

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division

FINAL

GROUND-WATER RECONNAISSANCE OF THE GRANT GROVE AREA,
KINGS CANYON NATIONAL PARK, CALIFORNIA

Prepared at the request of the
National Park Service
U.S. Department of the Interior

ADMINISTRATIVE REPORT
For U.S. Government use only

Sacramento, California
1964
Revised October 7, 1966

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By

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CONTENTS

	Page
Summary and conclusions-----	4
Introduction-----	5
Geologic units and their water-bearing properties-----	6
Ground-water conditions-----	7
Test-well site-----	9
Appendix, Drillers' logs of wells and results of test drilling-----	10

ILLUSTRATIONS

Figure 1. Index map-----	5
2. General Grant Grove area map-----	6

For preliminary release, all illustrations are at end of report. Page number given is that of the first principal reference to the illustration in the text.

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SUMMARY AND CONCLUSIONS

Both granodiorite and alluvium are water bearing in the Round Meadow area of Grant Grove, Kings Canyon National Park. To test the formations, a well about 100 feet deep should be drilled near the center of Round Meadow.

It is unlikely that the well will yield more than 50 gpm, and it is likewise unlikely that it will yield less than 10 gpm.

INTRODUCTION

In September 1963 at a conference between the U.S. Geological Survey and the National Park Service, it was requested by the Park Service that the Geological Survey investigate the water-supply problems of the Grant Grove area, Kings Canyon National Park, Calif. (fig. 1). Accordingly, Messrs. S. E. Rantz, George Gravalee, and R. H. Dale, of the Geological Survey, made a reconnaissance investigation of the area on September 25, 1963. Walter Stanford of the Park service provided a tour and description of the present facilities. Additional well data were obtained from the California Department of Water Resources. The study was made under the overall direction of Fred Kunkel, district geologist in charge of Ground Water Branch investigations in California.

A sustained supply of about 100 gpm (gallons per minute) is required to operate the present development at Grant Grove. Presently, the water is supplied from a number of springs in the area (fig. 2). This supply is adequate during normal years, but during a series of dry years there is a deficiency of supply.

Because there are no perennial streams in the area, the purpose of this study is to prospect for a supply of ground water. The scope of this report includes: (1) A general description of the geologic features, (2) an appraisal of the ground-water conditions, and (3) the selection of a test-well site.

GEOLOGIC UNITS AND THEIR WATER-BEARING PROPERTIES

In the Grant Grove area (fig. 2), two geologic units crop out. From oldest to youngest they are: (1) The basement complex of pre-Tertiary age, and (2) alluvium of Recent age.

The basement complex, consisting of weathered and moderately fractured granodiorite, crops out over most of the area. A well, the exact location of which is unknown, completed in the Wilsonia subdivision reportedly yielded 50 gpm. This is a high yield for a well in granodiorite, but it is not unreasonable. Locally, alluvium forms a veneer not more than 50 feet thick. However, it occurs as small discontinuous patches and, except in the vicinity of Round Meadow, does not warrant test drilling. Therefore, the alluvium, except in Round Meadow, was not differentiated from the granodiorite on figure 2. The alluvium was differentiated along Abbott Creek in sec. 32, T. 13 S., R. 28 E. In that area (Round Meadow), 0.3 mile long and 0.1 mile wide, the deposits are poorly sorted gravel and cobbles. These deposits are a source of ground water that supplies several springs, which are dug about 5 feet below the water table. The yield of each spring was estimated to be between 5 and 10 gpm.

GROUND-WATER CONDITIONS

The park-supply system consists of a spring in the northeast corner of the Wilsonia subdivision (Merritt Spring); a second spring about half way between Wilsonia and Abbott Creek (Winter Spring); and four springs in Round Meadow. On September 25, 1963, Winter Spring and Merritt Spring were measured at 9 gpm each; and the combined flow of the springs in Round Meadow was estimated at 30 gpm.

Logs of six wells in the Wilsonia subdivision were obtained from the California Department of Water Resources and are included as an appendix to this report. Logs of wells 4 and 5, both of which were drilled in the decomposed granodiorite, indicate yields of 50 and 15 gpm, respectively.

TEST-WELL SITE

The most favorable site for a test well is in the center of Round Meadow. The alluvium in this meadow is estimated to be about 50 feet thick and presumably is underlain by relatively permeable decomposed granodiorite. Therefore, the well, in order to penetrate the full thickness of the permeable deposits, should be drilled to a depth of about 100 feet.

APPENDIX

Drillers' Logs of Wells

Well 1. Owner: J. M. Wood, Fresno, Calif. Drilled by Fred H. King, Visalia, Calif., in 1955. 8-inch casing 0-52½ ft. Water observed at depth of 8 ft below land surface.

	Thickness (feet)	Depth (feet)
(Granodiorite), soft, decomposed -----	51	51
Granite -----	8	59
No record -----	10	69

Well 2. Owner: Paul Harris, Fresno, Calif. Drilled by Fred H. King, Visalia, Calif., in 1955. 8-inch casing 0-24 ft. Water observed at depth of 12 ft below land surface.

No record -----	33	33
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Well 3. Owner: A. J. Atkinson, Exeter, Calif. Drilled by Fred H. King, Visalia, Calif., in 1955. 8-inch casing 0-4 ft. Water observed at depth of 8 ft. below land surface.

Granite, decomposed -----	3	3
No record -----	28	31

Well 4. Owner: Paul Harris, Fresno, Calif. Drilled by Diversified Exploration Co., Inc., Lemon Cove, Calif., in 1961. 7-inch casing 0-28 ft. Perforated interval: Unknown. Water observed at depth of 43 ft below land surface; static level after perforating, 22 ft. Yield 50 gpm.

	Thickness (feet)	Depth (feet)
No record -----	28	28
Granite, decomposed -----	20	48
Granite -----	25	73

Well 5. Owner: Byron Jackson, Fresno, Calif. Drilled by Diversified Exploration Co., Inc., Lemon Cove, Calif., in 1961. Casing diameter unknown. Perforated interval: Unknown. Water observed at 12 ft below land surface; static level after perforating, 10 ft. Yield 15 gpm.

No record -----	26	26
Granite, with small fractures -----	24	50

Well 6. Owner: Byron Jackson, Fresno, Calif. Drilled by Diversified Exploration Co., Inc., Lemon Cove, Calif., in 1961. Casing diameter unknown; cased 0-16 ft. Perforated interval: Unknown. Water observed at 13 ft below land surface; static level after perforating, 8 ft.

No record -----	12	12
Granite, with many fractures -----	35	47

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Results of Test Drilling

The Park Service contracted for test drilling in Round Meadow at the most favorable site proposed by the Geological Survey and at one additional site nearby. Figure 2 of this report has been modified to show the proposed well site and location of the two completed wells. Testing indicated that test well 1 (13S/28E-32H1) in Round Meadow can be pumped at a sustained yield of about 75 gpm, and test well 2 (13S/28E-32K1) can be pumped at about 40 gpm. Chemical analysis of water from each of the wells indicates calcium bicarbonate water of excellent chemical quality.

Following are the log, test-pumping results, and chemical analysis of water for each of the two wells drilled.

OTHER NOS. NPS Test well no. 1

WELL LOG

State California County Fresno Subarea Round Meadow

Owner National Park Service

Location About 5 ft east of service road at west end of Round Meadow in Kings Canyon

National Park in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, T. 13 S., R. 28 E.

Drilled by L. T. Larson Address 1780 S Bishop
Kerman, California

Date October 5, 1964 Casing diam. 6 in. Land-surf. alt. About 7,000 ft

Source of data H. T. Mitten, Geologist, U.S. Geological Survey

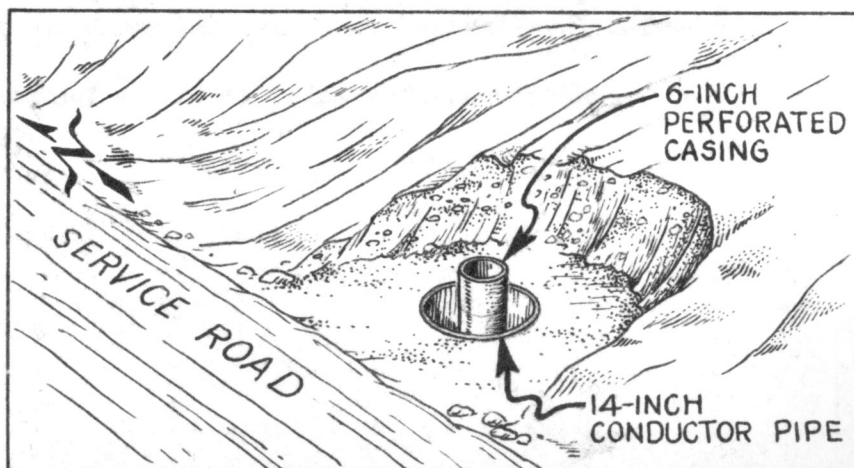
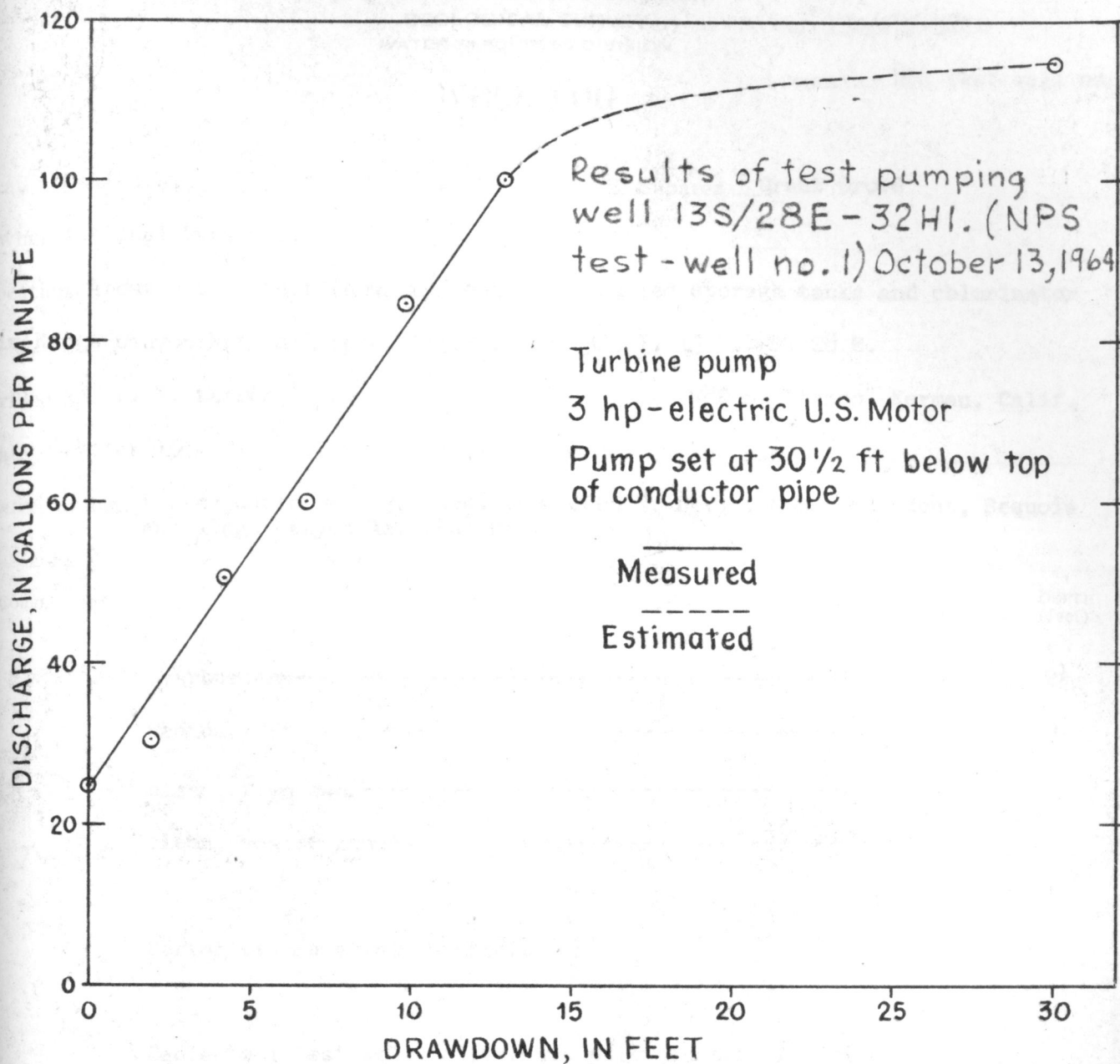
(Enter type of well, perforations, yield, and drawdown at end of log)

[illegible]

CONTINUED

(Enter type of well, perforations, yield, and drawdown at end of log)

RECORD BY H. T. Mitten DATE Oct. 5, 1964 SHEET 2 OF 2



WELL LOG

State California County Fresno Subarea Grant Grove

Owner National Park Service

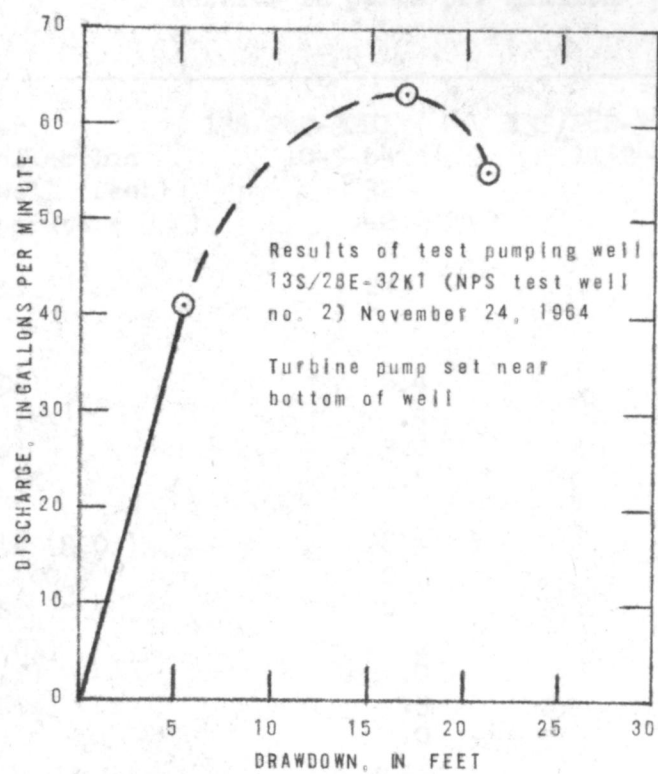
Location About 500 ft west (downgradient) from buried storage tanks and chlorinator
in Kings Canyon National Park, NW $\frac{1}{4}$ SE $\frac{1}{4}$, sec. 32, T. 13 S., R. 28 E.

Drilled by L. T. Larsen Address 1780 S. Bishop, Kerman, Calif.

Date October 1964 Casing diam. 6 in Land-surf. alt. 1000

Source of data Letter dated Dec. 3, 1964, from John M. Davis, Superintendent, Sequoia and Kings Canyon National Parks
(Enter type of well, perforations, yield, and drawdown at end of log)

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Overburden-----	2½	2½
	medium, fine sand-----	6½	9
	clean, fine sand-----	18	27
	clean, coarse sand-----	5	32
	Perforated interval not known		
	Cable-tool test well. Reference point is top of casing 16 in. above land surface. Water level before pumping was 10 ft below reference point.		



Chemical analysis of water

Analysis by U.S. Geological Survey

Results in parts per million

	13S/28E-32H1	13S/28E-32K1	U.S. Public Health Service drinking-water standards (1962)
Well number	13S/28E-32H1	13S/28E-32K1	
Date of collection	10-5-64	11-24-64	
Depth of well (feet)	32	32	
Water temperature (°F)	42		
Silica (SiO ₂)	24	28	
Iron (Fe)			0.3
Calcium (Ca)	6.4	5.8	
Magnesium (Mg)	.4	.6	
Sodium (Na)	3.8	4.9	
Potassium (K)	1.5	1.8	
Bicarbonate (HCO ₃)	28	29	
Carbonate (CO ₃)	0	0	
Sulfate (SO ₄)	0	1.0	250
Chloride (Cl)	.2	41.1	250
Fluoride (F)	.0	.0	.6-1.7
Nitrate (NO ₃)	.3	.8	45
Boron (B)	.0	.0	
Dissolved solids (calculated)	51	58	500
Hardness as CaCO ₃	18	17	
Noncarbonate hardness as CaCO ₃	0	0	
Percent sodium	30	35	
Specific conductance (micromhos at 25°C)	318	328	
pH	6.3	6.7	
Laboratory number	47751	48181	

a. Chloride analysis may be doubtful as sample was received in a plastic bottle originally containing sodium hypochlorite solution.

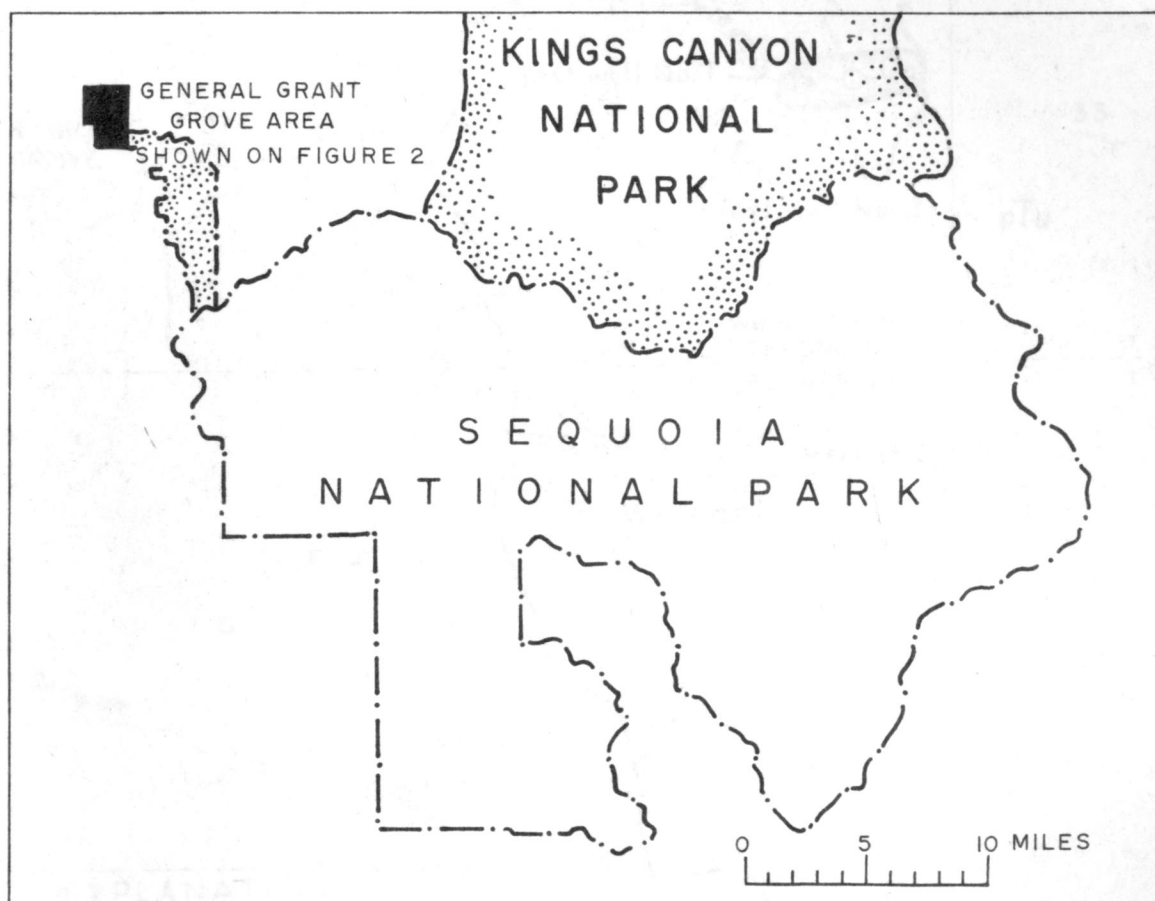


FIGURE 1.-INDEX MAP OF GENERAL GRANT GROVE AREA



FIGURE 2.-GENERAL GRANT GROVE AREA MAP