CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 98

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WEBB NO. 138 SASKATCHEWAN

By

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

OTTAWA

1936

CANADA

DEPARTMENT OF MINES

BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WEBB NO.138 SASKATCHEWAN

BY

B.R. MacKAY, H.H. BEACH, and R. JOHNSON

WATER SUPPLY PAPER NO.98

GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF WEBB, NO. 138 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.

CONTENTS

Page

Introduction 1

Glossary of terms used 5

Names and descriptions of geological formations referred to... 8

Water-bearing horizons of the municipality 10

Water-bearing horizons in the unconsolidated deposits 12

Water-bearing horizons in the bedrock 16

Ground water conditions by townships:

Township 12, Range 16, west of 3rd meridian 19

Township 12, Range 17, " " " " 20

Township 12, Range 18, " " " " 22

Township 13, Range 16, " " " " 24

Township 13, Range 17, " " " " 26

Township 13, Range 18, " " " " 27

Township 14, Range 16, " " " " 30

Township 14, Range 17, " " " " 32

Township 14, Range 18, " " " " 34

Township 15, Range 16, " " " " 35

Township 15, Range 17, " " " " 37

Township 15, Range 18, " " " " 38

Statistical summary of well information 41

Analyses and quality of water 42

General statement 42

Table of analyses of water samples 46

Water from the unconsolidated deposits 47

Water from the bedrock 48

Well records 50

Illustrations

Map of the municipality:

Figure 1. Map showing surface and bedrock geology that affect the ground water supply.

Figure 2. Map showing relief and the location and types of wells.

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

---

[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 Webb covers an area of 432 square miles in southwestern Saskatchewan. The area is described as townships 12, 13, 14, and 15, ranges 16, 17, and 18, W. 3rd mer. The northeastern corner of the municipality is approximately 2 miles north and 6 miles west of the city of Swift Current. The main line of the Canadian Pacific railway extends through the central part of the area. The village of Webb and the hamlet of Antelope are located on this railway line within this municipality, at respective distances of approximately 6 and 12 miles from the eastern border. The most predominant topographical feature of the municipality is the escarpment extending across the area in a northeasterly direction from the northwest corner of township 12, range 18, to the northeast corner of township 14, range 16. To the north of the escarpment the land slopes in a gently rolling plain in a northerly direction from elevations of between 2,500 and 2,600 feet near the foot of the escarpment to elevations of between 2,450 and 2,400 feet near the northern boundary of the municipality. A range of low sand hills extends diagonally across this area from the east-central part of township 14, range 18, to the northeastern corner of the municipality. At the escarpment the surface rises sharply near the eastern and western boundaries of the municipality and more gradually in the central part to an upland area some 400 to 500 feet above the northern plains. From elevations of 2,850 to 3,000 feet at the top of the escarpment the land again falls off in a southeasterly direction to an elevation of between 2,700 and 2,750 feet at the edge of Swiftcurrent Creek valley, in the southeastern corner of the municipality. Swiftcurrent creek flows in an easterly direction in a deeply eroded valley which follows along the southern boundary of the municipality to the centre of the southern boundary of township 12, range 16, from whence it extends in a northeasterly direction and passes out of the municipality near the northeastern corner of the same township. Another wide, deeply eroded valley extends southward from the face of the escarpment in secs. 34 and 35, tp. 13, range 17, to the central part of township 12, range 17, where it turns eastward to join Swiftcurrent Creek valley in sec. 28, tp. 12, range 16. The floor of this valley has an elevation of slightly over 2,700 feet above sea-level at the point where it crosses the southern boundary of township 13, range 17, and from this point, which is a drainage divide, the valley floor slopes almost inappreciably to the north to the face of the escarpment. To the south elevations drop gradually to approximately 2,650 feet along the bottom of Swiftcurrent Creek valley. A sluggish, intermittent stream drains the southern part of this valley and empties into the constantly flowing Swiftcurrent creek which drains the southern part of the upland.

Many undrained depressions occur, not only on the uplands but on the lower slopes of the escarpment. Streams extending from the many deeply eroded valleys along the escarpment face drain into depressions and form sloughs and shallow lakes. Goose, Gosling, and Gander lakes, occurring near the northern border of township 14, range 16, are the largest of these lakes. Intermittently flowing Bridge creek parallels the base of the escarpment from the western border to sec. 2, tp. 14, range 18, and thence extends due north to empty into Antelope lake in the eastern half of township 15, range 18. This lake has an approximate elevation of 2,319 feet above sea-level.

Swiftcurrent creek is fed by springs and flows continuously, providing water for stock pasturing in the creek valley. Springs along the banks of the creek and in tributary ravines also provide water for stock and for residents in the valley. Several springs occur along the escarpment south of

Seward and provide large quantities of water, adequate for the range stock in this area. Although Bridge creek usually ceases to flow early in summer some water is retained in depressions along the channel. Water in Antelope lake could be used for watering stock while the creek is flowing, but later in summer surface evaporation tends to concentrate the dissolved mineral salts and may render the water unfit for this purpose. Most of the sloughs in the northern lowlands are "alkali" and the waters are unsuitable for any use.

The greater part of the water supply of the municipality is obtained from wells. In the northern lowlands search for ground water is confined to the Recent and glacial deposits, as the underlying bedrock is almost entirely unproductive. On the southern uplands, however, more porous bedrock formations occur beneath the surface deposits and form the source of large supplies of water of good quality.

Water-bearing Horizons in the Unconsolidated Deposits

The unconsolidated deposits consist of dune sands forming the northern belt of sand hills, and of glacial deposits of various types covering the remainder of the area. The dune sands are a comparatively recent accumulation and have been formed by wind action. The glacial deposits were laid down by the great continental ice-sheet that many thousands of years ago advanced and retreated over Saskatchewan, and by the waters formed by the melting ice. The glacial deposits, collectively referred to as drift, are of three types, namely, glacial lake sands and clays, till, and moraine, differentiated by their method of deposition, the character of the sediments comprising them, and the types of topographic relief they present. As the ice-sheet advanced and retreated it laid down a layer of glacial till or boulder clay composed largely of compact, bluish grey, unstratified clay, through which are interspersed irregular beds and pockets of sands and gravels that are generally water bearing. The till presents a flat or gently rolling land surface. In this area the till occurs at the surface throughout practically the entire southern half of the municipality and large areas in townships 14, ranges 16, 17, and 18. It also underlies the lake and dune sands and the lake clay in most of the remainder of the northern half of the municipality. In areas where the retreating ice-sheet paused for any considerable length of time greater accumulations of a more porous type of drift, known as moraine, were deposited. The moraine consists largely of sandy, unstratified clay interspersed with beds of sands and gravels. The surface of the moraine is irregularly rolling, with many low knolls and intervening undrained depressions. Deposits of this type are confined to the areas of highest elevation immediately south of the escarpment in townships 13 and 14, range 16, and in small areas in the southeast corner of township 12, range 16, and along the western boundary of the municipality in townships 14 and 15, range 18.

As the ice-sheet gradually melted the resulting water accumulated in the lowlands to form lakes. Fine silts were washed from the uplands into the deeper parts of these lakes, and increasingly coarser sands around the margins. The past areal extent of one of these lakes is marked by the small area of lake clay along Bridge creek, in the west-central part of the municipality, and by the sands covering most of the northern three townships of the municipality and smaller areas in townships 14, ranges 17 and 18. Subsequent wind erosion of these sands formed the range of sand hills extending diagonally from the east-central part of township 14, range 18, to the northeastern corner of the municipality.

The areal extents of the various types of unconsolidated deposits within the municipality are indicated on the accompanying map (Figure 1). In the dune and lake sand-covered areas it is possible in most places to secure supplies of water sufficient for household use and 10 to 15 head of stock from wells not exceeding 20 feet in depth in the sand. Throughout the dune sand area ample supplies of water for range stock are obtained from dugouts not exceeding 10 feet in depth. The water from the sand is usually soft and in only a few places is the dissolved mineral salt content sufficiently high to render the water unsuitable for household use. At a few places along the bases of the steeper slopes, and along the small valleys carved into the face of the escarpment, deposits of sands and gravels, washed down from the higher land, occur. These beds are porous and if situated in depressions permit the accumulation of moderately large supplies of water of good quality. These supplies are readily obtainable by digging shallow wells.

Little ground water is available from the compact, light grey lake clay covering the small area along Bridge creek. In a few places small supplies of water are available from sand pockets scattered sparingly through the clay, but it is usually necessary to sink wells into the underlying boulder clay before satisfactory water supplies are encountered.

The Recent deposits of sand and clay are underlain by glacial drift, and in all other parts of the municipality the glacial drift is exposed at the surface. Throughout most of the area north of the escarpment the glacial deposits are believed to be from 150 to 200 feet thick. Over the upland area south of the escarpment they are not more than 100 feet thick in any locality, and are of negligible thickness in many places along Swiftcurrent Creek valley where numerous bedrock exposures occur.

The boulder clay itself is practically impervious, and only small seepages of highly mineralized water can be obtained from it. However, there are beds and pockets of sand and gravel interspersed in the boulder clay from which water supplies may be derived. Throughout the area north and west of the escarpment most of the ground water supplies are being obtained from wells, less than 40 feet deep, deriving their supplies from the Recent sands or from sand and gravel pockets in the upper part of the glacial drift. It is only in a few scattered localities that any difficulty has been experienced in obtaining suitable supplies of water at shallow depths. To locate productive sand or gravel pockets in the upper part of the drift it is necessary in many places to sink several test holes, since the porous beds are of irregular occurrence and their presence at depth is seldom indicated on the ground surface.

The few wells sunk to depths exceeding 50 feet indicate that quicksand beds are of common occurrence in the lower part of the glacial drift. Many of the wells sunk to these beds yield larger supplies of water than can be obtained from shallow wells. However, the water is generally very highly mineralized and not satisfactory for domestic use. The sand beds encountered at depths exceeding 50 feet in the drift will generally be of sufficient areal extent so that it will be necessary to sink only one hole to determine the presence or absence of productive beds over fairly large areas.

On the upland area south and east of the escarpment most of the residents have sunk wells through the glacial drift to obtain ground water supplies from the underlying Cypress Hills and Bearpaw bedrock formations. However, many residents do obtain small supplies of hard, drinkable water from scattered sand and gravel pockets interspersed in the boulder clay. Shallow wells are advantageously located near the bases of slopes or in depressions. Should the quality of water obtainable from the bedrock be unsatisfactory for domestic use, such shallow wells will provide small supplies of hard, drinkable water. In a few places the quantity of water obtained at shallow depths is sufficient for 15 to 20 head of stock. It is to be noted, however, that the supplies from shallow wells fluctuate with periods of drought to a much greater extent than from the wells sunk into the bedrock.

Water-bearing Horizons in the Bedrock

Three bedrock formations, known as the Cypress Hills, Eastend, and Bearpaw, underlie the glacial drift in different parts of the municipality. The Cypress Hills formation being the youngest normally overlies the Eastend beds which in turn rest upon the lowest formation, the Bearpaw. Widespread erosion of the Eastend before the deposition of the Cypress Hills formation has greatly limited its areal extent in the municipality, and it is now confined entirely to the southwest corner. Here the Cypress Hills beds overlie the Eastend, but at other places where the Eastend is absent they rest upon the Bearpaw formation. The Cypress Hills formation underlies the glacial drift of practically the entire area south of the escarpment, with the exception of the bottom of Swiftcurrent Creek valley and the tributary valley, extending from north to south through the south-central part of the municipality. The formation is composed largely of beds of cemented quartzite pebbles ranging from 2 to 5 inches in diameter, alternating with layers of hard sandstone, beds of uncemented sand and gravel, and thick beds of clay. Fairly large supplies of water are being obtained from the loose sand and gravel beds of this formation. The different beds as described above grade one into another, frequently within short distances both horizontally and vertically, so that no extensive aquifers have been traced in the formation. However, there are very few localities in the area underlain by this formation where water-bearing beds will not be encountered within 100 feet of the surface. In the southern parts of townships 13, ranges 17 and 18, the formation occurs, as shown on Figure 1 of the accompanying map, but very little conglomerate or sandstone is present and the formation is composed chiefly of clay with interspersed beds of sand and gravel. This material is difficult to distinguish from the overlying glacial drift.

The water obtained from the beds of the Cypress Hills formation of this municipality usually contains appreciable quantities of mineral salts in solution, but the salts are seldom present in sufficient quantities to render the water unfit for drinking.

The remnants of Eastend formation that occur in this municipality are composed mainly of very fine silts interbedded with shales, and are not known to be water bearing. This formation underlies the Cypress Hills formation and the glacial drift of small areas along the western part of the escarpment and along Swiftcurrent creek in the southwestern corner of the municipality. Should wells in this part of the municipality fail to obtain water in the glacial drift or the Cypress Hills formation it will be necessary to continue wells through the Eastend to productive horizons in the upper part of the Bearpaw formation. The Eastend probably does not, however, exceed 40 feet in thickness at any point, and is much less where the formation is covered only by glacial drift.

The upper part of the Bearpaw formation consists of beds of dark shales interspersed with thin beds of fine to medium coarse-grained sand and loosely consolidated sandstones. At greater depths in the formation the sandy beds are almost entirely absent, the formation consisting entirely of dark shales. These shales are readily distinguished from the boulder clay of the glacial drift by their soapy feel, their darker colour, the absence of stones or pebbles, and by the small roughly cubical fragments into which they break upon weathering. In the southeastern half of township 13, range 16, and in township 12, range 16, wells sunk to depths of between 70 and 160 feet, penetrating this formation, are yielding large supplies of hard water containing varying quantities of mineral salts. These wells draw their supplies from sand beds interspersed through the shales at elevations of between 2,680 and 2,590 feet above sea-level. Throughout the remainder of the area large supplies of soft water are being obtained from horizons at elevations of between 2,650 and 2,550 feet. The depths of wells tapping these horizons vary from 150 to 265 feet. In some areas, due to higher surface elevation, it would be necessary to drill to depths of 450 feet to reach the 2,550-foot level.

In the lower areas north of the escarpment the upper part of the Bearpaw formation is eroded away and the water-bearing beds will not be present. The northern boundary of the area in which there is possibility of obtaining water supplies from the Bearpaw is well marked near the eastern and western edges of the municipality where the escarpment is steep. The slopes of the escarpment in the central part of the municipality are gradual, and it is difficult to determine the exact position of this boundary. However, the deep drilled wells in sec. 22, tp. 13, range 18, and sec. 2, tp. 14, range 18, are near the northern limits of the area in which water supplies can be expected from the Bearpaw.

On the upland area south of the escarpment it is not advisable to drill below an elevation of 2,550 feet, as only the dark shales will be encountered.

Throughout the area north of the escarpment the sinking of wells below the contact of the glacial drift with the shales of the Bearpaw is not advisable, as only small supplies of highly mineralized water which would undoubtedly be unfit for any farm use will be found. The thickness of the overlying drift varies, but is probably nowhere much less than 150 feet or greater than 200 feet.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 12, Range 16

On the upland areas adjacent to Swiftcurrent Creek valley and the deep tributary valley, a layer of glacial drift, varying in thickness between 10 and 70 feet, mantles the underlying Cypress Hills formation. Small supplies of hard, usually mineralized, water can be expected from scattered sand and gravel pockets in the glacial drift. The supplies from this source would be sufficient only for household use and for a few head of stock. It is, therefore, in most places advisable to sink wells through the drift into the underlying Cypress Hills and Bearpaw bedrock formations rather than undergo the labour and expense of sinking the large number of test holes commonly required to locate a productive pocket in the drift. In most localities good supplies of water are obtained from beds of uncemented sand and gravel in the Cypress Hills formation. Although the depth of well drawing supplies from the porous beds varies in depth from 8 to 110 feet, only in areas of low elevation near the edges of the valleys are water-bearing beds likely to be reached at depths of less than 50 feet. The water obtained is soft or only moderately hard, and the yields from wells encountering the thicker beds of sand and gravel are amply sufficient for all local requirements. Although the water is not highly "alkaline", in some places the amount of iron in solution renders the water poor for domestic use. Should the Cypress Hills formation prove insufficiently productive, water is almost certain to be encountered in the upper, sandy part of the underlying Bearpaw formation. The elevations at which supplies have been obtained from this latter horizon in the upland areas range between 2,625 and 2,590 feet above sea-level, with depths of wells varying between 100 and 150 feet. The quality of the water varies from soft to very hard, depending to some extent upon the amount of water that comes from the overlying conglomerate. In all places where the sands in the Bearpaw have been penetrated the water is satisfactory for domestic use. All wells in the district reaching this horizon yield adequate supplies for farm requirements.

In the valleys previously mentioned the Cypress Hills formation is eroded away and only a thin layer of unconsolidated material covers the Bearpaw beds. Small supplies of mineralized water can be expected from thin beds and pockets of sand and gravel interspersed in the more impervious silts near the bottoms of the valleys.

There is also a good possibility of obtaining water from sand beds in the upper part of the Bearpaw formation at elevations above 2,550 feet. It is not advisable to continue wells below this elevation in any part of the township, as only marine shales will be encountered in which there is little possibility of obtaining suitable water supplies.

Township 12, Range 17

The glacial drift, which overlies practically the entire township, is very thin along the edges of Swiftcurrent Creek valley and the deep valley in the northeastern part of the township, but on the upland areas the thickness varies from 30 to 90 feet. A few residents obtain supplies of hard, drinkable water from pockets and thin beds of sand and gravel interspersed in the boulder clay. These aquifers are of small areal extent, and the supplies obtained are seldom sufficient for more than 5 to 10 head of stock and household requirements.

Larger and more dependable supplies of ground water are obtained from the Cypress Hills bedrock formation, which underlies the glacial drift of the entire area except in the valleys, as shown on the accompanying map (Figure 1). The character of the sediments forming the Cypress Hills beds varies markedly within small areas in this township, and it is impossible to predict the quality or supply of water obtainable at any point until a test well has been sunk. Most of the residents are obtaining good supplies of hard water, containing varying quantities of mineral salts, from beds of uncemented sand and cobbles. The depths of wells tapping these beds vary between 40 and 120 feet, depending upon the surface elevation of the proposed well site. The water is generally satisfactory for household use. However, some wells have been sunk through the formation without encountering any appreciable supply of water, and it becomes necessary to continue the boring or drilling into the upper part of the underlying Bearpaw formation.

The few wells that have been sunk to this latter hoarizon indicate the presence of extensive water-bearing sand beds. A 178-foot well located in the NE.$\frac{1}{4}$, section 25, yields a large supply of soft water from a sand bed at an approximate elevation of 2,625 feet. Wells on the NE.$\frac{1}{4}$, section 3, the NW.$\frac{1}{4}$, section 21, and the SW.$\frac{1}{4}$, section 26, did not reach productive beds until an approximate elevation of 2,550 feet was reached. These findings indicate that the aquifer at 2,625 feet is confined to a small area at the northeast corner of the township. The sand beds occurring between elevations of 2,600 and 2,550 feet are considered to be fairly continuous under the greater part of the township. The depths of wells necessary to reach the lower horizon will vary with the surface elevation at the well site, but even at the point of highest elevation in the area it should not exceed 250 feet. It is also probable that in areas of higher relief more Cypress Hills beds will be present, and water will be found at higher horizons. Water in these deeper wells is generally soft and drinkable, although hard water was obtained in the 154-foot well on the SW.$\frac{1}{4}$, section 26. The evidence of the existing wells indicates that water will be found at depths of 40 to 110 feet in the Cypress Hills formation, but should the supply be small or of poor quality the soft water horizon in the Bearpaw formation will be reached at depths of between 150 and 250 feet. Drilling below an elevation of 2,525 feet above sea-level, or a maximum depth of 300 feet, is not recommended in any part of the township.

Township 12, Range 18

The ground water supplies used in this township are being obtained from wells, not exceeding 110 feet in depth, having aquifers in the glacial drift or the Cypress Hills bedrock formation.

The layer of glacial drift is very thin along Swiftcurrent Creek valley and seldom extends down more than 50 feet in any part of the township. Many residents obtain household supplies, and in some cases sufficient water for farm requirements, from pockets and thin beds of sand and gravel occurring in the glacial drift within 35 feet of the surface. The water is usually hard and contains varying quantities of mineral salts. The concentrations of these salts are seldom high enough to render the water unfit for human consumption. Shallow wells located in depressions and at the bases of slopes in most cases produce larger supplies than wells on level flats. In any event, some prospecting may be necessary to locate productive pockets at shallow depth. Due to the presence of iron in waters from greater depths, shallow wells form better sources of drinking water. In areas where the drift is thin, however, even careful prospecting may fail to tap a productive bed and wells must be continued into the bedrock. Much larger and more constant supplies of water are being obtained from beds of uncemented sand, gravel, and cobblestones occurring in the Cypress Hills formation. This formation underlies the entire area north of Swiftcurrent Creek valley with the exception of a small area on the slope of the escarpment in the northwest corner of the township. In the western part of the township the formation is easily recognized by the presence of rounded quartzite stones, usually consolidated by a lime and sand cement. Little difficulty is experienced in obtaining ample supplies of water from aquifers in the Cypress Hills formation. The depths of wells required to tap the sand and gravel beds of the formation vary between 30 and 100 feet. In the eastern part of the township wells have been sunk to similar depths without striking the "cobblerock" which ordinarily comprises the greater part of the formation. However, the beds of quicksand and gravel that are commonly encountered at depths of 50 to 100 feet are believed to be part of the Cypress Hills formation. Loose cobbles and sand in the vicinity of springs along the north side of Swiftcurrent Creek valley indicate that the water comes from aquifers in the bedrock. The water obtained from the Cypress Hills formation in this township is generally hard and contains appreciable amounts of mineral salts. Iron is quite commonly present in sufficient quantities to cause sediment when the water is exposed to the air. Although this water has objectionable qualities for domestic use, many residents are forced to use it in the absence of better supplies. Shallow wells in the upper 35 feet of the glacial drift offer the best possibility of obtaining more suitable supplies for household use.

The Cypress Hills beds are believed to be underlain by the Eastend formation along the northern, western, and southern boundaries of the township. In the central and eastern parts of the area the Eastend is probably absent and the Cypress Hills immediately overlies the Bearpaw formation. There is little distinction between the Eastend and Bearpaw of this area.

Although no wells have been drilled into either of these formations in the township, wells in adjoining townships to the north and east indicate the possibility of obtaining good supplies of soft water at an approximate elevation of 2,550 feet. In order to reach this horizon it would be necessary to drill to depths of between 300 and 450 feet in all parts of the township except in Swiftcurrent Creek valley. However, there may also be sand beds at higher elevations in the Bearpaw from which good supplies of water would be obtained, but as yet no wells in this area have passed below the base of the Cypress Hills formation.

Drilling below an elevation of 2,550 feet is not advisable in any part of the township.

Township 13, Range 16

The mantle of glacial drift overlying the township consists of irregularly rolling moraine in the north-central and northwestern parts, but grades into a more level till plain over the remaining parts of the area. Neither the till nor the moraine are sources of large supplies of water. Porous sand and gravel beds occur very sparingly in the boulder clay, and water sufficient even for household requirements will be found only after careful prospecting. Since the underlying bedrock formations can be expected to yield large supplies of water that is generally of good quality, it seems advisable to sink wells to these lower horizons rather than spend time and money attempting to find the few productive beds occurring in the drift. Nevertheless, shallow wells located in depressions and at the bases of slopes can be expected to yield small supplies of water suitable for domestic use. The drift may reach thicknesses of 70 feet in isolated areas, but does not generally exceed 10 to 30 feet.

The Cypress Hills formation underlies the drift of the entire township with the exception of small areas in the northwest and southeast corners, as shown on the accompanying map (Figure 1). In the northwestern half of the township large supplies of hard, drinkable water are being obtained from beds of uncemented cobbles in the Cypress Hills formation, at depths varying from 18 to 68 feet. The water is usually encountered near the top of the formation, before the cemented conglomerate is reached. In the southeastern half of the township very little water is available in the Cypress Hills formation, and it has been necessary for residents to sink wells into the underlying Bearpaw formation.

Large supplies of water are being obtained from beds of sand and sandy shale in the upper part of the Bearpaw at elevations between 2,680 and 2,590 feet above sea-level, at depths ranging between 70 and 215 feet. Only on the uplands, in sections 7, 16, 28, 30, and 34, were wells greater than 150 feet deep required, and at no place did they exceed 215 feet. The water obtained from the wells less than 150 feet deep is generally hard, and although sometimes appreciably mineralized is quite suitable for household use. In the northwestern part of the township, three wells have been sunk through the conglomerate and yield large supplies of soft water from sand beds in the Bearpaw. One of these wells, in the SW.$\frac{1}{4}$, section 30, yields a brownish coloured water similar to that obtained from wells in the adjoining townships to the west. The productive sand bed in this well was encountered at an approximate elevation of 2,615 feet. The water from the two other wells on the NW.$\frac{1}{4}$, section 28, and the SW.$\frac{1}{4}$, section 34, is clear and soft, and is obtained from a sand bed at an approximate elevation of 2,635 feet. It is probable that soft water can be obtained from these horizons ~~at depths between~~ 150 and 225 feet in most of the northwestern half of the township. Deep drilling into the lower part of the Bearpaw formation is not expected to yield supplies of water that would justify the cost of drilling.

Township 13, Range 17

Only a thin mantle of glacial till overlies the Cypress Hills formation in the southern and eastern uplands of this township. A few residents obtain small supplies of water from shallow wells that have tapped sand and gravel pockets interspersed irregularly through the boulder clay. However, most of the wells in this part of the area have been sunk into the underlying Cypress Hills formation. In the northern part of the township a much greater thickness of glacial drift occurs, forming the only source of ground water in the lowland parts. The wells drawing their supplies from the glacial drift of the lowlands vary greatly in depth down to 200 feet. The greater number of these wells have encountered sand or gravel aquifers at depths of between 40 and 80 feet. There is no indication of any extensive water-bearing beds existing in the area. However, most residents have had little difficulty in obtaining suitable supplies of water.

As shown on Figure 1 of the accompanying map the Cypress Hills formation is considered to underlie the glacial drift of the upland area in the southern and eastern parts of this township. The formation as encountered in this area is not easily distinguished from the overlying glacial drift. It is composed chiefly of beds of stony clay interspersed with beds of sand and gravel. The cobblerock and sandstone, which ordinarily comprise the greater part of the formation, are seldom encountered. Practically all the ground water supplies used on the uplands are obtained from the sand and gravel beds of the formation at depths between 30 and 80 feet. The supplies obtained are generally sufficient for local requirements. The water is usually hard, but seldom contains sufficient concentrations of dissolved mineral salts to render it unfit for domestic use.

The Bearpaw formation underlies the Cypress Hills formation in the southern and eastern parts of the township, and in the lowlands is the uppermost bedrock formation beneath the drift. An extensive horizon occurs in the upper part of the Bearpaw formation in the upland areas, from which many residents are obtaining large supplies of soft, brownish coloured water. This horizon has been encountered at elevations of between 2,655 and 2,585 feet above sea-level, at depths between 190 and 265 feet. This or other horizons in the upper part of the Bearpaw formation will probably be productive in all of the upland area, at elevations above 2,550 feet. Drilling below this level is not advisable, as only small supplies of water can be expected from the compact marine shales at greater depths in the formation.

In the northwestern part of this township the upper part of the Bearpaw formation is eroded away and there is very little possibility of obtaining water supplies from the remaining marine shales. It is not possible to determine the exact northern boundary of the area in which the soft water supplies can be expected. However, they are not likely to be obtained north of the valley extending across the northern part of the township, and in this area prospecting for water should be confined to the drift.

Township 13, Range 18

A thin layer of compact, bluish grey, glacial lake clay covers a small area in the northwest corner of the township and is of little importance as a source of water supply. This deposit is underlain by glacial till at depths not exceeding 20 feet. The glacial till occurs at the surface over the remainder of the township. The layer of glacial drift is very thin on the slope of the steep escarpment in the southwest corner of the township, where bedrock exposures occur, but reaches a maximum thickness of possibly 150 feet in the lowlands in the northwestern part of the township. On the upland area in the southeastern sections the drift is underlain by the Cypress Hills formation at depths probably not exceeding 60 feet.

Practically all the ground water used in this township is obtained from pockets and small beds of sand and gravel in the glacial drift, at depths not exceeding 80 feet. In only a very few places has any difficulty been experienced in obtaining sufficient supplies for local requirements. Water obtained from the porous beds occurring in the boulder clay within 70 feet of the surface in the northern lowlands is hard, but in most cases satisfactory for domestic use. In the area extending along the base and on the slopes of the escarpment, wells of similar depths yield water that is highly mineralized and unfit for human consumption. In a few places the water is unfit even for stock. Careful prospecting to find porous beds at shallow depths in ravines or at the bases of steep slopes seems to be the most probable source of satisfactory drinking water. As shown on Figure 1 of the accompanying map, a small area in the southeastern part of the township is underlain by the Cypress Hills formation. Wells in the area do not show the presence of the "cobblerock" that ordinarily comprises the greater part of the formation. However, the clay and the beds of sand and gravel encountered below depths of approximately 40 feet in this area are believed to be part of this formation. A few wells have encountered productive beds in this formation at depths of between 50 and 100 feet. The supplies obtained are large and the water hard, but not too highly mineralized for domestic use.

The Eastend formation underlies the western edge of the Cypress Hills formation and immediately underlies the glacial drift in an area along the escarpment, as shown on the accompanying map. No water-bearing beds are known to exist in the Eastend formation, which differs very little from the upper part of the Bearpaw formation into which it grades without apparent break at an approximate elevation of 2,800 feet.

A 200-foot well on the NE.$\frac{1}{4}$, section 22, yields a large supply of soft water from a sand bed in the upper part of the Bearpaw formation, at an approximate elevation of 2,560 feet. Throughout the upland area in the southeastern part of the township, similar supplies are to be expected from this or other horizons at elevations above 2,550 feet. The depths required to reach the 2,550-foot level will vary with the surface elevation, and in some areas, where the surface elevations exceed 3,000 feet, it would be necessary to drill to depths as great as 450 feet to reach this horizon. In these areas, however, the Cypress Hills beds are correspondingly thicker and water should be found at much shallower depths. Soft water might be obtained at higher horizons in the Bearpaw.

In the northern and western part of the township the upper part of the Bearpaw formation is completely eroded away, and the glacial drift is underlain by compact marine shales from which no suitable water supplies can be expected.

It has not been possible to draw an exact northern boundary of the area in which the soft water supplies can be expected. However, the well in the SE.$\frac{1}{4}$, section 22, is probably near the northwestern limit of the area in which the soft water supplies are to be expected from the Bearpaw.

Township 14, Range 16

The ground water conditions existing in the upland area in the southeastern part of the township are altogether different from conditions existing in the lower area to the northwest of the escarpment. The two areas will be discussed separately.

The mantle of glacial drift overlying the area southeast of the escarpment varies in thickness between 20 and 70 feet, and consists mostly of porous, morainic deposits. Most residents of the area obtain their ground water supplies from sand and gravel pockets in the drift at depths not exceeding 25 feet. The supplies are generally only sufficient for household use and for a few head of stock. The water in many places is reported to be soft, and seldom contains any appreciable quantities of mineral salts.

The Cypress Hills formation underlies the glacial drift of this area, as indicated on Figure 1 of the accompanying map. It is probable that water-bearing sand and gravel beds exist in this formation. These water-bearing beds are not likely to be present in all parts of the area, due to irregular erosion of the formation before the deposition of the drift. No assurance can be given that water supplies will be obtained from this source at all points.

Wells on the SE.$\frac{1}{4}$, section 3, and the NE.$\frac{1}{4}$, section 9, respectively, 175 and 173 feet deep, yield large supplies of soft water from a sand bed in the upper part of the Bearpaw formation at an approximate elevation of 2,640 feet. Springs along the escarpment, in sections 21, 25, and 26, yield large flows of water from this horizon. The location of these wells and springs indicates that the horizon will be productive throughout the entire upland area in the southeastern part of the township. In order to reach the level of this horizon it will be necessary to sink wells to depths of between 150 and 200 feet, depending on the surface elevation at the proposed well site. In the eastern part of the township, the northwestern boundary of the area, in which there is a possibility of obtaining water supplies from this horizon is well defined by the steep escarpment and the position of the springs. However, the change in elevation is much more gradual in the southwestern part of the township, and it is difficult to foretell the exact position of the northern boundary of the area in which this horizon will be water bearing. Wells sunk in the area indicate that there is little probability of encountering the soft water horizon outside the northwestern boundary of the area underlain by the Cypress Hills formation, as indicated on the map (Figure 1).

In the northwestern part of the township all water supplies must be obtained from the glacial drift, as the upper sandy part of the Bearpaw formation underlying the drift is completely eroded away and the remaining compact marine shales are almost entirely barren of water-bearing beds.

It is generally advisable to make careful tests of the upper 40 feet of the drift in this area before sinking wells to greater depths. The water obtained from the scattered sand and gravel pockets in the upper part of the drift will usually be of satisfactory quality for household use, and in most localities it is possible to derive sufficient supplies from the shallow wells for local farm requirements. Should the supplies from shallow sources be insufficient for stock requirements, larger supplies of highly mineralized water can in most places be obtained from quicksand beds in the lower part of the drift. In prospecting for water of this type one hole will usually indicate the presence or absence of productive beds in the vicinity, as individual beds are believed to extend over fairly large areas.

In this area it is not advisable to sink wells into the marine shales of the Bearpaw formation. Considerable variation will exist in the depths and elevation at which the shale will be encountered in this part of the township. On section 17, two 212-foot dry holes were drilled, in which the shales were encountered at depths of 70 feet. Wells in section 8 yield water supplies from quicksand beds in the drift at depths between 200 and 230 feet. A well in section 6 draws its supply from a sand bed in the glacial drift immediately above the marine shale, at a depth of 130 feet. This well was continued to a depth of 285 feet and no other water-bearing beds were encountered.

Township 14, Range 17

Wells not exceeding 40 feet in depth, drawing supplies from the dune and lake sands or from the upper part of the glacial till, provide the greater part of the ground water used in this township.

As indicated on the accompanying map, glacial lake and Recent dune sands overlie the northwestern part of this township. In this area adequate supplies of soft or only moderately hard water are generally found in the sand at depths not exceeding 20 feet. In the sand hills several residents have satisfied stock requirements by excavating dugouts to depths of 5 to 8 feet in the sand, water entering the dugout by seepage from the sides. Since the sand comprising the dune and lake sand deposits is very porous, surface water tends to percolate downward until it reaches the top of the more impervious, underlying boulder clay, and tends to accumulate in basins or depressions in the surface of the clay. Hence, shallow wells or dugouts are most advantageously located in depressions; at other points of higher relief the sand may be found to be almost entirely barren. At such places it becomes necessary to extend wells down into the underlying boulder clay.

The supplies obtained from individual shallow wells tapping sand and gravel pockets in the glacial drift of this township are seldom sufficient for more than 10 head of stock in addition to household requirements. Two or more wells are, therefore, necessary, in many places, to provide adequately for stock requirements. Over the greater part of the township the water obtained from the shallow wells is quite suitable for domestic use. In the southwestern part of the township, however, the supplies being obtained are highly mineralized, and in some places cannot be used for drinking or cooking.

The village of Webb is deriving its water supply from shallow wells. The water is reported to be slightly "alkaline", but is undoubtedly of better quality than could be expected at greater depths. Sinking wells to depths greater than 40 feet is not advisable unless supplies obtained from shallower wells are altogether inadequate. Larger supplies of water may occur in quicksand and gravel beds in the lower part of the glacial drift, but the water is generally too highly mineralized to be suitable for domestic use. It is, also, difficult, in many cases, to draw water from the fine sands that commonly form the water-bearing beds at these lower levels.

One well, located on the SE.$\frac{1}{4}$, section 2, yields a large supply of soft, brownish coloured water from a sand bed in the Bearpaw formation at a depth of 167 feet. This well is near the northern edge of an horizon that is productive in adjoining townships to the south, and will only be found productive in the small area of relatively high elevation occurring in parts of sections 1 and 2 in this township.

In other parts of the township only the dark marine shales of the Bearpaw formation will be encountered below the glacial drift. It is inadvisable to sink wells into this shale, as only small supplies of very highly mineralized water can be expected. The glacial drift covering the bedrock of this township will probably be found to vary in thickness between 150 and 200 feet.

Township 14, Range 18

Glacial till covers the bedrock throughout the area and forms a till plain over the greater part of the northern half. Along the valley of Bridge creek the till is overlain by a thin layer of glacial lake clay that grades into lake sand throughout the remaining part of the southern and northeastern sections. In the east-central sections wind action has formed sand dunes. Many residents of the lake sand and dune sand-covered areas obtain adequate supplies of ground water from the sand at depths not exceeding 20 feet. Since the water does not, as a rule, contain high concentrations of mineral salts it is quite suitable for household use. As noted in the discussion of the township adjoining on the east, water in the sands tends to accumulate in places where basins or natural depressions occur in the surface of the more impervious, underlying boulder clay. Wells or shallow dugouts are, therefore, best located in depressions in the present ground surface. In this area a considerable amount of sand occurs interspersed in the lake clay covering Bridge Creek valley bottom, and a few residents have obtained water supplies from this material at shallow depths. The supplies are small, but the water is reported to be suitable for household use.

The dune and lake sands and clays are underlain by glacial till at depths of generally less than 20 feet. Where these dune and lake deposits are absent the glacial till is found at the surface. In this township numerous water-bearing sand and gravel pockets occur in the upper 40 feet of the glacial till. The locating of such productive pockets at shallow depths may necessitate several test holes. It is believed advisable, however, to do considerable prospecting in the upper part of the drift before considering the sinking of deeper wells. The water from the shallow wells is seldom too highly mineralized to be used for drinking. The supplies from these wells are not large, but are usually sufficient for local requirements. Larger supplies may be available from quicksand beds at greater depths. However, the water is almost invariably highly mineralized and suitable only for stock use.

The marine shales of the Bearpaw formation underlie the drift of the entire township at depths believed to be between 150 and 200 feet, but there may be many local variations. Only one well is known to have penetrated through the drift into the bedrock. This well was drilled in the town of Antelope, to a depth of 580 feet. It yields only a few barrels per day of soft, brownish coloured water, and it is improbable that the supply is coming from the bottom of the well. Appreciably better supplies cannot be expected from the compact, dark shales of the Bearpaw formation in other parts of the township, and all search for water should be confined to the glacial drift.

Township 15, Range 16

The surface material over the greater part of the township is glacial lake and Recent dune sand. This material is classified as lake sand in the relatively level areas, and as dune sand where the surface topography has been affected by wind action. The sand seldom exceeds 20 feet in thickness and is underlain by glacial till. The till is exposed at the surface over small areas in the northeastern and southeastern parts of the township. The areal distribution of these various types of deposits is indicated on the accompanying map (Figure 1).

Within the area covered by the lake or dune sands adequate supplies of water can generally be obtained from the sand within 15 feet of the surface. The water is soft or only slightly hard, and seldom contains sufficient quantities of mineral salts to render it unsuitable for drinking. In the dune sand area dugouts 5 to 8 feet in depth supply abundant quantities of water for range stock.

A few residents have been unable to obtain water supplies from the sand within the close vicinity of their farm buildings and have been forced to extend wells into the underlying glacial drift. The drift is composed mainly of boulder clay and is believed to extend down to depths of approximately 150 feet in this township. Only small seepages of highly mineralized water can be obtained from the boulder clay. However, pockets and thin beds of sand and gravel occur interspersed in the clay, from which supplies of water sufficient for farm requirements can be obtained. The pockets occurring within 40 feet of the surface are of small individual areal extent, and in some places it was found necessary to sink several test holes before a productive pocket was encountered. The water-bearing pockets and beds occurring at depths greater than 40 feet are sometimes continuous over greater areas. Should it be necessary to go below depths of 40 feet to obtain a suitable supply of water it is advisable to continue one well down to the base of the drift rather than to sink wells to intermediate depths on new locations. The water from the shallower wells is almost invariably less highly mineralized than the water derived from the lower part of the drift.

The marine shales of the Bearpaw formation underlie the unconsolidated deposits of this township. Only small supplies of highly mineralized water can be expected from this formation, and it is inadvisable to sink wells into it. Criteria for distinguishing these dark shales from the overlying boulder clay are given in an earlier section of this report.

Township 15, Range 17

A large part of the ground water supplies used in this township are being obtained from the lake and dune sands that overlie practically the entire municipality. Supplies from this source are generally available at depths not exceeding 20 feet. The water is usually soft or only slightly hard and seldom contains mineral salts in large enough quantities to render it unsuitable for drinking.

The supplies available in the sand depend on the nature of the surface of the underlying boulder clay. The water percolates freely through the porous sand and collects in depressions at the top of the impervious boulder clay. Except in the dune sand area the surface of this impervious clay will conform to a great extent to the present surface topography. Hence, much better prospects exist of obtaining water from the sand in valleys and depressions than on knolls and ridges. In the dune sand area the surface topography has been changed in by drifting sand and does not, as a rule, conform to the surface of the underlying clay. Little difficulty is experienced, however, in obtaining abundant supplies of water for range stock. Dugouts 5 to 10 feet deep are commonly used for this purpose. The glacial drift that underlies the surface sand is believed to extend down to a depth of at least 150 feet. A few residents have sunk wells into the drift where it has not been possible to obtain sufficient supplies from the surface sands within the close vicinity of their buildings. These wells vary in depth from 12 to 96 feet, and do not show the presence of any extensive water-bearing beds. In order to obtain supplies from the upper part of the drift within 40 feet of the surface, it will quite often be necessary to sink several test holes before a productive sand or gravel pocket is encountered. Sand and gravel beds occurring at depths greater than 40 feet are believed to be more extensive than those encountered nearer the surface. Should it be necessary to prospect at depths greater than 40 feet, it is advisable to continue one hole to the full depth of the drift rather than to sink several holes of intermediate depth.

It is not advisable to sink wells into the marine shales of the Bearpaw formation which underlie the glacial deposits of the entire township.

Township 15, Range 18

Boulder clay covers the bedrock throughout the township, forming a till plain over the southern sections and more irregularly rolling areas of moraine along the western border. Throughout the remainder of the area the boulder clay is covered by a mantle of lake sands. Antelope lake occupies an area of approximately 4 square miles in the central part of the township. A few springs located along the west side of the lake yield water that is reported to be drinkable. Whether the lake water can be used for stock depends largely upon its dissolved mineral salt content. In dry periods when the creek has ceased to flow evaporation of the lake water tends to concentrate the mineral salts and render the water highly "alkaline" and possibly unfit for watering stock.

Ample supplies of water for domestic use and for watering from 10 to 20 head of stock are available from wells sunk into the lake sand in the eastern half of the township at depths not exceeding 20 feet. The water usually contains mineral salts, but these are not present in sufficient quantities to render the water unfit for domestic use.

Throughout the western half of the township, and in isolated areas in the eastern half, it is difficult to locate supplies in the lake sands. This is due mainly to the fact that the surface of the underlying drift does not form impervious basins in which the ground water seeping through the sand can collect.

In these areas most residents have sunk wells into the glacial drift to obtain water. The depths of wells drawing supplies from the glacial drift vary between 20 and 122 feet. The quality of the water varies from soft to hard and highly mineralized. Only a few supplies, however, are reported to be unfit for domestic use.

Throughout the area west of Antelope lake there are many thick beds and pockets of sand and gravel interspersed through the upper 100 to 125 feet of the drift. Quicksand is quite commonly encountered at depths between 60 and 120 feet. Although large quantities of water are present in this sand difficulty is experienced in deriving supplies from it, due to its fineness. The springs along the west bank of Antelope Lake valley are believed to be fed from this sand.

Most residents of the eastern half of the township have had little difficulty in obtaining suitable supplies of water within 40 feet of the surface, from the Recent sands or the glacial drift. However, in a small area in the southeastern corner of the township, the shallow wells have proved unsatisfactory during dry seasons. There is no information to indicate the possibility of obtaining water at greater depths in the drift. However, when prospecting for water below depths of 40 or 50 feet it is believed advisable to continue one hole down to the base of the drift rather than to sink several holes to intermediate depths.

One well, on the NE.$\frac{1}{4}$, section 23, was sunk to a depth of 305 feet. Information available indicates that the marine shales of the Bearpaw formation were encountered at an approximate depth of 200 feet. A large supply of hard, mineralized water was obtained. This water is believed to have come from quicksand at the base of the glacial drift rather than from the Marine Shales below a depth of 200 feet. The shales lying below this depth are too compact to form extensive water-bearing beds, and it seems inadvisable to sink wells into them in any part of this township.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL
MUNICIPALITY OF WEBB, NO. 138, SASKATCHEWAN

Township	12	12	12	13	13	13	14	14	14	15	15	15	Total No. in muni-cipality
West of 3rd mer. Range	16	17	18	16	17	18	16	17	18	16	17	18	
Total No. of Wells in Township	12	36	52	49	64	66	39	48	73	20	28	45	532
No. of wells in bedrock	11	24	35	42	34	8	11	1	1	0	0	0	167
No. of wells in glacial drift	1	12	17	7	30	58	28	45	64	17	25	45	349
No. of wells in alluvium	0	0	0	0	0	0	0	2	8	3	3	0	16
Permanency of Water Supply													
No. with permanent supply	12	35	52	47	63	66	36	46	72	18	28	41	516
No. with intermittent supply	0	1	0	0	0	0	1	2	1	0	0	4	9
No. dry holes	0	0	0	2	1	0	2	0	0	2	0	0	7
Types of Wells													
No. of flowing artesian wells	0	1	0	0	0	1	0	0	0	0	0	0	2
No. of non-flowing artesian wells	5	15	26	27	42	28	8	5	19	3	8	10	196
No. of non-artesian wells	7	20	20	20	21	37	29	43	54	15	20	35	327
Quality of Water													
No. with hard water	6	29	47	42	50	60	22	38	54	12	23	40	423
No. with soft water	6	7	5	5	13	6	15	10	19	6	5	5	102
No. with salty water	0	2	0	0	0	3	0	0	0	0	0	0	5
No. with "alkaline" water	0	7	17	6	19	18	8	15	13	7	7	18	135
Depths of Wells													
No. from 0 to 50 feet deep	4	15	28	26	38	48	31	42	66	19	27	37	381
No. from 51 to 100 feet deep	4	10	23	10	18	10	1	4	5	1	1	5	98
No. from 101 to 150 feet deep	4	4	1	8	1	1	1	1	1	0	0	2	24
No. from 151 to 200 feet deep	0	5	0	3	2	1	3	1	0	0	0	0	15
No. from 201 to 500 feet deep	0	2	0	2	5	0	3	0	0	0	0	1	13
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	1	0	0	0	1
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0	0	0	0
How the Water is Used													
No. usable for domestic purposes	12	32	39	41	45	38	31	36	64	10	22	37	407
No. not usable for domestic purposes	0	4	13	6	18	28	6	12	9	8	6	8	118
No. usable for stock	12	36	50	45	58	59	37	46	70	15	27	41	496
No. not usable for stock	0	0	2	2	5	7	0	2	3	3	1	4	29
Sufficiency of Water Supply													
No. sufficient for domestic needs	12	34	52	46	63	63	36	43	72	18	28	38	505
No. insufficient for domestic needs	0	2	0	1	0	3	1	5	1	0	0	7	20
No. sufficient for stock needs	11	25	45	45	58	56	29	36	56	18	22	32	433
No. insufficient for stock needs	1	11	7	2	5	10	8	12	17	0	6	13	92

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 ropresents 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 Webb, No. 138, 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	SW.	27	12	18	3	78	1,043											(3)	(1)		(2)		(4)	(5)		x2
2	SE.	7	13	16	3	201	1,100	650	450	200	11	290	30	76	496	359	1,015	54		159		50	734	18		x3
3	SW.	10	13	16	3	105	700	500	280	220	7	210	20	68	295	199	632	36		142		5	437	12		x3
4	SE.	23	13	16	3	100	600	500	280	220	6	265	110	86	230	58	571	197		56	176		132	10		x3
5	SE.	12	13	17	3	43	531											(3)	(1)		(2)				(4)	x2
6	NW.	9	13	18	3	14	1,609												(2)		(3)	(4)	(1)		(5)	x1
7	NE.	14	13	18	3	18	2,626											(3)	(1)		(2)				(4)	x1
8	NE.	34	13	18	3	57	5,060	2,200	2,000	200	205	600	160	389	2,968	1,691	5,138	286		265	781		3,468	338		x1
9	NE.	9	14	16	3	173	1,526												(2)		(4)	(3)	(1)		(5)	x3
10	SW.	15	14	16	3	16	249											(1)	(3)	(2)					(4)	x1
11	SE.	2	14	17	3	167	880	35			25	470	10	7	209	426	846	18		18		460	309	41		x3
12	SW.	19	14	17	3	10	940												(2)		(4)	(3)	(1)	(5)		x1
13	NE.	1	14	18	3	580	1,100	40			117	685	20	4	4	501	920	36		8		677	176	193		x3

Water samples indicated thus, x1, are from glacial drift or other unconsolidated deposits.
Water samples indicated thus, x2, are from bedrock, Cypress Hills formation.
Water samples indicated thus, x3, are from bedrock, Bearpaw formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4), and (5) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analyses Nos. 1, 5, 6, 7, 9, 10, and 12, by Provincial Analyst.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Water found at shallow depths in the Recent dune sands is usually of good quality for household use. The results of an analysis of water from a 10-foot well sunk into these sands on the SW.$\frac{1}{4}$, sec. 19, tp. 14, range 17, are given as analysis No. 12 on the table of analyses accompanying this report. The total solid content of 940 parts per million is low compared with many waters from the glacial drift and the Bearpaw formation. The total solids consist chiefly of sodium sulphate (Na_2SO_4), calcium sulphate ($CaSO_4$), and magnesium sulphate ($MgSO_4$), but none is present in sufficient amounts to render the water unfit for drinking. This analysis is representative of the water obtained from the Recent dune and glacial lake sands. Only in places where wells are fed by seepage from undrained depressions, where ample opportunity is afforded for the concentration of mineral salts by evaporation of the water, will the mineral salt content be appreciably greater than indicated by the above analysis.

The glacial till and moraine are very irregular in composition, and as is to be expected the qualities of waters derived from them vary greatly, in many cases within limited areas. The compact boulder clay is regarded as the source of the mineral salts that contaminate many of the waters from the drift. Hence, even shallow wells encountering only boulder clay may yield a water highly charged with sulphate salts in solution which may be unfit for any farm use. Wells encountering extensive beds of porous gravels at shallow depths may be expected to yield water of good quality for domestic use. Analysis No. 10 is of water from a 16-foot well sunk into the moraine on the slopes of the escarpment in the SW.$\frac{1}{4}$, sec. 15, tp. 14, range 16. This water is soft and contains only 249 parts per million of total dissolved solids. The salts present are calcium carbonate ($CaCO_3$), magnesium carbonate ($MgCO_3$), calcium sulphate ($CaSO_4$), and calcium chloride ($CaCl_2$). These salts may give the water a slight degree of hardness, but in the concentrations in which they are present are tasteless and harmless. Water of much poorer quality occurs in the drift in the region bordering the escarpment in township 13, range 18. Analyses Nos. 7 and 8 are of waters from wells 18 and 57 feet deep, respectively, located on secs. 14 and 34, tp. 13, range 18. Both waters are highly charged with sulphate salts and iron and are excessively hard. Such waters are undrinkable and are not satisfactory for watering stock. Analysis No. 8 indicates a total solid content of 5,036 parts per million, and would tend to create severe scouring in stock. On some farms in the vicinity stock are reported to have died from drinking less highly mineralized water. Analysis No. 6 is much more typical of the waters from the upper part of the drift in other parts of the municipality. This water is hard and slightly "alkaline", but drinkable. Waters from aquifers covered by 30 or more feet of boulder clay may be more highly mineralized, but are suitable at least for watering stock.

Water from the Bedrock

The results of analysis of two samples of water from the Cypress Hills formation of this municipality are given in the table (analyses Nos. 1 and 5). These analyses were made by the Provincial Analyst, and indicate the component salts and their relative abundance. Analysis No. 5 is regarded as being typical of waters from this formation, but even analysis No. 1, having a total solid content near the upper limit for water generally obtained from aquifers in the Cypress Hills beds, is by no means undrinkable. The salts most commonly present are calcium and magnesium sulphate and calcium carbonate. These salts seldom occur in sufficient quantities to render the water unfit for drinking, and in many places the water is regarded as being of exceptionally good quality for this purpose. Iron is quite often present in the water in large enough quantities to cause a reddish sediment to form when the water is exposed to the air.

The water obtained from the upper part of the Bearpaw formation in the southeast part of township 13, range 16, and in the northern part of township 12, range 16, is hard, as shown by analyses Nos. 2, 3, and 4. However, the total solid contents are not high and the water is suitable for drinking.

Analyses Nos. 9 and 11 are of soft water from the upper part of the Bearpaw formation, and are regarded as representative of the water in the extensive horizons of the upland area south of the escarpment. The predominant mineral salts present are sodium sulphate (Na_2SO_4) and sodium carbonate (Na_2CO_3), but they are not present in sufficient quantities to render the water unfit for household use. Due to the presence of sodium carbonate (black alkali) continued use of the water for irrigation, however, might prove harmful to vegetation. The brownish colour of some of the water being obtained from the Bearpaw is due to the presence of carbonaceous matter in the beds through which the water passes, but has not any injurious effects.

Analysis No. 13, from the 580-foot well in the town of Antelope, is of water derived from the shale at greater depths in the lowlands. This water is not highly mineralized and is similar in character to waters from the upper part of the Bearpaw. It is probable that the total solid content will increase markedly at still lower horizons. Waters from the compact shales in the lower part of the formation may more closely resemble analysis No. 8 of water from the drift, except that magnesium sulphate may be lower and common salt appreciably higher.

WELL RECORDS—Rural Municipality of WEBB NO.138, 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	NW.	3	12	16	3	Spring	0	2,750	0	2,750	0	2,750	Cypress Hills cobble rock	Soft,clear	44	D, S	Sufficient for local needs.
2	NW.	7	"	"	"	Dug	110	2,800	-107	2,693	107	2,693	Cypress Hills	Hard,clear	44	D, S	Sufficient for local needs,
3	SW.	10	"	"	"	Spring	0	2,750	0	2,750	0	2,750	Cypress Hills cobble rock	Soft,clear	44	D, S	Sufficient for local needs.
4	SE.	16	"	"	"	Dug	55	2,650	- 54	2,596	54	2,596	Bearpaw sand	Hard,clear	44	D	Sufficient for household needs only.
5	SW.	16	"	"	"	Dug	106	2,700	- 90	2,610	106	2,594	Bearpaw sand	Hard,clear		D, S	
6	NW.	19	"	"	"	Dug	8	2,725	- 5	2,720	5	2,720	Cypress Hills gravel and cobbles	Soft,clear	44	D, S	Sufficient for local needs.
7	NW.	30	"	"	"	Drilled	150	2,775	-115	2,660	150	2,625	Bearpaw sand	Soft,clear		D, S	Sufficient for local needs.
8	NW.	31	"	"	"	Dug	64	2,800	- 60	2,740	60	2,740	Cypress Hills gravel	Soft,clear	44	D, S	Sufficient for local needs.
9	NW.	31	"	"	"	Dug	15	2,800	- 12	2,788	12	2,788	Glacial sand	Soft,clear	44	D, S	Sufficient for local needs.
10	NE.	31	"	"	"	Drilled	80	2,800	- 55	2,745	80	2,720	Cypress Hills sand	Hard,clear		D, S	Sufficient for local needs.
11	NW.	33	"	"	"	Drilled	125	2,730	-115	2,615	125	2,605	Bearpaw Hills sand	Hard,cloudy	48	D, S	Sufficient for local needs.
12	NW.	34	"	"	"	Drilled	100	2,740	- 72	2,668	100	2,640	Bearpaw Hills blue clay	Hard,clear, iron		D, S, I	Sufficient for local needs.
1	SE.	2	12	17	3	Dug	200	2,820	-160	2,660	200	2,620	Bearpaw sand?	Soft,clear.	44	D	Insufficient for local needs.
2	SE.	3	"	"	"	Dug	60	2,800	- 57	2,743	57	2,743	Cypress Hills cobble stone	Hard,clear	44	D, S	Sufficient for local needs.
3	NE.	3	"	"	"	Drilled	250	2,800	-100	2,700	250	2,550	Bearpaw sand and clay	Soft		D, S	Sufficient for local needs.
4	SE.	6	"	"	"	Bored	41	2,910	- 28	2,882	41	2,869	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs; large supply.
5	NW.	6	"	"	"	Dug	60	2,910	- 57	2,853	57	2,853	Glacial gravel	Hard,clear, iron		D	Insufficient; about 1 barrel a day; also 20-foot well with soft water.
6	SW.	7	"	"	"	Dug	22	2,950	- 20	2,930	20	2,930	Glacial blue clay	Hard,clear		D	Insufficient for local needs.
7	NE.	10	"	"	"	Bored	72	2,825	?	?	?	?	Cypress Hills clay			D, S	Insufficient for local needs.
8	SW.	11	"	"	"	Dug	60	2,800	- 57	2,743	57	2,743	Cypress Hills cobble stone	Hard,clear	44	D, S	Sufficient for local needs.
9	NE.	12	"	"	"	Dug	108	2,800	-107	2,693	107	2,693	Cypress Hills sand	Hard,clear	44	S	Sufficient for local needs; unfit for humans.
10	NW.	14	"	"	"	Dug	6	2,750	+ 1	2,751	6	2,744	Cypress Hills cobble rock	Hard,clear	44	D, S	Sufficient for local needs.
11	NW.	15	"	"	"	Bored	66	2,810	- 36	2,774	66	2,744	Cypress Hills cobble stone	Hard,clear, iron		D, S	Sufficient for 15 head stock.
12	SE.	16	"	"	"	Dug	120	2,840	- 80	2,760	120	2,720	Cypress Hills gravel	Hard,clear, iron, red sediment		D, S	Sufficient for 15 head stock.
13	NW.	17	"	"	"	Dug	28	2,925	- 25	2,900	25	2,900	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also another 28-foot well.

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 WEBB NO.138, 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
14	SE.	18	12	17	3	Spring	0	2,850	0	2,850	0	2,850	Cypress Hills sand	Hard, clear		D, S	Sufficient for local needs.
15	NE.	18	"	"	"	Dug	32	2,900	- 24	2,876	24	2,876	Glacial coarse sand	Hard, clear, iron, red sediment		D, S	Sufficient for 10 head stock.
16	SE.	20	"	"	"	Drilled	114	2,850	-100	2,750	114	2,736	Cypress Hills sand	Hard, iron, "alkaline"		D, S	Sufficient for local needs.
17	NE.	20	"	"	"	Dug	27	2,800	- 19	2,781	27	2,773	Glacial clay	Hard		D, S	Sufficient for local needs.
18	NW	21	"	"	"	Dug	40	2,850	- 38	2,812	38	2,812	Glacial blue clay	Hard, clear, iron, "alkaline"		D, S	Insufficient for local needs.
19	NW.	21	"	"	"	Drilled	240	2,800	-210	2,590	240	2,560	Bearpaw clay and sand	Soft		D, S	Sufficient for local needs.
20	SE.	22	"	"	"	Dug	29	2,800	- 23	2,777	23	2,777	Glacial clay	Hard, clear	44	D, S	Sufficient for local needs.
21	NE.	25	"	"	"	Drilled	178	2,800	-150	2,650	178	2,622	Bearpaw sand	Soft, clear	44	D, S	Sufficient for local needs.
22	NE.	25	"	"	"	Drilled	158	2,750	-132	2,618	158	2,592	Bearpaw blue sand			D, S	
23	SW.	26	"	"	"	Dug	154	2,700	- 74	2,626	154	2,546	Bearpaw clay	Hard		D, S	Sufficient for local needs.
24	SE.	27	"	"	"	Dug	72	2,800	- 70	2,730	70	2,730	Cypress Hills conglomerate	Hard, clear		D, S	Sufficient for 10 head stock.
25	SE.	28	"	"	"	Dug	110	2,850	-105	2,745	105	2,745	Cypress Hills conglomerate	Hard, clear, iron		D, S	Sufficient for local needs; also 16-foot well in conglomerate.
26	SW.	28	"	"	"	Dug	98	2,850	- 94	2,756	94	2,756	Cypress Hills blue clay	Hard, clear, iron, salts, "alkaline"		S	Insufficient for local needs; also a 60-foot well now dry.
27	SE.	29	"	"	"	Dug	12	2,850	- 8	2,842	8	2,842	Glacial clay	Soft, clear		D	Sufficient for household needs.
28	NE.	29	"	"	"	Dug	154	2,850	- 12	2,838	154	2,696	Cypress Hills sand and clay	Hard, clear, "alkaline"		S	Sufficient for local needs; large supply.
29	NE.	30	"	"	"	Drilled	93	2,875	- 20	2,855	93	2,782	Cypress Hills sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
30	NW.	32	"	"	"	Dug	40	2,870	- 16	2,854	40	2,830	Cypress Hills gravel and cobble stone	Hard, clear		D, S	Sufficient for 35 head stock.
31	NW.	34	"	"	"	Dug	75	2,840	- 70	2,770	75	2,765	Cypress Hills sand and gravel	Hard, clear, iron		D, S	Sufficient for 25 head stock.
32	SE.	36	"	"	"	Dug	14	2,800	- 10	2,790	10	2,790	Glacial sand	Soft, clear	44	D	Sufficient for local needs.
1	SE.	1	12	18	3	Bored	48	2,900	- 25	2,875			Glacial clay	Hard, clear, "alkaline"		N	Too "alkaline".
2	NE.	3	"	"	"	Dug	95	2,900	- 81	2,819	80	2,820	Cypress Hills sand	Hard, clear, "alkaline"		S	Insufficient; enough for only 6 head stock.
3	NW.	3	"	"	"	Dug	102	2,910	- 82	2,828	96	2,814	Cypress Hills sand	Hard, clear, "alkaline" iron		S	Sufficient for 32 head stock.
4	SE.	4	"	"	"	Spring		2,850	0	2,850	0	2,850	Cypress Hills sand and cobble stone	Hard, clear, iron		D, S	Would fill 1½ inch pipe.

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 WEBB NO. 138, 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	Height to which Water will Rise: Elev.	Principal Water-Bearing Bed: Depth	Principal Water-Bearing Bed: Elev.	Principal Water-Bearing Bed: Geological Horizon	Character of Water	Temp. of Water (in °F.)	Use to which Water is Put	Yield and Remarks
5	NE.	4	12	18	3	Spring		2,850	0	2,850	0	2,850	Cypress Hills sand	Hard, clear, iron		S	Large supply; other springs along this railway.
6	NE.	6	"	"	"	Dug	28	2,960	- 20	2,940	20	2,940	Cypress Hills gravel and stone	Hard, clear, "alkaline"		S	Sufficient for 20 to 30 head stock; also 18-foot well.
7	SW.	6	"	"	"	Bored	54	2,980	- 48	2,932	48	2,932	Cypress Hills coarse gravel	Hard, clear, iron		D, S	~~Sufficient for local needs.~~
8	SW.	8	"	"	"	Dug	34	2,970	- 30	2,940	15	2,955	Cypress Hills gravel	Hard, clear, iron, red sediment		~~D, S~~	Sufficient for 30 head stock.
9	NW.	10	"	"	"	Dug	60	2,950	- 56	2,894	40	2,910	Cypress Hills blue clay and sand	Hard, clear, iron, red sediment		D, S	
10	NE.	10	"	"	"	Dug	46	2,950	- 41	2,909	43	2,907	Glacial sand	Hard, clear, "alkaline"		S	Insufficient; enough for only 20 head stock in summer; also 54-foot well.
11	NW.	12	"	"	"	Spring		2,830	0	2,830			Cypress Hills cobble rock and sand	Hard, clear, iron		D, S	Fills two 1-inch pipes.
12	SE.	14	"	"	"	Dug	93	2,910	- 59	2,851	93	2,817	Cypress Hills gravel	Hard, clear		D, S	Sufficient for local needs; large supply.
13	NE.	14	"	"	"	Dug	90	2,900	- 78	2,822			Cypress Hills sand	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs.
14	SW.	14	"	"	"	Dug	96	2,930	- 66	2,864	96	2,834	Cypress Hills sand	Hard, clear		D, S	Sufficient for local needs; large supply.
15	NW.	14	"	"	"	Dug	58	2,920	- 36	2,884	58	2,862	Cypress Hills sand	Hard, clear, "alkaline"		S	Sufficient for local needs; large supply.
16	SW.	15	"	"	"	Dug	70	2,950	- 54	2,896			Cypress Hills sand	Hard, clear, iron, "alkaline"		D, S	Sufficient for 100 head stock.
17	NE.	16	"	"	"	Bored	56	2,960	- 26	2,934	56	2,904	Cypress Hills sand	Hard, clear, "alkaline"		D, S	Insufficient; not enough for 15 head stock; also two other similar wells.
18	NW.	16	"	"	"	Dug	51	2,960	- 46	2,914	43	2,917	Cypress Hills gravel	Hard, clear, iron, red sediment		D, S	Sufficient for 18 head stock.
19	SW.	17	"	"	"	Dug	38	2,970	- 32	2,938	37	2,933	Cypress Hills gravel	Hard, clear		D, S	Sufficient for 30 head stock; also similar well.
20	SW.	19	"	"	"	Dug	80	3,030	- 69	2,961	77	2,953	Cypress Hills sandstone	Hard, clear, iron, red sediment		D, S	Sufficient for local needs; good supply.
21	NW.	19	"	"	"	Dug	95	3,020	- 85	2,935	95	2,925	Cypress Hills sandstone	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs; good supply.
22	SW.	20	"	"	"	Dug	44	2,980	- 32	2,948	44	2,936	Cypress Hills conglomerate	Hard, clear, iron,		S	Sufficient for 35 head stock; also 28-foot well.
23	SE.	20	"	"	"	Dug	60	2,980	- 52	2,928	59	2,921	Cypress Hills gravel	Hard, clear, iron, red sediment		D, S	Sufficient for 25 head stock;
24	NE.	20	"	"	"	Dug	63	2,990	- 58	2,932	59	2,931	Cypress Hills gravel	Hard, clear, iron		N	Not used.
25	SE.	21	"	"	"	Dug	60	2,960	- 40	2,920			Cypress Hills gravel	Hard, clear, iron, "alkaline"		D, S	Sufficient; cannot be pumped dry.

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 WEBB NO. 138, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
26	SE.	22	12	18	3	Dug	33	2,900	- 30	2,870	30	2,870	Glacial clay and gravel	Soft		D, S	Sufficient for local needs.
27	NE.	22	"	"	"	Dug	35	2,950	- 27	2,923	29	2,921	Glacial sand	Hard, clear		D, S	Sufficient for 10 head stock.
28	NW.	23	"	"	"	Dug	26	2,950	- 21	2,929	17	2,933	Glacial sand	Hard, clear		D, S	Sufficient for 15 head stock; springs in pasture.
29	NW.	24	"	"	"	Dug	22	2,910	- 11	2,899	22	2,888	Glacial gravel	Soft, clear		D, S	Sufficient for 30 head stock.
30	NE.	24	"	"	"	Dug	34	2,900	- 28	2,872			Glacial sand	Soft, clear		D, S	Sufficient for local needs.
31	SW.	27	"	"	"	Dug	78	2,990	- 63	2,927	78	2,912	Cypress Hills gravel	Hard		D, S, I	Sufficient for local needs; large supply. #
32	SW.	28	"	"	"	Dug	63	2,990	- 50	2,940	52	2,938	Cypress Hills conglomerate	Hard, clear, iron, red sediment		S	Sufficient for 40 head stock.
33	SE.	30	"	"	"	Dug	16	3,000	- 14	2,986			Glacial fine sand	Hard, clear, iron		D, S	Sufficient; can be bailed dry also a 35-foot well.
34	NW.	31	"	"	"	Bored	80	2,950	- 60	2,890	80	2,870	Glacial fine gravel	Hard, clear, "alkaline" iron		D, S	Sufficient for local needs; good supply.
35	NE.	31	"	"	"	Spring		2,930	0	2,930	0	2,930	Glacial clay	Hard, clear		D, S	Sufficient for local needs; large supply,
36	SE.	34	"	"	"	Dug	51	2,990	- 48	2,942			Cypress Hills sand	Soft, clear		D, S	Sufficient for 20 head stock easily.
37	NW.	35	"	"	"	Dug	26	2,950	- 20	2,930	26	2,924	Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 40 head stock; also a similar well.
38	SW.	36	"	"	"	Drilled	80	2,910	- 40	2,870	80	2,830	Cypress Hills sand	Hard, clear, iron		D, S	Sufficient for local needs; large supply.
1	SE.	1	13	16	3	Dug	12	2,650	+ 0	2,650	10	2,640	Bearpaw shale	Hard, bluish sulphur		D, S	
2	SE.	2	"	"	"	Drilled	90	2,775	- 88	2,687	90	2,685	Bearpaw sand	Hard, clear, "alkaline"		D, S	Oversufficient for local needs.
3	NW.	2	"	"	"	Drilled	110	2,700					Bearpaw sand	Hard, clear, "alkaline", iron		D, S	Oversufficient for local needs.
4	SE.	4	"	"	"	Drilled	125	2,730	-110	2,620	125	2,605	Bearpaw sand	Hard, clear, iron, bitter		D, S	Sufficient for local needs.
5	NW.	4	"	"	"	Drilled	102	2,775	- 94	2,681			Bearpaw sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
6	NE.	5	"	"	"	Drilled	128	2,800	-117	2,683	128	2,672	Bearpaw blue clay	Hard, clear, iron		D, S	Oversufficient for local needs.
7	SE.	7	"	"	"	Drilled	201	2,840	-175	2,665	200	2,640	Bearpaw sand	Hard, clear, iron		D, S	Oversufficient for local needs. #
8	SW.	7	"	"	"	Dug	20	2,790	- 14	2,776	19	2,771	Glacial black clay	Hard, milky, "alkaline"		S	Not used much; can be pumped dry.
9	SW.	10	"	"	"	Drilled	105	2,760	- 92	2,668	105	2,655	Bearpaw sand	Hard, clear		D, S	Oversufficient for local needs.#
10	NE.	10	"	"	"	Drilled	120	2,750	-105	2,645	120	2,630	Bearpaw sand	Soft, brownish		D, S	Oversufficient for local needs.
11	SE.	11	"	"	"	Drilled	118	2,760	- 83	2,677			Bearpaw sand	Hard, clear		D, S	Sufficient; cannot be pumped dry.
12	NE.	12	"	"	"	Spring		2,630	0	2,630	0	2,630	Bearpaw sand	Hard, clear		S	Small supply; other springs.

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 WEBB NO. 138, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
13	NW.	12	13	16	3	Dug & Drilled	113	2,760	- 83	2,677			Bearpaw sand	Hard, clear		D, S	Well never cased, thus caved in.
14	SW.	13	"	"	"	Dug	73	2,760	- 72	2,688	68	2,692	Bearpaw grey sandstone	Hard, clear, iron		D, S	Sufficient for local needs.
15	NW.	13	"	"	"	Drilled	80	2,750	- 64	2,686	69	2,681	Bearpaw blue sand	Hard		D, S	Sufficient; cannot be pumped dry.
16	SW.	15	"	"	"	Drilled	100	2,730	- 88	2,642			Bearpaw sand	Hard, clear, iron		D, S	Oversufficient for local needs.
17	SW.	16	"	"	"	Drilled	166	2,800	-156	2,644			Bearpaw sand	Hard, clear, "alkaline" iron		D, S	Oversufficient for local needs.
18	SW.	17	"	"	"	Dug	22	2,800	- 11	2,789	21	2,779	Cypress Hills conglomerate	Hard, clear		D, S	Sufficient for 50 head stock.
19	NW.	18	"	"	"	Dug	18	2,810	- 6	2,804	15	2,795	Cypress Hills conglomerate	Hard, clear		D, S	Sufficient for local needs.
20	SW.	19	"	"	"	Bored	50	2,800	- 40	2,760	40	2,760	Glacial clay	Clear		D, S	Sufficient for local needs.
21	SW.	20	"	"	"	Dug	34	2,820	- 29	2,791	31	2,789	Cypress Hills conglomerate	Hard, clear, iron		D, S	Sufficient for local needs; also 24-foot well.
22	SE.	20	"	"	"	Dug	45	2,810	- 42	2,768	45	2,765	Cypress Hills conglomerate	Hard, clear, "alkaline"		D, S	Insufficient; can be pumped dry; 7 barrels.
23	NE.	21	"	"	"	Spring		2,730	0	2,730	0	2,730	Cypress Hills gravel	Hard, clear		S	Sufficient for local needs; other springs.
24	NW.	23	"	"	"	Dug	40	2,760					Glacial blue clay				Dry hole; also 47-foot dry hole.
25	SE.	23	"	"	"	Dug	100	2,760	- 89	2,671	100	2,660	Bearpaw sand	Hard, clear		D, S	Sufficient; cannot be lowered. #
26	SW.	24	"	"	"	Dug	70	2,750					Bearpaw sand	Hard, clear, iron		N	Sufficient; large supply; not used now.
27	NW.	24	"	"	"	Dug	85	2,750	- 79	2,671	26	2,724	Bearpaw sand	Hard, clear, iron		D, S	Sufficient for local needs; large supply.
28	SW.	25	"	"	"	Drilled	95	2,750	- 93	2,657			Bearpaw sand	Hard		D, S	Sufficient for 40 to 50 head stock.
29	SW.	27	"	"	"	Dug	19	2,750	- 17	2,733	19	2,731	Glacial clay	Hard, clear	50	D, S	Sufficient for local needs.
30	SE.	28	"	"	"	Spring		2,750	0	2,750	0	2,750	Cypress Hills conglomerate	Hard		D, S	Sufficient for local needs; large supply.
31	NW.	28	"	"	"	Drilled	166	2,800	-146	2,654	166	2,634	Bearpaw sand	Soft, iron		D, S	Sufficient for local needs; large supply.
32	SW.	30	"	"	"	Drilled	215	2,830	-203	2,627	215	2,615	Bearpaw sand	Soft, brown		D, S	Sufficient for local needs.
33	SW.	32	"	"	"	Bored	45	2,800	- 37	2,763	45	2,755	Cypress Hills conglomerate	Hard, iron		D, S	Sufficient for local needs; large supply also similar well.
34	NE.	32	"	"	"	Dug	32	2,800	- 16	2,784	16	2,784	Glacial blue clay	Hard, clear, iron		D, S	Insufficient for 16 head stock.
35	SW.	34	"	"	"	Drilled	185	2,820	-165	2,655	185	2,635	Bearpaw sand	Soft, clear		D, S	Sufficient for local needs.
36	SE.	34	"	"	"	Drilled	64	2,820	- 52	2,768	64	2,756	Cypress Hills cobbles	Hard, clear, iron		D, S	Sufficient for local needs; good supply.
37	SW.	35	"	"	"	Drilled	68	2,820	- 52	2,768	68	2,752	Cypress Hills cobbles	Hard, clear, iron		D, S	Sufficient for local needs; large supply.
38	NW.	35	"	"	"	Dug	32	2,800	- 26	2,774	28	2,772	Cypress Hills fine gravel	Hard, clear		D, S	Sufficient for local needs.

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

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

WELL RECORDS—Rural Municipality of WEBB NO. 138, 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
39	NE.	35	13	16	3	?	30	2,790			30	2,760	Cypress Hills cobble stones			N	Good supply; not used now.
40	NE.	36	"	"	"	Dug	8	2,750	- 5	2,745	5	2,745	Glacial sand	Soft,clear		S	Sufficient for local needs.
1	NW.	1	13	17	3	Drilled	80	2,820					Cypress Hills gravel	Hard,iron, "alkaline"		D, S	Sufficient for local needs; good supply.
2	SW.	2	"	"	"	Dug	55	2,810	- 51	2,759	50	2,760	Cypress Hills sand	Hard,clear	44	D, S	Insufficient for local needs.
3	NW.	2	"	"	"	Spring		2,720	0	2,720			Cypress Hills sand	Hard,clear		S	Sufficient for local needs.
4	NE.	2	"	"	"	Spring		2,750	0	2,750			Cypress Hills sand	Hard,clear		S	Sufficient for local needs.
5	NE.	4	"	"	"	Drilled	75	2,850	- 35	2,815	75	2,775	Cypress Hills sand	Hard,clear, "alkaline"	44	D, S	Sufficient for local needs.
6	SE.	5	"	"	"	Bored	44	2,900	- 27	2,873	44	2,856	Cypress Hills sandy gravel	Hard,clear		D, S	Sufficient for local needs; large supply.
7	NW.	5	"	"	"	Dug	32	2,875	- 12	2,863	32	2,843	Cypress Hills gravel	Soft,clear	44	D, S	Sufficient for local needs.
8	NE.	6	"	"	"	Dug	50	2,885	- 25	2,860	50	2,835	Cypress Hills gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
9	NW.	7	"	"	"	Dug	20	2,885	- 17	2,868	17	2,868	Glacial sandy clay	Hard,clear, sulphur	44	D, S	Sufficient for local needs.
10	SE.	8	"	"	"	Dug	35	2,875	- 18	2,857	35	2,840	Glacial sand	Soft,clear	44	D, S	Sufficient for local needs.
11	SW.	8	"	"	"	Dug	45	2,900	- 33	2,867	45	2,855	Glacial clay sand	Hard,clear	44	S	Sufficient for local needs.
12	SE.	9	"	"	"	Dug	18	2,850	- 15	2,835			Glacial sand				
13	NW.	9	"	"	"	Dug	15	2,890	- 5	2,885	14	2,876	Cypress Hills gravel	Hard,clear, iron		D, S	Sufficient for local needs.
14	SW.	10	"	"	"	Bored	56	2,860	- 48	2,812	56	2,804	Cypress Hills gravel	Hard,reddish, brown,sul-phur		D, S	Generally sufficient for local needs.
15	NE.	10	"	"	"	Bored	55	2,800	- 18	2,782	55	2,745	Cypress Hills gravel	Hard,cloudy, "alkaline"	44	S	Sufficient for local needs.
16	SE.	10	"	"	"	Drilled	225	2,810	-199	2,611	225	2,585	Bearpaw sand	Soft,brown-ish		D, S	Sufficient for local needs.
17	SE.	11	"	"	"	Spring		2,750	0	2,750			Cypress Hills sand	Hard		S	Sufficient for 40 head stock.
18	NE.	12	"	"	"	Drilled	51	2,850	- 32	2,818	51	2,799	Cypress Hills sand	Hard,clear, iron,sulphur	44	D, S	Sufficient for local needs; also 40-foot well.
19	SE.	12	"	"	"	Dug	43	2,800	- 33	2,767	42	2,758	Cypress Hills sandstone,sand and clay	Hard,clear, iron,"alka-line"		D, S	Sufficient for 30 head stock easily. #
20	SW.	13	"	"	"	Dug	50	2,850	- 41	2,809			Cypress Hills sand	Hard,clear, iron		D, S	Sufficient for 25 head stock.
21	NW.	13	"	"	"	Dug	35	2,850					Glacial clay				Dry hole.
22	NW.	14	"	"	"	Dug	15	2,800	- 5	2,795	15	2,785	Glacial clay	Hard,clear	44	S	Sufficient for local needs.
23	NE.	15	"	"	"	Drilled	60	2,850	- 30	2,820	52	2,798	Cypress Hills sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.

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

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

WELL RECORDS—Rural Municipality of WEBB NO. 138, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
24	SW.	15	13	17	3	Drilled	65	2,860	- 43	2,817	65	2,795	Cypress Hills sand	Soft, clear		D, S	Sufficient for local needs.
25	SE.	16	"	"	"	Drilled	72	2,870	- 30	2,840	72	2,7[illegible]8	Cypress Hills sand	Soft, clear		D, S	Generally sufficient for local needs.
26	SW.	17	"	"	"	Dug	56	2,900	- 51	2,849	19	2,881	Cypress Hills sand	Hard, clear, iron	44	D, S	Sufficient for local needs.
27	NW.	17	"	"	"	Dug	34	2,900	- 20	2,880	34	2,866	Cypress Hills gravel	Hard, clear, iron	44	D, S	Sufficient for local needs; also similar well.
28	SW.	18	"	"	"	Dug	95	2,950	- 88	2,862			Cypress Hills gravel	Hard, clear, iron	44	D, S	
29	NW.	19	"	"	"	Dug	21	2,810	- 17	2,793	15	2,795	Glacial fine gravel	Hard, clear	44	D, S	Sufficient for local needs.
30	SE.	20	"	"	"	Bored	45	2,905	- 21	2,884	45	2,860	Cypress Hills gravel	Hard, clear, iron	44	D, S	Sufficient for local needs.
31	SW.	21	"	"	"	Drilled	245	2,900	-220	2,680	245	2,655	Bearpaw blue sand	Soft, brownish		D, S	Sufficient for local needs; also a 70-foot well in Cypress Hills conglomerate.
32	NE.	21	"	"	"	Dug	52	2,860	- 27	2,833	52	2,802	Cypress Hills blue sand	Hard, clear, "alkaline"	44	D, S	Sufficient for local needs.
33	NW.	22	"	"	"	Dug	27	2,850	- 18	2,832			Glacial sand			N	Not used.
34	NE.	22	"	"	"	Drilled	265	2,850			265	2,585	Bearpaw sand	Soft		D, S	Sufficient ; very large supply.
35	SW.	23	"	"	"	Dug	20	2,840	- 6	2,834	13	2,827	Glacial gravel	Hard, clear		D, S	Barely enough for household needs; also 16-foot well and dam.
36	SW.	24	"	"	"	Drilled	246	2,850	-200	2,650	246	2,604	Bearpaw sand	Soft, brownish		D, S	Sufficient; very large supply.
37	NE.	24	"	"	"	Bored	50	2,850	- 30	2,820	50	2,800	Cypress Hills sand	Hard, clear, "alkaline"	44	D, S	Sufficient for local needs; also similar well.
38	SE.	25	"	"	"	Dug	23	2,850	- 17	2,833	20	2,830	Glacial gravel	Hard, clear, "alkaline"		D	Used very little; can be pumped dry.
39	NE.	26	"	"	"	Dug	25	2,850	- 20	2,830			Glacial yellow clay	Soft, clear		D, S	Sufficient for 10 head stock.
40	SE.	27	"	"	"	Dug	36	2,800	- 18	2,782	18	2,782	Glacial gravel and clay	Hard		S	Sufficient for local needs; also 70-foot well, water unfit for use.
41	NE.	27	"	"	"	Bored	75	2,770	- 50	2,720	75	2,695	Glacial gravel ?	Hard, clear, "alkaline"		S	Sufficient for 125 head stock when first dry; also 11-foot well for house use.
42	NE.	28	"	"	"	Dug	90	2,775	- 84	2,691			Glacial sand	Hard, clear		N	Not used; was used for stock.
43	SW.	29	"	"	"	Dug	15	2,780	- 11	2,769	13	2,767	Glacial gravel and rock	Hard, clear, iron		S	Sufficient for 40 head stock; also dam for stock.
44	SE.	30	"	"	"	Dug	78	2,800	- 60	2,740	78	2,722	Glacial coarse sand	Hard, iron		D, S	Sufficient for 40 head stock.
45	SW.	31	"	"	"	Dug	18	2,700	- 13	2,687	18	2,682	Glacial gravel	Hard, clear, "alkaline"		S	Sufficient for local needs; second 44-foot well used for house.
46	NW.	31	"	"	"	Drilled	198	2,740	-148	2,592	198	2,542	Glacial gravel	Soft, clear	44	D, S	Sufficient for 40 head stock.
47	SW.	32	"	"	"	Dug	42	2,710	- 30	2,680	42	2,668	Glacial gravel	Hard, clear		D, S	Insufficient; used by neighbours.
48	NE.	32	"	"	"	Bored	56	2,720	- 36	2,684	56	2,664	Glacial gravel	Soft, clear		D, S	Sufficient for 25 head stock.
49	S½.	33	"	"	"	Spring		2,700	0	2,700			Glacial sand	Hard, "alkaline"			Supply not used much.

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 WEBB NO. 138, 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	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
50	NW.	34	13	17	3	Dug	42	2,700	- 34	2,666	42	2,658	Glacial sand	Hard, clear	44	D, S	Sufficient for local needs.
51	NE.	34	"	"	"	Dug	6	2,670	- 4	2,666	4	2,666	Glacial sand	Hard, clear	44	S	Sufficient for local needs.
52	SW.	34	"	"	"	Bored	120	2,780	- 85	2,695	120	2,660	Glacial sand	Hard, clear, "alkaline" iron		S	Sufficient for 18 head stock; unfit for man.
53	SE.	35	"	"	"	Dug	16	2,820	- 12	2,808	15	2,805	Glacial gravel	Hard, clear, "alkaline"	44	S	Sufficient for local needs.
54	NE.	36	"	"	"	Drilled	190	2,780	-160	2,620	190	2,590	Bearpaw sand	Soft, brownish tint "alkaline"		N	Large supply; became too "alkaline" uses dam for stock needs.
55	NW.	36	"	"	"	Drilled	265	2,850			265	2,585	Bearpaw sand	Soft, brownish		D, S	Sufficient for local needs.
56	SW.	36	"	"	"	Dug	16	2,820	- 13	2,807	15	2,805	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
1	SE.	1	13	18	3	Dug	53	2,890	- 36	2,854	53	2,837	Cypress Hills clayey gravel	Hard, clear	44	D, S	Sufficient for 500 sheep and 30 head stock.
2	SW.	1	"	"	"	Dug	24	2,900	- 18	2,882	18	2,882	Glacial soft blue clay	Hard, clear, "alkaline"		S	Insufficient for local needs.
3	NW.	1	"	"	"	Dug	27	2,900	- 25	2,875			Glacial blue clay	Hard, clear		D, S	Sufficient for 40 head stock easily.
4	SW.	2	"	"	"	Dug	8	3,000	0	3,000	8	2,992	Glacial sand	Soft, clear		D, S	Will water 30 head stock.
5	SE.	3	"	"	"	Dug	85	2,990	- 71	2,919	85	2,905	Cypress Hills fine sand	Hard, iron		D, S	Sufficient for 22 head stock.
6	SE.	4	"	"	"	Dug	40	3,010	- 37	2,973			Glacial sand	Hard, clear		D, S	Sufficient for local needs; also similar well.
7	NW.	4	"	"	"	Dug	7	2,950	- 2	2,948	3	2,947	Glacial gravel	Hard, clear	42	D, S	Sufficient for local needs; also a spring.
8	SE.	5	"	"	"	Bored	96	2,980	- 81	2,899	81	2,899	Cypress Hills blue clay	Hard, clear		D, S	Sufficient for local needs; good supply also springs in valley.
9	SW.	6	"	"	"	Dug	14	2,750	- 11	2,739	3	2,747	Glacial sand	Hard, clear, "alkaline"		S	Insufficient; enough for working horses only; also 80-foot well; water unfit for stock.
10	NW.	6	"	"	"	Dug	20	2,700	- 14	2,686	5	2,695	Glacial gravel and rock	Hard, clear		D, S	Sufficient for 40 head stock.
11	NE.	7	"	"	"	Dug	10	2,700	- 7	2,693			Glacial blue clay	Hard, clear		S	Sufficient for local needs.
12	NW.	8	"	"	"	Dug	8	2,750	- 5	2,745	3	2,747	Glacial gravel Base in Bearpaw	Hard, clear salty			Insufficient; a spring supplies stock.
13	SE.	9	"	"	"	Dug	85	2,950	- 75	2,875			Glacial blue clay	Hard, bluish "alkaline", iron		S	Sufficient for 7 head stock.
14	SW.	9	"	"	"	Spring		2,920	0	2,920			Glacial sand	Hard, clear, oily on surface		S	Sufficient for local needs; also second spring.
15	NW.	9	"	"	"	Dug	14	2,930	- 7	2,923			Glacial gravel	Hard, cloudy, reddish sediment		D, S	Sufficient; had just enough for stock in 1934 also 42-foot well; water suitable for stock; #
16	SW.	10	"	"	"	Dug	18	3,000	- 3	2,997			Glacial sandy clay			S	
17	NW.	13	"	"	"	Dug	35	2,920	- 25	2,895	35	2,885	Glacial gravel	Hard, clear		S	Sufficient for 12 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 WEBB NO. 138, 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
18	NW.	14	13	18	3	Bored	35	2,870	- 23	2,847			Glacial gravel	Hard, "alkaline"		N	Unfit for use.
19	SW.	14	"	"	"	Spring		2,770	0	2,770			Glacial sand	Soft		S	Sufficient during summer; freezes in winter.
20	NE.	14	"	"	"	Dug	18	2,890	- 13	2,877	12	2,878	Glacial clay	Hard, clear, reddish sediment	44	S	Sufficient for local needs. #
21	SW.	15	"	"	"	Dug	37	2,890	- 30	2,860			Glacial blue clay	Hard, iron, "alkaline"		D, S	Barely enough for 16 head stock with two wells.
22	NE.	15	"	"	"	Dug	16	2,860	- 11	2,849			Glacial black clay	Hard, clear		D, S	Insufficient; 8 head stock was all that could be watered last winter.
23	SW.	16	"	"	"	Dug	43	2,825	- 31	2,794	31	2,794	Glacial clay	Hard, iron		S	Sufficient for 23 horses and 25 sheep.
24	SE.	16	"	"	"	Bored	56	2,890	- 46	2,844	56	2,834	Glacial sand	Hard, iron, "alkaline"		S	Barely enough for 25 head stock; can be pumped dry.
25	NE.	17	"	"	"	Bored	44	2,790	- 19	2,771	44	2,746	Glacial sand	Hard		D, S	Insufficient; only enough for 10 head stock during dry years.
26	SE.	18	"	"	"	Dug	60	2,670	- 40	2,630			Glacial sand	Hard, clear, "alkaline"		S	Sufficient for local needs.
27	SW.	20	"	"	"	Dug	87	2,650	- 43	2,607	87	2,563	Glacial sand	Hard, "alkaline"		S	Sufficient for 500 sheep.
28	NW.	20	"	"	"	Dug	21	2,660	- 13	2,647	20	2,640	Glacial sand	Soft		D, S	Sufficient for 25 head stock.
29	SE.	21	"	"	"	Dug	66	2,830	- 36	2,794	66	2,764	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for local needs; also a 22-foot well used for house.
30	NE.	21	"	"	"	Bored	60	2,780	- 50	2,730	56	2,724	Glacial sand	Hard, clear, "alkaline"		D, S	Insufficient for local needs; hauls drinking water.
31	NW.	22	"	"	"	Dug	50	2,780	- 30	2,750	50	2,730	Glacial sand and gravel	Hard, clear, "alkaline"		S	
32	NE.	22	"	"	"	Dug	60	2,760	- 55	2,705	55	2,705	Glacial gravel	Hard, clear, "alkaline"	44	D, S	Sufficient for local needs.
33	NE.	22	"	"	"	Drilled	200	2,760	-150	2,610	200	2,560	Bearpaw black sand	Soft, clear		N	Not used.
34	NW.	23	"	"	"	Spring		2,750	0	2,750			Glacial sand	Hard, "alkaline"			Sufficient for local needs; small seepage in 33-foot well.
35	SW.	24	"	"	"	Dug	24	2,810	- 10	2,800	24	2,786	Glacial gravel	Hard, clear, "alkaline"		N	Sufficient, but unfit for use; uses dam for stock.
36	NW.	24	"	"	"	Dug	27	2,750	- 17	2,733			Glacial gravel	Hard, "alkaline"		D, S	Sufficient for local needs; large supply.
37	SW.	25	"	"	"	Dug	82	2,810	- 70	2,740	80	2,730	Glacial clay	Hard, clear, salty, "alkaline"		D, S	Sufficient for local needs; also 15-foot well.
38	NW.	25	"	"	"	Dug	70	2,755	- 58	2,697	70	2,685	Glacial blue sand	Hard, clear		D, S	Sufficient for local needs.
39	SW.	26	"	"	"	Dug	14	2,700	- 8	2,692	13	2,687	Glacial gravel	Hard, clear	44	S	Sufficient for local needs.
40	NE.	27	"	"	"	Dug	7	2,640	+ 5	2,645	5	2,635	Glacial white clay	Hard, clear		D, S	Sufficient for local needs.
41	SE.	30	"	"	"	Bored	68	2,600	- 36	2,564	68	2,532	Glacial sand	Hard, clear	44	D, S	Sufficient supply, but not during dry years; also 25-foot well.
42	SW.	32	"	"	"	Dug	75	2,600			75	2,525	Glacial sandy gravel	Hard, clear		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 WEBB NO. 138, 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
43	NW.	32	13	18	3	Dug	14	2,555	- 10	2,545	12	2,543	Glacial sand	Hard, clear		D, S	Sufficient, but not in summer of 1934; also 103-foot and 46-foot wells.
44	SW.	33	"	"	"	Dug	30	2,580	- 20	2,560	26	2,554	Glacial clayey sand	Hard, clear	44	D, S	Sufficient for local needs.
45	NW.	33	"	"	"	Dug	22	2,560	- 17	2,543	20	2,540	Glacial clayey sand	Hard, clear	44	D, S	Sufficient for local needs; also 20-foot well.
46	NW.	34	"	"	"	Dug	20	2,545	- 9	2,536			Glacial gravel	Hard, clear		D	Sufficient for local needs.
47	NE.	34	"	"	"	Dug	57	2,580	- 32	2,548	57	2,523	Glacial sand	Hard, clear, iron		N	Cannot be used; #. also 12-foot well for house use.
48	SE.	36	"	"	"	Dug	45	2,740	- 37	2,703	45	2,695	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
49	NW.	36	"	"	"	Dug	20	2,650	- 14	2,636	20	2,630	Glacial sandy clay	Hard, clear, soda		D, S	Sufficient for local needs.
1	SE.	1	14	16	3	Dug	18	2,760	- 14	2,746	17	2,743	Glacial sandy gravel	Hard, clear, "alkaline"		D	Sufficient for local needs.
2	SE.	3	"	"	"	Drilled	175	2,815	-150	2,665	150	2,665	Bearpaw sand	Soft, clear		D, S	Sufficient for local needs.
3	NE.	4	"	"	"	Dug	20	2,840	- 10	2,830	10	2,830	Glacial sand	Hard, clear		D, S	Insufficient; cannot be pumped dry; also a 16-foot well.
4	SE.	6	"	"	"	Drilled	130	2,770	-110	2,660	126	2,644	Glacial sand Base in Bearpaw	Hard, clear, iron, "alkaline"		D, S	Can be pumped dry; another well drilled to 285 feet, only small seepage.
5	SW.	8	"	"	"	Drilled	165	2,712	- 95	2,617	165	2,547	Glacial black sand	Hard, clear, "alkaline"	44	D, S	Sufficient, but comes in slowly; also two 232-foot wells; small supply due to quicksand
6	NW.	8	"	"	"	Drilled	217	2,695	-199	2,496			Glacial quicksand	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs.
7	NE.	9	"	"	"	Drilled	173	2,810	-137	2,673	173	2,637	Bearpaw sand	Soft, clear		D, S	Sufficient for local needs. #
8	SW.	10	"	"	"	Dug	20	2,800	- 17	2,783	17	2,783	Glacial sand	Soft, clear		S	Sufficient for local needs.
9	NE.	10	"	"	"	Dug	16	2,780	- 11	2,769			Glacial sand	Hard, clear		S	Insufficient for local needs.
10	NW.	11	"	"	"	Dug	16	2,820	- 11	2,809	16	2,804	Glacial gravel	Soft, clear		D, S	Sufficient for local needs; also 18-foot well.
11	SW.	12	"	"	"	Dug	16	2,810	- 12	2,798	12	2,798	Glacial reddish sandy clay	Soft, clear		D, S	Insfficient for local needs; also 29-foot well.
12	NE.	12	"	"	"	Dug	12	2,760	- 7	2,753			Glacial sand	Soft, clear		D, S	Sufficient for 7 head stock in 1934 when it was low.
13	SE.	14	"	"	"	Dug	26	2,810	0	2,810	21	2,789	Glacial coarse gravel	Soft, clear		D, S	Sufficient for local needs.
14	SW.	15	"	"	"	Dug	16	2,850	- 10	2,840	10	2,840	Glacial yellow clay	Soft, clear		D, S	Sufficient for local needs. #
15	SE.	15	"	"	"	Dug	18	2,850	- 12	2,838	12	2,838	Glacial clay	Hard, clear		D, S	Sufficient for 15 head stock.
16	SE.	16	"	"	"	Dug	24	2,780	- 18	2,762	24	2,756	Glacial gravel	Hard, clear		D, S	
17	SE.	17	"	"	"	Bored	65	2,695	- 30	2,665			Glacial yellow clay	Hard, clear	42	D, S	Sufficient; supply comes in fast.
18	NW.	17	"	"	"	Drilled	212	2,650					Bases in Bearpaw shale				Two dry holes.

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 WEBB NO.138, 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.	18	14	16	3	Dug	16	2,610	- 14	2,596	16	2,594	Glacial gravel	Soft, clear		S	Insufficient; dry in winter.
20	NW.	18	"	"	"	Dug	15	2,600	- 10	2,590	11	2,589	Glacial sandy clay	Hard, clear		D, S	Sufficient for local needs.
21	SW.	19	"	"	"	Dug	13	2,580	- 8	2,572			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 12 head stock.
22	SE.	20	"	"	"	Dug	37	2,600	- 27	2,573	37	2,563	Glacial sand	Hard, clear, "alkaline"		S	
23	NW.	20	"	"	"	Dug	7	2,575	- 4	2,571	4	2,571	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; also springs.
24	SE.	21	"	"	"	Spring		2,630	0	2,630	0	2,630	Bearpaw sand	Hard, clear		D, S, I	Sufficient; fills 2-inch pipe; another similar spring.
25	SE.	22	"	"	"	Dug	12	2,825	- 7	2,818	4	2,821	Glacial sand	Soft, clear		D, S	Sufficient for 30 head stock.
26	NE.	23	"	"	"	Dug	12	2,800	- 7	2,793			Glacial sand	Hard, clear		D, S	Sufficient for local needs; large supply.
27	NW.	25	"	"	"	Spring		2,630	0	2,630	0	2,630	Bearpaw sand				Very large supply.
28	SE.	26	"	"	"	Spring		2,630	0	2,630	0	2,630	Bearpaw sand	Soft		S	Large supply; also three similar springs.
29	SW.	30	"	"	"	Dug	20	2,500	- 6	2,494	4	2,496	Glacial hard clay	Hard, clear, "alkaline"		D, S	Insufficient; enough only for 4 head stock.
1	SE.	2	14	17	3	Drilled	167	2,800	-122	2,678	167	2,633	Bearpaw sand	Soft, brown		D, S	Sufficient for local needs. #
2	NW.	2	"	"	"	Spring		2,680	0	2,680	0	2,680	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs; 100-foot well supplies soft water.
3	NE.	3	"	"	"	Dug	35	2,670	- 20	2,650	35	2,635	Glacial sand	Hard, clear		D, S	Sufficient for local needs; 150-foot well used for stock; 15-foot well near slough.
4	SW.	4	"	"	"	Dug	30	2,610	- 24	2,586	10	2,600	Glacial blue clay	Hard, clear, "alkaline"	44	S	Sufficient for local needs; also 16-foot well.
5	NE.	5	"	"	"	Dug	43	2,625	- 34	2,591	37	2,588	Glacial sandy clay	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
6	NE.	6	"	"	"	Dug	18	2,580	- 14	2,566	18	2,562	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for local needs; 50-foot well supplies stock; 90-foot wel almost dry.
7	SE.	7	"	"	"	Dug	13	2,530	- 10	2,520	13	2,517	Glacial sand	Hard, clear, "alkaline"		D, S	Insufficient for local needs; also 74-foot well; water unfit for use.
8	SW.	7	"	"	"	Dug	20	2,510	- 16	2,494	20	2,490	Glacial sand	Hard, cloudy, "alkaline"		S	Sufficient for local needs; also 7-foot well with "alkaline" water.
9	SW.	9	"	"	"	Dug	15	2,570	- 11	2,559	15	2,555	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
10	SE.	9	"	"	"	Dug	15	2,600	- 10	2,590	12	2,588	Glacial sand	Soft, clear		D, S	Sufficient for local needs; springs supply water for cattle.
11	NE.	14	"	"	"	Dug	18	2,600	- 16	2,584	8	2,592	Glacial sand	Hard, clear		D, S	Insufficient; water stock on next quarter.
12	SE.	16	"	"	"	Dug	12	2,574	- 10	2,564			Glacial sand	Hard, clear		D, S	Insufficient for local needs.
13	SW.	17	"	"	"	Dug	14	2,540	- 7	2,533	14	2,526	Glacial gravel	Hard, clear		D	
14	SE.	18	"	"	"	Dug	9	2,545	- 7	2,538	9	2,536	Glacial sand	Hard, cloudy, "alkaline"		S	Sufficient for stock needs.
15	SE.	19	"	"	"	Dug	12	2,520	- 6	2,514	12	2,508	Glacial gravel	Soft, clear		S	Sufficient for local needs.

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

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

WELL RECORDS—Rural Municipality of [illegible]

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
16	SW.	19	14	17	3	Dug	22	2,560	- 17	2,543	14	2,546	Glacial san[illegible] clay	Soft,clear		D, S	Sufficient for local needs; also 23-foot well.
17	NE.	19	"	"	"	Dug	12	2,520	- 9	2,511	12	2,508	Glacial sand	Soft,clear		S	Sufficient for stock needs.
18	SW.	19	"	"	"	Dug	10	2,520	- 8	2,512	10	2,510	Recent sand	Har[illegible]clear		D	Sufficient for local needs. #
19	SE.	20	"	"	"	Dug	25	2,560	- 21	2,539	21	2,539	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
20	SW.	22	"	"	"	Dug	26	2,540	- 25	2,515	25	2,515	Glacial sand	Hard,clear		D	Sufficient for household needs; also dam for stock.
21	SE.	22	"	"	"	Dug	22	2,525	- 18	2,507			Glacial whitish clay	Hard,clear, "alkaline"		S	Sufficient for local needs; also a 22-foot well of soft water.
22	NE.	22	"	"	"	Dug	27	2,575	- 19	2,556	27	2,548	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also similar well.
23	NW.	22	"	"	"	Dug	9	2,530	- 5	2,525	5	2,525	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
24	SW.	23	"	"	"	Dug	16	2,520	- 10	2,510			Glacial blue-grey clay	Hard,cloudy		S	Sufficient for local needs.
25	SW.	24	"	"	"	Dug	19	2,580	- 17	2,563	17	2,563	Glacial gravel	Hard,clear, oily on surface		D, S	Sufficient for local needs; also 60-foot well plugged with quicksand.
26	SW.	24	"	"	"	Dug	16	2,585	- 6	2,579	15	2,570	Glacial gravel and sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs; also two other 14-foot wells.
27	SE.	28	"	"	"	Dug	22	2,540	- 17	2,523	17	2,523	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also dugout in sand.
28	SW.	28	"	"	"	Dug	10	2,500	- 7	2,493			Glacial sand	Soft,clear		S	Insufficient; cannot dig through quicksand.
29	SW.	31	"	"	"	Dug	18	2,460	- 14	2,446	6	2,454	Recent sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs; also 6-foot well and spring.
30	SW.	36	"	"	"	Dug	11	2,450	- 10	2,440	11	2,439	Glacial sand	"Alkaline" cloudy		D	Insufficient for local needs.
1	SW.	1	14	18	3	Dug	44	2,600	- 32	2,568	44	2,556	Glacial blue clay	Hard,clear		D, S	Insufficient; hauled water last winter.
2	NE.	1	"	"	"	Drilled	580	2,580	-430	2,150	580	2,000	Bearpaw shale	Soft,brown		D, S	Insufficient; supply never exceeded 300 gallons a day.
3		2	"	"	"	Dug	22	2,563	- 12	2,551	22	2,541	Glacial gravel	Soft		D, S	Sufficient for 30 head stock and 15 persons.
4	SE.	2	"	"	"	Dug	22	2,600	- 14	2,586	22	2,578	Glacial coarse gravel	Hard,clear		D, S	Sufficient; supplies drinking water to Antelope.
5	NW.	2	"	"	"	Dug	23	2,550	- 20	2,530	20	2,530	Glacial sand and gravel	Soft,clear		D, S	Sufficient for local needs.
6	SE.	3	"	"	"	Dug	12	2,500	- 5	2,495	5	2,495	Glacial sand	Soft,clear		D	Sufficient for local needs; uses other wells for stock.
7	NE.	4	"	"	"	Dug	55	2,570	- 47	2,523	47	2,523	Glacial sand	Hard,"alkaline"		D, S	Barely enough for 9 head stock; also 16-foot well.
8	NW.	5	"	"	"	Dug	12	2,550	- 8	2,542	8	2,542	Glacial sand	Soft,clear		D, S	Insufficient during dry years; also 3-foot well.
9	SW.	6	"	"	"	Dug	105	2,630	- 95	2,535	105	2,525	Glacial sand	Soft,clear	44	D, S	Sufficient for local needs.
10	SE.	9	"	"	"	Dug	24	2,550	- 20	2,530	24	2,526	Glacial sand	Hard,clear		D	Sufficient for household needs only; also 8-foot well.
11	NE.	9	"	"	"	Dug	14	2,500	- 11	2,489	14	2,486	Glacial blue clay and sand	Hard,clear		D, S	Sufficient for local needs; also 22-foot well.

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 WEBB NO. 138, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
12	NW.	9	14	18	3	Bored	38	2,550	- 30	2,520	30	2,520	Glacial clay	Hard, clear		D, S	Insufficient; barely enough for 14 head stock; also 13-foot well.
13	NW.	10	"	"	"	Dug	50	2,550	- 39	2,511	50	2,500	Glacial drift	Hard, clear		N	Not used.
14	SE.	12	"	"	"	Bored	42	2,510	- 28	2,482	32	2,478	Glacial sand	Hard, clear, "alkaline"		S	Insufficient; only 8 barrels a day; also thre shallow wells.
15	NE.	12	"	"	"	Dug	12	2,500	- 8	2,492	8	2,492	Glacial sand	Hard, clear		D, S	Insufficient for local needs.
16	SE.	13	"	"	"	Dug	17	2,520	- 12	2,508	13	2,507	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also two other shallow wells.
17	NE.	13	"	"	"	Dug	10	2,520	- 3	2,517	3	2,517	Recent sand	Soft, clear		S	Large supply; another 16-foot well.
18	NE.	14	"	"	"	Dug	14	2,500	- 8	2,492	6	2,494	Recent sand	Hard, clear		D, S	Sufficient for local needs; also 12-foot well.
19	NW.	14	"	"	"	Spring		2,450	0	2,450			Recent sand	Soft, clear		S	Large supply.
20	SE.	15	"	"	"	Dug	16	2,500	- 14	2,486	14	2,486	Recent sand			D	Also a similar well.
21	NE.	15	"	"	"	Dug	15	2,480	- 8	2,472	13	2,467	Glacial sand and gravel	Soft, clear		D, S	Sufficient for 9 head stock; other shallow wells; poor supply.
22	SE.	16	"	"	"	Dug	18	2,500	- 14	2,486	16	2,484	Glacial sand	Hard, clear	44	D, S	Sufficient for local needs.
23	NW.	16	"	"	"	Dug	18	2,500	- 9	2,491	9	2,491	Glacial sand	Soft, clear		D, S	Sufficient for local needs.
24	SE.	17	"	"	"	Dug	35	2,520	- 29	2,491	29	2,491	Glacial sand	Hard, clear	44	D, S	Sufficient for local needs; also a 14-foot well.
25	NW.	17	"	"	"	Dug	40	2,500	- 32	2,468	40	2,460	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
26	NW.	18	"	"	"	Dug	22	2,540	- 17	2,523	22	2,518	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
27	SW.	19	"	"	"	Dug	35	2,570	- 33	2,537	35	2,535	Glacial coarse sand	Hard, clear		D, S	Sufficient for local needs.
28	NE.	20	"	"	"	Dug	23	2,490	- 19	2,471	15	2,475	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also a similar well.
29	NE.	21	"	"	"	Dug	17	2,470	- 11	2,459	17	2,453	Glacial sand	Hard, clear		D, S	Sufficient for local needs; also 65-foot well.
30	SW.	21	"	"	"	Dug	18	2,500	- 9	2,491	9	2,491	Glacial sand	Soft		D, S	Sufficient; watered 20 head stock during dry seasons. also 40-foot well.
31	SE.	23	"	"	"	Dug	8	2,475	- 5	2,470	5	2,470	Recent sand	Hard, clear		D, S	Sufficient for local needs.
32	SW.	23	"	"	"	Dug	18	2,460	- 15	2,445	18	2,442	Glacial gravel	Hard, clear		N	Not used at present.
33	NE.	26	"	"	"	Dug	17	2,475	- 11	2,464	11	2,464	Glacial sand	Soft, clear		D, S	
34	SW.	27	"	"	"	Dug	20	2,460	- 15	2,445	15	2,445	Glacial sand	Hard, "alkaline"		D	Sufficient; use creek for stock; also 60-foo well almost dry.
35	NE.	27	"	"	"	Dug	12	2,450	- 8	2,442			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs; also simiarlwell
36	NW.	27	"	"	"	Dug	30	2,430	- 20	2,410	20	2,410	Glacial gravel	Hard, clear		S,	Insufficient for local needs; also 12-and 4-foot wells.
37	SE.	28	"	"	"	Dug	24	2,470	- 18	2,452	24	2,446	Glacial sand	Hard, iron		D, S	Sufficient for 25 head stock; a similar well

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 WEBB NO. 138, 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
38	NW.	28	14	18	3	Dug	22	2,500	- 9	2,491	8	2,492	Glacial sand	Soft, clear, red sediment		D, S	Sufficient for local needs.
39	NE.	29	"	"	"	Dug	25	2,450	- 15	2,435	15	2,435	Glacial sand	Hard, milky "alkaline"		S	Sufficient for local needs; also spring.
40	SW.	31	"	"	"	Dug	18	2,450	- 13	2,437	13	2,437	Glacial gravel	Soft, clear		D, S	Sufficient for local needs.
41	NW.	31	"	"	"	Dug	46	2,460	- 34	2,426	42	2,418	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
42	NW.	32	"	"	"	Drilled	65	2,500					Glacial sand	Hard, clear, "alkaline"		D, S	Also springs.
43	SE.	33	"	"	"	Dug	12	2,480	- 5	2,475	5	2,475	Glacial sand	Soft, clear		D, S	Also 80-foot well.
1	NE.	1	15	16	3	Dug	10	2,450	- 3	2,447	3	2,447	Glacial sand	Soft, clear		D, S	Sufficient for 11 head stock easily.
2	NW.	1	"	"	"	Dug	12	2,500	- 6	2,494	6	2,494	Glacial sand	Hard, clear, "alkaline"		N	Not used; good supply; can be used for stock; other similar wells.
3	SE.	4	"	"	"	Dug	9	2,500	- 5	2,495	5	2,495	Glacial sand	Soft, brownish		S	Sufficient; good supply.
4	SW.	4	"	"	"	Dug	12	2,470	- 2	2,468	7	2,463	Glacial sand	Soft, clear		D, S	Sufficient for 20 to 25 head stock; also 6-foot well.
5	SW.	10	"	"	"	Dug	12	2,480	- 5	2,475	12	2,468	Glacial sand	Hard, clear		D, S	Sufficient; large supply.
6	SW.	13	"	"	"	Dug	18	2,500					Glacial clay				Dry hole; also 25-foot dry hole.
7	NE.	13	"	"	"	Dug	12	2,460	- 10	2,450	10	2,450	Glacial sand	Hard		D, S	Also dugout in sand.
8	NW.	15	"	"	"	Dug	5	2,450	- 2	2,448	2	2,448	Recent sand	Soft, brownish		S	Large supply.
9	NE.	21	"	"	"	Spring		2,400	0	2,400			Recent sand	Hard, clear		S	Large supply; sufficient for 110 head stock.
10	NW.	25	"	"	"	Dug	11	2,420	- 10	2,410	11	2,409	Recent sand	Soft, clear		S	Fair supply.
11	SW.	31	"	"	"	Dug	86	2,450	- 82	2,368			Glacial clay	Hard, clear, iron		D, S	Sufficient for 14 to 15 head stock.
12	NW.	31	"	"	"	Dug	15	2,430	- 9	2,421	9	2,421	Glacial sand	Hard, "alkaline"		S	Sufficient; uses two wells.
13	NE.	33	"	"	"	Bored	40	2,425	- 16	2,409	40	2,385	Glacial gravel	Hard, clear		D, S	Sufficient for 75 head stock; large supply.
14	NW.	34	"	"	"	Dug	40	2,425	- 16	2,409	40	2,385	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient; large supply.
15	NE.	35	"	"	"	Dug	25	2,430					Glacial sand	Hard, "alkaline"		D, S	Sufficient for 11 head stock.
1	NW.	2	15	17	3	Dug	5	2,470	- 2	2,468			Recent sand			S	Seems to be a good supply.
2	SW.	6	"	"	"	Dug	50	2,450	- 20	2,430	45	2,405	Glacial gravel	Hard, clear, "alkaline"		S	Sufficient for local needs; also 25-foot well used for house.
3	SE.	10	"	"	"	Dug	6	2,470	- 2	2,468			Recent sand			S	Seems to have a good supply.
4	SW.	16	"	"	"	Dug	34	2,450	- 30	2,420			Glacial sand	Soft, clear		D	Sufficient; not used for stock; also 5-foot well and dugout in sand.
5	SW.	18	"	"	"	Dug	8	2,450	- 6	2,444			Glacial sand			S	

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 WEBB NO. 138, 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
6	SE.	19	15	17	3	Dug	16	2,430	- 14	2,416	15	2,415	Glacial sand	Soft, clear		D, S	Sufficient for 50 head stock.
7	SE.	20	"	"	"	Dug	16	2,430	- 14	2,416	16	2,414	Glacial sand	Soft		D, S	Sufficient for 14 head stock
8	SW.	21	"	"	"	Dug	8	2,425	- 5	2,420			Recent sand	Hard, clear		D	Sufficient for ~~one~~ man; no stock.
9	NE.	25	"	"	"	Dug	96	2,450	- 76	2,374	96	2,354	Glacial clay	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs; also 25-foot well.
10	SE.	28	"	"	"	Dug	44	2,450	- 40	2,410	44	2,406	Glacial gravel	Hard, clear, iron		D, S	Sufficient for 75 head stock.
11	NW.	28	"	"	"	Dug	28	2,400	- 20	2,380	28	2,372	Glacial black clay	Hard, clear, "alkaline"		D, S	Sufficient for local needs; also 14-foot well
12	NW.	30	"	"	"	Dug	18	2,400	- 15	2,385	16	2,384	Glacial sand	Hard, clear		D, S	Sufficient for 12 head stock.
13	NE.	30	"	"	"	Bored	16	2,450	- 13	2,437			Glacial sand	Hard, clear		D, S	Sufficient for local needs.
14	NW.	31	"	"	"	Dug	12	2,400	- 10	2,390			Glacial gravel	Hard, clear		D	Sufficient for local needs; also 7-foot well.
15	NE.	31	"	"	"	Dug	12	2,450	- 9	2,441			Glacial sand	Hard, clear		D, S	Sufficient; can be pumped dry but fills in quickly.
16	SW.	32	"	"	"	Dug	20	2,450	- 17	2,433			Glacial sand	Soft, clear		D, S	Sufficient; barely enough for 6 head stock.
17	NE.	32	"	"	"	Dug	20	2,400	- 16	2,384	20	2,380	Glacial coarse sand	Hard, clear		D, S	Sufficient for local needs.
18	SE.	33	"	"	"	Dug	16	2,450	- 11	2,439	15	2,435	Glacial gravel	Hard, clear		D, S	Barely enough for 10 head stock.
19	NE.	33	"	"	"	Dug	5	2,400	- 2	2,398			Glacial sand	Hard, "alkaline"		S	Sufficient for 20 head stock.
20	NW.	33	"	"	"	Dug	18	2,400			18	2,382	Glacial sand	"Alkaline" clear		D, S	Sufficient for 20 head stock; also similar well.
21	SW.	35	"	"	"	Dug	16	2,445	- 14	2,431			Glacial sand	Hard, clear		D, S	Sufficient for local needs.
22	NE.	36	"	"	"	Dug	40	2,452	- 20	2,432			Glacial blue clay	Hard, clear		D, S	Sufficient; but uses other well also; also dam for stock.
1	SE.	1	15	18	3	Dug	23	2,450	- 18	2,432			Glacial sand	Soft, clear		D, S	Sufficient for 40 head stock, easily.
2	SW.	1	"	"	"	Dug	7	2,390	- 4	2,386			Glacial sand and gravel	Hard, brown		D, S	Insufficient; did not have any water last year; stock watered in creek during wet seasons.
3	NW.	1	"	"	"	Dug	51	2,430	- 30	2,400			Glacial blue clay and stones	Hard, clear, "alkaline"			Insufficient; only 4 to 5 pails a day.
4	NE.	2	"	"	"	Dug	33	2,430	- 27	2,403	31	2,399	Glacial gravel	Hard, clear, "alkaline"		D, S	Insufficient has no water during dry spells; also 30-and 16-foot wells.
5	SE.	2	"	"	"	Dug	35	2,420	- 27	2,393	35	2,385	Glacial sand	Hard, clear		N	Not used; also 30-and 33-foot wells.
6	NW.	3	"	"	"	Dug	20	2,350	- 14	2,336			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 6 head stock.
7	SE.	4	"	"	"	Dug	6	2,390	- 2	2,388			Glacial sand and gravel	Hard, clear, "alkaline"		S	Sufficient for 40 head stock or more.
8	NW.	4	"	"	"	Dug	30	2,350	- 24	2,326			Glacial sand	Hard, clear		D, S	Sufficient for household needs only; also 12-foot well.

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 WEBB NO. 138, 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
9	SE.	5	15	18	3	Dug	15	2,450	- 14	2,436			Glacial sand			N	Not used.
10	NW.	5	"	"	"	Dug	25	2,450	- 17	2,433			Glacial sand	Hard, clear		D, S	Sufficient for 15 head stock.
11	SW.	9	"	"	"	Dug	62	2,460	- 61	2,399			Glacial sand	Hard, clear, "alkaline"		S	Insufficient; cannot be pumped from sand.
12	SE.	9	"	"	"	Dug	22	2,350	- 16	2,334			Glacial clay	Hard, clear		D, S	Insufficient; only enough for 4 head stock.
13	SW.	13	"	"	"	Dug	8	2,380	- 4	2,376			Glacial sand	Hard, clear		D.	Sufficient for household needs; also 12-foot well for stock.
14	NE.	13	"	"	"	Dug	12	2,380	- 9	2,371			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 35 head stock easily.
15	NE.	16	"	"	"	Dug	122	2,450	-119	2,331	119	2,331	Glacial sand	Hard, brown, iron		N	It was used for stock; shallow well and spring
16	NE.	17	"	"	"	Dug	60	2,410	- 54	2,356			Glacial sand	Soft, clear		D, S	Sufficient for 10 head stock.
17	SW.	17	"	"	"	Dug	20	2,430	- 9	2,421	20	2,410	Glacial drift	Hard		D, S	Sufficient for 40 head stock easily.
18	NE.	20	"	"	"	Dug	63	2,450	- 61	2,389			Glacial sand	Hard, clear		D, S	Sufficient for 25 head stock.
19	SW.	20	"	"	"	Bored	30	2,410	- 22	2,388	22	2,388	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; also 58-foot well.
20	NE.	21	"	"	"	Spring		2,340	0	2,340			Glacial sand				Large supply; water is dammed in ravine.
21	NE.	23	"	"	"	Drilled	305	2,350	- 45	2,305			Glacial sand Base in Bearpaw	Hard, iron, "alkaline"		N	Not used now; was used for stock; also 20-foot well.
22	NE.	28	"	"	"	Dug	107	2,420	- 68	2,352	107	2,313	Glacial gravel	Hard, clear, "alkaline"		D, S	Insufficient; has to use two wells; also 13-foot well.
23	SE.	30	"	"	"	Dug	32	2,450	- 20	2,430			Glacial clay	Hard, clear		D, S	Insufficient for local needs.
24	SE.	30	"	"	"	Dug	33	2,450	- 30	2,420			Glacial sand	Hard, clear		D, S	Sufficient for 8 head stock.
25	SW.	30	"	"	"	Bored	42	2,450	- 20	2,430	20	2,430	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for 150 head stock.
26	NE.	30	"	"	"	Dug	20	2,440	- 13	2,427	20	2,420	Glacial drift	Hard, clear, iron		D, S	Sufficient for 70 head stock.
27	NE.	31	"	"	"	Dug	50	2,420	- 43	2,377			Glacial sand	Soft, clear		D, S	Sufficient for 40 head stock.
28	NE.	34	"	"	"	Dug	18	2,330	- 14	2,316			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
29	NE.	35	"	"	"	Dug	15	2,400					Glacial clay	Hard, clear, "alkaline"		D, S	Sufficient; can hardly be pumped dry.
30	SE.	35	"	"	"	Dug	22	2,360	- 15	2,345	22	2,338	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 30 head stock; used other well.
31	SE.	36	"	"	"	Dug	10	2,370	- 6	2,364			Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 14 head stock during dry periods; also 21-and 38-foot wells.
32	NE.	36	"	"	"	Bored	40	2,400	- 22	2,378			Glacial sand	Hard, clear, "alkaline"		S	Sufficient for local needs.

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

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