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THE SALT-MAKERS OF MANITOBA:
A STUDY OF THE USE OF THE NATURAL SALINE DEPOSITS

by

VIRGINIA PHYLLIS PETCH

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ABSTRACT

The objective of study in archaeology was to examine the saline springs and salt flats within the Manitoba Lowlands Saline Waterbelt as a resource for salt production. Field and archival data identified four groups of people who used the saline springs to make salt: the prehistoric Natives; the early fur traders and explorers; the Metis and the early industrialists. Although archaeological evidence for prehistoric salt-making was weak, the historic record demonstrates knowledge and use of salt.

Acknowledgements

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CHAPTER I

INTRODUCTION

The Need for Salt

Salt has played a very important role in human history. In fact, no substance other than water, has been used as regularly as salt (Gilmore 1955). Its popularity as a condiment and agent in "...cleaning, bleaching, dyeing, degreasing, dehairing and softening leather..." (Multhauf 1978:3) are but two examples of its many uses (Lovejoy 1986; La Belle 1979).

G. Bunge, the German physiologist, first studied the physiological necessity of salt in 1902 (Multhauf 1978). He conducted a series of experiments in order to determine why humans needed salt if carnivores did not. Using anthropological studies, he concluded that herbivores required salt to maintain an electrolyte balance and suggested that man's desire for salt came when he switched from hunting to the domestication of plants.

Sullivan (1981:404) has recently identified "the...shift to heightened plant selection and utilization..." as a reason for the purposeful inclusion of salt into the diet and concurs with scholars such as Messer(1984) and Neumann(1977) regarding electrolyte imbalances caused by salt deficiencies.

Neumann (1977) noted the physiological effects of salt taboos among the Chickasaw, Creek and Choctaw, during times of stress such as menstruation, pregnancy, disease, mourning and warfare. He concluded that such salt taboos developed because they were found to be advantageous to the population at large. He also suggested that mental derangement was a response to chronic salt deficiency. An interesting observation, noted in some of the journals of the Hudson's Bay Company, was the prevalence of "Windigo" among the Native population. Windigo was the name given to the cannibal spirit that lived in the forests, ate humans, and which manifested itself during the winter months. During this season, starvation was not uncommon, as supplies of fresh meat were often difficult to procure. It was also noted that in this period, some of the Native people suffered from lethargy and depression, symptoms Neumann associated with a salt-deficient diet. It may be possible that "Windigo" was a manifestation of a salt deficient diet. Messer (1984) stated that selected nutrient deficiencies were hypothesized "...as responsible for particular cultural behavioral patterns or social institutions..." (Messer 1984:215). As Messer further stated, water and salt, the two basic elements of human physiology, ensured and maintained the electrolyte balance (Messer 1984:232). Trace salts from "survival foods" such as tubers and bark would not be sufficient to maintain a healthy electrolyte balance. The frequency of inertia during winter months suggests that a breakdown in the chemically regulated body system was more a factor in mental illness and poor bodily function than actual starvation. Messer also questioned the meaning of

starvation among Natives and suggested that physiological and cultural factors needed to be explored before any definite conclusions could be reached.

Recent studies have not been able to determine the basis of salt appetite. Research pertaining to the relationship of high salt intake to hypertension, has not confirmed salt/hypertension as a cause/effect process (Kare et al 1980:416).

When A.L. Kroeber studied dietary habits of the North American Indians of the Pacific coast, he divided his study area into north/south sections. His research showed that salt was used by Natives in the southern half, but not in the north. He concluded that "...whatever underlying urge there may be in physiology as influenced by diet and climate, the specific determinant of salt use or nonuse in most instances is social custom, in other words, culture" (Kroeber 1942:1-20).

Early observations of the Iroquoian and Assiniboin by Radisson and La Verendrye, show that culture may have played a central role in the use of salt. This will be discussed in Chapter IV.

Salt as an item of economic trade was well-established in the trade networks of the Maya and Aztecs (Andrews 1983). Further north, annual treks by the Zuni to salt lakes were embedded in ritual. Locally, Manitou Lake, a salt lake in Saskatchewan, is still used regularly in purification and sweat lodge ceremonies (Geoff Bussidor, personal communication, 1989).

The Creek, Choctaw and Chickasaw were only several of southeastern Indian groups that traded salt. As Orser (1984) suggested, items that were readily

available to both trading groups were often exchanged as a gesture of friendship. Items such as food substances were often traded by the women (Wood 1972:159). Salt may have been one of the items traded. Lovejoy (1986) pointed out that Saharan salts varied in their quality and appearance and yet were traded back and forth. Different salts were used for different reasons, that is, some were used medicinally, while others were used as condiments or as fixing agents in dyeing. The medicinal nature of salt was also observed by Andrew Graham who noted that the "country salt" was a form of "Glauber salt - a crystalline sodium salt used as a purgative and aperient (laxative)" (Williams 1969:6).

La Belle (1979:4) described the process of tanning hides among North American Indians, "...les Ameridiens nomades produisaient un tres bon cuir en trempant les peaux dans une solution de cerveaux d'animaux et d'eau, et en les fumant ensuite audessus d'un feu de charbon". This is an interesting description, because the preparation of animal skins by prehistoric Natives in Canada is rarely described beyond "smoking" hides. La Belle stated that the hides were soaked in a solution of animal brains and water before they were smoked. This process would make the skins softer and more pliable. Edward Ahenakew, a Plains Cree from Saskatchewan, recalled his grandmother's method of making leather. After the hide was stretched, scraped, dehaired and dried it to was rubbed with animal brains in the same method described by La Belle (Beaver 1972:46-48).

La Belle also described the historic processing of animal skins by tanners in Bas-Saint-Laurent. Salt was an important element in preserving the skins. It was applied to the hides as soon as possible, because skins tend to harden. The salt also made the skin porous and more absorbant to tanin (La Belle 1979:91-92).

Buchner (personal communication, 1989) described skin processing at the Manigotagan Reserve, east of Lake Winnipeg as similar to that practiced in Bas-Saint-Laurent. Salt was laid down between the skins prior to smoking or tanning. This method may have had its origins in the prehistoric period or may have diffused west with the Ojibway who had regular contact with the early French settlements in Quebec.

It is not possible to identify this method, or any method of tanning preparation in the prehistory of the study area, as no organic remains have been found. however, since the areas adjacent to the study area practiced similar methods of skin preparation, these practices were, in all likelihood, carried out by the Natives living within the study area.
Because salt was so readily available in solution, that is, at the saline springs, it may have been used in skin preparation.

Reasons for a Salt Survey in Manitoba

In 1985, while assisting in archaeological investigations in and around Lake Winnipegosis, I had the opportunity to visit the Monkman Saltworks on the Red Deer Peninsula. Prior to this, I had not been aware of salt springs in the province, but soon became fascinated with their geographical distribution. Initial library research was both revealing and disappointing. Several postcontact (historic) salt-making activity sites were documented in the historic record, but without much detail and description. Prehistoric salt-making was absent from most of the anthropological literature, although early historic references hinted at aboriginal use of salt.

In view of the studies of salt production in sea lagoons from pre-Hispanic Mesoamerica and the circum-Caribbean (McKinnon and Kepecs 1989; Coe and Flannery 1967; Flannery 1976; Sullivan 1981), site specialization at saline springs by Late Woodland cultures in southern Illinois (Muller 1984), and historic reference to salt use by Natives in what is now the province of Manitoba (Burpee 1927), I decided to conduct an archaeological survey of the Lake Winnipegosis region of the province of Manitoba (Figure 1), under a grant from the Manitoba Heritage Federation.

The main reason for choosing this topic was that no research had focussed on the salt-makers or salt-making activities in Manitoba. Archaeological, historical and economic models had been tested on various sites and subjects around the study area, but salt had not been included in the resource list.

Geological surveys lacked historical details and the historic record

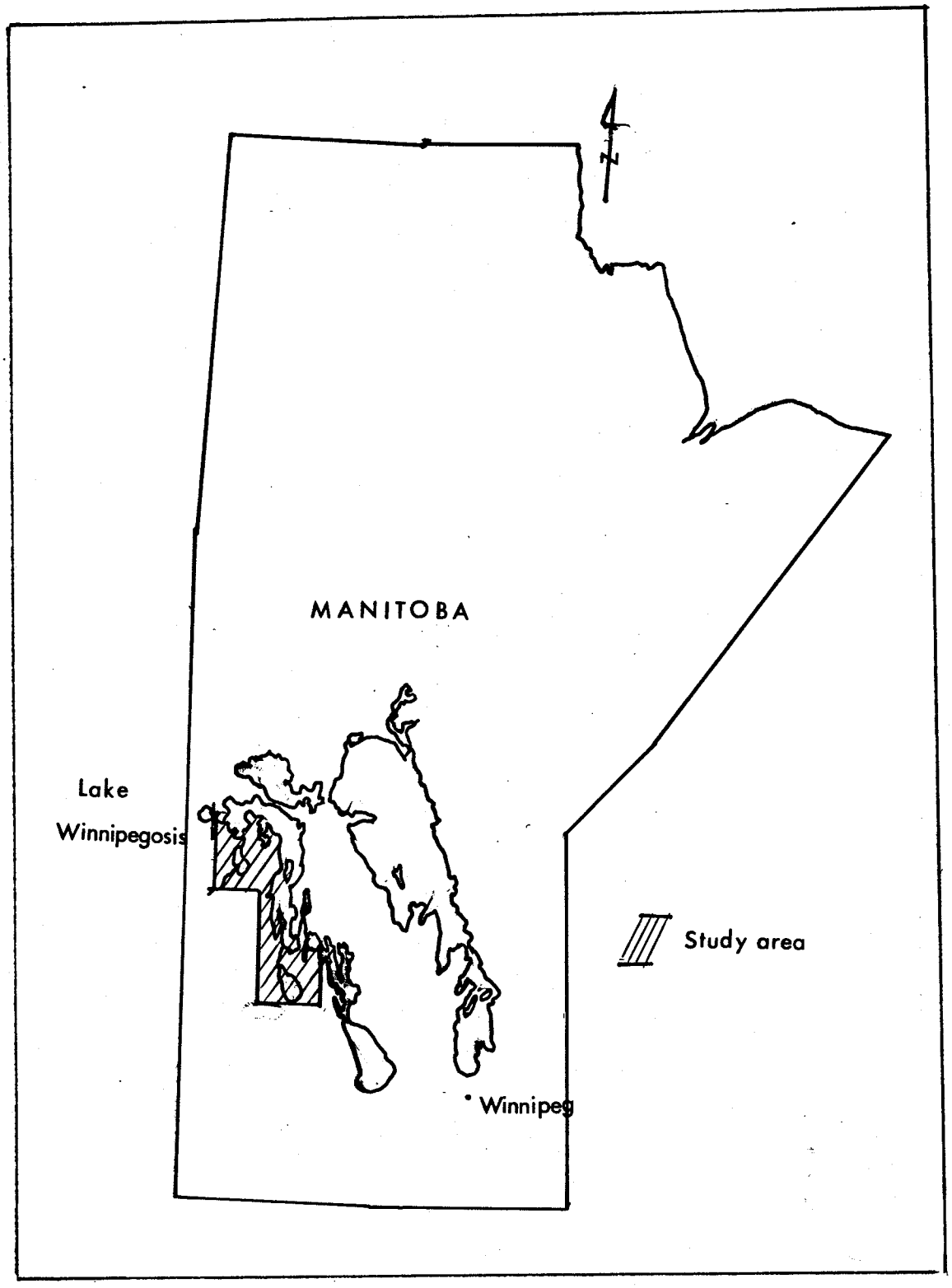


Figure 1: Map of Manitoba

provided only vague descriptions of former salt works. An archaeological survey of both geologically and historically-described sites seemed to be the most practical method of identifying and verifying sites of past salt-making activities.

As well, I was curious as to whether or not prehistoric Natives within the study area used salt. If resources were available, surely they would be used in some capacity. As mentioned, salt offered a number of practical and ideological uses: an agent in the tanning process, a condiment, an item of trade and a medicine and social taboo. Lovejoy (1986) also described the application of salt as a mordant or color-fixing agent used in dyeing Moroccan leather. Salt may also have been used by Native Indians for a similar purpose and may have been used in fixing colours in dyeing porcupine quills. Densmore (1987) noted that the Chippewa at the White Earth Reservation used the "red substance that rose from certain springs (Densmore 1987:370)" to dye quills. Red hematite is a common occurence around the salt springs and this may have been used in a salt solution to obtain a red dye. There seemed to be too many practical uses for salt for it to be overlooked by even the most mobile group of Natives.

Prehistoric salt-making activities had been identified by Muller (1984) along the Saline River in southern Illinois. Here, as at locations further south of this site, a distinct utilitarian type of ceramic was associated with the salt springs. Around the shores of Lake Winnipegosis, in particular at the Aschkibokahn Site (FbMb-1) and the Winnipegosis Site (EjLx-3), a unique

ceramic that had been identified as Duck Bay Ware had been recovered. I wanted to determine if there was a connection between this ceramic type and the salt springs that it seemed to be associated with. Could these above-mentioned sites be classified as "limited activity" sites (Muller 1984)?

Historically, several important references to salt-making within the study area during the 1700s were found in the Hudson's Bay Company Archives, as well as in several journals. Hind (1971) later identified several sites of salt production. The Monkman Saltworks was acknowledged as being the most productive Metis salt-making settlement.

Because little research had been conducted on the salt resources of Manitoba, I decided that this would be an interesting topic of investigation.

Previous Archaeological Research

Until 1950, most academic archaeological efforts had focussed on the burial mounds of southwestern Manitoba (Capes 1963). However, the similarities of ceramics and lithics with those to the south, as well as the inclusion of unexplained cultural remains, led MacNeish (1958) to conduct an intensive survey of southeastern Manitoba. The results of that survey formed the foundation of a chronology of occupation based on ceramic and lithic attributes that is still referred to.

Investigations north of the study area, often based on early historic records, began to flesh out the range of the prehistoric seasonal round (Hlady 1970,1971; Mayer-Oakes 1967; Tamplin 1977).

Formal research within the study area has been limited to three major investigations: excavations at Ashkibokahn (FbMb-1) and the Winnipegosis Site (EjLx-3) and the Glacial Lake Agassiz Survey. All three investigations indicated a degree of contemporaneity based on the recovery of two major ceramic types - Blackduck and Selkirk. Both types belong to the Late Woodland period, A.D. 800 - A.D. 1750.

It has been established that the prehistoric Cree were the manufacturers of Selkirk ceramics (MacNeish 1958; Hlady 1970, 1971). However, the authorship of Blackduck ceramics has been the subject of debate since the ware was first identified at the Shocker Site in 1932 (Wilford 1945). Wilford suggested that Blackduck pottery was a product of the Assiniboin. This was later supported by MacNeish (1958). However, further research by Evans (1961) and Wright (1972) rejected the Assiniboin hypothesis and a general Algonkian origin was favored. More recently, Buchner (1979) has also agreed with a pan-Algonkian genesis for Blackduck, although Dickson (personal communication 1990) still believes the Ojibway were responsible for the manufacture of this ceramic.

Interestingly, the range of Blackduck ceramics coincides with that of the proto-historic Assiniboin (Figure 2). As well, the historic record identified groups of Assiniboin as the occupants of the land along the Lake of the Woods and well into Manitoba in 1732 (Burpee 1927). It appears that the Ojibway did not enter into the Lake of the Woods area until the end of the 18th century, by which time the Assiniboin had localized in south-central Manitoba (Bishop and Smith 1975; Ray 1971).

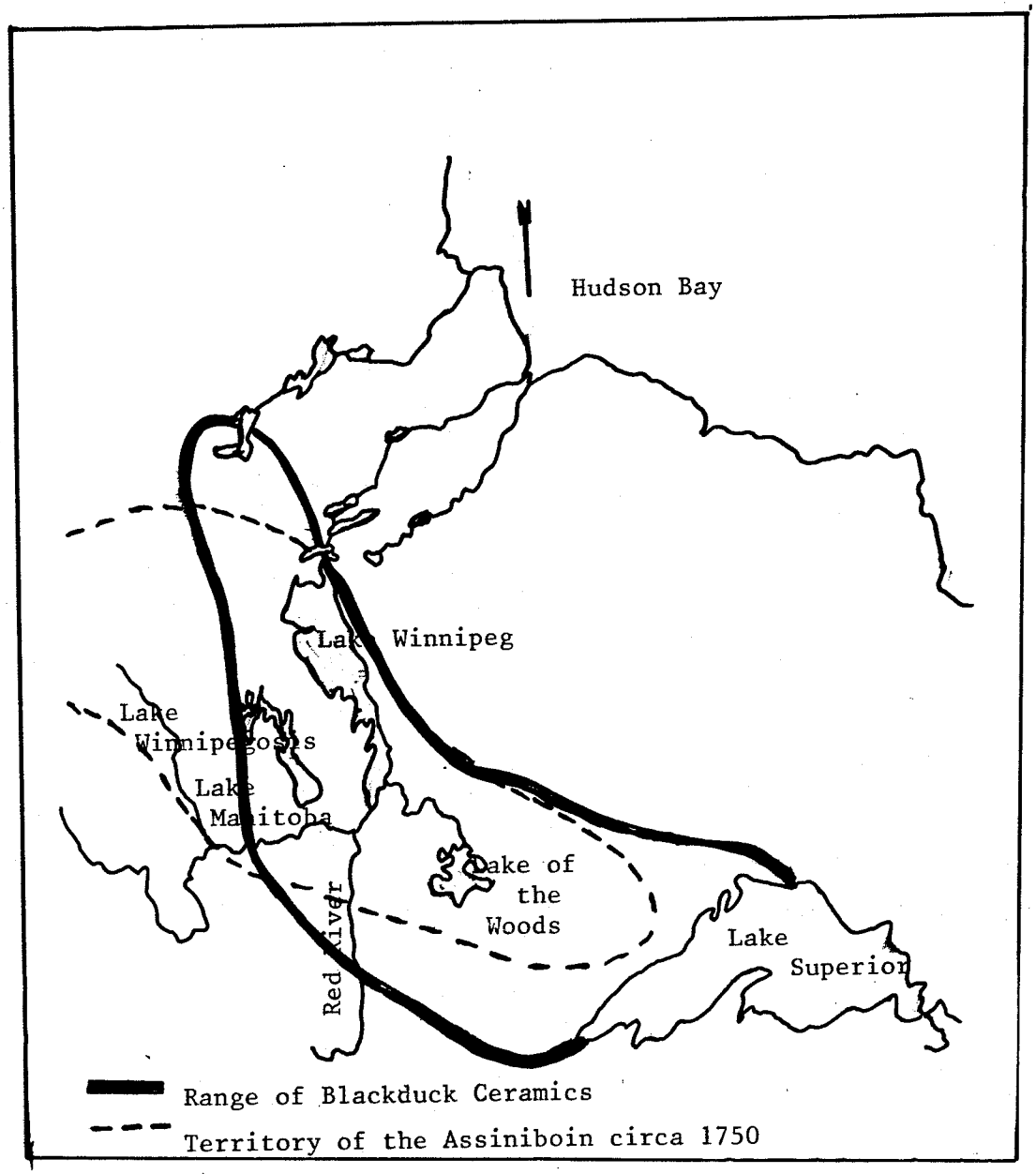


Figure 2: Range of Blackduck Ceramics and Assiniboin

(After Ray 1971)

Until 1975, three types of Late Woodland Ware had been identified in the study area: Blackduck, Selkirk and Clearwater Lake Punctate. Aberrant ware, referred to by MacNeish as Sturgeon Punctate (MacNeish 1958: 170), had been identified sporadically across the province. However, in 1975 and 1976, the ware was isolated at the Winnipegosis and Ashkibokahn sites. Associated with the Blackduck ceramics recovered from the Ashkibokahn Site, were vessel fragments that, although they had many of the characteristic traits of Blackduck, were distinctive enough to postulate a separate ware, Duck Bay ware (Snortland-Coles 1979). It has been argued that this may be a variance of Blackduck ceramics, or a utilitarian ware, since it was found contemporaneously with Blackduck. Many sherds recovered from several sites along the shores of Lake Winnipegosis and the Narrows of Lake Manitoba were coated with a thick dark residue which suggested a utilitarian function. The residue was not analyzed. Hanna suggested a possible year-round occupation at Ashkibokahn based on the resource base (Hanna 1982:198), but as with other reports and surveys, for example, Glacial Lake Agassiz Survey 1965-68; Snortland-Coles 1979; Badertscher 1979, the function of this unique ceramic was not investigated. In her thesis Hanna attempted to explain "the limited geographical distribution of Duck Bay ware (Hanna 1982:142). The possibility of salt-making was entertained, but not pursued.

The Ashkibokahn Site (FbMb-1) is probably one of the most important sites to be excavated within the Manitoba Lowlands Saline Waterbelt. Using site catchment analysis, Snortland-Coles (1979) and Hanna (1982) demonstrated the

importance of the marsh as a vital resource base and possible centre of seasonal settlement for prehistoric people.

Based on the concentrations of Duck Bay Ware, Hanna (1982) suggested that between A.D. 1100-1300 a near-endogamous group of people occupied Ashkibokahn perhaps on a year-round basis. The maximum carrying capacity of the marsh was estimated to be capable of supporting about 143 people with a density requirement of 2.76 km^2/person. This means that an area of 395 km^2 or an 11 km radius would have to be exploited in order to maintain the population (Hanna 1982:96-97). Hassan (1975) established that hunter-gatherer groups were usually restricted to 30-40% of the carrying capacity. Hanna (1982:92) applied this to the people of Ashkibokahn and concluded that, based on the availability of resources, between 43-58 people could comfortably inhabit this site.

Sullivan (1981:421-422) in his analysis of salt production capability in the Turks and Caicos, estimated that between mid-July and August 6818 bushels of salt could be produced by a 26-man crew working 6 hours a day. The amount of salt production that may have occurred at Askibokahn is not known, but there would have been a large enough population to draw from. Monkman, at the height of his salt-making operations, produced 1000 bushels of salt in a season.

Although Gibson (1976) did not apply site catchment or carrying capacity to the Winnipegosis Site, it is possible, using the Ashkibokahn model, to draw

some definite parallels between the two sites.

If, as Hanna suggested, the Ashkibokahn Site supported 43-58 people, then it should be possible to postulate a tentative population for the Winnipegosis Site based on six similarities.

1. The resource base of the Winnipegosis site is identical to that of Ashkibokahn.
2. Both sites are located at the deltas of rivers.
3. Both sites contained concentrations of prehistoric Duck Bay Ware.
4. The faunal remains at both sites indicated a similar food base and exploitation of all available animals.
5. Both sites were adjacent to salt springs that were used for salt production by Metis and fur traders.
6. Early Metis settlement occurred at or near the sites (see Figure 1).

Two differences between the two sites are 1. Site size - Ashkibokahn covered an island about 1.3 km , while the Winnipegosis Site was about 0.5 km .
2. The artifact assemblage was considerably smaller at the Winnipegosis Site.

Based on these similarites and differences, and applying Syms' model of Co-Influence Sphere(1976), as applied by Snortland-Coles (1979), the Winnipegosis site could be interpreted as a secondary subsistence-settlement site, supporting about 12-19 people. However, as Gibson (1976) pointed out, the site was badly disturbed by farming and may actually have extended further into the surrounding area and may have been larger than Ashkibokahn.

Duck Bay Ware has been found by Winnipegosis resident, Harvey Brown, at

several salt spring and salt flat sites on Lake Winnipegosis. Given the similarity of resources and density of animal populations, these sites may add relevant information regarding the relationship between precontact salt production at the salt springs and Duck Bay Ware. These sites have not been verified to date.

Hanna considered the possibility of salt production at Ashkibokahn. She suggested that the distinctiveness of Duck Bay Ware decoration denoted the function of the vessel, and that the residue on pot interiors may, in fact, be related to the production of salt (Hanna 1982:142-143). The presence of Duck Bay Ware in such a restricted area suggests that limited activity or site specialization (Muller 1984) probably occurred. Because of the presence of saline springs near Ashkibokahn, it is likely that the ceramic vessels were used for salt production. This possibility was never tested by Hanna and residue analysis was not within the objectives of this thesis.

More recently Lenius and Olinyk (1989) have revised the Late Woodland taxonomy of the Rainy River region based on physical attributes of ceramic vessels. Ceramic design, such as that associated with Duck Bay, have been removed from the Blackduck Horizon and reassigned to the Rainy River Composite (Lenius and Olinyk 1989:2) However, more attention has been given to form (physical traits) and range, rather than function (social traits) and range. Hanna (1989) presented a more anthropological basis for the form, function and range of Duck Bay ceramics by suggesting that the manufacturers of this pottery, women, belonged to an endogamous group centred at Duck Bay. The

recovery of this ware from outside the study area represented exogamous marriages that resulted from the need to maintain strong social ties with neighbouring groups. Aberrent or unusual pottery was seen as a result of marriage into the local Duck Bay group. Because of the rich resource base of the surrounding marshlands, this area may have been guarded carefully by the Duck Bay group. The presence of a concentration of one type of ceramics may be the manifestation of this territoriality.

It is important to understand the ceramic record because of the possibility that ceramics, in particular Duck Bay ware, were part of the salt-making process. Throughout Mesoamerica and the Caribbean, as well as the southern part of North America, there is evidence of a viable salt-making technology that included ceramics. By identifying the ceramic types at the salt springs in Manitoba, a relative date of cultural occupation and cultural affiliation can be assigned to the sites.

Other Research

In the past historical investigations of Indian people centred around the mission, for example, Grant 1984; McCarthy 1985, and fur trade (Innis 1930; Rich 1960) with little attention given to the Indian culture. The Indian was expressed in well-defined terms, but within a limited role and in a European context.

Contributions by Hickerson (1970), Bishop (1974) Ray (1971) and Ray and Freeman (1978) presented the Indian as being "a shrewd trader and discriminating consumer" (Moodie, personal communication, 1984). This was expanded upon by Orser (1984) who stated that Native groups "manipulated demand for European goods by depositing large numbers of them in mortuary contexts" (Orser 1984:2), thus creating an artifical shortage.

Trade and exchange systems were not foreign to the Assiniboin and Cree of Manitoba. Both groups were actively involved in the Middle Missouri trade system (Wood 1972). Ray (1971) pointed out that after contact, (1670-1870), trade with Europeans became enmeshed in the precontact trade routes.

Frank Tough (1987) expanded the study of Indian economics by examining the regional economics of Indians in northern Manitoba between 1870 and 1930. He established some firm conclusions regarding the demise of Native economics during this period but salt-making was not taken into consideration, even though it was carried out by both Natives and Metis.

Outline of Chapters

This thesis begins with a descriptive summary of the research area, its physiography, geology, soils, climate and vegetation, which combined, have created a uniquely rich resource base for human occupation.

A discussion on the technology of salt production of the four archaeologically-identified economies: the Prehistoric Natives; the fur traders; the Metis and the early industrialists follows. The transition from one economy to the next is seen as one of natural progression from the simplest to the most complex, both in terms of technology and production.

A description of the chronology of salt-making in Manitoba and the archaeological survey along with a brief analysis comprise Chapters IV and V.

The final chapter summarizes the survey.

CHAPTER II

THE RESEARCH AREA

Physiography

The research area lies within the province of Manitoba in the area designated as the Manitoba Lowland Saline Waterbelt (Teller 1984: 183) (Figure 3). This extends from The Pas, along the western shore of Lake Winnipegosis and Lake Manitoba and includes a substantial area along the western bank of the Red River.

This study focuses on the saline springs and salt flats identified along the western shore of Lake Winnipegosis, the Red Deer River and Swan Lake.

The study area is bound by the Precambrian Shield to the north and the Western Uplands (Manitoba Escarpment) to the west. Lakes Winnipegosis and Manitoba form the eastern limits. This saline belt extends south into the United States (Andrews 1983).

Although no major rivers drain into Lake Winnipegosis, three river routes are of historical significance. The Mossy, Swan/Shoal and Red Deer Rivers were part of regular inland fur trade routes. The routes were formerly part of the former native "highway" system that networked across North America. All three rivers are shallow and gentle, tending to diminish in size during the summer dry season.

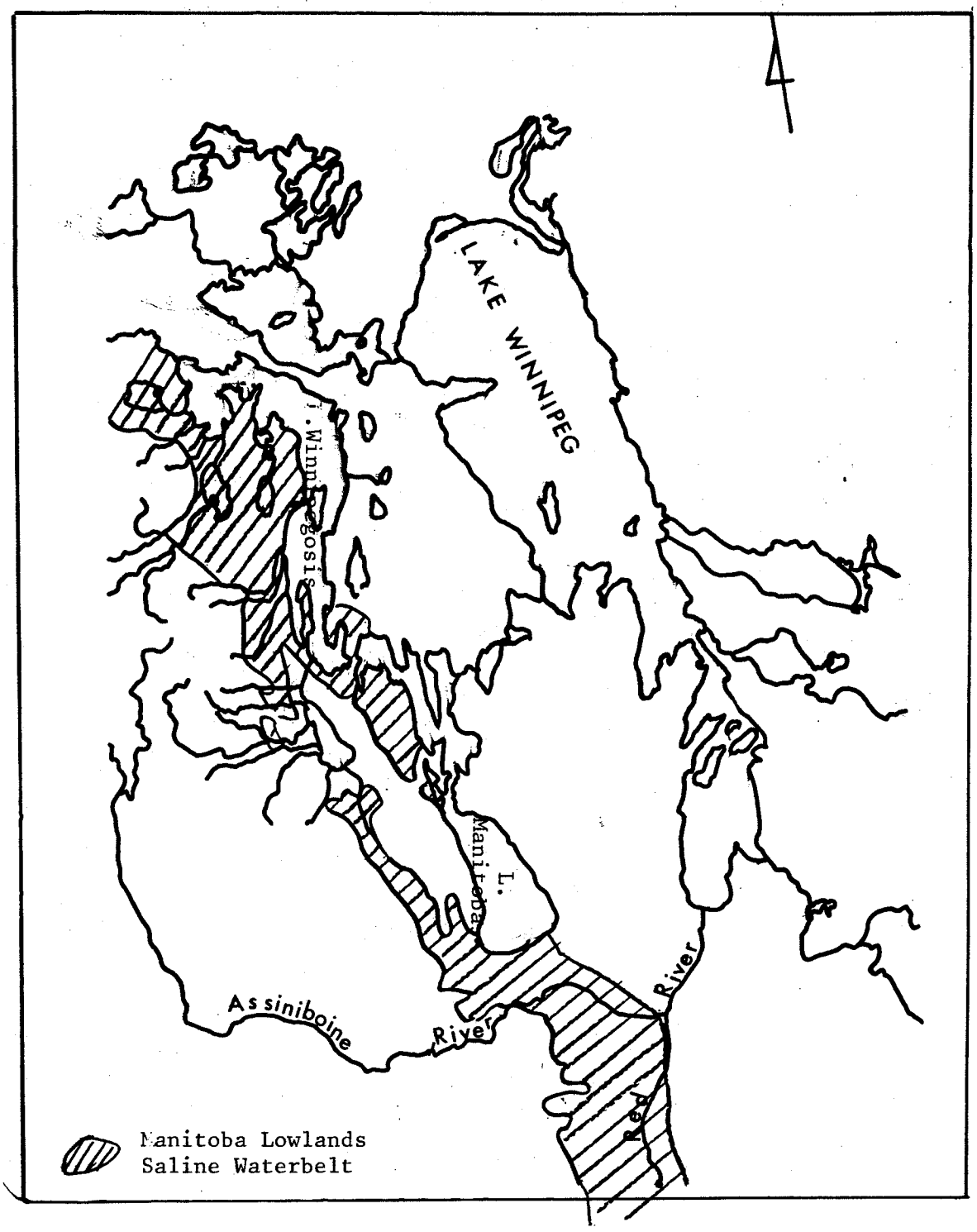


Figure 3: The Manitoba Lowland Saline Waterbelt

(After Teller 1984:183)

The geological record of the study area is both complex and fascinating. About 10,000 years ago the Wisconsinan glacial advance was halted by a warming trend, and Glacial Lake Agassiz formed as meltwater was impounded by the retreating glacier. Geological uplifting or isostatic rebound and the retreating glacier continued to reshape the land (Teller 1983) and Lake Agassiz diminished in size. Today, Lakes Winnipeg, Manitoba and Winnipegosis are the most obvious physical representations of former Glacial Lake Agassiz.

The effects of glaciation and various stages of stabilization of Lake Agassiz can be seen along the western shore of Lake Winnipegosis. The land is low and flat and is composed of lacustrine silts and clays strewn with limestone till. The basin gradually rises to the west where a series of beach ridges, most notably the Upper Campbell, mark the receding shore of former Lake Agassiz.

The research area is geologically described as a well-known salt-bearing zone (Hind 1858; Tyrrell 1892; Cole 1915; Cole 1938; Cameron 1949; Wadien 1984). As a member of the Elk Point Basin group, brine percolates up from the Middle Devonian Winnipegosis dolomite in the form of flowing brine springs (Ballantyne 1960; Sonnenfeld 1984) (Figure 4). The springs flow either directly into Lake Winnipegosis or any of the east-flowing rivers which empty into the lake. These springs discharge from the strip of Devonian rock outcrop which flanks the west side of Lakes Winnipegosis and Manitoba.

Although the exact number of saline springs is unknown, it is estimated to be around 50 (Stephenson 1973). The majority of springs are located around

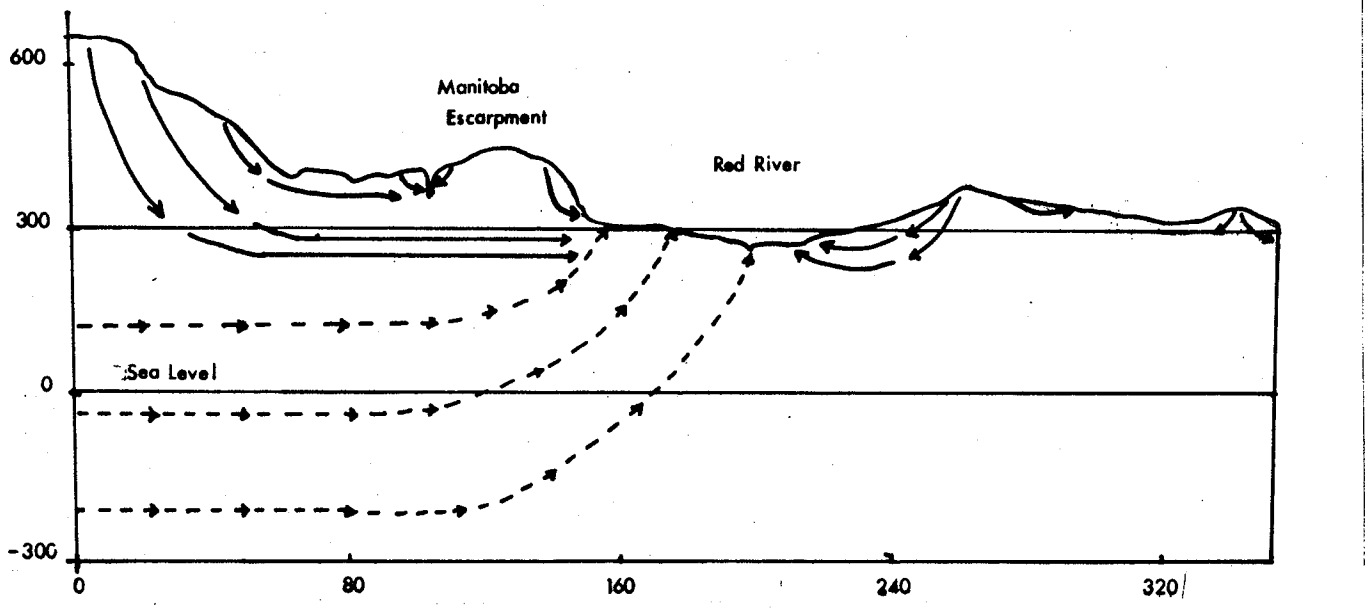


Figure 4: Flow of Brine Springs into Manitoba

After Teller 1984

Dawson Bay and the Red Deer Peninsula. A characteristic of the springs is their migrating nature. This makes it difficult to assess previous localities and as a result, human activity sites. However, several stable pools have existed in the same locale for at least 150 years and these will be the focus of this study.

All saline spring sites bear similar physical features. Discharge areas are identified by large salt flats or "burns" which vary in size depending on the rate of discharge and degree of salinity (Figure 5). A burn is defined as an area surrounding an active or former salt spring where natural flora cannot grow because of the salinity of the soil. The barren, gray soil, littered with glacial till supports little vegetation. Salt tolerant species, such as glaswort (Salicornia herbacea) supplant the natural vegetation.

The pool depressions caused by the discharging brine varied in diameter from 0.25 m at Steeprock Hill to over 4 metres at Lawrence Lake . The deepest pool was located at the McArdle Site. The funnel-shaped pool was probed with a 3 m pole, but the base of the pool was not located. Here, the complete skeleton of a deer was noted.

At some salt springs, hematite staining was noted around the edge of the spring (Figure 6).

Around the immediate perimeter of the salt flat, several species of grass and stunted shrubs grow. Further out from the centre of the saline flat natural regional vegetation is encountered.

Figure 5: A Typical Salt Flat with Burn

(Photo from author's file)

Figure 6: Hematite Staining Around a Salt Spring

(Photo from author's file)

The soils of the area are chernozemic dark gray and include luvisols and brunisols which have a very high lime content (Canadian Soil Survey 1978). Soils specifically at the salt flats have been described as being either of the Melina Series (Salina phase) or Novra Series (Mills and Smith 1981). Salinity and lime content results in sparse tree growth with an increase in prairie grass in the drier areas and wet meadow grasses in the poorly drained areas. In the areas of slightly higher elevation and good drainage, forest growth occurs, but tends to be small as compared with other broadleaf forest.

Based on world-wide climatic conditions, the study area lies within the region designated by Koppen et al (1930) as "Dfb", "...a region located in the centre of the continent at a great distance from the oceans and beyond their moderating effect on temperature" (Miller & Smith 1981:11). Here, summer temperatures are higher and winter temperatures lower than the world average for this zone. July temperatures average 19.6° C, while January temperatures average -17° C (Mills & Smith 1981:12).

The area has a subhumid climate with about 370 mm precipitation falling as rain and 138 mm falling as snow. June is the wettest month with 96.8 mm (Ibid). The differences in land elevation play a role in the climatic conditions within the study area. The Dawson Bay area is subject to frequent and sudden rain squalls that sweep in from the west through the Swan River Valley between the Porcupine and Duck Mountains (personal observation). The frost-free period ranges from 97 to 146 days. This information is pertinent when determining the optimal conditions necessary for the natural evaporation

of brines at the saline pools and springs. With peak temperatures occuring between mid-July to mid-September, and precipitation averaging 62.7 mm in July and August and 46.0 mm in September, it would be possible to gather naturally evaporated salt within the study area during the summer months with little technology involved.

The study area provided and continues to provide one of the most favorable resource bases conducive to year-round settlement.

The Manitoba Lowland Saline Waterbelt straddles two vegetative zones, the Parkland and Southern Boreal Forest (Ray 1971:28). This overlapping has created a remarkable blend of natural resources. The variety of big game and fur-bearing mammals, as well as an excellent fishery drew prehistoric people from both the Plains and the Northern Boreal Forest.

Flora include trembling aspen (Populus tremuloides), willow (Salix spp), white elm (Ulmus americana), red ash (Fraxinus pennsylvanica), bur oak (Quercus macrocarpa), manitoba maple (Acer negunda), and white birch (Betula papyrifera). In the Dawson Bay and Red Deer River area, black spruce (Picea mariana) demarcates the southern edge of the Northern Coniferous Forest. As well, blueberry (Vaccinium spp), saskatoon berry (Amelanchier alnifolia), common cat-tail (Typha latifolia), prickly wild rose (Rose acicularis), and red raspberry (Rubus spp) are found in abundance. Interestingly, a number of plants possessing medicinal qualities are present as well. These include Canadian fleabane (daisy) (Erigeron canadense), used for digestive problems;

juniper (Juniperus communis), used for a variety of complaints and as an emergency food; and chokecherry (Prunus serotina), used as a poultice and filler for pemmican (Stark 1981).

Flora adapted to a saline habitat include glaswort (Salicornia herbacea), sea-blight (Suaeda depressa), alkali-grass (Distichlis stricta), pigweed (Chenopodium rubrum), sea arrow grass (Triglochin maritima), golden dock (Rumex maritumus), and sea-milkwort (Glaux maritima) (Hansen 1957). It is not known if any of these saline plants were used by aboriginal people. Kroeber (1941) indicated that saline marsh grasses in California were often burned and the ashes collected and mixed with food. This apparently provided an adequate amount of salts and other minerals that were otherwise lacking in the diet.

The faunal resources, especially those associated with the salt springs are well represented and diversified. Deer (O. virginianus), moose (Alces alces), black bear (Ursus americanus), beaver (Castor canadensis), and muskrat (Ondatra zibethicus) were frequently noted. Prehistorically, bison (Bison bison) roamed the area and probably frequented the numerous salt springs (Jones 1985). Several of the early explorers such as Henry and La Verendrye, commented on the numerous bison and "deer" around the salt springs (Coues 1965; Burpee 1927). Moodie and Ray (n.d.) suggested seasonal migration of bison from plains to parkland. Bison bone recovered from the Winnipegosis Site (EjLx-3) supports this argument.

The marshes along the shores of Lake Winnipegosis and in those areas associated with salt springs and flats are a haven for waterfowl and

shorebirds. Canada geese (Branta canadensis), large diving ducks such as redheads (Aythya americana), and canvasback (Aythya vallisneria) as well as the great blue heron (Ardea herodias), common merganser (Mergus merganser), common (Sterna hirunda) and arctic tern (Sterna forsteri) and pelican (Pelicanus erythrorhynchos) were noted during field investigations. Raptors such as the bald eagle (Haliaeetus leucocephalus) and osprey (Panilon haliaeetus) were seen at close range.

It is most notable that a number of marine birds actually prefer to nest and remain here seasonally rather than continue further north to Hudson Bay, because the saline pools have created an artificial marine environment. The saline pools are noted as being valuable molting waterfowl habitats and the open salt flats are used by the nesting shorebirds (Sexton 1981:20). The piping plover (Charadrius melodus) in particular is of recent interest to Ducks Unlimited as this bird is felt to be nesting beyond the northern nesting range of its species (Sexton, personal communication, 1986).

The most common fish found along the shallow waters of the lake and at the river and stream mouths are pike (Esox lucius), whitefish (Coregonus clupeaformis) and sucker species (spp Catasternidae). In deeper water, pickerel (Stezostedion vitrum) abound.

Several species of amphibians and reptiles were noted including the wood frog (Rana sylvatica), red-sided garter snake (Thammophis sitales parietalis), American toad (Bufa terrestis terrestis), boreal chorus frog (Peudacris triseriatus maculata) and leopard frog (Rana pipiens).

Two marine invertebrates "the foraminifer (Elphidium gunteri) and the ostracod (Cythermomorpha fuscata) are present in the samples..." taken from Dawson Bay (Nielsen et al 1987: 1478-1485). Migrating birds are thought to have carried these marine animals into the Lake Winnipegosis area and those deposited at the saline pools have survived because of the salinity.

As well, freshwater clams have been found along the shore of Lake Winnipegosis, especially around the mouth of the Mossy River. Nielsen (Ibid) noted the extinct gastropod (Marstonia gelida) as part of the fossil assemblage at Dawson Bay. During test excavations at the Winnipegosis Salt Flat Site, shells were recovered from the gleyed luvisol at 25 centimetres below surfaces . These were identified by Dr. B. McKillop, Curator of Invertebrates, Manitoba Museum of Man and Nature as snail shells representing (Helisoma anceps anceps) and (Stagnicola elodes), both of which are common to the area (McKillop, personal communication, 1989).

CHAPTER III

TECHNOLOGY OF PRODUCTION

General Principles

The development of salt technology is directly related to the necessity of salt in daily operations. This is evident in tracing the progressive use of salt in Manitoba. However, before describing the technologies used to manufacture salt in Manitoba, it is important to understand the several forms in which salt occurs naturally.

Sea Salt

The sea was probably the site of the first salt production. Here, salt water was simply boiled in ceramic dishes. Large deposits of ceramic fragments or "briquetage" (Riehm 1961), found along the coast of England and France, and near inland springs in France, Germany and Africa denote an ancient salt industry. Recently, MacKinnon and Kepecs (1989) and Coe and Flannery (1967) reported a type of briquetage associated with salt sea lagoons along the Belize coast and in Guatemala and Costa Rica. Sullivan (1986) also identified coarse ceramics at several sea lagoon sites in the Turks and Caicos islands.

Historically, indications of a thriving coastal salt industry in Scotland were described by Whatley (1987). The availability of coastal outcrops of coal aided in the development of this industry.

Brine Salt

Saline springs occur globally (Lefond 1969). The salinity of the brine can and does vary, but even a weak brine will produce salt. Briquetage similar to that found at sea shore sites was found by Sellers (1877); Peithman (1953) and Muller (1984) at the Great Salt Spring in southern Illinois, suggesting the process of induced evaporation of brine, similar to that found at prehistoric sites in Europe, was the method used to procure salt.

Rock Salt

Rock salt, a non-hard rock, can manifest itself in two ways: it can occur as a solid deposit, in which case it is extracted in solid pieces or slabs e.g. the Timbuktu salt industry (Lovejoy 1986); or it can occur as a brine, either the result of natural fresh groundwater percolating up through the bed of rock salt, or by the artificial creation of salt brine created by filling rock salt pits with fresh water and evaporating the brine (Multhauf 1978:20-38).

Postcontact Technology of Production

The historic record provided the earliest descriptions of salt-making within the study area. As European exploration and fur trade expansion pressed further into the interior, details on the subistence patterns of both the Natives and fur traders increased. Fur traders within the study area, as elsewhere, increased their self-sufficiency by producing as much of their own food resources as possible.

Both the French and the British made use of the salt springs. Alexander Henry remarked on several salt springs, for example, one opposite the mouth of the Rat River, where Chaboillez the French trader established a post. Here, salt could be made all year round as the spring never froze. The Rat River saline spring produced 1 pint of salt for every 9 gallons of water (Bell 1888:3). Compared to the Monkman Saltworks, this was a very weak brine [the Monkman salt works produced 1 bushel of salt for every 30 gallons of brine, making the brine 19 times stronger than that at Rat River (Hind 1971:ii:45)].

After 1701, the Hudson Bay Company began hiring Orkneymen and Scots to work as laborers in the growing fur trade. This was because of their perceived hardiness, diligence and obedience. Along with these qualities came a practical knowledge of saltmaking. This Scottish connection provided the foundation for the first mineral industry in Manitoba as outlined in Chapter IV.

Along the coast of Scotland and the Orkney Islands, as with other coastal sites, sea water was trapped in artificially created basins or ponds. The brine was then transferred to an iron or stone cistern near the salt pan house by bucket and later by steam pump. From here it was drawn up into the pan which was about "...18 foot long and 9 foot wide and is made of iron plates...The pan is 18 inches deep and is filled with water to 15 inches" (Whately 1987: 9). The hot salt was drawn to the side of the pan as it formed, drained and packed into containers (Figure 7).

Most of the saltworks were fired by coal. However on the island of Cava, Flotta, and Ophir, peat was used successfully.

At the Monkman Salt Works the furnaces were fired by wood, and the labor involved in keeping up with production demands caused the laborers to complain constantly (Hind 1971:ii:46).

Wood-burning furnaces were also used by the early fur traders in the Swan River district as well as along the Red River.

The "kettles" were actually rectangular salt pans 5 feet x 2 feet x 1 foot. These were "laid upon two rough stone walls about twenty inches apart, which form the furnace" (Hind 1963:i:43), at one extremity a low chimney was constructed (Figure 8). No mention was made of the pans being affected by crusting or corrosion, a regular occurence in the Scottish salt industry.

Another method used by the Metis at Duck Bay was described by Spencer in 1873. Here reservoirs or pits were "...dug four or five feet deep..." (Spencer 1875:69) into the soil before the ice formed. As the salt water filled the pits it was collected, boiled and the salt extracted. This salt sold for 10 chelons [shillings ?] a barrel at the Red River Settlement (McCarthy 1987:73). Because of the corrosive nature of the salt, wooden planks were worn under the leather moccasins for protection.

The technology at sites such as this was crude. Temporary furnaces were constructed and evaporating pans placed on top. These were probably similar in size to those at the Monkman Saltworks, and those later used at the

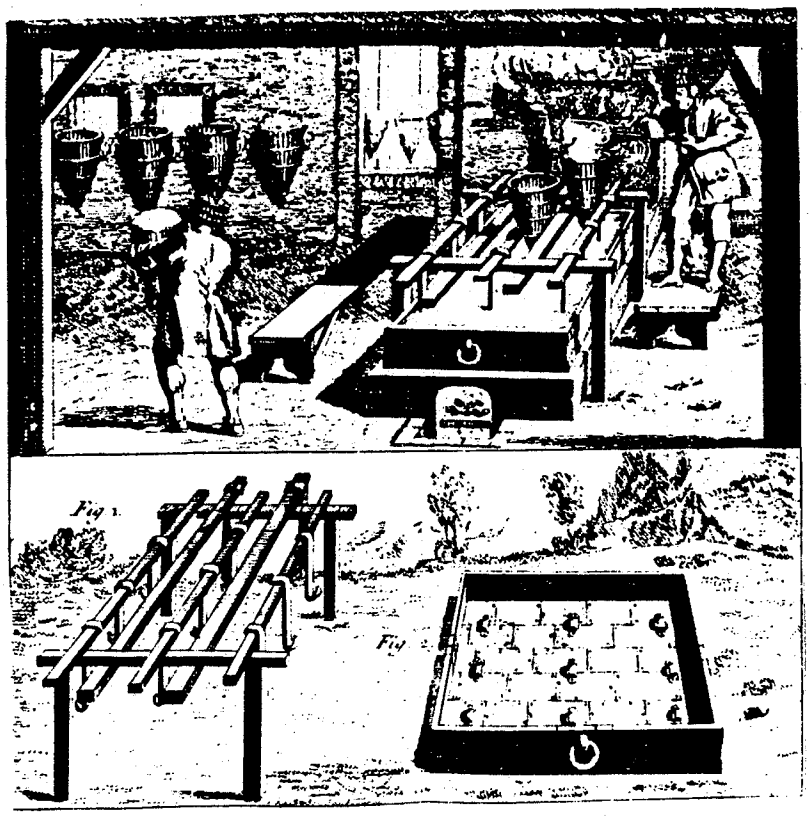


Figure 7: 18th Century Salt-Making in Scotland

(After Whatley, 1987)

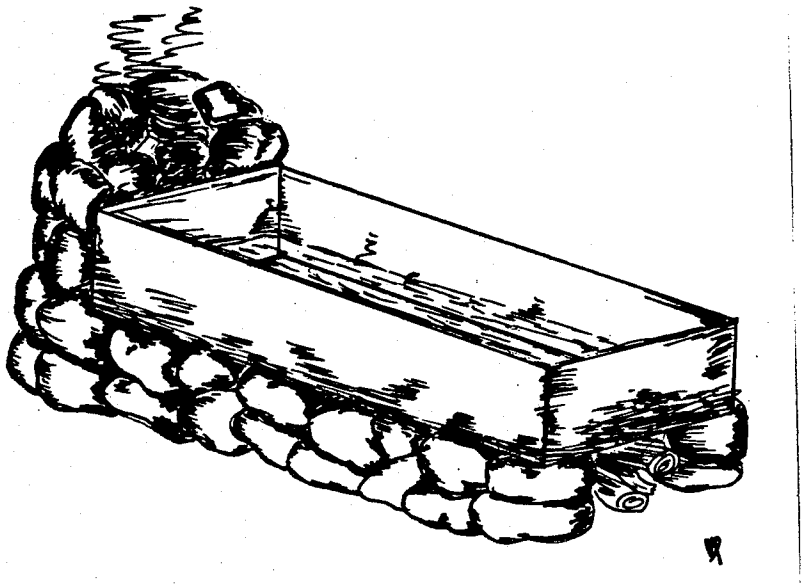


Figure 8: Artist's Interpretation of Salt-Making Furnace

(After Hind (1971)

Northern Salt Works (Winnipegosis Salt Flat - EjLx-7), north of the village of Winnipegosis.

Production was usually seasonal and pans were simply turned over at the end of the season. However, there is evidence that salt was occasionally made during the winter months as well, for example, one reads that "Peter Brass...intends to make the remainder in winter..." (MG1 07 1854: 4) and "January 13, 1799 I sent two men to make salt above Park River" (Coues 1965:235).

When Hind visited the Monkman Saltworks in 1858, the works consisted of "two small log-houses and three evaporating furnaces. The kettles of English construction, are well-made rectangular vessels of iron, five feet long, two feet broad and one foot deep" (Hind 1971:ii:45).

Here, thirty gallons of brine produced one bushel of salt and two bushels of salt could be produced from each kettle daily. During the summer, the Monkmans kept seven kettles in constant use in order to meet production demands.

On talking with the Monkman brothers at their saltworks, Hind mentioned the use of pumps and solar evaporation in the production of salt in other areas of the country. Although the Monkmans had heard of pumping the brine to the boilers, the process was never used at their saltworks. When Dominion surveyors visited the site thirty years later (1888), only broken furnaces and iron pans were all that remained.

The simple techniques used in the production of salt by Monkman and other Metis can be traced to techniques used in Scotland during the latter part of the 18th century. However, around Lake Winnipegosis, the salt-making activities all occurred out-doors. No saltpan houses were constructed.

Industrial Technology

As knowledge of chemistry and geology improved, so did the techniques of salt extraction.

The popularity and success of deep drilling in search of petroleum in the United States had, as an extra bonus, discovered the presence of large deposits of rock salt (Multhauf 1978:184; Dreyer 1982).

The geology of the Manitoba Saline Waterbelt was still not adequately understood at the end of the nineteenth century. Saline springs were thought to be the result of: 1. Fresh groundwater percolating up through a bed of rock salt; 2. Brine water from an underground sea working its way to the surface through ground faults; or 3. Fresh water from the Manitoba Escarpment seeping down through beds of near surface rock salt (Tyrrell 1893).

As a result of this speculation, experimental drilling across the Manitoba Lowlands was conducted in order to identify the nature of the salt formation. Strong brine was encountered at all drillings and the Neepawa area was identified as being the best site in terms of brine flow (Bannatyne 1960). The Neepawa Salt Company, later the Canadian Salt Company, was

established at the town of Neepawa. Here, precipitated salt from subsurface brine was extracted by the vacuum pan evaporation process from two wells. NaCl content was found to be more than 85% (Bannatyne 1960). At its peak 18000 to 25000 tonnes of salt was produced annually at the Neepawa site (Zanalin 1980:7).

Prehistoric Salt-Making

The two most common methods of salt production employed by Amerindians were natural solar evaporation and induced evaporation through boiling the brine (Peithmann 1953).

Solar evaporation of brine at the salt springs, especially during a hot, dry summer produces thick crystalline salt crusting around the edges of the spring. This natural process was noted to occur at the shallow sea lagoons of Belize (MacKinnon and Kepecs 1989) and Guatemala (Coe and Flannery 1967). As in Mesoamerica, the amount of naturally produced salt is dependent on the absence of rainfall. The effects of solar evaporation were visible during the field survey, when 10 days of hot sunshine with no precipitation produced a rim of salt 2 cm in thickness around springs at the Monkman Saltworks (EkKx-1) and the McArdle Saltworks (FfMg-3). This supports the climatological evidence given by Mills and Smith (1981) who demonstrated graphically the reduced precipitation and higher temperatures within the study area during July.

The salt that was presented to La Verendrye in 1732 was the product of natural evaporation. La Verendrye stated that the salt was collected "...where

the sun dries up the water so as to form a white salt" (Burpee 1927:28).

This suggests that minimal technology was employed in obtaining the product and that it may have been a secondary activity. That it was presented to him, indicates that salt held some importance among the Assiniboin. However, no details on the significance of salt to the Assiniboin were volunteered by the Native or La Verendrye.

Since La Verendrye did not elaborate on the methods of salt production, it is necessary to look outside the study area at saline springs where prehistoric salt production has been documented to complement the historic record. The closest saline spring that has been archaeologically investigated is the Great Salt Spring in southern Illinois (Figure 9). The site has been well-documented since 1814 (Cramer 1814; Sellers 1877; Myers 1923; Peithman 1953; Muller 1984). George E. Sellers (1877) provided the first archaeological description of the technology of production, concluding that much of the production was accomplished by solar evaporation. The site was further investigated by Peithmann (1953) and Muller (1984).

Salt pans, made of shell-tempered fired clay, and measuring from 50 cm to 1 metre across the rim were recovered. Some were bowl-shaped, others were shallow pans. Both types were textile impressed. Late Woodland and Mississippian period ceramics were also identified at the site (Muller 1984:505).

Other evidence included clay-lined hearths which were excavated near the salt springs. These appeared to be "arranged in apparent rows..." although

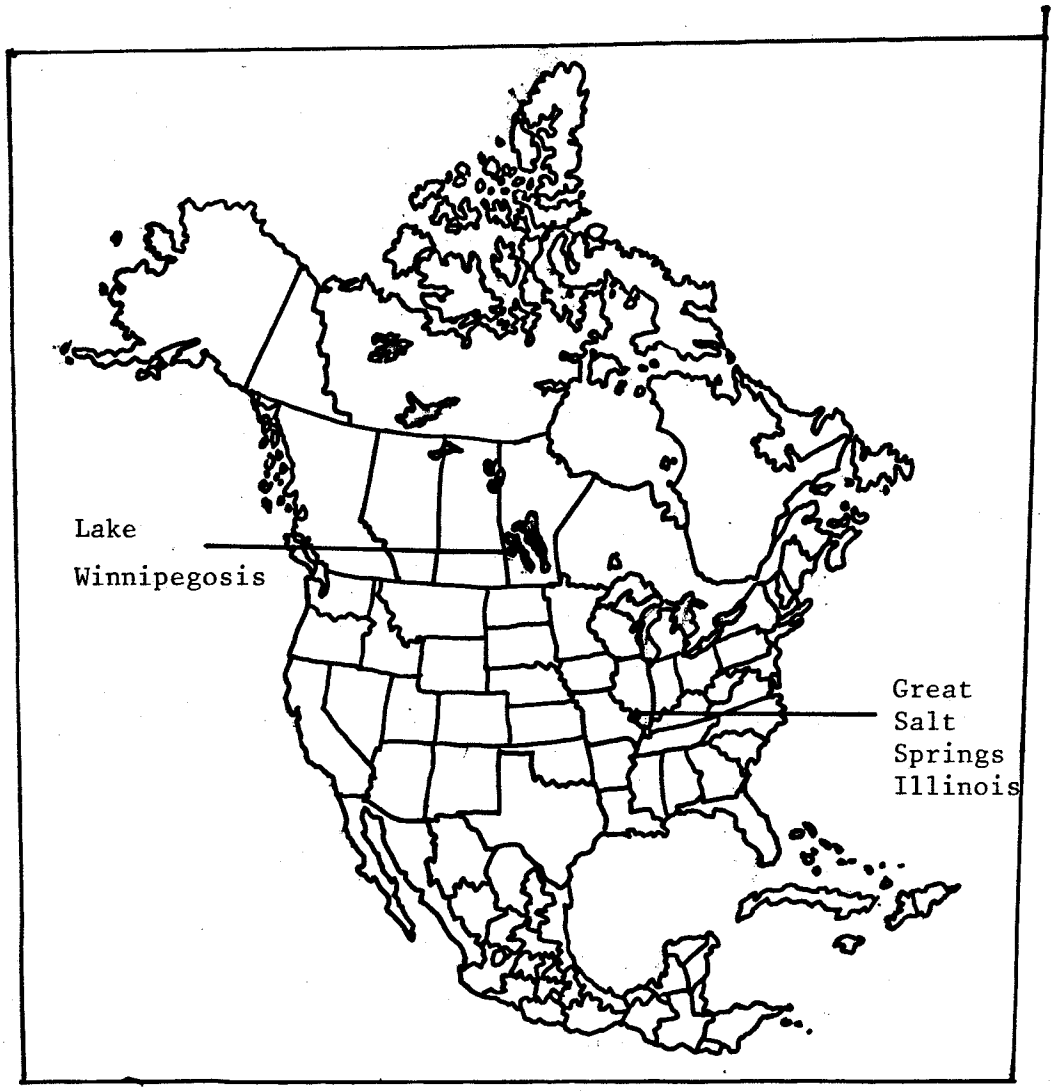


Figure 9: Map of North America Showing Relationship of the Great Salt Spring, Illinois to the Study Area at Lake Winnipegosis

"were probably not in contemporaneous use" (Muller 1984: 500). Muller concluded that the hearths were likely used in heating the brine in the saltpans to accelerate the evaporation process or "...this may have been accomplished indirectly through the use of boiling stones..." (Ibid). Dropping boiling stones into liquid-filled vessels was common among many of the Late Woodland groups, particularly the Assiniboin, whose name refers to this practice (Jenness 1977:308).

The irregular hearths excavated at the Great Salt Spring are reminiscent of the crude furnaces used by the Metis. The similarity of technique suggests either independent invention on behalf of the aboriginal groups associated with the Great Salt Spring or very early, perhaps Spanish, diffusion of production technology to the north from Mexico/Florida or English/Dutch influence from the east coast of American during the early 1600s. I feel that independent invention was probably the case as Late Woodland ceramics predate European contact.

Within the Manitoba Lowland Saline Waterbelt no concrete evidence of prehistoric brine boiling for salt extraction was found. Although this suggests that salt was gathered as a secondary activity, the recovery of Duck Bay ceramics from sites at or near salt springs suggests that induced evaporation of brine for salt extraction may have occurred..

At present, two sites within the Manitoba Lowlands Saline Waterbelt hold great potential for aboriginal salt-making activities: The Aschkibokahn Site,

(FbMb-1) and the Winnipegosis Site (EjKx-3). A utilitarian-like ceramic, identified as Duck Bay, was recovered in large quantities from these two sites. As mentioned, the producers of Duck Bay ceramics were originally thought to have been members of the Blackduck culture, being found mainly around the periphery of Lakes Winnipegosis and Manitoba and concentrated around the Duck Bay area (Figure 10). In most instances a thick residue coated the interior of the sherds indicating a utilitarian function. However, this was never chemically analyzed. The ware has similarities with Blackduck in temper and vessel wall thickness, but the motif differs considerably (Figure 11) and Duck Bay vessels have a more definite shoulder. In an analysis of Texcoco Fabric-marked pottery associated with Aztec saltmaking, Charlton (1971), suggested that the "...manufacture of a special ware for salt-making by a non-specialist would account for the distinctiveness of the ware." However as he further suggested, the increased demand for salt "...may have necessitated the use of a cheap, easily broken ware" (Charlton 1971: 218).

The presence of coarse-looking salt pans and vessels at the Great Salt Spring further suggests a utilitarian function of the pottery. Muller argued for site specialization rather than producer specialization, pointing out that full-time producer specialization was usually associated with state-level economic systems. No evidence for a state-level economy was found at the Great Salt Spring. Based on this and Charlton's suggestion of distinctiveness of ware, salt-making at the Great Salt Spring was more than likely a "'limited activity' or 'specialied site', organized on an 'as needed' basis or may have been scheduled as a seasonal activity" (Muller 1984: 491).

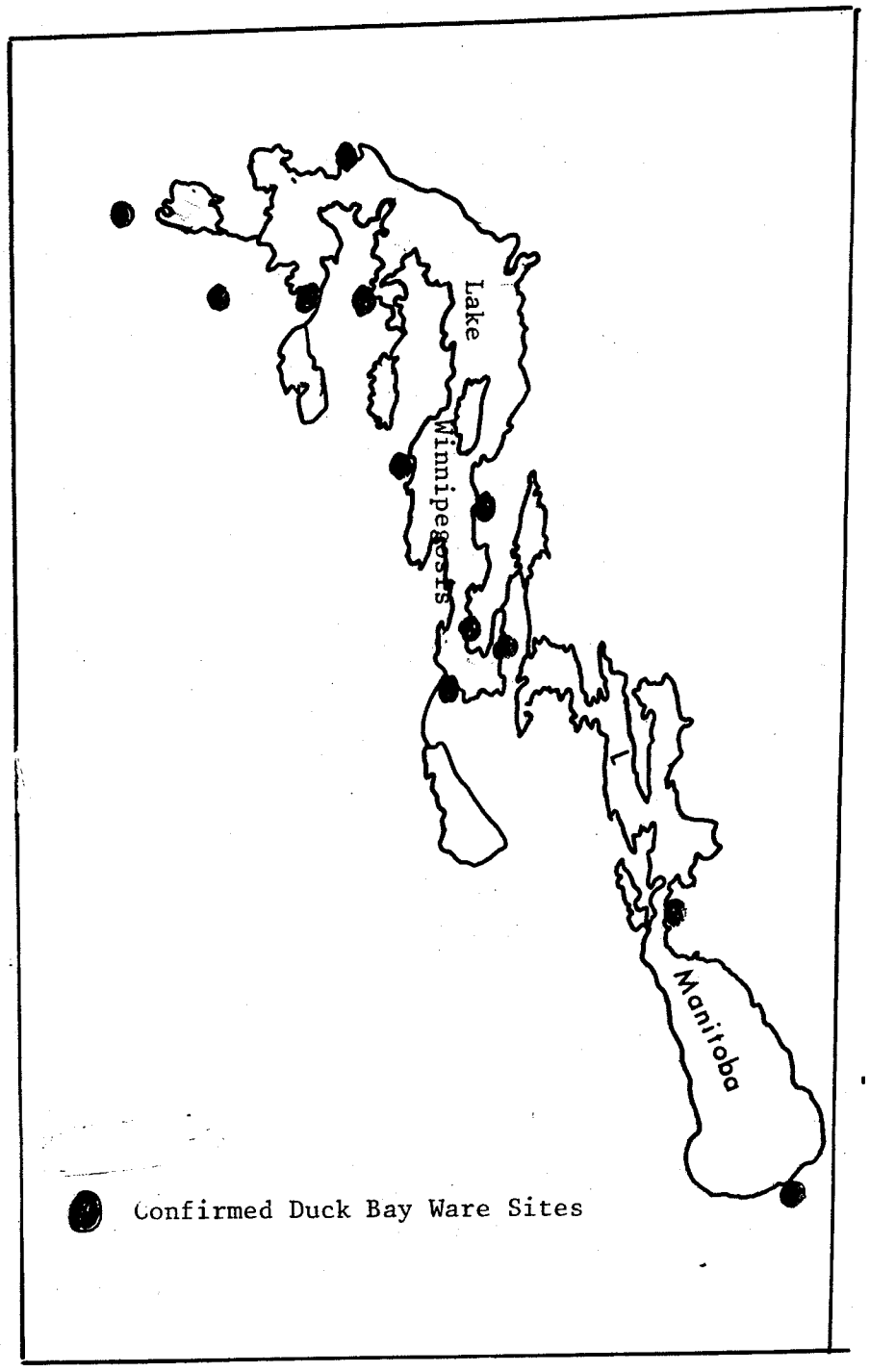


Figure 10: Map of Duck Bay Ware Sites Around Lakes Winnipegosis and Manitoba

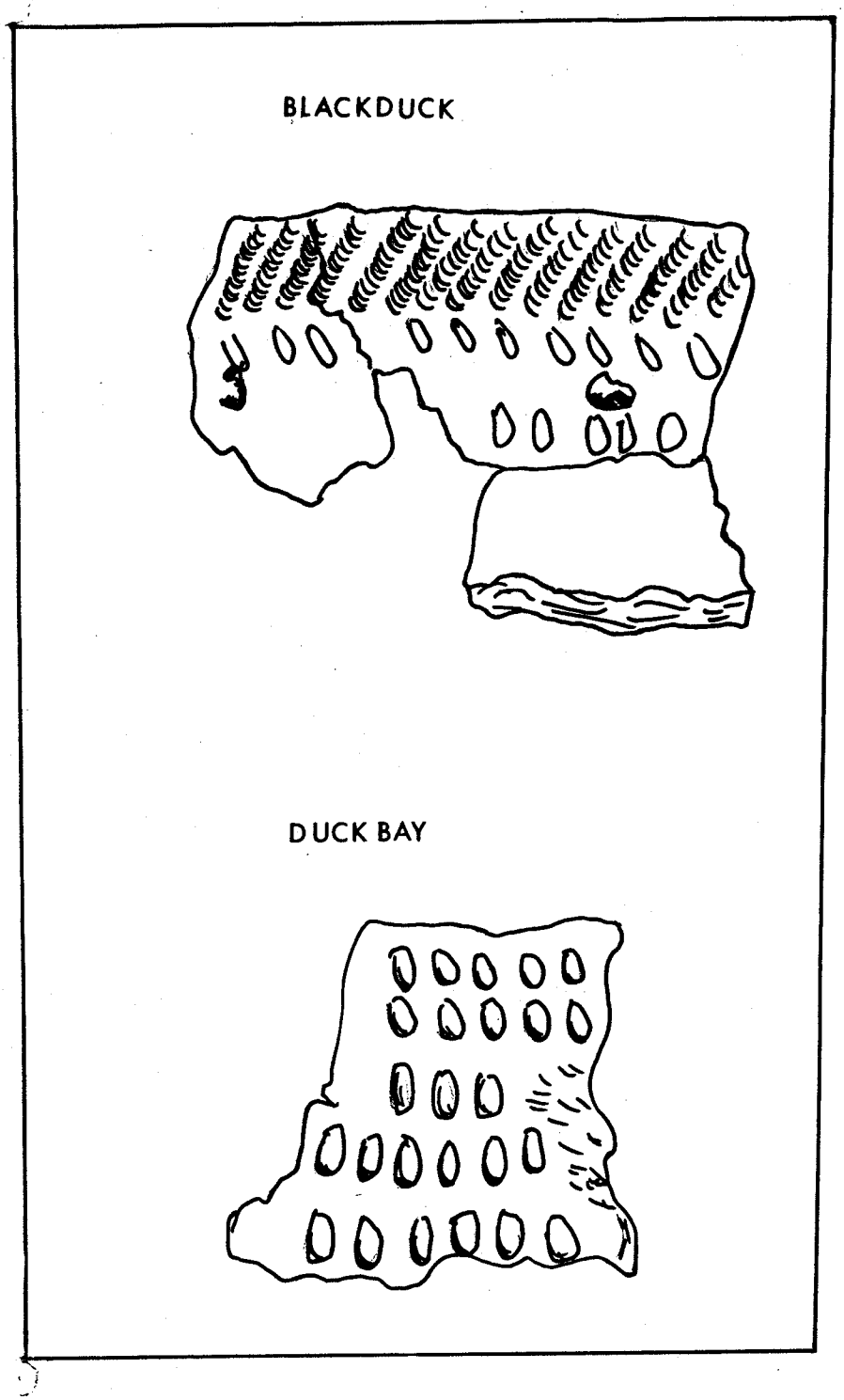


Figure 11: Comparison of Duck Bay and Blackduck Ware

If the Duck Bay ware was used exclusively for salt-making, a concentration of the ware should be found at or near salt springs.

The recovery of Duck Bay ware by archaeologists, amateur and otherwise, from five sites adjacent to salt springs suggests that this ware may have had a specific function. As noted previously, both the Aschkibokahn and Winnipegosis sites share the same type of resource base.

As Ray's (1971) model of seasonal exploitation suggested, Native groups who controlled the Parkland zone were at an advantage over neighbouring groups. In his discussion of postcontact Native economics, Ray demonstrated that the abundance and variety of resources within the Parkland zone, along with river access to the Hudson's Bay Company at York Factory, allowed the Assiniboin and Cree to develop and maintain control of this zone, which included the Manitoba Saline Waterbelt, and establish their roles as middlemen until trading posts were constructed in the interior. At the time of contact, the Native community within this area was represented by Cree and Assiniboin. Both the Assiniboin and Cree were familiar with the physiography of the area at the time of La Verendrye, as both groups assisted La Verendrye's son in establishing a post at the mouth of the Mossy River (Burpee 1927). As well, boundaries between Cree and Assiniboin land appeared to have been well-enscounced by the time of La Verendrye's travels (Burpee 1927) and a congenial relationship existed between the two groups. If the hypothesis put forward by Ray is extended back into the prehistoric period,

groups occupying this zone would have had the same advantages over their neighbours, especially with control of the natural resources. The aboriginal people represented by Duck Bay and Blackduck ceramics may have traversed the Manitoba Lowlands Saline Waterbelt as part of their seasonal round. Duck Bay ceramics may be the indicator of site specialization. Since there are similarities between this ware and ceramics used in salt processing at the Great Salt springs, a conscious effort may have been made to produce salt for a variety of uses, during the movement of seasonal round.

It may be however, that this area was, as Snortland-Coles suggested, a core area (after Syms 1976), from which seasonal shifts were made radiating out from the centre (Snortland-Coles 1979:51). This would account for Duck Bay ceramics being located at saline springs in the study area. Clearly more field research and excavation is required to test this hypothesis.

The proximity of both sites to the marshes and saline springs and the retrieval of Duck Bay ceramics from these and other salt flats, suggests two types of technology of production. The first is by simply collecting salt crystals from the edges of the springs and second by boiling the brine in ceramic pots, using stones to speed up the process.

No evidence of aboriginal brine boiling was identified during the field survey and no definite production methods were recorded in the early historic record other than references to "getting salt from the Indians".

CHAPTER IV

THE CHRONOLOGY OF SALT-MAKING IN MANITOBA

Significance of Salt

The extent of the use of salt by the aboriginal inhabitants of Canada is difficult to ascertain. Because of its common nature, Europeans seem to have considered it a relatively unimportant article to include in daily journals when compared to the business of the fur trade or Christianization of the Natives.

One of the earliest references to aboriginal salt was found in the journal of Pierre Esprit Radisson. Radisson, who in 1652, was captured by the Iroquoian, remarked, "...they gave me salt that served me all my voyage. They also took pains to put it up safe for me, not taking any of it for themselves" (Adams 1961:6). No reason for this cautious behaviour was given, as Radisson never speculated on the possible cultural value of salt amongst the Iroquois.

Neumann's (1977) suggestion that salt taboos were incorporated into aboriginal society during periods of stress, may explain the non-use of salt by the Iroquoian, who, because they were "at war", were forbidden from using it. Aware of its intrinsic value, however, they guarded it carefully. Among the Cherokee and Creek, salt taboos were in effect just prior to a conflict (Neumann 1977:294).

There was another reason that salt or saline springs were important to the Native people. La Verendrye observed "...that it was easy to get a living by hunting and fishing as buffalo and tourtes (pigeons, but thought to refer to deer in this case) were attracted there all year round by a saline spring that was close by" (Burpee 1927:251).

Likewise, several observations made by Alexander Henry in 1799 indicated that the salt springs played an important role in hunting as many animals were attracted to the springs by their physiological need for salt. The aboriginal people took advantage of this and incorporated the area of the salt springs into their seasonal hunts (Coues 1965:138-153).

European Exploration

While the French continued to push westward towards the interior, the English established themselves along the south-west coast of Hudson Bay.

The Hudson's Bay Company (H.B.C.)was established at Fort Prince of Wales near the mouth of the Churchill River in 1717. Over the next 40 years, Hudson Bay

Company personnel gathered information from the local Chipewyans about their homelands, and this was translated into a map of Indian country which included present day northern Manitoba, Saskatchewan and the North West Territories as far north as the Coppermine River. This was important to the H.B.Co. as it provided vital information on Chipewyan territory, the location of other indigenous groups

and the types of resources they could expect the Indians to bring into the Fort. The English, unlike the French, did not venture inland to the Native territories, but continued to "...sleep by the frozen sea" (Robson 1752) and wait for the Natives to make the long arduous trek to the Fort.

A map drawn in 1760 for Governor Moses Norton (Warkentin & Ruggles 1970:89) identified several interesting geological features in the Indian lands; one of these features was the presence of salt to the south-west of Churchill (Figure 12).

On investigating the country between Lakes Winnipeg and Athabasca, Andrew Graham commented on the abundance of salt that lay "...in large quantities..." and looked "...like snow..." (Williams 1969:5). This was later described by Philip Turnor in 1791 as, "...a place reported by some to be a salt hill where salt is dug out, but by others to be a place where salt dries upon the grass by the of a Lake and Salt springs...the Canadians get great quantities of it from the Indians (Tyrrell 1934:110).

Early Eighteenth Century

The earliest recording of salt in Manitoba was found in the journals of La Vérendrye. Aside from a mandate to encourage native trade with the French, he was commissioned to investigate the potential of the natural resources around Lake Winnipeg and Manitoba. Between 1732 and 1741, La Vérendrye learned of naturally occurring salt near the bottom of Lake Winnipeg and

Figure 12: Norton Map of 1760

(after Warkentin & Ruggles 1970)

commented that

> ...five or six league from the same river (Red) there is a salt spring which forms a basin where the sun dries up the water so as to form a very white salt. They (the natives) brought me some of it and it is very good. The savages use it... (Burpee 1927:188).

It is not possible to assess the cultural significance of salt at the time of La Verendrye. Like Radisson, he was more interested in the business of developing a fur trade network and discovering a route to the western sea.

In 1741, La Vérendrye sent his son Pierre, to the mouth of the Mossy River to build a small trade post (Champagne 1968:10). Fort Dauphin, as it was known, functioned for several years. Although salt springs are abundant in this area, no record of salt-making was made. The location of Fort Dauphin has never been positively identified. However, Tyrrell suggested that Fort Dauphin may have been located in the present town of Winnipegosis (Burpee 1927: 379). Centuries before the fort was established, the area at the mouth of the Mossy River was one of several important fishing centres for the aboriginal people. Archaeological investigations by Gibson in 1975 indicated a regular seasonal occupation. Based on similarity of ceramics between this site and Aschkibokahn, the site may have been occupied as early as A.D. 1180 (Snortland-Coles 1979). The proximity of the site to local salt springs provided easy access to the wildlife resources.

The La Vérendrye's were not the only explorers to identify the abundance of salt around Lakes Winnipegosis and Manitoba. As Anthony Henday probed deeper into the interior in 1754, he made several references to the abundance

of salt when he "Passed two salt lakes, large lumps of salt candid laying round the edges", and "...pitched on the side of a lake or rather a pond of water, a disagreeable salt taste, salt laying on the surface an inch thick (HBCA B239/a/69 fo 17).

That same year David Thompson noted salt springs on the west side of the Red River. His report states that

> We crossed several Brooks of Salt water, which come from ponds of salt water on the west side of the river (Red), one, or two are so strongly impregnated, that good salt if made of the water by boiling, the meat salted with it is well preserved, but somewhat corroded (Tyrrell 1916 :248)

These may have been the same salt springs that La Verendrye identified twenty years earlier as the source of salt of the Assiniboin. This area was well known for its salt as David Harmon remarked,

> This lake I am told is large and extends down a considerable distance towards York Factory (Hudson Bay). At only a few days march from here, there is several places where almost any quantity of excellent salt could be taken... (Lamb 1957:115).

Harmon also judged the salt springs on the Swan River as making a "tolerable salt" (Lamb 1957:33). Unfortunately, the exact location of the salt springs that were used by the posts was never identified, but the base of Thunderhill was suggested as one of the locations of former salt springs (Spencer 1875).

Self-sufficiency was a pre-requisite for the fur traders and when Charles Isham was sent to the Swan River District to establish a post in 1790, he immediately made use of the salt springs. A salt spring near the mouth of the Shoal River provided enough salt for his post and York Factory (HBCA B213/a/1, B213/a/2 fol2d; Tough 1987:161).

Early Nineteenth Century

At the beginning of the 19th century, entries in the Fort Pelly Post Journal reiterated the importance of salt-making in the Swan River area

> ... in an inlet of the Shoal River was a spring forming a basin about 20 feet in diameter and constantly bubbling. It was good salt in great demand "for sale to the colonists". It was esteemed for table use and for preserving buffalo tongues and other meats of the country. One Canadian made 10 gallons of salt a day and his price was 2 mB or about 6s money. If he had more boilers this man could have produced more and Cook thought it might become a "lucrative business" (HBCA B176/a/1).

The offspring from the country marriages (mariage a la facon du pays) between fur traders and Native women provided a unique and vital labor force (Van Kirk n.d.). The combination of European technology and aboriginal ingenuity was crucial to the success of the fur trade. This was also true of the growing salt industry. Many Scots, especially those from the Orkney Islands, brought with them a working knowledge of salt-making. The Scottish salt industry had flourished from the mid-1500's (Whatley 1987), and

techniques popular in Scotland during the 1700's were transmitted to the Manitoba interior via the fur trade and later the Selkirk Settlers of the Red River Settlement. Lack of equipment meant improvisation and, as is described in the technology of production, this often resulted in a coarse, impure salt.

Salt-making continued at Shoal river for over 60 years and there are signs that it became a family tradition similar to that in Scotland (Whatley 1987). While "Old man Brass...made 200 bushesl of salt (MG 1 D9 1861) at Shoal River, his son Peter was also making salt (MG 1 D7 1854:4).

Perhaps the most well-known of the salt-making Metis was the Monkman family. James Joseph Monkman established himself as a salt-maker as early as 1818, working the springs at Swan Lake, Duck Bay and finally at the Red Deer Peninsula. By the 1870's his family was producing 1000 bushels of salt per year (Cameron 1949:3). The quantities of salt necessary for preserving meat demanded regular production. Company men, as well as hired Indians and Metis, engaged in salt production not only for their own local post needs, but also to furnish salt for the newly established Red River Settlement. As the settlement grew, so did the demand for salt, for example "...200 bushels of country salt from Swan River..." (MG 2 A6 1836:109). It appears that during the period 1839 to 1875, salt-making shifted from the Hudson Bay Company to independent salt-makers such as Monkman, Brass and Campbell. As the fur trade declined, and transportation routes shifted from the Hayes/Nelson/Hudson Bay tracks to the Red River and steamboat and rail, many of the Natives and Metis returned to traditional economies, such as fishing and hunting. Agriculture

had been introduced into the area and both farming and ranching became prevalent. At this time, salt-making became part of the regional economy, supplying the growing farming communities and Red River Settlement. Small Native settlements sprung up around the salt springs and provided a steady labor force.

The Monkman Saltworks flourished under "old Joe Monkman" and his sons John and Joseph. Salt was made at the large salt flat on the Red Deer Peninsula on Lake Winnipegosis (Figure 13). It was packed in 100 bushel birchbark rogans (Figure 14) and transported by York boat to Oak Point on Lake Manitoba. From there it was transferred to Red River carts and sold to the Settlement, Portage la Prairie and the numerous homesteads that were being established along the river banks (Free Press 1908).

It was not coincidental that Father G. Belcourt, a Catholic missionary, established a mission at Duck Bay in 1839. The resources of the marshes, particularly at Duck Bay provided a year round food supply. The fall fishery, one of the most important and reliable aspects of native economy, was extremely productive at the mouths of the Duck and Drake Rivers (McCarthy 1987). Seasonal occupation here had its roots in the prehistoric period. The 1976 and 1977 excavations at Duck Bay (Ashkibokahn Site, FbMb-1) indicated a spring through fall site occupation with a focus on fishing that continued into the historic period. Father Belcourt noted that the production of salt was an important resource in the economy and it enabled the Sauteux (Ojibway) and Metis to live comfortably in a permanent setting at Duck Bay (Belcourt 1840).

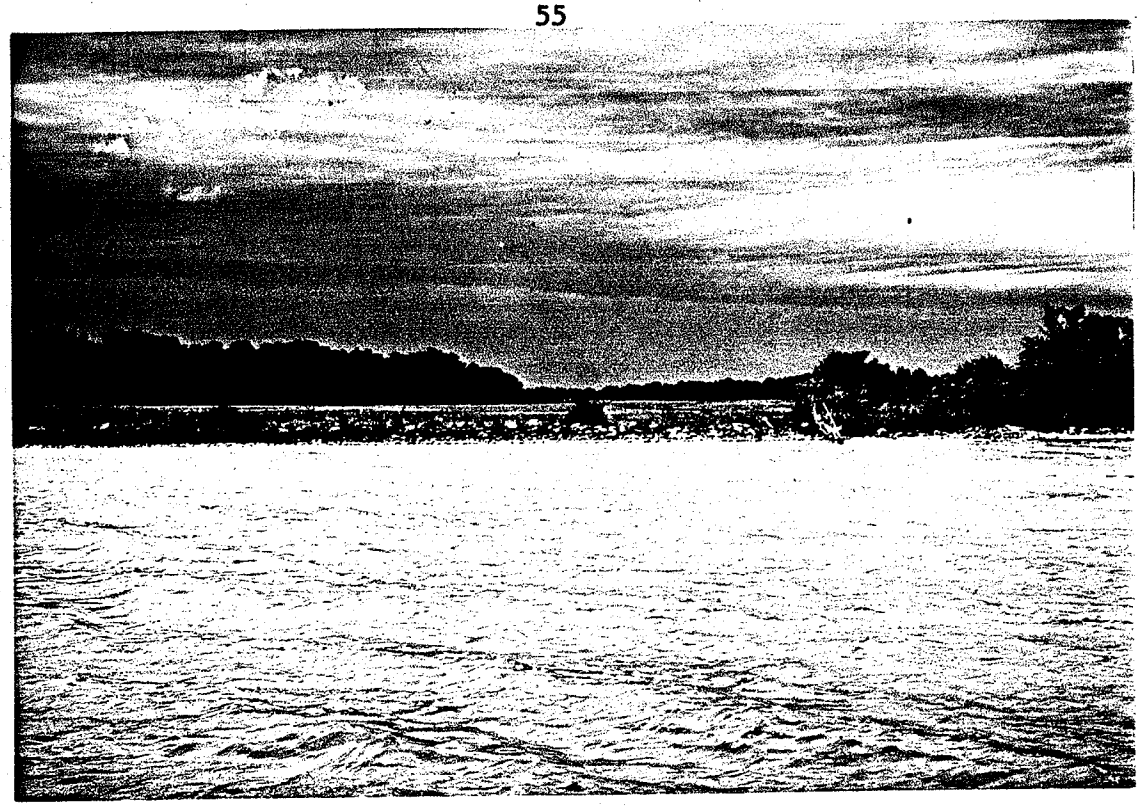


Figure 13: Site of Monkman's Saltworks

(Photo from author's file)

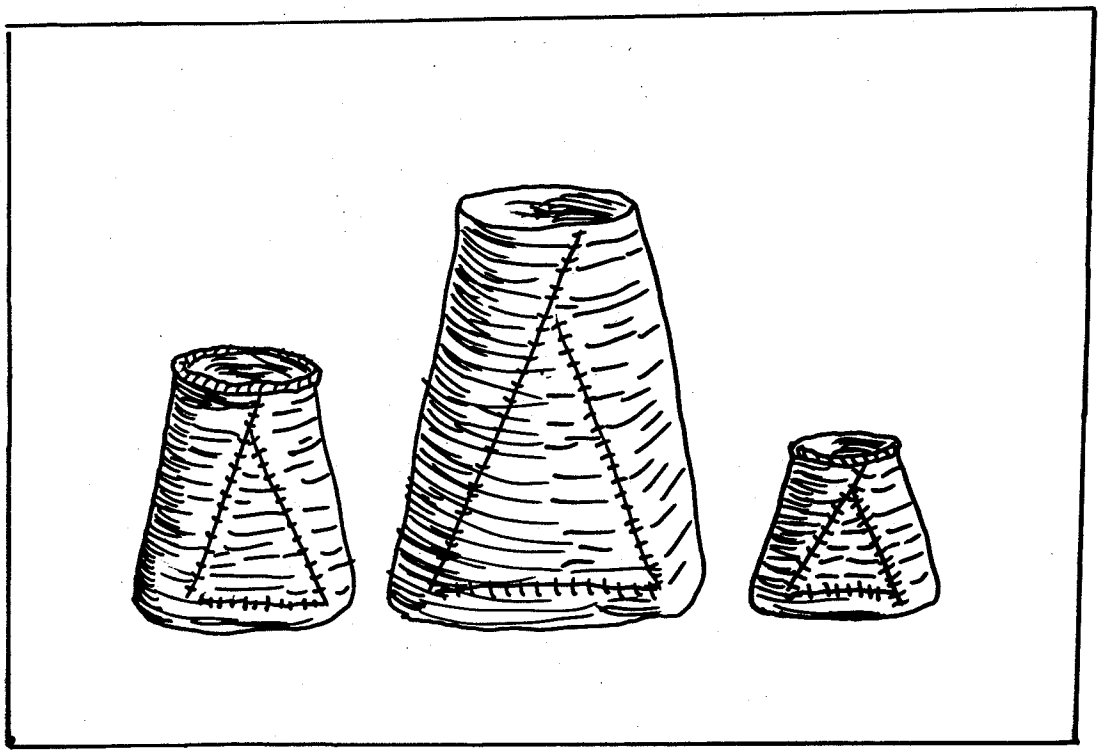


Figure 14: Birchbark Rogans used for transporting salt

(Redrawn after Free Press, 1908)

Spencer also noted the importance of salt-making to the Duck Bay settlement. The Sauteux, who were relative newcomers to this area (late 17th century), indicated that they did not use salt in precontact times . However, by the time Father Belcourt had established his mission at Duck Bay, the Sauteux were actively involved in the local salt-making industry. Salt-use among the Sauteux apppears to have been an acquired trait. Ethnographic accounts of the Ojibway in the Lake Superior area suggested that salt was not used by the people prior to European contact (Kohl 1985:319).

A song, "We Have Salt", recorded by Frances Densmore at the White Earth Reservation in Minnesota at the beginning of this century indicated that by 1847 the use of salt by these Ojibway had become an acquired taste and was an important item in their treaty negotiations (Densmore 1913:291) (Appendix A).

The ownership and production of salt as a part of the regional economy of the Duck Bay Ojibway and Metis was never negotiated in the terms of Treaty 5 (Tough 1987) and salt production was not pursued by either group by the turn of the century.

Prior to the preparations for treaty, geological explorations and surveys noted that the region had more to offer than just arable land. When Henry Youle Hind explored the land between the Assiniboine and Saskatchewan river he noted the presence of salt. Between 1873 and 1915, T.W. Spencer, (1873-74), J.B. Tyrrell (1889-90) and L.H. Cole (1915) conducted geological surveys across the province to determine the nature of the salt, that is, was the saline solution natural, or was it the result of groundwater percolating

through a bed of rock salt (Tyrrell 1893)? Rock salt was easier to extract than salt in solution. As well, geological research in the United States identified oil deposits in conjunction with salt deposits found in the form of salt dome (Dreyer 1982). It was thought that perhaps this might be the case with the Manitoba saline deposits.

Hind's two volume report not only laid the foundation for future geological surveys, but also provided some valuable (although often biased) ethnographical information (Hind 1971).

The Geological Survey of Canada (1873-74), under T.W. Spencer, confirmed the location of salt springs described by Hind.

These surveys, in part, prevented the development of the salt industry by the Metis and Native people. The preparation of their land for entrance into Confederation and the signing of Treaties limited the economic development of the native community. When the railway entered Manitoba in 1875, so did high quality, cheap rock salt from Ontario. The competition proved to be too much for the local saltmakers, such as the Monkman's and Brass' and by 1887, salt production in Manitoba had become an insignificant industry. When Dominion Land Surveyors visited the Monkman Saltworks in the 1880's, they found only the ruins of two log houses and the remains of two kettles (Dufresne 1888: 71). J.B. Tyrrell who also visited the site in 1889 described the few broken-down furnaces and old kettles as all that remained of Monkman's former enterprise (Figure 15).

Figure 15: Monkman Saltworks in 1889

(Courtesy of the Provincial Archives of Manitoba

J.B. Tyrrell Collection)

The only salt-makers left were occasional Indian families who stopped off to make salt for their immediate needs as their ancestors probably had hundreds of years before.

A short-lived revival of the site in the early 1900's by William Flett met with the same fate as his predecessors (Cole 1915; Brown personal communication, 1986)

Early Twentieth Century

Closer to the village of Winnipegosis Paul Wood attempted to work the salt springs. The Northern Saltworks Company (EjLx-7) was short-lived and although Belanger noted the saltworks in 1896, by 1898 the operation had folded. Here, as at the Monkman Saltworks, distance from markets, cost of production and transportation were factors of its demise.

In 1915 L.H. Cole provided a detailed account of the saline pools of Manitoba, in particular the Lake Winnipegosis area and concluded that solar evaporation would probably be the most economic means of obtaining the salt. Analysis of samples obtained by test drilling in the Saline Waterbelt and Brandon areas were favorable for full scale industry. In 1932 the Canadian Salt Company Limited began producing salt by the vacuum pan evaporation process at Neepawa, Manitoba (Figure 16). Brine was pumped from the drilled wells and processed (Figure 17). At its peak 18000 to 22500 tonnes of salt was produced annually (Zanalan 1980:7).

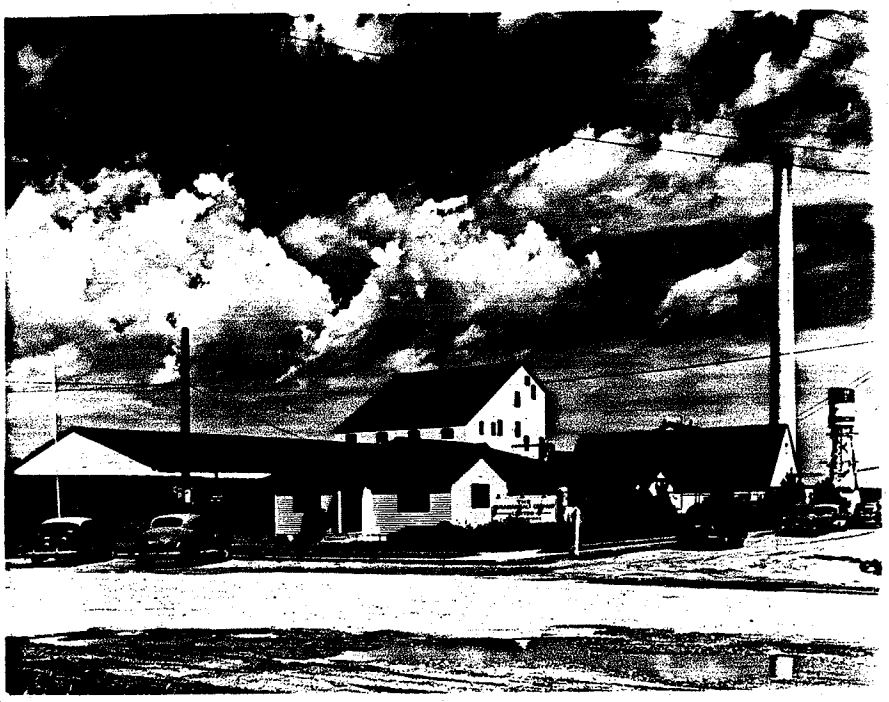


Figure 16: The Canadian Salt Company, Neepawa

(Courtesy of the Provincial Archives of Manitoba)

Figure 17: Checking salt at Neepawa

(Courtesy of the Provincial Archives of Manitoba)

At the same time that the Canadian Salt Co. was establishing the salt industry at Neepawa, another type of salt was being looked at for its marketability. By 1937, geological attention had turned to potash salts as a means of soil fertilization. Based on the association of potash with common salt in Stassfurt, Germany, a group of speculators, with Mr. McArdle of Swan River as one of the local entrepreneurs, formed the Northern Salt Syndicate and employed the services of Dr. G.M. Brownell, Assistant Professor of Geology and Mineralogy, University of Manitoba, to analyse test material recovered from salt springs at the Red Deer River. Based on his report, "...The discovery of a strong brine or a bed of rock salt offers an opportunity for commercial exploitation..." (Brownell 1937), the Northern Salt Syndicate submitted a proposal for drilling and developing the brine flow. The operation at the Red Deer River (McArdle Salt Flat) was not profitable and folded, distance from markets and transportation costs and internal problems being the main factors in its failure (Dubreuil personal comm. 1986).

The province of Manitoba continued to conduct geological surveys in an attempt to locate potash, phosphate and salt but the inhibiting factor appears to have been the cost of recovering the minerals from the brine and distance from market. As a result, no serious operations were established north of Neepawa. Brine wells east of Brandon continued to process brine until 1978 when the wells were abandoned and it became cheaper to ship in raw materials from elsewhere.

CHAPTER V

THE ARCHAEOLOGICAL SURVEY AND INTERPRETATION

The archaeological investigation consisted of field survey and archival research. A major problem with conducting a survey, is that no one site is examined in great detail. Time is always a major constraint to investigation. As a result, sites visited that did not show evidence of human activity, may in fact, have been the centre of activity. Since no previous survey of the salt flats or salt springs had been conducted, maps and information provided by local residents were the biggest asset in the field.

The interpretation of the data was enhanced by the historical record. Because of this, a continuity of resource use at the salt springs was identified at six sites: the Monkman Saltworks, the Duck Bay/Ashkibokahn, the McArdle Saltworks, the Winnipegosis Site and Saltworks, the Steeprock MSS#10 and the Little Waterhen/Salt Point site.

This chapter then, is a summary of the field component of the investigation into the location and use of salt in Manitoba.

Field Survey

Survey work began in June 1986 with four major objectives in mind, to:

1) locate and identify the salt springs described in the historic and geological records.
2) conduct an archaeological survey of the salt springs and surrounding areas to determine the extent of human activity.
3) identify the users of the salt springs.
4) provide some interpretation of the social groups that included salt-making in their economies.

An intensive review of the literature pertaining to salt was conducted. This included environmental reports, such as geological surveys, ecological studies, and soil and mineral maps; archaeological reports; such as the Provincial Archaeological Site Inventory Files and unpublished field reports were accessed for information regarding the location of archaeological sites within the study area; the Hudson's Bay Company Archives; journals of explorers and surveyors; and the Human Relation Area File.

The first field season was a three week period of intensive pedestrian survey, during which time a systematic search of known saline springs was conducted. Twenty-six geologically recorded salt pools and flats along the western shore of Lake Winnipegosis up to and including the Red Deer River were visited.

Travel to the sites was accomplished by van, however site survey was by foot and canoe. Although most of the sites proved to be extremely difficult and dangerous to get to, inclement weather proved to be the biggest obstacle. Sites along Dawson Bay were accessible only by boat during the summer. Investigations here were cut short because of poor weather conditions. The majority of salt springs failed to provide much evidence of prehistoric activity, but a few yielded artifacts such a bifaces, scrapers and knives. Four historic salt manufacturing sites were identified.

Since the purpose of the field survey was to identify rather than excavate, little testing and no excavation was conducted. Each geologically and historically documented salt spring and salt flat that could be reached was examined and mapped, also its location and proximity to known prehistoric settlement sites was noted.

Several sites could not be reached during the first field season and these sites were examined the following summer. In 1987, five separate field trips were conducted, one to Morris, Manitoba to locate salt springs on the west bank of the Red River near the Morris River (Coues 1965), one to Steeprock Bay area and three to the Winnipegosis Salt Flat site (EjLx-7). The last site visited (EjLx-7) proved to be a productive site in that features and foundations noted on the 1896 survey maps as belonging to Paul Wood and the Northern Salt Works was verified.

At the end of the 1987 field season, one area was left to be surveyed. The mouth of the Swan River was known to have been the site of a small salt making activity during the latter part of the 19th century. This was examined during September, 1988. However, aside from an old cabin and signs of previous homesteading, no suggestion of salt-making was noted. Again poor weather conditions prevailed and the survey was ended.

Human Activity Sites

Of the 26 saline pools and flats visited, only seven sites yielded any evidence of human activity (Figure 18). Two sites had been previously recorded (Wright 1963; McLeod 1985), but five were new archaeological sites.

Very few artifacts were recovered from the sites and they were limited to a few stone flakes, scrapers, bone, an unidentified polished stone as well as historic ceramics, glass and nails. No prehistoric ceramic was recovered during this investigation. Duck Bay Ware was later recovered at three nearby sites by a volunteer.

The location of all sites surveyed are described below (Table 1). A Manitoba Salt Survey Number (MSS#) was given to all sites, but only those at which human activity was noted were given a Borden Number.

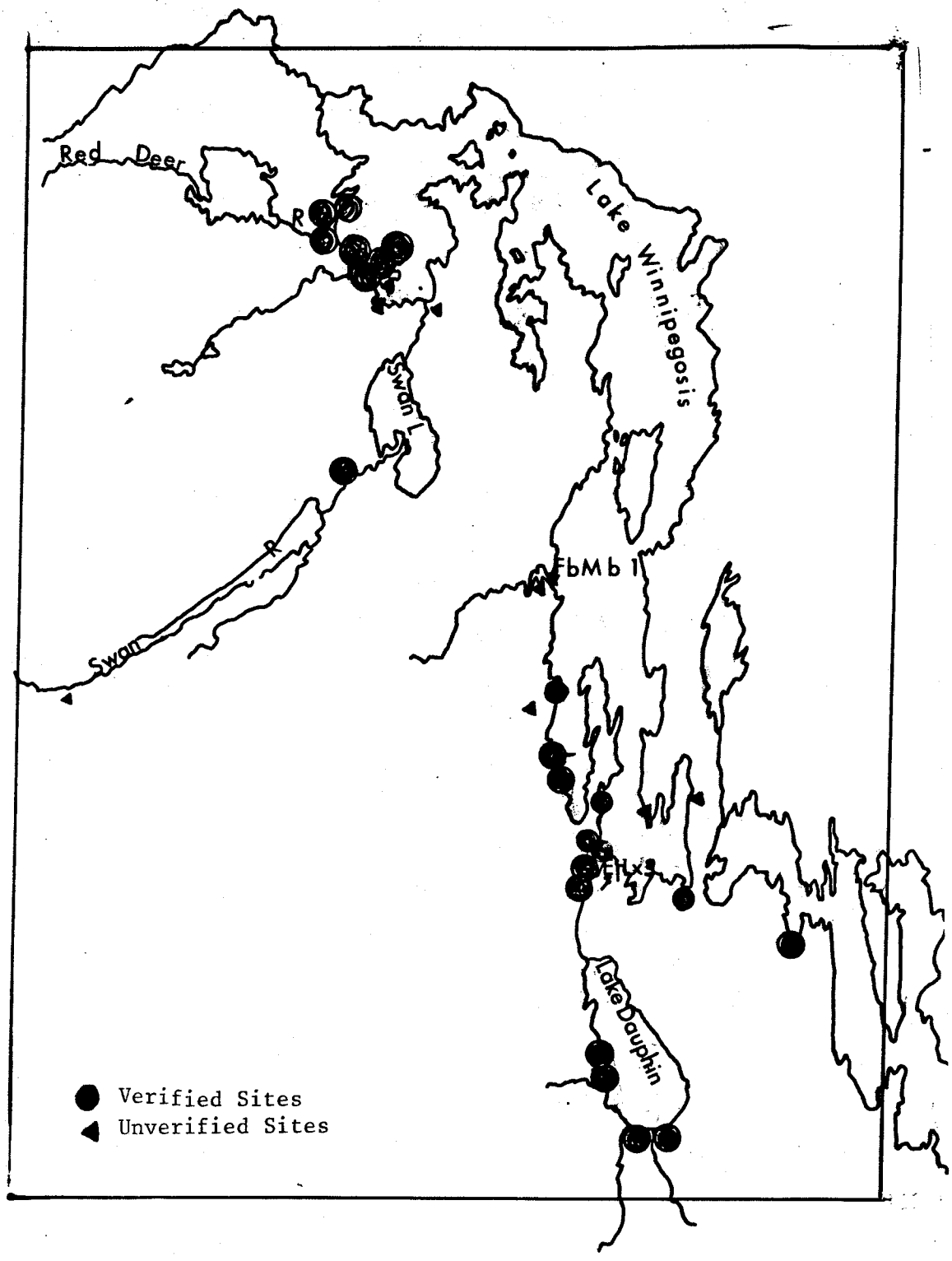


Figure 18: Map of Sites Surveyed

Table 1: SUMMARY OF SITES SURVEYED

BORDEN NUMBER	SITE NAME	LOCATION	MAP REF.	SITE TYPE	DATE SURVEYED
EkMa-4	Mudery	14UMN253344	62N/9	Prehistoric	30 June 1986
FfMg-1	Red Deer	14ULP623603	63C/14	Prehistoric	02 July 1986
FfMg-3	McArdle	14ULP613594	63C/14	PreHx/Hx/Industrial	02 July 1986
EkLx-1	Monkman	14UMN347334	620/12	PreHx/Metis	03 July 1986
EjLw-1	Lawrence	14UMN523143	620/12	Prehistoric	07 July 1986
EjLx-7	Wpgosis Salt Flat	14UMN346242	620/12	Historic	26 July 1986
MSS#7		14ULP633616	63C/14		02 July 1986
MSS#8		14ULP708509	63C/15	Historic	28 Aug 1986
MSSS#9		14ULP711518	63C/15		28 Aug 1986
MSS#10		14ULP734521	63C/15		28 Aug 1986
MSS#11		14ULN491788	63C/3		26 July 1986
MSS#12		14UMN214618	62N/16		26 July 1986
MSS#13-18		14UMN215600	62N/16		25 July 1986
MSS#19&20		14UMN345205	620/12		24 July 1986
MSS#21		-	620		06 July 1986
MSS#22&23		14UMM324937	620/5		05 July 1986
MSS#24&25		14UMM475618	620/4		05 July 1986
MSS#26		14ULP681519	63C/15		23 Aug 1987

Two previously excavated sites, Ashkibokahn (FbMb-1) and Winnipegosis (EjLx-3) were noted to occupy similar physiographic settings and contain similar cultural remains. Snortland-Coles described the Ashkibokahn Site in terms of "site-catchment" analysis, a concept developed by Vita-Finzi and Higgs (1970). By this method the correlation between precontact exploitation patterns and the marshlands resource base were analyzed. Snortland-Coles concluded that "...the marsh was a valuable source of prehistoric resources and probably served as a focus for settlement" Snortland-Coles 1979: 134).

The Winnipegosis Site was compared to this site because it shared many physical and cultural similarities of the Ashkibokahn Site. Sites surveyed during the 1986-1988 salt survey were examined with this "marsh model" in mind because most of the saline springs and salt flats offered the same resource base.

Description of the Archaeological Sites

The Mudery Salt Flat (EkMa-4)

The site was located east and adjacent to Highway 20, approximately 12.8 km north of the town of Winnipegosis. No evidence of salt-making at this site was found as road construction and cattle grazing had destroyed any possible features associated with salt-making. A large salt flat of 4.5 ha stretched to the east and was bordered by meadow grass and scrawny bur oak. Meadows interspersed with marshes extend east to Sagamace Bay. Limestone till was strewn across the flat. An active spring was present near the highway and measured approximately 0.6 m in diameter. Red algae and hematite staining were noted around the mouth of the spring. Moreover, because it had been very hot and dry, a white effervescence covered the entire salt flat. It looked and tasted like sea salt (Figure 19). No diagnostic artifacts were recovered. Chert flakes were found along the eastern edge of the flat near the meadow. A "stone axe" was also recovered near the shore of Sagamace Bay, near this site, several years ago. It is now in the Winnipegosis Museum. The

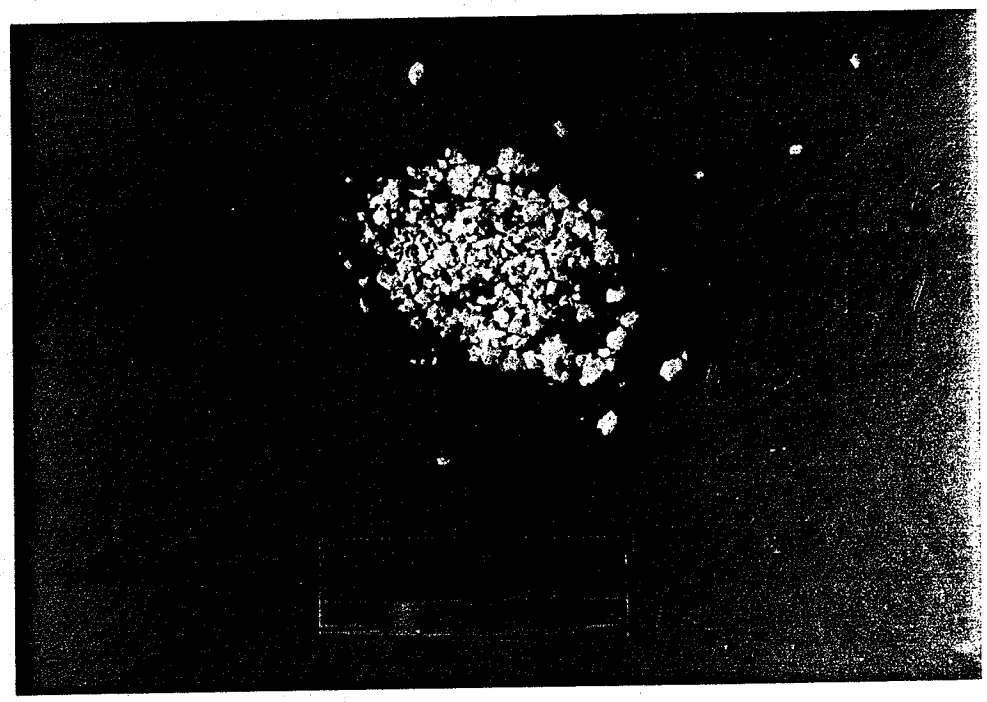


Figure 19: Salt Collected From Around the Mudery Salt Spring

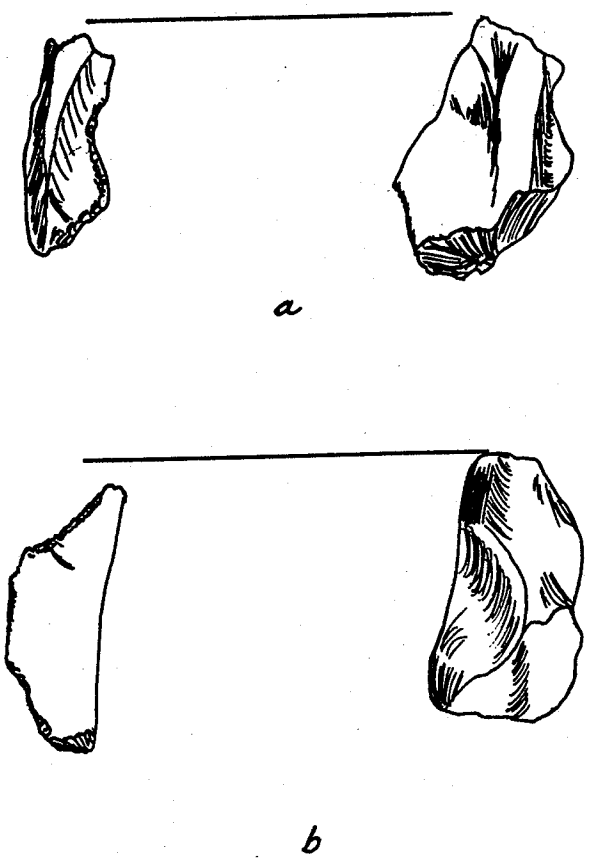
(Photo from author's file)

ridge on which it was found was part of an old Indian trail (pitching track) that extended from Dauphin Lake to Pine River along the Campbell Beach Ridge (Hind 1971:ii:51). Artifacts have been recovered from several spots along this path (H. Brown, personal communication, 1986).

Red Deer River Brook (FfMg-1)

The site was located on the north bank of the Red Deer River about 40 metres west of the bridge at the provincial roadside park. The site was first recorded by J.V. Wright in 1963 (Historic Resources Branch Site Inventory 1963) adjacent to the mouth of a small salt brook that empties into the Red Deer River. Unfortunately, the construction of a bridge in 1953 destroyed the site. There was further disturbance by park construction. Numerous flakes, scrapers and cores were identified at the site (Figure 20). A representative sample was collected but the majority were left in situ because of the disturbance created by park construction. Several small historic sites were reported to be in the vicinity, but these nor any prehistoric settlements were noted nearby. Indeed, Snortland-Coles (1979) had suggested that the delta of the Red Deer River might reveal prehistoric settlement and possibly Duck Bay ceramics. The Red Deer River was an important water route during prehistoric and historic times, and closer inspection of the area around the mouth of the river may reveal evidence of both time periods.

In May 1990, a heritage resource impact assessment of this area will be conducted for Manitoba Highways in preparation for a new bridge and highway.



Actual Scale

Figure 20: Two Flakes from FfMg-1

(Drawn by author)

Under the Manitoba Heritage Resources Act (1986) all construction and development requires impact assessment if heritage resources are considered to be threatened.

The McArdle Site (FfMg-3)

The McArdle Site (FfMg-3), a multicomponent site, was located on the south side of the Red Deer River on a large salt flat about 0.5 km west of Highway 10. The "old highway", located north of a limestone quarry, wound through the dense bush and passed within 0.5 km of the salt flat. An old corduroy road marked the entrance to the salt flat (Figure 21) and the old salt works of the Northern Salt Syndicate. Aside from the typical limestone till scattered across the flat, a collapsed building and corroded pipes (Figures 22 & 23) were noted near an active spring which measured approximately 3.5 meters in diameter. The spring was probed with a 4 metre pole, but bottom could not be determined. The skeleton of a deer was found inside the pool. At the extreme west edge of the salt flat, a Swan River chert uniface, a number of flakes, an unusual polished rock and a preform of unidentified stone material were recovered (Figure 24).

Historic records also document salt manufacture by the Red Deer River Depot during the early 1800s. John Tanner referred to a salt spring on the Red Deer River where the traders made their salt (James 1956:76). Although neither records are explicit as to the exact location of the salt spring, it may be that the McArdle Site is the one referred to.

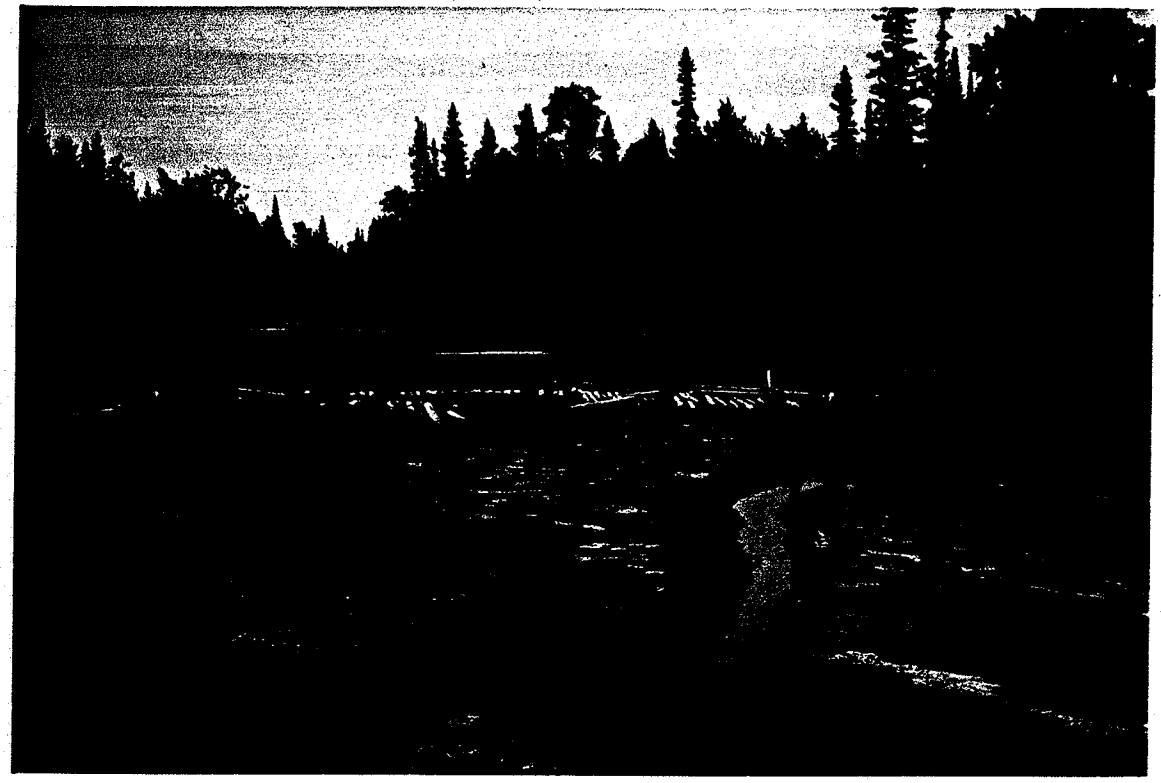


Figure 21: Corduroy Road at McArdle Salt Flat

(Photo from author's file)

Figure 22: Collapsed building at McArdle Salt Flat

(Photo from author's file)

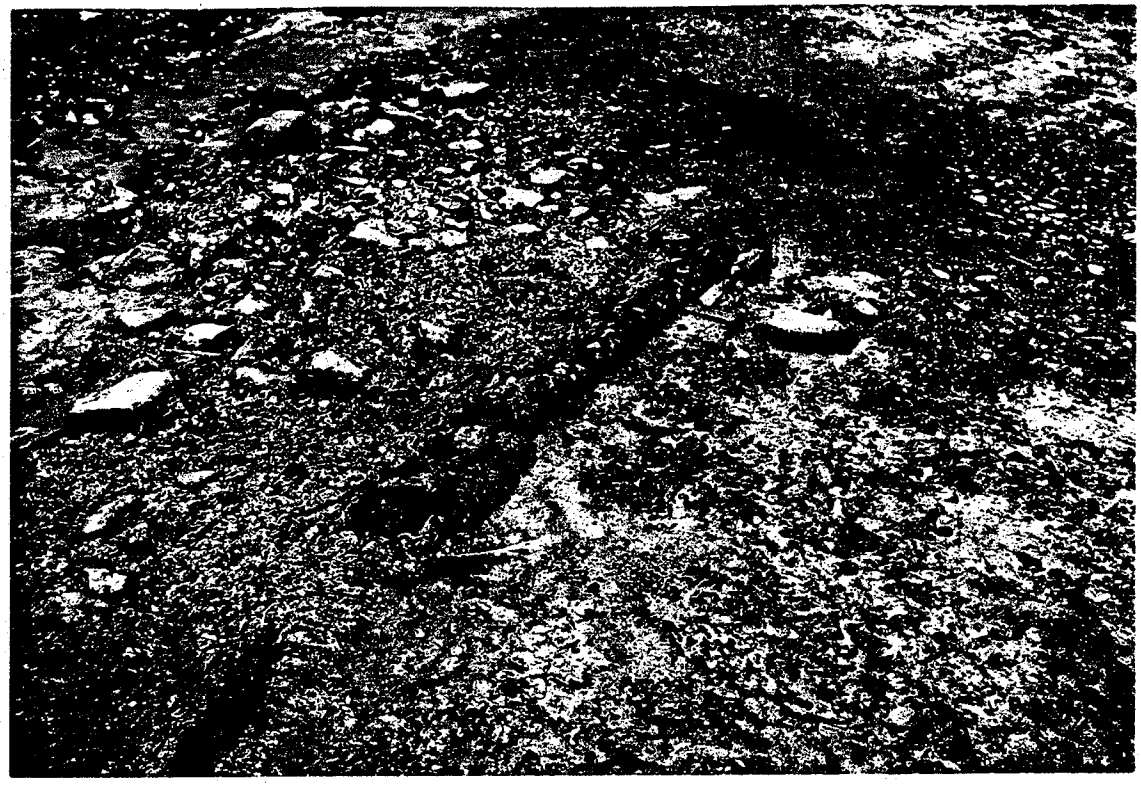


Figure 23: Corroded pipe on McArdle Salt Flat

(Photo from author's file)

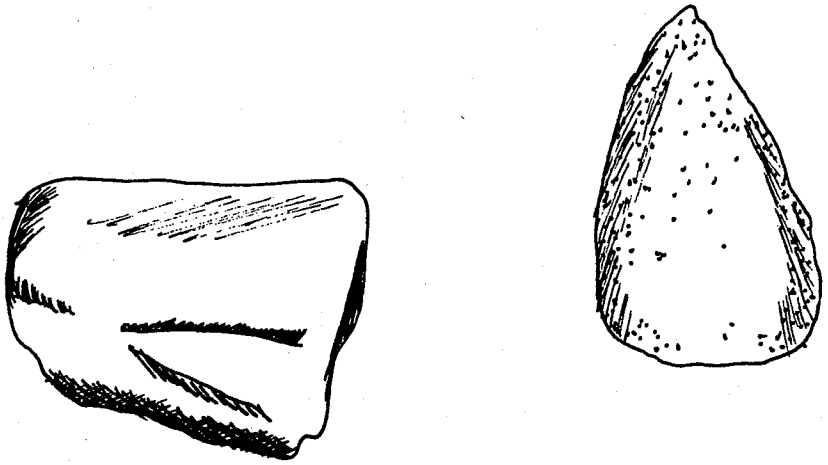


Figure 24: Polished stone and Preform from McArdle Flat

(Drawn from author's file)

The Monkman Saltworks (EkKx-1)

This is perhaps the best known historic salt-making site. It is mentioned most frequently in the historic records and seems to have been the most viable salt-making operation in the study area. The site was located on the west shore of Lake Winnipegosis on the Red Deer Peninsula. The large salt flat was surrounded by dense, but stunted trees and shrubs amd many small, brackish ponds were noted. Several depressions and mounded features which may represent old building foundations, were located on the north side of the flat about 300 m from the lake shore. The remains of several well cribs were also located. No metal troughs or ladles were seen and these were probably removed by the last salt workers, or by curiosity-hunters. A number of small grey chert flakes, historic glass, and ceramics, and a fishing weight were recovered during the pedestrian survey.

McLeod (1985) applied South's (1977) artifact class summary to artifacts recovered during his field survey at this site. He determined that although the historics record document that the Monkman saltworks began in 1818, it was not until 1839 that the site saw an increase in its operations of salt production.

A prehistoric component of stone flakes acknowledged use of the salt flats by Natives at least for hunting. Since diagnostic stone tools were not recovered at this site, it was not possible to identify the cultural affiliation of the prehistoric artifacts.

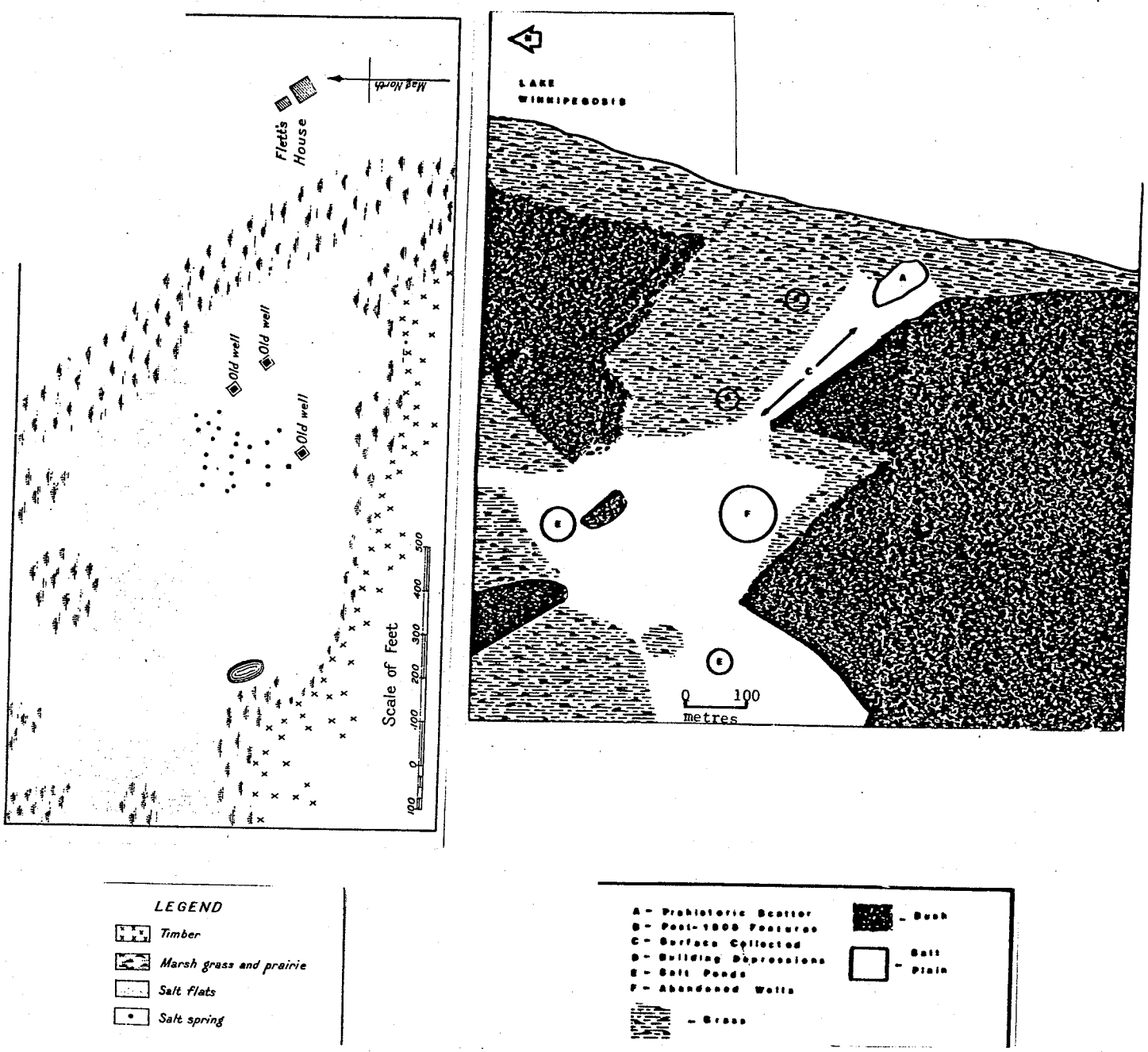


Figure 25: The Cole-McLeod Map Comparison

By comparing McLeod's (1985) and Coles (1915) maps (Figure 25), it was possible to identify the archaeological remains of Flett's House. According to Harvey Brown of Winnipegosis, his grandmother was a Flett and lived at the Monkman Saltworks area around the turn of the century (Brown, personal communication, 1986). The location of the old wells is the same on both maps. The late terminal date assigned by McLeod may represent the Flett occupation. More field and archival research is necessary identify the various occupations at this site.

Lawrence Lake Salt Spring (EjLw-1)

A small salt flat and salt spring on the west side of Lawrence Lake was surveyed. This site was located on the southwest edge of a large salt flat about 50 metres south-east of an active salt pool at the base of a small knoll which rose approximately 0.5 metre above the salt flat. A possible projectile point and a waterworn flake were recovered near the base of the small knoll (Figure 26). Shovel tests conducted at 2 metre intervals across the knoll, were entirely negative. Although the soil of the knoll was of a different composition than the salt flat, it was interpreted as a natural deposition.

The Winnipegosis Salt Flat Site (EjLx-7)

North of the village of Winnipegosis, a large salt flat with an extensive marsh was located. The was the site of a small salt manufacturing operation conducted by Mr. Paul Wood in the late 1890's for the Hudson's Bay Company (Belanger 1896) (Figure 27). At the west side of a small knoll, a large artificial depression was noted. This was filled with a variety of grasses

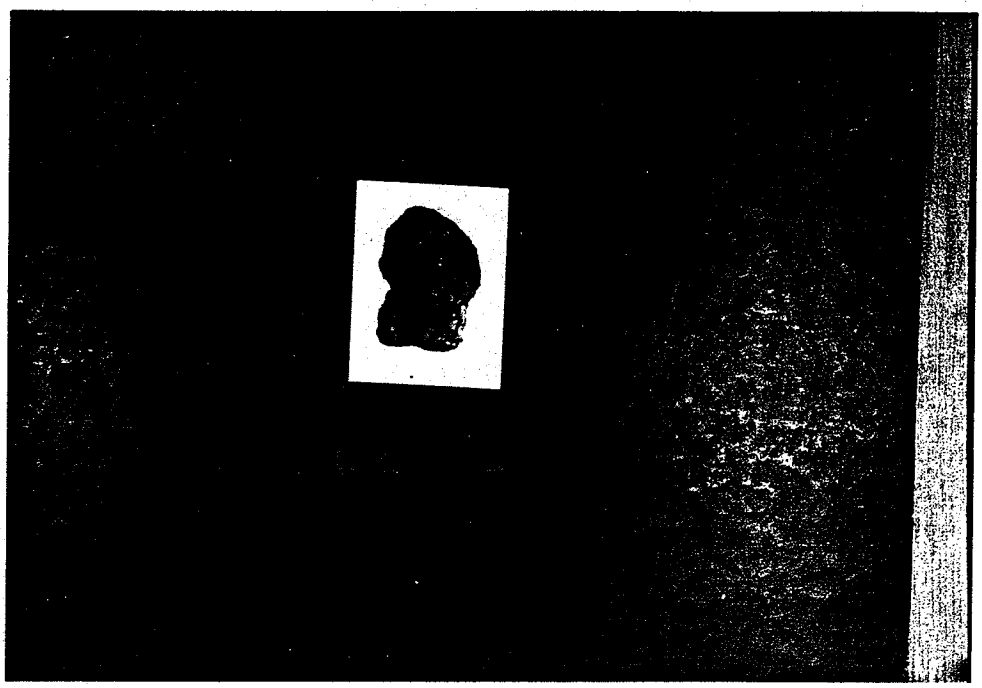


Figure 26: Waterworn Projectile Point from EjLw-1

(Photo from author's file)

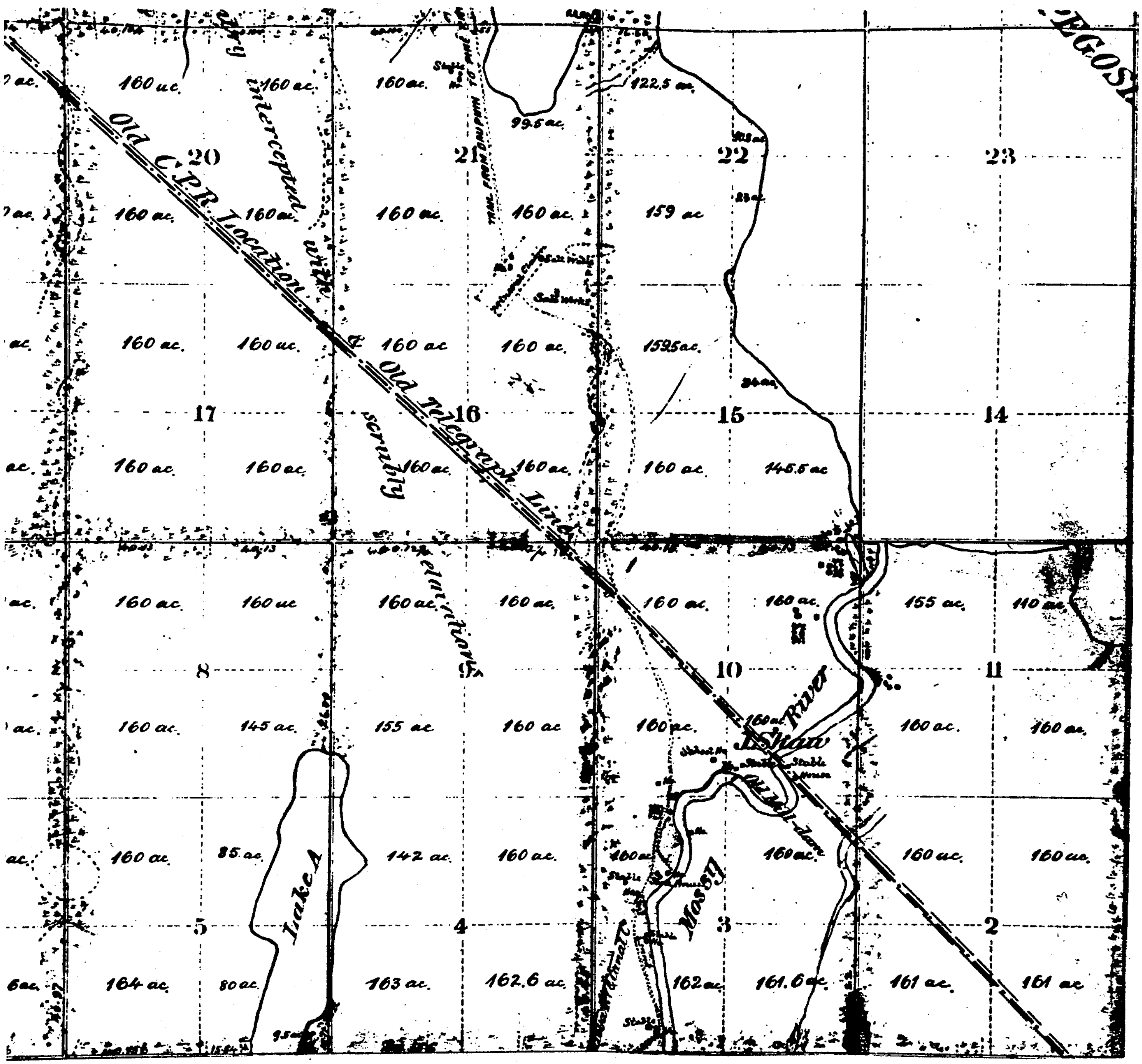


Figure 27: The 1896 Belanger Survey Map

(Courtesy of the Provinical Archives of Manitoba)

and some glaswort as well as wild rose. A shovel test was conducted and because the ground sounded "hollow", a test unit of 50 centimetres square was opened and the sod removed. Careful examination revealed gleyed soil similar to the soil of the adjacent salt flat. A very thin veneer of organic material clung to the roots of the sod. This was carefully trowelled, but no artifacts were recovered from the sod. The unit was excavated in 3 centimetre levels. No soil profiles were noted and the soil continued to be uniformly grey . At 25 centimetres, pieces of wood appeared. As the entire 50 centimetre square was cleared to this depth, wood planks became evident. Three planks, each measuring approximately 30 cms (12 inches) in width X 5.5 cms (2 inches) in thickness were in an excellent state of preservation. The planks ran in a north-west to south-east direction. An additional 50 centimetre square unit was opened at the north-west corner of the previous unit. Again no stratigraphy or soil horizons were noted until at 25 centimetres, the continuation of the wood planks was noted (Figure 28). A small piece of plank was carefully removed and the soil beneath it checked thoroughly. No artifacts were noted, except for small snail shells, a sample of which was taken for analysis. Because of technical difficulties no further testing was done at this site in 1986. The rest of the knoll was surveyed and several stone features were noted which related to the small work areas.

No active salt spring was noted at this site, but as mentioned previously, the migrating nature of the spring may be the reason for this. An area of "ooze" was noted 150 metres northwest of the feature. This was within

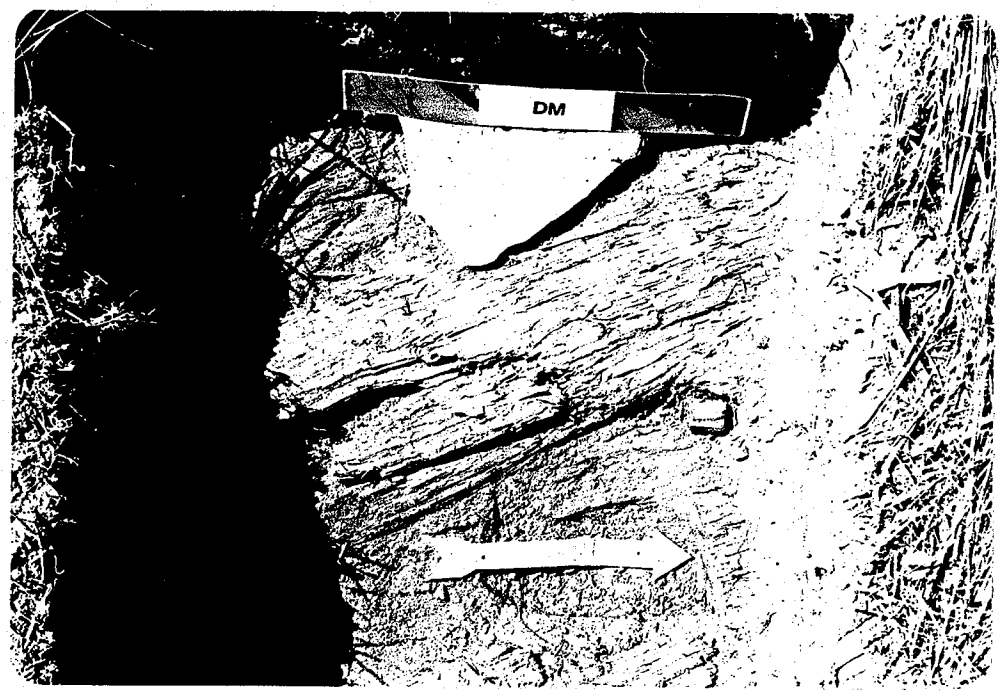


Figure 28: In situ wood planks

(Photo from author's file)

the area demarcated as a salt well by P. Belanger on the 1896 survey of the area. No well cribbings, furnace remains or equipment, such as salt pans were visible at the site.

In 1987, the survey of the Winnipegosis Salt Works continued in search of the house and shed indicated on the 1896 map. There was some discrepancy between the location of buildings on the survey map and their actual location. A pedestrian survey through a dense stand of oak and underbrush revealed the stone foundations of a small house and long building.

The house site was examined first. The stone foundation was in remarkable condition with the chinking still intact. It averaged 5.3 metres square with foundation walls measuring 0.9 metre in average thickness (Figure 29).

The area was cleared of deadfall, the leaf mat removed, and the stone foundation exposed. The foundation continued unbroken all around except for the north end of the east wall. Here, an opening 0.5 metre was noted. This was thought to represent a door entrance. The interior of the feature was filled with a thick leaf mat of 0.5 to 1 metre in depth, sloping towards the centre. This was carefully removed so that any additional features beneath it could be observed. No artifacts were recovered except for a piece of clear window glass 65 centimetres north of the door opening and nine centimetres below the leaf mat. The foundation was planviewed (Figure 30). The floor of the building failed to reveal any features and no organic staining that would suggest human activity. On talking with Mrs. Shumski, leasee of the land, I

Figure 29: Stone Foundation of Paul Wood House

(Photo from author's file)

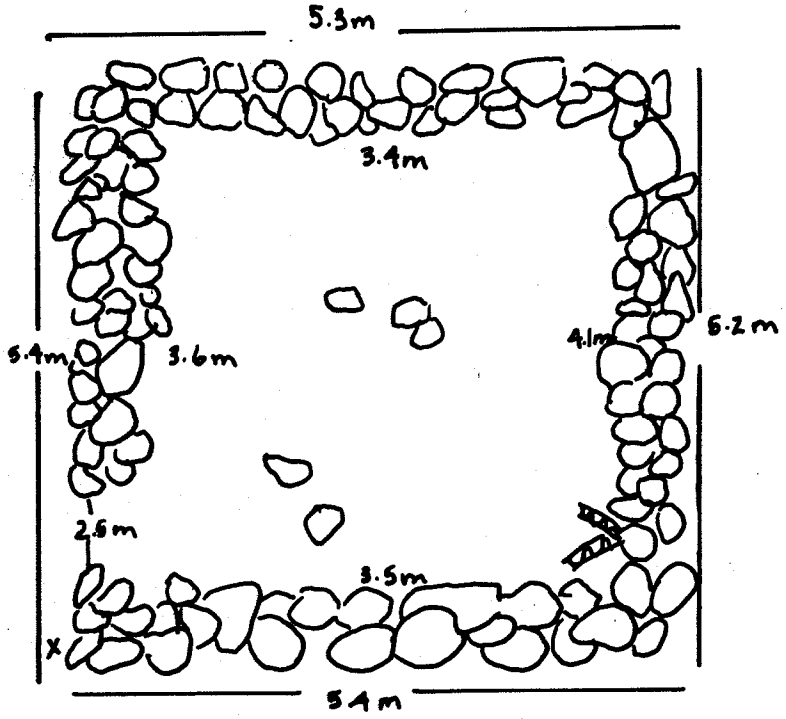


Figure 30: Planview of Paul Wood House

learned that twenty years ago her husband and brother-in-law cleared out at least two long metal troughs from the site area, along with a "bunch of other junk" (Shumski, personal communication, 1987). This equipment was most likely related to the salt manufacturing process. Approximately 15.6 metres north-west of the house foundation, a long, narrow foundation of similar structure was noted, again in dense underbrush. This measured 14 metres in length and 3.4 metres in width. The stone walls measured 0.9 metre in thickness. No further work was done at this time. The site is in no danger of destruction as both Mr. and Mrs. Shumski are conscientious about preserving the history of the Winnipegosis area.

MSS#7

This salt flat was located on the northeast side of the Red Deer River, approximately 1.6 km north of LFfMg-1. It was adjacent to the highway at the water's edge and appeared to be of no cultural significance.

MSS#8,9 and 10

Three sites on Dawson Bay were visited. MSS#8 was located at the top of a slope approximately 25 m above the level of the lake. The ground was firm, red in colour and covered with broken limestone. At the top of the slope and behind the bubbling salt pool, the ground was very marshy and unstable. Cole (1915) had indicated a former salt-making cabin with equipment at this site. However, inclement weather did not allow for a complete site survey at this time and this was postponed.

MSS#9 resembled MSS#8 when viewed from the lakeshore. However, on walking up the slope, it was discovered that its location consisted of a trembling bog with a salt spring located at the top of the hill.

MSS#10 consisted of two small springs adjacent to the lakeshore very close to the tip of the north Salt Point. These springs were located on the beach ridge and were surrounded by cobble beach.

MSS#11

One small salt spring on the west bank of the Swan River northeast of the town was visited. This site, however, has now dried up and is covered with vegetation. It was once a favorite spot for both cattle and deer (Dubreuil, personal communication, 1986).

MSS#12

A small salt flat about 1 km northwest of Camperville failed to reveal any evidence of human activity. Access to a site on the Pine River, where the historic record had indicated a former salt-making operation (Cole 1915) was not possible.

MSS#13 to 18

A number of small salt flats were observed along the western shore of Sagamace Bay in Lake Winnipegosis. For the most part, these areas were being used for grazing cattle. No artifacts were retrieved.

MSS#19 and 20

Two small salt flats west of Winnipegosis, and adjacent to the highway were surveyed, but no artifacts were recovered.

MSS#21

A small area north of the village of Toutes Aides was visited, but revealed only a marsh with no visible salt pool.

MSS#22 and 23

These two small sites were adjacent to Salt Creek, within 1 km of Dauphin Lake. Neither site yielded artifacts.

MSS#24 and 25

Two areas near the mouths of the Ochre and Turtle rivers were investigated. Historically, Hind (1971:ii:293) mentioned Native people making salt at the mouth of the Turtle River. However, on investigating the area around the mouths of both of these rivers, no salt springs, brooks or flats were found. Neither were there any artifacts or features that might related to the prehistoric period. A number of cellar-like depressions and pieces of wood were observed, but the former were not tested.

MSS#26

A steep, limestone hill had been noticed on the 1986 field survey. At that time we were not able to travel to the site because of the rough water. However, in 1987 the site was visited. Two very active salt springs were located at the base of the hill on the east side. Pedestrian survey of the hill and surrounding are did not reveal any signs of prehistoric or historic human occupation. The southern base of the hill was very marshy and a haven for waterfowl. Because of inclement weather, all investigations were again cut short.

Of the nineteen remaining salt springs investigated in 1986, one was revisited. The 1915 map of MSS 8 indicated a salt cabin on the south side of the salt spring. This was briefly reinvestigated in August, 1987 and although the area was difficult to reach, there were indications of a former cabin and human activity. A hand-made birch bark container was recovered near the site in 1988 (Figure 31) (McKillop, personal communication, 1989). This was not similar to the birchbark roggans used for containing salt, and was probably used for collecting berries. The container was felt to be fairly recent as it was sewn with string rather than sinew or tree root (K. Pettipas, personal communication, 1989).

The 1987 field survey was not as productive as anticipated. Four field trips were made to the Winnipegosis area and one trip to the Morris area.

The purpose of the 1988 field survey was to examine the mouth of the Swan River for evidence of salt springs. High winds, low water levels and engine trouble plagued this venture from the start and after being towed back up the river the investigation was aborted. Several salt springs were re-examined near Winnipegosis, including the Mudery Site and Winnipegosis Salt Flat, which did not seem to have been affected by the wet season.

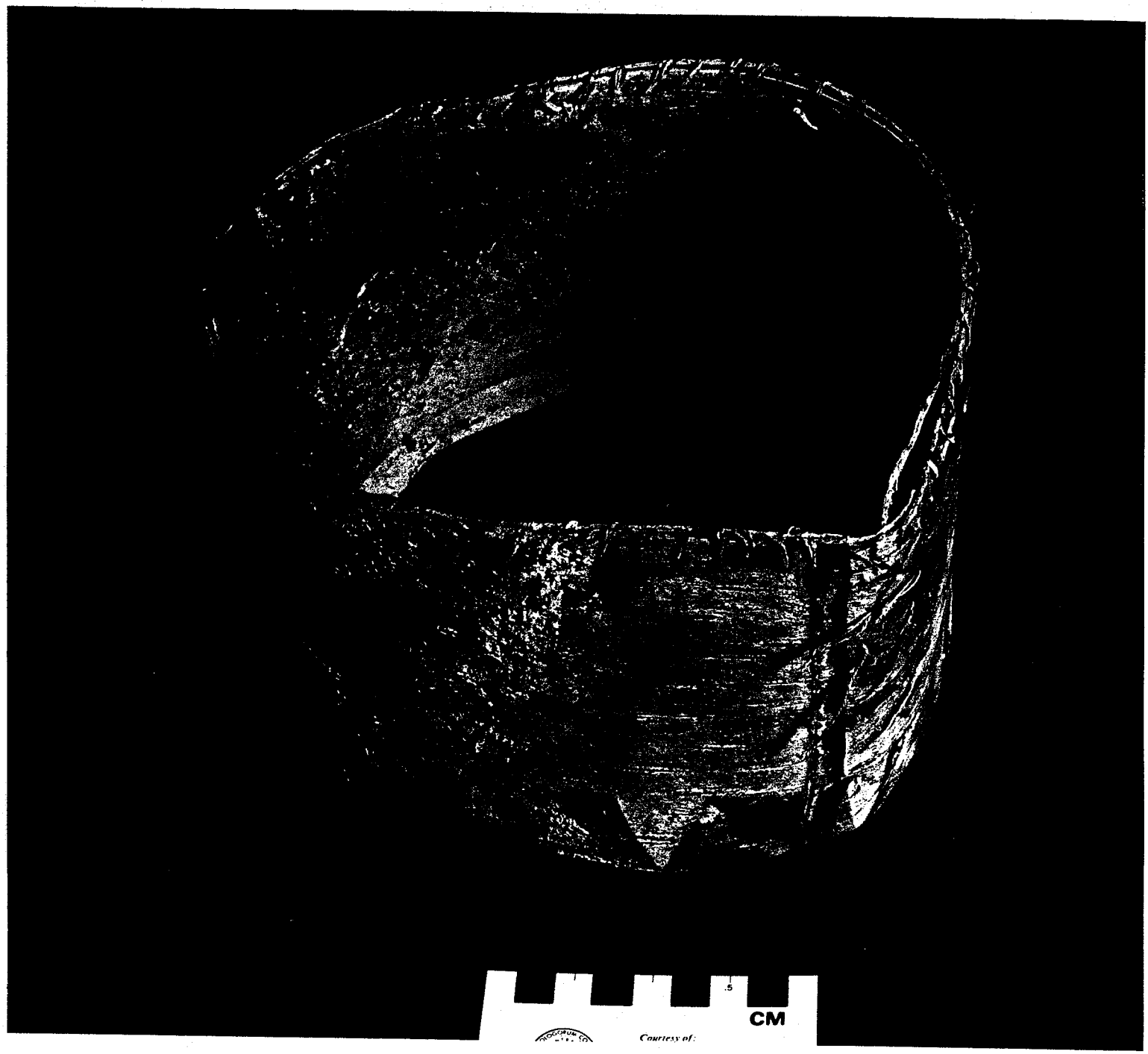


Figure 31: Birchbark container

(Photo courtesy of the Manitoba Museum of Man and Nature)

Analysis of the Survey

The distribution of natural resources at all sites visited was remarkably similar to that of the Ashkibokahn Site (FbMb-1). Hanna (1982) estimated that between 43-58 people resided at the Ashkibokahn Site in a semi-permanent setting and required a catchment area of 11 km radius or 395 km^2 to support the population. On examining the catchment area for the Winnipegosis Site (EjLx-3), two salt springs were located within the 11 km radius limit (Appendix B.1); these were the Winnipegosis Salt Flat Site (EjLx-7) and the Mudery Salt Flat site (EkMa-4).

The Red Deer River Site (Ffmg-1) and the McArdle Salt Flat Site (FfMg-3) were located within 4 kms of the mouth of the Red Deer River (Appendix B.2). The delta region was never surveyed, but the historical record identified this area as a regular camping site for both Natives and fur traders, as well as a site of fur trade period salt-making operations (James 1956).

A similar scenario was found at the mouth of the Steeprock River (Appendix B.3) where evidence of a small salt-making operation was recorded (MSS#8). Stone flakes were reported to have been found at the summit of a high hill (MSS#26) opposite the river mouth (Olinyk, personal communication, 1986). However, on surveying the site, only naturally fractured limestone flakes were noted.

Although the Monkman Salt Works Site (EkLx-1) had both a precontact and Metis component, no precontact Native ceramics were recovered. However, based on the high NaCl content of the brine from the salt springs and the historic popularity of the site, there is a reasonable chance that native ceramics may be found at some future date.

The Lawrence Lake Site (EjLw-1) as mentioned, yielded little information about human occupation, except that a possible waterworn and patinated projectile point was recovered, indicating at least a former hunting ground.

As indicated, the field data supporting prehistoric salt production is very limited. However, in addition to the two sites at which Duck Bay ceramics were located, Winnipegosis resident, Harvey Brown, surface-collected Duck Bay ceramics from two sites near the entrance to the Little Waterhen River (Figure 32), as well as one site opposite the Ashkibokahn Site.

Historic artifacts such as a grindstone (Figure 33) and Hudson's Bay Company glass bottle (Figure 34) were also collected at one site near the Little Waterhen River. All sites were adjacent to salt springs. A brief mention of salt being made by the Campbells (Free Press 1908) suggests that there were several Metis families making salt around the lake. However, no historic records regarding the Campbells and salt-making at the Little Waterhen were located.

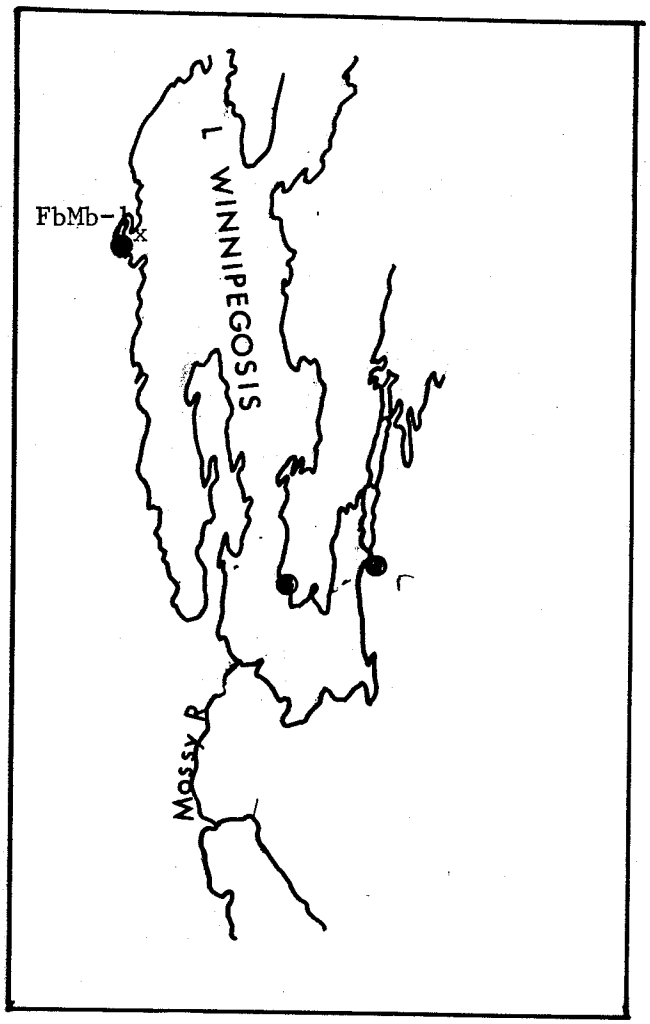


Figure 32: Map of Duck Bay Ceramic Sites Located by Harvy Brown

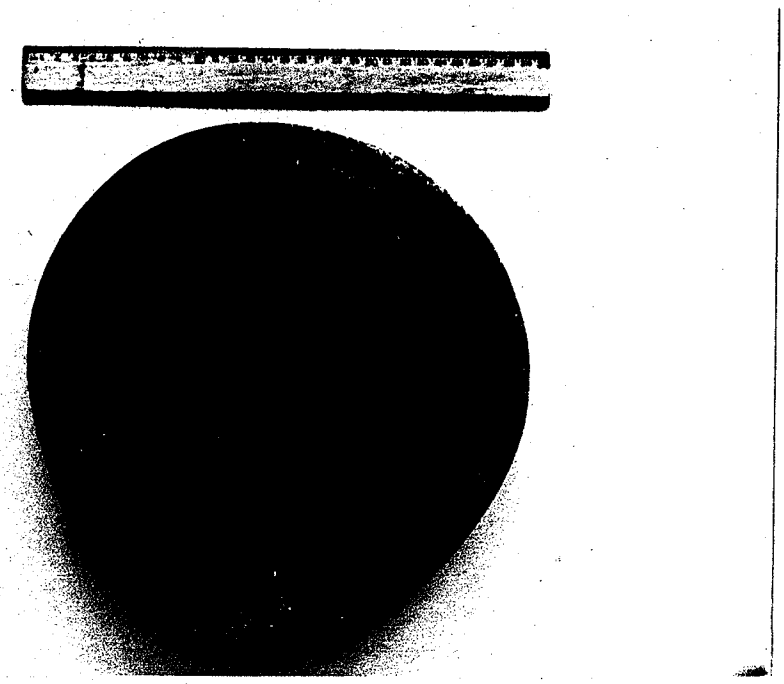


Figure 33: Granite Grindstone

(Photo from author's file)

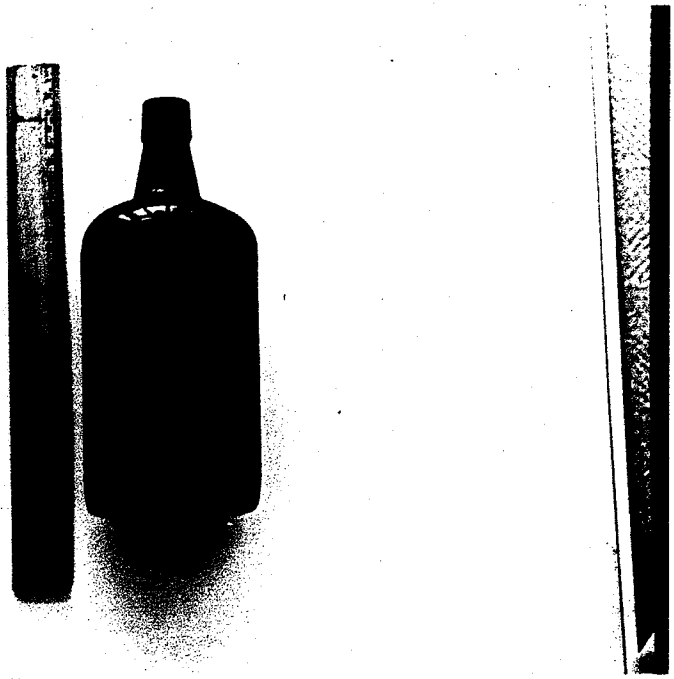


Figure 34: Hudson's Bay Company Bottle

(Photo from author's file)

CHAPTER VI

CONCLUSION

By examining the location of archaeological remains of human occupation at salt springs within the Manitoba Lowlands Saline Waterbelt through field survey and archival research, it was possible to identify four groups of saltmakers. Possibly the earliest salt-makers were the prehistoric Natives who frequented the area as early as A.D. 1100. This early salt-making may have involved boiling brine in clay pots. Fragments of clay pots at several salt springs suggest this activity. Although prehistoric evidence of salt-making in Manitoba through this study was limited to references in the early historic record, archaeological investigations at the Ashkibokahn (FbMb-1) and Winnipegosis (EjLx-3) sites suggested that small near-endogamous groups of people were exploiting the marsh resources on a regular basis. There is no reason not to believe that these people were also producing salt. The early historic records described both knowledge and use of salt by the Assiniboin of the Red River (Burpee 1927). Clearly, this is an indication that some form of salt production occurred.

Of the 26 saline springs and salt flats visited only seven showed evidence of human activity. However, this should not exclude the possibility of salt-making activities occurring at the remaining 19 sites. The deltas of

the Steeprock, Bell, Pine, Waterhen, Overflowing, Shoal and Swan Rivers, for example, are similar to the Duck/Drake and Mossy River deltas, and all flow into Lake Winnipegosis, with the exception of Swan River.

These delta regions should be tested extensively for Duck Bay ceramics, and evidence of salt-making. Further surveys and excavation at the mouths of the above-names rivers need to be conducted as Duck Bay ceramics have been recovered from several locations around Lake Winnipegosis and near the mouth of Swan River (Gary Wowchuk, personal communication, 1988).

Of the seven human activity sites, four were at or near the mouths of rivers. The Monkman Salt Works was located on the Red Deer Peninsula, a delta-like spit of low, marshy land with a physical environment not unlike that of the river deltas. The remaining two were adjacent to Lake Winnipegosis.

No evidence of salt as an article of trade between the Assiniboin or Cree and other Native groups was found in the available literature. The Assiniboin and Cree were part of the prehistoric trade network that included the central and western United States (Wood 1972) (Figure 35). The inclusion of Mandan ceramics at the Ashkibokahn and Winnipegosis sites suggests some type of trade or exchange occurred between the Mandan and makers of Duck Bay ceramics. In addition, tools manufactured from Knife River flint from North Dakota have been recovered from the study area. As mentioned in Chapter I, trade of food items was not part of the major trade inventory and probably occurred among the women (Wood 1972:159).

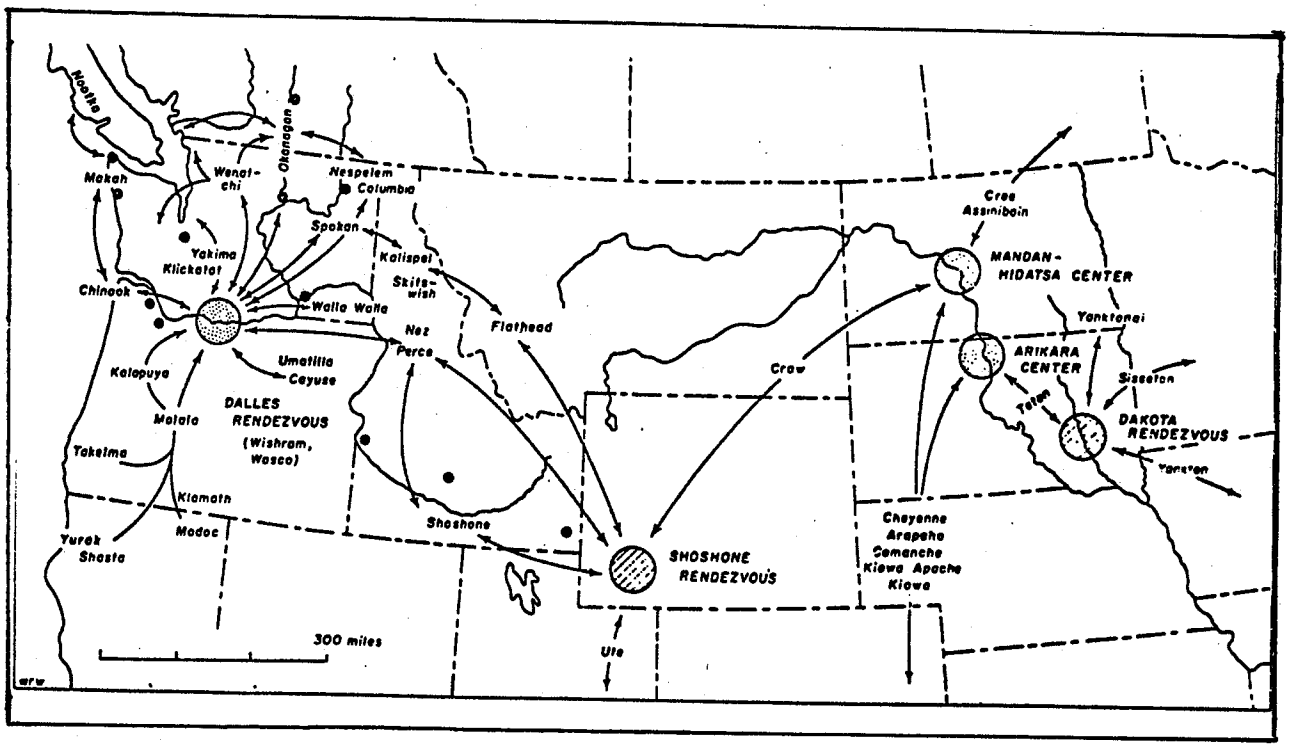


Figure 35: Precontact North American Trade Networks

(After Wood, 1972)

The possibility of prehistoric techniques of salt-making diffusing north from the Creek, for example, via the Yankton or Shawnee, needs to be considered. The Great Salt Spring is prime evidence of active prehistoric salt-making. River travel between the Mississippi and Red Rivers was frequent, as evidenced by the narrative of Tanner (James 1956).

Ray (1971) analyzed the early historic Native group movement within the Parkland region of Manitoba. His model of seasonal exploitation (Figure 36) traced seasonal movement of both Cree and Assiniboin in a north/south pattern through the Parkland zone. The seasonal shift was seen not as aimless wandering in search of game, but rather well-planned movement to a particular area for specific resource exploitation.

The hypothesis of specific resource exploitation or site specialization was tested by Muller (1984) at Mississippian salt springs in southern Illinois. His analysis of cultural remains at the Great Salt Spring site suggested that site specialization or "limited activity", that is salt-making, occurred rather than producer specialization, the latter being associated with state societies. This study supports Ray's model of seasonal exploitation by Native groups in the Parkland region of Manitoba, where specific resources were exploited on a regular schedule.

Syms' "Co-Influence Sphere" model (1976), designed to explain prehistoric ceramic variability in southwestern Manitoba, defined three levels of subsistence-settlement: core, secondary and tertiary. This model incorporated the same variables as in site catchment, carrying capacity and

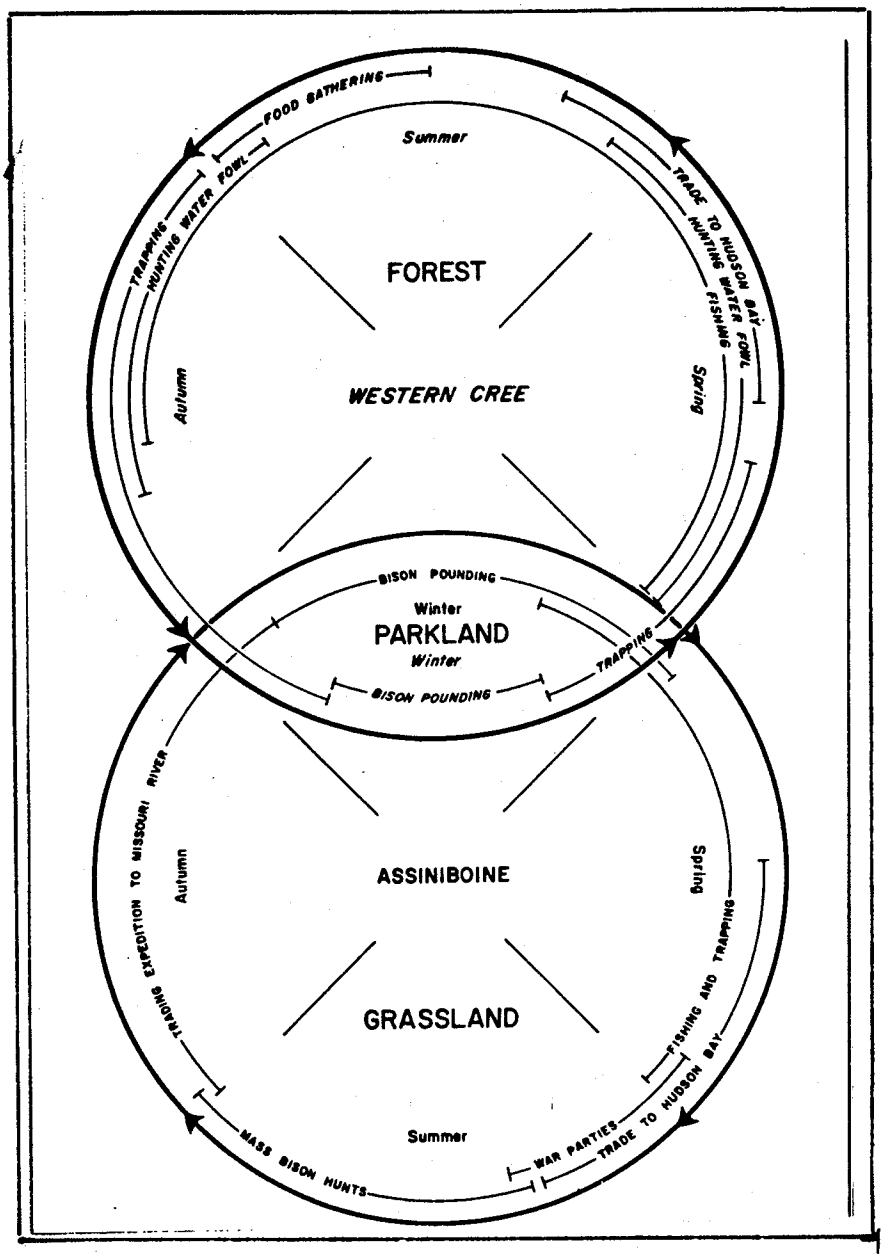


Figure 3: Ray's Model of Seasonal Movement of the Cree and Assiniboine

(After Ray 1971)

The fur trade period (1732-1811) saw individual posts juggling between two very different economies. The British mercantile system used by the Hudson's Bay Company had to be translated into a trade economy that the Native population could relate to. Trading posts were encouraged to be self-sustaining and this could only be accomplished with the cooperation of the Native groups that were attached to the posts. Native guides pointed out the best hunting areas and fisheries and other resources available in the area. The salt springs were not overlooked for two reasons. First, the salt springs and marshes attracted a variety of wildlife. Second, European and possibly Native knowledge of the many uses of salt made the salt springs a very important resource to exploit.

The Swan River Post, and later Shoal River House and Red Deer River Post, all used the nearby salt springs to produce salt necessary for preserving meat. Salt was even sent to York Factory, where it was probably used for salting down geese (Tough 1987).

The European furtraders and explorers introduced the use of iron kettles and salt pans to the area. This technological knowledge most likely arrived with the Scotsand Orkneymen. Salt-making techniques at the trading posts were similar to those used in mid-eighteenth century Scotland.

This technology persisted into the nineteenth century and was employed by the Metis families who saw salt-making as an alternative to trapping furs or hunting buffalo.

The Metis period (1811-1870), although its roots go back beyond 1811, experienced major social and economic growth with the establishment of the Red River Settlement. As mentioned, the combination of European technology and Native knowledge of the resources allowed for successful utilization of the salt springs. This success was shortlived as the Deed of Surrender of Ruperts Land to the Canadian government in 1870, the creation of the province of Manitoba, the signing of a series of Treaties limiting Native movement, and the influx of European settlers onto former Native and Metis lands destroyed the integrity of the Metis people.

The early industrial period (1870-1930) replaced the Metis salt-makers and geological surveys were quick to earmark salt springs and salt flats as potential economic resources. Research being conducted in Europe and the United States indicated a close relationship between salt deposits and petroleum. Since the status of the salt springs in Manitoba was not geologically well-described, a number of geological surveys across the Manitoba Saline Waterbelt took place to test the salt/petroleum hypothesis.

Although rock salt was not found, the brine from deep-drilling wells supported a salt-making industry until 1970.

The following table explains the various phases of salt-making activities that were associated with the Manitoba Lowlands Saline Waterbelt area from A.D.1100 to 1937. Table 2 shows that as salt-making progressed from the prehistoric period into the historic period, it became a viable local industry.

Table 2: Phases of Salt-Making Activities
In the Manitoba Lowlands Saline Waterbelt

Period	Era	Salt Makers	References	Economic Stage	Market
		Speculators for world markets	Prov. Archives Swan Valley	Industrial	Natl Intntl
	Industrial	McArdle, Neepawa			
HISTORIC		"Country-born" (Scots)	HBCA; journals	Cottage industry	Local
	Metis	Monkman, Brass, Campbell, Wood		Mercantile	RRS & hmstd
	Fur Trade	Company men, hired Natives	HBCA; journals	Mercantile Subsistence	Local YorkF
	Native	Salt used domestically	La Verendrye Neumann	Subsistence	Local N.A.
PREHISTORIC		Trade? Medicine?			trade

Tough explained that "...in economic history, the concept of access to a resource is as important as the spatial distribution of a resource" (Tough 1987:11). The inaccessibility of some prime salt springs, the expensive processing of the brine, high transportation costs and the availablity of cheap rock salt all contributed to the demise of the salt industry in Manitoba.

As mentioned at the beginning of this thesis, the main objective was to archaeologically survey saline springs and areas of salt-making activities within the Manitoba Lowlands Saline Waterbelt. There is still much field and archival research that could be conducted to identify the extent of

salt-making in Manitoba. The economic importance of salt to the early development of the Red River Settlement has only been briefly mentioned. In addition, the prehistoric component definitely needs to be closely examined in terms of site specificity and trade.

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MG 1 D9 1861 Letter from Adam McBeath, Duck Bay, Nov. 20, 1861 to Alexander Christie

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Dickson, G.	1990	Winnipeg
Dubreuil, J.	1986	Swan River
McKillop, B.	1989	Winnipeg
Moodie, D.W.	1984	Winnipeg
Olinyk, D	1986	Winnipeg
Pettipas, K.	1989	Winnipeg
Sexton, D.	1986	Winnipeg
Shumski, L.	1987	Winnipegosis
Wowchuk, G.	1988	Swan River

APPENDIX A

SONGS OF WHITE EARTH RESERVATION

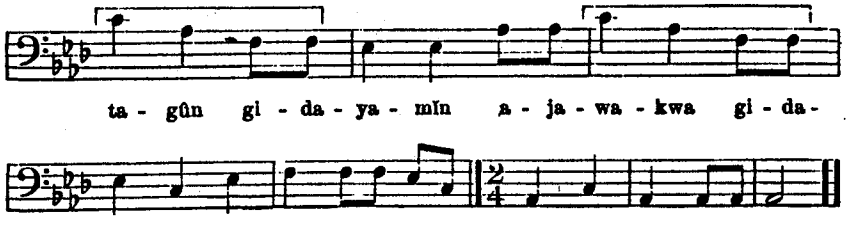
This group contains songs of several classes, comprising all the material in this work collected on White Earth Reservation, Minn., except songs connected with war (pp. 59–141).

No. 168. "We Have Salt" (Catalogue No. 268)

Sung by HENRY SELKIRK

VOICE ♩= 160
DRUM ♩= 104
(Drum-rhythm similar to No. 19)

VOICE ♩= 126



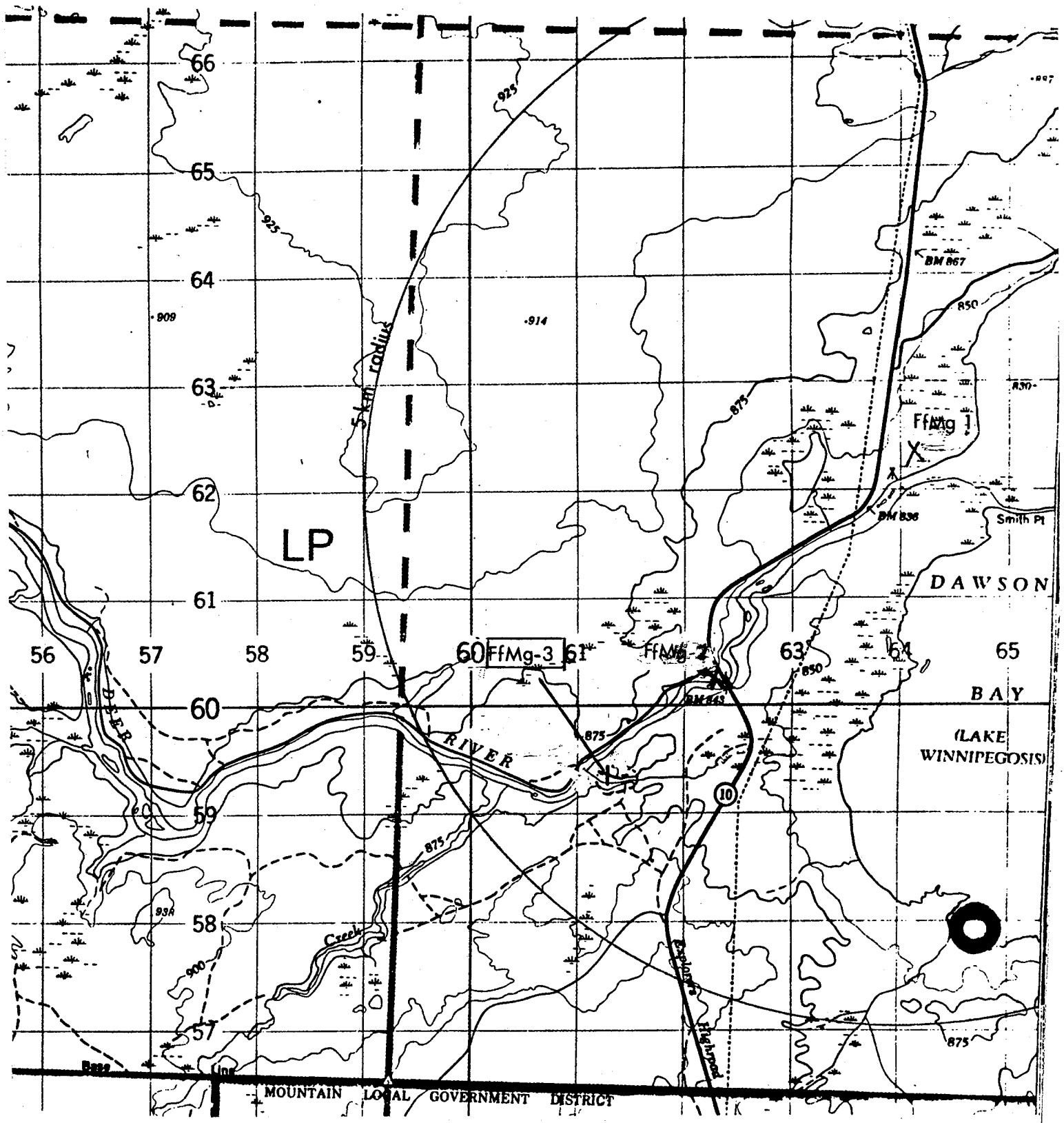
WORDS

ma′no	let
kigadeün′awen′imigo′min	them despise us
ji′wita′gûn	salt
gi′dayamin′	we have
a′jawa′kwa	here, beyond the belt of timber
gi′dayamin′	we live

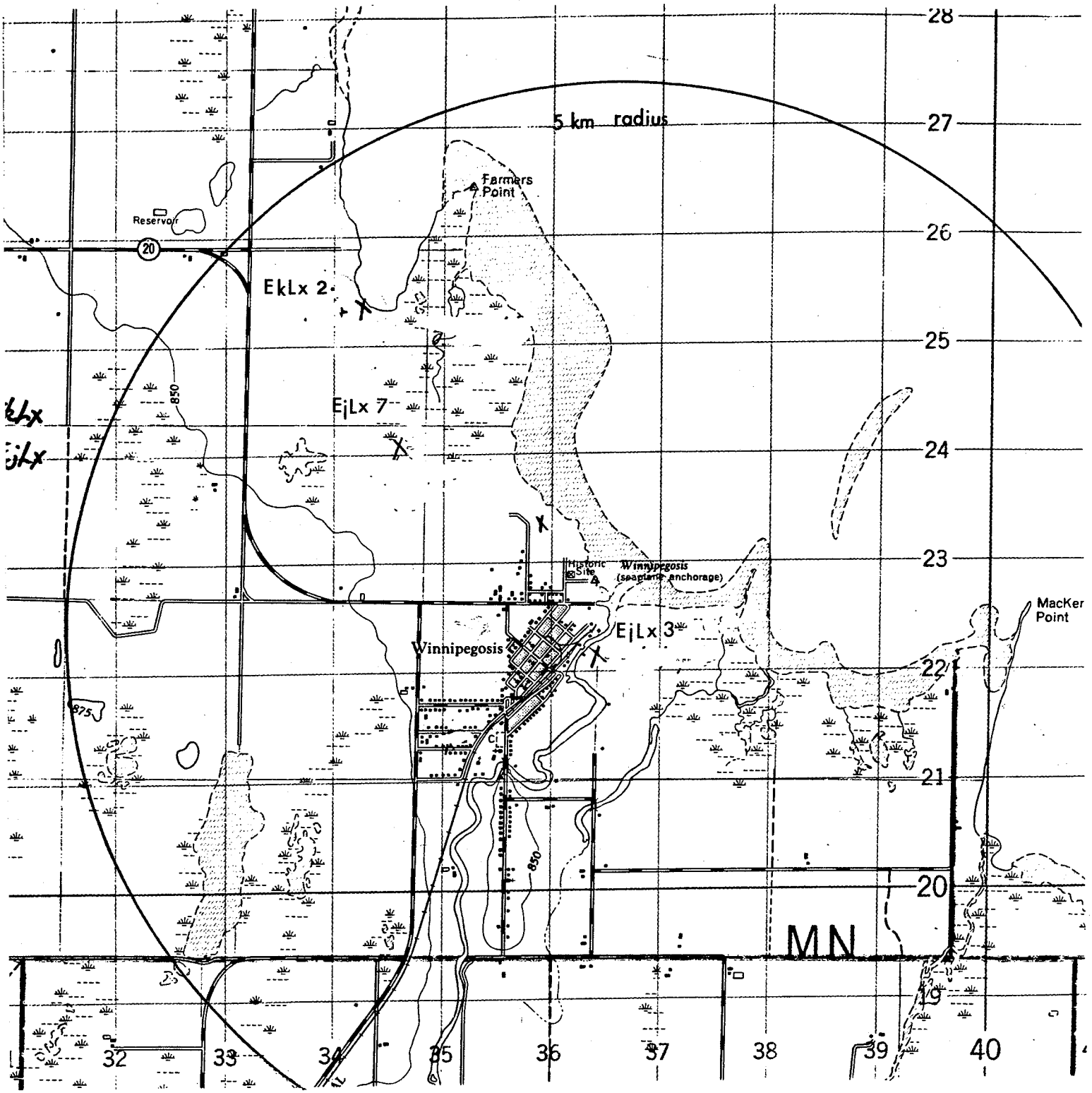
In the early days the Minnesota Chippewa had no salt, and some of the older Indians have not yet acquired a taste for it. In a treaty known as the "Salt Treaty," [1] concluded at Leech Lake, August 21, 1847, with the Pillager Band of Chippewa, there was a stipulation that the Indians should receive 5 barrels of salt annually for five years.

[1] *A compilation of all the treaties between the United States and the Indian tribes now in force as laws*, Washington, 1873, p. 212.

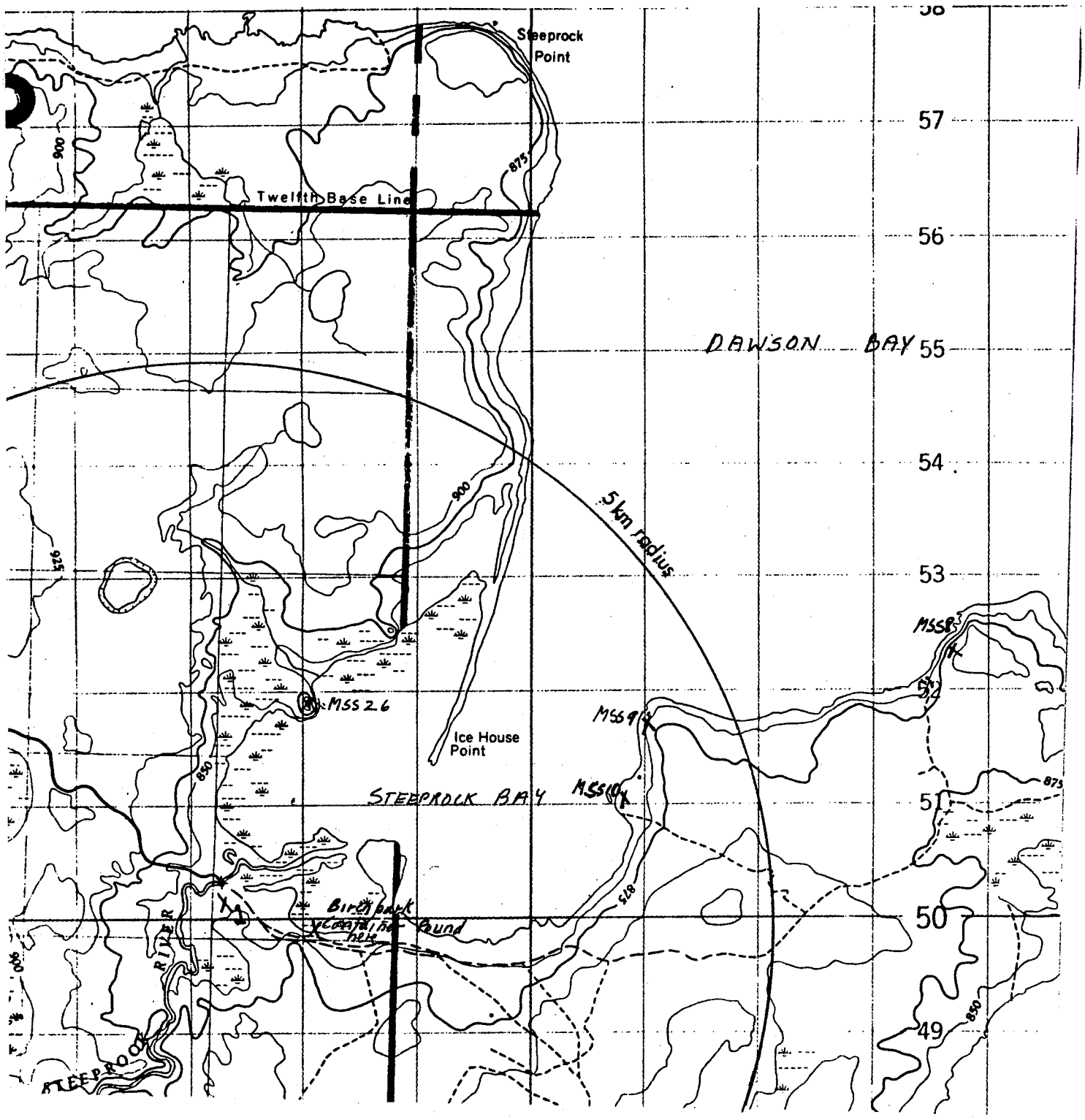
APPENDIX B.1


66
65
64
63
62
61
60
59
58
57
56
57
58
59
60
61
63
64
65
5 km radius
LP
FfMg-3
FfMg-2
FfMg-1
925
914
909
875
850
BM 867
BM 856
BM 843
Smith Pt
DAWSON
BAY
(LAKE
WINNIPEGOSIS)
RIVER
Creek
Explorer's
Highroad
10
MOUNTAIN
LOCAL
GOVERNMENT
DISTRICT

APPENDIX B.2


5 km radius
Farmers Point
Reservoir
20
EkLx 2
EjLx 7
EjLx 3
Historic Site
Winnipegosis
(seaplane anchorage)
Winnipegosis
MacKer Point
MN
850
875
28
27
26
25
24
23
22
21
20
19
32
33
34
35
36
37
38
39
40

APPENDIX B.3


Steeprock Point
Twelfth Base Line
DAWSON BAY
5km radius
MSS8
MSS9
MSS10
MSS26
Ice House Point
STEEPROCK BAY
Birch park
57
56
55
54
53
52
51
50
49
900
875
925
850
825
873