



WATER-RIGHT DOCKET

Great Smoky Mountains National Park

Docket No: 13

WELL. COLLINS CREEK PICNIC AREA

Preliminary Docket Information

00-00-0000: great smoky mountain docket no. 1 for map and preliminary map showing locations of water sources within the park

SEE GREAT SMOKY MOUNTAIN DOCKET NO. 1 FOR MAP
AND PRELIMINARY MAP SHOWING LOCATIONS OF
WATER SOURCES WITHIN THE PARK.

WATER RIGHTS DOCKET
Collins Creek Picnic Area
Great Smoky Mountains National Park

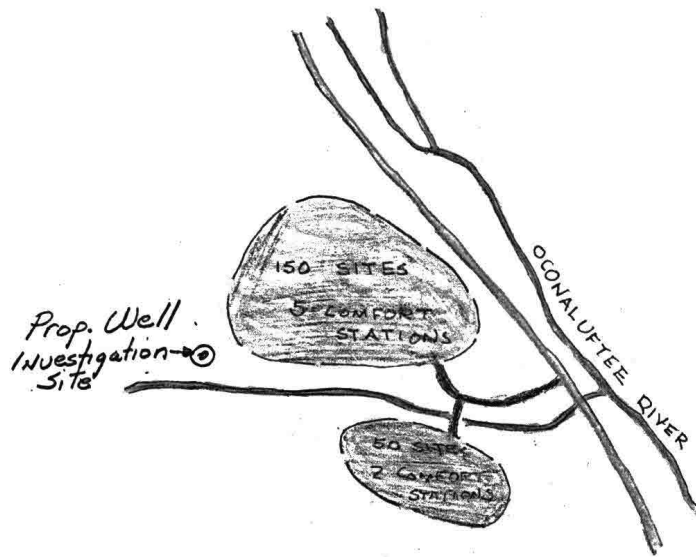
Supporting Hydro Data

COLLINS CREEK

Situation: The Oconaluftee Job Corps Center has a project in their 1967 F.Y. program for the construction of a 200-site picnic area just off U.S. 441 and approximately one mile north of Smokemont Campground. At the present time, no actual study has been made as to available water supply. It is estimated that the water consumption should run from 12,000 to 15,000 gallons per day.

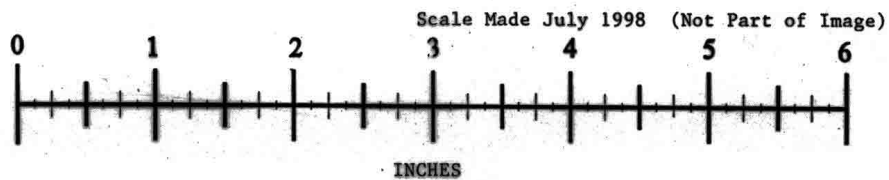
Proposed: That we drill an exploratory 8" well or combination of wells that will provide a minimum of 20 gallons per minute.

Progress to date: This is the first priority in the Water Resources Investigation program for 1967 F.Y. as submitted by the park.



COLLINS CREEK PICNIC AREA

SCALE 1" = 500'
200 PICNIC SITES



WATER SUPPLY

Collins Creek Picnic Area

The well site is located on the southern edge of the picnic area about 75 feet from the left bank of Collins Creek and approximately half a mile southeast of Highway 441. Altitude of the site is roughly 2,480 feet (from topographic map).

Drilling began on June 5, 1967. The first hole drilled at this site was abandoned at 73 feet; although it was straight, it was about 2 feet out of plumb at that depth. A second hole, located 18 feet northeast from the first one, was started on June 7 and completed June 12. Drill cuttings from this hole were used to fill the abandoned one. A hydro-geologic log of the well, drilled in alluvium and the Thunderhead Sandstone, follows:

- 0-15 ft., Thin soil cover and alluvium ranging from sand to boulders.
- 15-40 ft., Soft, highly weathered mica schist with no water.
- 40-64 ft., Mica quartz schist, getting progressively harder with little water. The well was cased to 64 feet.
- 64-73 ft., Slightly weathered mica quartz schist. Encountered about 10 gpm of water at 73 feet.
- 73-84 ft., Fine-grained mica quartz schist with thin layers of dark argillaceous phyllite. The yield increased to about 13 gpm.
- 84-95 ft., Zone of weathered and fractured gneiss with small veins of clear quartz. The yield increased to about 20 gpm.
- 95-122 ft., Fine-grained biotite quartz gneiss with a decrease in the amount of clear quartz. The yield increased to about 30 gpm.

122-132 ft., Biotite quartz gneiss with thinner layers of yellowish quartzite, the yield increased slightly.

132-148 ft., Very hard, unweathered biotite quartz gneiss with megascopic traces of soda feldspar and pyrite. Yield at this depth is 50 gpm after developing with compressed air for about 3 hours. Drilling terminated at 148 feet.

On June 15, a five-horsepower submersible pump was set in the well at a depth of 126 feet. Static water level was 21.4 feet below the top of casing. The pump had operated at a maximum discharge of 90 gpm for about $3\frac{1}{2}$ hours when the test was momentarily interrupted to install a valve for regulation of discharge. After resumption of the test, discharge was held at 72 gpm for $4\frac{1}{2}$ hours, and the drawdown remained steady at 77.3 feet (fig. 1). The specific capacity of this well is 1.3 gpm per foot of drawdown at 72 gpm after 8 hours of pumping.

As the estimated requirement for the picnic area is 15-20 gpm, this well will provide sufficient water for the present area. The water is of excellent quality and needs no treatment other than pH adjustment. The chemical analysis of a water sample taken at the end of the 8-hour pump test is given in table 1.

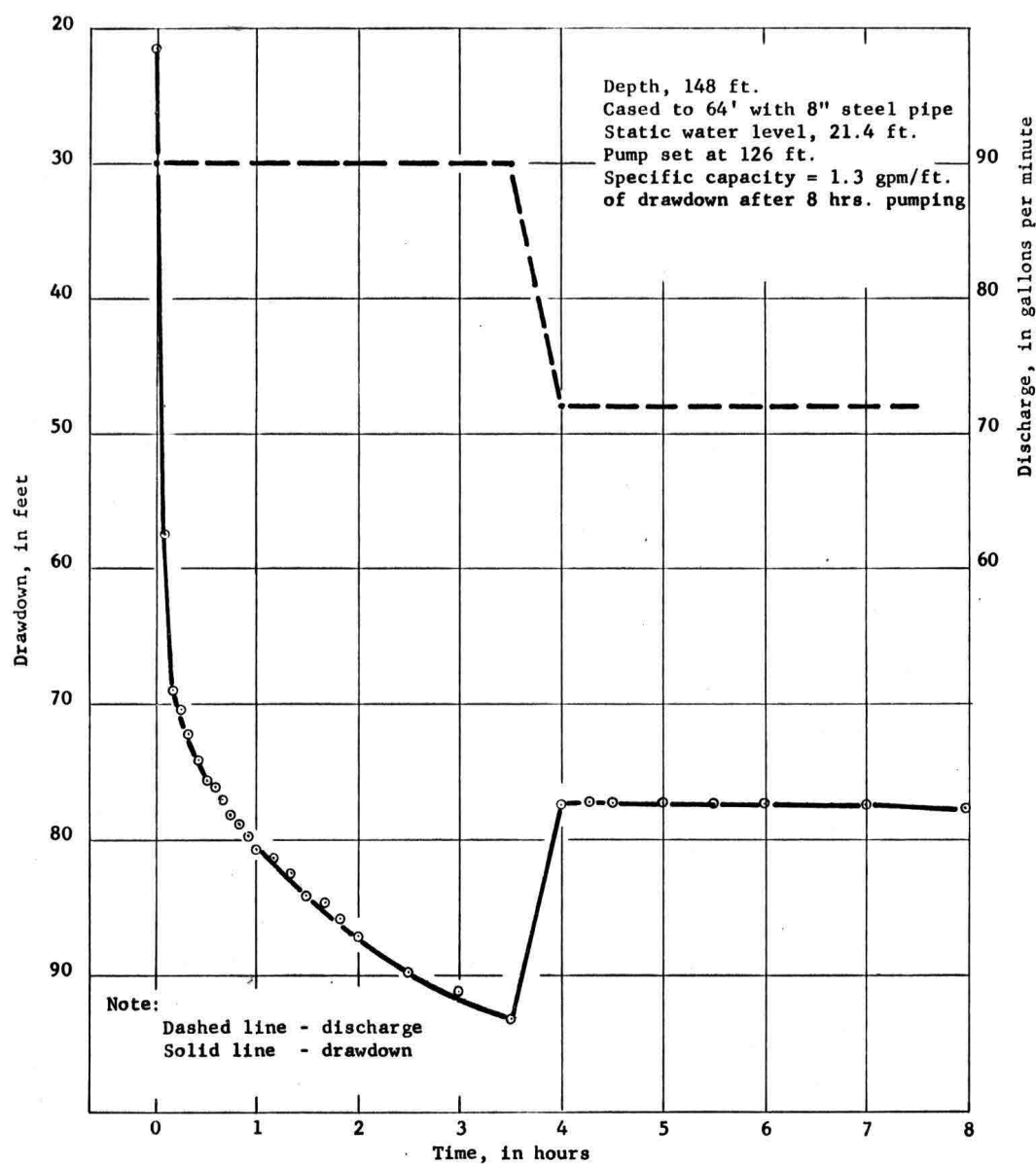


Figure 1. Discharge and drawdown of well at Collins Creek Picnic Area.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
WATER ANALYSIS

Table 1. Chemical quality
of water from the
Collins Creek well.

W.R. Lab. No. NC 48631

Location <u>N. C. - Swain Co.</u>			
Source <u>At Collins Creek. Depth: 148'. Drilled: 6-13-67. Collected orifice.</u>			
Owner: <u>NFS, Gatlinburg, Tenn, Gr. Sm. Mtn. Nat. Pk. Use: PS for picnic area supply.</u>			
WRF: <u>Fract. gneiss & schist. WL: pump. 67.3 below top of casing. Yield: 72 gmp meas.</u>			
Date of collection <u>June 15, 1967</u>			
Gage height(ft.) _____ Discharge(sec.ft.) _____ Temp.(°F) <u>56</u>			
(Parts per million)			
Silica (SiO ₂).....	12	Carbonate (CO ₃).....	0
Aluminum (Al).....	.1	Bicarbonate (HCO ₃).....	13
Iron (Fe).....	.08	Sulfate (SO ₄).....	1.6
Manganese (Mn).....	.01	Chloride (Cl).....	.7
Calcium (Ca).....	1.8	Fluoride (F).....	.1
Magnesium (Mg).....	.5	Nitrate (NO ₃).....	.1
Sodium (Na).....	1.9	Phosphate (PO ₄).....	.06
Potassium (K).....	.9	Zinc (Zn).....	.22
Lithium (Li).....		Copper (Cu).....	.01
(Parts per million)			
Dissolved solids:		ABS.....	
Sum.....	26	Color.....	0
Residue upon evapo- ration @ 180°C.....	25		
Hardness as CaCO ₃	8 1/2		
Noncarbonate.....	0		
pH.....	6.0	Specific conductance (micromhos at 25°C).....	25

1/ Includes hardness of all pol.cat.rep.

Unpublished records subject to revision

B. Consumption:METER READINGS - 1969 OPERATING SEASON

Breakdown according to usages:

Month (Consumption in 1,000 gal.)	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>TOTALS</u>
Picnickers (203,400).....	--	--	1	10	15	150	179	157	60	45	1	1	619
Difference (wasted; unaccounted).	--	--	<u>6</u>	<u>9</u>	<u>12</u>	<u>(66)</u>	<u>(5)</u>	<u>78</u>	<u>60</u>	<u>15</u>	<u>3</u>	<u>1</u>	<u>113</u>
TOTALS.....	--	--	7	19	27	84	174	235	120	60	4	2	732

This system served 203,400 picnickers during the 1969 season.

METER READINGS - 1970 OPERATING SEASON

Breakdown according to usages:

Month (Consumption in 1,000 gal.)	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>TOTALS</u>
Picnickers (198,340).....	--	1	3	10	39	114	112	148	67	89	9	--	592
Difference (wasted; unaccounted).	<u>7</u>	<u>12</u>	<u>13</u>	<u>19</u>	<u>(6)</u>	<u>(28)</u>	<u>30</u>	<u>72</u>	<u>23</u>	<u>(43)</u>	<u>3</u>	<u>5</u>	<u>107</u>
TOTALS.....	7	13	16	29	33	86	142	220	90	46	12	5	699

NOTE: Monthly "unaccounted for" not given since pumping control was manual and pumping was intermittent with little regard to keeping tank full at all times.

This system served 198,340 picnickers during the 1970 season.

(Collins Creek Picnic Area - Addendum No. 2)

(2/8/71)

NAME OF SYSTEM: Collins Creek Picnic AreaLOCATION: Park Route #1BLOCATION: STATE: North Carolina COUNTY: SwainA. Source of SupplyLocation - Reference to Permanent LandmarkCoordinates

1. Deep Well

1,350 feet upstream from bridge at U.S. 441
and 75 feet from right bank of streamLat. N 35°34'02.5"
Long. W 83°20'20.6"

This system consists of one, 8-inch diameter deep well drilled to a depth of 148 feet. The elevation at top of casing is 2,471.79 feet. The pumping unit is a Fairbanks Morse, 24 stage turbine with a 1,800 RPM single phase, 230 volt vertical hollow shaft motor with a nonreverse ratchet. The water is pumped through a Permutit neutralizer to bring the pH value up from 6.0 to 7.1 and through a two-inch force main to a 20,000 gallon reinforced concrete reservoir at an elevation of 2,594.0. From the reservoir the water flows by gravity through 4-inch mains to points of use. There are no other filters or purifiers required on this system.

B. Consumption:

The system is metered and was put into operation in July 1968. While a total of 392,800 gallons were pumped during the season, only 126,000 gallons are considered attributable to picnic usage. The remaining gallons were losses due to filling and emptying the system on a number of occasions and also due to a major water main leakage just outside the reservoir.

(Collins Creek Picnic Area - Addendum No. 1)

B. Consumption: (Cont'd)METER READINGS - 1968 OPERATING SEASON

Month (Consumption in 1,000 gal.)	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Total</u>
Picnickers (33,816)	--	--	--	--	--	--	167	98	82	46	--	--	393

C. Mains and Laterals:

<u>Size</u>	<u>Type</u>	<u>Length</u>
4"	Cast Iron	1,573 Lineal Feet
2"	Galvanized Steel	<u>275</u> Lineal Feet
	TOTAL	1,848 Lineal Feet

D. Problems:

NONE

E. Proposed Improvements:

NONE

(Collins Creek Picnic Area - Addendum No. 1)



Left: Pump House at Collins
Creek Containing a Deep
Well Pump and Water
Neutralizer



Right: A 20,000 Gallon
Reinforced Concrete
Reservoir Buried on a
Hillside Serving
Collins Creek Picnic
Area

(Collins Creek Picnic Area - Addendum No. 1)
(5/1969)

WATER SUPPLY

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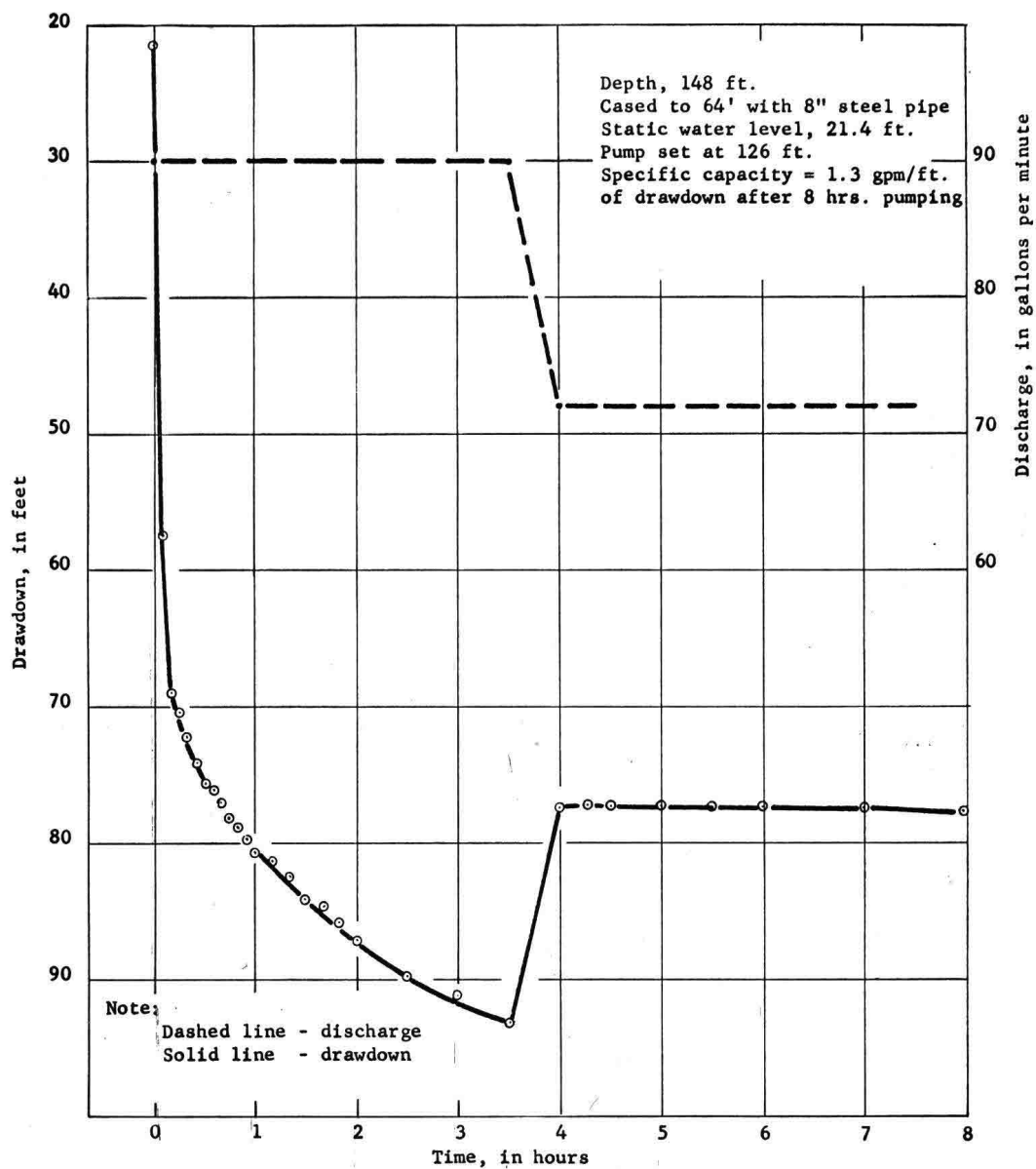


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Unpublished records subject to revision

Other Supporting Information

PROPOSED SITES FOR WATER RESOURCES INVESTIGATION

1. Park Headquarters
2. Green Mountain (Foothills Parkway)
3. Newfound Gap
4. Cades Cove
5. Deep Creek
6. Smokemont
7. Abrams Creek
8. Twin Creeks
9. Collins Creek
10. Metcalf Bottoms
11. Cataloochee
12. Elkmont
13. Cosby
14. Chimneys
15. Rocky Mountain (Foothills Parkway)
16. Webb Mountain (Foothills Parkway)
17. Little Greenbrier
18. Greenbrier
19. Sinks
20. Towstring
21. Indian Camp Creek
22. Tremont Ranger Station
23. Round Bottom Campground
24. Balsam Mountain Campground
25. Main Oconaluftee Residential Area
26. Old Oconaluftee Residence Area (Ravensford)
27. Big Creek Ranger Station
28. Cataloochee Ranger Station
29. Cataloochee Maintenance Area
30. Twentymile Ranger Station
31. Cherokee Orchard
32. Sugarlands

(09/28/67)

MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Gerald Rowe, Chief of Maintenance
Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

DATE: September 7, 1967

FROM : W. M. McMaster, USGS, WRD
Knoxville, Tennessee

SUBJECT: Summary of work plans for study of water resources of Great Smoky Mountains
National Park, North Carolina and Tennessee Districts

As I promised you on August 11, I am sending you our plans for the study of water resources of Great Smoky Mountains National Park that have been modified as a result of a meeting between North Carolina and Tennessee U. S. Geological Survey personnel July 6-7, 1967.

W. M. McMaster
W. M. McMaster
Hydrologist

cc: Edward J. Kennedy, Chief, Tenn. District
Ralph C. Heath, Chief, N. C. District



5010-108

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

Summary of work plans for study of water resources of Great Smoky Mountains
National Park, North Carolina and Tennessee Districts

Sept. 7, 1967

At a meeting in Knoxville during July 6-7, 1967, North Carolina and Tennessee personnel discussed modification of plans in the study of water resources of the Great Smoky Mountains National Park. Those who attended the meeting were: Ralph C. Heath, North Carolina District Chief; Edward J. Kennedy, Tennessee District Chief; D. R. Rima, Assistant District Chief for Tennessee; Nat Thomas, G. C. Goddard, and E. F. Hubbard of North Carolina; and W. M. McMaster of Tennessee.

At the meeting it was agreed that the effort in both districts should be combined under leadership of one individual; McMaster was delegated project leadership. McMaster will be responsible for ground water interpretive aspects of the study and Hubbard will be responsible for surface water interpretive aspects.

The final product will be a hydrologic atlas of the Smokies area, published by the Geological Survey, that will consist of the 1:125,000 base map upon which will be delineated ground water and surface water information. Ground water occurrence and availability will be shown as a series of patterns, each defining a range between a minimum, a maximum, and an average of expected well yields within the area covered by the pattern. These areas are expected to be established by topographic criteria, geologic location, estimated soil thickness, and background information provided by test wells drilled during the course of the study. If a test well appears capable of yielding the desired quantity of water for water supply at the drilling site, a pumping test will be run.

Surface water information will be indicated by isopleths of minimum flow in cubic feet per second per square mile at the 2-year 7-day recurrence interval, based on a series of low-flow measurements made during the course of the study, at a total of about 100 sites throughout the Park distributed so as to define variations in flow with location and altitude. It is hoped that these sites can be measured a total of 6-8 times following periods of about 7 days of no rainfall.

Ground water and surface water chemical quality will be described, based on results of analyses of water from test wells and samples collected from streams. A series of coliform analyses of stream water is planned to define possible areas of contamination.

An explanatory text and supplementary illustrations will be included. The atlas is expected to provide the NPS engineer a basis for planning future developments of any kind in the Park for which knowledge of water resources is required.

Consideration will be given to popular-type brochure for distribution to Park visitors, describing and illustrating the occurrence of water in the [redacted] and its role in shaping the mountains.

Test drilling and reporting will continue to be handled by the District in which the site is located.

Plans are to complete the text of the final report by May 1969 for transmission through final review prior to publication. However, if insufficient opportunities to collect low-flow measurements occurs during the remaining time through November 1968, it is hoped that supplementary funds will be available from NPS to make additional measurements during the following year.

775-9-17-65-

L54 SER(OLW)

SEP 14 1965

Reed
ARC 9/17
WRR

Memorandum

To: Superintendent, Great Smoky Mountains

From: Acting Assistant Regional Director, Operations,
Southeast Region

Subject: Water Resources Investigations, Great Smoky Mountains
National Park

We will be glad to assist you in developing a detailed water resources study at Great Smoky Mountains National Park during the 1966 fiscal year as requested in your memorandum of August 23. The results produced from such a study should provide us with the basis for a full and most effective development of all water resources located within the Park boundaries. It is evident that new sources of water are needed to meet the demands of future and existing Park facilities.

We believe the investigative work should include the following:

(1) The first and most pressing problem involves the need to expand several water supply systems in order to provide more water to take care of a greater number of Park visitors and increased Park uses. This requires an evaluation of the probable capacity of the present sources of supply and the locating of possible new sources of water supply of acceptable quality for increased demands of the future and (2) The second phase of the project (extending over a period of several years) would be to conduct surface and ground water studies throughout the Park in order to obtain a general knowledge of all water resources. With such information at hand, the Park staff will be able to plan efficiently for new or expanded developments.

An over-ceiling item was included in the 1966 F.Y. Regional Water Resources Program in the amount of \$26,000 to initiate a study of domestic water supply needs and test well drilling work at the Park. Mr. E. W. Reed, Chief, Water Resources, has recently advised that at present the Washington Office reserve contains sufficient funds to finance this study.

We agree a meeting and field reconnaissance should be held at the Park between representatives of the U. S. Geological Survey, the Regional Office and the Park staff to properly formulate a logical approach to this water resources project. In early October, we will take the necessary action to firm up a satisfactory date for the meeting with all those concerned.

(SIGNED)

W. Mikell

cc:

Director, w/c of inc.
Chief, EODC (2), w/c of inc.



UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

Y REFER TO:
L54

August 23, 1965

EAST REGION	
AUG 26 1965	
Regional Director	
Asst. Reg. Dir. (A)	26
Asst. Reg. Dir. (CA)	
Asst. to Reg. Dir. (PA)	
Asst. to Reg. Dir. (DI)	
Resource Studies Ag.	
<i>East & Water</i>	
<i>Maime</i>	

Memorandum

To: Regional Director, Southeast Region

From: Superintendent, Great Smoky Mountains *East Side*

Subject: Water Resources Investigations, Great Smoky Mountains National Park

Over the past couple of years, continued increases in demands on the numerous surface water supplies have gradually developed into a problem that needs immediate attention. While it is recognized that in the past we have shown little or no interest in water resources investigations, it now appears that well supplies may not only be a desirability but a necessity. During periods of prolonged drouth such as we are now experiencing in the Park, the surface supplies diminish to the point of nearly drying up, and supplemental supplies of low quality water are heavily treated and pumped into the supply lines.

During USPHS Engineer Henderson's recent trip to the Park, we had occasion to closely observe several of our major supplies. For example, we found that the Ash Hopper Branch gravity supply that ordinarily supplies headquarters was providing 19 gallons per minute (actual meter readings) over a period of a week. The consumption at this time was metered at 35,000 to 37,000 gallons per day and so, needless to say, we had to pump a supplemental supply out of a branch of Fighting Creek which runs through the residential area. We actually were only able to obtain a maximum of 15 gallons per minute from this supply. Incidentally, this creek pumping station is only a couple of hundred feet from the first domestic user and less than 1,000 feet from our major development area which definitely does not allow the desired chlorine retention time for safe water treatment. Also, when you realize that our actual usage exceeded an average of 25 gallons per minute and all available water in the system amounted to 34 gallons per minute, it is easy to see there is little margin for any emergency whether it be a leak in the line, any type of fire drawdown or allowance for any consideration of lawn sprinkling. If either of these supplies decrease further, we do have several alternatives in order to retain a minimum supply on hand.

By metering, we have determined that we are wasting 13,000 gallons per day through our Visitor Center dehumidifier system. This is quite a luxury and one that needs some study as to the possibility of re-circulation of this water. If our present supply should decrease any further, we would of course have to shut down the dehumidifier system which would have rather detrimental effects on artifacts storage as well as causing the Visitor Center to be rather uncomfortable.

Further checks on other major supplies in the Park showed similar conditions but none as critical as that that exists in the Headquarters area. If at all possible, and if it can be worked into your Water Resources Investigation program as an emergency measure, we would like to suggest the programming of an exploratory well for this fall. While we have little information on the characteristics of wells in this area, Mr. Henderson felt that a well programmed for 100-foot depth with rotary drill method (possible heavy river boulder sub-surface) should provide a plentiful supply for the area. On this basis, it appears that funds in the construction amount of \$2,500 would be needed to drill, case and test the well.

In an August 19 telephone conversation between Hydraulic Engineer Vick of your office and Chief of Maintenance Rowe, Mr. Vick had mentioned that he had put an over-ceiling item in his 1966 F.Y. Water Resources budget in the amount of \$24,000 to initiate a study of Park domestic water supply needs. We support this program whole-heartedly and hope that a necessary field inspection involving personnel from the USGS, the Regional Office, and the Park can be set up for the month of November. //

As suggested to Mr. Vick in the abovementioned telephone call, the following listing is a tentative priority list of well investigations which we would like to see programmed:

1. Headquarters -- As soon as possible.
2. Green Mountain Picnic Area, Foothills Parkway -- 1967 F.Y.
3. Cades Cove -- 1967 F.Y.
4. Cataloochee -- 1967 F.Y.
5. Rocky Mountain -- 1967 F.Y.
6. Chilhowee, Foothills Parkway -- 1968 F.Y.

7. Cades Cove -- 1968 F.Y.
8. Deep Creek -- 1968 F.Y.
9. Smokemont -- 1968 F.Y.
10. Chimneys -- 1969 F.Y.
11. Elkmont -- 1969 F.Y.
12. Cosby -- 1969 F.Y.
13. Webb Mountain, Foothills Parkway -- 1969 F.Y.


George W. Fry

Number of Documents in Docket	26		
Documents Dated from	8/23/1965	to	2/8/1971
Docket Compiled:	3/29/2011		