Hydrology of Stock-Water Development on the Public Domain of Western Utah

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1475-N

Prepared as part of the soil and moisture program of the Department of the Interior

Hydrology of Stock-Water Development on the Public Domain of Western Utah

By CHARLES T. SNYDER

HYDROLOGY OF THE PUBLIC DOMAIN

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1475-N

Prepared as part of the soil and moisture program of the Department of the Interior

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1963

UNITED STATES DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, *Secretary*

GEOLOGICAL SURVEY

Thomas B. Nolan, *Director*

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C.

CONTENTS

ILLUSTRATIONS

TABLES

HYDROLOGY OF STOCK-WATER DEVELOPMENT ON THE PUBLIC DOMAIN OF WESTERN UTAH

By CHARLES T. SNYDER

ABSTRACT

A geologic and hydrologic reconnaissance was made on the public domain of western Utah to appraise the water resources of the area and to provide a basis for locating and developing sources of stock water. The study area includes the Bonneville, Pahvant, and Virgin Grazing Districts, in parts of Tooele, Utah, Juab, Millard, Beaver, Iron, and Washington Counties, Utah.

Western Utah is in the Great Basin section of the Basin and Range physiographic province and is typified by northward-trending parallel mountain ranges, and basins of interior drainage. Precipitation ranges from 5 to 9 inches annually in most of the valleys but in some places it is as much as 15 or 16 inches and probably is considerably greater in the mountains.

The valleys of western Utah have been classified in the report according to their hydrologic and topographic characteristics. The Great Salt Lake valley and the Sevier Lake valley are closed or terminal valleys having no outlet for the discharge of water except by evaporation. Such valleys are topographically closed and hydrologically undrained. Valleys tributary to these terminal valleys are topographically open valleys from which water is discharged by gravity flow to the terminal valley. Quality of ground water in the valleys of western Utah depends upon the valley type and place where the water is sampled with respect to the body of ground water in the valley fill. Quality of the water in the drained parts of the valleys is usually good whereas water in the undrained parts of the valleys may be heavily charged with dissolved mineral contaminants. Limits of tolerance for use of salt-contaminated water are cited.

The adequacy of distribution of water supplies in western Utah was determined by application of the service area concept to the existing supplies. Stock-water supplies are obtained from wells, springs, and reservoirs. Most of the wells are in the valleys where water is obtained from valley fill; the depth to water ranges from a few tens of feet to several hundred feet. Ground water generally cannot be obtained in the mountains because the rocks either lack permeability or are drained.

Data collected in 13 valleys, each valley forming a ground-water unit, are listed in the tables and are used to evaluate the prospects for obtaining additional water supplies.

INTRODUCTION

PURPOSE AND SCOPE OF THE INVESTIGATION

Much of western Utah is public domain administered by the Bureau of Land Management. It is a region in which the low annual precipitation limits agricultural activity primarily to grazing. However, even grazing is restricted, as some localities do not have enough water for stock. Development of additional water supplies is needed to prevent overgrazing locally and to achieve optimum use of all the range.

This report gives the results of a geologic and hydrologic reconnaissance made during the summer of 1952, the spring of 1953, and the summer of 1955. The fieldwork was undertaken in response to a request from the Bureau of Land Management for information about the amount of stock water that was available, where additional water was needed, and what supplies could be found to fill the needs. The study included an inventory of existing stock-water supplies that was useful in locating well sites or for developing other sources of stock water.

PREVIOUS INVESTIGATIONS

Geographic investigations in western Utah were begun by Stansbury in 1849. Many geologic and geographic expeditions followed during the next 50 years. Highly important among them were the investigations of Gilbert (1890).

Ground-water investigations were made first in Beaver Valley by Lee (1908); late in Juab, Millard, and Iron Counties by Meinzer (1911); and in Box Elder and Tooele Counties by Carpenter (1913). More recently Cedar and Parowan Valleys were investigated by Thomas and Taylor (1946), Tooele Valley by Thomas (1946), and the Escalante Desert by Fix and others (1950).

Geologic investigations relating to the occurrence of mineral resources as well as the more general aspects of the geology have been made during the past several years. Reports describing the geology of western Utah are listed in a bibliography compiled by Buss (1951).

ACKNOWLEDGMENTS

This investigation was made as a part of the Soil and Moisture Conservation program of the Department of the Interior under the general supervision of H. V. Peterson, project hydrologist of the General Hydrology Branch, Water Resources Division, U.S. Geological Survey.

Acknowledgment is made of the cooperation received from the following personnel of the Bureau of Land Management: Messrs. Kent Giles and the late Earl Palmer, Bonneville Grazing District (now the Murray Grazing District); Pratt Allred and Nels Boge, Pahvant

Grazing District(now the Fillmore Grazing District); and Conway Parry, Virgin Grazing District (now the Cedar City Grazing District). Appreciation is expressed also to geologists of the Ground Water Branch, especially Harold E. Thomas, for advice and council.

Dr. W. T. Huffman of the Bureau of Animal Industry, Department of Agriculture, and Dr. P. F. Fix of the Geological Survey furnished information about limits of tolerance by livestock for mineral-contaminated water.

METHODS OF INVESTIGATION

Fieldwork consisted of a reconnaissance examination to locate the existing water sources and to map the extent of the water-bearing and non-water-bearing formations. Throughout much of the area water is found only in the valley fill, so the areal extent of the valleys is of major importance.

Locations of various features were determined by automobile and compass traverse from known points. Altitudes of the land surface were determined by barometric leveling from established bench marks. Locations were plotted with field maps furnished by the Bureau of Land Management.

During the reconnaissance an inventory was made of existing water facilities used for stock, and available information was compiled for each source. Also, possible new sources of stock water were investigated. Consideration was given to the use of surface water, such as springs, wherever possible, and well sites were sought when other water supplies were not available.

The service area of a well, spring, or reservoir is the area of range around a particular water source that can be used with a minimum amount of harm to the range or to the animals. To afford maximum protection for the range, water sources should not be more than 5 miles apart on easily traveled valley floors. On rough and broken terrain, where cattle have difficulty traveling, the water sources should be closer together. To appraise the distribution of water supplies in an area, circles of appropriate radius are drawn around each water source. Water supplies are considered to be adequate when these circles intersect or overlap.

NUMBERING SYSTEM

The numbering system used to describe the location of wells, springs, and reservoirs in this report is that in use by the Geological Survey. Utah is divided by the Salt Lake Meridian and Base Line into four quadrants, designated by capital letters. The two quadrants covering western Utah are: B, townships north and west of Salt Lake City and C, townships south and west of Salt Lake City. The quadrant designation and the township and range numbers are enclosed in parentheses. Thus, a location in T. 12 S., R. 9 W. is coded as (C–12–9) or a location in T. 2 N., R. 11 W. would be (B–2–11). The location is further defined by appending the section number and lower case letters indicating the quarter section. The quarter sections are designated: a, northeast; b, northwest; c, southwest; and d, southeast. Thus, the designation for a location in NW¼ sec. 5, T. 13 S., R. 8 W. would be (C–13–8)5b. This location is illustrated in figure 61.

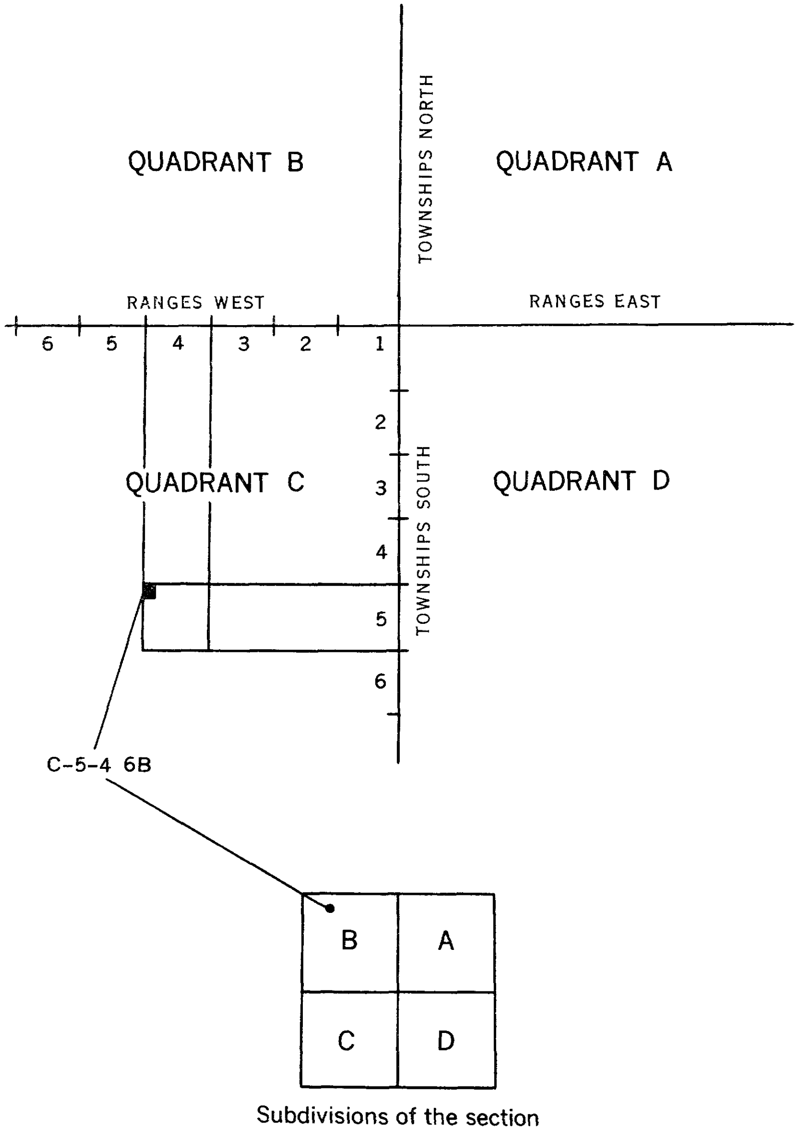

FIGURE 61.—Sketch showing numbering system used in this report.

GEOGRAPHY

LOCATION

The area described in this report (fig. 62) constitutes about one-sixth of the State of Utah. From north to south it includes parts of Tooele, Utah, Juab, Millard, Beaver, Iron, and Washington Counties. The eastern boundary follows the edge of the agricultural lands that are irrigated by streams originating in the high mountains of central Utah.

The public domain in western Utah is administered by the Bureau of Land Management through local grazing districts. The Bonneville District, with headquarters at Murray, include Tooele, Utah,

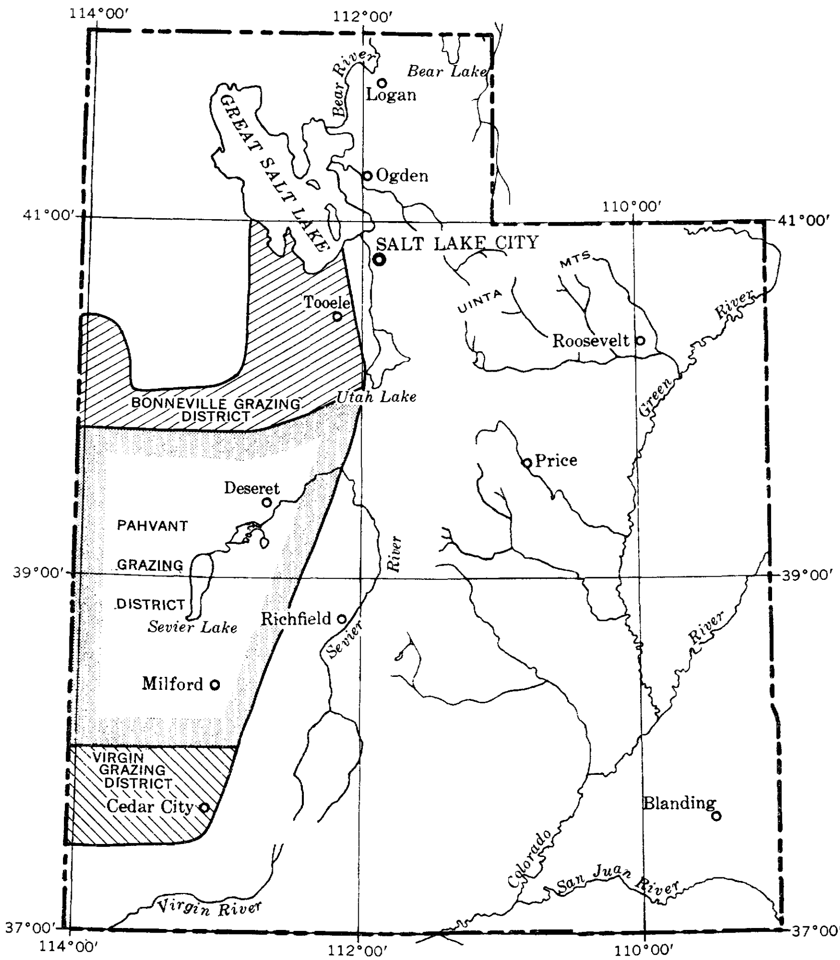

FIGURE 62.—Index map showing area of this report.

and part of Juab Counties; the Pahvant Grazing District, with headquarters at Fillmore, includes parts of Beaver, Millard, and Juab Counties; and the Virgin Grazing District, with headquarters at Cedar City, includes parts of Iron and Washington Counties. This study describes all the first two districts named but not all of the Virgin District.

U.S. Highways 6, 40, and 50 cross the area east to west, and many secondary roads and trails provide access to nearly every part of western Utah.

CLIMATE

Western Utah has an arid climate wherein potential evaporation far exceeds precipitation. The few available records (see table 1) show that annual precipitation is 5 inches or less for valleys in the northwestern part of the area but may be greater eastward and southward. In most of the valleys the precipitation ranges from 5 to 9 inches, but in some places it is as much as 15 or 16 inches. Although no records are available for the mountain areas, the kinds and quantities of vegetation indicate that annual precipitation in the mountains is considerably greater than in the valleys. This is confirmed further by the observation that the mountains are generally snow covered for several months each year.

An interesting feature of the precipitation pattern in western Utah is the contrast between the southern counties, in which precipitation is almost equally distributed throughout the year, and the western part of the two northern counties, where recurrent dry periods of two or more months are commonplace. Figure 63 shows by means of histograms the monthly distribution of precipitation at three widely separated stations.

TABLE 1.—*Climatological data for stations in western Utah (as of 1958)*

[Based on Weather Bureau Climatological Data]

Station	County	Altitude (feet)	Years of record[1]	Normal precipitation: Annual (inches)	Percent of annual: Summer	Percent of annual: Winter	Mean annual temperature (F°)	Length of growing season (days)
Black Rock	Millard	4,895	24	9.24	51	49	--------	96
Callao	Juab	4,341	20	4.78	52	48	--------	--------
Deseret	Millard	4,541	61	6.49	48	52	49.5	101
Desert Range Experiment Station.	Beaver	5,252	9	6.21	62	38	--------	135
Garrison	Millard	5,275	11	6.98	49	51	--------	120
Government Creek	Tooele	5,277	[2] 49	12.93	--------	--------	--------	120
Milford	Beaver	5,028	51	8.44	48	52	49.0	98
Partoun	Juab	4,537	8	5.82	43	57	--------	106
Tooele	Tooele	4,820	61	15.72	42	58	51.5	176

[1] Ending in 1958.
[2] Ending in 1949.

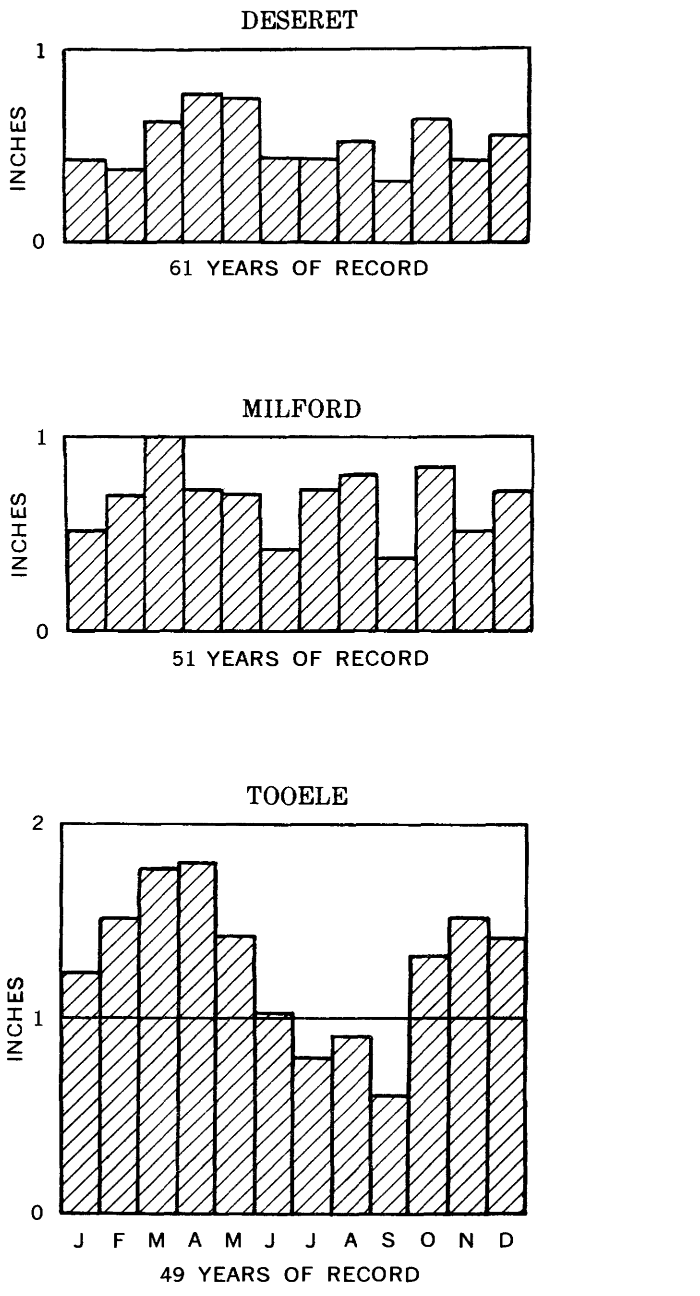

FIGURE 63.—Histograms showing distribution of monthly precipitation at three stations in western Utah.

SOILS AND VEGETATION

The soils of western Utah have been mapped by Marbut (1931, pl. 2) as northern gray desert soils. These range from the drained accumulations on the alluvial fans to the moist, salt-laden soils on the playa floors.

The vegetation in western Utah includes northern desert shrubs, which grow on the drained soils of the valley margins, and salt desert shrubs, which grow on the valley floors. Vegetation of the northern desert shrub type includes big sagebrush (*Artemisia tridentata*), black sage brush (*Artemisia nova*), rabbitbrush (*Chrysothamnus* sp), winterfat (*Eurotia lanata*) and shadscale (*Atriplex confertifolia*). Plant communities on the lower valley slopes and on the muddy playas are characterized by greasewood (*Sarcobatus verniculatus*), pickleweed (*Salicornia*), saltgrass (*Distichlis stricta*), and other salt-tolerant plants. Vegetation types that occur throughout the range of soil conditions in the area of this report contain valuable forage grasses and shrubs that support extensive livestock grazing.

LANDFORMS

Western Utah, in the Great Basin section of the Basin and Range physiographic province, has been described by Fenneman and Johnson (1930) as consisting of "isolated ranges (largely dissected block mountains) separated by aggraded desert plains." Most descriptions of the mountains and valleys stress their pronounced linearity but western Utah consists of sprawling valleys separated by mountains and intermontane basins. Fenneman (1931, p. 340) estimates that in a large part of this province, approximately half of the surface is occupied by mountains and the remaining half by valleys, a condition that seems to be characteristic of western Utah.

Generally speaking, each mountain is a partly eroded fault block having a north-south axis several times longer than its east-west axis. In contrast to the isolated ranges of the type described by Fenneman, many of the mountains in this region converge to form irregularly shaped ranges.

The mountains in the mapped area form a pronounced northeastward trending belt. According to Gilbert (1890), during the high stages of Lake Bonneville this belt of mountains formed a chain of islands that divided Lake Bonneville into two parts, the main body on the north and the Sevier body on the south and southeast. Gilbert's map of Lake Bonneville, (Gilbert, 1890, pl. 12) shows the main body covering almost half of the lake area, whereas the Sevier body was only about one-third the size of the main body.

Great Salt Lake Desert and the Sevier Desert (with the Escalante Desert as a principal tributary) are two large basins in western Utah that have 10 or more tributary valleys. In addition to the tributary valleys there are six isolated valleys—Sink, Rush, Cedar, White, Pine, and Parowan Valleys—that are separated from their neighbors.

The main body of Lake Bonneville extended westward from the mountains at Salt Lake City to the hills and mountains along the western boundary of the State. This area is now occupied by Great Salt Lake and the Great Salt Lake Desert. The Sevier body on the south covered the Sevier and Escalante Deserts.

Physiographic features in the valleys such as spits, bars, or beach terraces remain as evidence of the extent of Lake Bonneville. These features have been described in detail by Gilbert (1890) and Flint (1947).

The Great Salt Lake Desert, a featureless plain lying only a few feet above the present level of Great Salt Lake, is composed of lacustrine sediments that contain large amounts of salt derived by evaporation of Lake Bonneville. Part of these deposits are the well-known Bonneville Salt Flats.

One of the best known physiographic features in the Bonneville Basin is the relict channel known as the Old River Bed that linked Great Salt Lake with Sevier Lake during the latter stage of desiccation.

STREAMS

Surface water in western Utah is limited, with few exceptions, to short, steep, ephemeral streams that flow outward from the mountains during periods of snowmelt or after heavy rains. These streams occupy canyons at intervals around each of the mountains and terminate either on an alluvial fan or on a playa in the bottom of the valley.

Streamflow begins in the early spring when the snow starts to melt on the lower mountain slopes. Water usually continues to flow for several days or weeks during the period of snowmelt but ceases soon after the snow is gone. Snowmelt runoff is the largest source of water for recharge to the valley aquifers. Runoff also occurs as flash floods in response to summer thundershowers. These floods do not contribute much water to the aquifers, but they are important because they furnish water to surface reservoirs at a time when water from the early-season streamflow has been exhausted.

Small perennial streams occur at the foot of the mountains in Tooele and Skull Valleys and Fish Springs Flat. However, these flow for only short distances before the water entirely disappears by infiltration into alluvial materials or by evapotranspiration.

Beaver River, once one of the major streams, entered the Escalante Desert at Minersville and then flowed northward into the Sevier Desert. The Minersville Dam and other irrigation structures above it on this stream now retain or divert all surface flow from the Beaver River. Below Minersville the channel of Beaver River is dry except for occasional summer floods that originate below the Minersville Dam.

The Sevier River rises in the high mountains southeast of the mapped area (fig. 62), flows northward to about the latitude of the East Tintic Mountains, then westward to enter the Sevier Desert northeast of Delta, and finally southwestward to Sevier Lake. At its entrance to the Sevier Desert, the river has cut a deep channel into an alluvial fan, but the channel becomes shallower and disappears before it reaches Sevier Lake. All the flow of the Sevier River is diverted for irrigation before it reaches Delta, but return water from irrigation near Delta provides a small flow of water to the river as far west as Hinckley. Information on the occurrence and utilization of surface flow in the economy of the Sevier Desert has been described by Woolley (1947).

GEOLOGY AND OCCURRENCE OF GROUND WATER

The geology of western Utah, especially that of the mountains, is complex and not well known, even though detailed geologic examinations have been made in certain localities. Published reports include those by Walcott (1908), Gilluly (1932), Nolan (1935), and others. Features of the contact of valley fill and bedrock shown on the map (pl. 27) that were not shown by previous investigators (Stokes and others, 1951, p. 12; Butler and others, 1920, pl. IV; Morris, 1957; and Hintzie, 1960 *a–d*) were mapped during the reconnaissance. The area of western Utah included in this report is now (March 1961) shown on the geologic map compiled by Hintzie. These maps became available too late for use in preparing this report, but they can be consulted if additional geologic information is required.

MOUNTAINS

The mountains consist of uplifted, deformed, and somewhat eroded bodies of igneous, metamorphic, and sedimentary rocks that range in age from Precambrian to Quaternary. These rocks include schist, quartzite, and slate of Precambrian age; limestone, shale, quartzite, dolomite, and sandstone of Paleozoic and Mesozoic age; and sedimentary and igneous rocks of Tertiary and Quaternary age.

Although precipitation is higher in the mountains than it is in the valleys, only small supplies of water are obtained from wells and springs because the rocks are generally dense and impermeable. It is important, however, to note that runoff from the mountains is the major source of recharge for valley aquifers.

Recent alluvium in the mountain stream channels is not extensive. In some canyons it is saturated throughout the year, but in others it is saturated, or partially saturated, only for short periods following runoff. Permanently saturated alluvium, unfortunately, is not commonplace, and random drilling for water in the canyons is not advisable. Experience has shown that drilling in the mountains is expensive and rarely successful.

VALLEYS

Deposition in the valley has been continuous under a subaerial, semiarid environment since the valleys were first formed, except when the basins contained Pleistocene lakes. At present the basins are semiarid deserts with alluvial fans around the margins and playa lakes on the basin floor.

The valleys are filled to great depths with unconsolidated sediments. An exploration well (C-16-8)24a in the Sevier Desert west of Delta, drilled cooperatively by the Gulf, Union, Shell, and Standard of California Oil Companies, passed through 8,060 feet of sediment without reaching bedrock.

Sediments in the valleys range from coarse, poorly sorted debris in the alluvial fans to well-sorted silt and clay in the central valley floor. Lacustrine deposits, usually well-sorted silt and clay, interfinger with the alluvium. Playa deposits consist of well-sorted silt and clay interbedded with evaporites.

Alluvial fans play an important role in the hydrology of the valleys. Water enters the coarse-grained deposits at the apex of the fans and then moves downward through permeable zones of coarse material to replenish the valley aquifers.

Most stock water in the valleys is obtained from springs or from wells drilled into the valley fill. However, the occurrence and quality of the water differ from valley to valley and in different parts of the same valley. These differences are important and must be considered in a water-development program. The occurrence of water is discussed more fully in the detailed descriptions of the individual valleys.

The principal factors affecting the depth to water and the water quality are: the hydrologic and topographic characteristics of the valley, the location of the well within the valley, and the depth to and kind of bedrock.

The valleys of western Utah are listed in table 2 according to their hydrologic and topographic characteristics. Several of the valleys listed have no surface or subsurface outlets, hence are hydrologically undrained and topographically closed. Many of the valleys are tributary to the Great Salt Lake Desert or the Sevier Desert and are drained to these larger basins. These deserts are terminal basins that have no outlet so discharge of water occurs entirely by evaporation.

TABLE 2.—*Topographic and hydrologic characteristics of the valleys in western Utah*

Valley	Hydrologic characteristics		Topographic characteristics	
	Drained	Undrained	Open	Closed
Main body, Lake Bonneville:				
Tooele	×	--------	×	
Rush	×	--------	--------	×
Cedar	×	--------	--------	×
Skull	×	--------	×	
Sink	×	--------	--------	×
Great Salt Lake Desert	--------	×	--------	×
Government Creek	×	--------	×	
Dugway	×	--------	×	
Fish Springs Flat	×	--------	×	
Snake Valley	×	--------	×	
White	--------	×	--------	×
Sevier body of Lake Bonneville:				
Sevier Desert	--------	×	--------	×
Wah Wah	×	--------	×	
Escalante Desert	×	--------	×	
Cedar	×	--------	×	
Parowan	×	--------	--------	×
Pine Valley	×	--------	--------	×

The alluvial fill in the lower part of an undrained, closed basin is saturated throughout, and discharge of water occurs solely by evapotranspiration. If recharge exceeds evapotranspiration a marsh or playa lake will form. A marsh is formed if the water supports plant life. When the water becomes excessively saline plants cannot grow, and a wet playa or saline lake forms. In the geologic development of the basin, evaporites such as common salt and gypsum are deposited and eventually become interbedded and (or) intermixed with the alluvium. These evaporites may be redissolved by ground water so that in some closed basins the water is too highly mineralized for use.

In open or drained valleys, on the other hand, water flows to a lower valley; the water table, below which flow occurs, may be tens or hundreds of feet below the land surface. Consequently, loss of water by evapotranspiration is at a minimum and evaporites do not accumulate; therefore, the ground water is generally of relatively good quality and wells are feasible wherever the depth to water is within practical drilling depth.

The selection of the site for a well within a valley that is undrained is more difficult. Wells near the center of an undrained valley usually produce ample quantities of water, but this water may be highly mineralized and unfit for use by livestock. However, usable shallow wells developed near the margins of these valleys may intercept fresh water before it becomes too highly saline.

In some areas, pediments—thinly covered sloping rock surfaces that have the appearance of alluvial fans at the base of the mountain—occur in place of the usual alluvial fans. These pediments commonly occur in embayments or reentrants that are similar in appearance to the main part of the valley. Wells drilled in these areas are generally dry because they reach impermeable bedrock above the level of the valley water table. In most cases the thickness of the detrital veneer cannot be determined by visual inspection, and drilling in areas underlain by pediments generally is not recommended. Pediments occur along the base of the Confusion Range in White Valley; in Dugway Valley between the McDowell Mountains and the Dugway Range; between the Dugway Range and the Thomas Range; between the Confusion Range and the Wah Wah Mountains, east of Crystal Peak; and along the eastern edge of the Beaver and San Francisco Mountains.

In most valleys of western Utah the water table has approximately the same shape as the valley floor, but its inclination on the margins of the valley is not as steep as that of the ground surface; consequently, there is generally a progressive increase in depth to water outward from the central part of the valley floor toward the mountains.

For the most part, structural features in the bedrock, such as folds and faults, do not affect the occurrence of ground water in the valleys. The reason for this is that most of the deformations predate the deposition of alluvium, and also that the bedrock itself does not generally carry appreciable quantities of ground water.

USE OF SALINE WATERS

Usability of mineralized water by stock cannot be determined entirely by chemical analysis because tolerance levels are variable. In general, sheep and cattle can tolerate more salt in solution than can horses; furthermore, stock raised in areas of high-salt contamination can tolerate greater concentrations than can stock raised elsewhere.

During the period of the investigation (from 1950 until 1953) the Bureau of Land Management office of the Bonneville Grazing District used tolerance standards that were based on experiments with sodium chloride (common table salt) solutions, conducted in Australia by Ohman (1939). The results obtained by Ohman indicate that stock

649965—63——3

will utilize water containing no more than the following concentrations of sodium chloride: horses, 7,800 ppm (parts per million); cattle, 9,400 ppm; and sheep, 15,600 ppm (by comparison the ocean averages about 19,000 ppm sodium chloride). More recent experiments both in this country and in Australia indicate that the tolerances obtained by Ohman probably are conservative.

The experimental limits determined by Ohman apply to solutions of sodium chloride and may not be true when concentration of other salts are present. For example, a sample of water from the Greyback well (B-1-11)35 Tooele County that was analyzed by the Geological Survey showed the following composition:

Name and symbol	*ppm*
Sodium (Na)	3,620
Magnesium (Mg)	850
Calcium (Ca)	610
Chloride (Cl)	9,300

The calculated dissolved solids on the basis of this partial analysis is 14,600 ppm or more. C. E. Roberson (chemist, Geol. Survey) has computed that if all the sodium present were combined to form sodium chloride the maximum concentration of sodium chloride would be 9,200 ppm. On the basis of the work done by Ohman this water would be refused by horses and would be borderline for cattle but would be accepted by sheep. Actually even the sheep refused this water.

In discussing this analysis and others, Dr. W. T. Huffman (oral communication), formerly of the Bureau of Animal Industry, now retired, expressed the opinion that the sheep refused this water mainly because its high magnesium content made it unpalatable. Water obtained in several wells drilled west of Great Salt Lake and in the vicinity of Sevier Lake is refused by livestock. Additional work to establish standards for the maximum allowable concentrations of the various salts in stock water would be of considerable value.

DEVELOPMENT OF STOCK-WATER SUPPLIES IN INDIVIDUAL VALLEYS

Before this reconnaissance was made, water-supply development in the valleys of western Utah met the immediate local needs and only minor attention was being given to long-range areal development. The water supplies in the individual valleys, or groups of valleys that form physiographic units, have identifiable characteristics of occurrence and distribution peculiar to those units. The hydrologic characteristics of these individual basins and units are described separately in the following sections.

TOOELE AND RUSH VALLEYS

Tooele and Rush Valleys (pl. 27) occupy a northward-trending structural trough along the eastern edge of Tooele County. Although they occupy the same trough the valleys are separated by the Stockton Bar, a gravel spit that connects the bedrock mountains on the sides of the trough. Gilbert (1890) called this a "Wave Built Barrier," and shows its configuration in his plate 20. Tooele Valley, which lies to the north, is about half as large as Rush Valley to the south.

Cattle graze on the margins of Tooele Valley and on the surrounding mountain slopes. A large part of the public land on the valley floor has been included in the Tooele Ordnance Depot and has been withdrawn from grazing. The remainder of the valley floor is private land used for farming.

Most of Rush Valley is used for grazing, except for a belt of farmland along the western edge of the valley. Deseret Chemical Depot occupies about one township in the northeastern part of the valley.

In Tooele Valley surface water moves northward toward Great Salt Lake; but in Rush Valley surface flow, blocked by South Mountain and the Stockton Bar, terminates in Rush Lake near the northern end of the valley.

Stock water is furnished mainly by wells and in minor amounts by springs and reservoirs. Previous ground-water examinations were made by Carpenter (1913) and Thomas (1946).

SPRINGS

Several big springs in Rush Valley are used for irrigation but only the three springs used for stock are listed in table 3. Springs on private land in Tooele Valley, described by Thomas (1946, p. 99), have an annual discharge of about 20,000 acre-feet, but only a small part of this water is available for use by stock on the public domain.

The springs in Rush Valley offer a source of potential additional water for stock. The depression springs in Tooele Valley do not require improvement. Water from springs in the Stansbury Mountains (pl. 27) could be piped into the valley as needed.

RESERVOIRS

Reservoirs in Rush Valley provide water for sheep during the spring and early summer when there is runoff. Many reservoirs in the area go dry during the summer but two of the seven reservoirs listed in table 4 contained water when they were inspected in the fall of 1952. Specific reservoir sites were not identified during this examination, but additional reservoirs might be constructed on those stream channels that carry water.

WELLS

Many wells derive water under both artesian and water-table conditions throughout Tooele Valley. Thomas (1946, p. 97) estimated that about 90 percent of the 1,100 wells in the valley are artesian. According to Thomas (1946, p. 177), the water table in the fill of Tooele Valley has about the same shape as the valley floor, sloping toward the center of the basin and northward toward Great Salt Lake.

The southern part of Rush Valley is divided into an eastern and a western part by the West Tintic Mountains (the Vernon Hills). The area east of the Vernon Hills is about twice the size of the western counterpart. Near Vernon, west of the Vernon Hills, the ground water is relatively shallow—the greatest depth is 85 feet—and there are several flowing wells. East of the Vernon Hills many successful wells have been drilled into the valley fill. None flow as the depths to water range from 80 to 585 feet below the surface.

The water table in Rush Valley is inclined northward from altitudes of 5,400 feet in the southwest and 5,200 feet in the southeast to an altitude of 4,900 feet at Rush Lake. Thomas (1946, p. 195) considers it unlikely that there is large-scale ground-water movement from Rush Valley into Tooele Valley because of the large amounts of clay and other fine-grained sediments deposited around Rush Lake.

The quality of the water in most of the wells drilled in Rush Valley has not been a problem. However, well (C-6-5)21a, located near the north end of the valley, was abandoned because of high salt content. Additional information is needed on the quality of water from other wells in this part of the valley.

Many well sites could be selected in Rush and Tooele Valleys as needed, generally on the basis of information from existing nearby wells. Sites for additional wells, distant from existing wells, may be selected on the basis of data given in the following table.

Typical well sites in Rush and Tooele Valleys

Location	Altitude of land surface (feet)	Estimated depth to water (feet)	Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-2-6)29d	5,100	<200	19	5,375	300-400
(C-4-6)11a	5,000	<200	31a	5,310	300-400
(C-7-4)35c	5,130	200+	(C-8-5)21c	5,470	200-250
(C-7-5)6 or 7	5,350	200-300			

CEDAR VALLEY

Cedar Valley—the northernmost of 2 Cedar Valleys in the report area—is in western Utah County immediately east of Rush Valley. It is a small, closed basin bordered on the northwest and north by the

Oquirrh and Traverse Mountains, on the southwest and south by the East Tintic Mountains, and on the east by the Lake Mountains. These ranges are made up of folded and faulted Paleozoic sedimentary rocks and (or) Tertiary igneous rocks.

Cedar Valley is separated from the neighboring valleys by low passes that served as narrow channels between the main body of Pleistocene Lake Bonneville and the contemporaneous lake in Cedar Valley. When Lake Bonneville receded, Cedar Valley contained a small, isolated lake.

East and north of Fairfield the valley is farmed whereas the rest of the valley is used for grazing.

Water for stock in Cedar Valley is supplied by wells in the valley and by nearby mountain springs; there are no reservoirs in the valley.

SPRINGS

A dependable supply of water has been piped from Greeley spring (C–9–2)29a and Mabie spring (C–9–2)32b to tanks and troughs on the valley floor. A spring in the Oquirrh Mountains (C–6–3)15, northwest of Fairfield, furnishes water to a trough in Manning Canyon. These springs are listed in table 3.

WELLS

Nine usable stock wells have been drilled in the southern half of Cedar Valley in addition to several irrigation wells in the northern and central parts of the valley. Two wells at the south end of the Lake Mountains are included in table 3 although they are outside Cedar Valley. All the stock wells and three of the irrigation wells near Fairfield are listed in table 3 and are shown on the map (pl. 27). The water table ranges in altitude from 4,825 feet at Fairfield to 4,660 feet near the south end of the valley.

A well (C–8–3)35c, recently drilled into the alluvium of Broad Canyon, a tributary of Cedar Valley in the East Tintic Mountains, was dry at the alluvium-bedrock contact. Drilling was not continued into the underlying bedrock.

Additional stock-well sites can be selected in Cedar Valley on the basis of nearby wells. As an example, additional water for the areas northwest of Fairfield may be expected at two sites as indicated in the following table:

Typical well sites in Cedar Valley

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C–6–2)19b	5,000±	200–350
30b	5,000±	200–350

SINK VALLEY

Sink Valley, in north-central Tooele County, is the northernmost valley investigated (pl. 27). It is a small northward-trending basin about 20 miles long and 7 miles wide, northwest of Skull Valley and north of the Cedar Mountains. This valley is enclosed by the Lakeside Mountains on the east, the Cedar Mountains on the south, and the Grassy Mountains on the northwest and north. Alluvium-filled passes open into Skull Valley and into the Great Salt Lake Desert.

Water for stock in Sink Valley is supplied entirely by wells. These are listed in table 3 and shown on the map (pl. 27). No springs or reservoirs are utilized at present or are being considered for development within Sink Valley.

Seven wells have been drilled in Sink Valley to depths that range from 212 feet to 363 feet. Six were drilled into alluvial fans and reached water at depths ranging from 171 to 311 feet. These wells produce water of fair quality suitable for use by sheep. One well (B–3–9)19b, drilled on the valley floor, produced saline water and was abandoned.

The water table in the valley has about the same configuration as the valley floor with a northward inclination toward Great Salt Lake from an altitude of 4,275 feet at the south to 4,245 feet at the north.

SKULL VALLEY

Skull Valley in central Tooele County is one of the large valleys of the northern group used almost exclusively for grazing (pl. 27). It occupies a trough bounded on the east by the high Stansbury Mountains and on the west by the lower Cedar Mountains. The valley opens on the north to an embayment of Great Salt Lake. Skull Valley is considered to include the western slope of Stansbury Island and the eastern slope of the Lakeside Mountains. The southern boundary of the valley is formed by a chain of low hills extending southeastward from the Cedar Mountains.

The floor of Skull Valley rises southward from Great Salt Lake. In the north, near the lake, the slope is slight, and much of the valley floor is a mud flat only a few feet above the level of Great Salt Lake. Farther south the slope is somewhat greater, and the valley floor is dry, typical of the desert.

The east side of Skull Valley is relatively well supplied with water by intermittent streams originating on the high Stansbury Mountains. Lesser amounts of water enter the valley as ephemeral runoff from the Cedar Mountains.

Wells and springs provide water at scattered locations but large areas within the valley are without water and additional wells are required. Existing water sources are shown on plate 27 and are listed in tables 3 and 4.

SPRINGS AND RESERVOIRS

Springs in Skull Valley and in the neighboring mountains furnish a substantial supply of water for stock. Several springs in the valley are fault-line springs; others discharge through permeable zones at formational contacts.

Big Spring (C–1–7)8, the largest in the valley having an estimated discharge of 30 cfs, is one of several springs located on the fault near the north end of the Stansbury Mountains. Water from this spring, which is slightly saline, flows northward over the desert floor toward Great Salt Lake.

Jacobs Spring (C–4–10)7 may be developed by enclosure within a suitable head box to exclude cattle. Other springs in the mountains may require similar treatment.

Two irrigation reservoirs are in use in the central part of Skull Valley near the foot of the Stansbury Mountains. One reservoir receives runoff from the mountains and the second is supplied by springs. These are not used for stock. No stock reservoirs are in use in the valley.

WELLS

Seventeen wells ranging in depth from 20 to 448 feet have been drilled in the alluvial slopes on the margins of Skull Valley. The water table slopes northward from the head of the valley to the northern end where it is about at the level of Great Salt Lake. The head of water ranges from above the ground surface at the flowing wells to 390 feet below the surface in the deepest well near the south end.

Three wells have been drilled into the alluvial fans on Stansbury Island. Water was found in all of them, but in wells (B–1–6) 27d and 28d it was too saline for use. Several wells have been drilled along the eastern foot of the Lakeside Mountains under conditions similar to those found on Stansbury Island. Although the water level in these wells is only a few feet above level of Great Salt Lake, the water obtained is usable because there is fresh-water recharge from the mountains. On the other hand, water from wells on the desert floor near Delle, at the north end of Skull Valley, is too saline for any use.

Only saline water can be obtained from wells on the valley floor near Delle. Elsewhere throughout the valley previous drilling has demonstrated that usable water can be developed about as needed. Sites similar to those given in the following table may provide water from wells in the alluvial fans at the north end of the valley or as needed in the southern end of the valley. Water in the northern end of the valley will be slightly above the level of Great Salt Lake, the depth to water being 150 feet, whereas in the southern end of the valley depths to water may range from 30 to 400 feet.

Typical well sites in Skull Valley, the Lakeside Mountains, and Stansbury Island

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(B-2-8)17b	4,380	150-200
(C-2-6)28d	4,500	<200
(C-7-7)21d	5,270	500±

In summary, the quality of the water ranges from good in the south, to fair in the alluvial fans at the north end of the valley, to unusable on the valley floor near Great Salt Lake.

GOVERNMENT CREEK VALLEY

In plan view, Government Creek valley is a Y-shaped trough between the Cedar and Sheeprock Mountains on the east and the Simpson Mountains on the southwest (pl. 27). Davis Mountain is between the forks of the Y. A weather station maintained in the valley indicates that annual precipitation is about 13 inches, or considerably greater than in the area to the west. Government Creek occupies a well-defined channel that carries flow from the Simpson and Sheeprock Mountains. Recharge to the alluvium is sufficient for the stock wells needed.

Water supplies for Government Creek valley are provided by wells, springs, and reservoirs (pl. 27 and tables 3 and 4). Water-development possibilities include rehabilitation of existing unused wells, drilling of new wells, and development of springs or seeps.

SPRINGS AND RESERVOIRS

Several springs occur on the northeast slope of the Simpson Mountains. Water from one spring, (C-9-8)15c, has been piped about 4 miles down the mountain slope to a stock-watering trough (C-8-8)35. No springs occur on Davis Mountain, and springs furnish only minor amounts of water in the Onaqui, Sheeprock, and Cedar Mountains. A few of the springs listed in table 3 could be made to serve larger areas through use of pipelines.

As of 1952 three reservoirs have been constructed in the Davis Mountain area including one (C-8-7)8a east of the Davis Mountain and two, (C-9-8)2b and (C-9-8)15b, in the Government Creek valley on the northeastern slope of the Simpson Mountains. Information about their effectiveness is not available.

WELLS

Four sucessful wells have been drilled in the area east and south of the Davis Mountain, but only two were in use in 1952. The depth to water in them ranges from less than 100 feet (C-8-8)36b to 290 feet in the unused well (C-8-7)30d. If additional wells are required, water may be found under conditions similar to those in nearby wells or at sites similar to those described in the following table.

Typical well sites in Government Creek Valley

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-8-7)9a	5, 300	>250
(C-8-8)27	5, 000	>200

GREAT SALT LAKE DESERT

The part of the Great Salt Lake Desert that is included in the investigation is a belt 5 to 6 miles wide along the western foot of the Grassy and Cedar Mountains in central Tooele County. The area to the west and north is a wasteland, not suitable for grazing. Geologically and hydrologically this belt is similar to Sink Valley or other valleys that drain toward Great Salt Lake. Usable water can be obtained only on the alluvial fans, as the valley floor is underlain by saline water.

Ten wells and one spring, listed in table 3 and shown on plate 27, furnish water of fair quality for use by livestock.

SPRINGS AND RESERVOIRS

Lone Rock Spring in the northwestern part of the Cedar Mountains (C-2-10)8d, the only spring in the area, is a fault-line spring that furnishes a small supply of stock water.

No reservoirs have been constructed in this area because the low annual precipitation—probably only about 5 inches—and low runoff makes the use of reservoirs as water sources impractical.

WELLS

Ten wells have been drilled into the alluvial fans along the western slopes of the Grassy and Cedar Mountains and one well has been drilled on the valley floor near Clive.

Quality of the water varies with location. Wells drilled near the mountains usually provide water of fair quality, but wells drilled on the valley floor yield water that is too saline for use. This variation in quality depends upon the position of the well in relation to the body of saline water and the fresh water, which floats on the salt water.

Water of usable quality occurs in the alluvium between altitudes of 4,260 feet and 4,290 feet, or 60 to 90 feet above the level of Great Salt Lake. Wells have an average depth of 167 feet and range from 90 to 340 feet. Depth to water ranges from 78 to 295 feet below ground surface. Additional wells can be obtained in this marginal area within the indicated limits. Special attention is required during drilling and pump placement to insure fresh water. A well should not be drilled more than a few feet below the water surface, and the pump should be kept near the water surface to skim the fresh water overlying the salt water.

DUGWAY VALLEY

Dugway Valley in southern Tooele County and north-central Juab County is an embayment of the Great Salt Lake Desert enclosed on the east, south, and west respectively by the Simpson and McDowell Mountains, and the Dugway Range. Old River Bed, described earlier, is between the McDowell and Simpson Mountains and crosses Dugway Valley from the southeast in a trench cut into the valley floor. This trench contains stream sediments that are more permeable than the alluvial fans or the lake bed deposits. Alluvial fans in Dugway Valley are restricted to a narrow zone at the foot of the mountains.

Stock water in Dugway Valley is provided by wells, springs, and reservoirs.

SPRINGS AND RESERVOIRS

Simpson Spring (C–9–8)18 and Coyote Spring (C–10–8)5 (table 3) supply water for stock in the eastern part of Dugway Valley. Simpson Spring has been developed by the construction of tanks and troughs. Water from Coyote Spring is carried by a ditch to the Bennion Ranch (C–10–8)6c. Stock is able to water at this ditch throughout most of its length. Additional spring developments may not be required.

Four reservoirs (table 4) have been built (as of 1952) in Dugway Valley and one, Slow Elk Reservoir (C–11–9)7b, has been built in the northern end of the McDowell Mountains. Construction of additional reservoirs may be a means of providing increased water supplies if sites can be chosen where runoff will be adequate.

WELLS

Two separate bodies of sediment, the valley fill that occurs throughout Dugway Valley and the stream deposits of the Old River Bed trench, supply water to wells in Dugway Valley. These wells are listed in table 3. Four successful wells have been drilled into the valley fill to depths of 202 to 555 feet, and three wells in the Old River

Bed have been successful at depths of 57 to 100 feet. Depth to water varies from 170 to 525 feet below the surface in Dugway Valley and from 57 to 100 feet in Old River Bed. In one dry hole (C–11–10)9d bedrock was reached at a depth of 190 feet. Water in well (C–11–11)12a has a temperature of 98°F which is higher than the temperatures found in nearby wells. Water in Dugway Valley appears to be moving northward from the mountains toward Great Salt Lake Desert.

Dugway Valley is fairly well supplied with water at present. Additional wells at sites such as those listed in the following table should be successful.

Typical well sites in Dugway Valley

Location	*Altitude of land surface (feet)*	*Estimated depth to water (feet)*
(C–9–10)34	4, 400	50–150
(C–9–11)36c	4, 470	250–400
(C–10–10)22	4, 530	400–500

FISH SPRINGS FLAT

Fish Springs Flat is a small valley in north-central Juab County bounded by the Thomas Range on the east, the Dugway Range on the northeast, and the Fish Springs Range on the west. To the north the valley merges with the extensive flats of the Great Salt Lake Desert. The valley of Fish Springs Flat narrows toward the south. In its northern part the valley floor is mud covered, a characteristic of the Great Salt Lake Desert. The valley floor rises southward to become a typical semiarid basin. A dry, well-defined stream channel enters the southern end of Fish Springs Flat, but loses its identity about halfway down the valley.

The Thomas Range is composed largely of Tertiary volcanic rocks with isolated bodies of Paleozoic rocks. Paleozoic sedimentary rocks occur in the Dugway Range. A non-water-bearing pediment of igneous rock underlies the alluvium at shallow depth in the re-entrant between these two ranges.

Wells, springs, and reservoirs (tables 3 and 4) furnish water for stock throughout the valley.

SPRINGS AND RESERVOIRS

The springs in Fish Springs Flat were well known to early travelers but were first described in a published report by Meinzer (1911, p. 124–126). All the springs in this area, listed in table 3, are located on the valley floor except Wildhorse Spring (C–12–12)10 which is in the Thomas Range. Wildhorse Spring was improved in 1952 by construction of a head box and storage tank.

Reservoirs in the valley (table 4) include the Peterman Reservoir (C-11-12)15a, Fish Flat Reservoir (C-13-13)35c, and the Swazey Point Reservoir (C-14-13)7 in the extreme southwestern part of the valley. The dam at Fish Flat Reservoir was breached within a year of completion by storm runoff that exceeded the reservoir capacity.

WELLS

Water occurs in the alluvium of Fish Springs Flat at depths ranging from 145 to 370 feet. At present there is not enough information to permit generalizations about the water table, but it is likely that the water table slopes northward toward the Great Salt Lake Desert. All wells (table 3) were successful except (C-11-12)1d, where a dry, bedrock pediment was reached. These wells are all on the eastern side of the valley.

Wells drilled at sites along the western side of the valley, near the southern end, such as those listed in the following table should provide water. However, it may be necessary to drill to depths of 300 to 450 feet. A well drilled at the Wildhorse site (C-12-12)7 produced water at 190 feet. Additional drilling in the northern end of the valley does not appear to be warranted because of a lack of forage and also because of poor prospects for finding water of usable quality.

Typical well sites in Fish Springs Flat

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-13-13)33	4, 600	350-450
(C-13-14)13	4, 540	300-400
(C-14-14)1	4, 640	300-400
	4, 555	300-400

SEVIER DESERT

The Sevier Desert, one of the larger individual physiographic units in western Utah, occupies the central part of Juab, Millard, and Beaver Counties. The present investigations were limited to the public domain in the northwestern part of the Sevier Desert and tributary valleys such as Tintic Valley, a part of the Old River Bed (including the valleys of Judd Creek and Cherry Creek), Topaz Valley, Whirlwind Valley, Wah Wah Valley, Sevier Lake valley, and the alluvial plain west of Delta. These areas are shown on plate 27.

Sevier Desert is bounded on the northeast by the West Tintic and Canyon Mountains, on the southeast by the Pahvant Range, on the southwest and west by the Beaver Mountains and House Range, and on the north by the Drum Mountains and several smaller ranges. All of these ranges are composed of folded and faulted beds of Paleozoic sedimentary and Tertiary igneous rocks.

The Sevier Desert is now an isolated basin but during the latter part of the Pleistocene epoch it was occupied by Lake Bonneville. It was connected to the main body of the lake by a narrow strait between the McDowell and Simpson Mountains. Water flowing through this strait during the desiccation stage of Lake Bonneville cut the Old River Bed channel. Since Lake Bonneville time, flow in the Sevier River and its tributaries has been toward Sevier Lake.

Formerly the Sevier and Beaver Rivers contributed both surface and ground water to the Sevier Desert basin, but for many years almost all the surface flow has been withdrawn upstream for irrigation. Some ground-water recharge comes from the residual and return flows in these streams and from ephemeral streams that come into the valley from the surrounding mountains.

Wells, springs, and reservoirs in the Sevier Desert and its tributary valleys that furnish water for stock are shown on the map (pl. 27) and are listed in tables 3 and 4.

SPRINGS AND RESERVOIRS

Nearly 40 springs scattered throughout the Sevier Desert and its tributary valleys provide water for stock (pl. 27). These range from small seeps to springs that discharge 50 gpm to 450 gpm.

The improvement of three springs may be practical. Hole-in-the-Wall Spring (C–16–13)22, in the House Range, is a small fissure spring along the wall of an unnamed canyon. Improvement may include cleaning and installation of an outlet pipe to carry water to a trough on the canyon floor. Antelope Spring (C–28–13)18a in the San Francisco Mountains could be improved through construction of a head box to reduce evaporation losses. Water from Squaw Spring (C–27–13)26, also in the San Francisco Mountains, could be piped to a more accessible location.

Eighty-four stock reservoirs in the Sevier Desert are listed in table 4 and shown on plate 27. Many of these reservoirs provide only a temporary supply of water because of scanty rainfall. Others, built on stream channels from the mountains, receive sufficient water for stock use.

WELLS

At least 50 stock wells have been drilled on the margins of Sevier Desert, and many hundreds of irrigation and domestic wells have been drilled on private land in the central part of the area. Most domestic and irrigation wells in the Sevier Desert area have not been included in table 3 because the inventory of those wells has little or no bearing on the lands that are considered in this investigation.

Stock wells have been drilled to an average depth of about 250 feet but the extreme depths are 17 and 988 feet. Depth to water ranges from zero in flowing wells to a maximum of 520 feet.

Ground water occurs in the alluvium of Sevier Desert and its tributary valleys except at the southern end of Wah Wah Valley. Unfortunately, there is not enough information to determine the gradient of the water table or to predict the direction of water movement through the valley fill. Generally however, water in the alluvium around the margins of the Sevier Desert appears to be moving toward the center of the basin.

Throughout most of Sevier Desert the quality of water is good, except in the vicinity of Sevier Lake where the water contains rather large amounts of mineral contaminants. Here the selection of sites for development of usable water involves some risk.

Ground-water conditions in the Sevier Lake-Wah Wah Valley area are complex. Two successful wells and five dry holes have been drilled in these valleys. Two of the dry holes, (C–23–14)29b and (C–24–14)7c, were drilled in the mountains west of Sevier Lake, and a shallow dry hole was drilled about one-half mile west of well (C–24–12)6c. All holes were drilled to bedrock. Two dry holes, (C–27–13)5c and (C–27–14)22d, were drilled in the south end of Wah Wah Valley. Dry hole (C–27–13)5c was drilled to an unknown depth for the Newhouse Mining Co., (Meinzer, 1911, p. 119) and dry hole (C-27–14)22d to a depth of 500 feet. Neither of these holes reached bedrock but were abandoned because of their great depth. Further drilling in the south end of Wah Wah Valley does not appear to be justified.

On the basis of the information gathered during this examination it is believed likely that additional wells can be developed in many areas of the Sevier Desert, except locally in the Sevier Lake area or in the south end of Wah Wah Valley. Wells at most sites throughout the valley should yield water of good quality. However, if wells drilled in the valley reach bedrock they may be dry or if the valley fill contains evaporites the water will be unfit for use. Drilling probably would not be successful in the southern end of Wah Wah Valley as the valley fill seems to have been drained below an economical drilling depth. Wells drilled on the margins of Sevier Lake valley may tap a thin layer of fresh water overlying the salt water of the valley. Well sites considered for the Sevier Desert are given in the following table.

Typical well sites in Sevier Desert and tributary valleys

Location	Altitude of land surface (feet)	Estimated depth to water (feet)	Location	Altitude of land surface (feet)	Estimated depth to water (feet)
		Sevier Desert			
(C-12-5)14	5,465	<50	(C-13-8)15	4,600	150-250
(C-12-7)34c	4,745	200-300	(C-14-7)11	4,590	150-200
(C-13-6)17	4,650	50-150	20	4,600	50-150
(C-13-7)29	4,600	100-200	(C-14-8)35	4,600	50-150
		Topaz Valley			
(C-13-9)28c	5,000	400-500	(C-14-10)19a	5,340	100
(C-13-10)17a	4,890	300-600	(C-14-11)5d	5,440	100
(C-13-11)35c	5,200	100	29c	5,500	100
(C-13-12)25d	5,120	100	(C-16-9)6	4,840	300-400
(C-14-9)22	4,560	400-500	(C-16-10)12d	4,720	200-300
(C-14-10)3d	4,990	400-500			
		Whirlwind Valley			
(C-14-12)34d	5,170	700-800	(C-17-11)3 (south ½ of sec.)	4,790	250-350
(C-14-13)26	5,000	(1)	(C-17-12)11	4,935	(2)
(C-15-12)20b	5,300	(1)	(C-18-10)3	4,580	100-200
25	5,210	800	23	4,520	100-200
(C-16-11)17d	5,100	700	(C-18-12)17a	5,340	(2)
(C-17-9)21	4,570	50-150	(C-19-12)27d	4,690	250-350
(C-17-10)20c	4,780	200-300			
		Valley of Sevier Lake			
(C-21-12)30	------------	200-300	(C-24-11)5	4,535	150-250
(C-22-11)1	4,750	300-400	(C-25-14)1b	4,925	500-600
(C-22-12)23b	------------	200-300	(C-30-15)32	6,500	------------

[1] No estimate.

[2] Drill to bedrock.

WHITE AND IBEX VALLEYS

White, or Tule Valley, in western Millard and Juab Counties was described by Meinzer (1911, p. 121–124). During the high stages of Lake Bonneville, White Valley was occupied by the lake but as the lake level fell White Valley was isolated by a bay-mouth bar. Since then it has been a closed basin.

White and Ibex Valleys (pl. 27) are bordered on the east by the House Range and on the west by the Confusion Range. Ibex Valley, which is a southward extension of White Valley, is about 12 miles long.

A large playa occupies the north end of White Valley along the foot of the House Range. A smaller playa lies at the north end of Ibex Valley. The Ibex Valley playa generally becomes dry each year. White Valley is a topographically closed and hydrologically undrained valley on which the playa remains moist throughout the year.

Water, in short supply throughout White and Ibex Valleys, is provided by 5 wells and 5 springs within the valley and 3 springs in the surrounding mountains.

SPRINGS AND RESERVOIRS

Eight springs in White Valley and the surrounding mountains are listed in table 3. Four of the springs in White Valley are depression springs located on the valley floor where the water table is just below the surface. Painter Spring (C–19–14)5 discharges from a contact between two formations in the House Range.

The depression springs require little or no improvement. Additional water supplies may be available through utilization of Skunk Spring in the Confusion Range and Sinbad and Lone Pine Springs in the House Range. These springs, although nearly inaccessible, could be developed by constructing pipelines to the valley.

Eleven reservoirs have been constructed, as of 1955, in White Valley and neighboring mountains to augment existing water supplies. (table 4.) Two of the reservoirs contained water when they were visited in 1955. Mr. Nels Boge of the Bureau of Land Management reports that reservoirs in this valley have been only moderately successful because runoff volumes are small. Owing to the number of reservoirs in White Valley and their limited success it is doubtful that additional reservoirs would make much more water available for stock.

WELLS

Five wells have been drilled; two at the north end and one in the center of White Valley, and two in Ibex Valley. One of them, (C–22–14)24a in Ibex Valley, was dry at 400 feet when drilling was stopped. Successful wells range in depth from 40 feet in the center of the valley to 578 feet at the north end and to 515 feet in Ibex Valley.

The small amount of information available does not permit determination either of the shape of the water table or of the direction of movement of ground water. Meinzer (1911, p. 123) believed that water in the alluvium was unable to move out of the valley and that discharge was accomplished only by evaporation from the moist playa in the northern end of the valley. However, this does not eliminate the possibility that some ground water may escape northward between the Fish Springs and Confusion Ranges toward the Great Salt Lake Desert.

Well sites in White Valley can be chosen about as needed, in addition to those listed in the following table. Wells drilled at these sites should reach water unless bedrock is reached first; in this event, new drilling sites should be selected nearer to the center of the valley.

Typical well sites in White Valley

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-12-15)12c	4,830	500-600
(C-14-15)13	4,710	400-500
(C-15-14)8	4,580	300-400
(C-16-16)35	4,865	400-500
(C-19-15)27a	4,580	150-250

PINE VALLEY

Pine Valley, in southwest Millard County, Beaver County, and northwestern Iron County, is an enclosed basin surrounded by the Needle Range and the Wah Wah Mountains. Both ranges consist of Paleozoic rocks in the northern part and Tertiary igneous rock in the south.

The southern end of the valley is narrow and rimmed with steep mountain slopes and prominent alluvial fans, whereas the northern end has a broad valley floor.

Unlike most valleys in western Utah, Pine Valley is not connected with neighboring valleys. Throughout its history Lake Bonneville never reached a level high enough to invade Pine Valley. No streams flow out of the valley, and all of the water flows to the playa in the northeastern part of the valley. A terraced, ephemeral stream channel which extends for nearly 20 miles southward along the valley floor may once have carried sizable amounts of water, now carries only minor amounts of runoff after storms or during the spring.

Water supplies in Pine Valley, furnished by wells, springs, and reservoirs, are listed in tables 3 and 4.

SPRINGS AND RESERVOIRS

Twelve springs furnish water around the margin of the valley. Nine are on the eastern slope of the Needle Range and three are on the western slope of the Wah Wah Mountains. Spring development is being considered by the Bureau of Land Management for parts of T. 26, 27, 28 S., R. 17 W. Pipelines are planned to convey the spring water to troughs on the floor of the valley.

Reservoirs in the southern end of the valley furnish a small supply of water for stock where wells are not feasible and springs are inadequate. These reservoirs provide water for varying periods throughout the year.

Further water supplies required in the southern end of the valley, where wells are not practical, might be developed through construction of additional reservoirs.

WELLS

Five wells have been drilled in Pine Valley as of 1955. Of these four were successful and one was dry. At present (1961) three of the successful wells are in use but the fourth has been abandoned because of an obstruction in the bottom of the hole. Wells (C–25–16)18b and (C–26–16)19b on the east side of the valley are shallower than wells (C–25–17)33 and (C–26–17)17 on the west side. The dry hole (C–30–17)27a near the south end of the valley reached bedrock that was described as granite.

Pine Valley is a topographically closed, drained basin in which the playa is a dry clay pan and the depth to ground water is more than 300 feet. The direction of ground-water movement is not known but the incomplete data available indicate that the water table slopes toward the north.

Additional sites in Pine Valley can be selected as needed in the northern end of the valley. Water should be found under conditions similar to those in nearby wells or at the typical sites listed in the following table. Drilling results in the southern end of the valley will continue to be uncertain until more information is available concerning the ground-water conditions.

Typical well sites in Pine Valley

Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C–26–16)4b	5, 150	350–450
33	5, 245	400–500
(C–27–16)19b	5, 350	400–600
(C–27–17)35a	5, 525	Up to 650

SNAKE VALLEY

Snake Valley and its tributaries occupy a long, winding trough in western Iron County, and parts of Beaver, Millard, Juab, and Tooele Counties in Utah, and Lincoln and White Pine Counties in Nevada (pl. 27). The Snake Valley area includes Antelope Valley, Ferguson Desert, and Hamlin Valley.

Snake Valley, an alluvium-filled trough that is a tributary of the Great Salt Lake Desert, is bordered on the east by Confusion, Conger, Burbank, Mountain Home, and Needle Ranges. and on the west by the Deep Creek and Snake Mountains of Utah and Nevada.

In the north, Snake Valley opens onto the Great Salt Lake Desert mud flat, and the hydrologic conditions are similar to those at the north end of Fish Springs Flat and Skull Valley. The floor of Snake Valley rises rapidly southward from the Great Salt Lake Desert so that only the northern quarter of the valley was occupied by Lake Bonneville.

Surface drainage would be northward from Snake Valley toward Great Salt Lake Desert, but because of the scanty rainfall little water reaches the valley from the mountains. All available water from springs in the Snake and Deep Creek Mountains is used for irrigation and none is allowed to flow northward toward the Great Salt Lake Desert.

WATER SUPPLIES FOR STOCK

An ample supply of water for stock use is available in the valley fill of Snake Valley, but no ground water has been found either in the eastern half of the Ferguson Desert or in Antelope Valley. In addition to the supply from wells, water is furnished by springs and reservoirs. Wells furnish sufficient water for irrigation in some parts of Snake Valley.

Wells should provide suitable sources of additional water from the valley fill at many sites in Snake Valley. However, as wells are not feasible in the eastern part of the Ferguson Desert or in Antelope Valley, other sources of supply such as springs or reservoirs, must be sought.

SPRINGS AND RESERVOIRS

Springs, shown on plate 27 and listed in table 3, contribute water for stock in Snake Valley. Most springs are usable under present conditions, but some, such as Conger Spring (C–18–16)31, should be enclosed in a head box and piped to a tank or trough.

Reservoirs (table 4) supply water at a number of places in Snake Valley and its tributaries, especially in the Ferguson Desert and Antelope Valley where water cannot be obtained from wells.

Repair or enlargement of reservoirs that are too shallow or whose dams have been breached may be practical. Additional water supplies might be provided through construction of new reservoirs wherever there is sufficient runoff from the mountains to fill another reservoir.

WELLS

Water is obtained from wells scattered from Hamlin Valley to the north end of the Deep Creek Mountains. These wells range in depth from 30 to 600 feet. Dry holes in Ferguson Desert are somewhat deeper. Depth of water ranges widely according to changes in the aquifer and slope of the ground surface.

Seven of the holes drilled were dry, three each in Ferguson Desert and Antelope Valley and one in Snake Valley. One of the wells in Antelope Valley (C–24–18)29b and the dry hole in Snake Valley

(C-22-19)22 were drilled unsuccessfully for oil. Dry holes (C-22-16)8 and (C-22-16)20 in the eastern end of Ferguson Desert penetrated limestone bedrock, but well (C-22-16)19 was in alluvium and dry at a depth of 680 feet when abandoned. The two holes drilled for water in Antelope Valley (C-24-18)20b and (C-24-18)27a, were both dry at the bedrock contact, which was less than 200 feet below the surface.

Well sites have been selected in Snake Valley, but not in Ferguson Desert or Antelope Valley. New sites may be selected on the valley floor or on alluvial fans around the valley margins. Water may be expected somewhere near the estimated depths at the sites listed in the following table or at comparable depths at intermediate locations.

Salt contamination of ground water should not be a problem except in southwestern Tooele County where Snake Valley borders the Great Salt Lake Desert.

Typical well sites in Snake Valley

Location	Altitude of land surface (feet)	Estimated depth to water (feet)	Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-9-17)12	4,300	100-250	(C-18-18)1b	5,250	100-200
(C-11-16)28b	4,350	100-200	27	5,210	250-350
(C-11-17)35d	4,650	300-400	(C-19-18)6	4,950	50-150
(C-12-16)3d	4,550	150-250	(C-20-18)22c	5,105	100-400
(C-13-16)7 or 18	4,890	350-450	(C-21-19)14	4,990	50-100
(C-13-17)4c	4,640	100-200	(C-23-19)32a	5,645	200-250
35d	4,900	[1] 350-450	(C-28-19)6	6,350	([2])
(C-15-18)7b	4,800	50-150	(C-28-20)23d	6,160	([2])
(C-15-19)4b	5,005	250-350	(C-29-19)20b	6,250	([2] [3])
(C-17-17)18	5,075	200-300	(C-31-19)3d	6,430	([2])
(C-17-18)17c	4,940	50-150	(C-32-18)6c	6,415	([2])

[1] A site 1½ mi. NW may be satisfactory if this site is dry or well penetrates bedrock above 450 ft.
[2] No estimate.
[3] Rip Gut spring and reservoir may adequately service this area.

ESCALANTE DESERT AND CEDAR AND PAROWAN VALLEYS

The Escalante Desert and its two tributary valleys, Cedar and Parowan, are entirely within Iron County except for an arm that is called Escalante Valley on most maps, extending northward across Beaver County to Milford and Black Rock (pl. 27).

Parowan Valley, immediately west of the Hurricane Cliffs, is enclosed on the north and northwest by Black Mountain and on the west by the Red Hills. It is separated on the southwest from Cedar Valley by a low alluvium-filled pass.

Cedar Valley, called Rush Lake Valley by Meinzer (1911, p. 142), and Cedar City Valley by Thomas and Taylor (1946), is bordered on the east by the Hurricane Cliffs and Red Hills, on the north by Black Mountain, and on the west, southwest, and south by Iron Mountain, the Harmony Mountains and Cedar Mountain. This valley opens into the Escalante Desert through Twentymile Gap northwest of Cedar City and Iron Springs Gap west of Cedar City.

Escalante Desert is enclosed on the east by the Mineral Mountains and Black Mountain, on the southeast by the Iron Mountain and Antelope Range, on the south by an unnamed range of mountains between Enterprise and Uvada, on the northwest by the Needle Range and Wah Wah Mountains, and on the north by the San Francisco and Beaver Mountains.

Extensive ground-water investigations have been made in these valleys by Meinzer (1911, p. 138–142), White (1932) and Thomas and Taylor (1946). Details of the Cedar and Parowan Valley areas (pl. 27) were taken from Thomas and Taylor (1946, pl. 3).

The Escalante Desert was flooded by Lake Bonneville during part of the Pleistocene epoch. Surface drainage from the Escalante Desert is northeastward along the Beaver River channel toward the Sevier Desert. Tributary drainage from Cedar Valley enters the Escalante Desert through Twentymile and Iron Springs Gaps.

Land use is divided between farming on the low valley floor and stock grazing around the valley margins and on the surrounding mountain slopes.

Wells and springs that provide large amounts of water for irrigation are usually located on privately-owned farmland and hence are not available to water stock grazing on the public domain.

Stock-water supplies for the Escalante Desert and Cedar and Parowan Valleys are obtained from reservoirs, wells, and springs (pl. 27 and tables 3 and 4).

SPRINGS AND RESERVOIRS

Springs provide water for stock throughout the three valleys. They furnish usable water during most seasons but two unnamed springs, (C–31–16)3b and (C–31–16)1a, were not flowing in May 1956. Failure of these springs may be due to a lack of water in the alluvium or to obstructions in the discharge pipes. Several of the springs may be productive if developed or repaired. Mountain Spring, (C–32–16) 12b, for example, could be made more accessible to cattle by construction of a pipeline and trough.

Reservoirs furnish water at least part of the year. The Modena Reservoir (C–35–18)5 and the Minersville Irrigation Reservoir (C–30–9)1 supply water during most years.

The effective storage of several of the reservoirs listed in table 4 might be increased through deepening. New reservoir construction could be undertaken in locations where construction materials are available and where there is sufficient runoff to fill the ponds.

WELLS

Wells in these valleys supply only minor amounts of stock water in comparison with the large amount of water that is pumped annually for irrigation. No evaluation or inventory of the irrigation wells in the valley was made beyond that needed to define the regional water table that underlies the valley floor.

In Parowan Valley stock water is obtained from pumped wells, flowing wells, and springs. The northeasternmost well is the deepest with water at a depth of 270 feet below the surface. Wells in the southwestern end of the valley are less than 200 feet deep and have water at or near the surface.

Cedar Valley is supplied by many wells drilled into the valley fill. These wells are scattered throughout the valley except for an area in the extreme northeastern end where a shallow pediment underlies the valley floor.

Cattle graze over the northern half of the valley. In the southern half the land is largely used for farming; hence there is no need for additional stock wells in this area.

Grazing in the Escalante Valley is limited mainly to the margins of the valley and an area in the center where many wells provide water for stock. Wells in Escalante Valley range in depth from 16 to 336 feet and have a comparable range in depth to water.

If a water supply is needed at the northeastern end of Parowan Valley in the Little Valley area of Buckhorn Flat, it may be found at a depth of 200 or 300 feet.

Additional drilling in the north end of Cedar Valley will be successful only in areas where bedrock is not close to the land surface. It is possible, however, that water may be found if a well were drilled into the deeper part of the alluvium along Spanish Treasure Wash.

Stock water can be obtained as needed from the alluvium of the Escalante Desert. Exploratory drilling for stock water around the southern margin of the desert has not been undertaken on the same scale as along the northern edge of the valley. Wells may be obtained by drilling to the water table in the embayments southeast of Modena. Drilling in such embayments may involve the risk of reaching bedrock before water is reached; in this event new sites should be selected nearer the mouths of the embayments.

Several possible sites for wells are in the area east and northeast of Milford. Water may be moving from the mountains through the alluvium. If no water occurs at the base of the alluvium none is likely to be found by deeper drilling. Typical well-site possibilities are listed in the following table.

Typical well sites in Escalante Desert, Cedar and Parowan Valleys

Location	Altitude of land surface (feet)	Estimated depth to water (feet)	Location	Altitude of land surface (feet)	Estimated depth to water (feet)
(C-23-10)25	4,925	250-300	(C-29-8)20a	5,540	50-150
(C-25-11)12	4,850	50-150	(C-31-8)34 or 35	5,900±	200-300
17	5,100	250	(C-33-10)2b	5,700	300
(C-26-9)15d	5,655	<200	(C-33-17)9d	5,650	300-400
(C-28-9)9b	6,040	<200			

CONCLUSIONS

The results of these reconnaissance investigations indicate that the valleys of western Utah, although arid, are supplied with stock water from wells, springs, or flowing streams. However, there are some exceptions. In a few valleys the ground water has drained to depths beyond that of the deepest hole yet attempted, and in others the water in the center of the valley is heavily charged with mineral matter and is unusable by stock.

The utilization and further development of the existing surface-water supplies throughout the area deserve consideration. Also, additional ground-water supplies may be developed through drilling at sites chosen on the basis of nearby wells or the results of this study.

TABLE 3.—*Records of springs and wells in western Utah*

Depth: m, measured; r, reported. Type of well: Dr, drilled well; Du, dug well. Use of water: D, domestic; I, irrigation; N, unused; S, stock. All altitudes above mean sea level.

Location	Owner, tenant, or name	Altitude of surface		Use of water	Type of well	Depth of well (feet)	Remarks
		Land (feet)	Water (feet)				
Tooele and Rush Valleys							
Springs:							
(C-1-7)25c	Timpie						Slightly saline.
25d	Dolomite						Do.
25d	Saddle Rock						Do.
(C-9-4)20d	Powell			S			Contact spring.
32	Sabie			S			Do.
35b	Boulter			S			Do.
Wells:							
(C-2-6)6a				N			Highly mineralized.
(C-6-4)35b		5,120	4,960	S	Dr	r 365	
(C-6-5)21a	Bureau of Land Management.			S	Dr	r 377	r 80 ft to water.
26c				S	Du	r 17	m 15.7 ft to water.
(C-7-3)30a		5,080	4,955	S	Dr	r 300	
(C-7-4)14a	Bureau of Land Management.	5,060	4,975	S	Dr	r 875	
(C-7-5)4				S	Du	r 9	m 8.6 ft to water.
29d		5,240	5,020	S	Dr	r 260	
(C-8-3)5b		4,982	4,395	N	Dr	r 654	
6c		5,140	4,880	S	Dr	r 280	
(C-8-4)5		5,250	5,170	S	Du	r 160	Pumps dry in 5 hr.
22a		5,310	5,210	S	Dr	r 300	
30d		5,490	5,230	S	Dr	r 322	

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Tooele and Rush Valleys—Continued							
Wells—Con.							
(C-8-5)9c		5,340	5,255	S	Dr	r 150	
30c					Du	r 16	m 5.9 ft to water.
31a				S	Dr	r 273	Flowing well.
(C-8-6)26a				S	Dr	r 224	Do.
(C-9-4)2a		5,440	5,170	S	Dr	r >800	
Cedar Valley							
Springs:							
(C-6-3)15c	Manning Canyon			S			
(C-9-2)29a	Greeley						Water piped into Cedar Valley.
32b	Mabie						Do.
(C-9-3)27							
Wells:							
(C-6-2)9b		4,770	4,690	S	Dr	r 88	
29c		4,890	4,890	S	Dr	150	
29c		4,894	4,892	S	Dr	r 60	
(C-7-2)5c		4,900	4,855	S	Du	r 54	
19a		4,900	4,680	S	Du	r 240	
25		4,900	4,700	S	Du	r 200	
32a		4,890	4,670	S	Du	r 240	
(C-8-1)20				S	Dr	r 120	
32				S	Dr	r 220	r 190 ft to water.
(C-8-2)6d		4,950	4,700	N	Dr	r 250	Abandoned.
8a		4,930	4,660	N	Dr	r 270	Do.
15a		4,940	4,665	S	Du	r 275	
18b		4,960	4,680	S	Dr	r 290	
31a		5,020	4,660	S	Du	r 365	
(C-8-3)35c		5,550		N	Dr		Dry.
(C-9-2)4							
Sink Valley							
Wells:							
(B-1-10)3b	Bureau of Land Management.	4,430	4,260	S	Dr	r 212	
21d	do	4,480	4,275	S	Dr	r 250	
(B-2-9)20a	do	4,520	4,270	S	Dr	r 280	
(B-2-10)17d	do	4,520	4,250	S	Dr	r 330	
(B-3-9)19b	do	4,330	4,185	N	Dr	r 218	Abandoned, water saline.
(B-3-9)30	do	4,450	4,245	S	Dr	r 245	
(B-3-10)29d	do	4,555	4,245	S	Dr	r 363	
Skull Valley							
Springs:							
(B-2-6)20a							Small, saline.
(B-2-9)26d	Cramers						
(C-1-7)8a	Big						30 cfs. Temperature, 64 °F. Slightly saline.
(C-2-7)6d	Burnt			S			Slightly saline.
(C-2-8)13	Muskrat						
26	Big						
(C-2-9)7	Redlam						2 gpm.
19	Henrys						
(C-3-7)7	Delle Ranch			S			1,000 gpm. Temperature 59 °F.
(C-3-9)8	Sulphur						5 gpm. Temperature 57 °F. Slightly saline.

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface		Use of water	Type of well	Depth of well (feet)	Remarks
		Land (feet)	Water (feet)				
Skull Valley—Continued							
Springs—Con.							
(C-4-10)20a	Jacobs						2-3 gpm.
(C-5-9)31	Unnamed						
(C-5-10)21	do						
34	Cane						
(C-6-8)15	Orr's Ranch						1 cfs.
(C-6-9)8	White Rock						
Wells:							
(B-1-6)16a				S	Dr	r 60	m 26.8 ft to water.
27d	Bureau of Land Management.			N		r 157	r 152 ft. to water. Water too saline for use.
(B-1-6)28d	do			N		r 197	r 157 ft. to water. Water too saline for use.
(B-1-8)31d		4, 290	4, 255	N	Dr	r 120	
(B-1-9)9b	Bureau of Land Management.	4, 450	4, 225	S	Dr	r 395	
25d		4, 410	4, 235	S		r 215	
(B-2-8)28d		4, 260	4, 210	S	Dr	r 122	
(B-3-8)31c		4, 240	4, 195	N	Dr	r 80	
(B-3-9)23		4, 200	4, 195	N	Dr	r 77	
(C-1-7)35	Utah Lime Co			N	Dr	r 153	r 125 ft. to water. Too saline for use.
(C-1-8)5c		4, 290	4, 240	N	Dr	r 60	Too saline for use.
(C-5-8)32a	Deseret Livestock Co.			S	Dr	r 209	r 150 ft to water.
(C-5-8)34d		4, 625		S	Dr	r 20	Flowing well.
35c		4, 625		D, I	Dr	r 108	Do.
(C-5-9)16a	Deseret Livestock Co.			S	Dr	r 300	r 280± ft to water.
(C-6-7)19c		4, 760	4, 735	I	Dr	r 116	
(C-7-7)16b		5, 180	4, 790	S	Dr	r 448	
Government Creek Valley							
Springs:							
(C- 8-6)7c	Cedar			S			2 gpm, estimated.
(C- 9-8)15							
(C-10-8)11							
(C-10-7)7	Cherry						
Wells:							
(C-8-7)30d	Bureau of Land Management.	5, 165	4, 875	N	Dr	r 370	
(C-8-8)2a	Hatch	3, 000	4, 730	S	Dr	r 272	
(C-9-7)8b	A. Young	5, 380		S, D	Dr	r 100+	
Great Salt Lake Desert							
Springs:							
(C-2-10)8d	Lone Rock Sp						
(C-3-10)16	Quincy Sp						
Wells:							
(B-1-11)1c	Swan well	4, 460	4, 295	S	Dr	r 194	Quality fair.
26b	Porter well	4, 410	4, 270	S	Dr	r 175	Do.
35d	Greyback	4, 360	4, 280		Dr	r 155	Unfit for use; abandoned.
(B-2-11)20b	Byrum	4, 470	4, 175	S	Dr	r 340	Quality fair.
28c	Thumb	4, 385	4, 270	S	Dr	r 160	Do.
(B-3-11)31a	Finger 1			N	Dr	r 147	Too saline for use; abandoned.
31d	Finger 2	4, 250	4, 165	S	Dr	r 107	Too saline for use.
(C-1-11)18a	Clive			N	Dr	r 90	Do.
36b		4, 550	4, 280	S	Dr	r 290	Quality fair.
(C-4-11)15d	Clegg	4, 475	4, 260	S	Dr	r 243	Do.

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Dugway Valley							
Springs:							
(C- 9-8)18	Simpson						10 gpm.
(C-10-8)3	Indian						
5d	Coyote						½ cfs, estimated.
Wells:							
(C- 9-10)21d		4,400	4,350	N	Dr	r 57	
(C- 9-11)30d	Bureau of Land Management.	4,480	4,310	S	Dr	r 202	
(C-10- 9)4a	do	4,535	4,340	S	Dr	r 555	
8c	do	4,400	4,320	S	Dr	r 130	
18a		4,420		N	Du	r 100	Reported by Gilbert (1890, p. 182).
(C-10-10)31b	Bureau of Land Management.	4,540	4,350	S	Dr	r 551	
(C-11-10)9d	do			N	Dr	r 190	Dry. Rock at 190 ft.
(C-11-11)12a	do	4,600	4,330	S	Dr	r 306	Temperature, 98° F.
Fish Springs Flat							
Springs:							
(C-11-14)3	Big			S, I			50 gpm, estimated.
4	Hot			N			Temperature 200±° F.
23	Fish			S, I			
(C-12-12)10	Wildhorse						1 gpm, estimated.
(C-12-14)23	Cane						½ gpm. Saline.
Wells:							
(C-11-12)1d					Dr		Dry.
4d	Bureau of Land Management.	4,570	4,425	S	Dr	r 538	
(C-12-12)7	do			S	Dr	r 212	r 190 ft to water.
31b		4,570		S	Dr	r 325	
(C-14-12)4	Bureau of Land Management.	4,810	4,440	S	Dr	r 509	
Sevier Desert							
Springs:							
(C-10-7)17	Black						5 gpm, estimated.
27							10 gpm, estimated.
31	Iron						
(C-10-8)28	Six Mile						
35							5 gpm, estimated.
(C-11-3)20b							
21d							
22c							
28d							
(C-11-4)13a							
(C-11-7)10	Desert						5 gpm, estimated.
(C-11-8)1	Antelope						Do.
(C-11-9)36	Willow						
(C-12-3)4b							
9d	Railroad						
24d	Riley						
(C-12-5)9	Cherry Creek						
(C-12-9)8	Keg						
11	Crescent						
14							
(C-12-10)3	Flint						3 gpm, estimated.
35	Cane						10 gpm, estimated.
(C-12-11)7	Hanging Rock						
(C-14-8)11c	Fumarole Creek Crater.						300 gpm, estimated.
(C-14-11)22b	Shoenburger						1 gpm, estimated.

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Sevier Desert—Continued							
Springs—Con.							
(C-14-11)26b	Laird						Small.
(C-15-13)28							
(C-16-12)19							
(C-16-13)32	Hole-in-Wall						1 or 2 gpm.
26	Swazey						50 gpm.
35	Antelope						Do.
(C-17-9)25							
(C-19-9)22							Seep.
(C-21-9)7							Small seep.
(C-27-13)4							3 gpm, estimated.
26	Squaw						1 gpm, estimated.
(C-27-15)11a	Wah Wah						450 gpm, estimated.
(C-28-13)18a	Antelope						5 gpm, estimated.
(C-28-15)10a	Kiln						
(C-29-15)2d	Willow						10 gpm, estimated.
Wells:							
(C-11-3)20b		5,600			Dr		
28d		5,480		S	Dr	r 190	Flowing well.
(C-11-8)33d	G Bennion	4,560	4,525	I	Dr	r 128	
(C-11-9)1c	do	4,530	4,455	I	Dr	r 445	
(C-12-4)24	Bureau of Land Management.	5,380	5,370	S	Du	r 17	
(C-12-6)16c	do	4,950	4,675	S	Dr	r 335	
(C-12-7)1	do	4,925		N	Dr	r 300	Dry.
3b		4,650	4,415		Dr	r 270	
(C-12-8)28a	Bureau of Land Management.	4,580	4,560	S	Dr	r 245	
(C-13-4)20c	do			S	Dr	r 305	r 245 ft to water.
(C-13-6)25b	do	4,685	4,615	S	Dr	r 175	
(C-13-7)9c	do	4,600	4,490	S	Dr	r 210	
(C-13-9)8d	do	5,040		S	Dr	r 380	Dry. Bedrock at 350 ft.
9d	do	4,890	4,525	S	Dr	r 446	
(C-14- 5)1	do			N	Dr	r 467	Dry.
22c	do			S	Dr	r 300	r 100 ft to water.
35c				I	Dr	r 291	m 93.6 ft to water.
(C-14- 6)9a		4,650	4,585	N	Dr	r 165	
10c				S	Dr	r 160	r 50± ft to water.
21c				S	Dr	r 150	Do.
21d				S	Dr	r 150	Do.
(C-14-11)23a		5,920	5,905	S	Du	m 18.3	
(C-15- 5)9d				S	Dr	r 190	
29d					Dr	r 241	r 103 ft to water.
(C-15- 6)7d	Bureau of Land Management.			S	Dr	r 336	r 104 ft to water.
(C-15- 7)9c					Dr		Flows.
17d					Dr		Do.
(C-15- 8)8a	Bureau of Land Management.			S	Dr	r 150	Do.
34d				S	Dr	r 450	Do.
(C-15-9)16d					Dr	r 465	
27b		4,650	4,605	S	Dr		
(C-15-10)1a	Bureau of Land Management.	4,710	4,560	S	Dr	r 592	
(C-16-8)21b		4,671	4,665	N	Dr	r 988	
(C-16-9)29d	Bureau of Land Management.	4,640	4,525	S	Dr	r 151	
(C-17-8)13c				S	Dr	r 150	Flows.
(C-17-9)5d				S	Dr	r 150	r 20 ft to water.
(C-17-10)14b	Bureau of Land Management.	4,650	4,525	S	Dr	r 204	
(C-18 11)5d	do	4,850	4,600	N	Dr	r 565	Insufficient water, abandoned.
(C 19-8)32a		4,600	4,580	S	Du	r 21	
(C-19-9)15	Bureau of Land Management.			S	Dr	r 600	Flows.
(C-19-10)6d		4,640	4,450	N	Dr	r 591.5	
(C-19-11)21d		4,615	4,400	N	Dr		
(C-19-12)30a	Bureau of Land Management.			N	Dr	r 560	Dry.
(C-20-8)29	Union Pacific Railroad.			N		r 1998	r 88 ft to water. Abandoned.

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Sevier Desert—Continued							
Wells—Con.							
(C-21-13)1a	Bureau of Land Management.			N	Dr	r 176	Dry.
(C-23-12)6c	do	4,565	4,360	S	Dr	r 560	
(C-23-13)1d		4,640		N	Dr	r 31	Dry.
(C-23-14)29b				N			Dry. No information available.
(C-24-13)33		4,615		N	Dr		Dry. Oil test.
34c	Bureau of Land Management.	4,615	4,395		Dr	r 294	r 222 ft deep.
(C-24-14)7c	do			N	Dr	r 656	Dry.
(C-27-13)5c				N	Dr		Do.
(C-27-14)22d		4,925		N	Dr	r 500	Do.
White Valley							
Springs:							
(C-16-13)9	Lone Pine						
28	Sinbad						
(C-16-14)18	Coyote						
(C-17-15)2	Willow						
12	Tule						
13							
(C-17-16)33	Skunk						
(C-19-14)5	Painter						10 gpm.
Wells:							
(C-13-15)23a	Bureau of Land Management.	4,800	4,500	S	Dr	r 578	
(C-15-16)1	do	4,910	4,470	S	Dr	r 521	
(C-17-15)26		4,425	4,410	S	Dr	r 40	
(C-22-14)1b	Bureau of Land Management.	4,740	4,325	S	Dr	r 515	
24a		4,830		N	Dr	r 401	Dry.
Pine Valley							
Springs:							
(C-26-18)9	Beers						
16							
21							
24	Pine						2 gpm, estimated.
(C-27-18)27d	Patch-im-pa						5 gpm, estimated.
35c	Willow						Do.
(C-28-16)27d							Do.
(C-28-28)16c	Vance's						
27d	Buckhorn						10 gpm, estimated.
28d							2 gpm, estimated.
(C-30-15)18d							
(C-30-16)13a	Trough						2 gpm, estimated.
Wells:							
(C-25-16)18b		5,075	4,775	S	Dr	r 340	
(C-25-17)33d	U.S. Dept. Agriculture.	5,260	4,775	D, S	Dr	r 628	
(C-26-16)19b		5,205	4,850	S	Dr	r 393	
(C-26-17)17		5,345	4,555	N	Dr	r 801	
(C-30-17)27a	Bureau of Land Management.			N	Dr	r 648	Dry.
Snake Valley							
Springs:							
(C- 7-18)2							2 gpm, estimated.
21							
(C- 8-17)9							
18c							
30d	Goshute						
(C- 8-18)1b							
2b							
11	Ochre						

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface		Use of water	Type of well	Depth of well (feet)	Remarks
		Land (feet)	Water (feet)				
			Snake Valley—Continued				
Springs—Con.							
(C- 9-17)5	Minnihaha						1 gpm, estimated.
25							5 gpm, estimated.
36d	Redding						
(C- 9-18)35	Willow						
(C- 9-19)1d	North						
13c	Chadman						
(C-10-17)5	Eight Mile						
16a	Six Mile						
26							3 gpm, estimated.
32	Rocky						
35							3 gpm.
(C-11-17)1b	Willow						
21b							
(C-11-18)25							
(C-12-18)14c							
33d							
(C-12-19)27d	Blue						
(C-13-18)7d	Trough						
30d	Lion						
(C-13-19)36							
(C-14-18)2							
15							
22							
34b							
34c							
5	Ella						
8							
23	Yellow						
(C-15-19)31	Warm			S, I			900 gpm, estimated.
34c				S, I			
(C-16-18)22a	Bishop			S, I			2,000 gpm (r).
27a	Twin			S, I			
(C-17-19)21							120 gpm, estimated.
29							
(C-18-16)31	Conger			S			1 gpm, estimated.
(C-18-18)8a				S			2 gpm, estimated.
16	Knoll			S			5 gpm, estimated.
(C-19-19)8							
(C-22-19)31							
32							
C-24-17)8	Tunnel						
(C-24-19)32	Mountain Home						
(C-24-20)1d	Needle Point						
2				S			900 gpm, estimated.
(C-26-19)4	Sand Wash						
(C-26-19)8d	Cobble						
21							
23							
24	Cottonwood						
26	Forkie						
35	Carney						
(C-27-19)9	Couger						
27c	North Sulfur						
(C-28-19)3	Sulfur						5 gpm. estimated.
8	Cowboy						Do.
36b							
(C-29-18)7							
18d							
19a							
20b							
20c							
29							
(C-29-19)1c							
(C-29-20)36a	Rip Gut						
(C-30-18)21							
26							
33b							
33d							
(C-30-19)23	O'Grain						
(C-30-20)36							

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface		Use of water	Type of well	Depth of well (feet)	Remarks
		Land (feet)	Water (feet)				
Snake Valley—Continued							
Springs—Con.							
(C-31-18)3d	Little Basket						
4a							
10a	Pipeline						
24d							
(C-32-18)15d	Spanish George						
28							
Wells:							
(C- 6-18)6d		4,410	4,320	S	Dr	r 100	
(C- 8-17)27		4,400		N	Dr	r 395	Dry.
(C-10-17)1a		4,330	4,305	S	Dr	r 143	
1d		4,330		N	Dr	r 220	Dry.
(C-11-15)21				N	Dr		Water too saline for use.
24		4,340		N	Dr	r 300	Do.
30	Bureau of Land Management.	4,420	4,385	S	Dr	r 112	Brackish water.
(C-11-16)6		4,330		D	Dr	r 90-100	Flows.
(C-11-17)1		4,330	4,315	D	Dr	r 143	
(C-12-17)33				S	Dr	r 50	
34		4,590		D, S	Dr	r 175	
(C-13-18)23a		4,720	4,710	D, S	Dr	r 450	
(C-14-18)5c		4,820	4,760	D	Dr	r 70	
(C-16-19)3c							
4a				N	Du	r 34	
(C-18-19)20d		4,965	4,935	D, S	Dr	r 90	
(C-19-19)34d					Dr	r 406	
(C-20-17)9a	Bureau of Land Management.	5,460	4,860	S	Dr	r 760	
(C-20-19)1b	do	4,990		S	Dr	r 375	Flows.
7a				S	Dr	r 569	Do.
21b		5,020	5,000	I	Dr	r 66	
(C-21-17)8d	Bureau of Land Management.	5,090	4,865	S	Dr	r 316	
(C-21-18)10		5,080	5,015	S	Dr	r 66	
(C-21-19)31d				S	Dr	r 80	
(C-22-16)7c	Bureau of Land Management.	5,300		N	Dr	r 550	Dry.
19b	do	5,325		N	Dr	r 680	Do.
20				N		r 100	Do.
(C-22-19)6b		5,275	5,215	S	Dr	r 120	
22				N	Dr		Dry.
(C-23-19)9c				N	Du	r 30	
13a	Bureau of Land Management.			N	Dr	r 540	r 476 ft to water. Insufficient water.
(C-23-19)20b		5,400	5,385	S	Dr	r 45	
24d	Bureau of Land Management.	5,760		S	Dr	r 472	
(C-24-18)20b				N	Dr	r 360	Dry.
27a	Bureau of Land Management.			N	Dr	r 500	Do.
29b				N	Dr	r 936	Do.
(C-24-19)8		5,430		S			
(C-30-19)21d		6,475	6,305	S	Dr	r 215	
Escalante Desert and adjoining areas							
Springs:							
(C-25-9)8							
(C-25-12)35							2 gpm, estimated.
(C-26-9)34b	Salt						5 gpm, estimated. Temperature, 81° F.
34d	Roosevelt						3 gpm, estimated. Temperature, 101° F.
(C-27-8)16a	Mathew						Piped to tank in (C-27-8)22.
(C-28-9)28	Griffin						1 gpm.
(C-28-12)29d	Woodhouse						
(C-29-9)11b							5 gpm, estimated.
29c							Do.
(C-29-12)9d	Wheeler						
(C-29-13)13	Dry						
14	Mirror						

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Escalante Desert and adjoining areas—Continued							
Springs—Con.							
(C-30-14)7b	Iron						2 gpm, estimated.
(C-30-15)10c	The Seeps						
(C-31-10)4							
(C-31-14)7c	Bull						
29b	Paramore						
(C-31-15)12c	Prout						
25d							
30a							
(C-31-16)10	Keel						No flow May 1956.
33b							
(C-31-17)16d	Lone Pine						
19	Bob Leroy						
22	Bull						
23							
35	Typhoid						
(C-32-14)18	Sulfur						
(C-32-15)2b							
11b	Jensen						
12c							
(C-32-16)3d							Seep.
8d	Bible						
11b							2 gpm, estimated.
12c	Mountain						5 gpm, estimated.
29a	Culver						
31b	Mackleprang						
33c	West Adams						
(C-32-17)21c	Pace						
36a	Wooley						
(C-33-18)14							
15							3 gpm, estimated.
30b							
(C-33-19)35a							
(C-34-10)31							
(C-34-19)2d							
7a							
8c							
23b							
(C-35-10)6							
(C-35-11)1							
Wells:							
(C-24-10)9d		4,840	4,825		Du	r 16	
22a	Bureau of Land Mangement.			S	Dr	r 150	r 18 ft to water.
(C-25-10)11a				S	Dr	r 100	r 60 ft to water.
(C-25-11)9d		5,025		N	Dr	r 235	Dry.
10d		4,940		N	Du	r 30	Do.
(C-26-10)20					Dr		
31d		4,970	4,960		Dr	r 96	
(C-27-12)22b	Bureau of Land Management.				Dr	r 336	r 141 ft to water.
(C-28-11)10a	do	5,115			Dr	r 227	
22d		4,993	4,970		Du	r 25+	
(C-29-11)4a		5,105	5,095	S	Dr	r 68	
(C-29-12)35d	Geological Survey			N	Dr	r 100	m 83.0 ft to water
(C-29-14)35c				N	Dr	m 240.9	Dry.
(C-30-10)34b	Bureau of Land Management.				Dr	r 375	
(C-30-12)6c	do			N	Dr	r 305	r 230 ft to water. Well abandoned.
(C-30-13)2d		5,440	5,190		Dr	r 320	
8		5,410					
18d		5,355	5,185		Dr	r 173	
30b		5,265	5,180		Dr	r 87	
33a		5,091	5,040		Dr	r 90	
(C-30-14)19a					Dr	r 60	r 40 ft to water.
(C-31-7)14b		6,190	5,920	S	Dr	r 323	
(C-31-13)6a				S	Dr	r 55	r 51 ft to water.
(C-31-14)9b				S	Dr	r 47	r 44 ft to water.
33a				S	Dr		
(C-32-8)1a		5,746	5,695	S			
21		5,780			Dr		
(C-32-10)23c		5,945			Dr	r 390	Dry.
(C-32-12)6c					Dr	r 68	r 61 ft. to water.
31a		5,180			Dr		
34d		5,230	5,220		Du	r 16	

TABLE 3.—*Records of springs and wells in western Utah*—Continued

Location	Owner, tenant, or name	Altitude of surface: Land (feet)	Altitude of surface: Water (feet)	Use of water	Type of well	Depth of well (feet)	Remarks
Escalante Desert and adjoining areas—Continued							
Wells—Con.							
(C-32-13)27b	Bureau of Land Management.				Dr	r 132	r 62 ft to water.
29c		5,115			Dr		
(C-32-14)32		5,090	5,075		Du	r 20	
(C-32-16)26				S	Du	r 100	r 96 ft to water.
(C-33-10)16d		5,530	5,465	S	Dr	r 118	
31a		5,447	5,390	N	Dr	r 65	
(C-33-11)10c	Bureau of Land Management.			N		r 910	Dry.
29c		5,357	5,320	S	Dr	r 72	
30b		5,336	5,300	S	Dr	r 250	
(C-33-12)4b		5,204	5,145		Dr	r 111	
13					Dr	r 250	r 60 ft to water.
17a		5,297	5,185		Dr	r 226	
21b		5,289			Dr		
29a		5,299	5,180		Dr	r 130	
30c		5,213		S	Dr	r 132	
(C-33-13)3d		5,147	5,080	S	Dr	r 80	
(C-33-14)6				S	Dr	r 200	
15	Bureau of Land Management.			S	Dr	r 140	
20c		5,110	5,065	S	Du		
(C-33-15)7c		5,200					
31c		5,134	5,105	S	Dr	r 53	
(C-33-16)7c		5,335		S			
8		5,300	5,185	S			
(C-33-17)20		5,335		S			
26d		5,203	5,140	S	Dr	r 86	
29c		5,245	5,140	S	Dr	r 123	
(C-33-18)36a				S	Dr	r 240	r 202 ft to water.
(C-34-10)19c		5,480			Dr		
(C-34-11)1							
2d		5,387	5,385	N	Du	r 7	
9c		5,400	5,375	S	Dr	r 61	
16b		5,408		S			
22							
29b		5,443	5,420	S	Dr	r 56	
33d		5,450		S	Dr	r 312	
(C-34-12)19d		5,460		S	Dr	r 302	
(C-34-13)3c		5,209		S			
23a		5,256		S			
(C-34-14)24a		5,202		S			
(C-34-15)1a		5,105	5,103	S	Dr	r 110	
16c		5,117	5,105		Dr	r 15	
31b		5,128	5,120		Dr	r 8	
(C-34-16)9c		5,133	5,123		Du	r 17	
23a		5,123	5,120	S	Du	r 8	
31b		5,136	5,135	S	Dr	r 144	
(C-34-17)1a		5,158	5,135	S	Du	r 28	
9d		5,167	5,130	S	Dr	r 73	
31d		5,221	5,145	S	Dr		
(C-35-11)5b		5,470	5,445	S	Dr	r 45	
(C-35-13)4a		5,325		S	Dr	r 250	
(C-35-15)20b		5,158	5,135	S	Dr	r 162	
(C-35-16)3b		5,141	5,130	S	Dr	r 90	
31c		5,188	5,135	S	Dr	r 209	
(C-35-17)13c		5,169	5,135	S	Dr	r 200	
(C-35-19)19							
(C-35-15)11	Bureau of Land Management.	5,425	5,195	S	Dr	r 536	
(C-36-16)1d		5,212	5,145	S			
16d		5,209	5,150	S	Dr	r 68	
31c		5,272	5,155	S	Dr	r 222	

TABLE 4.—*Reservoirs in western Utah*

Location	Name	Location	Name
Tooele and Rush Valleys			
(C-6-4)34	Mercur Wash.	(C-8-4)23c	Boulter Wash.
(C-7-4)19		30c	Dunbar.
29		(C-8-6)9d	Lookout.
(C-8-3)7c	Topliff.		
Government Creek Valley			
(C-8-7)8a	Valley.	(C-9-8)2b	
		15	Indian Pass.
Dugway Valley			
(C-9-9)28d	South Simpson.	(C-11-11)12d	Monument.
(C-11-9)7b	Slow Elk.	23c	Bitner Knolls.
Fish Springs Flat			
(C-11-12)15a	Peterman.	(C-14-13)2	Juab.
(C-13-13)35c	Fish Flat.	7	Swazey Point.
		21	Table Knoll.
Sevier Desert			
(C-12- 5)8		(C-15-11)13b	Oldroyd.
13b	Cherry Creek.	(C-15-12)5	Swazey Knolls.
19		29	Swazey Bench.
(C-12- 6)4	Coyote Knoll.	(C-16- 9)4b	Little Drum.
(C-12- 7)18	Riverbed No. 2.	18a	Smelter Knolls.
(C-12- 8)27	Riverbed.	23b	Abraham.
(C-12-10)19		(C-16-10)31d	South Little Drum.
(C-13- 4)4		(C-16-11)30	Swazey No. 3.
(C-13- 7)9a	West Desert Mtn.	(C-16-12)12	Swazey No. 2.
11a	Desert Mtn.	(C-17- 9)4b	Marshall Canal.
(C-13- 8)15	Riverbed.	18	Marshall's Tract.
(C-13- 9)21		(C-17-10)29	Hinckley Trail.
26d	Hogback.	(C-17-11)3	
(C-13-10)17d	Topaz Valley.	19	Soap Hollow.
(C-13-11)25		(C-17-12)30b	Swazey Trail.
34	Little Valley.	(C-18-10)5	Swazey Wash. No. 3.
(C-14- 9)22	Whirlwind.		
29	Picture Rock Wash.	(C-18-11)5b	Highway.
		7	
(C-14-10)3	Picture Rock.	13b	Soap Wash.
(C-14-12)29	North Swazey Knolls.	16	
		19	
34	Seven Mile Knoll.	(C-18-12)25	Long Ridge.
(C-15- 9)1	Crater.	(C-18-13)7d	Marjum Pass.
3	Drum Hardpan.	(C-19- 9)34	Headquarters.
8	Big Drum.	(C-19-10)28a	Sevier Lake No. 4
25	Old Riverbed.	29d	Sevier Lake No. 6
(C-15-10)11	Ludlow.	(C-19-11)1	Deseret.
23		25c	Sevier Lake No. 5.
26	Greener.	28c	Pony Express.

TABLE 4.—*Reservoirs in western Utah*—Continued

Location	Name	Location	Name
Sevier Desert—Continued			
(C–20– 8)33	Neels.	(C–23–11)8a	Cricket No. 2.
(C–20– 9)25d	Neels No. 2.	30	Cricket.
(C–20–12)13b	Clay Flat.	(C–23–12)18	Johnson Pond.
19a	Sevier Lake.	(C–23–13)25d	Steamboat Wash.
27	Miller Canyon.	28d	Steamboat Pass.
(C–21– 8)19b	Borden Basin.	(C–24– 9)35	Antelope Point.
28c	Black Willows.	(C–24–11)8a	Cedar Wash.
(C–21–12)9c	Madison.	(C–24–12)26b	Lakeview.
16d	Needle Hardpan.	(C–24–13)12	Horse Trap.
32c	Needle Point.	(C–24–14)27a	Vorhee.
(C–21–13)14d	Sevier Lake No. 2.	29	Lawson.
(C–22– 7)29d	Hole-in-the-Rock.	(C–24–15)1a	
(C–22– 8)25c	Clayspot.	(C–25–13)1b	Lakeview No. 2.
(C–22– 9)35b	Bloomtrail.	31	Queen.
(C–22–10)1d	Big Sage.	(C–26–14)14	Dutchman.
9		25b	Newhouse.
(C–22–11)14	Nelson.	(C–27–14)2	
(C–22–12)7		4	
(C–23– 7)17	Black Point.	35	Wah Wah.
(C–23–10)12	Georges Valley.	(C–28–14)34b	Grover Wash.
(C–23–10)15	Cat Canyon.		
White Valley			
(C–13–15)22a	Honey Comb.	(C–21–14)23a	Madison Coats.
(C–14–14)7c	Roadside.	(C–22–14)7	
(C–16–16)16	Confusion.	25d	Ibex.
(C–17–15)6	White Valley.	(C–22–15)33	Snake Pass.
(C–19–16)17	Conger.		
(C–20–14)17	Swenson.		
34d	Watson Cow Pond.		
Pine Valley			
(C–26–16)5a	Electric Fence.	(C–28–16)4c	Red Cove.
(C–26–17)12b	Desert Range.	27c	Pine Grove.
(C–26–17)25d	Cow Track.	(C–28–16)28b	Woods.
(C–27–16)6a	Chemise.	(C–29–17)15c	Indian Creek.
18	Central Pine.	34	Sheep Creek.
30d	Civilian Conservation Corps.	(C–30–16)20b	Mackleprang.

TABLE 4.—*Reservoirs in western Utah*—Continued

Location	Name	Location	Name
Snake Valley			
(C-11-15)21	Boyd Station.	(C-22-17)17	Jensen Wash.
(C-12-15)10	Race Track.	(C-22-18)11	Cedar Wash.
(C-12-16)17	Mud Lake.	31d	Burbank.
(C-13-17)36	Hole-in-wall.	(C-22-19)29	
(C-16-18)6		(C-23-16)7a	Ferguson Knolls.
(C-16-19)33		(C-23-16)30a	Pine Pass.
(C-19-17)9a	Browns Hole.	(C-24-18)20	
(C-19-18)5d	West Buckskin.	27d	East Antelope.
(C-19-19)19		(C-24-19)20	
(C-20-18)21	Buckskin.	24	Mormon Gap.
(C-21-17)34	Ferguson Desert.	(C-25-19)8d	Fairview.
(C-21-19)13b	Six Mile Point.	(C-29-19)19d	
17d	Garrison.	(C-31-19)10	
(C-22-16)19b	X-Knolls.		
21			
Escalante Desert and adjoining areas			
(C-24-14)11b	Brimstone.	(C-30- 9)1	Minersville.
23d	Miner's Hill.	(C-30-11)18d	17 Mile.
(C-25-10)32		(C-30-14)32a	Iron Mine Wash.
(C-25-11)11		(C-30-15)28a	Jockeys.
(C-26- 9)24	Mitchell Spring.	(C-30-16)20	
25	Salt Cove.	(C-30-18)10	
(C-27-12)12c	Railroad Grade.	(C-31-11)6a	Monument Knolls.
(C-29-12)31c	Deadhorse Point.	17	Net Crow.
(C-29-13)31c	Burn's Knolls.	18	Hot Springs Canyon.
(C-30- 8)23	Greenville Hollow.	(C-35-18)5	Modena.

REFERENCES

Buss, W. R., 1951, Bibliography of Utah geology: Utah Geol. Mineralog. Survey Bull. 40, 219 p.

Butler, B. S., Loughlin, G. F., Heikes, V. C., and others, 1920, The ore deposits of Utah: U.S. Geol. Survey Prof. Paper 111, 672 p.

Carpenter, E., 1913, Ground water in Box Elder and Tooele Counties, Utah: U.S. Geol. Survey Water-Supply Paper 333, 90 p.

Fenneman, N. M., 1931, Physiography of western United States: New York, McGraw-Hill Book Co. Inc., 534 p.

Fenneman, N. M., and Johnson, D. W., 1930, Physical divisions of the United States: U.S. Geol. Survey Map, scale 1 : 7,000,000.

Fix, P. F., Nelson, W. B., Lofgren, Ben E., and Butler, R. G., 1950, Ground water in the Escalante Valley, Beaver, Iron, and Washington Counties, Utah: Utah State Engineer Tech. Pub. no. 6 in 27th Bienn. Rept., p. 109–210.

Flint, R. F., 1947, Glacial geology and the Pleistocene epoch: New York, John Wiley and Sons, 589 p.

Gilbert, G. K., 1890, Lake Bonneville: U.S. Geol. Survey Mon. 1, 438 p.

Gilluly, J., 1932, Geology and ore deposits of the Stockton and Fairfield quadrangles, Utah: U.S. Geol. Survey Prof. Paper 173, 171 p.

Hintzie, L. F., compiler, 1960a, Preliminary geologic map of the Tooele, Utah, 2° quadrangle: Brigham Young University Map, scale 1:250,000.

——— compiler, 1960b, Preliminary geologic map of the Delta, Utah, 2° quadrangle: Brigham Young University Map, scale 1:250,000.

——— compiler, 1960c, Preliminary geologic map of the Richfield, Utah, 2° quadrangle: Brigham Young University Map, scale 1:250,000.

——— compiler, 1960d, Preliminary geologic map of the Cedar City, Utah, 2° quadrangle: Brigham Young University Map, scale 1:250,000.

Lee, W. T., 1908, Water resources of Beaver Valley, Utah: U.S. Geol. Survey Water-Supply Paper 217, 57 p.

Marbut, C. F., 1931, Atlas of American agriculture: U.S. Dept. of Agric., Soils, pl. 2.

Meinzer, O. E., 1911, Ground water in Juab, Millard and Iron Counties, Utah: U.S. Geol. Survey Water-Supply Paper 277, 162 p.

Morris, H. T., 1957, General geology of the East Tintic Mountains, Utah: Guidebook to the Geology of Utah No. 12, p. 1–55.

Nolan, T. B., 1935, The Gold Hill mining district, Utah: U.S. Geol. Survey Prof. Paper 177, 172 p.

Ohman, A. F. S., 1939, Poisoning of cattle on saline bore water: Australian Veterinary Jour., v. 15 no. 1, p. 37–38.

Stokes, W. L., editor, and others, 1951, Geology of the Canyon, House and Confusion Ranges, Millard County, Utah: Guidebook to the Geology of Utah, no. 6, 113 p.

Thomas, H. E., 1946, Ground water in Tooele Valley, Tooele County, Utah: Utah State Engineer Tech. Pub. 4 *in* Utah State Engineer 25th Bienn. Rept., p. 91–238.

Thomas, H. E., and Taylor, G. H., 1946, Geology and ground-water resources of Cedar City and Parowan Valleys, Iron County, Utah: U.S. Geol. Survey Water-Supply Paper 993, 210 p.

Walcott, C. D., 1908, Cambrian sections of the Cordilleran area: Smithsonian Misc. Colln., v. 53, no. 5, p. 167–230.

White, W. N., 1932, A method of estimating ground-water supplies based on discharge by plants and evaporation from soil: U.S. Geol. Survey Water-Supply Paper 659–A, p. 1–105.

Woolley, R. R., 1947, Utilization of surface-water resources of Sevier Lake basin, Utah: U.S. Geol. Survey Water-Supply Paper 920, 392 p.

INDEX