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Rural Water Supplies in South Dakota : Hutchinson County

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Hutchinson County

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RURAL WATER SUPPLIES

IN

SOUTH DAKOTA

HUTCHINSON COUNTY

BY

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AND

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PREPARED BY THE WORK PROJECTS ADMINISTRATION AS A REPORT ON THE WELL SURVEY CONDUCTED AS WORK PROJECTS ADMINISTRATION OFFICIAL PROJECT 665-74-3-126; SPONSORED BY THE EXTENSION SERVICE AND THE EXPERIMENT STATION SOUTH DAKOTA STATE COLLEGE, IN COOPERATION WITH THE STATE GEOLOGICAL SURVEY.

JANUARY 1940

FOREWORD

This study was first proposed as a project of the Mineral Resources Committee of the State Planning Board under the direction of the State Geological survey and undertaken as a Work Projects Administration project sponsored by the State Planning Board, and was continued under the Planning Board until that body was abolished July 1, 1939 by the State Legislature. At that time sponsorship was transferred to the South Dakota Agricultural Experiment Station and the State College Extension Service, South Dakota State College. Field work was begun October 1, 1938 and was practically completed by February 15, 1939. Workers were assigned in the several counties under the supervision and direction of the County Agricultural Agents and Field Supervisors who were employed by the Work Projects Administration. Questionnaires were mailed out from the offices of the County Agents and were checked and tabulated in these offices. The material was then forwarded to the central office for final tabulation and analysis under the direction of Elmer E. Meleen and Walter V. Searight.

Particular credit should be given to the individual County Agricultural Agents in the various counties of the state who arranged the contacts with the individuals from whom these data were collected, furnished a large portion of the necessary supplies for field work, and directed the workers engaged in collecting field data. Without this assistance in gathering basic data, this study could not have been conducted. The value of the report is therefore in direct proportion to the accuracy and adequacy of these basic data.

INTRODUCTION

PURPOSE

This report on rural water supplies of South Dakota has been prepared to present data recently made available on the types and the sources of water supply, exclusive of stream, lake and dam waters. The information presented is of importance to evaluate present supplies. It should also prove useful as a basis for further development of supplies where they are needed or become necessary. Further, it is hoped that the facts presented may prove of value in any program of water conservation.

SOURCES OF INFORMATION

Questionnaires were sent to all, or essentially all of the farmers of the state, asking for complete data on farm wells and supplementary supplies, with the exception of the supplies above noted. A most gratifying number returned questionnaires, actually 60.1% average for the entire state. The coverage is probably more than 60.1% since it is likely that many unanswered inquiries were those to farmers who were without wells, the type of supply emphasized in the questionnaires. The data thus obtained were supplemented with information contained in the files of the State Geological Survey, the office of the State Engineer, and reports of the United States Geological Survey. This supplementary information, together with that contained in questionnaires was used in making the well location maps included in this report.

PROCEDURE

All data from the questionnaires were tabulated and analyzed statistically by counties, which were made the areal units of study. Within the county,

Acknowledgments - The authors wish especially to acknowledge and commend the conscientious assistance of Mr. E. L. Woodburn, Supervisor, for careful and painstaking supervision of statistical work. The authors also desire to express appreciation for the constant interest and support of this project by Mr. Bob Butts, Director of Research and Records Projects, South Dakota Work Projects Administration.

supplies were allocated as to kind on county maps. Since shallow waters are the most important source of rural supply in South Dakota, wells 200 feet deep and less were plotted on county maps from which maps indicating depths of wells by 50 foot intervals were made. Springs, shown on the well location map, and cisterns were also tabulated as important supplementary supplies, although the latter do not appear on maps or in the tables in this report.

PRESENTATION OF DATA

For convenience and utility, this report has been divided into sections, each covering one county, and each county section bound separately. Each county report contains the following material wherever possible.

1. Well Location Map: This map shows the location of all wells and springs within the county, so far as information is now available. These have been plotted in such a manner that artesian and shallow wells can be differentiated readily by the reader. Artesian wells, where they occur, are divided into flowing and pumped. Artesian wells showing decreased flow and those reported as controlled are also indicated by symbols. Shallow wells are differentiated as adequate and inadequate, and dry holes as of 1938 are located. Wells from other sources of information other than questionnaires collected by this survey are shown in blue.

2. Shallow Well Map: This map shows, as accurately as possible, in 50 foot intervals, the depths at which shallow supplies are commonly obtained. Where shallow wells are abundant, as indicated by the well location map, the map is as accurate as the information on which it is based, but where such wells are sparsely distributed errors are likely to occur. In many places reports of shallow wells are absent, in which case the area has been left blank.

3. Table of Pumped Wells, from 0 to 200 feet (inclusive) in depth: This table shows minimum, maximum, and average depths of wells within the county, as reported in the questionnaires. Tabulations are by townships. The general character of the water, hard, medium, and soft, as reported by farm-

ers, and the number of wells suitable or unsuitable for drinking are shown in this table. Further, the adequacy of supply, as indicated on the questionnaires, and use for irrigation are shown here.

4. Table of Wells greater in depth than 200 feet: Minimum, maximum, and average depths are indicated. Character, reported as hard, medium or soft is tabulated. Adequacy and use for irrigation are shown as in the preceding table.

5. Table of flowing wells: Minimum, maximum, and average depths are shown together with general character and use for irrigation. The volume of flow as reported, and the number of flowing wells reported as equipped with control valves is also included in this table.

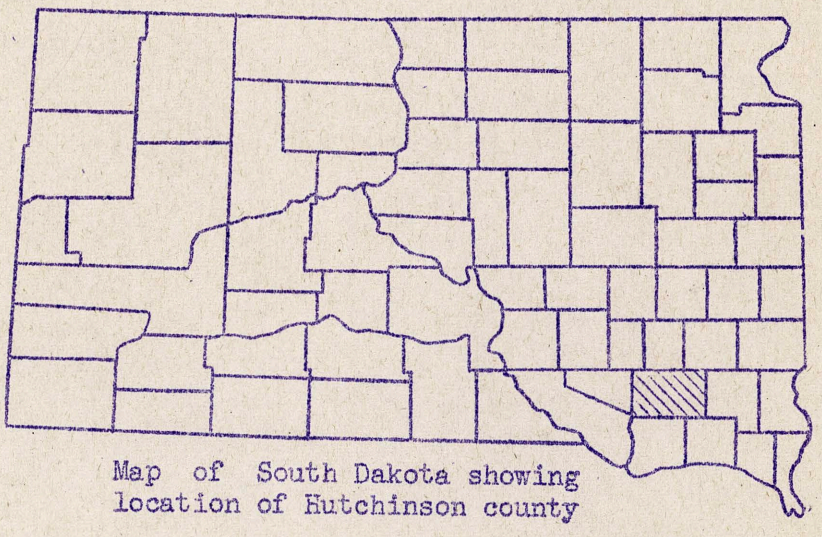
SUMMARY OF STATE SUPPLIES

In the entire state, a total of 48,479 wells were reported in response to questionnaires, returned by 60.1% of the recipients. If those who did not respond have a number of wells in proportion to those who reported, there are approximately 80,000 wells in South Dakota. There are possibly many less than this number since several counties with large numbers of wells returned over 75% of the questionnaires and since many farmers without wells did not reply because they were not requested to do so in the formal questionnaire. Of the wells reported, 16.2% are artesian, including both pumped and flowing wells. Shallow wells are 83.8% of the wells reported. Wells from shallow sources are thus obviously by far the most important means for obtaining water in rural South Dakota.

Important supplementary supplies are cisterns and springs. Roughly, there is more than one cistern to each 40 wells. Many springs are reported, however, in counties with very few wells, so that in some localities they are of considerable importance.

Hutchinson County

Hutchinson county is in the southern part of eastern South Dakota. It is bounded on the north by Davison, Hanson and McCook county, on the east by Turner county, on the south by Bon Homme and Yankton counties and on the west by Douglas and Charles Mix counties. The area is approximately 817 square miles.



Map of South Dakota showing location of Hutchinson county

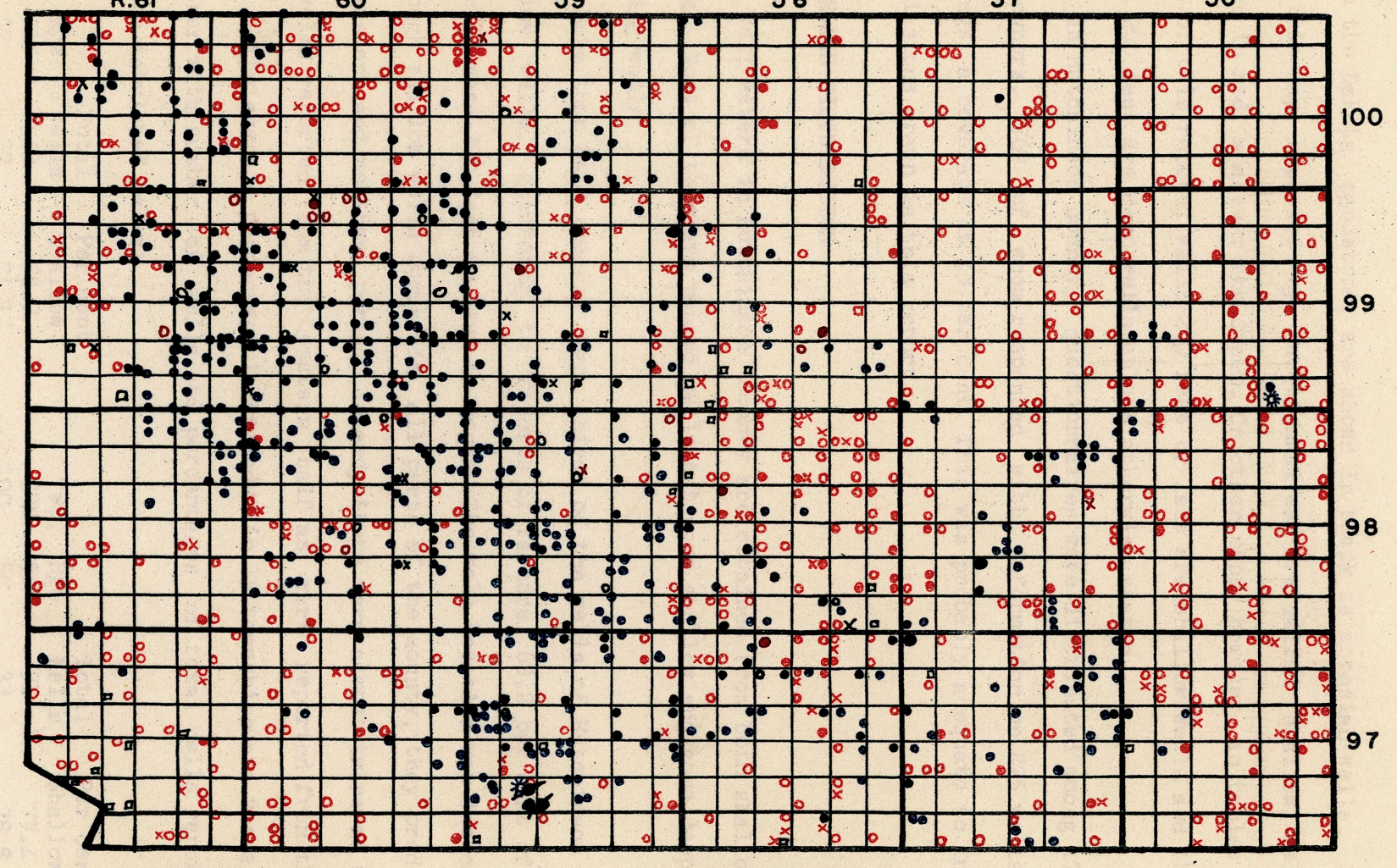
The area is an agricultural one with 96.6 per cent of the 522,880 acres in farms divided into 1805 farm units of approximately 280 acres in each farm unit. Corn, wheat, barley, oats and rye are the important field crops. Livestock - cattle, horses, sheep and hogs are also important. Dairy cattle and dairy products are increasingly important.*

In an area, most of which is farmed, where livestock, especially dairy cattle and hogs are raised, widely distributed sources of water supply are necessary. Supplies required are not great, but adequate and constant supplies of suitable water at relatively low cost are required in order to operate farms of these sizes and organization profitably. The well location map of Hutchinson county indicates that water supplies are generally available and widely distributed over the county.

On the well location map, wells obtaining water under pressure, mostly

*South Dakota Agricultural Statistics, Annual Report, 1937

LOCATION OF ARTESIAN AND SHALLOW WELLS IN HUTCHINSON COUNTY



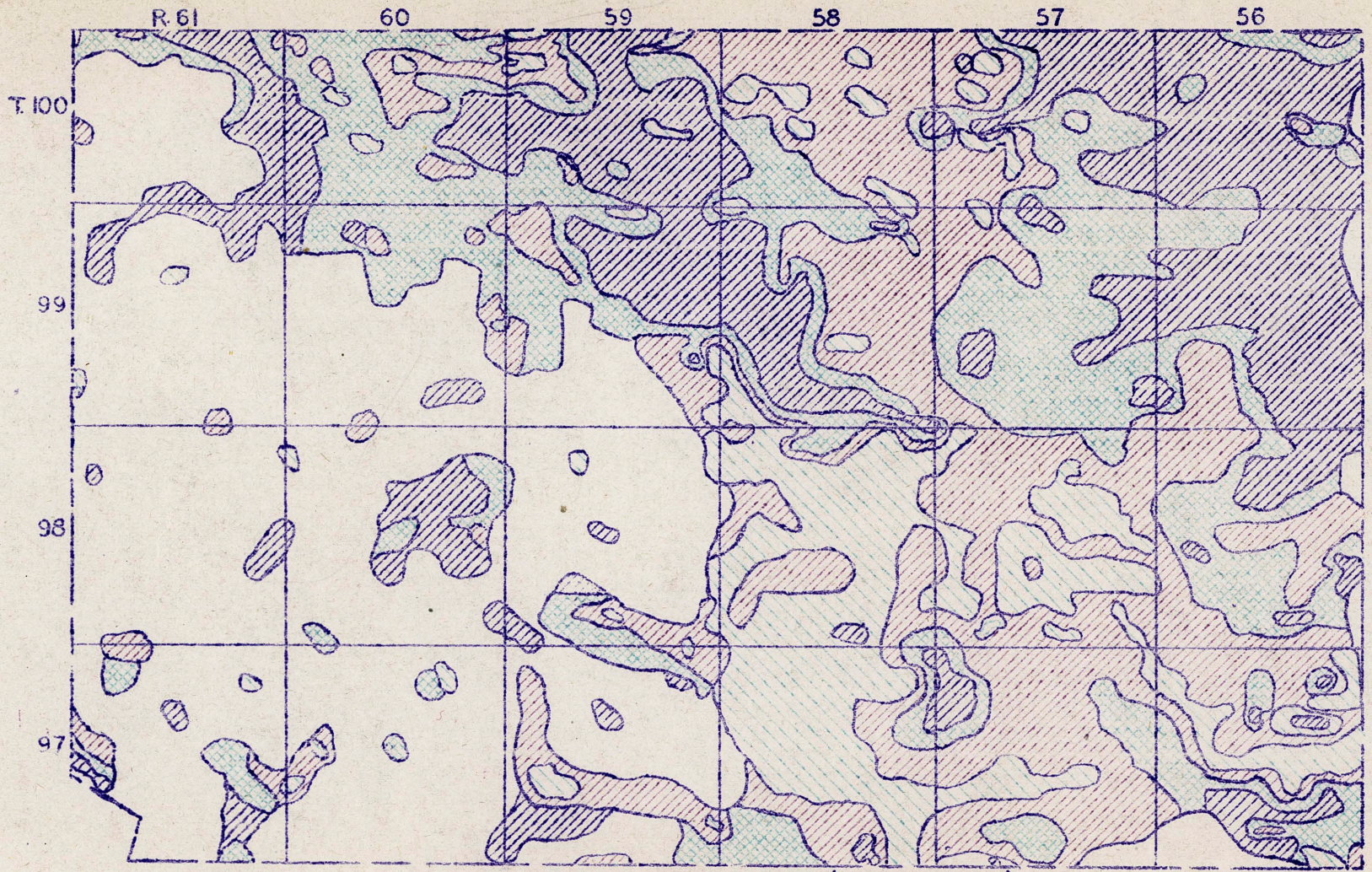
ARTESIAN WELLS

- O FLOWING WELLS—STEADY OR INCREASING
- ● FLOWING WELLS—DECREASED FLOW
- X CEASED FLOWING
- □ PUMPED
- / CONTROLLED ⌀ ⌀

SHALLOW WELLS

- O ADEQUATE SUPPLY
- ● INADEQUATE SUPPLY
- X DRY WELLS
- □ SPRINGS
- ● WELLS FROM OTHER SOURCES
- ✲ CITY WELLS

HUTCHINSON COUNTY



SHALLOW WELLS (0-200 FT.)

DEPTH AT WHICH SUPPLIES ARE COMMONLY OBTAINED

0-50 FT. 50-100 FT. 100-150 FT. 150-200 FT.

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per cent from 50 to 100 feet deep, 22.4 per cent from 100 to 150 feet, and the remainder, 26.2 per cent, were reported 150 to 200 feet deep. Most of the shallowest wells, 50 feet or less in depth, were reported from the central portion of the county, mostly in ranges 57, 58, and 59. They are numerous also in Twp. 97N., Rge. 56W. Shallow wells have been mapped on 50 foot depth intervals on the shallow well map to show where these supplies are commonly obtained.

Twenty seven shallow wells, 5.2 per cent of all shallow wells, were reported to be flowing. These vary from 40 to 200 feet in depth. Most of these wells (18) are in the western part of the county in ranges 59 and 60. The remaining wells (9) are reported from eastern townships with numbers reported in each as follows:

Twp.	Rge.	Shallow Flowing Wells	Twp.	Rge.	Shallow Flowing Wells
97N	56W	1	98N	57W	4
97	57	2	99	57	2

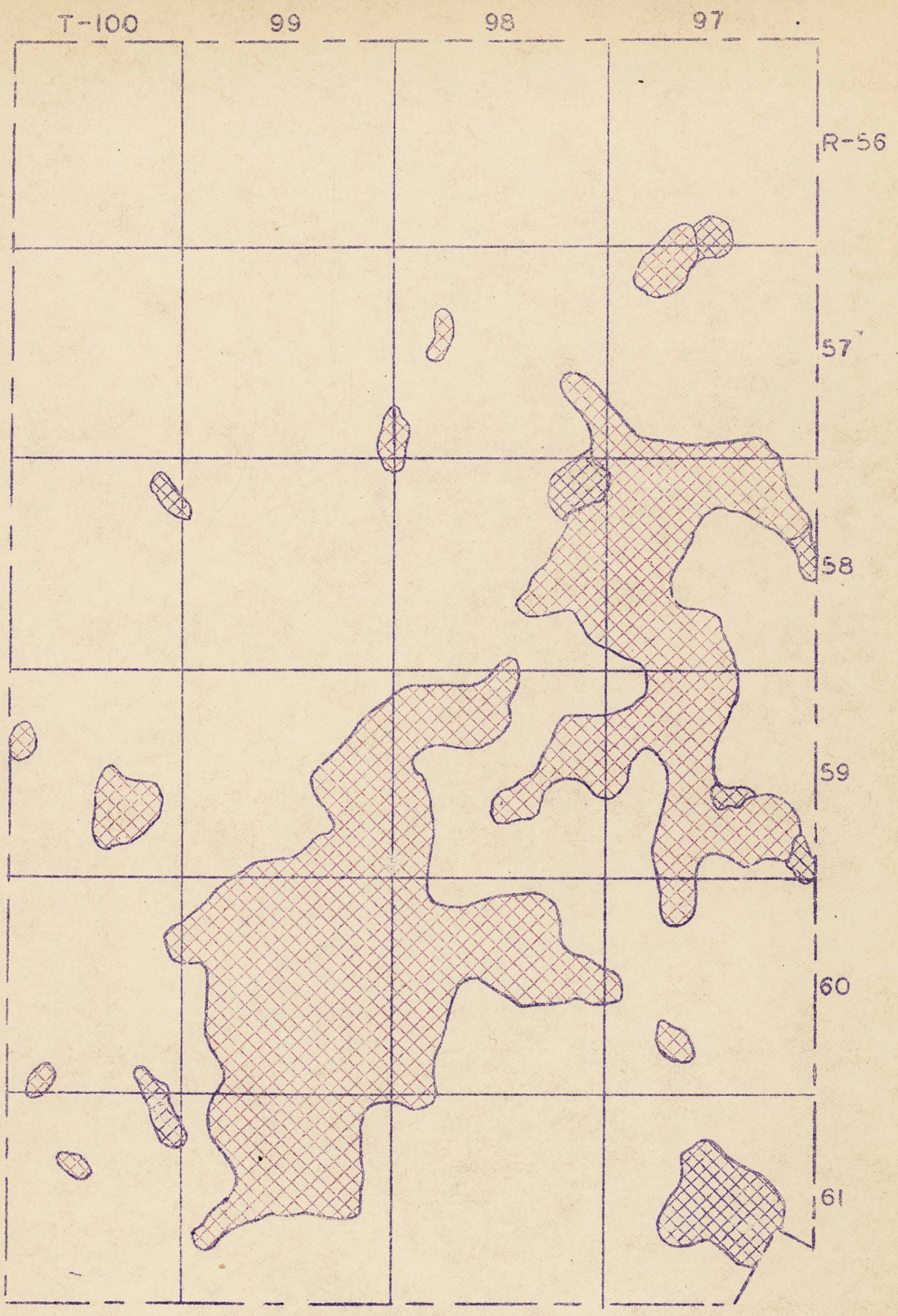
Deep wells, more than 200 feet, are more than one third, 36.8 per cent, of all wells reported from Hutchinson county. They were reported from all townships except Twp. 99N., Rge. 57W., and make up from 6.1 per cent to 94.4 per cent of all wells in the other 23 townships. Those townships with more than half of the wells reported deep are tabulated as follows:

Twp.	Rge.	Total Wells	Per cent Deep	Twp.	Rge.	Total Wells	Per cent Deep
97N	59W	40	60	98N	61W	18	94.4
97	60	31	74.2	99	59	32	53.1
97	61	37	62.2	99	60	42	57.1
98	59	24	58.3	99	61	37	86.5
98	60	45	64.4				

Almost three times as many deep wells were reported in the western half of the county than in the eastern half. Many deep wells in Hutchinson county, 36.5 per cent of those reported, were flowing wells. Indeed, in some townships, these outnumber the deep pumped wells, as in the townships tabulated below:

Twp.	Rge.	Pumped	Flowing	Twp.	Rge.	Pumped	Flowing
97N	58W	2	11	98N	59W	2	12
97	59	5	19	99	60	7	17

ARTESIAN AREAS-1938



HUTCHINSON COUNTY

FLOWING PUMPED

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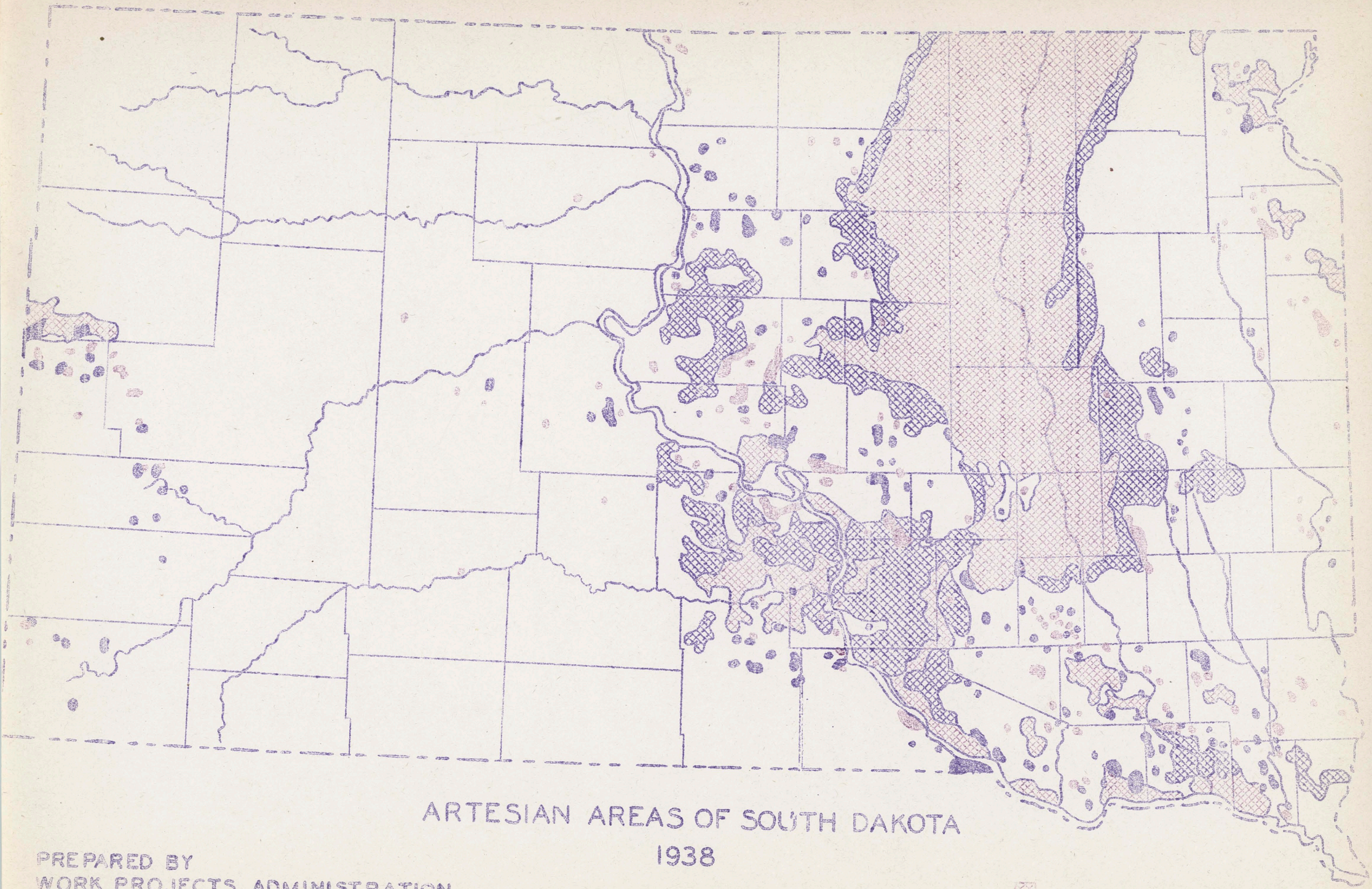

ARTESIAN AREAS OF SOUTH DAKOTA
1938

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W.P. 3636

FLOWING WELLS

PUMPED ARTESIAN WELLS

The areas of flowing and deep wells which are artesian are shown on the artesian map of Hutchinson county and the relation of these areas to those of the state are shown on the artesian map of South Dakota.

Although deep wells, almost entirely artesian, obtain water from depths ranging down to 750 feet, nearly one third of those reported, 32.8 per cent, were reported from depths between 200 and 300 feet;23.6 per cent were reported from 300 to 400 feet; 17.8 per cent between 400 and 500 feet; 20.5 per cent between 500 and 600 feet; and a very small percentage, 5.3 per cent, were reported deeper than 600 feet.Those in the western part of the county are deeper, on the whole, than those in the east.

CHARACTER OF WELL WATERS

The character of well waters of Hutchinson county has been determined from responses by farmers and owners to questionnaires. Each farmer was asked whether the water from his well was hard, moderately hard,or soft, and whether it was satisfactory for drinking. Although chemical analyses, the most satisfactory basis for determination of quality, are rarely available to farmers, usage is probably a fairly satisfactory criterion of general quality. Details must await adequate laboratory analyses.

In general, the well waters of Hutchinson county are predominantly hard. Farmers reported that of all wells, 57.8 per cent were hard, 33.7 per cent were moderately hard, and only 8.5 per cent were soft. Thus, 91.5 per cent of all waters reported were hard.

Hard waters are especially characteristic of shallow wells, since 59.4 per cent were reported definitely hard and 38.1 per cent moderately hard, with only 2.5 per cent reported soft.

In general, water from deep wells, more than 200 feet deep, is also hard, with 55.5 per cent hard, 26.9 per cent moderately hard,and 17.6 per cent soft.

The increase in relative number of soft water wells among the deep wells is due to the penetration by a number of wells into the Codell sandstone which

in this and adjacent areas, produces much soft water. This sandstone supplies water in several southwestern townships, mostly in wells 300 to 600 feet deep. Four townships in which deep wells obtain soft water within these depths and the percentage of soft water deep wells reported are tabulated as follows:

Twp.	Rge.	Per cent Soft	Twp.	Rge.	Per cent Soft
97N	60W	50.0	98N	60W	42.5
97	61	82.6	98	61	60.0

Other deep wells, most of which obtain water from the Dakota sandstone produce mostly hard water, according to reports.

Most of the waters from wells of Hutchinson county are satisfactory for drinking, although water from 14.7 per cent of all wells were reported unsatisfactory for drinking purposes. The shallow wells, however, include more than the average proportion of wells reported to produce water unsatisfactory for drinking with 17.8 per cent. Only 8.8 per cent of the deep pumped wells were reported to supply water unsuitable, and flowing wells, both shallow and deep, were reported to include 11.6 per cent unsuitable to use for drinking. Analyses are needed to indicate causes for unsuitability, since some waters are unsatisfactory because of surface contamination, and others because of unpalatable and possibly objectionable substances dissolved in the water.

ADEQUACY OF WELL WATERS

In order to ascertain to what degree wells are adequate to supply water for current farm needs, farmers were asked whether supplies were adequate. Most wells were reported adequate. Of all wells reported, however, nearly one fifth, 17.9 per cent, were said by the users not to supply sufficient water in 1938 for current farm needs. Shallow wells are reported to be about an average with 17.8 per cent inadequate. Most cases of inadequacy, however, are among those 50 feet or less in depth and these in the south central part of the county where inadequacy at these depths ranges between 25 per cent and 42.9 per cent. Several townships in which inadequacy is more or less critical in

shallow wells are tabulated below with percentages of inadequate to total shallow wells:

Twp.	Rge.	Per cent Inadequate	Twp.	Rge.	Per cent Inadequate
97N	57W	27.8	99N	56W	25.
97	58	32.	99	59	30.8
97	59	25.	100	58	42.9
98	58	33.3			

Deep pumped wells were reported 14.5 per cent inadequate but deep flowing wells were reported 29 per cent inadequate. Deep pumped wells are inadequate in considerable numbers in the northwestern part of the county at depths between 200 and 700 feet. In some of these townships large percentages, up to 75 per cent of the deep pumped wells, were reported inadequate. The following townships report more than 30 per cent inadequate:

Twp.	Rge.	Per cent Inadequate	Twp.	Rge.	Per cent Inadequate
98N	60W	31.3	100N	60W	42.9
99	60	71.4	100	61	75.

Flowing wells, both deep and shallow, were reported 23.2 per cent inadequate. Four townships report more than one fourth of the flowing wells inadequate:

Twp.	Rge.	Per cent Inadequate	Twp.	Rge.	Per cent Inadequate
97N	59W	31.6	98N	57W	40.
97	60	25.	99	60	39.1

The average volume of flow of flowing wells averages 1.3 to 36.7 gallons per minute by townships, or a reported flow of one to 50 gallons per minute by wells. Only five wells were reported to be equipped with control valves. Nearly 90 per cent, 87.2 per cent, were reported to be decreasing in rate of flow, 12.7 per cent steady and less than one per cent, a single well, was reported to have increased in flow.

SUPPLEMENTARY SUPPLIES

Springs and cisterns are supplementary water supplies commonly used in eastern South Dakota. Springs are of minor importance in Hutchinson county since only three were reported. Water from one of these was reported soft,

one hard, and the third was not stated. All were adequate and suitable for drinking.

In any area in which wells produce hard water, cisterns are important supplementary supplies. In Hutchinson county more than three fourths as many cisterns were reported as wells, a total of 623 cisterns. These are extensively used for laundry and drinking.

HUTCHINSON COUNTY

Table 1.

DATA ON PUMPED WELLS FROM 0 TO 200 FEET (INCL.) IN DEPTH

LOCATION		Number of Wells	DEPTH OF WELLS			CHARACTER OF WATER					ADEQUACY OF SUPPLY			
Twp.	Rge.		Min.	Max.	Ave.	Hard	Med.	Soft	Corrode Casing	Unsuitable for Drinking	Adequate	Inade-quate	Number used for Irrigation	Approximate Acres Irrigated
97	56	36	8	200	77	26	9	-	3	7	29	7	3	1 5/8
97	57	18	32	200	83	12	5	1	4	4	13	5	1	1/8
97	58	25	15	200	58	14	11	-	1	6	17	8	-	-
97	59	16	35	200	88	11	4	-	1	2	12	4	2	1/2
97	60	7	16	160	86	5	-	1	2	-	6	1	1	3/4
97	61	14	10	168	119	13	1	-	3	3	13	1	1	-
98	56	33	53	189	117	11	19	3	4	4	27	6	5	3/4
98	57	25	30	200	66	17	8	-	5	3	20	5	2	1/4
98	58	51	16	175	54	31	17	-	4	13	34	17	-	-
98	59	8	18	200	78	4	4	-	3	3	8	-	1	-
98	60	14	32	200	141	6	7	1	1	1	11	3	-	-
98	61	1	-	-	160	-	1	-	1	-	1	-	-	-
99	56	28	50	200	154	23	5	-	14	10	21	7	2	1/4
99	57	29	48	195	134	15	12	-	4	5	28	1	-	-
99	58	24	18	200	95	16	7	1	3	4	20	4	1	1/4
99	59	13	15	200	99	2	9	-	3	2	9	4	1	1/8
99	60	12	90	200	132	1	10	-	2	-	11	1	2	1/8
99	61	5	50	178	145	2	3	-	2	1	5	-	-	-
100	56	26	95	200	164	13	11	1	5	2	25	1	2	-
100	57	20	11	200	96	11	8	1	5	5	20	-	-	-
100	58	14	24	150	53	11	-	-	-	2	8	6	-	-
100	59	19	20	200	74	11	7	-	-	2	17	2	2	-
100	60	38	30	196	114	18	15	3	7	8	35	3	1	1/8
100	61	18	72	200	143	9	8	-	6	1	16	2	-	-
Total		494				282	181	12	83	88	406	88	27	4 7/8

HUTCHINSON COUNTY

Table 2.

DATA ON PUMPED WELLS OVER 200 FEET IN DEPTH

LOCATION		Number of Wells	DEPTH OF WELLS			CHARACTER OF WATER					ADEQUACY OF SUPPLY			
Twp.	Rge.		Min.	Max.	Ave.	Hard	Med.	Soft	Corroded Casing	Unsuitable for Drinking	Adequate	Inade-quate	Number used for Irrigation	Approximate Acres Irrigated
97	56	6	220	530	295	3	3	-	1	-	6	-	-	-
97	57	4	235	528	351	2	1	-	-	-	4	-	-	-
97	58	2	250	560	405	2	-	-	-	-	2	-	-	-
97	59	5	210	585	377	2	2	1	1	-	5	-	3	1/2
97	60	20	238	409	338	5	4	11	1	-	20	-	1	-
97	61	23	218	700	471	2	2	19	1	1	22	1	-	-
98	56	5	215	230	221	3	2	-	-	-	5	-	-	-
98	57	1	-	-	202	1	-	-	-	1	1	-	-	-
98	58	12	220	585	366	6	6	-	-	-	11	1	-	-
98	59	2	393	486	440	1	1	-	-	1	2	-	-	-
98	60	16	230	700	335	3	5	6	6	-	11	5	1	1/2
98	61	17	234	464	378	3	3	9	1	2	16	1	-	-
99	56	11	210	385	245	8	3	-	1	5	8	3	-	-
99	58	7	217	400	306	3	4	-	-	2	7	-	-	-
99	59	9	240	440	324	5	2	-	2	1	7	2	2	1/2
99	60	7	230	600	435	1	3	-	-	1	2	5	-	-
99	61	18	218	750	365	6	7	1	1	1	15	3	-	-
100	56	7	215	366	262	5	2	-	-	-	7	-	-	-
100	57	2	237	320	278	1	-	1	-	-	2	-	-	-
100	58	1	-	-	530	1	-	-	-	-	-	1	-	-
100	59	7	220	340	288	6	1	-	1	1	7	-	1	-
100	60	7	240	500	336	3	2	2	1	1	4	3	-	-
100	61	4	230	574	421	1	1	1	1	-	1	3	-	-
Total		193				73	54	51	18	17	165	28	8	1 1/2

NOTE: No wells reported for T.99N R.57W.

HUTCHINSON COUNTY
Table 3.
DATA ON FLOWING WELLS

LOCATION		Number of Wells	DEPTH OF WELLS			CHARACTER OF WATER					ADEQUACY OF SUPPLY					
Twp.	Rge.		Min.	Max.	Ave.	Hard	Med.	Soft	Corroded Casing	Unsuitable for Drinking	Adequate	Inadequate	Number used for Irrigation	Approx. Acres Irrigated	Ave. Gallon Per Min.	Number Controlled
97	56	1	-	-	169	1	-	-	1	-	1	-	-	-	-	-
97	57	5	138	425	273	4	1	-	3	-	5	-	1	1/8	5.25	-
97	58	11	280	650	449	7	4	-	4	-	11	-	3	1	13.95	-
97	59	19	420	630	551	14	3	1	10	-	13	6	2	1/2	13.69	2
97	60	4	100	674	501	-	4	-	-	-	3	1	-	-	36.67	-
98	57	5	40	275	118	4	1	-	2	-	3	2	-	-	1.50	-
98	58	7	480	585	528	6	1	-	1	-	6	1	-	-	1.30	-
98	59	14	45	552	390	7	7	-	1	1	12	2	3	5/8	8.29	-
98	60	15	160	700	507	10	3	1	5	1	12	3	-	-	10.15	-
99	57	2	75	140	108	2	-	-	2	-	2	-	-	-	3.00	-
99	59	10	110	490	351	9	1	-	3	2	8	2	-	-	5.11	1
99	60	23	105	700	425	17	4	2	7	6	14	9	3	1 1/4	4.99	1
99	61	14	366	611	537	13	1	-	10	3	11	3	1	-	2.56	1
100	59	5	154	225	186	4	-	-	3	2	4	1	-	-	7.17	-
100	60	2	130	382	256	1	-	-	-	1	-	2	-	-	2.00	-
100	61	1	-	-	529	1	-	-	1	-	1	-	-	-	5.00	-
Total		138				100	30	4	53	16	106	32	13	3 1/2		5

NOTE: No wells reported for this group from the following townships and ranges: T.97N., R.61W; T.98N., R.56W, 61W; T.99N, R.56W, 58W; T.100N., R.56W, 57W, 58W.

Hutchinson County Well Notes

The following are pertinent remarks quoted from questionnaires returned by farmers and are included opinions of the water situation as expressed by the individual farmers and must be so applied.

Twp.97N., Rge.56W. SW 1/4 Sec. 9	30 feet: "The well on my place has been good until these dry years come along and has been getting lower every year."
Twp.97N., Rge.56W. NE 1/4 Sec. 36	312 feet: (chalk rock) "The present well is the tenth well on this farm, having had 8 bored wells of various depths up to 125 ft. and a drilled well of 240 feet. This drilled well lasted only a short time, due to sand."
Twp.97N., Rge.57W. NE 1/4 Sec. 7	198 feet: "Shallow bored wells do not hold out. I had a well drilled 528 ft. deep with plenty of water, with only 28 ft. to water from surface and could pump 25 gallons a minute but was troubled with fine sand which could not be stopped. Always wore out pump leathers and cylinders."
Twp.97N., Rge.60W. NE 1/4 Sec. 9	400 feet: "It is quite a job getting a well in this vicinity. You get down about 16 ft. and strike quicksand and surface water and this sand goes down to about 80 or 100 ft. with veins of clay or blue clay. This is what makes drilling or sliding casing ahead impossible."
Twp.97N., Rge.60W. SW 1/4 Sec. 15	140 feet: (chalkrock)
Twp.97N., Rge.60W. SW 1/4 Sec. 28	272 feet: (chalkrock)
Twp.98N., Rge.56W. NE 1/4 Sec. 13	70 feet: "The water from my well is not fit to drink. I believe there are chances for an artesian well on my farm."
Twp.98N., Rge.56W. SW 1/4 Sec. 27	110 feet: "40 ft. down there is a hollow space where casings drop down about 2 ft. when a well is drilled. Our well used to be only 70 feet deep then water was nearly soft. About 4 or 5 years ago it went low on water, then we drilled it deeper. Water is very good to drink but not soft enough for laundry."
Twp.98N., Rge.57W. SE 1/4 Sec. 30	"The first well could not be finished on account of so much coarse gravel. The second one there was too much blue clay and no water."
Twp.98N., Rge.58W. SW 1/4 Sec. 2	48 feet: "Some holes were dry when made and others contained rock making digging difficult."

Twp.98N., Rge.58W. NW 1/4 Sec. 13	34 feet: "We only pump 1 1/2 barrels at a time, then in 15 or 20 minutes we can pump and get as much again. We are short of water in summer. It is not good for drinking or cooking as it contains alkali."
Twp.98N., Rge.59W. NW 1/4 Sec. 12	420 feet: "Have 3 artesian wells on farm and neither flows more than the size of a pencil."
Twp.98N., Rge.59W. SE 1/4 Sec. 33	120 feet: "Ive got one pumped well 120 ft. deep on hill and one artesian 48 ft. deep on bottom."
Twp.98N., Rge.60W. SW 1/4 Sec. 6	560 feet: "This well is 560 ft. deep, and at this depth there is a very hard rock. The well drillers say this rock can not be drilled through."
Twp.98N., Rge.60W. NW 1/4 Sec. 21	260 feet: "The water is sometimes black and the pail around the outside is oily."
Twp.99N., Rge.56W. NW 1/4 Sec. 12	385 feet: "There was a well on this farm in chalk rock or sand but always troubled and did not give sufficient water, therefore it was necessary to go deeper in a new hole."
Twp.99N., Rge.57W. Sec. 22	73 feet: "Between 78 and 91 ft.the drillers hit a hard layer which they are unable to drill through. This they claim is a layer of granite. Wells drilled above this layer do not last very long. There are artesian wells every where in the neighborhood but no artesian can be drilled on this place on account of this layer of rock."
Twp.99N., Rge.59W. Sec. 3	17 feet: "This well was a hand dug well about 4 ft. square and 17 ft. deep, but since the fine sand has worked in with the water, and has filled in about 2 1/2 ft. the water comes in on the side about four feet from the bottom. The curbing is poor and it's the second that's been put in."
Twp.100N., Rge.57W. Sec. 34	120 feet: "I had a well drilled about 6 ft. from my present well and the water from that well was always unclear. If it was allowed to settle it gave a sediment of gray matter. That well was about 150 ft. deep. After about 2 years it went dry."
Twp.100N., Rge.59W. Sec. 18	96 feet: "The difficulties were experience with wells is sand rock and no water."
Twp.100N., Rge.60W. Sec. 9	329 feet: "The sand rock is too soft on this place. I should get a good well at between 108-120 ft. according to my neighbors wells."

Twp.100N., Rge.60W. Sec. 31	430 feet: "We have two wells. The artesian well stopped flowing entirely in 1930. It did not give enough water so in 1918 we made a new well and put a windmill on it. The artesian well still has water in the pipes up to the ground. All it would need is repiping. The water is alkali and hard on pipes."

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