pettipas 1967), North Dakota (Schneider 1982), central and southern Minnesota (Clouse 1984), Michigan (Fitting 1975), and Wisconsin (Wendt 1985). The Plano phase, which developed primarily in the Plains lasted from about 10,000 to 7,000 years ago in Ontario (Wright 1972a:13). However, in southeastern Manitoba, it is estimated to have lasted from 8,000 to 6,500 years ago (Pettipas and Buchner 1983:437). The projectile points for this phase fall into two basic categories: 1) lanceolate forms, such as Agate Basin and Hell Gap; and 2) stemmed forms, such as Alberta, Scottsbluff, and Eden (Fig. 19). The Agate Basin style projectile point is probably the most



a - Clovis b - Folsom c - Plainview d - Agate Basin
e - Eden f - Scottsbluff g - Alberta h - Hell Gap

(from Chapman 1975 and Hughes 1972)

Figure 19: Palaeo-Indian Projectile Points

frequently encountered Plano point. It appears to have been utilized throughout the entire Plano period and is widely dispersed throughout North America. A very similar point to the Agate Basin point is the Angostura point. Indeed, some authors believe it is merely a variant of the Agate Basin point and should not be placed in a separate category (Wormington and Forbis 1965:23, Pettipas 1985:41). For the purposes of this thesis, the Agate Basin and Angostura points will be considered as the same point type.

Likewise, there can also be considerable stylistic and temporal overlap between Agate Basin and Hell Gap points, "to the extent that it is very difficult indeed to separate them as exclusive diagnostics of temporally discrete subphases or complexes" (Pettipas 1985:41). In the High Plains, temporal differences have been noted between a variety of point types. At the Hell Gap site in southeastern Wyoming, for example, a well-developed sequence is evident: the Agate Basin complex which dates from 10,500 to 10,000 B.P., the overlying Hell Gap complex dates from 10,000 to 9,500 B.P., and above this the Alberta/Scottsbluff/Eden complex from 9,500 to 9,000 B.P. (Irwin-Williams et al. 1973). The date of 10,000 B.P. for the Hell Gap complex was also obtained from the Casper site in east-central Wyoming (Frison 1974). The points recorded from this site were all Hell Gap with the exception of one Clovis point. At the Agate Basin site in eastern Wyoming, Agate Basin and Hell Gap points were intermixed in a stratum dated to about 10,000 B.P. (Frison and Stanford 1982).

Plano Phases East of the Great Plains

Due to the acidic nature of soils in the boreal forest, bone preservation is poor and only rarely will faunal remains survive. At the Holcombe site in southeast Michigan, a phalanx of what was identified as barren ground caribou (*Rangifer arcticus*) was recovered (Cleland 1965). Agate Basin style points have been recovered from this and other nearby sites (DeVisscher and Wahla 1970). The identification as barrren ground caribou has recently been challenged as being too specific (Spiess et al. 1984-85). The identification of *Rangifer* is not disagreed with but the senior author of that article believes the small size could be attributed to shrinkage from being burned since the bone is calcined.

Other evidence of the presence of caribou in the Great Lakes area includes a find near Flint, Michigan, where a radiocarbon date of 5,870±400 B.P. was obtained on wood associated with caribou remains (Crane 1956). This was not an archaeological site. At the Cummins site, a large Palaeo-Indian site in Northwestern Ontario, three medium sized mammal bone fragments were recovered which were a reasonable match with the proximal end of a caribou radius (Julig 1984). The Cummins site will be further discussed later.

An examination of similar and possibly related Palaeo-Indian complexes which hunted these big game animals in different regions but in similar environmental settings may provide us with indications of what to look for in Palaeo-Indian sites located within the study area. Palaeo-Indian points have been recovered in many areas of Wisconsin. For example, a survey of the Yahara River basin produced several sites where fluted and Plano points were recovered (Wendt 1985). Most often, the Plano points were Agate Basin, although an Eden, a Plainview, and several other lanceolate points were also recovered.

From a survey of the northern portion of Wisconsin, numerous Plano sites were discovered (Salzer 1974). One of the components of these sites has been described as the Flambeau phase (Salzer 1974:43-44) (Fig. 20). Sites related to this phase are small in size and found along small streams at lake outlets and on the shores of modern lakes. Hixton silicified sandstone is the preferred lithic raw material, but other locally available materials, such as basalt, jasper, felsite, and quartz, were used. Artifacts include Agate Basin projectile points, large bifaces, scrapers, bifacial knives, gravers, wedges, bipolar cores, and utilized flakes. A relatively high proportion of the artifacts were used in a scraping function. A date of 9,000 B.P. has been attributed to the Flambeau phase.

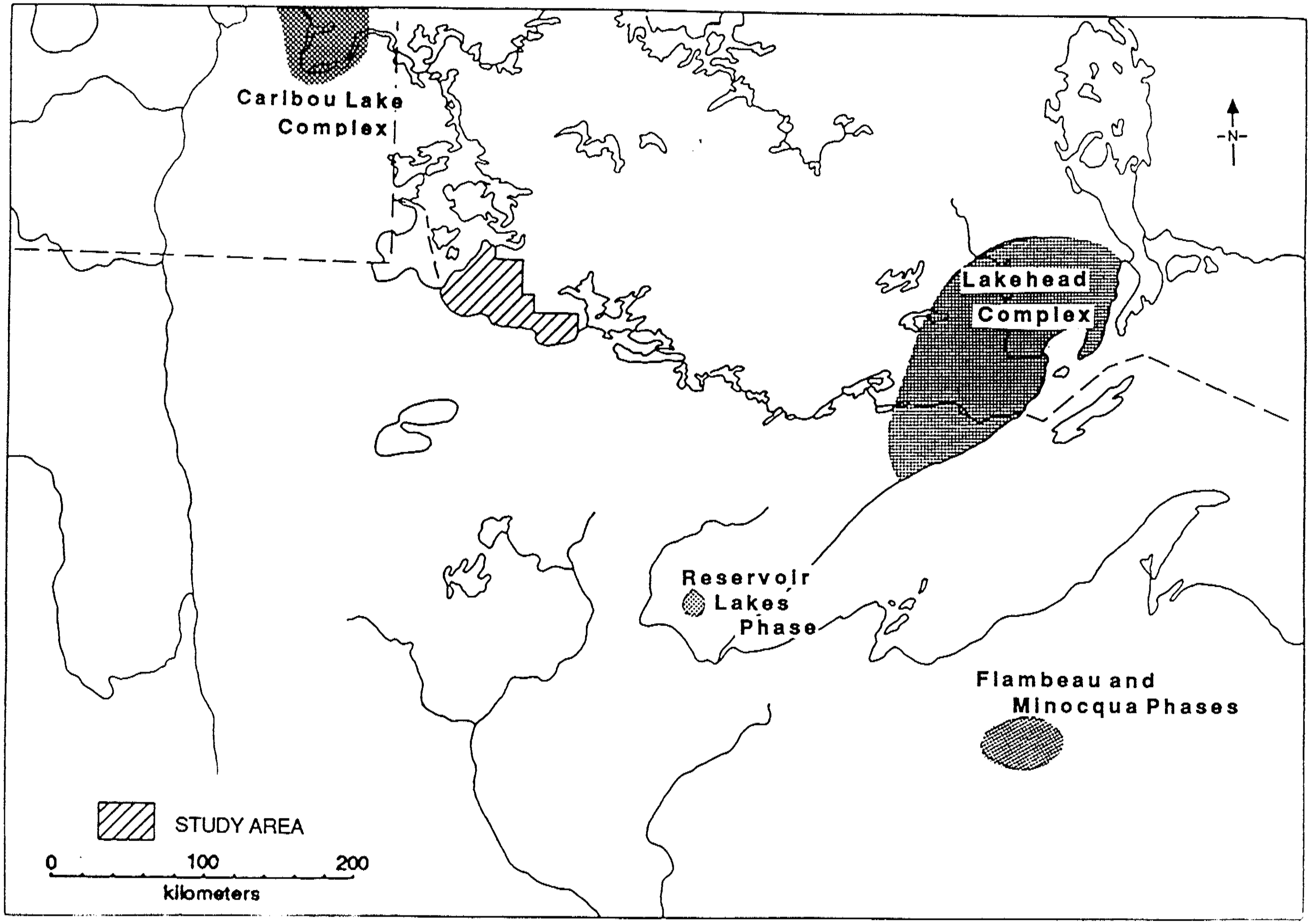


Figure 20: Palaeo-Indian Complexes

Located nearby are sites of another late Palaeo-Indian component - the Minocqua phase (Salzer 1974:44-45) (Fig. 20). Site size and locale are the same as for the Flambeau phase but the projectile points are different. They are somewhat like Scottsbluff points but the contracting base ends in two short lateral projections, or "ears". Similar points have been found in northeastern Minnesota (Steinbring 1970) and in Manitoba (Pettipas 1970). The rest of the artifact assemblage consists of scrapers, large and small bifaces, bifacially worked flat knives, wedges, bipolar cores, and utilized flakes. A majority of the artifacts were made from locally available basalt, felsite, welded tuff, rhyolite, jasper and quartz. This phase has been tentatively dated from 8,000 to 7,000 B.P.

In Minnesota, evidence of the Plano tradition has been found throughout much of the state. Examples include Plainview, Agate Basin, Hell Gap, and Scottsbluff points from east central Minnesota (Cain 1969), Eden from central Minnesota (Clouse 1984), Plainview and other lanceolate points from northeastern Minnesota (Platcek 1965), and Scottsbluff and Plainview from the northwestern area (Peterson 1973; Clouse 1984). A large collection of artifacts which were surface collected in east central Minnesota have been attributed to the Reservoir Lakes Phase (Steinbring 1974:67) (Fig. 20). It consists of various point forms, such as Agate Basin, Scottsbluff, Eden, Hell

Gap, and Plainview. These points are frequently made from jaspilite, also referred to as jasper taconite. Other artifacts associated with the Reservoir lakes phase include choppers, crudely made bifaces, crescentic blades, adzes, long heavy picks, and large retouched flakes. All of the sites are on high ground, typically on river channels between 200 and 270 meters above the present level of Lake Superior. Steinbring notes that this phase is remarkably similar to the Shield Archaic as described by Wright (1972b), except that it exhibits a far clearer Plano involvement.

About 300 kilometers east of the Rainy River District is the western shoreline of Lake Superior which, 9,500 years ago, was submerged under glacial Lake Minong. It was also at this time that the Palaeo-Indian period of occupation known as the Lakehead Complex became established in this region (Fox 1975, 1980) (Fig. 20). Most of the sites associated with this complex are quarry sites where artifacts of jasper taconite were produced. The Brohm site, 30 kilometers east of Thunder Bay, was one of the first sites associated with the Lakehead Complex to be examined (MacNeish 1952). It is situated on a Lake Minong, an early stage of Lake Superior, beach ridge and, when originally discovered, had large quantities of jasper taconite flakes and broken artifacts on the surface.

Probably the most notable of the Lakehead Complex sites is the Cummins site which is located 10 kilometers west of the present Lake Superior shoreline, within the city limits of Thunder Bay. Situated on a former Lake Minong beach ridge, the site is an extensive quarry and habitation site covering an estimated 80 hectares. Earliest examinations of the site were done in the early 1960s (Dawson 1983). Many areas of the site are densely covered with lithic debitage and broken tools. By far, the commonest raw material which was utilized was jasper taconite. Other materials recovered include Gunflint silica, quartz, slate, Knife Lake siltstone, and Hudson Bay Lowland chert (Julig 1984). A number of pressure flakes found at the site were originally identified as Knife River flint, but have since been identified as Hudson Bay Lowland chert or Lake Superior agate (Julig et al, n.d.). Fragmentary remains of a cremation burial found in the 1960s in the eastern part of the site have recently been accelerator-dated to 8,500±390 B.P. (Julig 1984:192). Based on rapidly dropping water levels after 9,400 B.P., Julig (1984:194) believes that the Cummins site was probably some distance from the lake during its major period of occupation.

Evidence of the Lakehead Complex has also been recorded from the Knife Lake area in Quetico Provincial Park to the west of Thunder Bay, about 180 kilometers east of the Rainy River District (Fox 1980). Tools here are made predominantly from Knife Lake siltstone but jasper taconite have also been found.

Although there is a wide range of styles of projectile points represented in the Lakehead Complex, there appears to be many similarities between the styles and flaking techniques exhibited in the Flambeau and Reservoir Lakes Phases (Fox 1975:47-48). A wide range of other artifacts, including scrapers, bifacial knives, drills, cores, and gravers, make up the Lakehead Complex tool kit assemblage. If there was a movement by the people from Wisconsin, through Minnesota, and into the Thunder Bay area, as does seem reasonable, a later date than 9,000 B.P. would have to be assigned to the Flambeau Phase or an earlier date of around 9,000 B.P. for the Lakehead Complex. About 8,500 years ago, southeastern Manitoba was inhabited by a culture known as the Caribou Lake Complex (Steinbring and Buchner 1980). Being near the prairie/boreal forest transition zone, these people probably relied on game such as moose and caribou whenever bison were not available. The Sinnock site on the lower Winnipeg River is a typical site from this culture (Buchner 1981,1984b). It appears to have been a bison kill and butchering station where Plano points and tool types have been found.

Throughout much of the boreal forest, similar Plano points can be found even though bison was most likely not part of the food resource. One of the more productive sites associated with this complex is the Sinnock site, which dates to about 8,000 B.P. (Buchner 1984a). This site, a single component bison kill and butchering station located along the lower Winnipeg River, was partially excavated during the early 1980s before being flooded for hydroelectric purposes (Buchner 1981,1984b). Projectile points from this complex are "crude representations of Plano forms... essentially percussion-worked" (Steinbring and Buchner 1980:25). They are predominantly lanceolate in shape although some are vaguely stemmed variants. Also in the assemblage are crudely made choppers which may have also functioned as cores, large bifaces in various shapes, end-scrapers, uniface knives and/or scrapers, and long curved prismatic flakes. Steinbring and Buchner (1980) see the Caribou Lake Complex as a westward extension of the Lakehead Complex. However, it has also been argued that the Caribou Lake Complex peoples migrated from the plains, following the bison to the plains/boreal forest transition zone (Pettipas and Buchner 1983; Buchner 1984). They suggest that these people turned to other game animals whenever bison herds were not plentiful in the area. Adding credence to this hypothesis of Plains affiliation is a recent study involving the statistical analysis of the tool kits from the Lakehead Complex and the Caribou Lake Complex which suggests that they are not culturally related (Arnold 1985).

Chapter V

RESULTS OF THE 1986 FIELD SEASON

Morphology of the Strandlines

Strandlines throughout most of the study area appear to be associated with the Campbell phase of Lake Agassiz which lasted from 10,000 to 9,500 B.P. (Teller and Thorleifson 1983). These ridges are located at an elevation of 350 m (1148 feet) above sea level, although this can vary by up to three meters. The few strandlines west of the Pinewood River drainage basin (Fig. 21), can be partially attributed to the mapping strategy used. As was mentioned previously, the area east of Emo was mostly mapped prior to the field work, whereas the rest was done while in the field. Also, the Campbell level strandlines were of primary interest to this study and since much of the area west of the Pinewood River drainage basin is below this level, limited attempts were made to locate strandlines there.

Strandlines have occasionally been eroded by post-glacial river activity, as can be seen in the Pinewood River and Lavallee River drainage basins. Only in the north halves of Tait, Pattullo, and Nelles townships, the eastern part of Sutherland Township, and the south half of Sifton Township, where there are numerous outcrops, does the bedrock appear

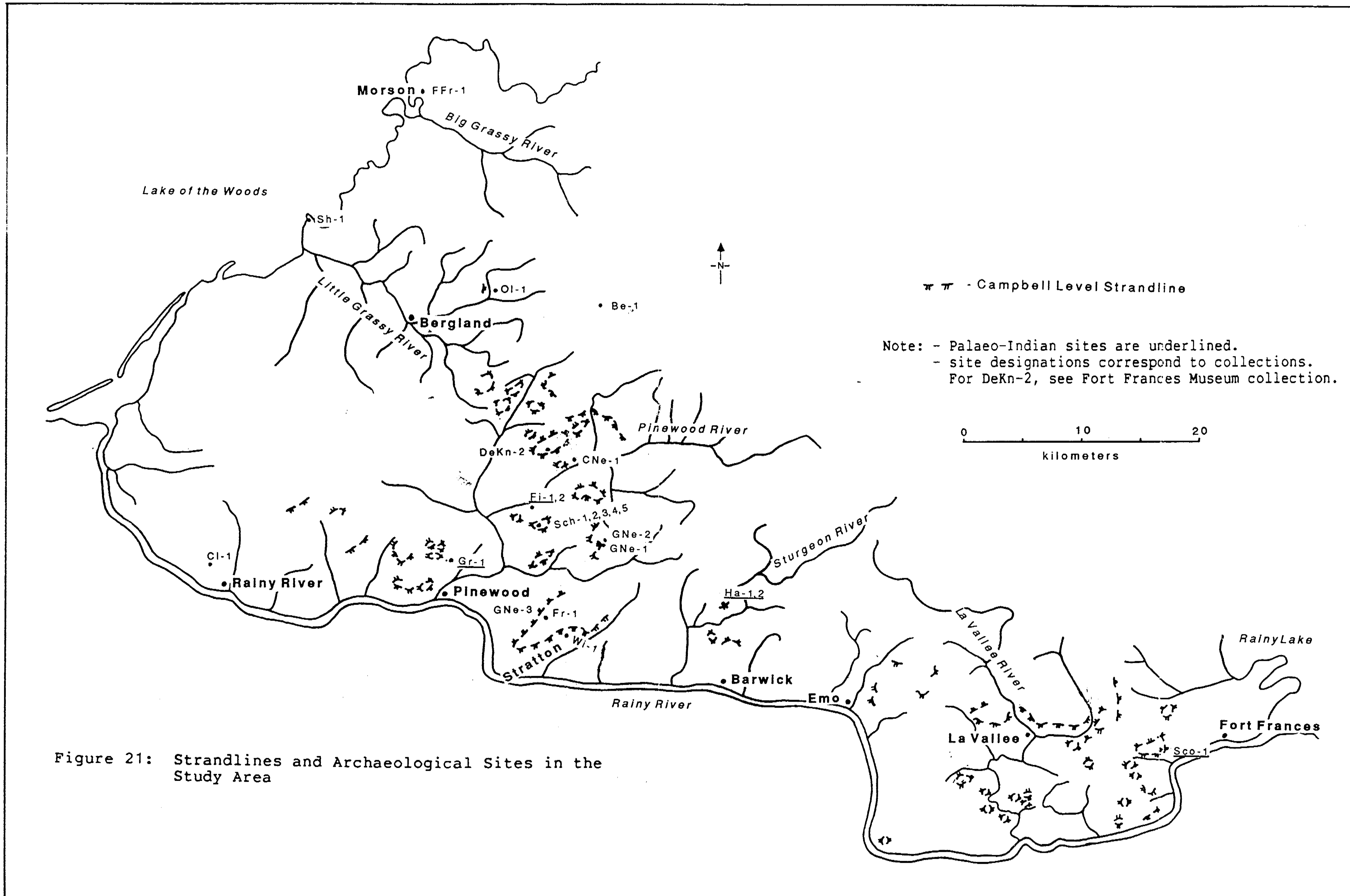


Figure 21: Strandlines and Archaeological Sites in the Study Area

to play a role in affecting the morphology of strandlines. Field examination indicated that erosional strandlines, which were always wave cut benches, generally have steeper slopes than the depositional beaches (Fig. 22). Depositional strandlines are characterized by a convex beach and often have a swale-like form in the rear of the beach. Degraded cliffs or bluffs were not observed at any location. The well-drained sandy areas of a beach often had different species of grasses and weed growing on it than the more poorly-drained soils on either side. Relief of the strandlines varies from about one to five meters. Breadth of the beaches also varies considerably. They can range from two or three meters to over 175 meters wide (Johnston 1915:56).

Generally, in the flat area east of Emo, strandlines are primarily erosional features. A notable exception to this is a north-south trending ridge immediately west of Fort Frances. This beach ridge is mostly composed of sand but gravel deposits do occur along it. Very few bedrock exposures are evident in this area.

North of the community of Barwick very few beach ridges are evident in the rolling topography. There are a few gravel deposits several meters thick. North and west of Stratton, in relatively flat land, there are numerous well developed beach ridges consisting of sand and gravel. Some of these are up to seven meters thick. There are several very large bedrock outcrops in this area.

Figure 22: Erosional and Depositional Strandlines

a) Erosional strandline feature in Devlin Township.

b) Depositional strandline feature in Morley Township.

a

b

The Archaeology

After four months in the field, 17 sites were found which can be attributed to either Palaeo-Indian or Archaic, or which are non-diagnostic. The non-diagnostic sites are most likely from the Palaeo-Indian or Archaic period rather than the more recent Woodland period as suggested by the artifacts and their relationship to the Campbell strandline. Since the majority of these finds were by local collectors, the author had to rely on them for provenience information. Provenience varied from extremely good, in cases where the collector could point to the exact location of the find, to poor - "somewhere around Stratton."

Although the focus is on Palaeo-Indians, artifacts from the Archaic and Woodland periods, as well as several non-diagnostic artifacts were also be examined. Woodland artifacts were found along the Rainy River or in the eastern part of the study area and included projectile points, mauls, and pipes. These are briefly discussed in Appendix C. Cultural affiliation has been determined by comparing the artifacts with those in published reports on Palaeo-Indians (for example, Salzer 1974; Fox 1975,1980; Buchner 1981,1984b; and Dawson 1983) and the Archaic (Wright 1972b). Artifact numbers used in the text, excluding the Royal Ontario Museum collection, were assigned as a temporary means of identification. Artifacts donated to the Fort Frances Museum will be given permanent catalogue numbers upon their arrival at the Museum. Measurements for all artifacts can be found in Appendix B.

The Collections

Berg Collection

- owner: Dale Berg, Dewart Township, Ontario.

This collection consists of one complete stemmed biface (Fig. 23a) made from Lake of the Woods chert, probably dating to the Archaic. The stem is slightly flared. It was found in an open field in the north half of lot 1, concession 2 of Dewart Township, several hundred meters from the nearest source of running water. This field is at an elevation of about 400 meters, well above the Campbell level. The collector dug several other holes in the area of the find but encountered no other artifacts.

Cleve Collection - owner: Fort Frances Museum, Fort Frances, Ontario.

This non-diagnostic artifact, a preform (Fig. 23b) of Lake of the Woods rhyolite, was found by Pat Cleve while working with the Ontario Geological Survey during the summer of 1986. It was recovered below the Campbell level in a ditch, site DeKp-1, about one kilometer north of the town of Rainy River lying on a deposit of fine sand below the Campbell level. The artifact has been donated to the Fort Frances Museum by Ms. Cleve.

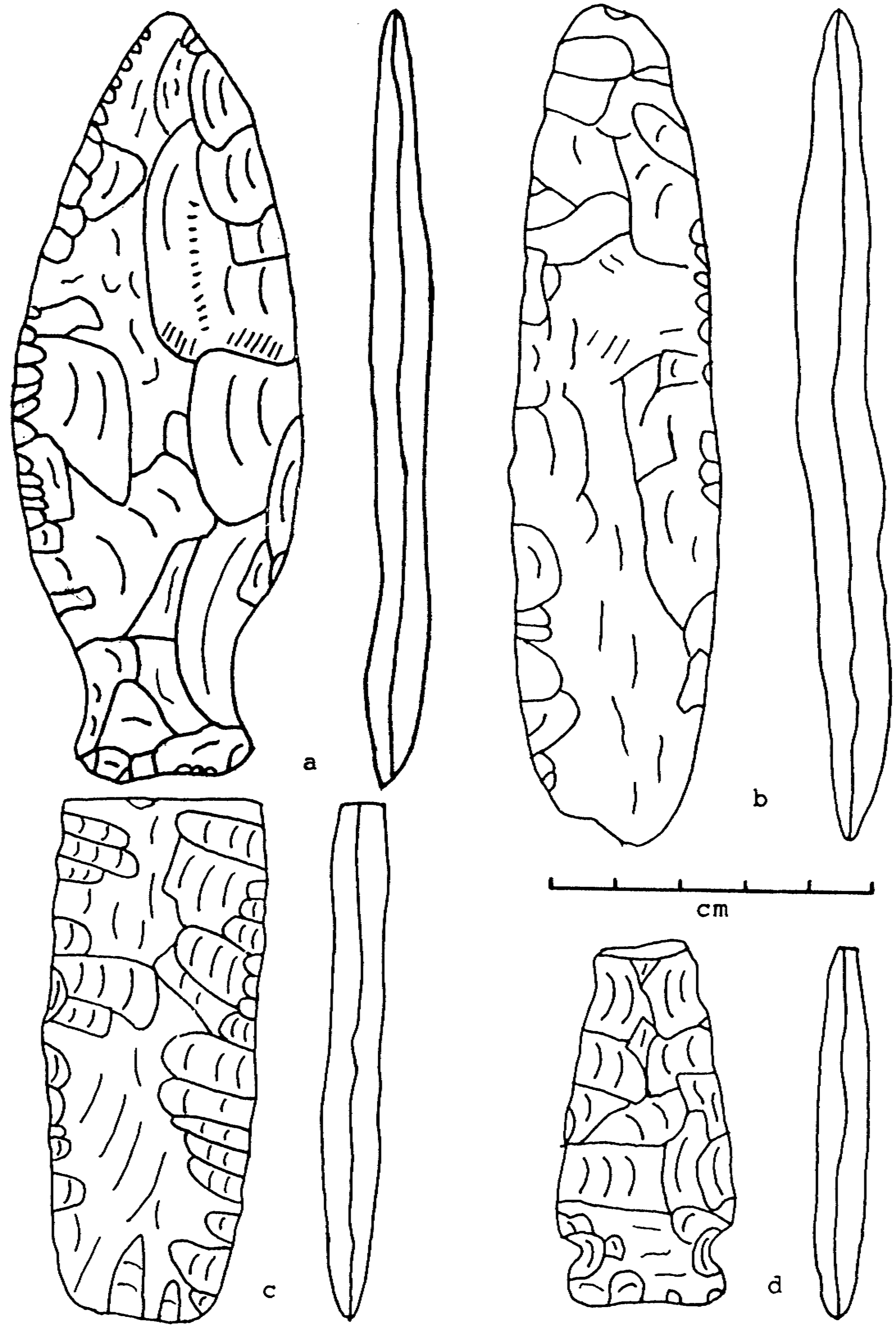


Figure 23: Berg, Cleve, and Fifield Collections

<u>Fifield Collection</u> - owner: Keith Fifield, Fort Frances, Ontario.

Two artifacts compose this collection, both of which were found within a few hundred meters from one another. One of the artifacts, found on the property of Lawrence Brown, is the basal portion of an Agate Basin point (Fig. 23c) made from Hixton silicified sandstone. The only known source of this material is in central Wisconsin (Porter 1961). The site, DeKn-1, is located about 10 kilometers north of the town of Stratton. It is on a small mound with a swampy area to the south and southeast which drains into an intermittent stream immediately west of the site. This in turn flows into the Pinewood River, approximately 200 meters to the north. Twenty-one shovel tests were done using a 5 meter grid. The only artifact recovered was a flake of an unidentified bluish-grey chert.

The other artifact in this collection is a side-notched point (Fig. 23d) of Lake of the Woods chert. It resembles several Archaic points found on the Winnipeg River in southeastern Manitoba (Steinbring 1980:Fig. 18). It was found by Robert Brown, the brother of Lawrence, in a plowed field a few hundred meters to the north east of where the former point was found.

<u>Fort Frances Museum Collection</u> - owner: Fort Frances Museum, Fort Frances, Ontario.

Among the artifacts in the Fort Frances Museum collection is a projectile point (Fig. 24a), possibly Archaic, which has been made from a flake of Lake of the Woods chert. The point, which is heavily waterworn, has a slight longitudinal curvature to it. It was found near the town of Morson, Ont., near Lake of the Woods.

Also in this collection is a white chert flake which was recovered by this writer from a gravel pit near Lake of the Woods (site DeKq-4). Eight shovel test pits were put in with negative results.

This writer also found two pieces of detritus of unidentified chert and a possible hammerstone in separate shovel test pits at site DeKn-2, which is on a Campbell strandline. The possible hammerstone is a broken cobble which has evidence of battering at the unbroken end. A total of 42 shovel tests were done at the site.

<u>Friesen Collection</u> - owner: Jake Friesen, Stratton, Ontario.

The single artifact from this collection was found by Mr. Friesen in his driveway the day after it had been freshly gravelled. The artifact probably came from a gravel pit near the Stratton garbage dump, about two kilometers northwest of Stratton. This area, slightly above and to the

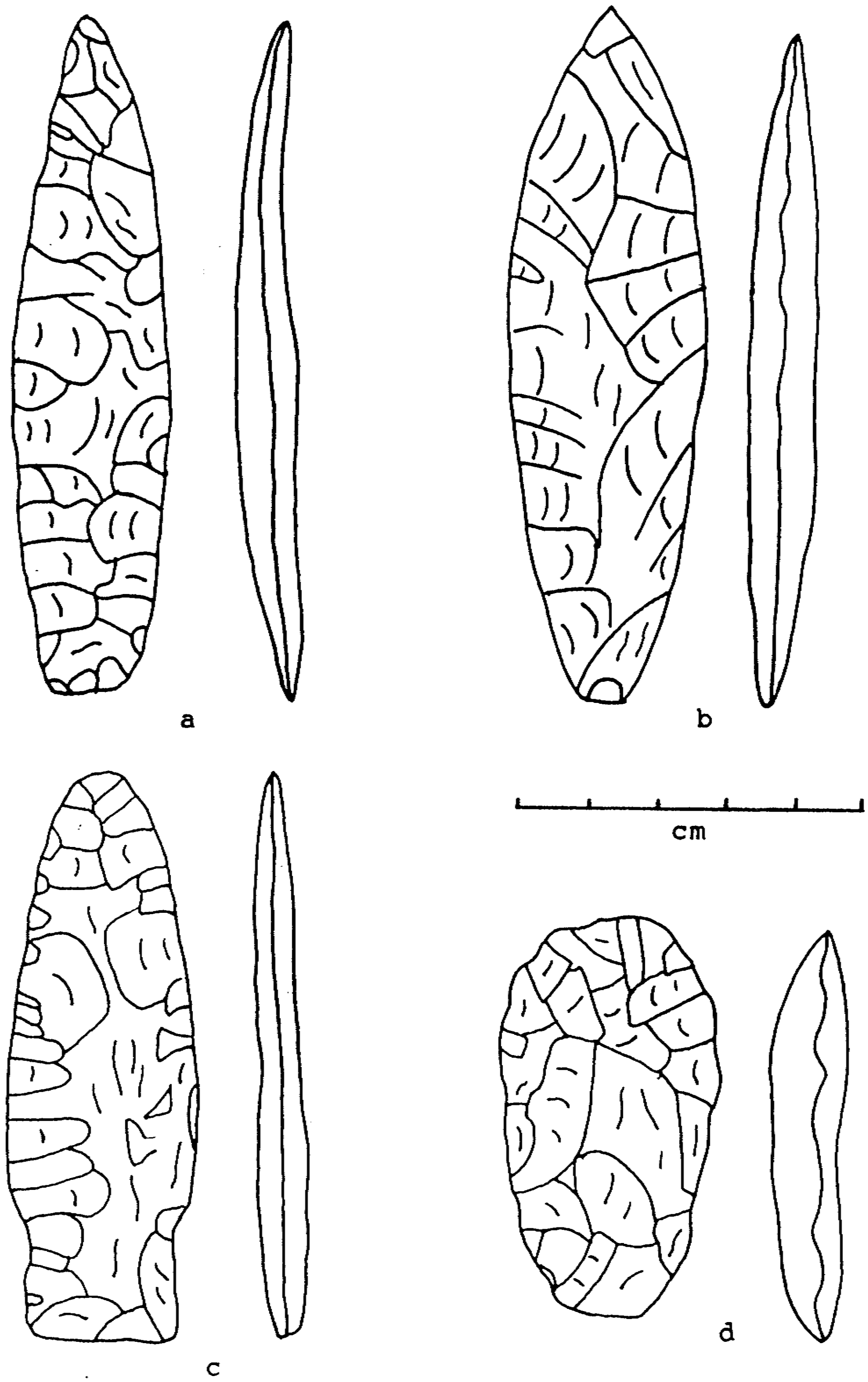


Figure 24: Fort Frances Museum, Gray, and Hadley Collections

east of a Campbell beach ridge, consists of numerous deep gravel pits, several of which are nearly depleted. The pit from which the artifact was extracted is still active. All pits in the area were visually examined but no artifacts were found.

The artifact in the Friesen collection is a large core or chopper (Fig. 25) made from Lake of the Woods chert. Both lateral edges show signs of battering. Artifact GNe-3 (Fig. 27b), an Archaic projectile point, in the Garnett Neilson collection, was also found in this vicinity.

Gray Collection - owner: Peter Gray, Toronto, Ontario.

This item, a complete Agate Basin point (Fig. 24b) of quartz, was found by a local resident in a small depleted gravel pit about 12 kilometers northwest of Stratton, on Highway 619. This gravel deposit is below the Campbell level. There are no streams in the immediate area but there are several low-lying swampy areas. An examination of the site produced no additional artifacts.

Hadley Collection - owner: Fort Frances Museum, Fort Frances, Ontario.

Mr. Ben Hadley found these artifacts, a Scottsbluff point (Fig. 24c) and a scraper (Fig. 24d), in the garden on his property which is about 5.5 kilometers north of the town of Barwick. The site is on a curving section of the Campbell

Figure 25: Friesen Collection

beach. The beach slopes to the south. Continuing east along the ridge for about five meters, it curves to slope to the southeast. About 50 meters southeast of the site is an intermittent stream which drains into Sturgeon Creek.

The point is made from Lake of the Woods rhyolite and the scraper is made from an unidentified tan-coloured chert. A visual examination of the garden produced a flake of an unidentified chert. Later, 48 shovel tests were put in outside of the garden using an six by eight grid with a five meter interval. This resulted in the recovery of one more flake, also of an unidentified chert. Mr. Hadley stated he had found three or four other points in the same area but had given them away many years ago. He believes it would be almost impossible to trace them now. Mr. Hadley donated his collection to the Fort Frances Museum.

McNabb Collection - owner: Emo Museum, Emo, Ontario.

Two projectile points, both broken, comprise this collection. One is the basal portion of a Scottsbluff point (Fig. 26a), while the other is the tip of a point of unkown cultural affiliation (Fig. 26b). The donor, Mrs. D. McNabb, of Stratton, had no idea of the provenience of these artifacts which had been found many years previously, other than that they were from the Stratton area.

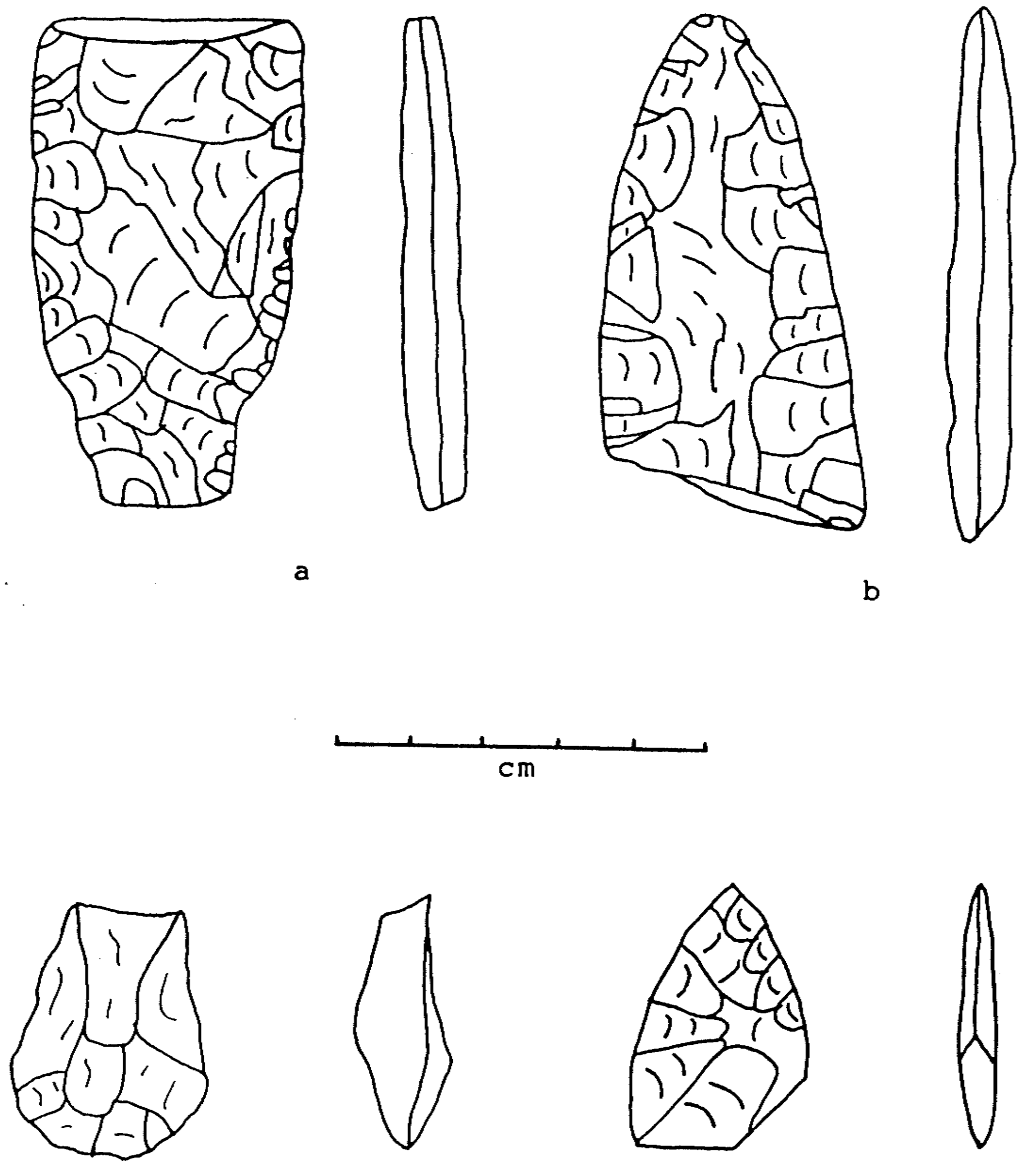


Figure 26: McNabb, C. and G. Neilson Collections

C. Neilson Collection - owner: Carman Neilson, Stratton, Ontario.

Mr. Neilson had noticed a lithic scatter on his land, about 14 kilometers north of Stratton. The site (DeKm-1) is on a low ridge below the Campbell level which dips gently to the southeast towards an intermittent stream. In all cases, the artifacts were associated with the topsoil. The scatter appears to be composed solely of quartz detritus of varying sizes. Forty-three pieces of detritus were collected over an area approximately 20 by 30 meters. Shovel testing, using a five by seven grid with a ten meter interval, was done to attempt to determine the extent of the scatter. However, of the 35 shovel tests, only three were positive - two produced one piece of detritus each but the third produced nine pieces. These have all been donated to the Fort Frances Museum.

Mr. Neilson reported he had found a "small arrowhead" in the northwest part of the area that was shovel tested, but it has since been misplaced. In the fall of 1986, Mr. Neilson found the basal portion of a drill (Fig. 26c) in the same general area. He forwarded it on to the author for analysis.

G. Neilson Collection - owner: Garnett Neilson, Stratton, Ontario.

Mr. Neilson proved to be one of the more avid collectors in the Stratton area, but the small size of his collection indicates the scarcity of artifacts in this area. His collection consists of three artifacts, two of which he found in different parts of his property, and the third near the Stratton garbage dump. One of the artifacts found on his property, a biface (Fig. 27a), probably Archaic, made from Lake of the Woods chert, was found at an elevation above the Campbell level, although no beach is evident in the area. This point resembles an Archaic point from the Petaga Point site in east-central Minnesota (Bleed 1969:Plate 10k). The site is about eight kilometers north-northeast of Stratton. About one half kilometer to the south-southeast of this site, Mr. Neilson found the tip of a quartz projectile point (Fig. 26d) of unknow cultural affiliation. This site is on a well-defined Campbell beach. Shovel testing was conducted at both sites, with negative results. At the former site a grid of five by seven tests with a five meter interval was used, while at the latter site a grid of five by twelve tests with a ten meter interval was used.

The third artifact, found near the Stratton garbage dump, is a side-notched projectile point, that is probably Archaic, ca. 7,000 to 3,000 years old. This was recovered

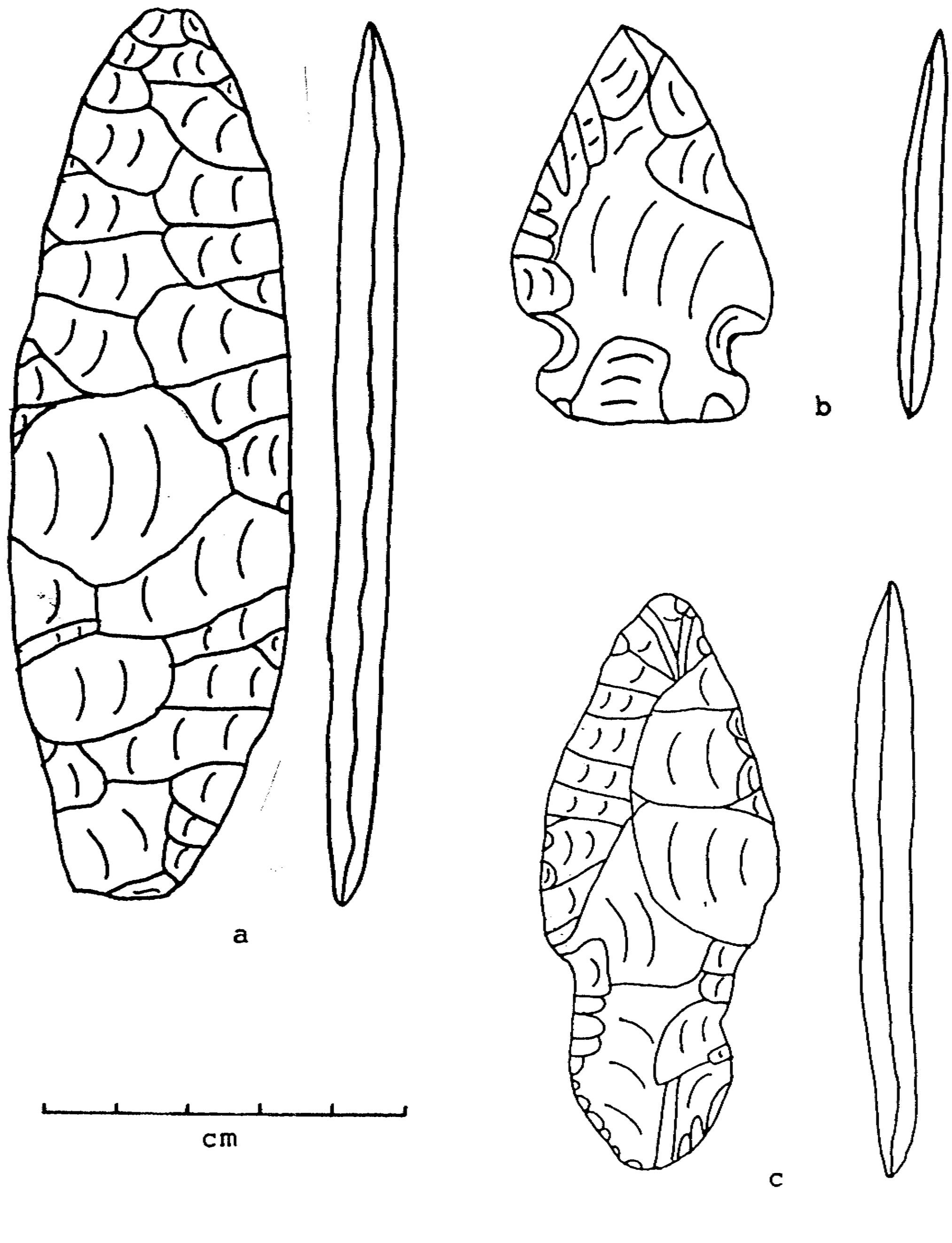


Figure 27: G. Neilson and Olson Collections

in the same general vicinity as where the core/chopper in the Friesen collection originated.

<u>Olson Collection</u> - owner: T. Olson, Terrace, British Columbia.

Included in this collection is an Alberta-like projectile point (Fig. 27c), but probably Archaic, made from Lake of the Woods chert found in the northwest portion of the study area about three kilometers east of Cozy Corners on Highway 600. The point was found west of and below a Campbell beach. Between the site and the beach is a creek which drains into the Grassy River. Due to weather conditions, testing of the site was negated and the author was unable to return at a later date.

<u>Royal Ontario Museum Collection</u> - owner: Royal Ontario Museum, Toronto, Ontario.

The eight Plano points in this collection were collected by Dr. W. Kenyon during the late 1950s and into the 1960s while doing an archaeological collection of the Rainy River District. Unfortunately, the provenience is not precise in most cases and this writer could only examine the casts of these artifacts. Raw material types for some of the artifacts were provided by the Museum. The following descriptions provide the Royal Ontario Museum catalogue number with the cast number in brackets.

Artifact 958.262.1 (C-362), an Agate Basin projectile point (Fig. 28a) made of rhyolite, was recovered in Devlin Township. Two large bifaces, 958.262.2 and .3, also recovered in Devlin Township, are of the same material. Artifact 958.196.5 (C-366), a Hell Gap projectile point (Fig. 28c), has a broken tip which Mayer-Oakes (1970:363) believes may have been reworked. It was recovered in Burris Township. Also from Burris Township in Concession 5, Lot 10 and 11, is an Agate Basin projectile point (Fig. 28b), 964.205.2 (C-372), of unknown material. Two Agate Basin points were recovered in the northeast quarter of section 25 in Lash Township. Artifact 962.125.1 (C-370) (Fig. 28d) is made from what was described as "sandstone (silica-rich)" and 962.125.2 (C-368) (Fig. 29a) is made from a possible chert.

Of the remaining projectile points, the provenience of one is listed only as Rainy River District, while the other two are definitely outside of the study area. The artifact from the Rainy River District is a Hell Gap point (Fig. 29b), 967.242.8 (C-376), made from sandstone (silica-rich). The two points recovered outside of the study area are a lanceolate point (Fig. 29d), 964.206 (C-374), of an unknown material recovered on the northeast corner of Rainy Lake, and an Agate Basin point (Fig. 29c), 959.44.1 (C-364), of unknown material from the Kenora District. It was recovered from East Andrew Bay on Gibi Lake in Code Township.

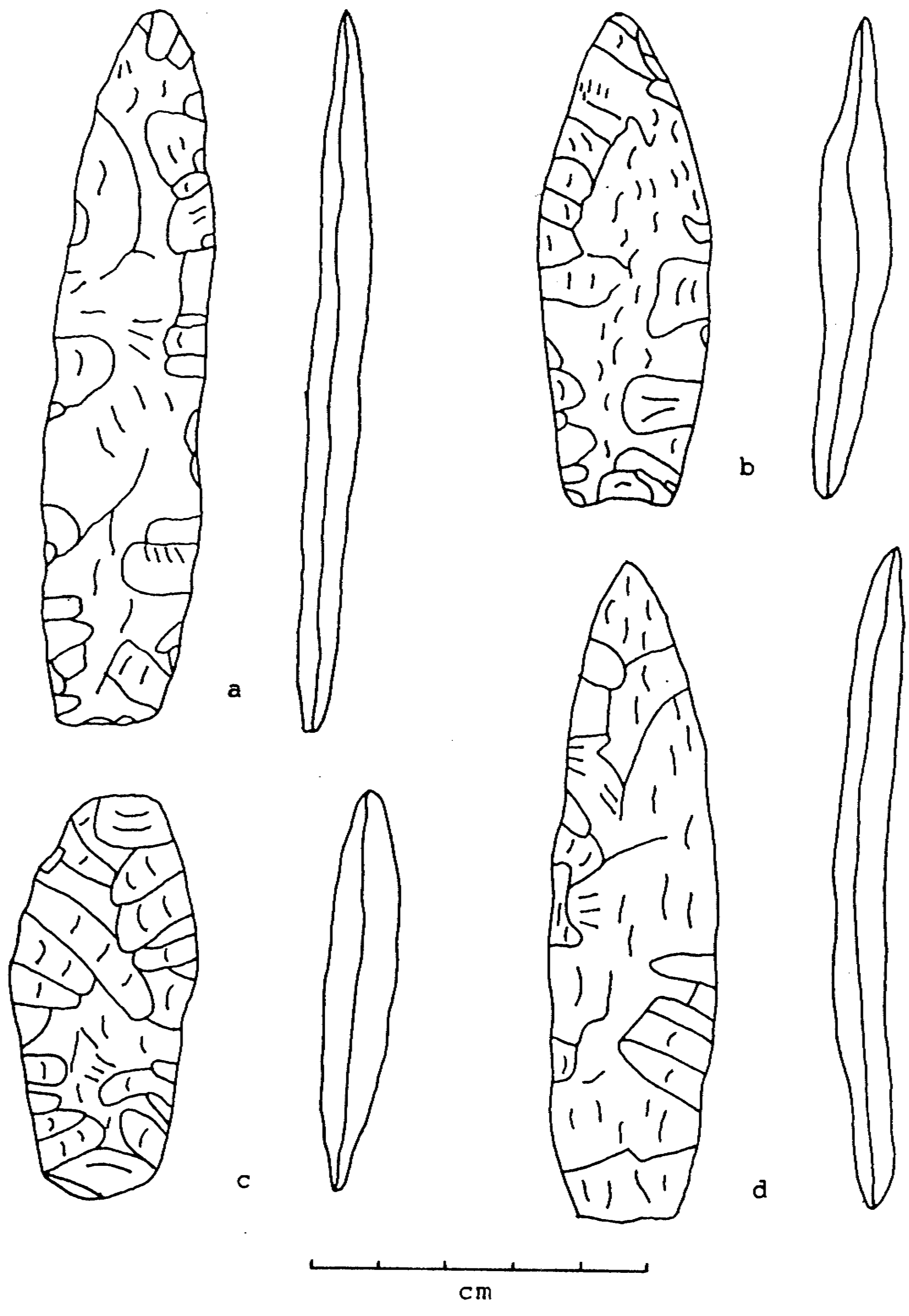


Figure 28: Royal Ontario Museum Collection

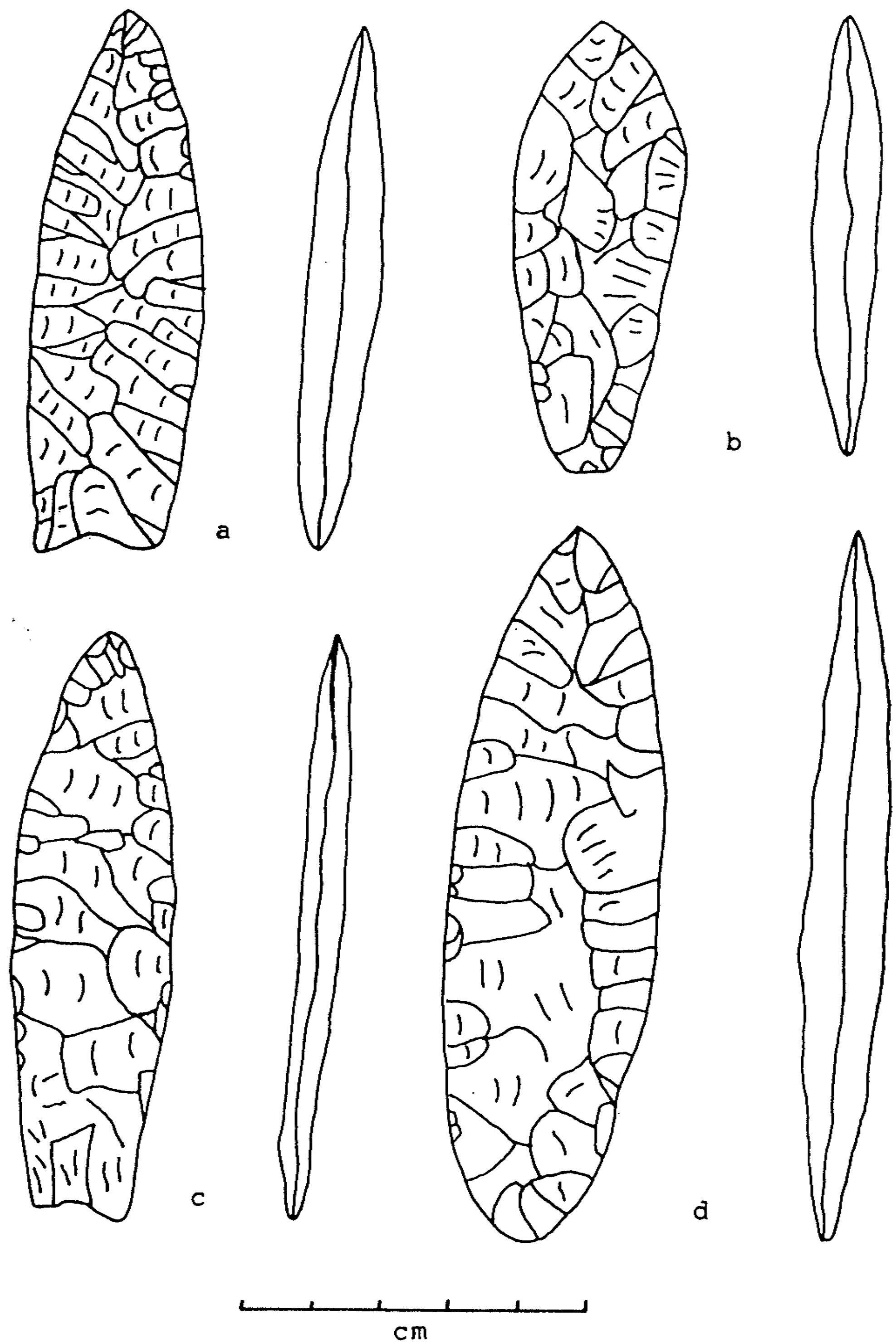


Figure 29: Royal Ontario Museum Collection

Schram Collection - owner: Sid Schram, Stratton, Ontario.

Over a period of years, Mr. Schram has found five artifacts on his property, none of which are diagnostic. This land is about nine kilometers north of Stratton, just south of Lawrence Brown's property where the point made from Hixton silicified sandstone was found (Fi-1). The exact proveniences for the artifacts are not known. A notable feature of much of Mr. Schram's property is that it represents an island, approximately one square kilometer in size during the Campbell phase, and in some areas has well developed beach deposits, in particular in the southeast corner. To the southwest of this area is a creek which drains into the Pinewood River.

Two areas were shovel tested along the south-sloping beach ridge using five meter intervals for a total of 35 tests. The gravel pit in the southeastern area and a garden in the northeastern area were also examined, but with no results.

Two of the artifacts are bifaces (Figs. 29a and 30a) of Lake of the Woods chert. One of these is heavily waterworn. The other artifacts include a siltstone (?) scraper (Fig. 30b) which is slightly waterworn, a preform (Fig. 31b) of Lake of the Woods rhyolite which appears to have broken during manufacture, and a siltstone (?) preform (Fig. 31c) in an early stage of production.

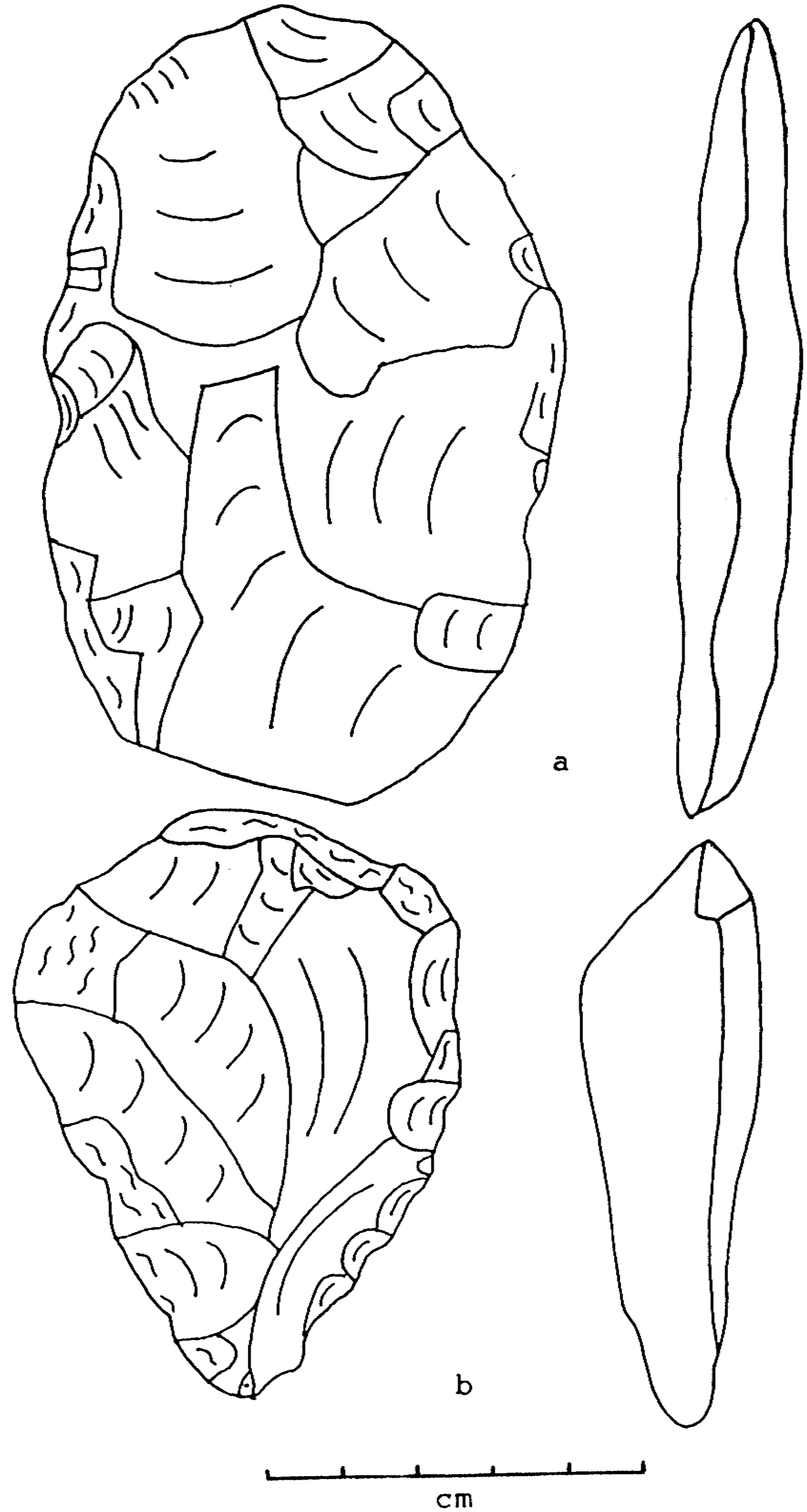


Figure 30: Schram Collection

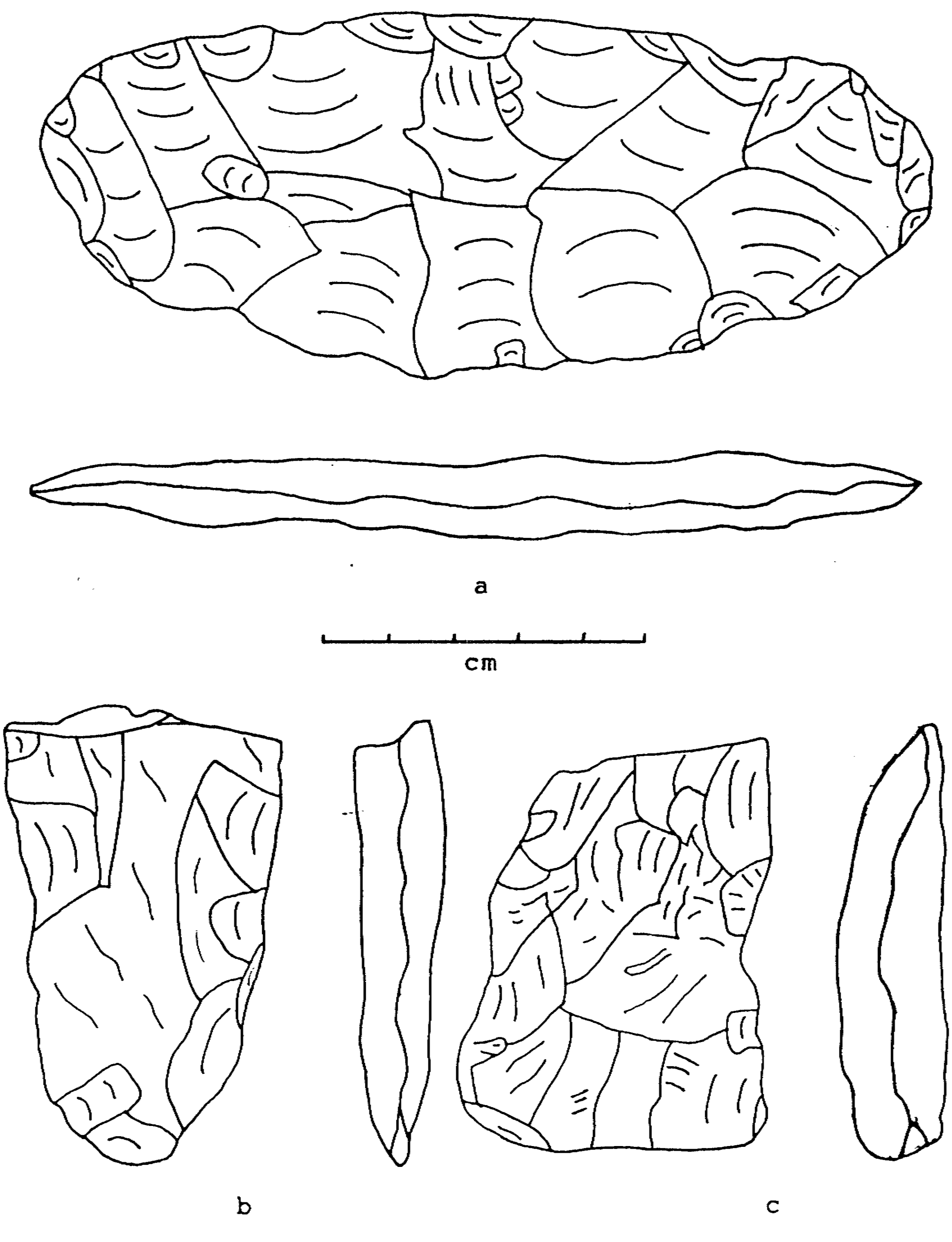


Figure 31: Schram Collection

Scott Collection - owner: Carl Scott, Fort Frances, Ontario.

This collection consists of a single artifact which is unique to the area. It is a large broken biface (Fig. 32), probably of Palaeo-Indian age, of Lake of the Woods rhyolite. The site (DdKi-3), a former Campbell beach ridge, is a gravel pit west of Fort Frances. Four pieces of detritus, all of an unidentified brown chert, were also found. The detritus has been donated to the Fort Frances Museum.

Sharp Collection - owner: Kip Sharp, Stratton, Ontario.

The stemmed projectile point (Fig. 33b) in this collection was found by Mr. Sharp about one meter deep in beach sands at the public beach at Lake of the Woods Provincial Park. This possible Archaic point, heavily waterworn,is made from Lake of the Woods chert. It is similar to an Archaic point found on the Winnipeg River (Steinbring 1980:Fig. 12b) and one from the Petaga Point site in east-central Minnesota (Bleed 1969:Plate 12k).

Williams Collection - owner: Gordon Williams, Stratton, Ontario.

Mr. Williams recovered a biface (Fig. 33a), possibly Archaic, from his garden in the town of Stratton. The site is almost one kilometers south of and below a Campbell beach. The biface, made from Lake of the Woods chert, has

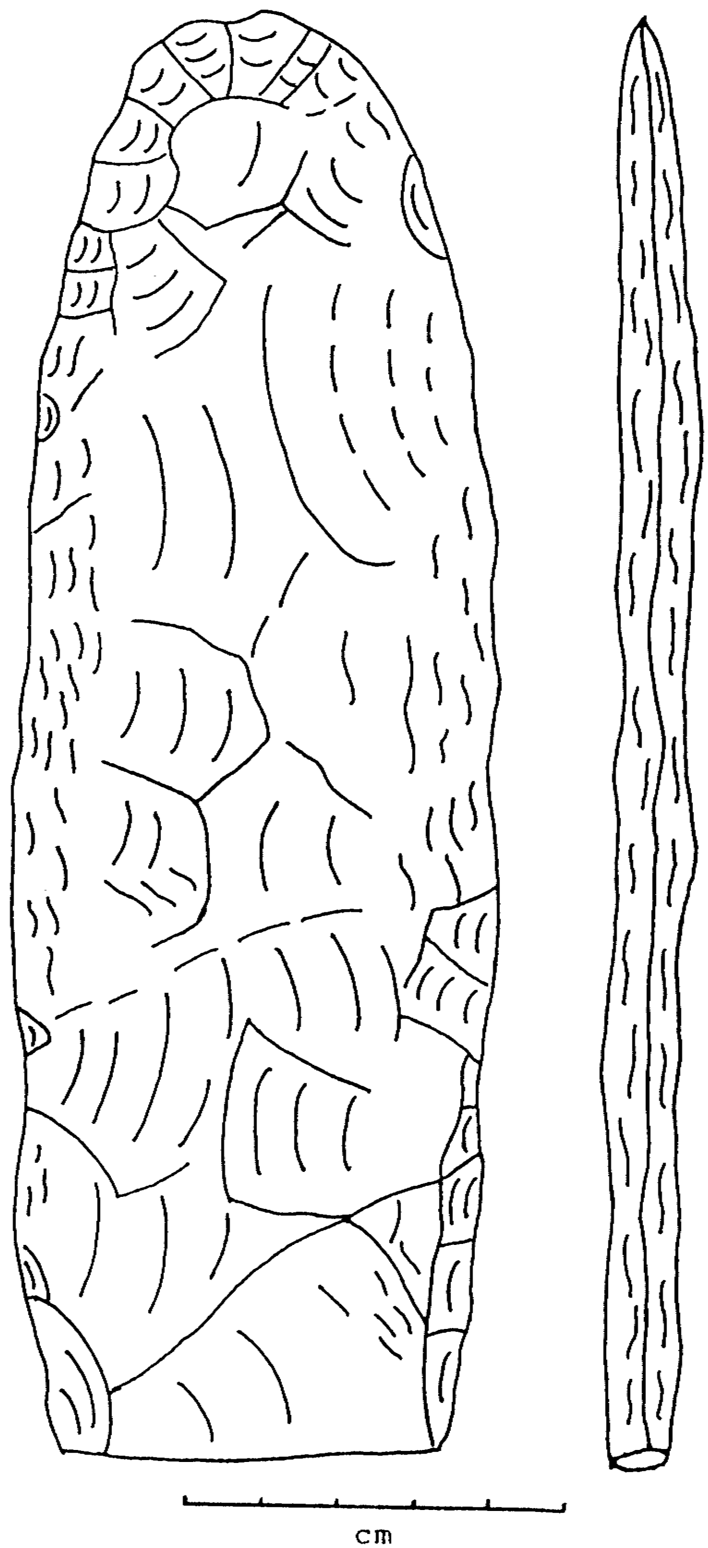


Figure 32: Scott Collection

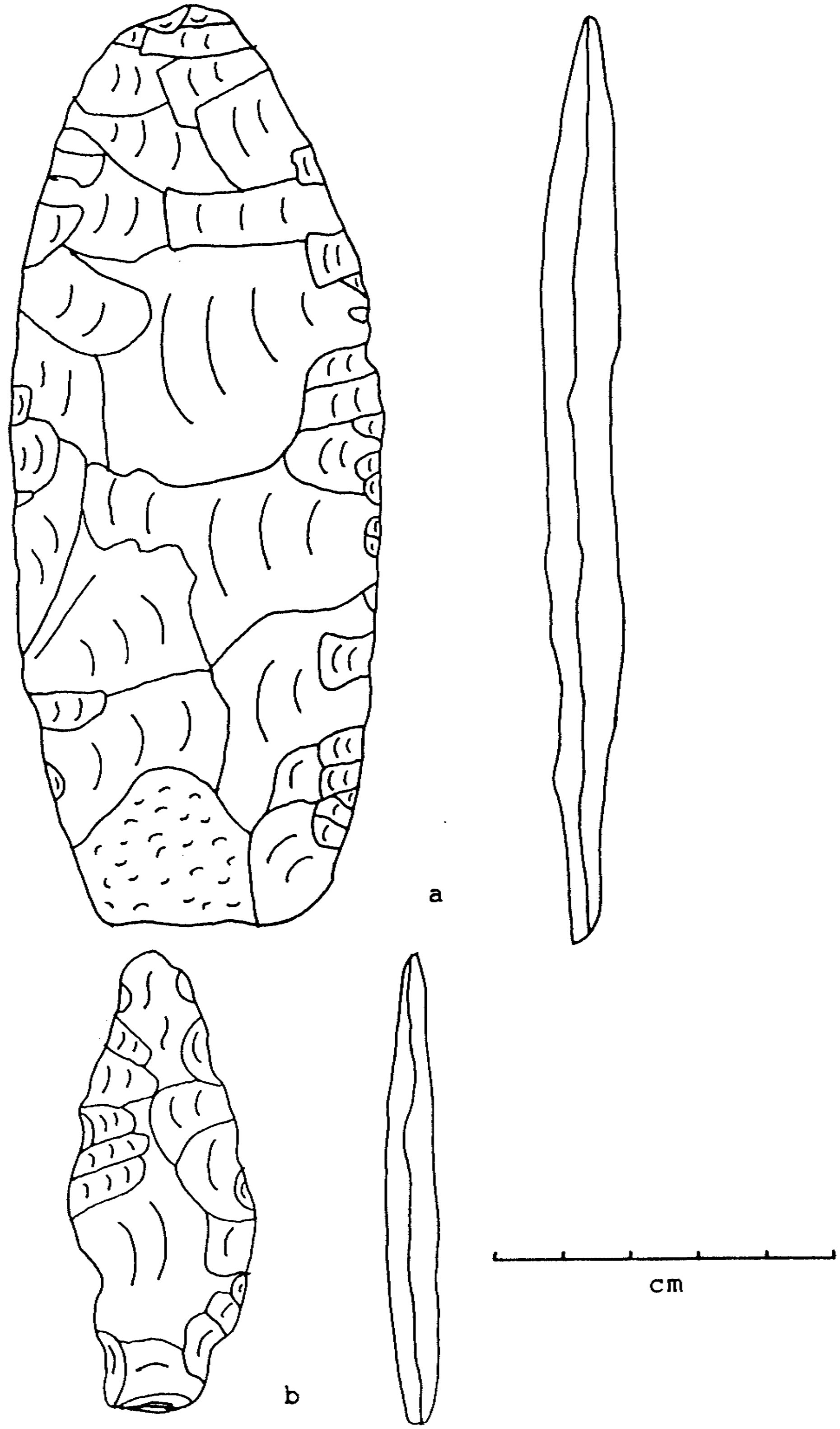


Figure 33: Sharp and Williams Collections

been thermally altered on one side at the basal end. There is also a hinge fracture at the basal end which reduces the original length.

Site Age and Distribution

Of the ten diagnostic Palaeo-Indian projectile points, six were Agate Basin, two Hell Gap, and two Scottsbluff. These points date to 10,000 to 7,000 years ago (Wright 1972a:13). Archaic artifacts (ca. 7,000 to 3,000 B.P.) (Wright 1972a:23) include two side-notched points and five other points and bifaces. Archaeological sites in the Rainy River District dating to the Palaeo-Indian and Archaic periods are small and can often be found near a source of fresh water. While W. Kenyon located most of the Palaeo-Indian material in the Royal Ontario Museum collection east of Emo, three of the four Palaeo-Indian sites reported in this thesis were found west of Emo, as were most of the Archaic and non-diagnostic sites. All of the sites, excluding DeKn-2, were found as surface finds by local collectors, usually farmers working their fields. The Palaeo-Indian and Archaic sites usually had only one or two artifacts.

Of the 17 sites found, nine of them, two being Palaeo-Indian, three Archaic, and four non-diagnostic, are located within the Pinewood River drainage basin. The rest of the sites are scattered throughout the District, with the majority of them being located west of Emo.

Two of the four Palaeo-Indian sites in the study area were located on the Campbell beach level and two below (Table 1). The Scottsbluff point in the Hadley collection and the large biface in the Scott collection were both found on what would have been points of land. DeKn-1, where artifact Fi-1, an Agate Basin point, was found, is located below the Campbell level beside an intermittent stream which flows into the Pinewood River. The Agate Basin point in the Gray collection was also found below the Campbell level, but near a swampy area.

Three of the eight Archaic sites were found above the Campbell level and five below. The sites above the Campbell level vary from being about one to several kilometers from the strandline and there is no source of fresh water within several hundred meters. These are represented by the Berg collection, artifacts Fr-1 from the Friesen collection and GNe-3 from the G. Neilson collection, and GNe-1 from the G. Neilson collection. Of the five sites below the Campbell level, two are on a present-day lake - Lake of the Woods. These sites, represented by the Sharp collection and artifact FFr-1 in Fort Frances Museum collections, contain the only other artifacts besides those from the Schram collection which are waterworn. The sites represented by the Olson and Williams collections, also found below the Campbell level, are inland but within 100 meters of a stream. Only artifact Fi-2 from the Fifield collection was

TABLE 1

Relationships of Sites with the Campbell Level

Collection	Campbell Level	Water Source	Cultural Affiliation
Berg	above	< 100 m	Archaic
Cleve	below	near swamp	non-diagnostic
Fifield			
(Fi-1)	below	> 100 m	Plano
(Fi-2)	below	< 100 m	Archaic
Ft. Frances Museum			
(FFr-1)	below	on Lake of the Woods	Archaic
(DeKn-2)	on	< 100 m	non-diagnostic
Freisen and G. Neilson			
(Fr-1 + GNe-3)	above	< 100 m	Archaic
Gray	below	near swamp	Plano
Hadley	on	> 100 m	Plano
C. Neilson	below	> 100 m	non-diagnostic
G. Neilson			
(GNe-1)	above	< 100 m	Archaic
(GNe-2)	on	< 100 m	non-diagnostic
Olson	below	> 100 m	Archaic
Schram	on	> 100 m	non-diagnostic
Scott	on	> 100 m	Plano
Sharp	below	on Lake of the Woods	Archaic
Williams	below	> 100 m	Archaic

found below the Campbell level and not within 100 meters of water.

Three of the non-diagnostic sites were found on the Campbell level and two below. Of those found on the Campbell level, two are associated with "complex" features, that is, not on a straight segment of beach, and do not have any streams within several hundred meters. Artifacts from the Schram collection were found on what would have been an island, approximately one square kilometer in size during the Campbell phase, while the artifact GNe-2 from the G. Neilson collection was found on what would have been an embayment. Site DeKn-2 in the Fort Frances Museum collection was discovered on what was a straight stretch of beach. The two sites below this level are both near water sources. DeKp-1 (Cleve collection) is near a swampy area and the artifacts from the C. Neilson collection were found within 100 meters of a stream.

Lithic Resources of the Rainy River District

Five different lithic materials are represented by the six Palaeo-Indian artifacts (Table 2). In contrast, there are only two lithic materials represented by the nine Archaic artifacts. Eight of these are made from Lake of the Woods chert, whereas only one of the Palaeo-Indian artifacts are made of this material.

Most of the lithic material must have been imported since raw materials are extremely scarce in the area. Local gravel pits consist primarily of coarse-grained rocks, such as granite, with only occasional cobbles of quartz and even fewer cobbles of chert. Only 8.3% of the artifacts are made of quartz that could have been obtained locally. Most of the imported material comes from the Wabigoon Greenbelt in

TABLE 2

Lithics Utilized According to Cultural Affiliation*

Material	Plano	Archaic	ND	Total
LW chert	1 (4.2)	8 (33.3)	2 (8.3)	11 (45.8)
LW rhyolite	2 (8.3)	- -	32(12.5)	5 (20.8)
quartz	1 (4.2)	- -	1 (4.2)	2 (8.3)
siltstone	- -	- -	2 (8.3)	2 (8.3)
Hixton silicified sandstone	1 (4.2)	- -	- -	1 (4.2)
unidentified chert	1 (4.2)	1 (4.2)	1 (4.2)	3 (12.5)
Total	6 (25.0)	9 (37.5)	9 (37.5)	24 (100.0)

* excluding detritus and Royal Ontario Museum collection
- percentages in brackets
ND = non-diagnostic
LW = Lake of the Woods

the vicinity of Kenora. Among the rocks occurring in this belt are the black-coloured Lake of the Woods chert and the gray/green-coloured Lake of the Woods rhyolite which, at times, are similar in appearance.

In Quetico Provincial Park, about 180 kilometers to the east, artifacts associated with the Palaeo-Indian period have been found which were made from Knife Lake siltstone, a locally occurring material (Fox 1980). Trace element analysis by P. Julig has determined that Knife Lake siltstone and Lake of the Woods chert are similar in composition (G. Rajnovich, personal communication), but they are usually distinct upon visual examination. Lake of the Woods chert tends to be almost black, whereas Knife Lake siltstone is often grey. Artifacts from the study area most closely resemble the Lake of the Woods chert and are therefore assumed to originate from the Kenora area.

Artifact Fi-1, the basal portion of an Agate Basin point, is made from Hixton silicified sandstone. This material was imported from the greatest distance - from Wisconsin.

Chapter VI

DISCUSSION

A Question of Relationships

Links with other areas can be suggested by similar projectile points and the presence of imported materials. This is evident in the Rainy River District where the Palaeo-Indian projectile points are similar to those from nearby and distant areas. Most of the points were made from imported materials.

Several of the crudely made points from the Rainy River District (eg. Fig. 28a and d), are similar to several of the points from the Sinnock site in southeastern Manitoba (eg. Buchner 1981:Plate 6w and x; Buchner 1984b:Plate 4a and h). An Agate Basin point in the Royal Ontario Museum collection (Fig. 28b) resembles one from the Winnipeg River (Steinbring 1980:Fig. 11b). Also, the large ovoid bifaces in the G. Neilson, Schram, and Williams collections are similar to bifaces found along the Winnipeg River (Steinbring 1980:Fig. 19). Many of the artifacts from the Sinnock site are made from rhyolite which ranges in colour from gray to black (Buchner 1984b). This material may be from the same geological formation as the Lake of the Woods rhyolite.

In the Kenora area to the north of the study area, an Agate Basin point (Royal Ontario Museum collection catalogue number 959.44.1) was found which is similar to several of the points from the Rainy River District. However, more convincing evidence of a link with the Kenora area is the presence of Lake of the Woods chert and Lake of the Woods rhyolite which occur there as outcrops and cobbles. Of the diagnostic artifacts from the Rainy River District, 66.6% of them were made from either of these materials (Table 2).

A site of interest, located west of Kenora near the Ontario-Manitoba border, is the Rush Bay Road site. When originally discovered, it was assessed to be between 3,500 and 5,000 years old (Hlady and Kucera 1971). Artifacts consisted primarily of debitage and a few tools, including a biface identified as a large lanceolate projectile point of quartzite. The site has recently been re-investigated and assigned a date of 9,500 B.P., based partially on a radiocarbon date of 8,450±550 B.P. obtained on charcoal (Steinbring 1986; Steinbring and Nielsen 1986). However, this writer finds no reason to extend the date of this site and accepts the radiocarbon date at face value.

In the Thunder Bay area to the east, jasper taconite was a commonly used material for artifact production. None of this material has been found in the study area, although a scraper made from this material was recovered at the Plummer site on the American side of the Rainy River (W. Yourd, personal communication).

Several of the points and bifaces found in the study area resemble artifacts between the study area and Thunder Bay and others in Minnesota. From the South Fowl Lake site, located approximately 250 kilometers east of the study area near the boundary waters, a number of large ovoid bifaces (Platcek 1965:Plate 16) were recovered which are similar to bifaces from the G. Neilson, Schram, and Williams collections. This site contains artifacts from the Palaeo-Indian, Archaic, and Woodland periods. The crudely made points in the Royal Ontario Museum collection (Fig. 28a and d) resemble a point found near Thunder Bay (Fox 1980:Fig. 2a, 3a). Three points from the study area (Figs. 29a, 29b, and 24c) are similar to points from east-central Minnesota (Cain 1969:Fig. 1a; Steinbring 1974:Fig. 2I and 2A, respectively).

The basal portion of the Agate Basin projectile point made from Hixton silicified sandstone in the Fifield collection (Fig. 23c) closely resembles the point depicted in the report on the Flambeau Phase in northern Wisconsin (Salzer 1974:Fig. 1). That point is also made from Hixton silicified sandstone. This material, which originates from Wisconsin, has been found to a limited extent in other parts of Northwestern Ontario (Arthurs 1987). These other finds include: a biface fragment and flake from the Cummins site in Thunder Bay; a Scottsbluff-like point northwest of Thunder Bay; and an Agate Basin-like point, a large retouched flake, and two small flake fragments from sites in Quetico Provincial Park, 180 kilometers east of the study area.

Due to the numerous links with other areas, it is difficult to state with certainty the origin of these people. However, it is possible to attempt to estimate when they first entered the area. Projectile points found here resemble other points which are known to date between 10,000 and 7,000 years ago. Two of the Palaeo-Indian sites are located on Campbell strandlines as are three non-diagnostic sites, one having water worn artifacts, also on this level. Therefore, it is proposed that people first moved into this area during the latter part of the Emerson phase of Lake Agassiz about 9,500 years ago. This was either prior to or shortly after the recession of the lake from the Campbell level. The Archaic artifacts represent a later period of intermittent occupation between 7,000 and 3,000 years ago.

The Environmental Setting After Lake Agassiz

By 9,500 B.P., Lake Agassiz had begun to recede below the Campbell level and much of the study area was no longer under water. The Agassiz shoreline was still above the present-day level of Lake of the Woods, and occurred only in the northwestern portion of the Rainy River District.

The predominantly spruce forest had been replaced by a pine and deciduous forest. It consisted of pine, spruce, cedar, larch, birch, poplar, ash, oak, and elm, and shrubs such as willow and alder, as well as herbs such as grasses, sage, ragweed, and asters. This assemblage is similar to the forest that exists today.

Although only one antler fragment from a moose which dates to around 9,500 B.P. has been found in the study area, the fauna was probably similar to what is present today. This includes bear, moose, beaver, otter, and hare, with the addition of caribou which is now extinct in the area.

Summary

The Rainy River District was first inhabited by Palaeo-Indians and although their origins are uncertain, links with surrounding and distant areas are suggested by similar projectile points and imported lithic materials. Although most of the artifacts dating to the Archaic time period were made from Lake of the Woods chert, Palaeo-Indian artifacts were made from a wider variety of materials, including Lake of the Woods chert, Lake of the Woods rhyolite, quartz, and Hixton silicified sandstone. The latter is the only exotic material which was imported from several hundred kilometers.

The sites, often found near fresh water sources, are small and typically consist of only a few artifacts. Palaeo-Indian sites were located both on and below the Campbell beach level, but never above it. Although the evidence is weak, due to such a small sample size, it is possible to suggest that the Palaeo-Indians entered the Rainy River District, slightly before or after the recession of Lake Agassiz from the Campbell level, about 9,500 years ago. In addition to the Palaeo-Indian sites, there are the three non-diagnostic sites located on the Campbell strandline, one with water worn artifacts, which adds credence to this hypothesis.

There are several reasons why the Palaeo-Indians would chose to settle along the Lake Agassiz shoreline. Although no evidence has been found to suggest that these people fished, this was a food source that most certainly was available to them. Also, since animals would use the shorelines as a migratory route, it was an excellent location for hunting. The people would also have used the shoreline as a migratory route from one site to another. With only one or two artifacts found at any of the Palaeo-Indian sites, it is difficult, if not impossible, to determine what activities occurred at the site.

Future geomorphic research in the study area could involve a more detailed examination of the strandline features and their relationship to other features, such as bedrock outcrops. Archaeological research could concentrate on examining the often deep deposits of gravel and peat. Although this type of research would be expensive and time consuming, it may result in significant finds, such as the worked antler fragment and stone tool found in gravel deposits about four meters beneath the ground surface at Morson (Kenyon and Churcher 1965), the bison remains found in a peat deposit near Kenora (McAndrews 1982), and the bison kill site found in the peat deposit at Itasca, Minnesota (Shay 1971).

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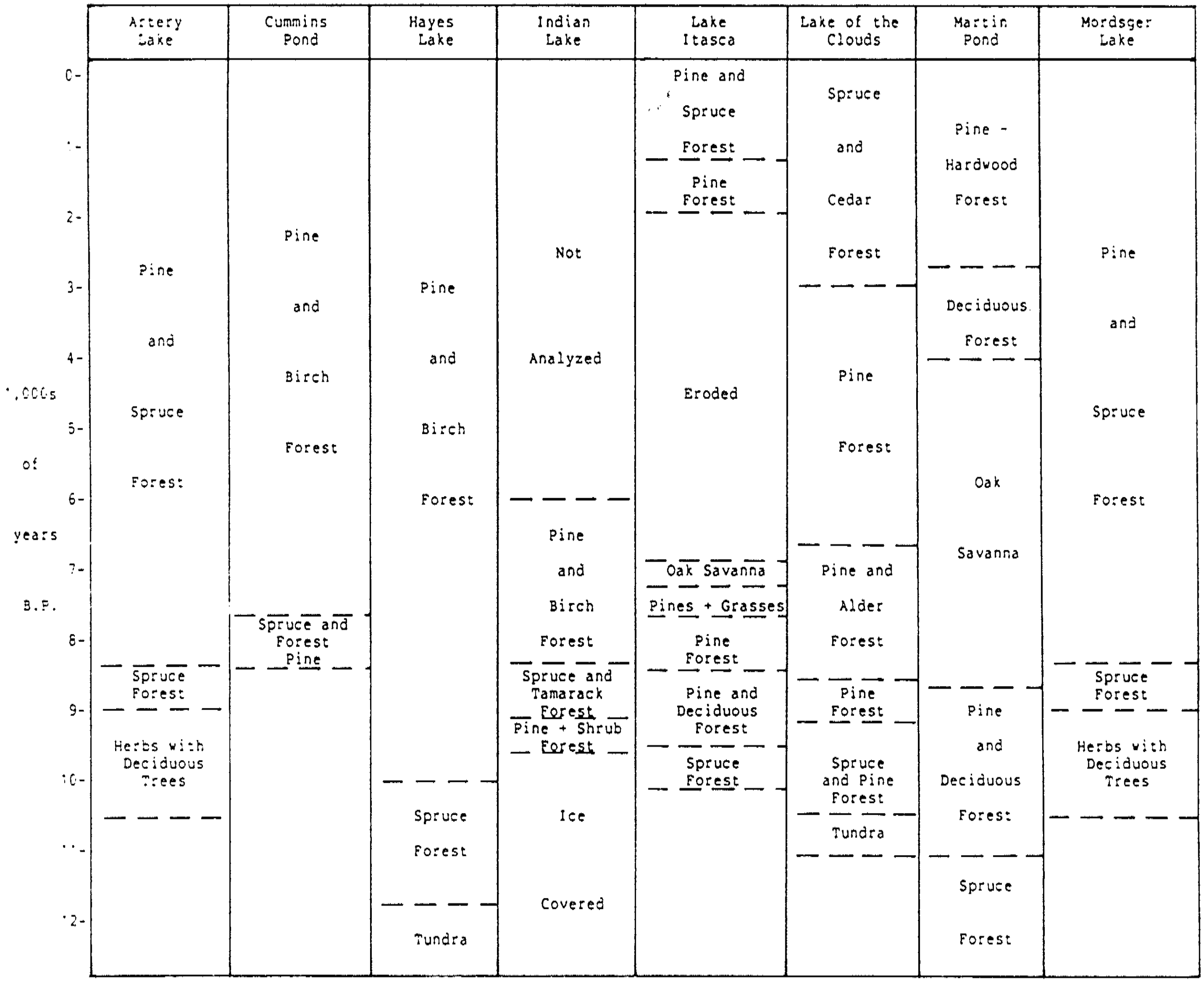
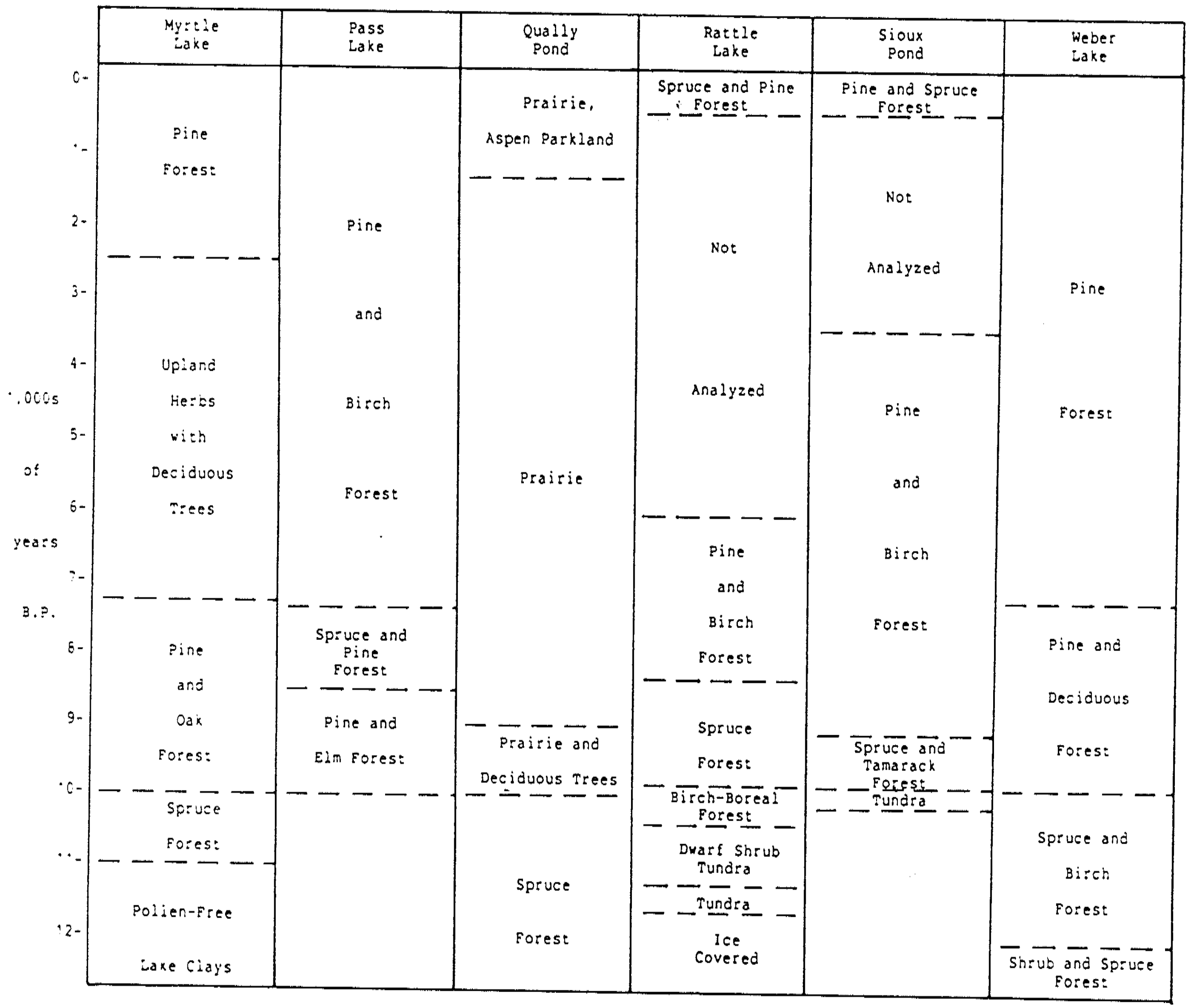
Appendix A

SUMMARY OF POLLEN CORE SITES



Artery Lake
Cummins Pond
Hayes Lake
Indian Lake
Lake Itasca
Lake of the Clouds
Martin Pond
Mordsger Lake
1,000s of years B.P.
0-
1-
2-
3-
4-
5-
6-
7-
8-
9-
10-
11-
12-
Pine and Spruce Forest
Spruce Forest
Herbs with Deciduous Trees
Pine and Birch Forest
Spruce and Forest Pine
Pine and Birch Forest
Spruce Forest
Tundra
Not Analyzed
Pine and Birch Forest
Spruce and Tamarack Forest
Pine + Shrub Forest
Ice Covered
Pine and Spruce Forest
Pine Forest
Eroded
Oak Savanna
Pines + Grasses
Pine Forest
Pine and Deciduous Forest
Spruce Forest
Spruce and Cedar Forest
Pine Forest
Pine and Alder Forest
Pine Forest
Spruce and Pine Forest
Tundra
Pine - Hardwood Forest
Deciduous Forest
Oak Savanna
Pine and Deciduous Forest
Spruce Forest
Pine and Spruce Forest
Spruce Forest
Herbs with Deciduous Trees


Myrtle Lake
Pass Lake
Qually Pond
Rattle Lake
Sioux Pond
Weber Lake
0-
2-
3-
4-
5-
6-
8-
9-
12-
.000s
of
years
B.P.
Pine Forest
Upland Herbs with Deciduous Trees
Pine and Oak Forest
Spruce Forest
Pollen-Free Lake Clays
Pine and Birch Forest
Spruce and Pine Forest
Pine and Elm Forest
Prairie, Aspen Parkland
Prairie
Prairie and Deciduous Trees
Spruce Forest
Spruce and Pine Forest
Not Analyzed
Pine and Birch Forest
Spruce Forest
Birch-Boreal Forest
Dwarf Shrub Tundra
Tundra
Ice Covered
Pine and Spruce Forest
Not Analyzed
Pine and Birch Forest
Spruce and Tamarack Forest
Tundra
Pine Forest
Pine and Deciduous Forest
Spruce and Birch Forest
Shrub and Spruce Forest

Appendix B

MEASUREMENTS OF ARTIFACTS MENTIONED IN THE TEXT

Berg Collection

catalogue number - Be-1

artifact - stemmed biface (knife ?) (Fig. 23a)

raw material - Lake of the Woods chert

condition - complete

length - 117 mm

width - 44 mm

thickness - 10 mm

stem length - 23 mm

stem width (narrowest) - 21 mm

stem width (flare) - 25 mm

Cleve Collection

catalogue number - Cl-1

artifact - preform (Fig. 23b)

raw material - Lake of the Woods rhyolite

condition - complete

length - 127 mm

width - 29 mm

thickness - 12 mm

Fifield Collection

catalogue number - Fi-1

artifact - Agate Basin projectile point (Fig. 23c)

raw material - Hixton silicified sandstone

condition - basal portion

length - 80 mm

width - 32 mm

thickness - 8 mm

catalogue number - Fi-2

artifact - Archaic side-notched projectile point (Fig. 23d)

raw material - Lake of the Woods chert

condition - tip broken off

length - 55 mm

width - 26 mm

thickness - 8 mm

notch width - 19 mm

Fort Frances Museum Collection

catalogue number - FFr-1

artifact - projectile point (Fig. 24a)

raw material - Lake of the Woods chert

condition - complete

length - 96 mm

width - 21 mm

thickness - 9 mm

Friesen Collection

catalogue number - Fr-1

artifact - core/possible chopper (Fig. 25)

raw material - Lake of the Woods chert

condition - complete

length - 197 mm

width - 111 mm

thickness - 33 mm

Gray Collection

catalogue number - Gr-1

artifact - Agate Basin projectile point (Fig. 24b)

raw material - quartz

condition - complete

length - 98 mm

width - 28 mm

thickness - 10 mm

Hadley Collection

catalogue collection - Ha-1

artifact - Scottsbluff projectile point (Fig. 24c)

raw material - Lake of the Woods rhyolite

condition - complete

length - 81 mm

width - 27 mm

thickness - 7 mm

stem length - 19 mm

stem width - 21 mm

catalogue number - Ha-2

artifact - bifacially worked scraper (Fig. 24d)

raw material - unidentified chert

condition - complete

length - 56 mm

width - 31 mm

thickness - 11 mm

McNabb Collection

catalogue number - Mc-1

artifact - Scottsbluff projectile point (Fig. 26a)

raw material - Lake of the Woods chert

condition - basal portion

length - 64 mm

width - 35 mm

thickness - 18 mm

stem length - 15 mm

stem width - 20 mm

catalogue number - Mc-2

artifact - projectile point (Fig. 26b)

raw material -Lake of the Woods rhyolite

condition - basal half absent

length - 70 mm

width - 33 mm

thickness - 19 mm

C. Neilsen Collection

catalogue number - CNe-1

artifact - drill (Fig. 26c)

raw material - Swan River (?) chert

condition - basal portion

length - 32 mm

width - 26 mm

thickness - 15 mm

Also recovered at this site were 54 pieces of debitage, 43 of which were surface collected. Their maximum dimensions fell into the following groupings:

Size	Number	Per Cent
0.1 - 1.0 cm	5	9.3
1.1 - 2.0 cm	23	42.6
2.1 - 3.0 cm	13	24.1
3.1 - 4.0 cm	6	11.1
4.1 - 5.0 cm	2	3.7
5.1 - 6.0 cm	0	0.0
6.1 + cm	5	9.3
Total	54	100.1

G. Neilsen Collection

catalogue number - GNe-1

artifact - biface (Fig. 27a)

raw material - Lake of the Woods chert

condition - tip broken off

length - 123 mm

width - 38 mm

thickness - 8 mm

catalogue number - GNe-2

artifact - projectile point (Fig. 26d)

raw material - quartz

condition - tip only

length - 35 mm

width - 14 mm

thickness - 8 mm

catalogue number - Gne-3

artifact - Archaic side-notched projectile point (Fig. 27b)

raw material - unidentified brown chert

condition - complete

length - 54 mm

width - 35 mm

thickness - 7 mm

notch width - 28 mm

Olson Collecttion

catalogue number - Ol-1

artifact - Alberta-like projectile point (Fig. 27c)

raw material - Lake of the Woods chert

condition - complete

length - 79 mm

width - 32 mm

thickness - 7 mm

stem length - 27 mm

stem width - 23 mm

Royal Ontario Museum Collection

ROM catalogue number - 958.262.1

cast number - C-362

artifact - Agate Basin style projectile point (Fig. 28a)

raw material - rhyolite

condition - complete

length - 105 mm

width - 24 mm

thickness - 7 mm

ROM catalogue number - 958.196.5

cast number - C-366

artifact - Hell Gap projectile point (Fig. 28c)

raw material - rhyolite

condition - tip broken

length - 60 mm

width - 27 mm

thickness - 9 mm

ROM catalogue number - 964.205.2

cast number - C-372

artifact - Agate Basin projectile point (Fig. 28b)

raw material - unidentified

condition - complete

length - 72 mm

width - 26 mm

thickness - 12 mm

ROM catalogue number - 962.125.1

cast number - C-370

artifact - Agate Basin projectile point (Fig. 28d)

raw material - sandstone (silica-rich)

condition - complete

length - 98 mm

width - 26 mm

thickness - 8 mm

ROM catalogue number - 962.125.2

cast number - C-368

artifact - Agate Basin projectile point (Fig. 29a)

raw material - possible chert

condition - complete

length - 75 mm

width - 24 mm

thickness - 10 mm

ROM catalogue number - 967.242.8

cast number - C-376

artifact - Hell Gap projectile point (Fig. 29b)

raw material - sandstone (silica-rich)

condition - complete

length - 64 mm

width - 24 mm

thickness - 9 mm

ROM catalogue number - 964.206

cast number - C-374

artifact - lanceolate point (Fig. 29d)

raw material - unidentified

condition - complete

length - 102 mm

width - 31 mm

thickness - 11 mm

ROM catalogue number - 959.44.1

cast number - C-364

artifact - Agate Basin projectile point (Fig. 29c)

raw material - unidentified

condition - complete

length - 84 mm

width - 24 mm

thickness - 6 mm

Schram Collection

catalogue number - Sch-1

artifact - biface (Fig. 30a)

raw material - Lake of the Woods chert

condition - complete, waterworn

length - 102 mm

width - 68 mm

thickness - 15 mm

catalogue number - Sch-2

artifact - biface (Fig. 31a)

raw material - Lake of the Woods chert

condition - complete

length - 135 mm

width - 55 mm

thickness - 15 mm

catalogue number - Sch-3

artifact - scraper (Fig. 30b)

raw material - siltstone (?)

condition - proximal end broken, slightly waterworn

length - 76 mm

width - 58 mm

thickness - 21 mm

catalogue number - Sch-4

artifact - preform (Fig. 31b)

raw material - Lake of the Woods rhyolite

condition - broken at mid section

length - 68 mm

width - 42 mm

thickness - 12 mm

catalogue number - Sch-5

artifact - preform (Fig. 31c)

raw material - siltstone (?)

condition - broken

length - 62 mm

width - 47 mm

thickness - 16 mm

Scott Collection

catalogue number - Sco-1

artifact - biface (Fig. 32)

raw material - Lake of the Woods rhyolite

condition - broken near mid section

length - 191 mm

width - 62 mm

thickness - 12 mm

Sharp Collection

catalogue number - Sh-1

artifact - projectile point (Fig. 33b)

raw material - Lake of the Woods chert

condition - one shoulder broken

length - 66 mm

width - 26 mm

thickness - 6 mm

stem length - 10 mm

stem width - 14 mm

Williams Collection

catalogue number - Wi-1

artifact - biface (Fig. 33a)

raw material - Lake of the Woods chert

condition - hinge fracture at basal end, thermally removed flake

length - 135 mm

width - 53 mm

thickness - 11 mm

Appendix C

WOODLAND AND NON-DIAGNOSTIC COLLECTIONS

Locations of the following sites are shown in Figure 34.

Allan Collection - owner: Terry Allan, Emo, Ontario.

This collection consists of five scrapers and a large biface. Originally, Mr. Allan had several Late Woodland projectile points in his collection but they were stolen. The artifacts were recovered on his land near Lyon Creek.

catalogue number - Al-1
artifact - biface
raw material - orange quartzite/chert
condition - complete
length - 181 mm
width - 49 mm
thickness - 17 mm

catalogue number - Al-2
artifact - scraper
condition - complete
raw material - grey chert
length - 58 mm
width - 34 mm
thickness - 7 mm

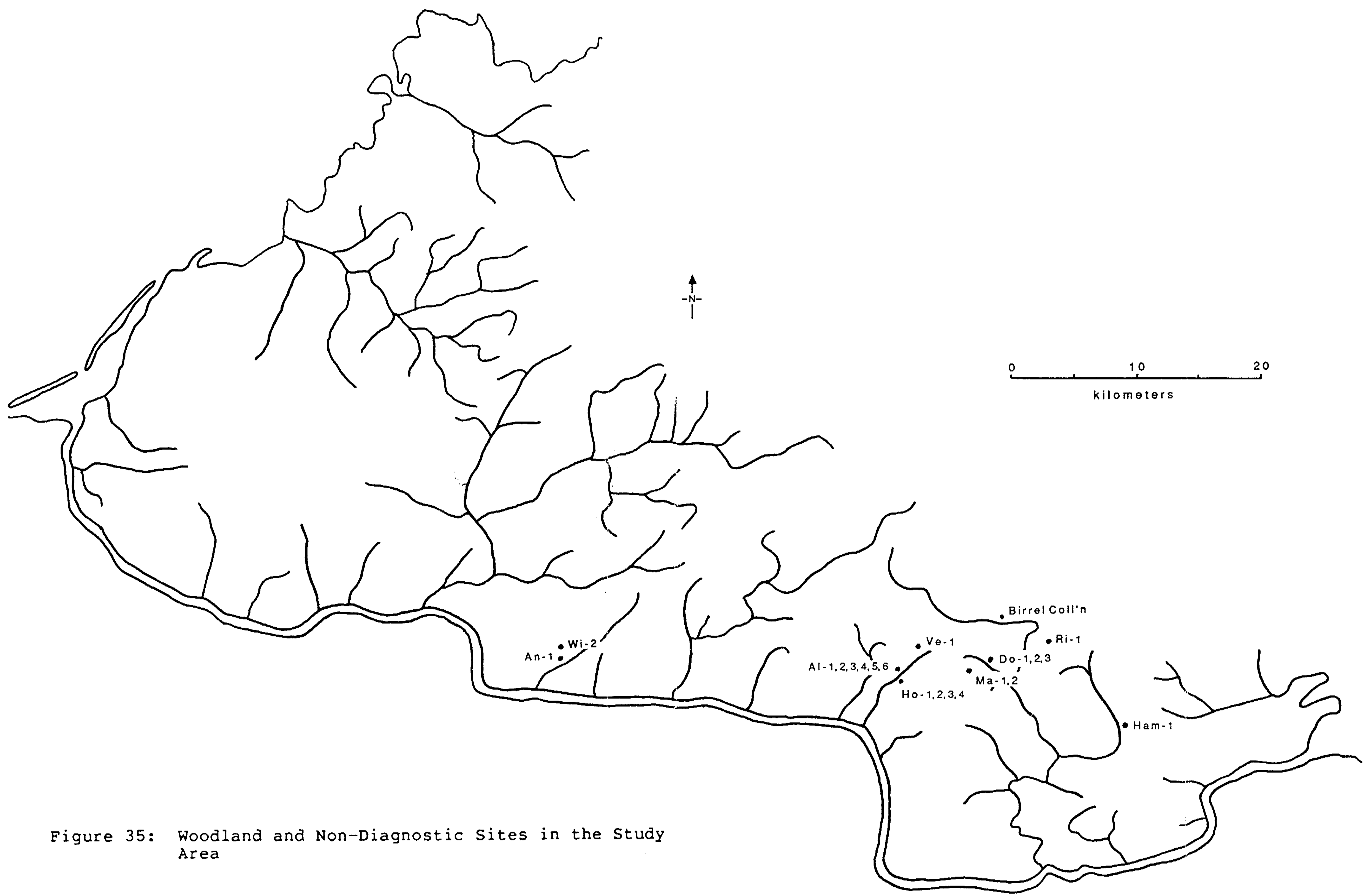


Figure 35: Woodland and Non-Diagnostic Sites in the Study Area

catalogue number - Al-3

artifact - scraper

condition - broken

raw material - grey chert

length - 25 mm

width - 26 mm

thickness - 5 mm

catalogue number - Al-4

artifact - scraper

raw material - Gunflint silica

condition - complete

length - 21 mm

width - 21 mm

thickness - 17 mm

catalogue number - Al-5

artifact - scraper

raw material - Gunflint silica

condition - broken on side

length - 23 mm

width - 18 mm

thickness - 17 mm

catalogue number - Al-6

artifact - scraper

raw material - Gunflint silica

condition - complete

length - 49 mm

width - 27 mm

thickness - 14 mm

<u>Anderson Collection</u> - owner: Alec Anderson, Stratton, Ontario.

This collection consists of one Late Woodland projectile point of a brown chert. The point was found on Mr. Anderson's property, approximately one kilometers south of Stratton.

catalogue number - An-1

artifact - Late Woodland projectile point

raw material - brown chert

condition - tip broken off

length - 34 mm

width - 22 mm

thickness - 8 mm

notch width - 17 mm

<u>Birrel Collection</u> - owner: Fort Frances Museum, Fort Frances, Ontario.

This collection consists of four pieces of debitage of grey chert recovered by this writer from shovel test pits on Mr. William Birrel's property, site DeKk-1, located about eight kilometers north of Devlin. Using a five meter interval, 42 shovel test pits were dug, three of which were positive. Mr. Birrel informed this writer that he had recovered about "two handfuls" of flakes and a spear point which was "about 5,000 years old," according to Dr. W. Kenyon of the Royal Ontario Museum to whom it was donated. These artifacts were all recovered from a limited area, which corresponded to where the debitage was recovered from the shovel test pits. The site is located on a small ridge, above the Campbell level, in a clearing north of the La Vallee River.

Donaldson Collection - owner: Gale Donaldson, Emo, Ontario.

On the northeast bank of a tributary of the La Vallee River, Mr. Donaldson has recovered several artifacts. These include a Late Woodland projectile point of Selkirk (?) chert, a bifacially-worked scraper, a unifacially-worked scraper, and three flakes, one of rhyolite and two of an unidentified chert.

catalogue number - Do-1
artifact - Late Woodland projectile point (Fig. 35b)
raw material - Selkirk (?) chert
condition - complete
length - 29 mm
width - 18 mm
thickness - 5 mm
notch thickness - 11 mm

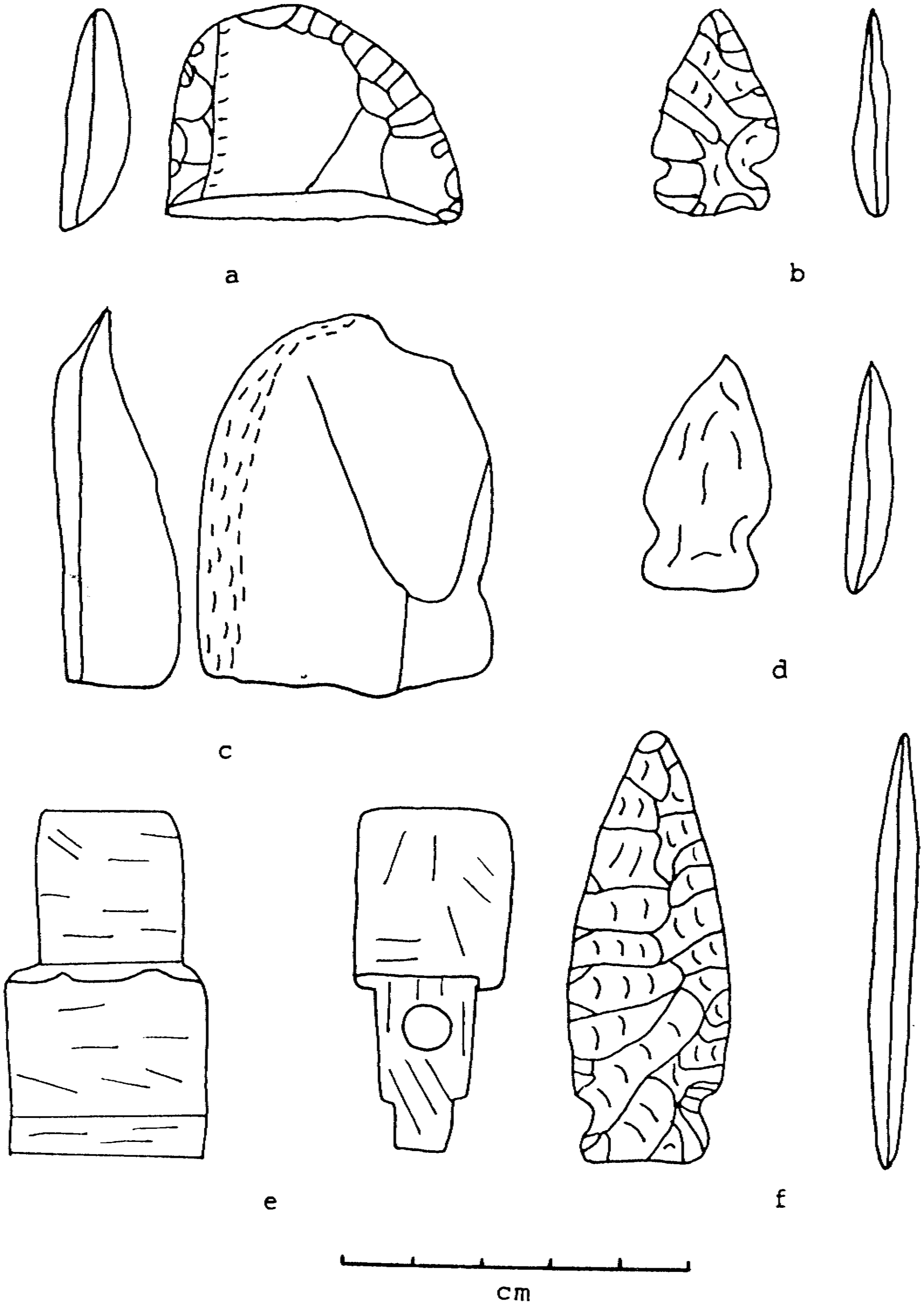


Figure 35: Donaldson and Holland Collections

catalogue number - Do-2

artifact - bifacially-worked scraper (Fig. 35a)

raw material - siltstone

condition - broken

length - 29 mm

width - 41 mm

thickness - 8 mm

catalogue number - Do-3

artifact - scraper (Fig. 35c)

raw material - siltstone

condition - broken

length - 54 mm

width - 43 mm

thickness - 15 mm

Hammond Collection - owner: Fort Frances Collection, Fort Frances, Ontario.

The single biface in this collection is heavily pot-lidded and has likely undergone a partial colour change due to heating. It was found in a garden, site DdKj-3, beside a small creek. It has been donated to the Fort Frances Museum by Mr. and Mrs. Don Hammond.

catalogue number - Ham-1

artifact - biface

raw material - grey chert

condition - broken, heavily pot-lidded

length - 78 mm

width - 48 mm

thickness - 11 mm

<u>Holland Collection</u> - owner: Phillip Holland, Emo, Ontario.

The artifacts in this collection were found in various areas of Mr. Holland's property, located approximately four kilometers northeast of Emo. The artifacts consist of a side notched Archaic/Woodland projectile point, a Late Woodland projectile point, a large biface, and a complete steatite pipe.

catalogue number - Ho-1

artifact - side-notched Archaic/Woodland projectile point (Fig. 35f)

raw material - white chert

condition - complete

length - 61 mm

width - 23 mm

thickness - 6 mm

notch width - 14 mm

catalogue number - Ho-2

artifact - Late Woodland projectile point (Fig. 35d)

raw material - orange quartzite (?)

condition - complete

length - 33 mm

width - 17 mm

thickness - 6 mm

notch width - 12 mm

catalogue number - Ho-3

artifact - biface (Fig. 36)

raw material - siltstone/chert (?)

condition - complete

length - 12.7 mm

width - 62 mm

catalogue number - Ho-4

artifact - pipe (Fig. 35e)

raw material - steatite

length - 28 mm

height - 48 mm

width - 21 mm

bowl orifice - 16 mm

stem orifice - 7 mm

Mattson Collection - owner: Art Mattson, Emo, Ontario.

Mr. Mattson has found a maul and a scraper at separate locales on his property, located about seven kilometers northeast of Emo.

catalogue number - Ma-1

artifact - maul (Fig. 37a)

raw material - granitic-type rock

condition - complete

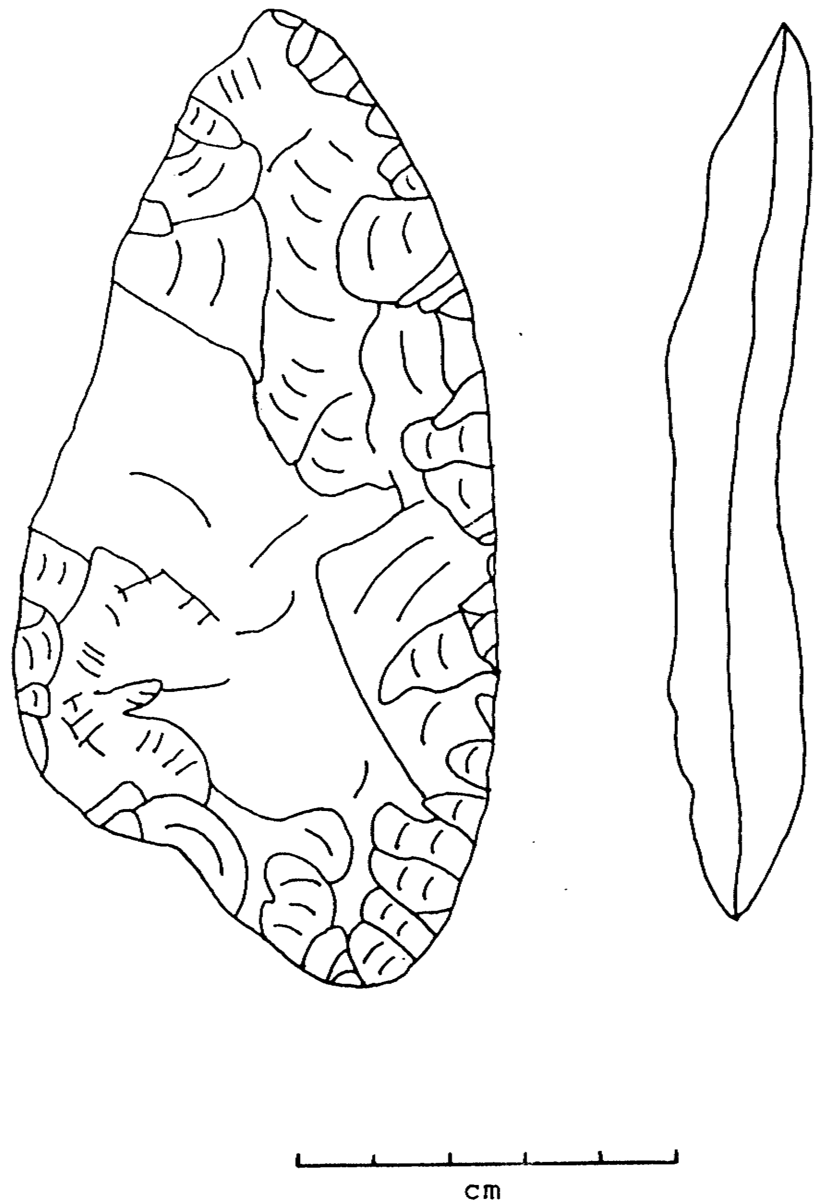


Figure 36: Holland Collection

length - 96 mm

width - 74 mm

thickness - 50 mm

catalogue number - Ma-2

artifact - scraper (Fig. 37b)

raw material - siltstone

condition - complete

length - 63 mm

width - 32 mm

thickness - 8 mm

<u>McNabb Collection</u> - owner: Mr. and Mrs. Don McNabb, Stratton, Ontario.

This collection consists of a single Late Woodland projectile point of a light grey chert. The original provenience of it is uncertain, although it is from the Stratton area.

catalogue number - McN-1

artifact - Late Woodland projectile point (Fig. 37c)

raw material - light grey chert

condition - complete

length - 34 mm

width - 15 mm

thickness - 7 mm

notch width - 11 mm

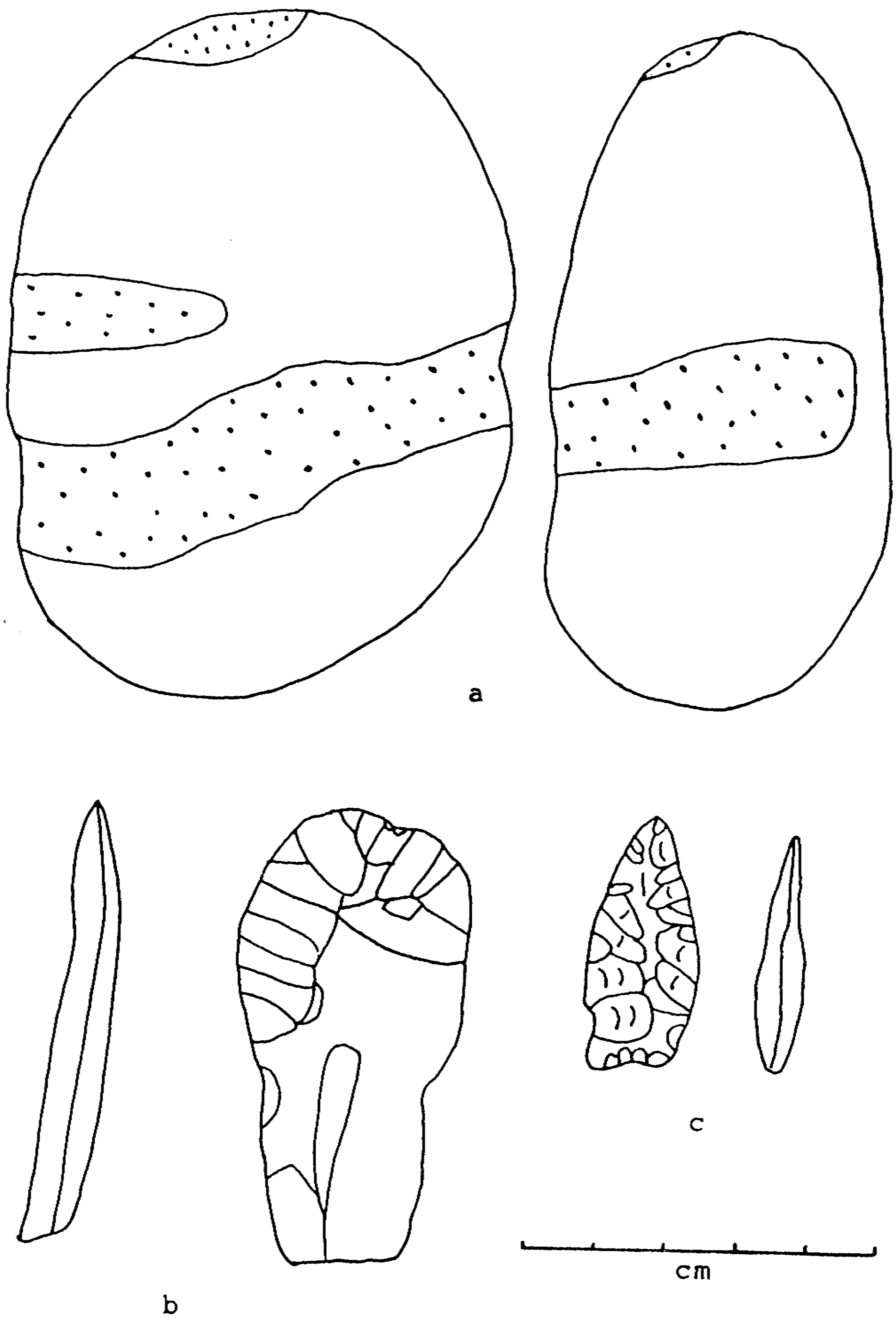


Figure 37: Mattson and McNabb Collection

<u>Olson Collection</u> - owner: T. Olson, Terrace, British Columbia.

In addition to the Alberta-like projectile point (Ol-1) in this collection, there is also an L-shaped steatite pipe (Fig. 38c) which was given to the grandfather of the owner by a former chief of the Big Grassy Reserve. Its origins are unknown.

catalogue number - Ol-2
artifact - pipe (Fig. 38c)
raw material - steatite
condition - complete
stem length - 40 mm
stem height - 17 mm
stem width - 17 mm
bowl height - 33 mm
bowl width - 19 mm
bowl thickness - 17 mm

<u>Rittau Collection</u> - owner: Mrs. Rittau, Burris Township, Ontario.

This collection consists of a biface of Knife River flint, a large translucent white chert flake, and two pieces of debitage of pinkish-white chert. All the artifacts were found on the Rittau property, nine km north of the town of La Vallee.

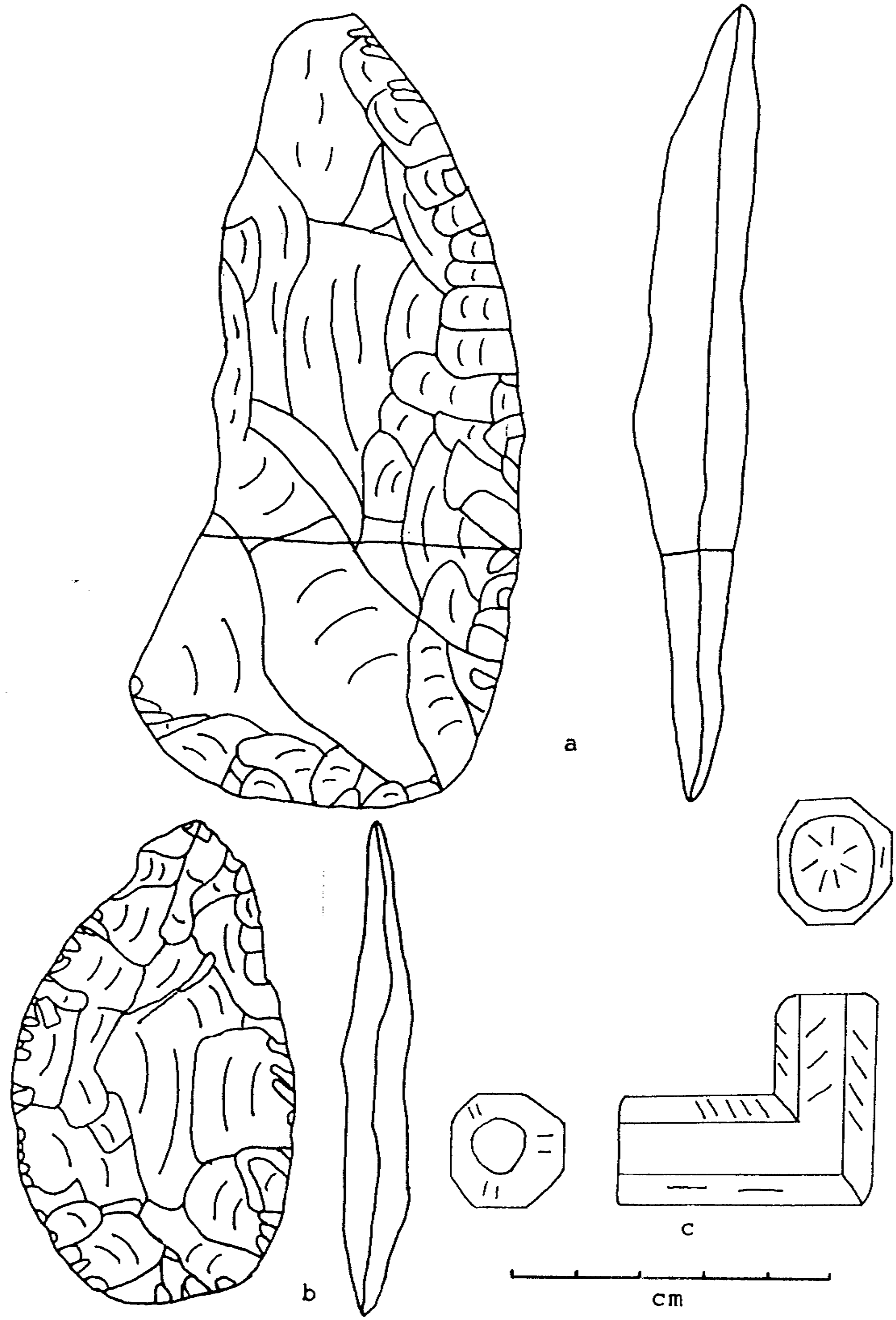


Figure 38: Olson, Rittau, and Veldhuisen Collection

catalogue number - Ri-1

artifact - biface (Fig. 38b)

raw material - Knife River flint

condition - complete

length - 74 mm

width - 43 mm

thickness - 10 mm

<u>Veldhuisen</u> <u>Collection</u> - owner: Nick Veldhuisen, Emo, Ontario.

The single artifact in this collection is a broken biface of Knife River flint. There are several pot-lids on it. It was found in a plowed field on Mr. Veldhuisen's property, north of Lyon Creek.

catalogue number - Ve-1

artifact - biface (Fig. 38a)

raw material - Knife River flint

condition - broken

length - 121 mm

width - 56 mm

thickness - 23 mm

Williams Collection - owner: Gordon Williams, Stratton, Ontario.

In addition to the biface (Wi-1) in this collection, there is also a maul (Fig. 39) made from an unidentified material, possibly steatite. This artifact, produced by grinding and having no indications of use wear, is flattened at one end and rounded at the other. It was found in the garden of the owner.

catalogue number - Wi-2

artifact - maul (Fig. 39)

raw material - steatite (?)

condition - complete

length - 144 mm

width - 56 mm

thickness - 43 mm

notch width - 49 mm

notch thickness - 32 mm

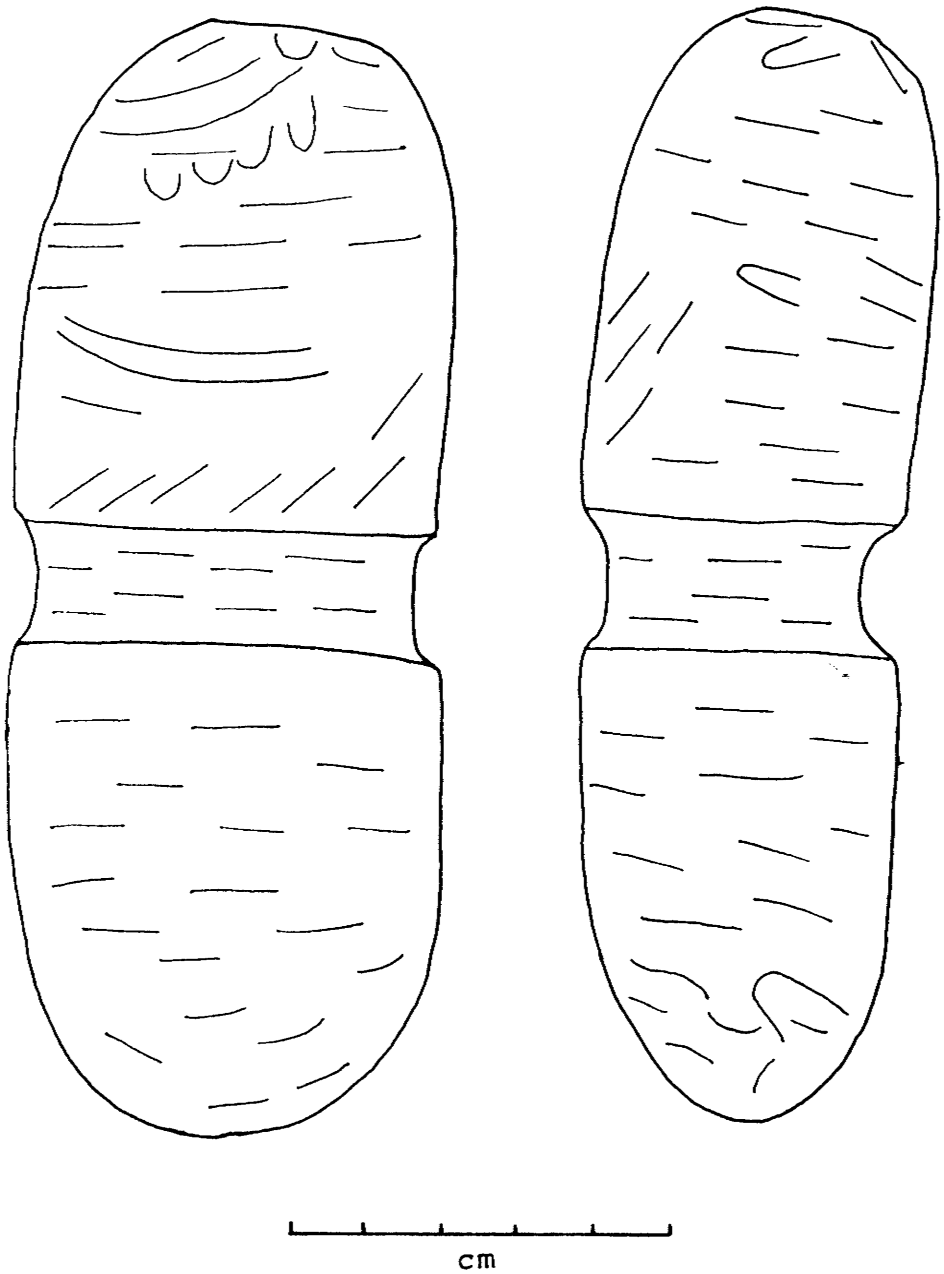


Figure 39: Williams Collection