CANADA

DEPARTMENT OF MINES

AND

TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 52

PRELIMINARY REPORT

# GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF LAKE OF THE RIVERS NO. 72 SASKATCHEWAN

By

B. R. MacKay, and H. H. Beach



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# GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF LAKE OF THE RIVERS NO. 72 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 given 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 age.

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 loose, 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 issued 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 rests 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 coteau. 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 Lake of the Rivers covers an area of 270 square miles in the south-central part of Saskatchewan. The area consists of a block of nine townships bounded on the west by the 3rd meridian and described as townships 7, 8, and 9, ranges 28, 29, and 30, W. 2nd meridian. The Lethbridge-Weyburn branch of the Canadian Pacific railway passes through the southern part of the area. The town of Assiniboia, near the western boundary of the municipality, is a junction point of this line and the Canadian Pacific line to Moose Jaw 60 miles to the northeast. The valley partly occupied by Lake of the Rivers forms the most conspicious topographic feature of the municipality. The lake has an approximate elevation of 2,200 feet above sea-level. From it the valley sides rise abruptly for 100 feet or more to merge into a gently rolling plain that extends throughout the remainder of the municipality. This plain has an average elevation of 2,350 feet in the northern and central townships, but rises gradually to elevations exceeding 2,500 feet in the extreme southwest corner of the municipality.

### Water-bearing Horizons in the Unconsolidated Deposits

The ground water supplies of the municipality are derived from Recent stream gravels, from the glacial drift, and from several horizons in the underlying bedrock. The stream gravels occur in thin beds deposited along the bottoms of many ravines and coulées tributary to the valley of Lake of the Rivers. These gravels form an important source of water for domestic use, particularly in the central and southern townships where the glacial drift is only sparingly productive of water. Wells sunk to shallow depths in the gravels yield sufficient quantities of medium hard water for domestic use,

and for a few head of stock. These gravels provide the best source of drinking water in the central townships. Many thousands of years ago a great continental ice-sheet advanced in a general southwesterly direction over much of southern Saskatchewan, depositing an irregular mantle of glacial drift, till, or boulder clay over the greater part of this municipality. With the recession of the ice greater thicknesses of unconsolidated material were deposited, particularly in those areas where the ice front was stationary for any period of time. Such material is called "moraine" and differs from the boulder clay or till plain in that much of the clay has been washed out by waters issuing from the melting ice, leaving generally a more porous deposit. The moraine is generally thicker and characterized by knolls and undrained basins such as occur in the northeastern corner of the area. The glacial streams issuing from the ice front carried away some of the gravels and deposited them as alluvial fans or deltas in a comparatively thin layer over an extensive area in the northwestern part of the municipality.

The variation that exists in the thickness of the drift over the area is due not only to difference in quantity of deposition by the advancing ice-sheet but also to many irregularities in the surface of the underlying bedrock. Hence it is difficult to give a figure that will be consistent even in small areas. The drift is of negligible thickness along the lower slopes of Lake of the Rivers valley and it probably does not exceed 40 feet in thickness throughout the southwestern townships. It thickens materially in the central and east-central areas, exceeding 80 feet in several places. Along the northern part of the area the bedrock lying below the drift has been encountered in a number of wells at depths

ranging from 40 to 60 feet, depending upon the elevation of the surface. The greater part of the drift covering the uplands is composed of yellow to bluish grey boulder clay. Thin beds or pockets of sand and gravel of limited areal extent are irregularly interspersed through the clay, and it is in these pockets that most of the water in the drift accumulates. Wells sunk entirely in boulder clay yield only small seepages of highly "alkaline" water. Throughout the central townships and the northern halves of the southern townships the sand pockets are not particularly numerous or of any considerable areal extent. It occasionally becomes necessary to sink several holes to depths of 20 to 30 feet before a supply of water adequate for domestic use is obtained. The water is of medium hardness and contains varying amounts of "alkali" salts. It is usually usable, however, and in sufficient amounts for a few head of stock. The impervious nature of the clay makes it possible to retain water in excavated dugouts for considerable periods of time. Throughout the southern parts of the southern townships the gravel and sand pockets become more numerous and many wells sunk to depths of 25 to 30 feet yield small supplies of soft water suitable for domestic use.

Usable water sufficient for 100 head of stock or more is obtained from a well located in NW. ¼, sec. 33, tp. 9, range 28, at a depth of about 65 feet. It has not been determined whether this supply is derived from a sand pocket or from a more extensive horizon, in the terminal moraine area in the northeast corner. Pockets and beds of gravel form small knolls and ridges over many parts of the upland areas. It has been found that shallow wells sunk on or near to these small prominences often yield sufficient quantities of

drinkable water for average farm requirements. In the area east of Lake of the Rivers small supplies of drinkable water are generally obtainable from the drift at shallow depth, but it is usually advisable to sink wells into the bedrock where larger supplies of water are obtainable. The extensive deposits of sands and gravels occurring in the northwestern part of the township yield large quantities of water at shallow depths. The quantity of dissolved mineral salts in the water is variable over small areas and in many instances the water is unfit for household use.

Water-bearing Horizons in the Bedrock

There are four bedrock formations represented in this municipality, two of which contain important water-bearing beds. The uppermost formation, locally termed the Ravenscrag, underlies the drift throughout the entire upland areas of the region down to an approximate elevation of 2,275 feet above sea-level and possibly to a slightly lower elevation over the northwestern quarter of the municipality. A massive sand bed is known to occur at the base of the Ravenscrag in areas to the west but is thin or absent throughout at least the southern half of the municipality. Throughout the southern half of the township the Ravenscrag is underlain by approximately 35 feet of white to buff-coloured, plastic clay known as the Whitemud beds. It has not been definitely determined whether this bed is present under the Ravenscrag in the northern half of the township. A bed of coarse grey sand that weathers green, forms the top of the Eastend formation and underlies the Whitemud in the southern half of the area, and probably underlies the Ravenscrag to the north. This sand bed is struck at elevations between 2,265 and 2,220 feet above sea-level throughout the

greater part of the municipality and forms an important water-bearing horizon in many parts of the area. Some 10 to 20 feet of silt and fine sand underlying the coarse sand bed form the lower part of this formation. The Eastend grades downward into the Marine shale at an approximate elevation of 2,200 feet throughout the southern townships and at about 2,170 feet toward the northern boundary.

The Ravenscrag is composed of yellow-brown clays and brown shales interbedded with layers of blue sand and occasional thin coal seams. As is to be expected in a formation showing considerable variation in its component beds, ground water derived from the Ravenscrag varies markedly at different depths even in comparatively small areas. Fairly large supplies of hard, "alkaline" water are obtainable from the Ravenscrag at elevations between 2,330 and 2,300 feet, throughout the greater part of townships 7 and 8 and S.½, township 9, range 29. The aquifer rises gradually to the west into township 7, 8, and 9, range 30, where it lies at elevations ranging from 2,400 to 2,380 feet. Water derived from sand beds immediately underlying coal seams is in many cases soft and soda-bearing. This is particularly true of supplies from this horizon throughout the three southern townships. It is not usually suitable for household use, although several wells along the southern boundary of the municipality yield excellent drinking water. In township 8, ranges 29 and 30, and in the southwestern half of township 9, range 29, and township 9, range 30, the water from the Ravenscrag is hard and contains "alkaline" salts and iron to such an amount as to render it unfit for domestic use. This horizon and one lying below it, to be described later, are the most productive water horizons in the area although the quality of the water

is generally poorer than that of the smaller supplies derived from the overlying glacial deposits. In township 9, range 30, the supplies derived from the drift are adequate for local needs, and it is not generally necessary to sink wells into the underlying Ravenscrag. Dry holes have been sunk into the Ravenscrag in nearly all sections in the western half of township 9, range 28, and along the eastern parts of township 9, range 29. It is probable that, due to a lack of pervious beds, little water will be obtained from this formation either in the western half of township 9, range 28, or the northwestern half of township 9, range 29. Several wells situated in the central part of township 9, range 29, are drawing fairly large supplies of water suitable for stock from the coarse sands at the top of the Eastend formation, lying below the Ravenscrag at an approximate elevation of 2,240 feet. This horizon will, however, probably not be productive throughout the central and northern parts of this township.

The Ravenscrag formation produces small supplies of water at several places east of Lake of the Rivers. The most productive horizon, however, is encountered in the coarse green sand of the Eastend formation, occurring below the Whitemud beds at elevations between 2,240 and 2,190 feet. This horizon is productive throughout the entire area east of the valley. The supply is believed to be derived from a catchment area in the highlands in the municipality to the east. The many springs along the lower slopes of Lake of the Rivers valley derive their supply from this horizon.

In the eastern part of township 9, range 28, and the northern half of township 8, range 28, the supply is usable and is sufficient for local stock requirements. The water in

the southern part of the area becomes much softer due to the presence of "soda" and because of the flat taste is usually unsuitable for household use. This horizon yields fair supplies of a similar quality of water throughout the remainder of the municipality, with the exception of the dry area mentioned above.

In most parts of the western townships adequate supplies for stock are obtainable from the Ravenscrag and it is not necessary to sink wells into the Eastend formation. Water occurs in small amounts in the Eastend formation, but is of very poor quality.

The Marine shale underlies the entire township, below 2,190 feet in the central part, and at slightly lower elevations in the northern and southern townships. The shale is easily recognizable in drilling by its dark grey to black colour when wet and by roughly cubical shapes to its small component fragments when dry. Water derived from the shale is highly "alkaline" and salty and quite unfit for household or stock use. Drilling through the overlying beds down into the shale is not recommended for any part of the municipality.

## GROUND WATER CONDITIONS BY TOWNSHIPS

### Township 7, Range 28

The ground water supply of this township is obtained from Recent stream deposits, the glacial drift, and from the underlying bedrock formations.

The Recent stream deposits consist of beds of sand, silt, and gravel in the bottoms of the ravines and coulées. Several shallow wells sunk to depths not exceeding 20 feet yield a soft to medium hard water from the gravels, in sufficient quantities for 5 to 15 head of stock. The supply is seasonal, however, and frequently becomes negligible in the autumn. Wells so situated generally form a good source of water for domestic use. In two instances "alkaline", undrinkable water was found near the lower ends of the valleys, where there seems to be a greater accumulation of mineral salts in the sediments. The character of these sediments varies considerably, and it is quite probable that in areas where the gravels are thin and silts are predominant, a poorer quality of water is to be expected than from the more-porous phases of the deposits. The bottom of the broad valley east of the town of Willows is largely covered by silts, from which only small seepages of "alkali" water can be expected at shallow depths.

The glacial drift, that covers the uplands of the township, varies in thickness from a few feet along the slopes of Lake of the Rivers to 30 or 40 feet along the southern boundary of the township. Small pockets of sands and gravels scattered through the boulder clay comprising the drift contain water with variable amounts of mineral salts. Wells sunk to depths ranging from 15 to 25 feet on the uplands and striking

a productive sand or gravel layer form a good source of hard, slightly "alkali" water for house use, but the yield is not usually sufficient for more than 10 to 15 head of stock. When larger quantities of water required for stock, dugouts, and dams across the coulées, have satisfied the demand on many farms. Drilling or boring into the underlying bedrock is advisable, however, in many parts of the township.

Some difficulty has been experienced in tracing the productive horizons in the bedrock, due to discrepancies found in the existing topographic maps of the area. It will hence be found that the elevations of several of the well sites given do not agree with the contours that have been taken directly from previously published maps. The uppermost bedrock water-bearing horizon occurs in a coal seam in the Ravenscrag formation, at elevations varying from 2,480 to 2,430 feet above sea-level, in the highest part of the township in sections 4, 10, and 11. Two wells sunk to depths ranging from 20 to 40 feet in sections 10 and 11 obtain a small supply of soft, soda-bearing water which has been found unsuitable for household use. Although this horizon yields large supplies of water in the higher land of the township to the south, and in section 4 of this township, it cannot be considered as a source of any large amounts of water for stock in sections 10 and 11. Here it is advisable to sink wells to the second horizon, which occurs in the basal blue-grey sand beds of the Ravenscrag at elevations varying from 2,330 to 2,290 feet above sea-level. This horizon is believed to be productive generally throughout the entire southern half of the township. It has been found necessary to sink to depths of 100 to 150 feet before penetrating the horizon in most of the upland sections. The water is soft due to the presence of "soda"

in solution which is often in sufficient quantities to render the water unsuitable for garden irrigation and for household use, other than washing. The yield from individual wells is large, being sufficient in some localities for 25 and even 50 head of stock. The springs occurring along the upper slopes of the valley in sections 23 and 35 flow continuously from outcrops of this horizon. The water is soft, and although containing soda, is being used in the household and for watering several head of stock.

The third horizon is a bed of coarse grey-green sand of the upper Eastend formation, underlying the thin bed of white clay of the whitemud formation from 70 to 85 feet below the horizon described above, or at an approximate elevation of 2,245 to 2,220 feet. This horizon seems to have about the same areal extent as the one above it, although it has seldom been found necessary to sink wells to the lower horizon except along the lower slopes of the broad northern valley. The water is similar to that in the Ravenscrag, but the iron content is considerably higher often rendering the water unsuitable for household use. The supply is variable over the area, but usually sufficient for 25 head of stock. Several springs also occur at this horizon along the lower slopes of the valley.

The Marine shale is known to underlie the entire township below the approximate elevation of 2,190 feet. The small supplies of highly mineralized water that are derived from the shale are unfit for farm use and drilling into the shale is not recommended.

This formation immediately underlies the Recent deposits along the valley bottom. In this part of the area wells should not be sunk below depths of 25 feet, as suitable supplies of water cannot be expected from the underlying shale.

Township 7, Range 29

Glacial drift composed largely of yellow and blue boulder clay with only occasional irregular pockets of sand and gravel overlies the upland parts of this township. The thickness of the drift varies from at least 40 feet along the southern border to less than 10 feet on the southern slopes of the valley of Lake of the Rivers. The sand and gravel pockets are fairly numerous in the drift in the southern third of the township. Wells 15 to 25 feet deep encountering these pockets yield sufficient water for household needs and for a few head of stock. Toward the northern boundary of the township the drift is much less porous and shallow wells yield only small quantities of "alkaline" water, which is usually undrinkable. Even greater concentrations of mineral salts are found in the water from shallow wells dug into the silts and sands covering the bottom of the valley of Lake of the Rivers.

The drift of the upland area is underlain by the Ravenscrag bedrock formation down to an approximate elevation of 2,260 feet above sea-level. The Ravenscrag is in turn underlain by 20 to 25 feet of buff-white clay forming the Whitemud beds that are exposed in the vicinity of the town of Willows. A layer of coarse grey sands and brown shales not less than 30 feet thick underlies the Whitemud at an approximate elevation of 2,240 feet. These beds may be seen outcropping at high water level on the east side of Lake of the Rivers near the south end of the lake. This latter sand bed and the grey sands at the base of the Ravenscrag form two water-bearing horizons which extend throughout the entire township with the exception of the floor of the valley of Lake of the Rivers.

The uppermost productive bedrock horizon, a bed of coarse grey sand occurring in the lower part of the Ravenscrag formation, is present throughout the upland area at an elevation between 2,360 and 3,330 feet above sea-level. Many wells 90 to 160 feet deep, depending upon the surface elevation, are producing a soft, soda-bearing water in sufficient quantities for local farm requirements. Supplies derived from a coal seam overlying the sand bed are more often hard and contain fairly large quantities of sodium sulphate. Water from either of these sources is not generally satisfactory for domestic use. Residents of the district usually depend for drinking water upon shallow wells sunk in the drift or in Recent deposits along coulee bottoms. The second productive horizon occurs in the Eastend sand beds, underlying the Whitemud beds at an approximate elevation of 2,220 feet. Although this horizon will probably be found to be productive throughout the entire township south and west of the valley, it has been tapped by wells only in the north-eastern quarter of the township. It forms the main source of water for stock along the slopes of the valley and comes to the surface as a line of springs near the valley bottom. The water is hard and highly mineralized and used for stock watering only. Due to the relatively poor ground water conditions in the bedrock underlying this sand bed it is inadvisable to sink wells below this horizon in any part of the township.

Township 7, Range 30

A layer of glacial drift varying in thickness between 20 and 60 feet covers the entire township. Sand and gravel pockets in the boulder clay are few and of small areal extent. This condition causes considerable difficulty in obtaining adequate supplies of drinking water over the township, as the

water from the underlying bedrock horizons is generally unsuitable for domestic use. The sand pockets are fairly numerous along the southern boundary of the township, where it is probable that small supplies of drinkable water may be obtained at shallow depths. It may be necessary to dig several holes, however, throughout the remainder of the township before even a small supply of drinkable water is obtained. One well dug to a depth of 18 feet on NW.$\frac{1}{4}$, section 36, yields sufficient quantities of fairly soft water for household needs and a few head of stock, from isolated sand pockets in the drift. Where any large number of stock are to be watered, residents are advised to sink wells through the drift into the underlying Ravenscrag bedrock formation. An aquifer in a bed of sand lying beneath a thin coal seam has been struck in many wells in this district. It is believed that this aquifer is at elevations between 2,425 and 2,390 feet throughout the entire township except in sections 24, 25, and 36, where a slight northeasterly dip to the beds has caused the aquifer to be found at elevations between 2,385 and 2,365 feet. In sections 13 and 14, where the glacial drift is thin, this aquifer is penetrated at a depth of 45 feet, but throughout the remainder of the township it is necessary to sink wells from 100 to 130 feet to reach the productive bed. The water is hard and contains "alkali" salts and iron in some wells, and is soft and soda-bearing in others. Only in the extreme southern sections of the township is the water regarded as suitable for household use. The yield is generally sufficient for 20 to 30 head of stock. There has been as yet no necessity for sinking wells below this horizon in the township. The aquifer, which occurs in a bed of sand at 2,225 feet in the township to the east, may be productive beneath this township. This would necessitate drilling to depths of 200 to 300 feet, however, in some of the higher parts of the area.

Township 8, Range 28

The ground water supply of this township both from the glacial drift and the underlying bedrock is considerably better in the northeastern half of the township than in the southwestern half. The glacial drift covers the entire area to depths of 20 to 40 feet. Throughout the southwestern sections the drift is composed largely of boulder clay. Any ground water to be found in the drift occurs in the more porous beds of sand and gravel pockets which are scattered sparsely through the clay. These pockets when close to the surface yield small supplies of drinkable water. Small sand and gravel knolls and ridges have formed productive sites for shallow wells for household supply. Over much of the area, however, there is little evidence on the surface of the occurrence of these pockets and it may be necessary to dig several widely spaced holes before a suitable yield is obtained. Several residents have resorted to seepage wells dug beside dugouts for drinking water, whereas others are obliged to haul water for house use from the shallow wells in the central part of the township. Much greater amounts of gravel and sand occur at shallow depths in the drift covering the central sections. Here wells not exceeding 20 feet in depth yield sufficient quantities of hard, drinkable water for local farm requirements. These gravels are by no means uniformly scattered over the central sections, but are believed to lie in narrow bands marking buried stream channels in the drift. Wells in sections 15, 23, 27, and 28 are deriving their supply from such a source. In the northern sections the drift is composed largely of boulder clay, but shallow wells can usually be expected to provide sufficient water for house use.

The clays, shales, and occasional sand beds and thin seams of lignite coal which compose the Ravenscrag bedrock formation underlie the drift throughout the township down to an approximate elevation of 2,270 feet above sea-level, i.e. down to a level approximately 60 feet above the high water line of the lake. The Ravenscrag is immediately underlain by 25 to 35 feet of buff-white fire-clays known as the Whitemud beds. These white beds are underlain in turn by some 40 feet of alternating beds of shale and massive, grey-weathering, green sand, forming the top of the Eastend formation. Although the Ravenscrag has yielded comparatively little water in this township the sand beds below the Whitemud form an extensive water-bearing horizon. In sections 3 and 18, however, many holes have been drilled into the bedrock even to depths of 160 feet without obtaining water. It appears that the sands are largely absent in this part of the area and that little water can be expected from deeper drilling. In sections 7 and 8, and in nearly every section in the township with the above exceptions, the green sand bed occurs at elevations between 2,245 and 2,225 feet and forms a source of adequate water supply for local stock requirements. The depth to this horizon on the upland parts of the township varies in different localities due to differences in surface elevation, but production is usually obtained at depths of 100 to 160 feet. The water from this aquifer is soft and soda-bearing in most places, and is not suitable for household use. Drilling below this horizon in any part of the township will encounter the Marine shale which does not yield supplies of ground water suitable for farm requirements.

Township 8, Range 29

A mantle of glacial boulder clay with a maximum thickness of about 50 feet covers the entire upland part of this township. Irregular pockets of sand and gravel of limited areal extent are interspersed through the boulder clay. In many parts of the township wells not exceeding 40 feet deep yield small supplies of medium hard, drinkable water of varying degrees of alkalinity. Due to the irregular distribution of the sand and gravel pockets, however, it is often necessary to dig several holes before a suitable supply is obtained. Small supplies of water of a better quality are in many cases obtained in shallow wells located in the bottoms of ravines. The Ravenscrag bedrock formation underlies the drift down to an approximate elevation of 2,300 feet above sea-level. Some 40 to 45 feet of Whitemud beds underlie the Ravenscrag, followed by a similar thickness of coarse grey sand. Many wells have been sunk into the sand beds of the lower part of the Ravenscrag. The water derived from this horizon is hard and "alkaline", and although generally unsuitable for household use can be used for stock. The supply is not generally sufficient for more than 25 head of stock. Considerably larger supplies of soft, soda-bearing water are to be expected from the coarse, greenish grey Eastend sands below the Whitemud beds at elevations between 2,260 and 2,220 feet. This horizon has been struck in wells in nearly all sections of the township at depths varying from 100 to 125 feet from the surface. The high soda content of the water limits its use to the watering of stock.

Usually two wells appear to be necessary to satisfy the water requirements of farms in this township, a shallow

well in drift for drinking water and a deeper well into the Ravenscrag or the underlying green sand for stock watering.

The Marine shale underlies the entire township below an approximate elevation of 2,220 feet. The water conditions in the shale are very poor and sinking wells into it in any part of the township is not recommended.

Township 8, Range 30

The glacial deposits covering the entire area consist of a few feet of sandy clay underlain by boulder clay followed by a fairly extensive bed of sand. The boulder clay has a thickness ranging from 40 to 50 feet along the southern boundary and increases to approximately 60 feet in the northern sections. Wells dug to depths ranging from 10 to 20 feet in the upper sandy clay generally yield soft or medium hard, drinkable water, in sufficient quantities for household requirements, but usually not more. Very little water can be expected from the underlying boulder clay. Wells sunk to the sand below the clay, however, yield enough water for local stock requirements. Throughout the central and northern parts of the township the water is quite highly mineralized and generally unfit for domestic use. Better water is obtainable at this horizon in the southern parts.

Three sand aquifers were penetrated in the present town well in Assiniboia at depths of 40, 65, and 85 feet, respectively from the surface. The water from the upper two horizons is of medium hardness and comparatively low in mineral salts. The lowest horizon yields a more highly mineralized water. These aquifers probably occur as isolated pockets rather than extensive beds as several test holes in

the town have failed to strike more than small seepages at these horizons. A lack of detailed information has made it impossible for the writer to determine the full areal extent of the productive beds. Water suitable for stock watering is obtained at depths of less than 125 feet from sand beds and coal seams of the Ravenscrag formation underlying the drift. In some places the yield is adequate for 30 or more head of stock and it is suitable for household purposes. In many of the wells into the bedrock, however, iron, soda, or sodium sulphate (Glauber's salt) render the water unsuitable for domestic use. Deep drilling, to depths greater than 200 feet, is not recommended in this township. Water in the bedrock is under hydrostatic pressure and rises in the wells above the aquifer. Artesian conditions are known to exist in the municipality to the west, but it is improbable that flowing artesian wells will be located in this township.

Township 9, Range 28

Ground moraine, in which the near surface water conditions are generally poor, covers the southwestern corner of this township and the slopes of the valley of Lake of the Rivers. The remainder of the township is covered by an irregular mantle of terminal moraine in which fairly extensive deposits of sands and gravels occur in boulder clay within 30 feet of the surface, where little difficulty should be experienced in obtaining a supply of water for household use at shallow depths.

Large quantities of water of good quality, sufficient in several instances for 100 head of stock or more, are obtained from a local sand and gravel horizon in the drift encountered at depths ranging from 65 to 90 feet, at an approximate elevation of 2,245 feet throughout sections 32, and 33. Dry holes to

the south and west indicate that this horizon is productive only in the sections referred to above.

Marked differences are noted in the water conditions existing in the underlying bedrock formations on opposite sides of Lake of the Rivers. South and east of the lake, the coarse grey to green sand of the Eastend formation lying below the Whitemud beds, is encountered in wells at elevations of 2,220 to 2,195 feet above sea-level and sunk to depths ranging from 100 to 145 feet, depending on the elevation of the well site. This horizon yields sufficient water for local farm requirements. The water is hard and not generally highly mineralized and is used for household purposes. It is under sufficient artesian pressure to cause it to rise to a point 65 feet below the surface in many of the wells. The supply of this horizon is believed to be derived from rain falling on a catchment area in the hills to the northeast of the township and seeping gradually down to this horizon. In sections 3 and 4, and generally throughout the area west of the lake, the horizon is either less porous or has been largely removed by erosion so that little or no water can now be obtained by drilling into the bedrock. In many sections wells 100 and even 160 feet deep obtain only small amounts of water. Deeper drilling cannot be expected to yield larger supplies. If adequate quantities of water cannot be obtained from the overlying glacial deposits in this part of the township farmers will be obliged to construct dams in the coulées or dugouts on the uplands in order to conserve sufficient water for stock.

Township 9, Range 29

A layer of glacial drift composed largely of boulder clay overlies the whole township. The thickness of the drift varies considerably within small areas, but is probably nowhere

less than 40 feet, and not more than 80 feet, thick over the upland parts of the township. An extensive area of outwash sands and gravels covers the drift in the west-central part of the township, as shown on the accompanying map (Figure 1). Shallow wells sunk into the outwash deposits yield large supplies of hard water, sufficient in many places for a large number of stock. Considerable amounts of mineral salts have also become concentrated in the lower parts of the area, particularly in the ravines and coulées, rendering the water unsuitable for household use. Considerable difficulty has been experienced in keeping these wells free from caving sand. The northeast corner of the rolling country is underlain by terminal moraine in which the small, scattered, sand and gravel pockets form a source of small quantities of usable water at shallow depths. Throughout the remainder of the township the porous beds in the drift are fewer and although shallow wells satisfy household requirements it is generally necessary to sink wells into the underlying bedrock in order to obtain sufficient water for stock.

A lack of detailed logs of the wells producing from aquifers in the bedrock, and considerable differences existing in the character of the water from different wells have made the tracing of the bedrock horizon difficult in this township. Throughout the western half of the area, wells sunk to depths of from 65 to 140 feet, depending upon surface elevation, obtain a water from sand beds presumed to be in the Ravenscrag formation at an approximate elevation of 2,260 feet above sea-level. The yield is sufficient for local stock requirements but the mineral salt content of the water is generally high, making the water unsuitable for household use. In the eastern half of the township water is obtained from a lower horizon, at elevations

between 2,200 and 2,160 feet, but as the ground surface is lower it is seldom necessary to drill deeper than 110 feet to reach the productive aquifer. This horizon is probably productive over the greater part of the township, but the quantity of water obtainable varies in different localities. In the southeast corner this aquifer yields only small seepages, whereas sufficient supplies for 20 or more head of stock are derived from individual wells in the central part of the area. The water is "alkaline" and is not suitable for household use. The Marine shale is believed to underlie the entire township at elevations below 2,150 feet. As no water suitable for farm use can be expected in the shale, drilling below 2,150 feet in any part of the township is not recommended.

Township 9, Range 30

The ground water supplies of this township are derived almost entirely from the mantle of glacial drift that covers the entire area. The thickness of the drift is variable, being less than 20 feet along the southern boundary and increasing to over 40 feet toward the northern part. An extensive gravel horizon is encountered at shallow depths throughout the central and northeastern parts of the township. Along its southern margin this horizon grades into sand beds which extend into sections 10, 11, 12, and the southwestern half of section 15. Sufficient supplies of water for local stock requirements are obtainable at shallow depths throughout the area underlain by the gravel and the sand horizons. The water from the gravel is found to vary greatly in its "alkali" salt content within small areas. Many of the wells yield a medium hard, drinkable water whereas others close by give supplies that are unfit for household or stock use. Water from the sand beds shows corresponding variations in mineral salt content and

is often quite high in iron. Little information has been obtained in regard to the water conditions of the underlying Ravenscrag formation. A fair supply of medium hard, slightly "alkali" water was struck beneath a coal seam at a depth of about 50 feet below the surface in SE.¼, section 3. The lateral extent of this aquifer has not been determined. A well located in SW.¼, section 14, has encountered a large supply of water in a coarse sand bed at a depth of 150 feet below the surface, or at an elevation of 2,210 feet. It is probable that this horizon, which is believed to be the massive sand at the top of the Eastend formation, will be found to be productive at this elevation over the greater part of the township. The water is high in iron and "alkali" salts and is unfit for household use but suitable for stock. The depth to the Marine shale, which probably underlies the whole area has not been determined. Wells sunk below an elevation of 2,150 feet, however, will not likely yield sufficient supplies of water suitable for farm use.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF LAKE OF THE RIVERS, NO. 72, SASKATCHEWAN

| Township | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | Total No. in Municipality |
|---|---|---|---|---|---|---|---|---|---|---|
| West of 2nd meridian Range | 28 | 29 | 30 | 28 | 29 | 30 | 28 | 29 | 30 | |
| Total No. of Wells in Township | 42 | 24 | 15 | 36 | 30 | 19 | 55 | 60 | 26 | 307 |
| No. of wells in bedrock | 26 | 11 | 10 | 24 | 18 | 6 | 31 | 32 | 7 | 165 |
| No. of wells in glacial drift | 14 | 13 | 5 | 12 | 12 | 13 | 24 | 28 | 19 | 140 |
| No. of wells in alluvium | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Permanency of Water Supply | | | | | | | | | | |
| No. with permanent supply | 35 | 22 | 15 | 33 | 27 | 15 | 38 | 49 | 26 | 260 |
| No. with intermittent supply | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| No. dry holes | 7 | 2 | 0 | 3 | 2 | 4 | 17 | 11 | 0 | 46 |
| Types of Wells | | | | | | | | | | |
| No. of flowing artesian wells | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| No. of non-flowing artesian wells | 15 | 14 | 12 | 13 | 16 | 8 | 20 | 31 | 10 | 139 |
| No. of non-artesian wells | 20 | 8 | 3 | 20 | 12 | 6 | 18 | 18 | 16 | 121 |
| Quality of Water | | | | | | | | | | |
| No. with hard water | 23 | 22 | 13 | 23 | 27 | 13 | 34 | 44 | 23 | 222 |
| No. with soft water | 12 | 0 | 2 | 10 | 1 | 2 | 4 | 5 | 3 | 39 |
| No. with salty water | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| No. with "alkaline" water | 4 | 13 | 10 | 7 | 18 | 6 | 14 | 31 | 6 | 109 |
| Depths of Wells | | | | | | | | | | |
| No. from 0 to 50 feet deep | 23 | 9 | 3 | 16 | 9 | 3 | 10 | 18 | 22 | 113 |
| No. from 51 to 100 feet deep | 5 | 9 | 8 | 3 | 16 | 12 | 20 | 20 | 3 | 96 |
| No. from 101 to 150 feet deep | 7 | 3 | 3 | 13 | 4 | 0 | 20 | 20 | 1 | 71 |
| No. from 151 to 200 feet deep | 4 | 1 | 1 | 4 | 1 | 0 | 4 | 2 | 0 | 17 |
| No. from 201 to 500 feet deep | 3 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 7 |
| No. from 501 to 1,000 feet deep | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| No. over 1,000 feet deep | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| How the Water is Used | | | | | | | | | | |
| No. usable for domestic purposes | 26 | 5 | 4 | 16 | 11 | 9 | 30 | 23 | 18 | 142 |
| No. not usable for domestic purposes | 9 | 17 | 11 | 17 | 17 | 6 | 8 | 26 | 8 | 119 |
| No. usable for stock | 32 | 17 | 15 | 32 | 26 | 14 | 37 | 44 | 26 | 243 |
| No. not usable for stock | 3 | 5 | 0 | 1 | 2 | 1 | 1 | 5 | 0 | 18 |
| Sufficiency of Water Supply | | | | | | | | | | |
| No. sufficient for domestic needs | 33 | 22 | 15 | 33 | 28 | 15 | 38 | 49 | 26 | 259 |
| No. insufficient for domestic needs | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| No. sufficient for stock needs | 21 | 19 | 14 | 27 | 22 | 15 | 20 | 35 | 20 | 193 |
| No. insufficient for stock needs | 14 | 3 | 1 | 6 | 6 | 0 | 18 | 14 | 6 | 68 |

## 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 a 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. Residents

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 deleterious effects. The scale found on the inside of steam boilders 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 hardness 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 Lake of the Rivers, No. 72, 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. | Alka-linity | 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 | NE. | 31 | 7 | 28 | 2 | 15 | 460 | 260 | 150 | 110 | 9 | 365 | 90 | 40 | 41 | 100 | 433 | 161 | | 84 | 0 | 112 | 61 | 15 | | ×1 |
| 2 | NE. | 23 | 7 | 29 | 2 | 20 | 3,072 | | | | 502 | | | | | | | | 510 | | 633 | 343 | 949 | 93 | | ×1 |
| 3 | SE. | 23 | 7 | 30 | 2 | 61 | 2,397 | | | | | | | | | | | | (2) | | (3) | (4) | (1) | (5) | | ×1 |
| 4 | NE. | 2 | 8 | 30 | 2 | 85 | 863 | | | | | | | | | | | (3) | (1) | | (2) | | (4) | | (5) | ×1 |
| 5 | S.½ | 22 | 9 | 29 | 2 | 109 | 8,537 | | | | | | | | | | | | | | | | | | | ×2 |

Water samples indicated thus, ×1, are from glacial drift or other unconsolidated deposits.
Water samples indicated thus, ×2, are from bedrock, Eastend 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. 2,3,4, 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

The first analysis is of water derived from the thin deposits of Recent gravels covering the bottom of a coulée extending north from Willows valley. This water was reported to have a poor taste. The chemical analysis of the sample obtained does not indicate that mineral salts are present in this water in sufficient quantities to be the cause of any taste the water may have. This water is hard, but not excessively so. Shallow wells located in ravines obtain their water from a relatively large surface area and hence are more easily polluted than wells deriving their supply from greater depths. It has been found in several localities in the municipality that although moderately hard, drinkable water may be obtained at shallow depths in the upper reaches of the ravines and coulées, greater amounts of dissolved mineral salts occur in the waters farther down the valleys. The fine silts covering the bottom of Lake of the Rivers valley east of Willows are not conducive to the ready circulation of ground water. The small supplies derived from the silts are often so highly mineralized as to be objectionable for household use.

Few generalizations are possible in regard to the quality of ground water from the glacial drift covering this municipality. The character of the deposits shows marked variations at different depths or laterally over small areas. Correspondingly marked differences are noted in the quality of the ground water obtained from the drift. One well may be producing a moderately hard, slightly mineralized water, whereas a well sunk to a similar depth and located only a few feet away may give a water too highly "alkaline" to be fit for farm requirements. It is not to be inferred, therefore, that if

poor water conditions are found in one well these conditions will of necessity prevail throughout the adjoining area. In general it has been found that waters found in extensive gravel deposits in the drift near the surface are of better quality and more suited to household use than waters from isolated pockets at greater depths. Exceptions to this generalization are noted in the area of extensive outwash gravels in the northwest townships. When these gravels fill or partly fill depressions in the underlying boulder clay the mineral salts have become concentrated in the depressions, rendering the water highly "alkaline". Surface waters percolating slowly through boulder clay concentrate the mineral salts in the more porous beds. The small seepages derived from the boulder clay itself are often highly charged with dissolved salts. The second and third analyses given are of waters from small sand pockets in the boulder clay. These waters have a total dissolved solid contents of 3,072 and 2,397 parts per million. These figures greatly exceed the upper limits of dissolved mineral salt for drinkable waters. The large amounts of magnesium sulphate (Epsom salts) and sodium sulphate (Glauber's salt) present would undoubtedly render this water strongly laxative to persons unaccustomed to its use. This water will not likely prove harmful to stock, particularly during the winter months when they are fed on dry fodder.

The town well at Assiniboia draws its supply from what are believed to be fairly extensive sand and gravel deposits beneath the boulder clay. Here the percolating waters have presumably leached out much of the mineral salts in the porous beds so that the water obtained at the present time is not highly mineralized. The fourth analysis indicates the relative amounts of dissolved salts in this water.

Water from the Bedrock

A lack of detailed analyses of waters derived from the bedrock of this municipality makes it impossible to formulate definite conclusions in regard to the mineral salts present in the waters, or their relative amounts. With the exception of a few localities in the area east of Lake of the Rivers, the supplies derived from the bedrock of this municipality are generally unsuitable for household use. Wells striking coal in the Ravenscrag at depths of less than 100 feet usually give a hard, often brown-coloured water charged with considerable amounts of sulphate salts. Iron and sulphate salts, of which Glauber's salt is probably the chief constituent, form the impurities in the waters from this source. Water from greater depths in the Ravenscrag and from the extensive sand beds at the top of the Eastend formation is usually soft due to the presence of sodium carbonate (black alkali). The "soda" gives the water a flat taste which makes it objectionable for household use. The fifth analysis given is of water from a 109-foot well deriving its supply from the Eastend sands. A total dissolved solid content of 8,537 parts per million makes this water quite unfit for either household or stock use. In most localities, however, water from this horizon is evidently not so highly mineralized, as it is being used for stock without noticeable ill effects. The presence of "black alkali" in waters from deep wells makes them quite unfit for watering plants.

# WELL RECORDS—Rural Municipality of LAKE OF THE RIVERS, No. 72, 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. | 2 | 7 | 28 | 2 | Dug | 12 | 2,400 | - 8 | 2,392 | 8 | 2,392 | Recent sands | Soft, clear | 44 | D, S | Sufficient for 16 head stock. |
| 2 | NE. | 4 | " | " | " | Bored | 151 | 2,590 | -119 | 2,471 | 135 | 2,455 | Ravenscrag sand | " , " , soda | 44 | D, S | Insufficient for local needs. Poor drinking water: (coal). |
| 3 | NE. | 5 | " | " | " | " | 110 | 2,460 | - 98 | 2,362 | 110 | 2,350 | " " | Soft, iron, soda | 40 | S | Large supply; unfit for drinking. |
| 4 | NW. | 6 | " | " | " | " | 72 | 2,410 | - 62 | 2,348 | 65 | 2,345 | " " | Hard, clear, iron | 41 | D, S | Sufficient for 40 head stock; (coal). |
| 5 | SW. | 9 | " | " | " | " | 130 | 2,460 | -120 | 2,340 | 130 | 2,330 | " " | Hard, iron, clear | 42 | D, S | " " 30 " " ; (coal). |
| 6 | NW. | 10 | " | " | " | Dug | 20 | 2,500 | - 17 | 2,483 | 20 | 2,480 | " " | Hard, clear | 43 | D, S | " " household needs only; (coal) |
| 7 | NW. | 11 | " | " | " | Bored | 180 | 2,465 | -168 | 2,297 | 180 | 2,285 | " " | Hard, iron, soda | | S | Very little water; coal at 2,365 feet. |
| 8 | NE. | 11 | " | " | " | Dug | 42 | 2,455 | - 10 | 2,445 | 10 | 2,445 | Glacial clay | Soft, clear | 46 | D, S | Sufficient for 20 head stock. |
| 9 | SW. | 12 | " | " | " | Drilled | 365 | 2,530 | -300 | 2,230 | 365 | 2,165 | Eastend sand | Soft, soda | 43 | D, S | Very large supply; sufficient for 50 head stock. |
| 10 | SE. | 14 | " | " | " | Bored | 133 | 2,450 | -115 | 2,335 | 133 | 2,317 | Ravenscrag sand | Soft, soda, clear | 42 | D, S | Sufficient for 25 head stock. |
| 11 | SW. | 14 | " | " | " | " | 150 | 2,450 | -115 | 2,335 | 150 | 2,300 | " " | Soft, clear | | N | Large supply; poor drinking water. |
| 12 | NE. | 14 | " | " | " | " | 53 | 2,380 | - 35 | 2,345 | 53 | 2,327 | " " | " , " | | D, S | Yield not known. |
| 13 | NW. | 15 | " | " | " | Dug | 15 | 2,375 | - 10 | 2,365 | 15 | 2,360 | Glacial sand | " , clear | 42 | D | Sufficient for 2 households. |
| 14 | SE. | 16 | " | " | " | " | 17 | 2,500 | - 5 | 2,495 | 4 | 2,496 | " " | " , " | | D, S | Small supply. |
| 15 | SW. | 16 | " | " | " | " | 34 | 2,310 | - 30 | 2,280 | 34 | 2,276 | Ravenscrag sand | " , " | 42 | D, S | Sufficient for 15 head stock. |
| 16 | NW. | 17 | " | " | " | Bored | 48 | 2,270 | - 38 | 2,232 | 48 | 2,222 | " " | " , " , iron | | D, S | " " local needs. |
| 17 | SW. | 18 | " | " | " | Dug | 22 | 2,400 | - 18 | 2,382 | 22 | 2,378 | Glacial(?) " | Soft, clear, iron | 42 | D | Supply decreasing; 135 foot well waters stock. |
| 18 | SW. | 20 | " | " | " | " | 14 | 2,230 | - 4 | 2,226 | 14 | 2,216 | " " | Hard, clear | | D, S | Small supply. |
| 19 | NW. | 23 | " | " | " | " | 4 | 2,330 | 0 | 2,330 | 4 | 2,326 | Ravenscrag sand | Hard, iron, soda | 44 | D, S | Large supply; water struck under coal seam. |
| 20 | SW. | 25 | " | " | " | Bored | 22 | 2,290 | - 14 | 2,276 | 22 | 2,268 | Glacial sand | Hard, clear | 43 | N | Drinking water hauled. |
| 21 | NE. | 27 | " | " | " | Drilled | ? | 2,285 | - 40 | 2,245 | 40 | 2,245 | Ravenscrag sand | ? | | N | Water also found in coal at depth of 110 feet. |
| 22 | NE. | 27 | " | " | " | Bored | 78 | 2,260 | - 48 | 2,212 | 78 | 2,182 | " sandy clay | Hard, clear, iron | 43 | S | Sufficient for 30 head stock; unfit for man. |
| 23 | NE. | 31 | " | " | " | Dug | 17 | 2,230 | - 12 | 2,218 | 15 | 2,215 | Recent stream gravels | Hard, clear, "alkaline" | 42 | S | Sufficient for 6 head stock; unfit for man.# |
| 24 | SW. | 35 | " | " | " | Spring | 2 | 2,240 | + 1 | 2,241 | | | Ravenscrag coal | Soft, clear | 43 | D, S | Large supply; fills 1-inch pipe. |
| 25 | SE. | 35 | " | " | " | Bored | 45 | 2,220 | - 42 | 2,178 | 45 | 2,175 | Glacial clay | Hard, " | | N | Very small seepage. |
| 26 | NW. | 36 | " | " | " | " | 140 | 2,380 | - 80 | 2,300 | 140 | 2,240 | Ravenscrag sand | Soft, " , soda | 43 | D, S | Sufficient for 30 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 LAKE OF THE RIVERS, NO. 72, 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 | NE. | 1 | 7 | 29 | 2 | Bored | 92 | 2,410 | - 80 | 2,330 | 90 | 2,320 | Ravenscrag sand | Hard, clear, soda | 42 | S | Poor supply; unfit for humans. |
| 2 | E½ | 4 | " | " | " | Dug | 39 | 2,425 | - 5 | 2,420 | 39 | 2,386 | Glacial sand | Soft, salty(?) | | D, S | Sufficient for local needs. |
| 3 | SE. | 6 | " | " | " | " | 25 | 2,440 | - 10 | 2,430 | 20 | 2,420 | " " | Hard, clear | | D, S | " " " " . |
| 4 | SW. | 7 | " | " | " | " | 16 | 2,410 | - 11 | 2,399 | 16 | 2,396 | " " | " , " | 42 | D, S | " " 10 head stock. |
| 5 | SW. | 12 | " | " | " | Bored | 120 | 2,480 | -105 | 2,375 | 120 | 2,360 | Ravenscrag coal | " , " , "alkaline" | 44 | S | " " 15 " " ; use shallow well for drinking. |
| 6 | SW. | 15 | " | " | " | " | 85 | 2,450 | - 60 | 2,390 | 85 | 2,365 | Glacial (?) | Hard, clear | 44 | D, S | Small supply. |
| 7 | NW. | 19 | " | " | " | " | 130 | 2,460 | -122 | 2,338 | 130 | 2,330 | Ravenscrag sand | " , " , soda | 40 | S | " " ; unfit for humans. |
| 8 | SE. | 21 | " | " | " | " | 104 | 2,445 | - 96 | 2,349 | 104 | 2,341 | " black clay | Hard, iron, "alkaline" | 44 | S | Fair supply; unfit for humans. |
| 9 | NE. | 23 | " | " | " | Dug | 20 | 2,325 | - 11 | 2,314 | 20 | 2,305 | Glacial sand | Hard, clear | 43 | D | Sufficient for household needs only; #. |
| 10 | SW. | 25 | " | " | " | Bored | 65 | 2,290 | - 60 | 2,230 | 65 | 2,225 | Eastend " | " " , "alkaline" | 43 | S | " " 9 head stock; unfit for man. |
| 11 | NW. | 25 | " | " | " | Drilled | 680 | 2,240 | | | | | Marine shale | | | | Dry hole. |
| 12 | SE. | 26 | " | " | " | Bored | 30 | 2,360 | - 20 | 2,340 | 30 | 2,330 | Glacial sand | " , hard, clear | 42 | S | Sufficient for local stock needs; drinking water hauled. |
| 13 | SW. | 26 | " | " | " | " | 45 | 2,330 | - 40 | 2,290 | 45 | 2,285 | " " | Hard, iron, "alkaline" | 44 | S | Sufficient for local " " ; " water hauled. |
| 14 | SW. | 27 | " | " | " | " | 48 | 2,340 | - 30 | 2,310 | 48 | 2,292 | " " | " , hard, clear | 44 | S | Sufficient for " " " ; " water hauled. |
| 15 | NW. | 27 | " | " | " | Drilled | 100 | 2,320 | - 50 | 2,270 | 100 | 2,220 | " (?) " | " , " , "alkaline" | 43 | S | Sufficient for " " " ; " water hauled. |
| 16 | SE. | 30 | " | " | " | " | 158 | 2,500 | -128 | 2,472 | 158 | 2,342 | Ravenscrag coal-seam | " , hard, iron | 44 | N | Drinking water hauled. |
| 17 | NW. | 33 | " | " | " | Bored | 60 | 2,340 | - 30 | 2,310 | 60 | 2,280 | Ravenscrag clay | Hard, clear, "alkaline | | S | Sufficient for local stock needs; drinking water hauled. |
| 18 | SW. | 34 | " | " | " | " | 90 | 2,310 | - 50 | 2,260 | | | Glacial sand | " ,hard, clear | 42 | S | Sufficient for " " " ; drinking water hauled. |
| 19 | SW. | 35 | " | " | " | " | 73 | 2,308 | - 65 | 2,243 | 73 | 2,235 | " gravel | " , " , "alkaline" | 43 | S | Sufficient for " " " ; " water hauled. |
| 20 | SW. | 36 | " | " | " | Dug | 10 | 2,230 | - 2 | 2,228 | 8 | 2,222 | " " | " , hard, clear | 42 | S | Sufficient for " " " ; " water hauled. |
| 1 | NW. | 1 | 7 | 30 | 2 | Bored | 72 | 2,520 | - 60 | 2,460 | 80 | 2,440 | Ravenscrag sand | Hard, iron, "alkaline" | 44 | D, S | Sufficient for 10 head stock; poor drinking water. |
| 2 | NW. | 2 | " | " | " | " | 125 | 2,550 | -100 | 2,450 | 125 | 2,425 | " " | " ,hard, iron | 43 | S | Small supply; drinking water hauled. |
| 3 | NE. | 3 | " | " | " | " | 135 | 2,560 | -127 | 2,433 | 135 | 2,425 | " coal seam | Soft, clear, soda | 44 | D, S | Sufficient for 11 head stock. |
| 4 | SW. | 13 | " | " | " | " | 45 | 2,465 | - 30 | 2,435 | 45 | 2,420 | " " " | Hard, iron, "alkaline" | 43 | S | " " 8 " " ; drinking water hauled. |
| 5 | SW. | 14 | " | " | " | " | 50 | 2,480 | - 48 | 2,432 | 50 | 2,435 | " " " | Hard, iron | 44 | D, S | Small supply. |
| 6 | SE. | 23 | " | " | " | " | 61 | 2,465 | - 50 | 2,415 | 65 | 2,404 | Glacial(?) sand | " , clear, "alkaline" | 43 | S | Sufficient for 10 head stock; haul drinking water.# |
| 7 | SE. | 24 | " | " | " | " | 70 | 2,420 | - 40 | 2,380 | 55 | 2,365 | " (?) " | " , ", iron | | S | Sufficient for 20 " " ; " " wa |

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 LAKE OF THE RIVERS, NO. 72, 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | NE. | 24 | 7 | 30 | 2 | Bored | 100 | 2,460 | - 91 | 2,369 | 100 | 2,360 | Ravenscrag coal-seam | Hard, iron, "alkaline" | 44 | S | Sufficient for 16 head stock; haul drinking water. |
| 9 | NW. | 25 | " | " | " | " | 100 | 2,480 | - 90 | 2,390 | 100 | 2,380 | Ravenscrag coal-seam | Hard, iron, "alkaline" | 44 | S | Small supply; haul drinking water. |
| 10 | NE. | 26 | " | " | " | " | 182 | 2,482 | - 40 | 2,442 | 182 | 2,300 | Ravenscrag sand-stone | Hard, iron, clear | 45 | S | Large supply; haul drinking water. |
| 11 | NW. | 27 | " | " | " | " | 60 | 2,485 | - 40 | 2,445 | 40 | 2,445 | Glacial sandy clay | Hard, "alkaline", red sediment | 43 | S | Sufficient for local stock needs. |
| 12 | N½ | 34 | " | " | " | " | 100 | 2,500 | - 50 | 2,450 | 100? | 2,400 | Ravenscrag (?) sand | Hard, iron, "alkaline" | | S | Sufficient for local stock needs; unfit for ma |
| 13 | NE. | 35 | " | " | " | " | 100 | 2,490 | - 90 | 2,400 | 100 | 2,390 | Glacial(?) clay | Hard, iron, "alkaline" | 44 | S | Sufficient for 15 head stock; drinking water hauled. |
| 14 | SW. | 36 | " | " | " | " | 110 | 2,485 | -100 | 2,385 | 110 | 2,375 | Ravenscrag coal-seam | Hard, iron | 44 | S | Sufficient for 17 head stock; drinking water hauled. |
| 15 | NW. | 36 | " | " | " | Dug | 18 | 2,465 | - 14 | 2,451 | 18 | 2,447 | Glacial sand | Soft, clear | 43 | D, S | Sufficient for 8 head stock. |
| 1 | SW. | 1 | 8 | 28 | 2 | Bored | 102 | 2,435 | - 82 | 2,353 | 100 | 2,335 | Ravenscrag sand | Hard, clear, iron | | S | Sufficient for 16 head stock; use 30 foot well for drinking. |
| 2 | SE. | 2 | " | " | " | " | 48 | 2,370 | - 40 | 2,330 | 48 | 2,322 | Glacial sand | Hard, clear, iron | 42 | D, S | Small supply; water hauled in winter. |
| 3 | NE. | 3 | " | " | " | " | 130 | 2,380 | | | | | Ravenscrag clay (?) | | | | Dry hole; all water hauled. |
| 4 | NW. | 7 | " | " | " | " | 112 | 2,350 | - 80 | 2,270 | 112 | 2,238 | Eastend green sand | Soft, soda | | S | Sufficient for 60 head stock; spring used for drinking. |
| 5 | NW. | 8 | " | " | " | " | 116 | 2,340 | - 98 | 2,242 | 116 | 2,224 | " green sand | Hard, soda, iron | | S | Small supply; unfit for humans or stock. |
| 6 | NW. | 10 | " | " | " | " | 168 | 2,410 | -158 | 2,252 | 168 | 2,242 | " green sand | Medium hard | | | " " ; drinking water hauled. |
| 7 | NE. | 10 | " | " | " | " | 155 | 2,385 | -150 | 2,235 | 155 | 2,230 | " green sand | Hard, iron, "alkaline" | | S | " " ; " " " . |
| 8 | SW. | 12 | " | " | " | " | 112 | 2,360 | -108 | 2,252 | 112 | 2,248 | " green sand | Soft, iron | | S | " " ; " " " . |
| 9 | NE. | 12 | " | " | " | " | 75 | 2,300 | - 68 | 2,232 | 75 | 2,225 | " coarse sand | Hard, clear | | D, S | Small supply. |
| 10 | NW. | 14 | " | " | " | " | 160 | 2,315 | -100 | 2,215 | 160 | 2,155 | Marine shale | Hard, iron, soda, "alkaline" | | N | Unfit for humans or stock. |
| 11 | NW. | 15 | " | " | " | Dug | 13 | 2,360 | - 7 | 2,353 | 13 | 2,347 | Glacial gravel | Medium hard, clear | 42 | N | Unfit for humans; all water hauled. |
| 12 | SW. | 17 | " | " | " | Bored | 90 | 2,340 | | | | | Ravenscrag sand | | | | 5 similar dry holes. |
| 13 | NW. | 17 | " | " | " | " | 140 | 2,370 | -132 | 2,238 | 140 | 2,230 | Eastend sand | Soft, soda, clear | | D, S | Sufficient for 24 head stock. |
| 14 | SE. | 18 | " | " | " | " | 160 | 2,350 | | | | | Ravenscrag and Whitemud | | | | Several dry holes; all water hauled. |
| 15 | SE. | 19 | " | " | " | Dug | 12 | 2,250 | - 10 | 2,240 | 12 | 2,238 | Glacial or Ravenscfag | Soft, clear, soda | | D, S | Sufficient for 65 head stock. |
| 16 | NE. | 20 | " | " | " | " | 14 | 2,335 | - 6 | 2,329 | 14 | 2,321 | Ravenscrag sand | Soft, black precipitate | | D, S | Sufficient for 14 head stock. |
| 17 | NW. | 22 | " | " | " | Bored | 150 | 2,390 | - 90 | 2,300 | 150 | 2,240 | Eastend coarse sand | Soft, soda | | S | Sufficient for 60 " " . |
| 18 | NW. | 23 | " | " | " | " | 118 | 2,350 | - 43 | 2,307 | 118 | 2,233 | Whitemud clay | Soft, soda, iron | | S | Small 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 LAKE OF THE RIVERS, NO. 72, 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | NE. | 23 | 8 | 28 | 2 | Dug | 7 | 2,350 | - 4 | 2,346 | 7 | 2,343 | Glacial gravel | Hard, slightly "alkaline" | | D, S | Sufficient for 8 head of stock; Auxiliary well used. |
| 20 | SE. | 27 | " | " | " | Bored | 114 | 2,370 | - 94 | 2,276 | 114 | 2,256 | " or Ravenscrag clay | Hard, " , iron | 42 | S | Small supply; drinking water hauled. |
| 21 | NE. | 27 | " | " | " | Dug | 8 | 2,350 | - 7 | 2,343 | 8 | 2,342 | Glacial gravel | Hard, clear | | D, S | Sufficient for 20 head stock. |
| 22 | NE. | 28 | " | " | " | " | 17 | 2,385 | | | 17 | 2,368 | " sand | Soft, " | | D, S | " " local needs. |
| 23 | SW. | 32 | " | " | " | " | 145 | 2,310 | -110 | 2,200 | 145 | 2,165 | Whitemud, Eastend, Marine shale | Hard, black, iron, slimy | | S | " " 7 " " ; unfit for humans |
| 24 | NE. | 32 | " | " | " | " | 118 | 2,310 | -100 | 2,210 | 118 | 2,192 | Eastend?sand or Marine shale | Hard, "alkaline", black precipitate | 41 | S | Very small supply. |
| 25 | NW. | 34 | " | " | " | " | 125 | 2,360 | -105 | 2,255 | 125 | 2,235 | Eastend sand | Soft, clear | | D, S | Sufficient for 30 head stock. |
| 26 | SE. | 35 | " | " | " | Dug | 12 | 2,335 | - 10 | 2,325 | 12 | 2,323 | Glacial gravel | Hard, iron | | D, S | " " 5 " " . |
| 27 | NE. | 35 | " | " | " | Bored | 150 | 2,380 | -105 | 2,275 | 150 | 2,230 | Eastend sand below Ravenscrag | " , " | | D, S | " " 30 " " . |
| 28 | NE. | 36 | " | " | " | " | 22 | 2,320 | - 12 | 2,308 | 20 | 2,300 | Glacial sand | Medium hard, clear | | D, S | " " household needs only. |
| 29 | NE. | 36 | " | " | " | " | 92 | 2,300 | - 60 | 2,240 | 60 | 2,240 | Eastend sand | ? | | D, S | " " local needs. |
| 1 | SW. | 3 | 8 | 29 | 2 | " | 35 | 2,320 | - 33 | 2,287 | 35 | 2,285 | Ravenscrag?sand | Hard, iron, slightly "alkaline" | | D, S | Very small supply; spring is used. |
| 2 | SE. | 6 | " | " | " | " | 92 | 2,400 | - 82 | 2,318 | 92 | 2,308 | " " | Hard, "alkaline" | | S | Sufficient for 27 head stock; shallow well for drinking water. |
| 3 | NE. | 7 | " | " | " | " | 123 | 2,355 | - 43 | 2,312 | 123 | 2,232 | Eastend sand | Soft, soda, iron (?) | | S | Sufficient for 15 head stock; drinking water hauled. |
| 4 | NE. | 9 | " | " | " | " | 97 | 2,330 | - 88 | 2,242 | 97 | 2,233 | " " | Hard, "alkaline" | | S | Sufficient " 10 " " ; " " hauled. |
| 5 | SE. | 13 | " | " | " | Dug | 12 | 2,420 | - 10 | 2,410 | 12 | 2,408 | Glacial sand | Hard, iron, "alkaline" | 42 | D, S | Sufficient " 10 " " ; " " hauled, |
| 6 | SW. | 15 | " | " | " | " | 14 | 2,310 | - 8 | 2,302 | 14 | 2,296 | " " | Medium hard, clear | | S | Sufficient " 17 " " ; 43 foot well for drinking. |
| 7 | NE. | 16 | " | " | " | Bored | 72 | 2,325 | - 65 | 2,260 | 72 | 2,253 | Ravenscrag(?) sand | Hard, "alkaline" | 42 | S | Sufficient " 15 " " ; drinking water hauled. |
| 8 | SW. | 16 | " | " | " | " | 100 | 2,410 | - 80 | 2,330 | 100 | 2,310 | " (?) sand | Hard, "alkaline" | 42 | S | Sufficient for 24 " " ; " " hauled. |
| 9 | SE. | 17 | " | " | " | " | 97 | 2,410 | - 87 | 2,323 | 97 | 2,313 | " " | Hard, iron | 42 | D, S | Insufficient for 8 head stock. |
| 10 | NW. | 18 | " | " | " | " | 100 | 2,405 | - 75 | 2,330 | 100 | 2,305 | " " | " , " , "alkaline" | | S | Sufficient for 12 head stock. Use 40 foot well for drinking. |
| 11 | NE. | 20 | " | " | " | " | 120 | 2,400 | -100 | 2,300 | 120 | 2,280 | " " | " , hard, iron | 42 | S | Sufficient for local needs; drinking water hauled. |
| 12 | NW. | 21 | " | " | " | " | 100 | 2,400 | - 70 | 2,330 | 100 | 2,300 | " " | Hard, iron, "alkaline" | | S | " " 8 head stock. |
| 13 | NE. | 28 | " | " | " | " | 87 | 2,305 | -77 | 2,228 | 87 | 2,218 | Eastend sand | " , hard | 42 | S | " " " " " . |
| 14 | NW. | 29 | " | " | " | " | 112 | 2,340 | - 85 | 2,255 | 105 | 2,235 | " " | Hard, iron, clear | 41 | D, S | " " 100 " " . |

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 LAKE OF THE RIVERS, NO. 72, 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | NE. | 30 | 8 | 29 | 2 | Bored | 115 | 2,440 | -100 | 2,340 | 115 | 2,325 | Ravenscrag sand | Hard, iron, "alkaline" | | S | Sufficient for local stock needs; seepage well for house. |
| 16 | SW. | 31 | " | " | " | " | 30 | 2,400 | - 10 | 2,390 | 30 | 2,370 | Glacial clay | Hard, slightly "alkaline" | 42 | D | Small supply; 60 foot well gives "alkaline" stock water. |
| 17 | NW. | 32 | " | " | " | " | 100± | 2,440 | - 13 | 2,360 | 30 | 2,410 | " sand | Hard, iron, "alkaline" | | S | Small supply; shallow well for household. |
| 18 | SE. | 32 | " | " | " | " | 160 | 2,[illegible] | [illegible] | [illegible] | 130 | 2,300 | Ravenscrag?sand | Hard, iron, "alkaline" | | S | Sufficient for 8 head stock. Shallow well for household needs. |
| 19 | NW. | 34 | " | " | " | " | 127 | 2,325 | -100 | 2,225 | 127 | 2,198 | Probably Eastend sand | Hard, clear. " alkaline" | | S | Sufficient for 6 " " . Shallow well for household needs. |
| 20 | NE. | 34 | " | " | " | Dug | 20 | 2,330 | - 8 | 2,322 | 20 | 2,310 | Glacial sand | Medium hard, clear | | D, S | Sufficient for 10 " " . |
| 1 | SE. | 1 | 8 | 30 | 2 | Bored | 65 | 2,450 | - 45 | 2,405 | 65 | 2,385 | " " | Hard, iron, magnesia | | N | Pond used for household and stock. |
| 2 | NE. | 2 | " | " | " | " | 85 | 2,460 | - 40 | 2,420 | 77 | 2,387 | " " | Medium hard, clear | | D, S, M | Large supply; #. |
| 3 | NE. | 2 | " | " | " | Dug | 16 | 2,425 | - 3 | 2,422 | 16 | 2,409 | Recent sand | Soft, clear | | D | Small supply. |
| 4 | SW. | 10 | " | " | " | Drilled | 400 | 2,400 | - 58 | 2,342 | | | Into Marine shale | | | N | |
| 5 | SW. | 10 | " | " | " | " | 1110 | 2,400 | | | | | "Marine " | | | W | Dry hole. |
| 6 | NE. | 11 | " | " | " | Bored | 65 | 2,415 | | | | | Glacial clay | | | W | " " ; all water hauled. |
| 7 | SW. | 12 | " | " | " | " | 30 | 2,415 | - 20 | 2,395 | 30 | 2,385 | " sand | Hard, strongly "alkaline | | S | Sufficient for 10 head stock; drinking water hauled. |
| 8 | NW. | 13 | " | " | " | " | 40 | 2,385 | - 35 | 2,350 | 40 | 2,345 | " " | Hard, iron, clear | | D, S | Insufficient for 13 head stock. |
| 9 | SW. | 22 | " | " | " | Drilled | 257 | 2,400 | + 1 | 2,401 | 80 | 2,320 | " " | Hard | | N | Very small supply. |
| 10 | SW. | 22 | " | " | " | " | 444 | 2,400 | - 22 | 2,378 | 48 | 2,352 | Marine shale | | | W | Dry hole. |
| 11 | NE. | 23 | " | " | " | Bored | 65 | 2,410 | - 45 | 2,365 | 65 | 2,345 | Glacial drift | Hard, iron, "alkaline" | | S | Small supply; drinking water hauled. |
| 12 | NW. | 24 | " | " | " | " | 72 | 2,425 | - 27 | 2,398 | 72 | 2,353 | " blue clay | Hard, iron, slightly "alkaline" | 42 | S | Sufficient for 14 head stock; drinking water hauled. |
| 13 | SE. | 25 | " | " | " | Drilled | 85 | 2,400 | - 65 | 2,335 | 85 | 2,315 | " " " | Hard, iron, strongly "alkaline" | 42 | S | Sufficient for 16 head stock; drinking water hauled. |
| 14 | NW. | 25 | " | " | " | Bored | 52 | 2,425 | - 42 | 2,383 | 52 | 2,373 | " gravel | Hard, clear, "alkaline" | 42 | S | Sufficient for 15 head stock. " " hauled. |
| 15 | NE. | 26 | " | " | " | " | 56 | 2,425 | - 43 | 2,382 | 56 | 2,369 | Ravenscrag sand | Hard, clear, "alkaline" | | S | Sufficient for local stock needs. " " |
| 16 | NW. | 26 | " | " | " | " | 55 | 2,470 | - 25 | 2,445 | 55 | 2,415 | " gravel | Hard, clear | 43 | D, S | Sufficient for 30 head stock. |
| 17 | SW. | 35 | " | " | " | " | 60 | 2,440 | - 25 | 2,415 | 60 | 2,380 | Glacial " | Soft, " | 42 | D, S | Sufficient for 15 head stock. |
| 18 | NE. | 35 | " | " | " | " | 63 | 2,430 | - 20 | 2,410 | 63 | 2,367 | " sand | Hard, iron, "alkaline" | | D, S | Sufficient for local needs. |
| 19 | SE. | 36 | " | " | " | " | 72 | 2,440 | - 62 | 2,378 | 72 | 2,368 | " " | Hard, clear, magnesia | | D, S | Sufficient for 12 head stock; drinking water hauled. |

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 LAKE OF THE RIVERS, NO. 72, 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 | NE. | 2 | 9 | 28 | 2 | Bored | 146 | 2,325 | -116 | 2,209 | 146 | 2,179 | Eastend gravel | Hard, iron | 42 | D, S | Sufficient for 30 head stock. |
| 2 | SW. | 3 | " | " | " | " | 130 | 2,300 | -123 | 2,177 | 130 | 2,170 | Marine shale | Hard, iron, "alkaline" | 42 | S | Very small supply; drinking water hauled. |
| 3 | SE. | 4 | " | " | " | Drilled | 140 | 2,305 | | | | | " " | | | N | Dry hole. |
| 4 | NE. | 5 | " | " | " | Bored | 100 | 2,245 | - 80 | 2,165 | 100 | 2,145 | " " | Hard, "alkaline" | 43 | N | Very small supply; unfit for humans or stock. |
| 5 | SW. | 5 | " | " | " | " | 96 | 2,250 | - 66 | 2,184 | 96 | 2,154 | " " (?) | Hard, iron, "alkaline" | 42 | D, S | Sufficient for 15 head stock. |
| 6 | NE. | 7 | " | " | " | " | 74 | 2,300 | - 59 | 2,241 | 72 | 2,228 | Glacial gravel | Hard, clear | 40 | D, S | Sufficient for 15 head stock. |
| 7 | SW. | 9 | " | " | " | Dug | 16 | 2,220 | - 4 | 2,216 | 16 | 2,204 | " clay | " , " | 41 | D, S | Good supply. |
| 8 | SE. | 10 | " | " | " | Bored | 135 | 2,310 | -100 | 2,210 | 135 | 2,175 | " " | Hard, iron, "alkaline" | 42 | D, S | " " . |
| 9 | NE. | 10 | " | " | " | " | 135 | 2,255 | - 60 | 2,195 | 105 | 2,150 | Eastend(?) sand | Hard, clear | 42 | D, S | Sufficient for at least 5 head stock. |
| 10 | NE. | 12 | " | " | " | " | 98 | 2,330 | - 48 | 2,282 | 98 | 2,232 | " sand | Hard, iron, "alkaline" | 43 | D, S | Small supply. |
| 11 | SE. | 13 | " | " | " | " | 118 | 2,320 | - 78 | 2,242 | 118 | 2,202 | " " | Soft, clear | 43 | D, S | Sufficient for 25 head stock. |
| 12 | SE. | 15 | " | " | " | " | 150 | 2,245 | - 70 | 2,175 | 150 | 2,095 | " " | Hard, " | 42 | D, S | Sufficient for 16 head stock. |
| 13 | SW. | 17 | " | " | " | " | 105 | 2,300 | -100 | 2,200 | 105 | 2,195 | Ravenscrag sand | Soft, " | 42 | D | Very small supply. |
| 14 | NW. | 18 | " | " | " | " | 164 | 2,300 | -100 | 2,200 | 164 | 2,136 | Eastend sand | " , " , iron | 42 | S | Sufficient for 18 head stock; shallow well for drinking. |
| 15 | SW. | 19 | " | " | " | " | 110 | 2,300 | - 90 | 2,210 | 110 | 2,190 | " " | Hard, iron, "alkaline" | 40 | S | Insufficient for 10 head stock;shallow well for drinking. |
| 16 | SW. | 20 | " | " | " | " | 135 | 2,300 | - 85 | 2,215 | 135 | 2,165 | " " | Hard, iron, "alkaline" | 41 | D, S | Sufficient for 35 head stock. |
| 17 | NE. | 23 | " | " | " | " | 95 | 2,300 | - 89 | 2,211 | 95 | 2,205 | " " | Hard, iron | 43 | D, S | " " 60 " " . |
| 18 | NE. | 20 | " | " | " | " | 152 | 2,310 | -137 | 2,173 | 152 | 2,158 | " " | " , clear, "alkaline" | 41 | D, S | " " 20 " " ; dry hole 135 foot deep. |
| 19 | SE. | 29 | " | " | " | " | 105 | 2,320 | -100 | 2,220 | 105 | 2,215 | " " | Hard, iron, cloudy | 40 | D, S | Only sufficient for 3 head stock. |
| 20 | SW. | 29 | " | " | " | Dug | 22 | 2,390 | - 15 | 2,375 | 22 | 2,268 | Glacial clay | Soft, clear | 42 | D, S | Very small seepage. Some water hauled. |
| 21 | SW. | 30 | " | " | " | " | 20 | 2,275 | - 19 | 2,256 | 20 | 2,255 | " sand | Hard, " | 42 | D, S | Small supply. Some water hauled. |
| 22 | NW. | 31 | " | " | " | " | 12 | 2,300 | - 9 | 2,291 | 12 | 2,288 | " " | " , " , "alkaline" | 42 | S | Sufficient for 40 head stock. |
| 23 | NE. | 31 | " | " | " | " | 14 | 2,330 | - 12 | 2,318 | 14 | 2,316 | " " | Hard, clear | 42 | D | Very small supply; several 70 foot dry holes. |
| 24 | NE. | 32 | " | " | " | Bored | 64 | 2,310 | - 45 | 2,265 | 64 | 2,246 | " gravel | " , iron, "alkaline" | 42 | D, S | Large supply. |
| 25 | NW. | 33 | " | " | " | " | 68 | 2,315 | - 50 | 2,265 | 68 | 2,247 | " " | Hard, iron, clear | 42 | D, S | Sufficient for 100 head stock. |
| 26 | NE. | 33 | " | " | " | " | 90 | 2,305 | - 80 | 2,225 | 90 | 2,215 | " sand | Hard, iron, "alkaline" | 42 | D, S | " " 20 " " . |

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 LAKE OF THE RIVERS, NO. 72, 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | NW. | 34 | 9 | 28 | 2 | Bored | 136 | 2,215 | - 96 | 2,119 | 136 | 2,079 | Marine shale | Hard, iron, "alkaline" | 42 | S | Insufficient for 23 head stock; drinking water hauled. |
| 1 | M½ | 2 | 9 | 29 | 2 | " | 120 | 2,320 | | | | | | Hard, clear, "alkaline" | | S | Sufficient for local stock needs. |
| 2 | NE. | 3 | " | " | " | " | 95 | 2,295 | - 48 | 2,247 | 48 | 2,247 | Glacial shale | Hard, clear, "alkaline" | 42 | S | " " 50 head stock. |
| 3 | SE. | 4 | " | " | " | " | 105 | 2,360 | - 85 | 2,275 | 105 | 2,255 | Eastend sand. | Hard, "alkaline," clear | 43 | S | " " 10 " " ; drinking water hauled. |
| 4 | NW. | 6 | " | " | " | " | 72 | 2,380 | - 34 | 2,346 | 72 | 2,308 | Ravenscrag sand | Hard, cloudy, "alkaline" | | S | Sufficient for 40 head stock; drinking water hauled. |
| 5 | NE. | 7 | " | " | " | " | 103 | 2,360 | - 93 | 2,267 | 103 | 2,257 | Eastend coarse sand | Hard, clear "alkaline" | 42 | S | Insufficient for 12 head stock. |
| 6 | NW. | 10 | " | " | " | " | 40 | 2,325 | -38 | 2,287 | 40 | 2,285 | Glacial sand | Hard, clear, "alkaline" | 42 | S | Caved in; poor supply. |
| 7 | NW. | 10 | " | " | " | " | 116 | 2,325 | | | 116 | 2,209 | Eastend coarse sand | Hard, clear, "alkaline" | 42 | D, S | Poor supply and quality. |
| 8 | SW. | 12 | " | " | " | " | 115 | 2,325 | -104 | 2,221 | 115 | 2,210 | " coarse sand | Hard, clear, "alkaline" | 42 | S | " " " " . |
| 9 | NW. | 12 | " | " | " | " | 103 | 2,300 | -97 | 2,203 | 103 | 2,197 | Eastend sandy clay | Hard, iron, "alkaline" | 40 | S | " " " " . Several dry holes 100 to 170 feet deep. |
| 10 | SE. | 12 | " | " | " | Dug | 20 | 2,320 | - 12 | 2,308 | 20 | 2,300 | Glacial gravel | Medium hard, clear | 42 | D, S | Sufficient for 10 head stock. |
| 11 | SW. | 13 | " | " | " | Bored | 142 | 2,310 | -132 | 2,178 | 142 | 2,168 | Eastend sand | Hard, iron, "alkaline" | 42 | D, S | Small supply. |
| 12 | NW. | 14 | " | " | " | " | 130 | 2,290 | -128 | 2,162 | 130 | 2,160 | " " | Hard, cloudy, "alkaline" | | S | " " . |
| 13 | SE. | 15 | " | " | " | " | 137 | 2,300 | -117 | 2,183 | 137 | 2,163 | " " | Hard, iron | 44 | D, S | Sufficient for 8 head stock. |
| 14 | NW. | 15 | " | " | " | " | 90 | 2,310 | - 60 | 2,250 | 90 | 2,220 | Ravenscrag sand | Hard, salty, "alkaline" | 41 | S | " " 7 " " . |
| 15 | SW. | 16 | " | " | " | Dug | 18 | 2,345 | - 12 | 2,333 | 18 | 2,327 | Glacial clay | Hard, clear | 43 | D, S | " " household needs only. |
| 16 | SE. | 18 | " | " | " | Bored | 97 | 2,360 | - 57 | 2,303 | 97 | 2,263 | Ravenscrag(?) sand | " , " , "alkaline" | 42 | S | " " 20 head stock; shallow well gives drinking water. |
| 17 | NE. | 18 | " | " | " | " | 73 | 2,360 | + 1 | 2,361 | 73 | 2,287 | " " | Soft, clear | 44 | D, | Very large supply. |
| 18 | SW. | 19 | " | " | " | Dug | 53 | 2,350 | - 32 | 2,318 | 53 | 2,297 | Glacial sand | Hard, " , iron | 42 | S | Sufficient for at least 6 head stock. |
| 19 | NE. | 19 | " | " | " | " | 12 | 2,355 | - 4 | 2,351 | 12 | 2,343 | " gravel | Hard, " | 45 | D, S | Sufficient for 15 head stock. |
| 20 | NW. | 20 | " | " | " | Bored | 65 | 2,310 | - 40 | 2,270 | 65 | 2,245 | " " | " , " , "alkaline" | 43 | S | Sufficient for 8 head stock; drinking water hauled. |
| 21 | NW. | 21 | " | " | " | Dug | 12 | 2,350 | - 7 | 2,343 | 12 | 2,338 | " " | Hard, clear, "alkaline" | 48 | D | Sufficient for household needs only. 88 foot well gives "alkaline" water for stock. |
| 22 | NE. | 21 | " | " | " | Bored | 160 | 2,300 | -146 | 2,154 | 160 | 2,140 | Eastend silt | Hard, strongly "alkaline" | 42 | N | Poor supply; too "alkaline" for farm use. |
| 23 | NE. | 22 | " | " | " | " | 98 | 2,335 | - 88 | 2,247 | 98 | 2,237 | Ravenscrag sandy clay | Hard, " | 42 | S | Sufficient for 30 head of stock; drinking water hauled. |
| 24 | S½ | 22 | " | " | " | " | 109 | 2,350 | | | 109 | 2,241 | Ravenscrag " clay | " strongly "alkaline" | | N | Unfit for stock or humans.# |
| 25 | SW. | 23 | " | " | " | " | 100 | 2,290 | - 60 | 2,230 | 100 | 2,190 | Ravenscrag sandy clay | Soft, clear | 42 | D, S | Sufficient for 16 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 LAKE OF THE RIVERS, NO. 72, 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 | NE. | 23 | 9 | 29 | 2 | Drilled | 66 | 2,315 | - 56 | 2,259 | 66 | 2,249 | Ravenscrag sandy clay | Medium hard, clear | 44 | D, S | Sufficient for 14 head stock. |
| 27 | NW. | 23 | " | " | " | " | 83 | 2,300 | - 23 | 2,277 | 85 | 2,215 | Eastend shale | Hard, "alkaline" | | S | Sufficient for local needs. |
| 28 | SE. | 24 | " | " | " | Dug | 12 | 2,350 | - 8 | 2,342 | 12 | 2,338 | Glacial gravel | Hard, iron | 45 | D, S | Sufficient for 15 head stock. |
| 29 | NE. | 24 | " | " | " | Bored | 62 | 2,320 | - 54 | 2,266 | 62 | 2,258 | " clay | " , " | 44 | D, S | " " 25 " " . |
| 30 | SE. | 25 | " | " | " | Dug | 14 | 2,300 | - 11 | 2,289 | 14 | 2,286 | " " | Soft, clear | 42 | D, S | " " 6 " " . |
| 31 | NE. | 30 | " | " | " | " | 14 | 2,300 | - 12 | 2,288 | 14 | 2,286 | " sand,gravel | Medium hard, clear | 43 | D, S | " " 3 " " only. |
| 32 | SW. | 30 | " | " | " | Bored | 52 | 2,320 | - 27 | 2,293 | 52 | 2,268 | "(?) sand | Hard, "alkaline" | 43 | S | " " 10 " " " . |
| 33 | NW. | 30 | " | " | " | " | 50 | 2,310 | - 25 | 2,285 | 50 | 2,260 | " " | Hard, clear "alkaline" | 43 | S | " " local stock needs. |
| 34 | SW. | 32 | " | " | " | " | 140 | 2,300 | | | 140 | 2,160 | Eastend lower sand | Hard, clear, "alkaline" | 40 | S | " " 15 head stock. Drinking water hauled |
| 35 | NW. | 33 | " | " | " | " | 82 | 2,300 | - 60 | 2,240 | 82 | 2,218 | Glacial gravel | Hard, cloudy, "alkaline" | 42 | S | |
| 36 | NE. | 33 | " | " | " | " | 72 | 2,300 | | | 72 | 2,228 | " " | Hard, clear, "alkaline" | 42 | S | Sufficient for 30 head stock; drinking water hauled. |
| 37 | NE. | 34 | " | " | " | " | 140 | 2,290 | | | | | Marine shale | | | | Dry hole. |
| 38 | SW. | 36 | " | " | " | Dug | 12 | 2,310 | - 10 | 2,300 | 20 | 2,290 | Glacial gravel | Soft, clear | | S | Sufficient for 5 head stock. |
| 1 | SE. | 2 | 9 | 30 | 2 | Bored | 60 | 2,400 | - 48 | 2,352 | 60 | 2,340 | Ravenscrag sand | " , " | | D, S | Sufficient for local needs. |
| 2 | SE. | 3 | " | " | " | Dug | 50 | 2,385 | - 30 | 2,355 | 50 | 2,335 | " shale | ","alkaline" | 43 | D, S | " " 16 head stock. |
| 3 | NW. | 10 | " | " | " | " | 18 | 2,360 | - 16 | 2,344 | 18 | 2,342 | " sand | Soft, iron | 43 | D, S | " " 17 " " . |
| 4 | NW. | 12 | " | " | " | Bored | 50 | 2,360 | - 45 | 2,315 | 50 | 2,310 | " " | Hard, clear | 42 | D, S | " " 17 " " . |
| 5 | NE. | 12 | " | " | " | Dug | 25 | 2,350 | - 23 | 2,327 | 25 | 2,325 | Glacial gravel | ","alkaline" | 43 | D, S | " " 16 " " . |
| 6 | SE. | 13 | " | " | " | Bored | 28 | 2,360 | - 24 | 2,336 | 26 | 2,334 | " " | " ,strongly "alkaline" | 42 | S | " " 20 " " . |
| 7 | SE. | 14 | " | " | " | " | 24 | 2,355 | - 10 | 2,345 | 24 | 2,331 | " sand | Hard, clear | 44 | D, S | " " 12 " " . |
| 8 | SW. | 14 | " | " | " | " | 150 | 2,360 | - 65 | 2,295 | 150 | 2,210 | Eastend sand | " , iron, "alkaline" | 40 | S | Large supply but unfit for use. |
| 9 | SE. | 15 | " | " | " | " | 80 | 2,365 | - 65 | 2,300 | 80 | 2,285 | Glacial sand | " , hard | 43 | S | Insufficient for 10 head stock. |
| 10 | SW. | 15 | " | " | " | Dug | 24 | 2,375 | - 21 | 2,354 | 24 | 2,351 | " " | Hard, clear, iron | 44 | S | Sufficient for 15 head stock; drinking water hauled. |
| 11 | SW. | 22 | " | " | " | " | 7 | 2,365 | - 6 | 2,359 | 7 | 2,358 | " gravel | Hard, "alkaline" | 42 | S | Sufficient for 40 head stock. |
| 12 | NW. | 22 | " | " | " | " | 12 | 2,365 | - 10 | 2,355 | 12 | 2,353 | " " | Hard, clear, "alkaline" | 42 | S | Sufficient for 50 head stock. |
| 13 | NE. | 22 | " | " | " | " | 16 | 2,375 | - 10 | 2,365 | 18 | 2,357 | " " | Medium hard, clear | 44 | D, S | Small supply. |
| 14 | SW. | 23 | " | " | " | Bored | 45 | 2,350 | - 43 | 2,307 | 45 | 2,305 | " " | Hard, iron, "alkaline" | 43 | S | " " . |
| 15 | NE. | 23 | " | " | " | Dug | 12 | 2,350 | - 10 | 2,340 | 12 | 2,338 | " " | Hard, clear | | D | Sufficient for local household needs. |
| 16 | SW. | 24 | " | " | " | Bored | 12 | 2,360 | - 10 | 2,350 | 12 | 2,348 | " gravel | ","alkaline" | 43 | S | Sufficient for 13 head stock. |
| 17 | SW. | 25 | " | " | " | " | 60 | 2,350 | - 55 | 2,395 | 60 | 2,290 | " (?) sand | ", " , iron | 41 | S | Small supply. |
| 18 | NE. | 35 | " | " | " | Dug | 28 | 2,360 | - 10 | 2,350 | 28 | 2,332 | " gravel | Medium hard, "alkaline" | 43 | D, S | Sufficient 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.