CANADA
DEPARTMENT OF MINES

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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WOOD RIVER No. 74 SASKATCHEWAN

BY

B. R. MacKay, H. H. Beach & J. M. Cameron

Water Supply Paper No. 222

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF WOOD RIVER, NO. 74 SASKATCHEWAN

INTRODUCTION

Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible. The examination of so large an area and the interpretation of the data collected were possible because the bedrock geology and the Pleistocene deposits had been studied previously by McLearn, Warren, Rose, Stansfield, Wickenden, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerably in supplying several hundred well records. The base maps used were supplied by the Topographical Surveys Branch of the Department of the Interior.

Publication of Results

The essential information pertaining to the ground water conditions is being published in reports, one being issued for each municipality. Copies of these reports are being sent to the secretary treasurers of the municipalities and to certain Provincial and Federal Departments, where they can be consulted by residents of the municipalities or by other persons, or they may be obtained by writing direct to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. Should anyone require more detailed information than that contained in the reports such additional information as the Geological Survey possesses can be obtained on application to the director. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range, and meridian concerning which further information is desired.

The reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells. Technical terms used in the reports are defined in the glossary.

How to Use the Report

Anyone desiring information about ground water in any particular locality should read first the part dealing with the municipality as a whole in order to understand more fully the part of the report that deals with the place in which he is interested. At the same time he should study the two figures accompanying the report. Figure 1 shows the surface and bedrock geology as related to the ground water supply, and Figure 2 shows the relief and the location and type of water wells. Relief is shown by lines of equal elevation called "contours". The elevation above sea-level

is given on some or all of the contour lines on the figure.

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are give on the figure. Where contour lines are not shown on the figure, the elevations of adjacent wells as indicated in the Table of Well Records accompanying each report can be used. The approximate elevation of the water-bearing horizon at the well-site can be obtained from the Table of Well Records by noting the elevation of the water-bearing horizon in surrounding wells and by estimating from these known elevations its elevation at the well-site.[1] If the water-bearing horizon is in bedrock the depth to water can be estimated fairly accurately in this way. If the water-bearing horizon is in unconsolidated deposits such as gravel, sand, clay, or glacial debris, however, the estimated elevation is less reliable, because the water-bearing horizon may be inclined, or may be in lenses or in sand beds which may lie at various horizons and may be of small lateral extent. In calculating the depth to water, care should be taken that the water-bearing horizons selected from the Table of Well Records be all in the same geological horizon either in the glacial drift or in the bedrock. From the data in the Table

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[1] If the well-site is near the edge of the municipality, the map and report dealing with the adjoining municipality should be consulted in order to obtain the needed information about nearby wells.

of Well Records it is also possible to form some idea of the quality and quantity of the water likely to be found in the proposed well.

GLOSSARY OF TERMS USED

Alkaline. The term "alkaline" has been applied rather loosely to some ground-waters. In the Prairie Provinces, a water is usually described as "alkaline" when it contains a large amount of salts, chiefly sodium sulphate and magnesium sulphate in solution. Water that tastes strongly of common salt is described as "salty". Many "alkaline" waters may be used for stock. Most of the so-called "alkaline" waters are more correctly termed "sulphate waters".

Alluvium. Deposits of earth, clay, silt, sand, gravel, and other material on the flood-plains of modern streams and in lake beds.

Aquifer or Water-bearing Horizon. A water-bearing bed, lens, or pocket in unconsolidated deposits or in bedrock.

Buried pre-Glacial Stream Channels. A channel carved into the bedrock by a stream before the advance of the continental ice-sheet, and subsequently either partly or wholly filled in by sands, gravels, and boulder clay deposited by the ice-sheet or later agencies.

Bedrock. Bedrock, as here used, refers to partly or wholly consolidated deposits of gravel, sand, silt, clay, and marl that are older than the glacial drift.

Coal Seam. The same as a coal bed. A deposit of carbonaceous material formed from the remains of plants by partial decomposition and burial.

Contour. A line on a map joining points that have the same elevation above sea-level.

Continental Ice-Sheet. The great ice-sheet that covered most of the surface of Canada many thousands of years ago.

Escarpment. A cliff or a relatively steep slope separating level or gently sloping areas.

Flood-plain. A flat part in a river valley ordinarily above water but covered by water when the river is in flood.

Glacial Drift. The l ose, unconsolidated surface deposits of sand, gravel, and clay, or a mixture of these, that were deposited by the continental ice-sheet. Clay containing boulders forms part of the drift and is referred to as glacial till or boulder clay. The glacial drift occurs in several forms:

(1) Ground Moraine. A boulder clay or till plain (includes areas where the glacial drift is very thin and the surface uneven).

(2) Terminal Moraine or Moraine. A hilly tract of country formed by glacial drift that was laid down at the margin of the continental ice-sheet during its retreat. The surface is characterized by irregular hills and undrained basins.

(3) Glacial Outwash. Sand and gravel plains or deltas formed by streams that ... sued from the continental ice-sheet.

(4) Glacial Lake Deposits. Sand and clay plains formed in glacial lakes during the retreat of the ice-sheet.

Ground Water. Sub-surface water, or water that occurs below the surface of the land.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it is struck.

Impervious or Impermeable. Beds, such as fine clays or shale, are considered to be impervious or impermeable when they do not permit of the perceptible passage or movement of the ground water.

Pervious or Permeable. Beds are pervious when they permit of the perceptible passage or movement of ground water, as for example porous sands, gravel, and sandstone.

Pre-Glacial Land Surface. The surface of the land before it was covered by the continental ice-sheet.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet.

Unconsolidated Deposits. The mantle or covering of alluvium and glacial drift consisting of loose sand, gravel, clay, and boulders that overlie the bedrock.

Water Table. The upper limit of the part of the ground wholly saturated with water. This may be very near the surface or many feet below it.

Wells. Holes sunk into the earth so as to reach a supply of water. When no water is obtained they are referred to as dry holes. Wells in which water is encountered are of three classes.

(1) Wells in which the water is under sufficient pressure to flow above the surface of the ground. These are called Flowing Artesian Wells.

(2) Wells in which the water is under pressure but does not rise to the surface. These wells are called Non-Flowing Artesian Wells.

(3) Wells in which the water does not rise above the water table. These wells are called Non-Artesian Wells.

NAMES AND DESCRIPTIONS OF GEOLOGICAL FORMATIONS, REFERRED TO IN THESE REPORTS

Wood Mountain Formation. The name given to a series of gravel and sand beds which have a maximum thickness of 50 feet, and which occur as isolated patches on the higher parts of Wood mountain. This is the youngest bedrock formation and, where present, overlies the Ravenscrag formation.

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rest upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

Ravenscrag Formation. The name given to a thick series of light-coloured sandstones and shales containing one or more thick lignite coal seams. This formation is 500 to 1,000 feet thick, and covers a large part of southern Saskatchewan. The principal coal deposits of the province occur in this formation.

Whitemud Formation. The name given to a series of white, grey, and buff coloured clays and sands. The formation is 10 to 75 feet thick. At its base this formation grades in places into coarse, limy sand beds having a maximum thickness of 40 feet.

Eastend Formation. The name given to a series of fine-grained sands and silts. It has been recognized at various localities over the southern part of the province, from the Alberta boundary east to the escarpment of Missouri côteau. The thickness of the formation seldom exceeds 40 feet.

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron

is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

Belly River Formation. The Belly River consists mostly of non-marine sand, shale, and coal, and underlies the Bearpaw in the western part of the area. It passes eastward and northeastward into marine shale. The principal area of transition is in the western half of the area where the Belly River is mostly thinner than it is to the west and includes marine zones. In the southwestern corner of the area it has a thickness of several hundred feet.

Marine Shale Series. This series of beds consists of dark grey to dark brownish grey, plastic shales, and underlies the central and northeastern parts of Saskatchewan. It includes beds equivalent to the Bearpaw, Belly River, and older formations that underlie the western part of the area.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Wood River covers an area of 324 square miles in the southwestern part of Saskatchewan. It consists of nine townships, described as tps. 7, 8, and 9, ranges 4, 5, and 6, W. 3rd mer. The centre of the municipality lies 51 miles south and 47 miles west of Moose Jaw and approximately 15 miles south of the town of Gravelbourg.

The Weyburn-Lethbridge branch of the Canadian Pacific railway runs across the north-central part of the municipality. The town of Lafleche is situated on the railway in sec. 6, tp. 9, range 4, and the villages of Woodrow and Melaval are on the same line, located 7 miles west and 6 miles east of Lafleche, respectively. Several, small, northerly flowing, intermittent streams converge in the south-central part of this municipality to form Wood river, which flows in a meandering course northward through a broad, shallow valley and leaves the municipality near the centre of the northern border. Lynthorpe creek, the main tributary, flows from Twelvemile lake to the southeast of this area and joins Wood river in the northeastern part of township 7, range 5. Many low, marshy flats lying at an approximate elevation of 2,400 feet above sea-level occur along the river valley. Away from the valley the land surface is a gently rolling plain, rising to form low, broad topped hills with elevations not greatly exceeding 2,500 feet in the interstream areas. The most prominent topographic feature of the area is a long, narrow hill that rises to elevations exceeding 2,550 feet, and that extends in an east-west direction through the south-central parts of townships 9, ranges 4 and 5. The southern slopes of this hill are in places quite steep and deeply dissected by many small coulées. The northern and western slopes are more gradual. The topographic map available of the six southern townships is not in sufficient detail to indicate more than the broad

variations in the relief, but the three northern townships have been mapped in more detail and the contours as drawn on the northern part of Figure 2, of the map accompanying this report, are more accurate than those in the south. Wood river flows throughout all but the driest years and provides a supply of water for the stock of nearby residents. Lynthorpe and Pinto creeks and the smaller tributary stream generally contain water only in the spring and early summer, and, consequently, provide supplies for stock only during these seasons.

Considerable difficulty has been experienced in obtaining adequate supplies of water in the central part of this municipality. Many residents have been obliged to excavate dugouts or build small dams in coulées in order to conserve sufficient surface water to meet stock requirements. In small areas, however, conditions are better and wells satisfy the local demand. The water-bearing beds in this municipality occur in the unconsolidated Recent deposits that occur along the creek valleys, in the glacial drift that covers the greater part of the area, and to a more limited extent in the bedrock formations underlying the drift. Impervious clays form a large part of the unconsolidated deposits, and account for the difficulty of getting water in some areas. The limited areal extent of many of the productive aquifers, and the lack of precipitation in recent years necessary to replenish formerly existing supplies are other contributary factors.

Water-bearing Horizons in the Unconsolidated Deposits

Recent flood-plain deposits consisting of sands and silts, and more occasionally gravels, occur in thicknesses rarely exceeding 30 feet along the valleys of Wood river, Pinto and Lynthorpe creeks, and several smaller tributary streams. Thinner deposits of Recent sands and silts washed down into some of the

valleys occur in the northern townships of the municipality. Seepage wells in the deposits along the streams provide nearby residents with water supplies for domestic requirements during those seasons of the year when the streams are flowing. Some of these wells strike pockets of sand and gravel that yield throughout the year sufficient quantities of good water to supply both household and stock requirements. The Recent deposits in the valleys in the northern townships collect surface waters, and shallow wells in a few places obtain from them adequate domestic supplies.

The glacial drift was deposited many thousands of years ago by a great continental ice-sheet that advanced southwesterly over Saskatchewan and upon melting gradually retreated to the northeast. As this ice-sheet advanced and retreated it deposited upon the bedrock surface an irregular layer of boulder clay or till composed essentially of bluish grey, plastic clay through which are scattered boulders of varying sizes, and occasionally beds or pockets of stratified sands and gravels. These latter, porous beds are generally water bearing. The upper 20 to 30 feet of the drift has weathered a light buff to yellowish brown and is generally more porous than the lower, more compact boulder clay. At places where the retreating ice front paused for any considerable period of time a generally thicker and more porous type of boulder clay termed "moraine" was laid down. The moraine in this municipality is confined largely to the areas of higher relief, and is characterized by a rolling land surface with many low knolls and ridges and intervening undrained depressions in contrast with the flat prairie land of the till-covered areas.

Waters formed by the melting ice gathered in depressions in the lower lands and formed lakes. Fine sediments were carried into these lakes and on settling formed a layer of compact lake

clays. The site of such a former glacial lake is now evidenced by the presence of bluish grey lake clay covering a wide area along the valleys of Wood river and Pinto creek in the south-western part of the municipality. A more sandy phase of this lake deposit extends along the bottom of Lynthorpe Creek valley. Further evidence of the action of waters issuing from the ice is to be seen in the deposits of glacial outwash sands and gravels that occur in narrow areas on the upper valley slopes of Pinto creek in township 8, range 6. The areal extent of these different types of dep sits is indicated on Figure 1, of the accompanying map.

The thickness of the glacial drift increases from the eastern to the western side of the municipality, but shows considerable variation within limited areas. It is known to be only 30 feet thick in some places, but is 150 feet thick in nearby areas. Such variations as are known to exist are discussed in the sections of this report dealing with the individual townships.

The differences in character in the different types of unconsolidated deposits cause corresponding variations in the quality and quantity of water found in them. Generally, glacial outwash sands and gravels, being porous and not containing inherently large amounts of readily dissolvable mineral salts, form reliable sources of water supply. In this municipality only two wells are recorded as having been sunk into these deposits, and only one of these yields a satisfactory water supply. However, it is believed that thorough prospecting of the deposits will locate other pockets that will yield at least sufficient water for domestic needs and for a few head of stock.

The glacial lake clays are largely impervious, and little or no water can be obtained from them. However, in this

area water-bearing sand and gravel lenses and pockets occur fairly continuously below the clays at depths of 10 to 40 feet below the surface, and provide supplies that are generally adequate for stock requirements. The water obtained unfortunately is almost invariably highly mineralized and only in a few places can it be used for household purposes. In some places the content of mineral salts is so high as to render the water unfit even for stock use.

The boulder clay forming the greater part of the till and moraine deposits is generally too impervious to form a reservoir for more than small seepages of ground water. Wells sunk into the boulder clay yield a water that is so highly charged with sulphate salts in solution as to be undrinkable, and it may be unfit for stock use. Sand and gravel beds or pockets scattered through the boulder clay provide the water supplies in the drift-covered areas. Due to their irregular distribution in the boulder clay they are located only by careful prospecting, as there is usually little or no indication at the surface of their presence at depth. Shallow wells are generally best located in depressions or at the bases of slopes. The surface relief has less bearing on the distribution of the deeper pockets. Generally, sand and gravel pockets are more widespread in the moraine than in the boulder clay and, consequently, water supplies are as a rule more easily located in the moraine-covered area than on the till plain.

In many parts of Saskatchewan sand beds occurring at the contact of the boulder clay and the underlying bedrock are sources of ground water. Only in isolated places in this municipality has this horizon been found to be productive, and generally the drift overlies the shales of the Bearpaw formation without intervening porous beds. Places where water supplies are being obtained from the drift bedrock contact will be discussed under the sections dealing with the individual townships.

Water-bearing Horizons in the Bedrock

Two bedrock formations, known as the Eastend and Bearpaw formations, immediately underlie the glacial drift in different parts of the municipality. Where present the Eastend overlies the Bearpaw. It consists of dark grey shales interbedded with thin layers of fine grey sands and silts. The Eastend is confined to the highland area of township 9, range 4, and an area about 5 miles in width extending through township 8, range 4, into the northeast corner of township 7, range 4. This formation is not exposed at the surface and it has been necessary to depend entirely upon well logs in the plotting of its areal distribution, shown on Figure 1 of the accompanying map. The formation boundaries will doubtless have to be further altered with more extensive drilling.

Two sand horizons in the Eastend formation form excellent sources of water supply in the municipality. The higher horizon occurs at an approximate elevation of 2,450 feet above sea-level and is tapped by wells 50 to 110 feet deep in the southeastern part of township 8, range 4, and the northeastern part of township 7, range 4. The wells obtain supplies of water of good quality that are adequate for household and stock requirements.

The lower horizon, lying at an approximate elevation of 2,400 feet above sea-level, is tapped by many wells in the eastern half of township 8, range 4, and a few others located along the eastern boundary of township 8, range 5, and in the southern part of township 9, range 4. The wells range in depth from 22 to 40 feet in the lowland areas in township 8, range 4, but some exceed 100 feet in depth in the higher areas. The wells obtain supplies of water that are generally adequate for stock needs. This water is generally of good quality, but from some of the wells over 50 feet deep it has a high mineral salt content

and is unfit for domestic use. The Bearpaw formation underlies the Eastend, and immediately underlies the glacial drift where the Eastend is absent.

The Bearpaw formation consists essentially of compact shales. These shales contain no stones or pebbles and may be recognized by their bluish grey colour and soapy feel to the touch when wet and the small roughly cubical fragments into which they crumble upon drying. The shales are either entirely unproductive or yield only small supplies of highly mineralized water. However, the upper phases of the formation where they have been weathered are porous and yield fairly satisfactory water supplies. In an area extending over the central and northwestern part of township 7, range 4, the east-central part of township 8, range 5, and a small part of the south-western corner of township 8, range 4, wells tap sandy beds in the Bearpaw that form a fairly continuous horizon which dips in a northwesterly direction from an elevation of 2,412 feet in sec. 9, tp. 7, range 4, to an elevation of 2,305 feet in sec. 21, tp. 8, range 5. The wells range from 25 to 120 feet in depth, depending on the thickness of the glacial covering, and obtain supplies that are generally adequate for stock needs. With rare exceptions the water is too highly charged with mineral salts in solution to be suitable for household use. Many wells elsewhere in the municipality have been sunk into the Bearpaw, and most of them were dry, but isolated wells in township 8, range 6, and townships 9, ranges 4 and 6, have obtained satisfactory stock water supplies. Except in the area described above, wherein sandy beds form a fairly continuous horizon in the formation, residents are well advised to confine their search for water supplies to the glacial drift or to the sands of the Eastend formation.

In the areas where ground water supplies are difficult to obtain, the construction of dams across small draws or the excavation of dugouts are recommended as means of securing stock supplies. Holes sunk close by and deriving small supplies by seepage are possible sources of water for domestic use.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 7, Range 4

Lynthorpe creek flows in a northwesterly direction from section 2 to the northwest corner of the township, and provides a pasture supply of water for stock of nearby residents. Wells in the township are sunk into the Recent deposits along Lynthorpe creek, into the two types of glacial drift that mantles the entire area remote from the creek, and into the underlying bedrock formations. Dams and dugouts provide additional supplies for stock on many farms.

Sands, silts, and, occasionally, thin beds of gravels floor the valley of Lynthorpe creek. Residents located near this stream sink shallow wells in the deposits and obtain by seepage small supplies of water that during the spring and early summer is suitable for household use. Residents located on the SE.$\frac{1}{4}$, section 9, SE.$\frac{1}{4}$, section 15, SE.$\frac{1}{4}$, section 21, and SE.$\frac{1}{4}$, section 32, have dug wells less than 27 feet deep in these deposits, from which they obtain adequate supplies for household and stock use throughout the year.

The covering of glacial drift probably nowhere exceeds a thickness of 55 feet. Three types of deposits, namely glacial lake silts and sands, moraine, and boulder clay or till occur in the township, the areal distribution of each type being shown on the accompanying map (Figure 1).

Glacial lake silt floors the bottom of Lynthorpe Creek valley for about $\frac{1}{2}$ mile on each side of the channel. The deposits range in thickness from 20 to 40 feet, but due to their generally impervious nature they are considered to be an unlikely source of water supplies. A well, 36 feet deep, sunk on the NE.$\frac{1}{4}$, section 20, however, obtains from the underlying boulder clay a small supply of water suitable for household use.

It is probable that sand and gravel occur in isolated pockets under the silts, and potentially they are a source of good water supplies in this area, although careful prospecting with an auger would be necessary to locate them.

The moraine and glacial till consist generally of a few feet of top soil; followed by 10 to 40 feet of yellow boulder clay containing scattered pockets of sand and gravel; and in some places an underlying deposit a few feet thick of compact, blue-grey boulder clay. Sand and gravel also occur in isolated patches at the base of the boulder clay. The pockets are water bearing and several wells in the southern and central sections obtain from them supplies adequate for stock needs. In a few places, however, supplies are inadequate during dry seasons and surface water retained in dams and dugouts is used to supplement the supply. Water from the sand and gravel pockets is generally of good quality and suitable for domestic use.

The Bearpaw bedrock formation immediately underlies the glacial drift throughout the township except for a small area in the northeast corner where the Eastend formation occurs between the drift and the underlying Bearpaw. The sands of the Eastend are a source of water supplies in this part of the township. Two wells, 75 and 50 feet deep, located on the SE.$\frac{1}{4}$, section 35, and the SW.$\frac{1}{4}$, section 36, respectively, obtain from these sands supplies of water ample for the local stock needs and of a quality suitable for the household. Other wells sunk to similar depths in this part of the township would probably be equally productive.

The Bearpaw formation is ordinarily a poor source of water supplies, but several wells located in the central till plain area draw a supply from a sand or sandy clay horizon in the formation. The productive horizon dips to the north. A

well 40 feet deep, on the SW.¼, section 9, reached the productive bed at an elevation of 2,412 feet above sea-level, whereas a well on the NE.¼, section 31, was sunk to a depth of 80 feet, or to an elevation of 2,354 feet, before an adequate water supply was obtained. Wells situated in the intervening sections reach this horizon at intermediate elevations and depths. These wells yield water supplies adequate for stock needs. The water generally contains such large amounts of mineral salts in solution as to be unfit for household use. However, water from two of the wells, namely, a 40-foot well on section 9 and a 74-foot well on the NE.¼, section 17, is being used in the household without apparent ill effects. Two other wells, 60 feet deep, on the SW.¼, section 1, and SE.¼, section 31, did not locate water at this horizon, and obtain from the compact shales only small supplies of highly mineralized water that is unfit even for stock.

It is possible that satisfactory water supplies can be obtained from the Bearpaw in other places, but testing should be confined to within 80 feet of the surface. In other parts of the township, with the exception of the part underlain by the Eastend formation prospecting would be better confined to the glacial drift. Should prospecting in this area prove to be unproductive residents are well advised to construct dams and dugouts to conserve surface water.

Township 7, Range 5

Wood river, Lynthorpe creek, and smaller tributaries provide stock supplies to residents along the valleys during the spring and early summer. Wells in the township are sunk into the Recent deposits along the creeks, the glacial drift, and the underlying Bearpaw bedrock formation. It is difficult to obtain water by sinking wells in this township, and many residents use dams and dugouts to conserve surface water.

Recent deposits occur along the valley bottoms of Wood river and Lynthorpe creek and the smaller tributaries. They consist of sands, silts, and, more occasionally, gravels. Shallow seepage wells sunk in these deposits near the stream channels provide by seepage a seasonal supply of household water for many residents of the township. Other wells sunk in the deposits located some distance from the stream channels do not depend directly upon seepage from the creek for their supply. These wells range in depth from 10 to 26 feet. A year-round supply, generally adequate for stock needs, is derived from several such wells. Not all of them, however, yield water that can be used for domestic purposes, and in several places water for drinking must be obtained from other sources. A spring flows from these deposits on the SW.$\frac{1}{4}$, section 27, and provides a stock supply for the owner throughout the year.

Glacial drift mantles the entire area remote from the streams and has a thickness ranging from 20 to 50 feet. Four types, namely, glacial lake silts, glacial lake clays, moraine, and till, have been recognized in the township, the distribution of each type being outlined on the accompanying map (Figure 1).

The glacial lake clay deposits are generally 10 to 40 feet thick and consist of a light brownish, impervious clay that is not a source of water supplies. The deposits of silt are more sandy and porous, but contain only small supplies of water. However, isolated sand and gravel lenses occur below both the clay and silt deposits and provide water supplies in some localities. Wells located on the NE.$\frac{1}{4}$, section 3, NW.$\frac{1}{4}$, section 10, SE. and NE.$\frac{1}{4}$'s, section 16, NW.$\frac{1}{4}$, section 20, SE.$\frac{1}{4}$, section 22, and SW.$\frac{1}{4}$, section 36, tap such pockets between 16 and 42 feet from the surface. The wells, in general, obtain

fairly large supplies of water that are adequate for stock needs of the farms on which they are located. The supply from the well on the NE.¼, section 3, however, has decreased during the dry years between 1928 and 1934 until at present the owner experiences a shortage of water. The resident on section 10 finds it necessary to use two similar wells to satisfy water requirements. The water from most of the wells is of fair quality and suitable for household use, but that from the wells on section 16 is very highly mineralized and unfit even for stock use.

The moraine and boulder clay deposits consist, in general, of a few feet of top soil, 10 to 40 feet of yellow boulder clay containing scattered pockets of sand and gravel, and a basal deposit of blue boulder clay ranging in thickness from a foot or two to 35 feet. Scattered pockets of sand and gravel occur between the yellow and blue clay. The gravel and sand pockets are water bearing, but in the drift of this township they are difficult to locate. Wells located on the NE.¼, section 7, NW.¼, section 8, SW.¼, section 9, SW.¼, section 18, SE.¼, section 23, and NE.¼, section 24, tap such pockets at depths of 15 to 35 feet. The wells on sections 7 and 18 obtain supplies that are adequate for the residents' stock needs, but the others obtain only small supplies. The water from the wells in the western sections is used for domestic purposes, but that from the well on section 7 has a laxative effect when used by humans. The water from the two wells tapping pockets in the eastern sections is hard, has a high mineral salt content, and is unsuitable for domestic use. Intensive and systematic prospecting over the moraine- and boulder clay-covered areas would probably locate more productive pockets. Testing should be limited to depths of 40 feet, as the underlying bedrock is considered productive only of small supplies of water so highly

mineralized as to be unfit even for stock. Productive pockets appear to be more numerous in the boulder clay along the western boundary than elsewhere in the township. Water obtained from these pockets, however, will probably be suitable only for stock use.

With the single exception of a 17-foot well on the NE.$\frac{1}{4}$ section 34, wells in this township that have passed into the Bearpaw formation do not obtain usable supplies of water. This well yields water of good quality and in sufficient quantity to water 8 to 10 head of stock. Where conditions are such that water cannot be obtained from either the glacial drift or the bedrock residents must consider the advisability of constructing dams or excavating dugouts to store surface waters. Such reservoirs would provide stock supplies. Drinking water supplies could be obtained from seepage wells dug beside the reservoirs or by catching the rainfall in cisterns.

Township 7, Range 6

Water supplies in this township are obtained from Wood river and from wells. Wood river ceases to flow only during the driest years, and serves nearby residents as a source of stock water. Wells are less than 60 feet deep and are sunk only into the unconsolidated Recent and glacial deposits.

The Recent stream deposits, consisting of sands and silts, are found in thicknesses of 15 feet or less along the bed of Wood river. Wells sunk in these deposits obtain small supplies of water as seepage from the stream. This water is suitable for household use during the time of the year when water in the creek is not stagnant. Wells sunk to greater depths in the Recent deposits and not dependant directly upon seepage from the stream would possibly yield moderately large supplies that could be depended upon throughout the year.

The glacial drift over this township is probably about 60 feet thick in the southeast and northwest corners, and 30 to 50 feet thick on Wood River flats. On the flats the deposits consist of glacial lake clays and in the rolling areas to the southeast and west of boulder clay.

The lake clay flats consist in general of a few feet of top soil, approximately 15 feet of lake clay, and 20 to 30 feet of yellow to brown boulder clay in which occur beds of sands or gravels that are fairly continuous but are not present at all places. The clay itself is unproductive and wells in the area should be sunk to tap the underlying sand and gravel pockets. Wells encounter the pockets at depths ranging from 15 to 50 feet below the surface, and obtain supplies that are, in general, adequate for stock needs. The water from the wells is hard and fairly highly mineralized, that from the shallow wells being suitable for household use, but that from the others suitable only for stock, and in some cases it is unsatisfactory even for that purpose.

In the till-covered areas on the southeast and northwest parts of the township the drift is over 60 feet thick. The upper 20 or 30 feet is weathered yellowish brown, but the lower part is bluish grey. Sand and gravel pockets occur scattered through the upper, weathered part of the drift and occasionally occur in the lower, unweathered, blue-grey boulder clay and also at its contact with the underlying bedrock. In the southeast corner wells tap extensive sand beds with occasional patches of gravel in the boulder clay at depths ranging from 30 to 60 feet, and obtain from them large supplies of water. The quality of this water varies from place to place, but is generally better in those beds lying near the surface. For example, water from the 30- and 43-foot wells on the SW. and SE.$\frac{1}{4}$'s, section 13, is suitable for household use,

whereas the water from the 60-foot well on the SE.$\frac{1}{4}$, section 12, is fit only for watering stock. Along the western side of the township smaller pockets of sand and gravel are tapped by wells at depths between 25 and 45 feet in the boulder clay and yield supplies adequate for the needs of residents. The water, in general, is of good quality and suitable for household use. It would seem in this township that the chief difficulty is not so much of obtaining sufficient quantities of water as of obtaining water low enough in dissolved mineral salts to be used in the household. Drinking water is obtained from shallow wells in the drift, seepage wells beside Wood river, or by catching the rainfall in cisterns.

The Bearpaw bedrock formation underlies the unconsolidated deposits throughout the township, and as this formation cannot be considered a source of satisfactory water supplies, prospecting for water should be confined to the Recent and glacial deposits.

Township 8, Range 4

Water supplies in this township are obtained from wells sunk into the glacial drift, and into the underlying bedrock formations. Supplementary supplies for stock are obtained in places from dams constructed in coulées and from dugouts.

Glacial drift, consisting of till and moraine, mantles the entire township, the areal distribution of each type being shown on Figure 1 of the accompanying map. The eastern half of the township is overlain by moraine. It has a thickness of approximately 60 feet, and has an irregularly rolling surface with many low knolls and undrained depressions. Glacial till covers the western part of the township. Its thickness probably nowhere is less than 10 feet or greatly exceeds 30 feet.

Pockets of sand and gravel scattered in the boulder clays of the glacial drift yield water supplies of good quality to wells less than 30 feet deep, located on sections 4, 9, and 24. The supplies are adequate for the needs of residents. A 30-foot well on the SE.$\frac{1}{4}$, section 14, did not strike a sand or gravel pocket, but obtains a seepage supply from the clay that is sufficient for the owner's needs throughout the spring and summer. Larger supplies are available from the underlying bedrock formations and most residents in this township obtain their water supply from this source. It is possible, however, that with sufficient prospecting glacial sand and gravel pockets could be located that would yield satisfactory supplies and thus eliminate the expense of deeper drilling.

The Eastend bedrock formation immediately underlies the glacial drift in all but a small area in the western and southwestern parts, and possibly a narrow area along the eastern border, of the township. Th Bearpaw formation underlies the Eastend formation, and where the Eastend is absent the Bearpaw shales immediately underlie the drift.

Two water-bearing horizons occur in the Eastend formation in this township. The higher of these lies at an approximate elevation of 2,450 feet above sea-level, and is tapped by wells in the southeastern part of the area. The wells, 70 to 110 feet in depth, generally obtain supplies adequate for local farm needs. The 85-foot well on the SE.$\frac{1}{4}$, section 22, however, obtains a supply sufficient for only 7 head of stock. The water from the deeper wells is soft and probably contains fairly large amounts of soda in solution, but from the shallower wells it is hard and contains "sulphate" salts in solution. In neither type, however, is the total salt content sufficiently high to render the water unfit for household

purposes. This horizon is not found in other parts of the township, having probably been removed by erosion before the deposition of the drift.

The lower productive horizon in the Eastend formation occurs at an approximate elevation of 2,400 feet above sea-level, and underlies the western and central sections of the township and very probably extends under the higher productive horizon in the eastern sections. Wells reach the sands of the horizon at depths of about 100 feet in the higher lands of the south, and at depths between 12 and 70 feet with local variations of surface elevation in the northern lowlands. These wells yield large supplies of water that are in all cases sufficient for the needs of the residents. The Melaval village well, sunk 40 feet deep on the NW.$\frac{1}{4}$, section 35, and wells 100, 80, and 35 feet deep, located on the SE.$\frac{1}{4}$, section 3, NE.$\frac{1}{4}$, section 21, and NW.$\frac{1}{4}$, section 32, respectively, obtain water that is soft and although containing soda is suitable for household use. The other wells tapping this horizon obtain water that is hard and quite highly mineralized with sulphate salts. In many places this water cannot be used for domestic purposes.

The Bearpaw formation, ordinarily not productive of usable water supplies, yields to two wells, 115 and 110 feet deep, located on the NW.$\frac{1}{4}$, section 7, and SE.$\frac{1}{4}$, section 18, respectively, supplies adequate for the local stock needs. The water is, however, unfit for household use. As satisfactory water supplies can be obtained from the glacial deposits and the Eastend formation prospecting should be confined to these sources rather than risk failure in the much less productive, compact shale of the Bearpaw formation. By the construction of dams and dugouts stock water supplies can be secured for at least part of the year. Seepage wells beside these reservoirs would provide drinking water.

Township 8, Range 5

Wells in this township derive supplies from Recent deposits along the stream valleys, from the glacial drift that covers the township, and, in the east-central part of the area, from water-bearing horizons in the underlying bedrock formations. Large supplies are difficult to obtain in the western part of the township, most of which is mantled by compact till or glacial lake clays. The wells either yield only small amounts of water or water that has such a high mineral salt content as to be unsatisfactory for household use. Many residents have constructed dams and dugouts to enlarge their stock supplies. Drinking water is obtained in many places from seepage wells dug beside the reservoirs or streams, and by catching the rain in cisterns.

Recent deposits of sands, silts, and gravels that occur along the stream valleys form possible sources of small domestic supplies to nearby residents during the seasons of the year when the streams are flowing. Larger and more constant supplies could possibly be obtained from wells sunk deeper in the deposits and more remote from the actual stream channel.

Wood River flats, covering most of the southwestern corner of the township, is underlain by approximately 20 feet of glacial lake clays. Wells in this area tap water-bearing sand or sandy clay beds or pockets in the boulder clay that lies below the impervious and unproductive lake clays. Supplies are generally fairly large and adequate for stock needs, but the water is charged with a large amount of sulphate salts in solution and is not suitable for household use, and in some cases even for stock use.

The glacial drift exposed over the remainder of the township consists of 60 to 100 feet of boulder clay containing

scattered pockets of sands and gravels. The boulder clay is productive of only small seepages, but pockets of sand and gravel in it, generally within 30 feet of the surface, yield fairly large supplies of water. The pockets are small and difficult to locate, and only in isolated sections over the township have wells encountered them. Supplies obtained from individual wells are generally adequate for the household and for a few head of stock. Productive sand and gravel beds also occur in places at the contact between the boulder clay and the underlying bedrock. Wells 50, 60, and 70 feet deep, located on the NE.$\frac{1}{4}$ and NW.$\frac{1}{4}$, section 11, and SE.$\frac{1}{4}$, section 15, respectively, tap such beds and obtain ample supplies for local stock needs. The water is suitable for household use.

The Bearpaw bedrock formation underlies the glacial drift in all parts of the township, except two small areas on the eastern boundary where the Eastend sands occur between the drift and the Bearpaw. The sand beds of the Eastend yield water supplies to a 118-foot well on the SE.$\frac{1}{4}$, section 12, and to an 83-foot well on the NE.$\frac{1}{4}$, section 25. The supply of water from the 118-foot well is of good quality and the yield is sufficient for the owner's stock needs. The 83-foot well obtains only a small supply of water that is not suitable for household use. It is possible that wells sunk to similar depths in the southeast corner of the township would obtain yields from the Eastend formation although the exact distribution of this formation in the area has not been determined.

The Bearpaw formation is ordinarily not productive of good water supplies. However, wells 80 to 120 feet deep, sunk over an area comprised of sections 13, 21, 23, 24, and 26, tap sand beds near the top of the formation from which supplies adequate for stock needs are obtained. The water is hard and highly mineralized, and with the exception of the supply from

the 80-foot well on the NW.¼, section 23, is unsuitable for household use. Holes sunk as deep as 300 feet in other parts of the township testify to the lack of productive beds in the formation in these localities.

The upper 30 feet of the glacial drift should be thoroughly prospected for water-bearing pockets before deep drilling is attempted in any part of the township. In the area along the eastern boundary where the drift is underlain by the Eastend formation and in the small area where the Bearpaw is at present productive deep wells can be sunk with reasonable assurance of obtaining a supply, but elsewhere in the township should shallow prospecting be unsuccessful residents are well advised to conserve surface water in dams and dugouts.

Township 8, Range 6

Wood river flows through the northeastern corner of the township. Pinto creek crosses the northern half of the area and joins Wood river in section 24. Supplies of surface water for stock use can be obtained by residents from Wood river throughout most of the year and from Pinto creek in the spring and early summer. Ground water supplies in the township are obtained from Recent deposits, the glacial drift, and the underlying Bearpaw bedrock formation.

Recent stream deposits, consisting of sands, silts, or occasionally gravels, floor the bottoms of Pinto Creek and Wood River valleys. Many shallow wells have been sunk in these deposits, and during the times of the year when the streams are flowing they provide small supplies of water suitable for household use.

A 6-foot well sunk in a small patch of sandy alluvium on the NW.¼, section 19, provides a year-round supply of water that is used chiefly for domestic purposes.

Glacial drift underlies the entire area away from the stream. The thickness ranges from 60 to over 160 feet in the southern part of the township and from 80 to 90 feet in the northern part. The upper part of the glacial drift differs in composition and porosity in different parts of the area. Lake clays cover the creek flats and extend over a considerable area in the southeast corner of the township. Patches of glacial outwash sands and gravels occur in the extreme northwest corner and in a narrow zone on the edge of the flats south of Pinto creek, in the west-central part of the township. An irregularly rolling area of moraine caps the higher land in an area 1 to 2 miles in width extending northeastward from the centre to the southwest corner of the township, and a small area immediately east of Woodrow. Glacial till is exposed over the rest of the area. The areas covered by these various deposits are shown on Figure 1 of the accompanying map of the municipality.

Glacial outwash sands or gravels due to their porous nature are likely sources of water at shallow depths. Only one well at present derives satisfactory supplies of good quality water from them, but it is believed that elsewhere in the areas where they occur good supplies can be obtained within 30 feet of the surface.

The lake clays overlie the boulder clay and in the flat areas have an average thickness of 20 feet. The lake clays are yellow-buff near the surface, but become bluish grey at depth. They are impervious and in themselves are not a source of water supply. Sand or gravel pockets that occur below the lake clay, however, yield fairly large supplies of highly mineralized water in this area. Wells tap these pockets at depths ranging from 20 to 60 feet below the surface. The water obtained is suitable only for watering stock. Other supplies in this area are obtained from porous pockets in the boulder clay lying at depths greater than 100 feet.

The moraine and boulder clay deposits consist, in general, of a few feet of top soil; 20 to 35 feet of yellow boulder clay containing scattered pockets of sand and gravel; 60 to 125 feet of blue-grey boulder clay; and beds of sand, gravel, or black "muck" at the contact of the clay with the underlying bedrock shales. These latter beds are fairly continuous under the eastern alf of the township, but are probably only of scattered occurrence in the remainder of the area. Shallow wells in isolated sections of the township obtain small supplies of water, generally of good quality, from the porous pockets in the yellow boulder clay. The village of Woodrow obtains a supply from a 12-foot well that taps a pocket on the NW.$\frac{1}{4}$, section 27. Wells from 120 to 160 feet deep in the southeastern part of the township, and about 80 or 90 feet deep in the northeast parts, obtain supplies adequate for the residents' stock needs from beds that lie at the contact between the glacial deposits and the bedrock. Generally, a high concentration of mineral salts in the water from these wells renders it unsuitable for household use. However, the waters from the 125-foot well on the SE.$\frac{1}{4}$, section 22, the 150-foot well on the NE.$\frac{1}{4}$, section 21, and the 121-foot well on the SW.$\frac{1}{4}$, section 12, are used for this purpose without apparent harmful effects.

The Bearpaw formation that underlies the glacial drift throughout the entire township is productive of water supplies only from sandy pockets scattered sparingly in the top part of this compact shale formation. The 125-foot well on the NE.$\frac{1}{4}$, section 1, obtains from such a source a water supply adequate for stock needs. The water contains a large amount of sulphate salts in solution and is not suitable for domestic use. A 424-foot hole on the NE.$\frac{1}{4}$, section 34, sunk into the Bearpaw formation obtained a small flow of water from a sandy pocket in

the formation at 190 feet below the surface. This supply was never utilized, as the casing became stuck in the hole and plugged the well.

Thorough prospecting would probably locate at least small supplies in the upper 40 feet of glacial deposits in the township. In the western part of the area stock supplies could almost certainly be obtained at approximate depths of 120 feet. The uncertainty of successful results in drilling into the Bearpaw make it advisable to confine prospecting in all parts of the township to the glacial deposits.

Township 9, Range 4

Water supplies in this township are obtained by constructing dams across coulées, from dugouts, and in most places from wells. These wells derive their supplies from the glacial deposits and from water-bearing horizons in the underlying bedrock formations.

Glacial drift covers the entire township and has a considerable variation in thickness from place to place. It is approximately 150 feet thick in the hilly, central part, but is much thinner towards both the north and south, and in some of the valleys in these areas it is only a few feet thick. The drift consists of boulder clay or till in the northern part and the southwestern corner of the township, and of moraine in the central part, the areas covered by each being shown on the accompanying map (Figure 1).

The moraine and till deposits consist essentially of boulder clay in which are scattered water-bearing sand and gravel pockets. Wells located in the southern half of the township obtain supplies from pockets within 65 feet of the surface. The supplies are in most places adequate for the local stock needs, but from a few of the wells the water has a high mineral

salt content and is not suitable for domestic purposes. Springs in the ravines and at the bases of some of the steeper slopes provide additional supplies for stock in some places.

Wells located on sections 19, 21, 22, 23, and 28 tap pockets in the drift between 80 and 134 feet from the surface. The wells on sections 19, 21, and 22 yield water that is so highly mineralized as to be unfit for household use. The supply, however, is suitable and adequate for stock needs. The wells on sections 23 and 28 obtain only small supplies, and in these sections and in other parts of the northeast corner of the township water is difficult to obtain. In a few places in this area small supplies sufficient only for domestic needs are obtained by digging shallow seepage wells.

The Eastend and Bearpaw bedrock formations underlie the glacial drift in different parts of this township. The Eastend is present only in the highlands area of the central and southern parts of the township. The Bearpaw underlies the Eastend where it is present and occurs immediately under the drift throughout the remainder of the township. The sands of the Eastend formation are tapped by two 10-foot wells on section 4 and a 65-foot well on section 9, and yield supplies of water adequate for stock needs. The water is highly mineralized and only from the 10-foot well on the NW.$\frac{1}{4}$, section 4, is it suitable for household use. These wells reach the productive sands at an approximate elevation of 2,390 feet above sea-level, but farther north in the township wells have been sunk below this level without encountering the sands. Consequently, this source may be regarded as reliable only in the southeastern part of the township.

The Bearpaw formation generally produces only small supplies of water that is highly charged with mineral salts. In certain places, however, the upper parts of the shales of the

formation have been rendered quite porous, due to weathering before the advance of the ice-sheet, and yield better supplies. A 30-foot well located on the NW.¼, section 32, taps such a porous zone in the shale and obtains a satisfactory water supply. However, wells 90, 35, and 90 feet deep, located on the SW.¼, section 27, NE.¼, section 30, and SW.¼, section 35, respectively, yield supplies more typical of the formation. The 35-foot well derives only a small supply, and the others yields water that is so highly mineralized as to be unfit for either household or stock use.

The best sources of water are the Eastend sands in the southeast corner and the glacial deposits throughout the remainder of the township. Prospecting for water supplies should be confined to these deposits, and if they prove unproductive residents are well advised to excavate dugouts or construct dams which if carefully located and sufficiently large would retain year-round stock water supplies.

Township 9, Range 5

Satisfactory water supplies are difficult to obtain in this township, particularly in the central and northwestern parts. Stock is watered in many places from the surface waters collected by dams or dugouts, and from Wood river. Many of these supplies are available only during the spring and early summer, and during other times of the year water is hauled from the few wells in the area that yield water of good quality. The wells in the township obtain their water supplies from Recent sands that floor Wood River valley, from sands that have been washed down from hills into the valleys, and from the glacial deposits that cover the area. Several holes in the township were sunk into the underlying Bearpaw bedrock formation, but none obtained water.

The Recent sands in the valleys collect small amounts of water from rainfall. Yields to wells, consequently, vary greatly with the local rainfall and are thus unreliable. The water thus obtained is of good quality, however, and suitable for household use.

The glacial drift varies greatly in thickness over the township. It is at least 173 feet thick in the higher areas of the west, but thins out towards the northeast with a recorded thickness of 38 feet in section 36. The glacial boulder clay covers the northeastern and much of the southern parts of the township, whereas a belt of moraine averaging 2 miles in width trends northwesterly across the central part of the township and another covers the southwestern corner. The areal extent of these deposits is shown on the accompanying map (Figure 1).

The moraine and boulder clay deposits consist in general of clay that is yellowish buff near the surface, but becomes bluish grey at depth. The clay itself is not a source of satisfactory water supplies but contains scattered sand and gravel pockets that are water bearing. Along the southern and eastern boundaries of the township wells have tapped pockets yielding satisfactory water supplies, but elsewhere in the township wells either tap very small pockets, yielding only small supplies, or failing to encounter such a pocket derive only a small seepage supply from the clay. Wells located on sections 4, 7, 13, and 36 obtain water supplies ample for the local stock needs from pockets within 45 feet of the surface. The water is hard but not highly mineralized and is suitable for domestic use. The 20-foot well on the SE.$\frac{1}{4}$, section 4, yields part of the drinking water supply for the village of Lafleche. Productive pockets occurring in the lower part of the drift are tapped by wells 92, 60, and 85 feet deep, located on the SW.$\frac{1}{4}$, section 2, NW.$\frac{1}{4}$, section 12, and E.$\frac{1}{2}$, section 24. These wells

also obtain supplies adequate for stock needs, but the water is generally more highly mineralized and is not suitable for household use. The 92-foot well provides the stock supply for the village of Lafleche.

The Bearpaw formation underlies the glacial drift throughout the township. It is not considered a likely source of water supplies in this area. The surface of the formation is fairly uniform and occurs throughout the township at an approximate elevation of 2,300 feet above sea-level. Hence, drilling below this elevation is not advisable. The best possibilities of obtaining water in the area are in the upper 45 feet of the glacial drift, and this zone should be prospected thoroughly over as wide an area as possible. If it proves unproductive residents are well advised to construct dams or excavate dugouts, which if carefully located and constructed provide a year-round stock supply. Drinking water supplies could be obtained from seepage wells beside the reservoirs or by catching the rainfall in cisterns.

Township 9, Range 6

Water supplies in this township are obtained from wells sunk into Recent sands flooring some of the small valleys, from the glacial drift that mantles the area, and, to a limited extent, from the underlying Bearpaw bedrock formation. Dams constructed across coulées supplement well supplies in many places.

The Recent sands that have been washed down into the valleys from the adjoining slopes supply water to shallow wells that during years of normal precipitation are adequate for local stock needs. The water from such a source is generally of good quality and suitable for household use.

The glacial drift has an average thickness of approximately 100 feet over the township, but irregularities in both

the ground surface and the underlying bedrock surface cause large local variations in this thickness, in section 21 the bedrock is known to be within 40 feet of the surface. The township is largely covered by glacial till or boulder clay, but a belt of territory along the southeast-northwest diagonal of the township and a small area of the north corner are covered by moraine. The strip of moraine along the diagonal of the township is about 1 mile wide in the central part, but widens out to over 2 miles at the southeast and northwest corners. The moraine and boulder clay deposits consist, in general, of yellow clay that becomes blue-grey at depth. Sand and gravel pockets occur scattered in the upper 60 feet of the clay, and in patches below the clay at the contact with the bedrock. Generally, the pockets are more widespread in the moraine than in the boulder clay, and most wells obtaining their supplies from such pockets are located either in the moraine-covered areas or just at the edge of these deposits. The supplies from the pockets are in most places adequate for the local stock needs. The water is mineralized, and the concentration of mineral salts appears to increase with the depth of the productive pocket below the surface. Water from pockets lying within 20 or 30 feet of the surface has the lowest salt content, and is generally suitable for household use. Water from deeper beds is generally not suitable for household use, and in a few places is unfit even for stock. Wells 60, 96, 100, and 80 feet deep, on the SW.$\frac{1}{4}$, section 1, SW.$\frac{1}{4}$, section 2, SE.$\frac{1}{4}$, section 4, and NE.$\frac{1}{4}$, section 21, respectively, tap the productive beds lying near the base of the deposits. Only the 60-foot well obtains a usable water supply, the yield from the 96-foot well being too small for use, and the water from the others is too highly mineralized to be fit either for domestic requirements or for watering stock.

The Bearpaw formation that underlies the glacial deposits in all parts of the township is in most places productive of only small supplies of highly mineralized water. However, two wells, 68 and 180 feet deep, in sections 11 and 21, sunk into the formation obtain sufficient water for stock needs. The mineral salts in solution in the water prevent its use for household purposes, but the water is reported to have no apparent ill effects when used for stock. It is doubtful whether the Bearpaw would be similarly productive elsewhere in the township, and prospecting for water supplies should be confined generally to the upper 60 feet of the glacial deposits. Dams and dugouts are means of securing stock supplies in the area. Drinking water supplies could be obtained from seepage wells beside the reservoirs or by catching the rainfall in cisterns.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF WOOD RIVER, NO.74, SASKATCHEWAN

Township	7	7	7	8	8	8	9	9	9	Total No. in municipality
West of 3rd meridian Range	4	5	6	4	5	6	4	5	6	
Total No. of Wells in Township	34	41	43	27	47	48	54	50	41	385
No. of wells in bedrock	11	19	0	23	17	2	12	1	6	91
No. of wells in glacial drift	19	15	43	4	30	46	42	48	35	282
No. of wells in alluvium	4	7	0	0	0	0	0	1	0	12
Permanency of Water Supply										
No. with permanent supply	33	40	42	26	36	43	43	13	32	308
No. with intermittent supply	0	0	0	1	2	0	2	6	4	15
No. dry holes	1	1	1	0	9	5	9	31	5	62
Types of Wells										
No. of flowing artesian wells	1	0	0	0	0	0	0	0	0	1
No. of non-flowing artesian wells	15	24	28	16	11	17	18	8	15	152
No. of non-artesian wells	17	16	14	11	27	26	27	11	21	170
Quality of Water										
No. with hard water	22	38	40	20	31	40	42	18	35	286
No. with soft water	11	2	2	7	7	3	3	1	1	37
No. with salty water	1	0	0	0	0	0	1	0	0	2
No. with "alkaline" water	9	28	23	11	17	16	21	10	15	150
Depths of Wells										
No. from 0 to 50 feet deep	25	40	40	13	26	26	30	23	28	251
No. from 51 to 100 feet deep	9	1	3	7	10	11	20	20	11	92
No. from 101 to 150 feet deep	0	0	0	7	9	9	4	6	0	35
No. from 151 to 200 feet deep	0	0	0	0	1	1	0	1	1	4
No. from 201 to 500 feet deep	0	0	0	0	1	1	0	0	1	3
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
How the Water is Used										
No. usable for domestic purposes	22	19	21	18	21	19	24	12	21	177
No. not usable for domestic purposes	11	21	21	9	17	24	21	7	15	146
No. usable for stock	31	24	32	26	32	40	42	18	34	279
No. not usable for stock	2	16	10	1	6	3	3	1	2	44
Sufficiency of Water Supply										
No. sufficient for domestic needs	33	38	42	26	35	43	43	12	32	304
No. insufficient for domestic needs	0	2	0	1	3	0	2	7	4	19
No. sufficient for stock needs	26	30	36	25	24	38	31	10	19	239
No. insufficient for stock needs	7	10	6	2	14	5	14	9	17	84

ANALYSES AND QUALITY OF WATER

General Statement

Samples of water from representative wells in surface deposits and bedrock were taken for analyses. Except as otherwise stated in the table of analyses the samples were analysed in the laboratory of the Borings Division of the Geological Survey by the usual standard methods. The quantities of the following constituents were determined; total dissolved mineral solids, calcium oxide, magnesium oxide, sodium oxide by difference, sulphate, chloride, and alkalinity. The alkalinity referred to here is the calcium carbonate equivalent of all acid used in neutralizing the carbonates of sodium, calcium, and magnesium. The results of the analyses are given in parts per million--that is, parts by weight of the constituents in 1,000,000 parts of water; for example, 1 ounce of material dissolved in 10 gallons of water is equal to 625 parts per million. The samples were not examined for bacteria, and thus water that may be termed suitable for use on the basis of its mineral salt content might be condemned on account of its bacteria content. Waters that are high in bacteria content have usually been polluted by surface waters.

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Resident

accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

The calcium (Ca) and magnesium (Mg) content of water is dissolved from rocks and soils, but mostly from limestone, dolomite, and gypsum. The calcium and magnesium salts impart hardness to water. The magnesium salts are laxative, especially magnesium sulphate (Epsom salts, $MgSO_4$), and they are more detrimental to health than the lime or calcium salts. The calcium salts have no laxative or other deletorious effects. The scale found on the inside of steam boilers and tea-kettles is formed from these mineral salts.

Sodium

The salts of sodium are next in importance to those of calcium and magnesium. Of these, sodium sulphate (Glauber's salt, Na_2SO_4) is usually in excess of sodium chloride (common salt, NaCl). These sodium salts are dissolved from rocks and soils. When there is a large amount of sodium sulphate present the water is laxative and unfit for domestic use. Sodium carbonate (Na_2CO_3) "black alkali", sodium sulphate "white alkali", and sodium chloride are injurious to vegetation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate, magnesium sulphate, and calcium sulphate ($CaSO_4$). When the water contains large quantities of the sulphate of sodium it is injurious to vegetation.

Chlorides

Chlorides are common constituents of all natural water and are dissolved in small quantities from rocks. They usually occur as sodium chloride and if the quantity of salt is much over 400 parts per million the water has a brackish taste.

Iron

Iron (Fe) is dissolved from many rocks and the surface deposits derived from them, and also from well casings, water pipes, and other fixtures. More than 0.1 part per million of iron in solution will settle as a red precipitate upon exposure to the air. A water that contains a considerable amount of iron will stain porcelain, enamelled ware, and clothing that is washed in it, and when used for drinking purposes has a tendency to cause constipation, but the iron can be almost completely removed by aeration and filtration of the water.

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and it represents the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due mainly to the bicarbonates of calcium and magnesium and iron, and permanent harness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

can be partly eliminated by adding simple chemical softeners such as ammonia or sodium carbonate, or many prepared softeners. Water that contains a large amount of sodium carbonate and small amounts of calcium and magnesium salts is soft, but if the calcium and magnesium salts are present in large amounts the water is hard. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from the Municipality of Wood River, No. 74, Saskatchewan

LOCATION						Depth of Well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	$CaCl_2$	
1	NW.	20	7	5	3rd	20	080	320	100	160	25	340	40	40	209	200	684	72		84		178	309	41		✱1
2	SW.	30	7	5	3rd	10	580											(3)	(1)		(2)				(4)	✱1
3	NW.	27	7	0	3rd	20	9,240	1,800	1,700	100	161	785	370	392	5,420	3,100	8,861	660		105	1,021		6,810	265		✱1
4	SE.	32	7	0	3rd	30	1,440	800	700	100	7	415	00	119	668	444	1,370	107		249		13	989	12		✱1
5	NE.	1	8	6	3rd	125													(4)		(5)	(2)	(1)	(3)		✱2
6	NW.	30	8	0	3rd	65	2,360	800	750	50	35	795	220	148	1,040	726	2,344	394		309		35	1,548	58		✱1

Water samples indicated thus, ✱1, are from glacial drift.
Water samples indicated thus, ✱2, are from bedrock, Bearpaw formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4), and (5) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analyses Nos. 2 and 5 by Provincial Analyst, Regina.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Four analyses by the Geological Survey and one by the Provincial Analyst, Saskatchewan, are available of waters from the unconsolidated deposits in this municipality. No analyses have been made of waters from the unconsolidated deposits of Recent origin. Hence, the following generalizations regarding the quality of waters from this source are based on the reports of residents and observations at the well sites.

Water in Recent sands or silts that is derived by direct seepage from streams or by the downward percolation of the surface water seldom contains large amounts of mineral salts in solution, and rarely is any salt in sufficient concentration to have any harmful effect. Such waters, if free from pollution by decaying organic matter, and particularly sewage, are generally suitable for all farm purposes.

Silts form the greater part of the valley alluvium remote from the actual stream channels. This material is generally so fine grained that water does not circulate through it readily. Hence, ample opportunity is afforded for the water to dissolve any soluble mineral salts present in the silts. Many of the waters found in the river flats is, therefore, not satisfactory for drinking. Water of appreciably better quality is derived from more porous beds or pockets of sands and gravels that are interspersed through the silts. The source of the water entering the valley deposits from the uplands is an important factor in determining its usability in the households. Seepages entering the silts from compact boulder clay or from the shales of the Bearpaw formation that form the valley sides are invariably highly mineralized, and may adversely affect the quality of water in the silts that would otherwise be drinkable. On the other hand, water derived from the upper, more porous beds of the glacial

deposits on the uplands is not highly mineralized and upon collecting in the gravel beds in the valley silts may form a supply of drinkable water. Due to the proximity of the shales to the surface along Wood river, water derived from the alluvial flats in this area is often of poor quality and not satisfactory for domestic use. Along many of the smaller tributaries, however, water from the stream deposits is drinkable.

Large variations in the quality of water from the glacial deposits are found even within small areas. This is to be expected, since the deposits themselves vary greatly in composition from place to place. Clays, both boulder clay and lake clays, are believed to be the source of the sulphate salts that are the chief mineral constituents of water from the drift. Porous beds of sands and gravels occurring at or near the surface, and hence not covered by any large thickness of clays, yield waters that are soft or only moderately hard and quite satisfactory for domestic use.

Analyses Nos. 1, 2, and 4 on the accompanying table are typical of the good domestic supplies that may be obtained from shallow sand and gravel pockets. The total solid contents of these waters are, respectively, 680, 580, and 1,440 parts per million, and the water is not excessively hard compared with supplies from greater depths in the drift. Sodium or calcium sulphate is invariably present and generally occurs in greater amounts than any of the other salts comprising the total solids. Magnesium sulphate is also present, but the combined sulphates are not present in any of these waters analysed in sufficient amounts to cause ill effects upon persons drinking the waters. The other salts indicated by these analyses are present only in minor amounts and have little or no effect upon the quality of the supply for farm use.

Water derived from the compact boulder clay or from thin sand beds interbedded in the clays show appreciably higher concentrations of dissolved salts. In general, the total solid content seems to increase with increasing depth into the drift. The third analysis given on the accompanying table is of water from a sand bed only 26 feet below the surface, but this water has undoubtedly been contaminated by contact either with seepages from the boulder clay or the underlying Bearpaw bedrock formation. This water is characteristic of many of the supplies derived from the boulder clay. The analysis shows the water to contain 9,240 parts per million of salts, consisting of 6,810 parts of sodium sulphate, 1,021 parts of magnesium sulphate (Epsom salts), 265 parts of sodium chloride (common salt), and negligible amounts of calcium and magnesium carbonates. The concentration of these salts renders the water unfit for human or stock use, and the resident finds it necessary to dilute it with less highly mineralized water before using it for watering stock.

The sixth analysis on the table is typical of water obtained from greater depth in the drift. The particular source bed of this water lies below 65 feet of boulder clay. The water contains 2,360 parts per million of dissolved salts, made up to a considerable extent of sodium sulphate. This concentration of salts renders the water unfit for household use, and harmful even when used by stock. The iron and sulphur that this water also contains adds to its disagreeable properties. Iron forms an objectionable feature in many waters of this municipality. Much of this iron may be removed by allowing the water to stand for a period of time in a trough or container having a large water surface exposed to the air. Agitation of the water is also helpful in removing iron. One method that has proved successful is to allow the water to pass over a sheet of corrugated, galvanized iron suspended between the pump and the trough. Deeper

beds in the glacial deposits yield waters that are probably more highly mineralized than indicated by analysis No. 6, and, consequently, such waters are rarely suitable for household use and in many places are of questionable value even for stock.

Water from the Bedrock

Waters from the Eastend formation are of two general types, a hard water containing predominately sulphate salts and a soft, soda-bearing water. Both types, however, do not usually contain mineral salts in excessive amounts, although an increase is noted in the salt content with increasing depths below the surface. The waters are suitable for stock use, but from some of the deeper wells the concentration of salts prohibits its use for domestic purposes. The sulphate type of water is comparable to waters from the glacial drift, and the use to which it may be put is dependant upon the concentration of the sulphate salts. The soda-bearing type contains sodium carbonate in addition to usually fairly large amounts of sodium sulphate. The sodium carbonate in this type of water, if present in sufficiently large concentration, renders the water harmful to plants and many of these waters should not be used for garden irrigation. The use of these waters for household and stock is governed generally by the amount of sodium sulphate that they contain.

The Bearpaw formation, being of marine origin, contains inherently larger quantities of readily dissolvable mineral salts than does the Eastend formation or the glacial deposits. Waters from the Bearpaw formation invariably contain large amounts of mineral salts in solution. Sodium sulphate is usually in the greatest concentration with successively lesser amounts of sodium carbonate, magnesium carbonate, and the sulphates of magnesium and calcium, as illustrated by analysis No. 5 on the

accompanying table. Waters from the Bearpaw are generally unsuitable for domestic purposes, and if obtained from great depths in the shales are unsuitable even for stock. However, sandy beds and lenses occur interbedded with the shales of the formation that yield water that is generally not so highly mineralized as seepages from the compact clays and shales themselves. Such supplies in a few places over the municipality are even sufficiently low in dissolved salts to be used in the household.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SW.	1	7	4	3	Bored	60	2,508	- 57	2,451	57	2,451	Bearpaw clay	Hard, "alkaline"		N	Not fit for use; so well filled in.
2	SW.	5	"	"	"	Bored	40	2,508	- 30	2,478	40	2,468	Glacial drift	Hard, clear		D, S	Sufficient for local needs; used also by neighbours.
3	NW.	6	"	"	"	Bored	24	2,488	- 6	2,482	12	2,476	Glacial gravel	Hard, clear		D, S	Sufficient for 60 head stock; another well 24 feet deep used by horses; also a 50-foot well.
4	NW.	8	"	"	"	Bored	60	2,504	- 45	2,459	45	2,459	Glacial clay	Soft, clear		D, S	Sufficient for 20 head stock; another similar well 90 feet deep.
5	SW.	9	"	"	"	Bored	40	2,440	- 25	2,415	40	2,400	Bearpaw	Hard, clear		D, S	Oversufficient for 50 head stock.
6	SE.	9	"	"	"	Bored	27	2,388	+ 1	2,389	27	2,361	Recent alluvium	Soft, clear		D, S	Sufficient for local needs.
7	SE.	15	"	"	"	Bored	27	2,430	- 12	2,418	25	2,405	Recent gravel	Hard, clear		D, S	Sufficient for 40 head stock.
8	NW.	16	"	"	"	Bored	27	2,445	- 17	2,428	20	2,425	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
9	NE.	17	"	"	"	Bored	74	2,457	- 32	2,425	74	2,383	Bearpaw	Soft, clear		D, S	Sufficient for local needs; also a dry hole 35 feet deep.
10	NW.	20	"	"	"	Bored	42	2,450	- 39	2,411	42	2,408	Glacial sand	Soft, clear		D, S	Insufficient for local needs during winter.
11	NE.	20	"	"	"	Dug	36	2,425	- 30	2,395	34	2,391	Glacial brown clay	Hard, clear, salty		D, S	Insufficient for local needs during dry seasons.
12	SE.	21	"	"	"	Dug	14	2,402	- 9	2,393	14	2,388	Recent alluvium	Hard, clear		D, S	Sufficient for local needs.
13	SE.	22	"	"	"	Bored	60	2,434	- 10	2,424	45	2,389	Bearpaw silt	Hard, clear, "alkaline" white sediment		S	Sufficient for 50 head stock; another well 40 feet deep is used for domestic needs.
14	NE.	22	"	"	"	Bored	35	2,442	- 10	2,432	10	2,432	Glacial yellow sandy clay	Soft, clear, "alkaline"		D, S	Sufficient for local needs,
15	NE.	24	"	"	"	Dug	12	2,500	- 7	2,493	11	2,489	Glacial yellow sand	Soft, clear		D, S	Sufficient for 20 head stock.
16	SE.	25	"	"	"	Bored	38	2,510	- 15	2,495	38	2,472	Glacial drift	Hard, yellow, iron, "alkaline"		S	Sufficient for local needs; another well 24 feet deep is used for domestic needs.
17	NW.	30	"	"	"	Bored	30	2,460	- 13	2,447	15	2,445	Glacial drift	Hard, clear, "alkaline" white sediment		S	Sufficient for 20 head stock; another well 20 feet deep is used for domestic needs.
18	SE.	31	"	"	"	Bored	60	2,400	- 58	2,342	58	2,342	Bearpaw soapstone	Hard, iron, "alkaline" red sediment		N	Not fit for use; also a seepage well; hauls domestic supply 2 miles.
19	NE.	31	"	"	"	Bored	80	2,414	- 60	2,354	60	2,354	Bearpaw	Hard, yellow		S	Sufficient for local needs.
20	SE.	32	"	"	"	Dug	15	2,376	- 7	2,369	15	2,361	Recent gravel	Soft, clear		D, S	Sufficient for 12 head stock.
21	NE.	32	"	"	"		32	2,380	- 17	2,363			Bearpaw	Hard, iron, "alkaline"		S	
22	NW.	33	"	"	"	Bored	25	2,402	- 13	2,389	24	2,378	Bearpaw	Hard, clear, "alkaline"		S	An 18-foot well is used for domestic needs.
23	NE.	33	"	"	"	Bored	53	2,436	- 18	2,418	53	2,383	Bearpaw	Hard, clear, "alkaline"		S	
24	SE.	35	"	"	"	Bored	75	2,510	- 55	2,455	75	2,435	Eastend	Soft, clear		D, S	Sufficient for local needs.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
25	SW.	36	7	4	3	Bored	50	2,500	- 30	2,470	50	2,450	Eastend	Hard,clear		D, S	Sufficient for local needs.
1	SW.	2	7	5	3	Bored	26	2,426	- 18	2,408	24	2,402	Recent sand	Hard,clear		D	Sufficient for domestic needs.
2	NW.	2	"	"	"	Dug	12	2,388	- 8	2,380	11	2,377	Recent clay	Hard,clear, "alkaline"		S	Sufficient for local needs.
3	NE.	3	"	"	"	Bored	18	2,390	- 23	2,367	38	2,352	Glacial sand	Soft,clear		D, S	Insufficient for 10 head stock; formerly a good supply.
4	NE.	7	"	"	"	Bored	35	2,395	- 10	2,385	35	2,360	Glacial sand	Hard, red, iron, "alkaline" red sediment		D, S	Oversufficient for 30 head stock.
5	NW.	8	"	"	"	Dug	24	2,420	- 12	2,408	23	2,397	Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient supply in 1933 and 1934.
6	SW.	9	"	"	"	Dug	15	2,530	- 7	2,523	7	2,523	Glacial yellow clay	Hard,cloudy, iron,red sediment		D, S	Insufficient for 15 head stock.
7	NW.	10	"	"	"	Dug	28	2,418	- 22	2,396	26	2,392	Glacial clay	Hard,clear, "alkaline"		D	Insufficient for local needs; another similar well 25 feet deep.
8	NE.	10	"	"	"	Dug	14	2,386	- 8	2,378	12	2,374	Recent sand	Hard,clear		D, S	Sufficient for 8 head stock; used also by neighbours.
9	NE.	14	"	"	"	Bored	42	2,425									Dry hole; base in Bearpaw soapstone.
10	NE.	16	"	"	"	Bored	42	2,390	- 13	2,377	42	2,348	Glacial coarse gravel	Hard,cloudy, "alkaline" white sediment		S	Sufficient for 15 head stock; another well 15 feet deep is used for domestic needs.
11	SE.	16	"	"	"	Bored	40	2,398	- 30	2,368	30	2,368	Glacial clay	Hard,oily grey colour "alkaline"		S	Sufficient for local needs; hauls drinking water from NE.¼, section 10.
12	NW.	17	"	"	"	Bored	70	2,473					Bearpaw soapstone	Hard,iron "alkaline"		N	Not fit for use; so filled in, also a seepage well on farm.
13	SW.	18	"	"	"	Bored	30	2,390	- 10	2,380	10	2,380	Glacial drift	Soft,clear, "alkaline"		D, S	Was sufficient for local needs, but filled in now.
14	NW.	20	"	"	"	Dug	26	2,374	- 22	2,352	26	2,348	Glacial sand	Hard,clear, "alkaline" white sediment		D, S	Sufficient for local needs; also used by neighbours. #
15	SE.	22	"	"	"	Bored	40	2,418	- 35	2,383	40	2,378	Glacial gravel	Hard,clear, "alkaline" white sediment		D	Sufficient for local needs.
16	SE.	23	"	"	"	Bored	28	2,444	- 20	2,424	20	2,424	Glacial clay	Hard,clear		S	Sufficient for local needs.
17	NE.	24	"	"	"	Bored	35	2,374	- 25	2,349	25	2,349	Bearpaw clay	Hard,cloudy, iron,"alkaline" red sediment		N	Not fit for use; another well supplies water for domestic needs.
18	SW.	27	"	"	"	Spring							Recent sand	Hard,clear		S	Waters stock in winter; flows all year.
19	NW.	28	"	"	"	Bored	40	2,386					Bearpaw sand	Hard,clear, bitter,iron, "alkaline"		N	Not fit for use.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
20	SE.	31	7	5	3	Bored	25	2,372	- 13	2,359	23	2,349	Bearpaw clay	Hard, clear, "alkaline"		N	Large supply, but not fit for use; twelve other similar wells.
21	NW.	33	"	"	"	Dug	18	2,365	- 15	2,350	18	2,347	Recent sand	Hard, clear		D	Sufficient for local needs.
22	SW.	33	"	"	"	Bored	22	2,365	- 10	2,355	20	2,345	Recent sandy clay	Hard, clear, "alkaline"		D, S	Sufficient for 9 head stock during the winter; uses creek for stock during summer.
23	NE.	34	"	"	"	Dug	18	2,390	- 12	2,378	12	2,378	Bearpaw clay	Hard, clear		D, S	Sufficient for 8 to 10 head stock during dry seasons.
24	NW.	35	"	"	"	Dug	17	2,389	- 9	2,380	17	2,372	Recent sand	Hard, clear, "alkaline"		S	
25	SW.	36	"	"	"	Dug	16	2,400	- 12	2,388	12	2,388	Glacial sandy clay	Hard, clear		D, S	Sufficient for local needs. #
1	NW.	2	7	6	3								Glacial drift			D	Farmer on SW.¼, section 14, hauls domestic supply for this well.
2	NW.	3	"	"	"	Bored	50	2,410	- 12	2,398	50	2,360	Glacial clay	Hard, clear, "alkaline" white sediment		S	Oversufficient for local needs.
3	NW.	6	"	"	"	Bored	29	2,430	- 21	2,409	27	2,403	Glacial gravel	Hard, clear		D, S	Oversufficient for local needs.
4	NW.	7	"	"	"	Dug	32	2,435	- 24	2,411	32	2,403	Glacial drift	Soft, clear		D, S	Oversufficient for local needs.
5	NE.	9	"	"	"	Dug	20	2,396	- 17	2,379	17	2,379	Glacial clay	Hard, clear		D	Sufficient for domestic needs only; uses river for stock.
6	SE.	9	"	"	"		16						Glacial drift	Bitter		N	Not fit for use, so filled in.
7	SE.	10	"	"	"	Bored	50	2,410	- 10	2,400	50	2,360	Glacial drift	Hard, clear, "alkaline"		S	Sufficient for local needs; two other wells 13 and 17 feet deep..
8	NE.	10	"	"	"	Bored	20	2,386	- 12	2,374	20	2,366	Glacial drift	Hard, clear, "alkaline" white sediment		N	Abundant supply, but not fit for use, also a number of similar wells.
9	SE.	12	"	"	"	Bored	60	2,420	- 40	2,380	60	2,360	Glacial sand	Hard, clear, "alkaline" iron		S	Sufficient for local needs.
10	SE.	13	"	"	"	Bored	43	2,418	- 38	2,380	43	2,375	Glacial sand	Hard, clear, iron, "alkaline" white sediment		D, S	Sufficient for 25 head stock; 10 barrels a day.
11	SW.	13	"	"	"	Bored	30	2,380	- 14	2,366	30	2,350	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 40 head stock; several other wells, but water highly mineralized.
12	SW.	14	"	"	"	Bored	50	2,392	- 24	2,368	50	2,342	Glacial sand	Hard, iron, "alkaline" red sediment		N	Abundant supply; but unfit for use; a 20-foot well gives a small supply for stock.
13	NE.	15	"	"	"	Dug	14	2,385	- 6	2,379	12	2,373	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient only for domestic needs.
14	NW.	16	"	"	"	Dug	15	2,400	- 10	2,390	15	2,385	Glacial drift	Hard, clear, black sediment.		D, S	Sufficient for local needs.
15	NW.	18	"	"	"	Dug	32	2,470	- 28	2,442	32	2,438	Glacial sand	Soft		D, S	Sufficient for 12 head stock.
16	SE.	20	"	"	"	Dug	16	2,398	- 10	2,388	16	2,382	Glacial drift	Hard, clear, soda.		D, S	Sufficient for local needs; also a 12-foot well unfit for use.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
17	NW.	20	7	6	3	Bored	45	2,474	- 25	2,449	45	2,429	Glacial drift	Hard, clear		D, S	Sufficient for local needs.
18	NW.	21	"	"	"	Dug	14	2,394	- 9	2,385	9	2,385	Glacial clay	Hard, clear, "alkaline"		S	Sufficient for 13 head stock.
19	NE.	22	"	"	"	Dug	15	2,380	- 10	2,370	10	2,370	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also a 20-foot dry hole.
20	SW.	23	"	"	"	Dug	18	2,388	- 12	2,376	16	2,372	Glacial gravel	Hard, clear		D, S	Sufficient for domestic needs.
21	NE.	23	"	"	"	Bored	36	2,382	- 20	2,362	36	2,346	Glacial drift	Hard, clear		D, S	Sufficient for local needs; also two other wells 20 feet and 80 feet deep.
22	NW.	27	"	"	"	Bored	26	2,385	- 21	2,364	26	2,359	Glacial sand	Hard, cloudy, iron, "alkaline"		S	Sufficient for 8 head stock; hauls drinking water. #
23	NW.	28	"	"	"	Dug	28	2,404	- 21	2,383	22	2,382	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient only for domestic needs.
24	SE.	32	"	"	"	Dug	30	2,405	- 16	2,389	30	2,375	Glacial gravel	Hard, clear		D, S	Sufficient for local needs. #
25	SW.	32	"	"	"								Glacial drift	Hard		D	Farmer on NW.¼, section 27, hauls drinking water from here.
26	NE.	33	"	"	"	Bored	46	2,403	- 26	2,377	46	2,357	Glacial sand and gravel	Hard, clear, "alkaline"		D, S	Sufficient for local needs; cannot be pumped dry.
27	NE.	34	"	"	"	Bored	28	2,390	- 6	2,384	28	2,362	Glacial sand	Hard, "alkaline"		S	Sufficient for local needs.
28	SE.	35	"	"	"	Bored	32	2,396	- 8	2,388	32	2,364	Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 18 head stock.
29	SW.	36	"	"	"	Bored	30	2,382	- 9	2,373	30	2,352	Glacial sand	Hard, clear, iron		S	Oversufficient for local needs.
30	SE.	36	"	"	"	Bored	56	2,372	- 11	2,361			Glacial drift	Hard, yellow red sediment iron		S	Sufficient for 28 head stock.
1	NW.	2	8	4	3	Bored	70	2,525	- 50	2,475			Eastend sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
2	SE.	3	"	"	"	Bored	100	2,498	- 80	2,418	100	2,398	Eastend	Soft, clear		D, S	Sufficient for local needs.
3	NW.	4	"	"	"	Dug	17	2,440	- 7	2,433	7	2,433	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for 4 head stock.
4	NW.	7	"	"	"	Bored	115	2,478	-100	2,378			Bearpaw	Hard, clear, iron, "alkaline"		S	Sufficient for 8 head stock.
5	NE.	7	"	"	"	Bored	75	2,490					Eastend sand ?	Hard, clear, iron, red sediment		D, S	Sufficient for 50 head stock.
6	SW.	7	"	"	"	Bored	110	2,503	-100	2,403	100	2,403	Eastend sand	Hard, clear, iron		D, S	Sufficient for local needs.
7	NW.	8	"	"	"	Bored	100	2,512	- 75	2,437	100	2,412	Eastend sand	Hard, clear, iron, "alkaline"		S	Sufficient for 8 head stock.
8	SE.	9	"	"	"	Bored	27	2,456	- 2	2,454	27	2,429	Glacial sand	Soft, clear	45	D, S	Sufficient for 10 head stock.
9	SW.	12	"	"	"	Bored	104	2,558	- 64	2,494	80	2,478	Eastend sand	Soft, clear sulphur		D, S	Sufficient for 8 head horses.
10	SE.	13	"	"	"	Bored	110	2,534					Eastend	Soft, clear		D, S, I	Sufficient for 10 head horses.
11	SE.	14	"	"	"	Bored	30	2,515	0	2,515			Glacial drift	Hard, clear		D, S	Intermittent supply.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO.74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
12	NE.	16	8	4	3	Bored	40	2,480	- 5	2,475	40	2,440	Eastend sand	Hard,clear		D, S	Sufficient for 8 head stock.
13	NW.	18	"	"	"	Bored	28	2,438	- 23	2,415	28	2,410	Eastend yellow sand	Hard,clear, "alkaline"		D, S	Sufficient for 15 head stock.
14	SE.	18	"	"	"	Bored	110	2,452	- 70	2,382	110	2,342	Bearpaw	Hard,clear, iron		S	Sufficient for local needs.
15	NW.	19	"	"	"	Bored	35	2,445	- 29	2,416	31	2,414	Eastend sand	Hard,clear		S	Sufficient for 10 head stock.
16	SE.	21	"	"	"	Bored	112	2,498	- 70	2,428	108	2,390	Eastend black sand	Hard,clear, "alkaline"		S	Sufficient for 20 head stock; another well 130 feet deep has mineralized water.
17	NE.	21	"	"	"	Bored	80	2,481					Eastend sand	Soft,clear, iron		D, S	Sufficient for 25 head stock.
18	SE.	22	"	"	"	Bored	85	2,544	- 83	2,461	83	2,461	Eastend	Hard,clear	45	D, S	Insufficient for 7 head stock.
19	SW.	24	"	"	"	Bored	20	2,450	- 15	2,435	20	2,430	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for 15 head stock.
20	NW.	30	"	"	"	Bored	69	2,470	- 49	2,421	54	2,416	Eastend clay ?	Hard,clear, iron,"alkaline" red sediment	45	S	Sufficient for 25 head stock.
21	SW.	31	"	"	"	Bored	50	2,470	- 42	2,428	50	2,420	Eastend	Hard,clear		D, S	Sufficient for 12 head stock.
22	NE.	31	"	"	"	Bored	27	2,420	- 22	2,398	25	2,395	Eastend	Hard,clear, "alkaline"		S	Sufficient for local needs.
23	NW.	32	"	"	"	Bored	35	2,405	- 15	2,390	20	2,385	Eastend sand	Soft,clear		D, S	Sufficient for 17 head stock.
24	SW.	33	"	"	"	Bored	12	2,411	- 9	2,402	9	2,402	Eastend sand	Hard,clear		D, S	Sufficient only for domestic needs.
25	NW.	35	"	"	"	Bored	40	2,440	- 12	2,428	40	2,400	Eastend	Soft,clear		D	Sufficient supply; used also by town of Melaval; another well 50 feet deep, is also used for stock.
1	SW.	1	8	5	3	Dug	16	2,484	- 12	2,472	16	2,468	Glacial gravel	Hard,clear, "alkaline"		D	Sufficient for domestic needs.
2	SE.	2	"	"	"	Bored	110	2,455									Several dry holes; base in Bearpaw.
3	SW.	4	"	"	"	Bored	20	2,365	- 16	2,349	16	2,349	Glacial clay	Hard,clear		N	Insufficient supply and not fit for use.
4	NW.	5	"	"	"								Glacial drift	Hard		D, S	
5	NE.	6	"	"	"	Bored	28	2,376	- 12	2,364	12	2,364	Glacial white clay	Hard,clear, "alkaline"		N	Sufficient supply, but unfit for use; several other similar wells.
6	NW.	6	"	"	"	Dug	14	2,356	- 8	2,348	12	2,344	Glacial black sand	Hard,clear, iron,"alkaline"		S	Sufficient for 13 head stock.
7	SE.	9	"	"	"		30	2,426					Glacial drift	Hard		S	Poor supply; is used for stock during winter.
8	SW.	10	"	"	"	Bored	30	2,416	- 26	2,390	30	2,386	Glacial fine sand	Hard,dark, iron,"alkaline"		N	Not fit for use, so filled in.
9	NE.	10	"	"	"	Bored	55	2,435	- 45	2,390	45	2,390	Glacial whitish clay	Hard,cloudy, iron,"alkaline" red sediment		S	Insufficient for 15 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO.74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
10	NW.	11	8	5	3	Bored	60	2,440	- 50	2,390	60	2,380	Glacial gravel	Soft, clear		D, S	Was sufficient for local needs; filled in now.
11	NE.	11	"	"	"	Bored	50	2,440	- 33	2,407	33	2,407	Glacial sandy loam	Hard, clear		D, S	Sufficient for 6 head stock.
12	SW.	12	"	"	"	Drilled	330	2,540									Dry hole; base in Bearpaw soapstone.
13	SE.	12	"	"	"	Bored	118	2,506	-110	2,396			Eastend	Hard, clear, iron, red sediment		D, S	Sufficient for 5 head stock.
14	SE.	13	"	"	"	Bored	120	2,472	- 80	2,392	120	2,352	Bearpaw soapstone	Hard, clear, "alkaline"		S	Sufficient for local needs.
15	SE.	14	"	"	"	Bored	26	2,460	- 18	2,442	18	2,442	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 16 head stock; also used by neighbours; also a 90-foot dry hole.
16	SE.	15	"	"	"	Bored	70	2,463	- 50	2,413	70	2,393	Glacial sand	Hard, dark, iron, "alkaline"		D	Sufficient for local needs; four neighbours obtain their domestic supply from this well.
17	NW.	16	"	"	"	Dug	10	2,400	- 6	2,394	8	2,392	Glacial gravel	Hard, clear, "alkaline"		S	Insufficient for 30 head stock.
18	NE.	17	"	"	"	Bored	30	2,366	- 17	2,349	15	2,351	Glacial clay	Hard, clear		D	Sufficient for local needs; three families use this well.
19	NW.	17	"	"	"	Dug	28	2,340	- 4	2,336	28	2,312	Glacial sand	Hard, clear		S	Sufficient for 28 head stock; well is also used by neighbours.
20	NW.	21	"	"	"	Bored	110	2,415	-100	2,315	110	2,305	Bearpaw sand	Hard, clear, iron		S	Sufficient for 15 head stock.
21	SW.	22	"	"	"	Bored	39	2,416	- 10	2,406	10	2,406	Glacial gravel	Soft, clear		D, S	Sufficient for 11 head stock; well is also used by neighbours.
22	NE.	22	"	"	"	Dug	19	2,425	- 11	2,414	14	2,411	Glacial gravel	Soft, clear		D	Sufficient only for domestic needs.
23	NW.	23	"	"	"	Bored	80	2,430	- 65	2,365	80	2,350	Bearpaw sand	Hard, clear, "alkaline"		D, S	Sufficient for 12 head stock.
24	SW.	24	"	"	"	Bored	85	2,426	- 70	2,356	85	2,341	Bearpaw	Hard, clear, "alkaline"		S	Sufficient for 20 head stock.
25	NE.	24	"	"	"								Glacial drift	Hard		D	Farmer on SW¼, section 24, hauls drinking water from here.
26	NE.	25	"	"	"	Bored	83	2,476	- 50	2,426			Eastend	Hard, clear, iron, "alkaline"		S	Intermittent supply.
27	SW.	26	"	"	"	Bored	106	2,440	- 76	2,364	106	2,334	Bearpaw sand	Hard, clear, "alkaline"		S	Sufficient for local needs.
28	SW.	27	"	"	"	Bored	140	2,494									Dry hole; base in Bearpaw soapstone.
29	NW.	27	"	"	"		198	2,490					Bearpaw	Hard		D, S	Poor supply.
30	SE.	28	"	"	"		144	2,486									Dry hole; base in Bearpaw soapstone.
31	NW.	30	"	"	"	Dug	10	2,385	- 6	2,379	4	2,381	Glacial gravel	Hard, clear		S	Sufficient for 19 head stock.
32	SE.	33	"	"	"	Dug	30	2,470	- 15	2,455	20	2,450	Glacial sand	Hard, clear		D	Sufficient only for domestic needs; another well 20 feet deep; also a 120-foot dry hole.
33	NE.	33	"	"	"	Dug	20	2,406	- 14	2,392	14	2,392	Glacial sand	Soft, clear		D, S	Sufficient for about three-quarters of the town of Lafleche; other similar wells.
34	SW.	35	"	"	"	Bored	80	2,428					Bearpaw soapstone	Hard, "alkaline"			Was only a very small supply, so filled in.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO.74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
35	NW.	36	8	5	3	Bored	20	2,522					Glacial sand	Hard,clear		D	Intermittent supply.
1	NE.	1	8	6	3	Bored	125	2,394	- 30	2,364	125	2,269	Bearpaw black sand	Hard,clear, "alkaline"		S	Sufficient for local needs; another well 26 feet deep. #
2	NW.	1	"	"	"	Bored	28	2,390	- 10	2,380	28	2,362	Glacial sand	Hard,clear, "alkaline"		S	Sufficient for 14 head stock.
3	NW.	2	"	"	"	Bored	48	2,430	- 38	2,392	40	2,390	Glacial gravel	Hard,clear		D, S	Sufficient for local needs; another well 12 feet deep is used for stock.
4	SE.	4	"	"	"	Dug	12	2,386	- 8	2,378	10	2,376	Glacial sand	Soft,clear		D, S	Sufficient for , head stock; another well 60 feet deep not fit for use.
5	SW.	4	"	"	"	Bored	34	2,412	- 24	2,388	24	2,388	Glacial clay	Hard,clear, "alkaline"		S	Sufficient for local needs.
6	NE.	9	"	"	"	Bored	120	2,453	-100	2,353	108	2,345	Glacial sand	Hard,clear		S	Sufficient for local needs; another well 46 feet deep is used for domestic needs.
7	SE.	10	"	"	"	Bored	160	2,476	-100	2,376	160	2,316	Glacial drift	Hard,clear		S	Sufficient for local needs; another well 16 feet deep is used for domestic needs.
8	SE.	11	"	"	"	Dug	25	2,442	- 22	2,420	22	2,420	Glacial sand and gravel	Soft,clear		D	Sufficient for domestic needs.
9	SW.	12	"	"	"	Bored	121	2,456	- 83	2,373	120	2,336	Glacial drift	Hard,clear		D, S	Sufficient for local needs; used chiefly in winter.
10	NW.	12	"	"	"	Bored	130	2,452	-110	2,342	130	2,322	Glacial black mud	Hard,clear, iron, red sediment		S	Sufficient for 50 head stock.
11	SW.	13	"	"	"	Dug	60	2,394									Dry hole; base in glacial drift.
12	SE.	15	"	"	"	Bored	40	2,433					Glacial drift	Hard,clear		S	Sufficient for local needs.
13	NE.	16	"	"	"	Bored	80	2,426	- 75	2,351			Glacial clay	Hard,clear		D, S	Sufficient only for domestic needs.
14	SE.	17	"	"	"	Bored	25	2,420	- 16	2,404	19	2,401	Glacial drift	Hard,clear, "alkaline"		S	Insufficient for local needs.
15	SE.	18	"	"	"	Dug	20	2,371	- 12	2,359	19	2,352	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
16	NW.	19	"	"	"	Dug	6	2,390	- 4	2,386	4	2,386	Recent sand	Soft,clear		D, S	Sufficient for local needs.
17	NE.	20	"	"	"	Dug	19	2,384	- 9	2,375			Glacial clay	Hard,clear, iron		S	Sufficient for 30 head stock.
18	SE.	20	"	"	"	Dug	16						Glacial sand	Hard		D	Sufficient for local needs
19	NE.	21	"	"	"	Bored	150	2,440					Glacial drift	Hard,clear, iron		D, S	Sufficient for local needs.
20	NE.	21	"	"	"	Dug	18	2,392	- 13	2,379	18	2,374	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for 50 head stock.
21	NW.	22	"	"	"	Bored	40	2,416	- 35	2,381	35	2,381	Glacial gravel	Hard,clear, "alkaline"		S	Sufficient only for 7 head stock.
22	SE.	22	"	"	"	Bored	125	2,410	-112	2,298	112	2,298	Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs; also three dry holes from 100 to 150 feet deep.
23	SW.	23	"	"	"	Bored	100	2,400	- 30	2,370	95	2,305	Glacial drift	Hard,brown "alkaline"		N	Sufficient supply, but not used.
24	SE.	23	"	"	"	Bored	85	2,400	- 60	2,340			Glacial drift	Hard,clear, "alkaline"		S	Sufficient for 8 head horses.
25	NW.	25	"	"	"	Bored	92	2,430	- 72	2,358	92	2,338	Glacial sand	Hard,cloudy, iron,"alkaline,"white sediment		S	Sufficient for 8 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO.74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
26	SE.	26	8	6	3	Dug	14	2,430	- 10	2,420	10	2,420	Glacial grey clay	Hard, clear		D, S	Sufficient for local needs; also used by neighbours.
27	SE.	27	"	"	"	Dug	20	2,390	- 16	2,374	16	2,374	Glacial sand	Hard, clear		S	Sufficient for local needs; another well 12 feet deep is used for domestic needs.
28	NW.	27	"	"	"	Dug	12	2,380	- 6	2,374	10	2,370	Glacial sand	Hard, clear		D, S	Sufficient supply; 7 barrels a day; another similar well 14 feet deep.
29	NW.	30	"	"	"	Dug	40	2,395	- 30	2,365	40	2,355	Glacial gravelly clay	Hard, clear, iron		S	Sufficient for local needs; also a dry hole 12 feet deep.
30	SW.	31	"	"	"	Dug	27	2,430	- 22	2,408	22	2,408	Glacial gravel	Hard, clear		D, S	Insufficient for 10 head stock.
31	SW.	33	"	"	"	Bored	60	2,402	- 25	2,377	60	2,342	Glacial sand	Hard, clear, iron		S	Another well 14 feet deep is used for domestic needs.
32	NE.	34	"	"	"	Drilled	424	2,407	-100	2,307	190	2,217	Bearpaw	Hard, clear, "alkaline"		N	Not used because casing stuck and plugged well.
33	NE.	34	"	"	"	Bored	80	2,407	- 70	2,337	80	2,327	Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 30 head stock.
34	NW.	35	"	"	"	Drilled	90	2,406	- 60	2,346	90	2,316	Glacial drift	Hard, "alkaline"		S	Sufficient for local needs; can not pump dry.
35	NW.	36	"	"	"	Bored	65	2,395	- 49	2,346			Glacial drift	Hard, dark, iron, sulphur, "alkaline", black sediment		S	Oversufficient for 10 head stock. #
36	NE.	36	"	"	"	Bored	80	2,405	- 75	2,330			Glacial drift	Hard, clear, "alkaline"		S	Insufficient supply; 5 barrels a day.
1	NW.	1	9	4	3	Bored	40	2,460	- 15	2,445	40	2,420	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for local needs.
2	SW.	4	"	"	"	Dug	10	2,380	- 5	2,375	5	2,375	Eastend sand	Hard, clear, "alkaline"		S	Sufficient for local needs.
3	NE.	4	"	"	"	Dug	10	2,410	- 6	2,404	6	2,404	Eastend sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs; also a spring for stock needs.
4	NE.	7	"	"	"	Bored	65	2,500	- 45	2,455	65	2,435	Glacial gravel	Hard, clear, "alkaline"	44	S	Sufficient for 25 head stock; another well 15 feet deep is used for domestic needs.
5	NW.	8	"	"	"	Bored	55	2,485	- 35	2,450	55	2,430	Glacial sand	Soft, clear		D, S	Sufficient for local needs; also used by neighbours.
6	SE.	9	"	"	"	Bored	65	2,440	- 42	2,398	60	2,380	Eastend black sand	Hard, clear, iron, sulphur		S	Sufficient for local needs; also a shallow well for domestic needs.
7	N½	10	"	"	"	Bored	75	2,500	- 63	2,437	75	2,425	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also a spring that is sufficient for 100 head stock.
8	NE.	12	"	"	"	Bored	24	2,550	- 5	2,545	24	2,526	Glacial gravel	Hard, clear, iron, salty, "alkaline"	44	S	Sufficient for local needs.
9	W½	14	"	"	"	Bored	60	2,550	- 50	2,500	50	2,500	Glacial gravelly clay	Hard, clear		N	Small supply; farm deserted.
10	SW.	15	"	"	"	Bored	56	2,550	- 38	2,512	38	2,512	Glacial red clay	Hard, cloar		S	Sufficient for local needs; another well 35 feet deep is used for domestic needs.
11	SW.	16	"	"	"	Bored	60	2,550	- 30	2,520	30	2,520	Glacial sand	Hard, clear, iron	42	S	Sufficient for local needs; another well 20 feet deep is used for domestic needs.
12	SW.	17	"	"	"	Bored	58	2,500	- 44	2,456	58	2,442	Glacial sand	Soft, clear, "alkaline iron	43	D, S	Sufficient for local needs; another well 100 feet deep is not fit to use; also a 45-foot dry hole.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
13	SW.	18	9	4	3	Bored	47	2,505	- 30	2,475	47	2,458	Glacial coarse gravel	Hard, clear, iron, sulphur, "alkaline", dark sediment	40	D, S	Sufficient for local needs.
14	NE.	18	"	"	"	Dug	25	2,500	- 21	2,479			Glacial gravelly clay	Hard, clear		D, S	Intermittent supply; also several dry holes.
15	NW.	19	"	"	"	Bored	90	2,440	- 20	2,420	90	2,350	Glacial sand	Hard, clear, iron, "alkaline"	43	S	Sufficient for local needs; also a shallow well for domestic needs.
16	NW.	21	"	"	"	Bored	134	2,465	- 10	2,455	134	2,331	Glacial sand and gravel	Hard, cloudy, iron, "alkaline"	42	S	Sufficient for local needs; haul drinking water.
17	NE.	21	"	"	"	Bored	90	2,540	- 70	2,470	90	2,450	Glacial sand	Hard, clear, sulphur, iron, "alkaline" red sediment	42	S	Sufficient for local needs.
18	W½.	22	"	"	"	Bored	90	2,540	- 75	2,465	75	2,465	Glacial sand	Hard, iron, "alkaline"		S	Usually sufficient for local needs; haul drinking water.
19	SW.	22	"	"	"	Bored	50	2,550	- 38	2,512	38	2,512	Glacial sand	Hard		D, S	Sufficient for local needs.
20	NE.	22	"	"	"	Bored	80	2,550	- 40	2,510	80	2,470	Glacial drift	Hard, clear, iron, "alkaline"		S	Sufficient for local needs; haul drinking water.
21	NW.	23	"	"	"	Bored	70	2,500	- 68	2,432	68	2,432	Glacial sand	Hard, clear, "alkaline"		S	Insufficient for local needs; only enough for 4 horses.
22	NE.	23	"	"	"	Bored	100	2,550					Glacial sand	Hard, clear, "alkaline"		S	Sufficient for local needs; hauls drinking water.
23	SE.	25	"	"	"	Dug	22	2,460	- 19	2,441	19	2,441	Glacial clay	Hard, clear	42	D, S	Sufficient for local needs.
24	NE.	25	"	"	"	Dug	25	2,380	- 21	2,359	21	2,359	Glacial clay	Hard, clear		D, S	Sufficient for local needs.
25	NE.	26	"	"	"		105	2,430									Dry hole; base in Bearpaw; also a 30-foot seepage well.
26	SW.	27	"	"	"	Bored	90	2,445	- 65	2,380	90	2,355	Bearpaw	Hard, clear, iron, "alkaline" red sediment		S	Sufficient for local needs; also a 95-foot dry hole.
27	NW.	27	"	"	"	Dug	18	2,425	- 15	2,410	18	2,407	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
28	NE.	27	"	"	"	Dug	14	2,430	- 8	2,422	8	2,422	Glacial clay	Soft		D	Sufficient for local needs; another well 30 feet deep is used for stock during winter.
29	N½.	28	"	"	"	Bored	85	2,450	- 81	2,369	81	2,369	Glacial gravel	Hard, clear, "alkaline"		S	Insufficient supply; 1 barrel a day; also two dry holes 120 and 85 feet deep.
30	W½.	30	"	"	"	Dug	22	2,420	- 17	2,403	17	2,403	Glacial sand	Hard, soda, "alkaline"		S	Insufficient for local needs; haul drinking water.
31	NE.	30	"	"	"	Bored	35	2,370	- 10	2,360	10	2,360	Bearpaw clay	Hard, clear, "alkaline"	45	D, S	Insufficient for local needs; another well 135 feet deep with small supply.
32	NW.	32	"	"	"	Dug	30	2,380	- 22	2,358	30	2,350	Bearpaw sand	Hard, clear	43	D, S	Sufficient for local needs; also used by neighbours.
33	NE.	34	"	"	"	Dug	20	2,350	- 12	2,338	12	2,338	Glacial sandy clay	Hard, clear		D, S	Intermittent supply.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
34	SW.	35	9	4	3	Bored	90	2,425	- 30	2,395	90	2,335	Bearpaw sand	Hard, clear, "alkaline"	42	N	Not fit for use; so filled in; another well 12 feet deep for stock needs; also a 50-foot dry hole.
1	SW.	2	9	5	3	Bored	92	2,390	- 52	2,338	92	2,298	Glacial sand	Clear, iron, "alkaline"	43	S	Oversufficient for local needs; haul drinking water.
2	SE.	4	"	"	"	Dug	20	2,360	- 11	2,349	20	2,340	Glacial sand	Hard		D, S	Sufficient for local needs.
3	S½.	7	"	"	"	Dug	45	2,330	- 25	2,305	40	2,290	Glacial sand	Hard, clear	43	D, S	Sufficient for local needs.
4	SE.	10	"	"	"	Bored	50	2,380									Dry hole; base in glacial drift.
5	SE.	12	"	"	"	Dug	25	2,437	- 24	2,413	24	2,413	Glacial sand	Hard, clear		D, S	Intermittent supply.
6	NW.	12	"	"	"	Bored	60	2,408	- 40	2,368	60	2,348	Glacial silt	Hard, clear, "alkaline"		S	Sufficient for local needs; haul drinking water.
7	E½.	13	"	"	"	Bored	45	2,475	- 30	2,445	45	2,430	Glacial sand	Hard, clear, mineralized		D, S	Sufficient for local needs.
8	NE.	14	"	"	"	Bored	100	2,445	- 60	2,385	60	2,385	Glacial clay	Hard, clear, iron, "alkaline"	42	N	Not fit for use; hauls water.
9	SW.	16	"	"	"	Bored	100	2,360									Dry hole; base in glacial drift.
10	NW.	16	"	"	"	Dug	20	2,355	- 5	2,350	9	2,346	Glacial sand	Soft, clear		D	Insufficient for local needs.
11	W½.	17	"	"	"	Bored	100	2,380	- 60	2,320	100	2,280	Glacial drift	Hard, cloudy, "alkaline"	43	S	Sufficient for local needs; drinking water hauled.
12	SE.	18	"	"	"	Bored	65	2,380									Many dry holes; base in glacial drift.
13	SW.	19	"	"	"	Dug	18	2,405									Dry hole; base in glacial drift; also a 100-foot dry hole.
14	SE.	20	"	"	"		140	2,448									Many dry holes; base in glacial drift.
15	SE.	20	"	"	"	Dug	16	2,448	- 10	2,438	10	2,438	Glacial sand and gravel	Hard, clear	42	D, S	Intermittent supply.
16	NE.	22	"	"	"	Bored	95	2,350	- 75	2,275			Glacial drift	Hard, clear, "alkaline"	42	S	Intermittent supply.
17	NE.	23	"	"	"	Bored	90	2,390	- 70	2,320			Glacial sandy clay	Hard, cloudy, iron, "alkaline"	42	S	Insufficient for local needs; hauls drinking water.
18	E½.	24	"	"	"	Bored	85	2,425	- 35	2,390	85	2,340	Glacial sand and gravel	Hard, clear, iron, "alkaline"	43	D, S	Sufficient for local needs.
19	SW.	24	"	"	"	Dug	31	2,390	- 24	2,366			Glacial gravel	Hard, clear, "alkaline"		D, S	Intermittent supply.
20	SW.	27	"	"	"	Bored	65	2,350	- 50	2,300	65	2,285	Glacial silt	Hard, clear, "alkaline"	42	S	Sufficient for local needs; also a dry hole.
21	SW.	28	"	"	"	Bored	120	2,380									Many dry holes; base in glacial gravel.
22	NW.	29	"	"	"	Dug	12	2,432	- 6	2,426	6	2,426	Recent sand	Hard, clear	42	D, S	Intermittent supply.
23	NE.	29	"	"	"	Dug	20	2,405									Dry hole; base in glacial drift.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO.74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
24	E½	30	9	5	3	Bored	20	2,456	- 10	2,446			Glacial gravelly clay	Hard, clear	43	D	Intermittent supply; also ten dry holes to a depth of 150 feet.
25	E½	31	"	"	"	Dug	25	2,460									Dry hole; base in glacial drift.
26	SW.	32	"	"	"	Drilled	200	2,446									Dry hole; base in Bearpaw.
27	NE.	32	"	"	"	Dug	25	2,370	- 13	2,357	22	2,348	Glacial sand	Hard, clear	43	D	Sufficient for domestic needs; also a dry hole.
28	SW.	36	"	"	"	Bored	38	2,345	- 32	2,313	32	2,313	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
1	SW.	1	9	6	3	Bored	60	2,400	- 50	2,350	50	2,350	Glacial sand	Hard, black "alkaline"	43	S	Sufficient for local needs.
2	NE.	1	"	"	"	Bored	40	2,400	- 32	2,368	40	2,360	Glacial sand	Hard, clear	43	S	Sufficient for local needs; also two dry holes 20 and 30 feet deep.
3	SW.	2	"	"	"	Bored	96	2,430	- 90	2,340	90	2,340	Glacial sand	Clear, iron, red sediment	42	S	Intermittent supply; another similar well 100 feet deep.
4	NW.	3	"	"	"	Dug	30	2,450	- 26	2,424	26	2,424	Glacial gravel	Hard, clear		D, S	Insufficient for local needs.
5	NE.	3	"	"	"	Bored	45	2,440	- 30	2,410	45	2,395	Glacial sand and gravel	Hard, clear	44	D, S	Usually sufficient for local needs; another well 19 feet deep is used for domestic needs.
6	SE.	4	"	"	"	Bored	100	2,460					Glacial drift	Hard, iron, "alkaline" red sediment		N	Not fit for use; a seepage well is used for domestic needs.
7	NE.	4	"	"	"	Dug	20	2,460	- 10	2,450	20	2,440	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also several shallow wells.
8	SW.	5	"	"	"	Bored	20	2,520	- 12	2,508	20	2,500	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; used also by neighbours.
9	NE.	7	"	"	"	Bored	50	2,515									Dry hole; base in glacial blue clay.
10	NW.	11	"	"	"	Bored	180	2,440	-140	2,300			Bearpaw	Hard, clear, iron, "alkaline"		S	Sufficient for local needs.
11	NW.	12	"	"	"	Dug	20	2,420	- 16	2,404	20	2,400	Glacial gravel	Hard, clear		D	Sufficient for local needs.
12	SW.	15	"	"	"	Dug	20	2,460	- 10	2,450	20	2,440	Glacial gravel	Soft, clear		D, S	Sufficient for local needs.
13	NE.	15	"	"	"	Dug	24	2,450	- 21	2,429	21	2,429	Glacial gravel	Hard, clear		D	Intermittent supply.
14	W½	16	"	"	"	Bored	50	2,500	- 40	2,460	40	2,460	Glacial drift	Hard, clear, iron, "alkaline"	43	N	Not fit for use; so filled in; haul drinking water.
15	NW.	19	"	"	"	Dug	15	2,455	- 5	2,450	5	2,450	Glacial sand	Hard, clear	44	D, S	Sufficient for local needs.
16	NE.	20	"	"	"	Bored	50	2,535	- 44	2,491	50	2,485	Glacial coarse sand	Hard, clear, iron	42	D, S	Sufficient for local needs.
17	W½	21	"	"	"	Bored	68	2,515	- 40	2,475	40	2,475	Bearpaw soapstone	Hard, clear, iron, "alkaline"	42	S	Sufficient for local needs; several similar wells.
18	NE.	21	"	"	"	Bored	80	2,490	- 76	2,414	76	2,414	Glacial sandy clay	Hard, clear, "alkaline"		S	Sufficient only for 6 horses.
19	SE.	22	"	"	"	Dug	12	2,440	- 8	2,432	8	2,432	Glacial sand	Hard, clear		D, S	Intermittent supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WOOD RIVER NO. 74, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
20	SW.	23	9	6	3	Dug	25	2,440	- 18	2,422	25	2,415	Glacial sand	Hard, clear, "alkaline"		D	Sufficient for local needs; use a dam for stock.
21	NW.	23	"	"	"	Dug	16	2,440	- 12	2,428	16	2,424	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
22	SW.	27	"	"	"	Dug	14	2,475	- 11	2,464	14	2,461	Glacial sand	Hard, clear		D	Sufficient for local needs; use a dam for stock; also a 40-foot dry hole.
23	SE.	33	"	"	"	Drilled	400	2,480									Dry hole; base in Bearpaw shale.
24	W½	33	"	"	"	Bored	46	2,555	- 34	2,521	46	2,509	Glacial gravel	Hard, clear, iron, "alkaline"	42	D, S	Sufficient for local needs; 5 tanks a day.
25	NW.	35	"	"	"	Bored	51	2,450	- 41	2,409	50	2,400	Glacial sand	Hard, clear, "alkaline"	43	S	Sufficient for local needs; a shallow well is used for domestic needs.
26	SW.	36	"	"	"	Bored	60	2,450	- 55	2,395	60	2,390	Glacial gravel	Hard, clear, "alkaline"	43	S	Sufficient for local needs; another well 16 feet deep is used for domestic needs.
27	NW.	36	"	"	"	Bored	47	2,470	- 37	2,433	47	2,423	Glacial gravel	Hard, clear, iron, "alkaline"		S	Sufficient for local needs.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.