

Bib key ID: 656367

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

_____ NATIONAL PARK

FILE NO. CB-660-05

ANALYSIS
OF
WATER SYSTEM
CEDAR BREAKS NATIONAL MONUMENT

By
A. van V. Dunn
Hydraulic Engineer

IMPORTANT

This file constitutes a part of the official records of the National Park Service and should not be separated or papers withdrawn without express authority of the official in charge.

All Files should be returned promptly to the File Room. Officials and employees will be held responsible for failure to observe these rules, which are necessary to protect the integrity of the official records.

ARNO B. CAMMERER,
Director.

Water Rights Section,
Office of the Chief Counsel,
601 Sheldon Building,
San Francisco, Calif.
August 14, 1941.

NATIONAL PARK SERVICE
WATER RIGHTS SECTION, OFFICE OF CHIEF COUNSEL
ANALYSIS OF WATER SYSTEM
CEDAR BREAKS NATIONAL MONUMENT

By

A. van V. Dunn
Hydraulic Engineer

601 Sheldon Building
San Francisco, Calif.,
August 14, 1941.

Introductory Summary

All water now used at Cedar Breaks National Monument is diverted at a spring in Section 10, T 37 S, R 9 W, SLM, on land of the National Park Service, under a license owned by the Utah Parks Company, conveyed to distribution reservoirs in that operator's pipeline, and thence used in the distribution reservoirs and lines of both the Monument and its operator. The Park Service owns no water right of its own. Use from this joint diversion is at the operator's lodge, the National Park Service utility area, public campground, and museum and headquarters areas. Formerly the Park Service also operated a CCC camp on Forest Service land in Section 36, T 36 S, R 9 W, SLM. and diverted water from springs on the Forest Service land for camp use without water right, but with the permission of the Forest Service.

Even with the CCC camp now gone, the water demand in the Monument has nearly reached the total available supply at the U. P. Co. diversion. In fact, the available supply is far less than the quantity covered by the license. Tentative plans are under consideration for the Park Service to provide an auxiliary water supply either from the Forest Service springs formerly used by the CCC, or from Alpine Lake, on National Park Service land in Section 25, T 36 S, R 9 W, SLM. Diversion of either proposed source will require the perfection of a water right. The diversion of the Forest Service springs will also require either interbureau permits or the transfer of the required land from Forest to Park Service.

The Utah Parks Company feels that Park Service use of their system should be covered by formal agreements which do not now exist. Due to the imminent need for a change in the water development plan, it is desirable that such an agreement should cover both existing and proposed conditions. The following information is offered to permit the formulation of such an agreement, and to show wherein the tentative agreement submitted by the Utah Parks Company seems weak.

Map NM-CB-6975

Map NM-CB-6975, Water System Study, is compiled from pantographed copies of Park Service and Operator's maps, mostly from blue prints and from the Geological Survey topographical map of the area. Exact matching of polyconic and plane projections is not possible, and there is some further distortion due to shrinkage of blue prints, but such errors have been evident to the writer and are not great.

In basic data the Geological Survey map showed standard regular sections, while Park Surveys indicate that all sections are really irregular. The Lodge is definitely plotted at different positions in Section 11 on the Geological Survey and Operator's lease maps. The writer's information does not indicate whether the Park Service triangulation stations A, B, C, . . . I, are the identical Geological Survey bench marks along the rim, or not. Neither does it indicate whether the road shown on the Geological Survey map is a projection or part of the actual field survey, nor whether the Park Service ran an actual survey or accepted the Bureau of Roads data, which is usually crude.

The map, as compiled, is matched on the east line of section 11, including the 1/4 corner to which the Operator's leased area is tied. Apparently the better match would be by southwest quarter of that section, which would move all detailed surveys northerly with relation to natural features. Either position is adequate for this report, but the one adopted illustrates some of the following discussion better.

Utah Parks Company Leases

This report is based on the Union Pacific map, CE drawing No. 51239, dated October 1, 1929. This map shows the rectangular Lodge area to have been located from the east-west center line of section 11, T 37 S, R 9 W, SLM, without designating true bearings of section lines or lease traverse. Presumably the pipe line traverse is an extension from the lease traverse with the same indefinite bearings. All these bearings are available, however, through the Park Service coordinates of the section corners, and bearings of section lines determined by the General Land Office and shown on its plats. The map gives the following explanation of the Operator's lease.

Lodge Area: "Special Use Permit from U. S. Department of Agriculture, National Forest Service, for 30 years, dated March 12, 1924, covering 5 acres for pavilion site."

Water System: "Special Use Permit dated April 17, 1924, for 30 years covers land occupied by pipe line water tank and spring area."

Spring: "Appropriation No. 1494 from State of Utah."

According to a tentative agreement between the Operator and Park Service, to be described later, the Forest Service permits were superseded by one from the Park Service which expires January 19, 1960. The writer has not seen the Park Service permit, but assumes it agrees with data just quoted.

Utah Parks Company Water Rights

The Operator's water right, previously mentioned, has not been fully studied, but the following data is available:

Application No. 9386 was granted certificate No. 1494 in 1936 for the appropriation of 0.06 sec. ft. of water with priority of September 5, 1925.

The lease map shows the diversion to be made at one spring in section 10, but that another spring is available on the pipe line in section 11. A complete copy of the water right will be obtained to determine whether it includes the right to divert from only one or both springs.

The spring flow at the diversion now in use ranges from 26,000 g.p.d. (0.04 sec. ft.) in May to as little, if not less than, 8000 g.p.d. (0.012 sec. ft.) in the latter part of the summer when the need is greatest. The unused spring ceases to flow at all in late summer. In other words, although the license was granted on actual diversion and use of 0.05 sec. ft. early in the season, the greater part of the right is largely imaginary from mid-summer to fall, and only of value at the present diversion to the extent of 0.012 sec. ft.

Operator's Water Demand

The Lodge employs 12 people, served an average of 40 luncheon guests in June, 1940, and a few people spend the night, but there were only 36 overnight guests during all of June, 1940. Park attendance records, largely estimated, are as follows, and show that attendance is relatively static at between 15,000 and 20,000 per year:

<u>Year</u>	<u>Annual Attendance</u>
1934	17,120 people
1935	21,000 "
1936	22,000 "
1937	21,719 "
1938	22,500 "
1939	15,996 "
1940	15,762 "

From records for Bryce Canyon it seems probable that June water use is about half of that for July and August, respectively, and the 1940 demand was only about 72% of the maximum past requirement. On this basis the Operator's present potential water demand seems to be approximately 280% of that for June, 1940, and estimated as follows:

Probable Average Daily Lodge Water Demand

<u>Use</u>	<u>June 1940</u>	<u>Peak Month 1936</u>
12 Employees @ 100 g.p.d.	1200 g.p.d.	
18 Employees @ 100 g.p.d.		1800 g.p.d.
2 Overnight Guests @ 100 g.p.d.	200 g.p.d.	
6 Overnight Guests @ 100 g.p.d.		600 g.p.d.
40 Luncheon Guests @ 50 g.p.d.	2000 g.p.d.	
112 Luncheon Guests @ 50 g.p.d.		5600 g.p.d.
Average Daily Water Demand	3400 g.p.d.	8000 g.p.d.

This suggests that the Utah Parks Company has probably used nearly all of the available supply at times in the past, and that peak day demand was satisfied only because of the 8000 gallon reserve in the reservoir and the fact that spring flow was above the minimum. It is important to note, too, that in the years of past peak demand the Park Service had a minimum representation and little or no water system for campground use, making such water demands negligible and well within the transient allowance included in the rates for hotel guests.

Park Service Demands

The Park Service maintained one ranger at the Monument in 1940, who with his family would require 110 g.p.d. for each of 3½ people, using averages, or 385 g.p.d. Total attendance reached a peak in June, 1940, of 112 people, suggesting that 72 visitors who did not visit the Lodge were dependant on Park Service water at the Museum and Campground areas. Maintenance crews have not in the past had facilities on the water system, camping instead near the CCC camp site, but a utility area is planned or being developed. Due to inadequate past development, Park Service water demand has not been normal. The following estimates of Park Service water demand in the area served by existing facilities are comparative only:

Estimated Park Service Water Demand in Section 11.

<u>Use</u>	<u>Peak Month</u>		<u>Peak Month 1936</u>	
	<u>1940</u>	<u>1936 Facil-</u>	<u>If Ultimate Faci-</u>	
		<u>ities</u>	<u>lities were Available</u>	
3 Permanent Employees @ 110 g.p.d.	330 g.p.d.			
3 " " @ 100 "		300 g.p.d.		
12 " " @ 110 "			1320 g.p.d.	
140 Visitors @ 20 "	2800 g.p.d.			
200 " @ 7 "		1400 g.p.d.		
200 " @ 25 "			5000 g.p.d.	
Utility Shops			1000 g.p.d.	
Total	3130 g.p.d.	1700 g.p.d.	7320 g.p.d.	

From this analysis it is evident that the Park Service interests may demand a water supply nearly equal to the available supply from the Utah Parks Company spring at any time in the near future. Inadequate sanitary facilities, inadequate Monument personnel, an undeveloped utility area, low attendance for the past two years, addition of 30,000 gallons of National Park Service storage, and the fact that peak attendance has probably come when the spring flow is average or better, have all fortunately contributed to prevent possible friction with the operator over disposition of the latter's limited supply.

In addition to this major demand the Park Service operated a CCC camp for a number of years. Such camps require from 5000 g.p.d. to 11000 g.p.d., depending on climate type of work, and personal habits of the particular camp. The camp is now gone. It obtained its water from Forest Service springs at the head of Long Valley Creek while in existence, and some demand for part of the quota of water will always remain to provide for temporary construction and maintenance crews. An allowance of 5000 g.p.d., particularly early in the season, does not seem unreasonable.

In addition the Park has two other approach roads, from Panguitch and Parowan. Future checking stations at these approaches, or perhaps one at the junction of the roads, will add further water demand ranging from 200 g.p.d. to 1000 g.p.d., depending on the type of development and whether the water is piped or hauled.

Total Park Water Demand

From the preceding discussion it seems evident that only a few years will be required before the Monument will need at least 21,000 g.p.d., or 0.033 sec. ft. The Operator's water right for 0.06 sec. ft. is adequate and will allow for appreciable further increases in attendance if the physical water is available. However, records indicate that there is not the available supply except early in the season, and even then the supply is not adequate for much increase in attendance. It is easy to foresee that there may be inadequate water from the Operator's supply to serve just the Lodge interests, with none for the Park Service.

Potential Supplemental Water Supplies

The Park Service is already considering the development of two other potential sources of water supply:

1. The Forest Service springs which previously served the CCC camp in Section 36.
2. Alpine Lake in Section 25.

The Forest Service springs are available, and reported to have a flow of about 8000 g.p.d. They would provide a gravity supply for the campground, but would require a pump for all other distribution and for proper fire protection head. If they were acquired they should be fenced to prevent pollution by stock from the adjacent Forest Service range. This could be arranged under Forest Service permit, but an inspection of the map shows that much of the same area is also needed to provide proper administration and development of the Monument. It is suggested that all Forest Service land in Sections 36 and 1 might well be transferred to the Park Service. After acquisition and before water system construction, an appropriative water right should be initiated with the State Engineer.

Alpine Lake would require twice as long a pipe, but it offers a gravity supply with approximately 40 feet of head on the existing reservoirs, which are at least 125 feet higher than the Forest Service springs. There seems to be ample water, but flow records are lacking. The Public Health Service has not been questioned regarding the quality of water at the two sources, but it seems probable that the lake would be given the lower rating. Here again a water right should be initiated before construction is started. No Forest Service permit is needed at the lake, but any pipe line to the place of use will evidently have to cross a corner of Forest Service land in Section 36 which should be covered by permit.

Water Right Procedure

The Utah Parks Company springs and Alpine Lake are all tributary to Coal Creek through the eroded area of Breakers below the plateau. It seems probable that no surface flow ever leaves the Monument area. The water needs legal appropriation for use, but the priority of rights does not seem very important. However, the return flow is into Long Valley Creek in another drainage, so that any appropriation is definitely adverse to lower water users on Coal Creek.

The Forest Service springs are on Long Valley Creek and the land traversed by their surface or seepage flow is good range land. It is also probable that lower users could establish a more direct conflict with their use by any appropriation in the park, although any damage seems to be limited to remote danger of pollution as the return flow is all to the same drainage. No difficulty is anticipated in obtaining a permit to appropriate as of this date, but it seems possible that the Utah Parks priority of 1925 might have some advantages.

Apparently, even the spring flow of the Utah Parks springs, when combined with that of the Forest Service springs, is only about 0.093 sec. ft., or less than the Utah Parks right. Also, all anticipated water demand, as long as attendance fluctuates from 15,000 to 22,000 per year,

is only 0.033 sec. ft. or only 55% of the Utah Parks license No. 1494. Thus, the Utah Parks Company seems to have ample rights to cover all anticipated water demand and available supply. All that is needed is transfer of portions of the right to other sources to make the right all physically real.

Past policy has been for the Park Service to perfect all rights for the use of itself and the operator in the name of the United States. Older Operators' rights are gradually being acquired by the United States as a part of this procedure. The Utah Parks Company is operating at the North Rim of Grand Canyon under rights perfected by the United States, and it has just recently made a tentative offer to donate its rights to Trough and Shaker Springs in Bryce Canyon to the United States. On this basis transfers of rights under Certificate No. 1494 should be predicated on prior transfer of title to the right to the United States. For the moment the Director has indicated a desire to defer any further pressure to expedite such conveyances until time for renewal of the Operators' leases, in this case until 1960.

The alternative is for the Park Service to make a new independent appropriation on either supplemental source of supply it selects. The filing fees are low. The cost of maps to prove use are the same as for transferring existing rights and the cost of possible later transfer of the older right would be reduced by the procedure. Further, it will be possible to transfer part of the license covered by Certificate No. 1494 at a later date if the priority becomes important even if the junior right exists.

Before either plan is followed a water system design is needed. The water rights section proposes to make a filing in federal name as soon as such data is available. Meantime, however, it would be well to reconsider the merits of acquiring the better right and saving the possible later cost of transfer and need for abandoning the junior one.

Administrative Features

It is clear that water use at the peak of the season is to become increasingly dependant on regulatory storage. The present Utah Parks reservoir is only adequate for a one day demand of double the late season supply. The Park Service reservoir permits a five day run. Normally both Park Service and Operator will require reserve storage at the same time, but not always. Due to the limited supply in any case, and the limits of existing storage it would be desirable to consolidate the facilities. Further, the existing reservoir site seems to offer the only suitable pressure for either system.

Local conditions seem best adapted to a unified water system. This will require a single ownership and management. It will also require an operating agreement between the various water users

Water Use Agreements

The Utah Parks Company has drafted a tentative water use agreement for Park Service approval which was referred to the Water Rights Section by memorandum from the Chief Counsel on October 23, 1940. This agreement is based on the water system as it now exists. The following comments are numbered and titled as in the agreement:

"(2) Consideration"

The Utah Parks Company is to be granted free and unrestricted use of the water in both its own and Park Service reservoirs and pipe lines. With its further sole ownership of the water right and diversion system the Company reserves the right to all water when needed even if it leaves the Park interests with no supply. The Company demand for all water is to be expected any time in the future.

"(3) Ownership of Spring and Water"

The Company claims title to spring and use of water, and further makes Company rights paramount as suggested under (2). Actual title to the spring area is a lease of limited duration. Its title to the use of water is a license good only during use for specified beneficial purposes. The right from the State would lapse through non-use for 5 years or 10 years if extension were made according to provisions existing in the State Water Code. Use is dependent on access, which is lost if the federal lease is not renewed. It is also possible that full use has not been made since 1938 and may not be made for some years to come without the helping use by the Park Service. These conditions should be recognized in the agreement.

"(4) Maintenance of Water System"

This seems to be broad enough to cover any condition of ownership.

"(5) Delivery of Water"

This item covers several points needing separate comments:

- A. The Company again indicates that it does not have to supply any water to the Park Service if the supply is inadequate, and never more than what it considers surplus.

B. It specifically limits water service to the Park Service to the time the Lodge is in operation. This makes the Park Service dependant on such storage as it may have in its own reservoir for more than half of the year. This arrangement may be ample for the needs of the rangers' quarters, but may be very unsatisfactory if Park Service maintenance crews wish to occupy the new utility area before the season opens.

C. In order not to be construed as a public utility the Company makes service to the United States conditional on State rulings. It makes no provisions for adjusting the operating agreement to permit further service under such rulings.

"(6) Additional Connections"

This limits Monument growth, except as the Park Service may provide additional water supply, to the joint dictates of the Park Service and Operator.

"(7) Liability"

This is a legal provision and no comments are offered except that part of it seems needless and part seems beyond the authority of those who are supposed to sign the agreement. The first sentence should be ample.

"(8) Officials not to Benefit"

No comments.

"(9) Termination"

This is a legal matter.

"(10) Term"

This definitely limits the agreement to the term of the Operator's lease, but makes no provision for the disposition of the Operator's rights if the lease is not renewed.

"(11) Agreement not to be Assigned"

This limits federal assignment of interest, but does not limit assignment by the Company, which is equally important. This should be modified to agree with the terms of the Operators lease. Federal control

does exist in that no assignment can be made by the Company except for transfer of all water rights to sources outside of the Park. Any assignment of the existing source or water system is conditioned on obtaining right of way or occupancy of the land from the Park Service.

"(12) Successors and Assigns"

This is a legal matter.

The whole tone of the agreement suggests that the Company will gradually use more and more of the water and either limit the Lodge development to water facilities, or rely on the federal generosity to supply more from the developments forced on it, when the time arrives. From the limited past travel figures the Company is probably well fixed for many years to come, except for storage capacity. More storage will require a larger area at the reservoir site or use of federal facilities as previously described. Note that the lease covers the land occupied by the existing reservoir, but no more.

The Park Service acquires nothing tangible by the agreement as drawn and will merely assist the company in its self sufficiency if it provides it with greater storage. Hence the agreement should be redrawn to cover the future and recognize every little item of control that the Park Service has as a means of preserving them. The lease might be amended to include a notes and bounds description of the Company reservoir site to permit a larger reservoir, or the joint use of the Park Service reservoir might be granted, but in either case such broadening of contracts should be in exchange for equally tangible assignments to the United States. They do not appear in the present draft of agreement.

Furthermore, amendment of the lease is equivalent to termination of the old and substitution of a new lease. This would permit present consideration of the conveyance of water right title from Operator to the United States instead of on January 19, 1960.

Survey and Design Data

The accompanying map suggests that it may be desirable to check the section ties of the Operator's lease area and water system. Park Service surveys of the Museum, Campground and Utility Areas, must also be tied to section corners before any water right filing is made, particularly the Utility Area which is near, if not on, a section line.

It is not necessary to have a complete design of the proposed Park Service water system to file the application, but it is necessary to determine the basic plan. The rest of the design can then be prepared at

more leisure for the final proof. The basic data should include the following:

1. Tie from point of diversion to a section corner which first requires that the question of Forest Service springs or Alpine Lake source be decided.
2. If the Forest Service springs are accepted it will be desirable to tie each spring to a section corner as well as the main point of diversion, in order that a "spring area" can be described.
3. The general plan of diversion must be described, including size of pump and motor, if such are used, and general plan of dam, collecting sump or other works.
4. Elevation of point of diversion, diameter of pipe from diversion to reservoir and its approximate length must be determined.
5. Data regarding the existing 30,000 gallon distribution reservoir is now ample if that is all the storage contemplated, but the general plan of a larger unit should be given if one is to be installed before proof of full use of the diverted water is made.
6. The maximum available supply of water during the season, as well as that at time of peak attendance, should be determined with greater accuracy than seems to have been done to date.
7. The writer should also have a copy of any agreement which may be executed by the Park Service and Operator regarding use of both the Operator's and proposed Park Service Systems, more as a reference than to incorporate in the filing.
8. A map of the CCC camp area should be made, and tied to a section corner, if the area is to be used and served with water in the future.