



WATER-RIGHT DOCKET

Great Smoky Mountains National Park

Docket No: 16

JUNEY WHANK BRANCH, DEEP CREEK CAMPGROUND

Preliminary Docket Information

00-00-0000: intro: see grsm docket 1 for map and preliminary map of water sources in 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
Deep Creek Developed Area
Great Smoky Mountains National Park

Supporting Hydro Data

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>
Campers (51,573).....	--	--	--	--	8	165	351	386	69	53	--	--	1,032
Picnickers (18,074).....	--	--	--	--	4	10	19	24	10	5	--	--	72
Residences.....	22	20	15	11	11	21	33	33	21	22	22	22	253
Unaccounted.....	--	--	--	<u>5</u>	<u>87</u>	<u>107</u>	<u>83</u>	<u>66</u>	<u>47</u>	<u>73</u>	--	--	<u>468</u>
TOTALS.....	22	20	15	16	110	303	486	509	147	153	22	22	1,825

During the 1969 season, this system served 51,573 campers, 18,074 picnickers, and the residential area.

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>
Campers (44,632).....	--	--	--	6	25	173	312	267	81	28	--	--	892
Picnickers (11,924).....	--	--	--	1	4	11	11	16	3	1	--	--	47
Residences.....	11	10	11	11	11	11	22	33	32	22	22	22	218
Unaccounted.....	<u>4</u>	<u>4</u>	<u>4</u>	<u>28</u>	<u>201</u>	<u>172</u>	<u>204</u>	<u>146</u>	<u>102</u>	<u>136</u>	--	--	<u>1,001</u>
TOTALS.....	15	14	15	46	241	367	549	462	218	187	22	22	2,158

During the 1970 season, this system served 44,632 campers, 11,924 picnickers, and the residential area.

(Deep Creek Developed Area - Addendum No. 2)

(2/8/71)

NAME OF SYSTEM: Deep Creek CampgroundLOCATION: Two miles north of
Bryson City, N. C.LOCATION: STATE: North Carolina COUNTY: Swain

<u>A. Source of Supply</u>	<u>Location - Reference to Permanent Landmark</u>	<u>Coordinates</u>
1. Juney Whank Branch	500 feet more or less from the intersection of Juney Whank Branch and Deep Creek	Lat. N 35°28'06" Long. W 83°26'07"

This system is a gravity flow primary system for Deep Creek Campground Area with the intake being located about a third of a mile from the campground at an elevation of 1,985 feet. The original intake structure was revised in 1953 to improve the quality of water by addition of an 8" dia. x 8' long perforated pipe buried in the stream bed and a collection box. The combination of a small concrete diversion dam controls the stream flow and provides impoundment. The storage consists of one 11,000 gallon concrete reservoir (Elevation W.L. 1,928') about 1,445 feet down the line from the intake and a 50,000 gallon reservoir located 1,440 feet further down the line and across Deep Creek (built in 1961). Due to an error in location, this reservoir does not fill to capacity and holds only an estimated 27,000 gallons. The purification of the water consists of 8' x 51' sand filter unit located about 200' from the intake and a chlorinator on top of the 11,000 gallon reservoir connected to the supply main.

2. Deep Creek

North end of campground about 600 feet
upstream of islands, island in river bed

Lat. N 35° 27' 45"
Long. W 83° 26' 07"

This is a secondary system, the intake being a 3' x 3' reinforced concrete structure with a 12" perforated CGM pipe 20' long, set in the river bed and covered with gravel. From the pumphouse, located 25' from the intake a 2" galvanized steel line 25' long connects through an injection type chlorinator to the 4" main. The pump used is a 3 Horsepower Fairbanks Morse.

3. Deep Well

Well is located 250' N and 60' E of present
pumping station.

Lat. N 35° 27' 46"
Long. W 83° 26' 05"

This well is drilled to a 125' depth, 8" diameter, 93 gallon per minute capacity, static water level 7.9'. Specific capacity is 9.1 gallons per foot of drawdown. This is an excellent well relative to terrain and will provide sufficient water for present needs. This well is not in use at present time (12/67). It will replace both Deep Creek and Juney Whank systems when put into use.

B. Consumption:

Maximum daily - 20,000 gallons

Maximum monthly - 504,000 gallons

Maximum annual - 2,000,000 gallons

(Deep Creek Developed Area - Addendum No. 1)

METER READINGS - 1966 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>
Campers (65,916)	--	--	2	17	36	300	437	412	85	40	--	--	1,329
Picnickers (16,078)	--	--	2	4	14	9	13	13	6	2	--	--	63
Residents	25	14	22	21	40	40	41	41	43	43	24	23	377
Unaccounted	<u>12</u>	<u>6</u>	<u>1</u>	<u>8</u>	<u>17</u>	<u>-34</u>	<u>-32</u>	<u>-16</u>	<u>42</u>	<u>17</u>	<u>8</u>	<u>7</u>	<u>36</u>
TOTALS	37	20	27	50	107	315	459	450	176	102	32	30	1,805

During the 1966 season, this system served 65,916 campers, 16,078 picnickers, and the residential area.

METER READINGS - 1967 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>
Campers (66,327)	--	--	2	15	32	296	407	372	135	66	--	--	1,325
Picnickers (21,234)	--	--	1	7	8	16	23	14	5	9	--	--	83
Residences	25	14	11	10	11	31	22	22	11	11	10*	11*	189
Unaccounted	<u>12</u>	<u>6</u>	<u>-2</u>	<u>68</u>	<u>56</u>	<u>9</u>	<u>15</u>	<u>49</u>	<u>-31</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>182</u>
TOTALS	37	20	12	100	107	352	467	457	120	86	10*	11*	1,779

During the 1967 season, this system served 66,327 campers, 21,234 picnickers, and the residential area.

*Estimated

(Deep Creek Developed Area - Addendum No. 1)

METER READINGS - 1968 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>
Campers (51,558)	--	--	--	14	47	185	320	295	128	42	--	--	1,031
Picnickers (14,220).	--	--	--	2	4	7	19	20	3	--	--	--	55
Residences	11	11	11	11	11	10	22	22	21	22	21	22	195
Unaccounted	<u>17</u>	<u>4</u>	<u>9</u>	<u>25</u>	<u>62</u>	<u>78</u>	<u>61</u>	<u>167</u>	<u>33</u>	<u>14</u>	<u>19</u>	<u>18</u>	<u>507</u>
TOTALS	28	15	20	52	124	280	422	504	185	78	40	40	1,788

During the 1968 season, this system served 51,558 campers, 14,220 picnickers, and the residential area.

C. Distribution Mains and Laterals:

<u>Size</u>	<u>Type</u>	<u>Length</u>
4"	Cast Iron	2,861 Lineal Feet
2"	Galvanized Steel	4,036 Lineal Feet
1"	Galvanized Steel	240 Lineal Feet
1"	Copper	202 Lineal Feet
1"	Plastic	180 Lineal Feet
3/4"	Galvanized Steel	<u>30 Lineal Feet</u>
	TOTAL	7,549 Lineal Feet

(Deep Creek Developed Area - Addendum No. 1)

D. Problems:

The Deep Creek area consists of a campground containing 151 sites, a 42-site picnic area and several sets of employee quarters. This is a heavily used area in certain seasons of the year.

The gravity water supply contains minute particles of mica, and the cost of filtration is expensive. The pumped supply is directly from Deep Creek and is subject to heavy visitor contamination, requiring extensive chlorination.

E. Proposed:

Put the existing well into production as main area supply. This is included in a tentative 1970 F.Y. program and includes development of the deep well, altitude valving to allow us to utilize both reservoirs fully, etc. The old intake and sand filter installation will be retained in stand-by condition.

(Deep Creek Developed Area - Addendum No. 1)



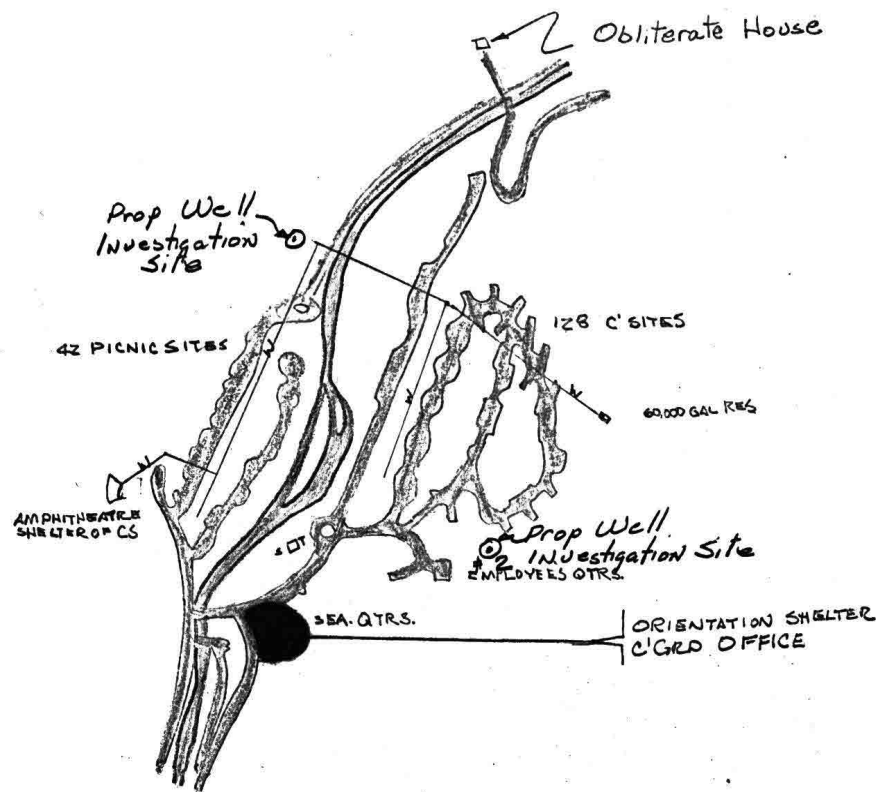
INTAKE STRUCTURE AT DEEP CREEK
SHOWING THE SETTLING BASIN, WINGWALL,
DAM, FILTER, AND COVERED COLLECTION BOX

DEEP CREEK

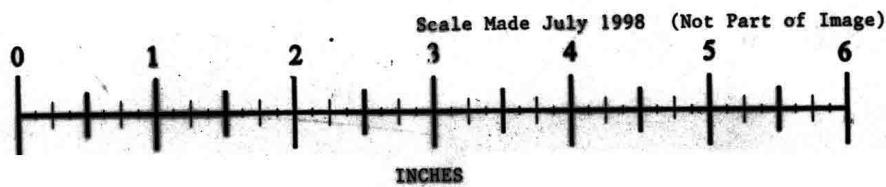
Situation: The Deep Creek area consists of a campground containing 151 sites, a 42-site picnic area and several sets of employees quarters. This is a heavily used area in certain seasons of the year and daily water consumption figures run about 15,000-20,000 gallons (based on actual meter readings). The water supply for the area consists of an open creek which provides a gravity flow. This supply is supplemented by a pumping system that obtains its water from Deep Creek. The gravity water supply contains minute particles of mica and the cost of filtration is a very expensive item. The pumping supply is subject to heavy visitor concentration and requires extensive chlorination.

Proposed: That we drill an 8" well or combination of wells that may ultimately allow us to eliminate both of the present supplies. In order to serve the area, this well system should have a capacity of 35 to 50 g.p.m.

Progress to date: Wage rates have been requested for this work and we are hopeful that we can get this investigation under contract by mid-May 1966. The actual depth and location of the well to be based on recommendations by U.S.G.S. geologists.



DEEP CREEK DEVELOPED AREA
SCALE: 1" = 500'



Other Supporting Information

WATER SUPPLY

Deep Creek Campground

Based on hydrogeologic criteria, a well site was selected in the Deep Creek Campground about 250 ft N 60° E of the present pumping station (fig. 2). The well was subsequently drilled and tested during June 6-15, 1966. A geologic log of the well, drilled in alluvium and the Thunderhead Sandstone, follows:

- 0-23 ft, Alluvium ranging from sand to boulders. The well was cased to 25 ft.
- 23-35 ft, Light-brown quartzite, fractured and yielding water.
- 35-45 ft, Quartzite with some thin layers of mica schist, the well now yielding about 12 gpm (gallons per minute).
- 45-65 ft, Quartzite with thin layers of mica schist and layered gneiss, the well yielding about 12 gpm.
- 65-75 ft, Quartzite with thin layers of mica schist and amphibolite gneiss, yielding more water.
- 75-85 ft, Quartzite with thin layers of schist and gneiss, the well yielding over 40 gpm.
- 85-115 ft, Predominately quartzite, yielding more water.
- 115-125 ft, Predominately quartzite, the well yielding about 100 gpm, and drilling terminated at 125 ft.

Static water level was 7.9 ft. A test pump installed at 110 ft. was operated at maximum discharge for 2 minutes and thereafter at the discharge rates shown on the accompanying chart (fig. 3). At the end of the 8-hour test period, discharge was constant at 93 gpm. The specific capacity of the well is 0.91 gpm per foot of drawdown. This is an excellent well relative to its terrane and will provide sufficient water for the present requirements of the campground. The water is qualitatively excellent, requiring no treatment or restrictions for public use. The quantities of dissolved minerals are listed in table 2.

Previously, the water supply has been taken by gravity from Juney Whank Branch, supplemented by pumping from Deep Creek. These supplies are adequate to meet present and predictable future demands. (See table 1.)

Although the dissolved constituents shown in tables 3, 4, and 5 indicate water of excellent quality, it is reported that the supply from Juney Whank Branch contains minute particules of mica, requiring filtration, and that pumped from Deep Creek requires chlorination.

A low-flow partial-record station has been operated for several years on Deep Creek in the vicinity of the campground. Low-flow frequency data developed for the station are shown in figure 4. The curves in figure 4 may be helpful in general comparisons of streamflow in the park area having different recurrence intervals and different lengths of period.

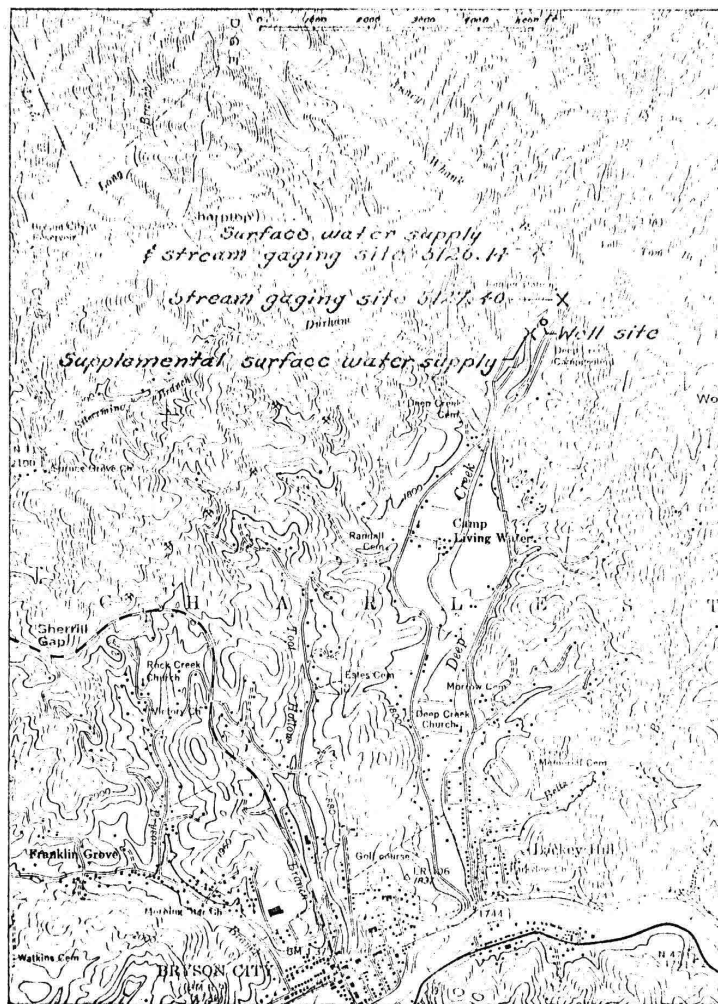
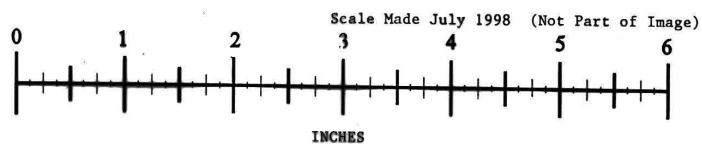


Figure 2.--Map of the Deep Creek campground area.

8



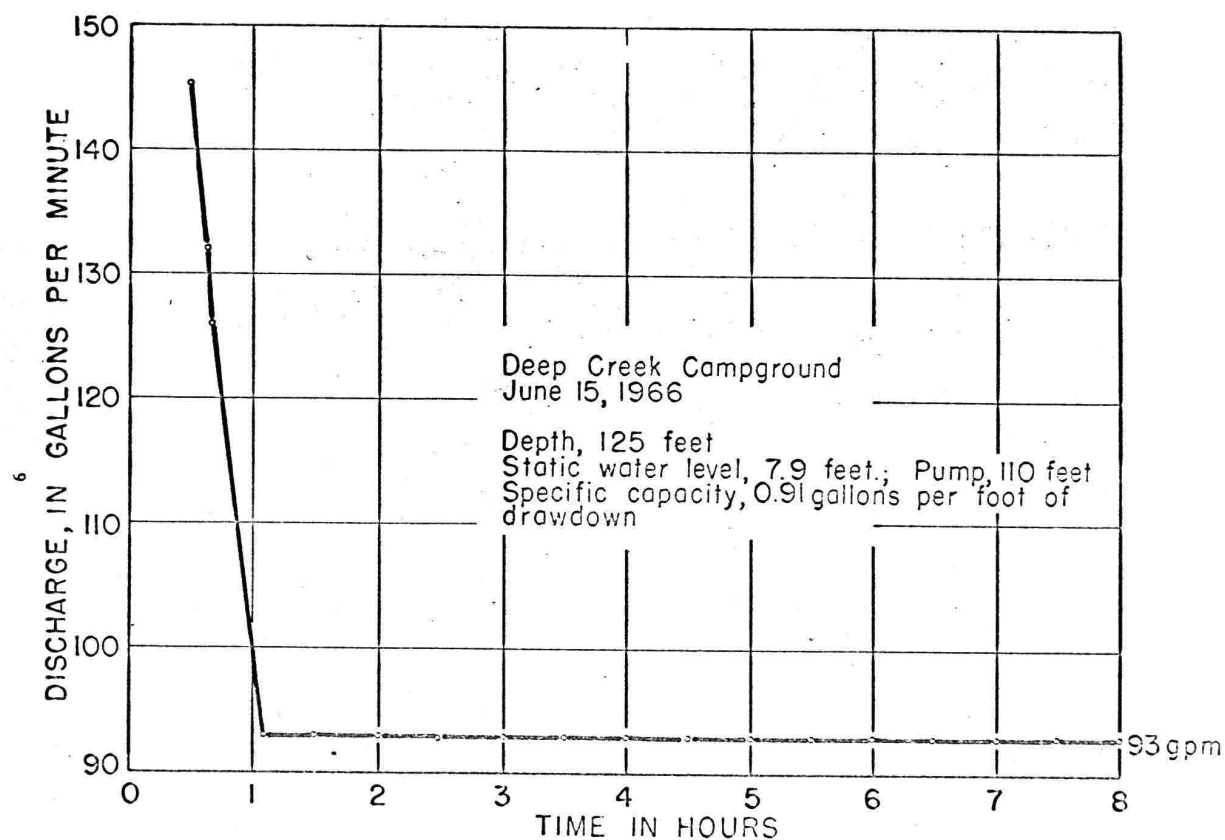


Figure 3.-- Discharge of the well at Deep Creek Campground during the pumping test.

W 1276
Extreme low data plot
April 1955

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

10-3-57-10

altitude and frequency of *Deep Creek near Bryson City, N.C.* on
Drainage area *10.2* sq. mi. Period *1897 to 1955*

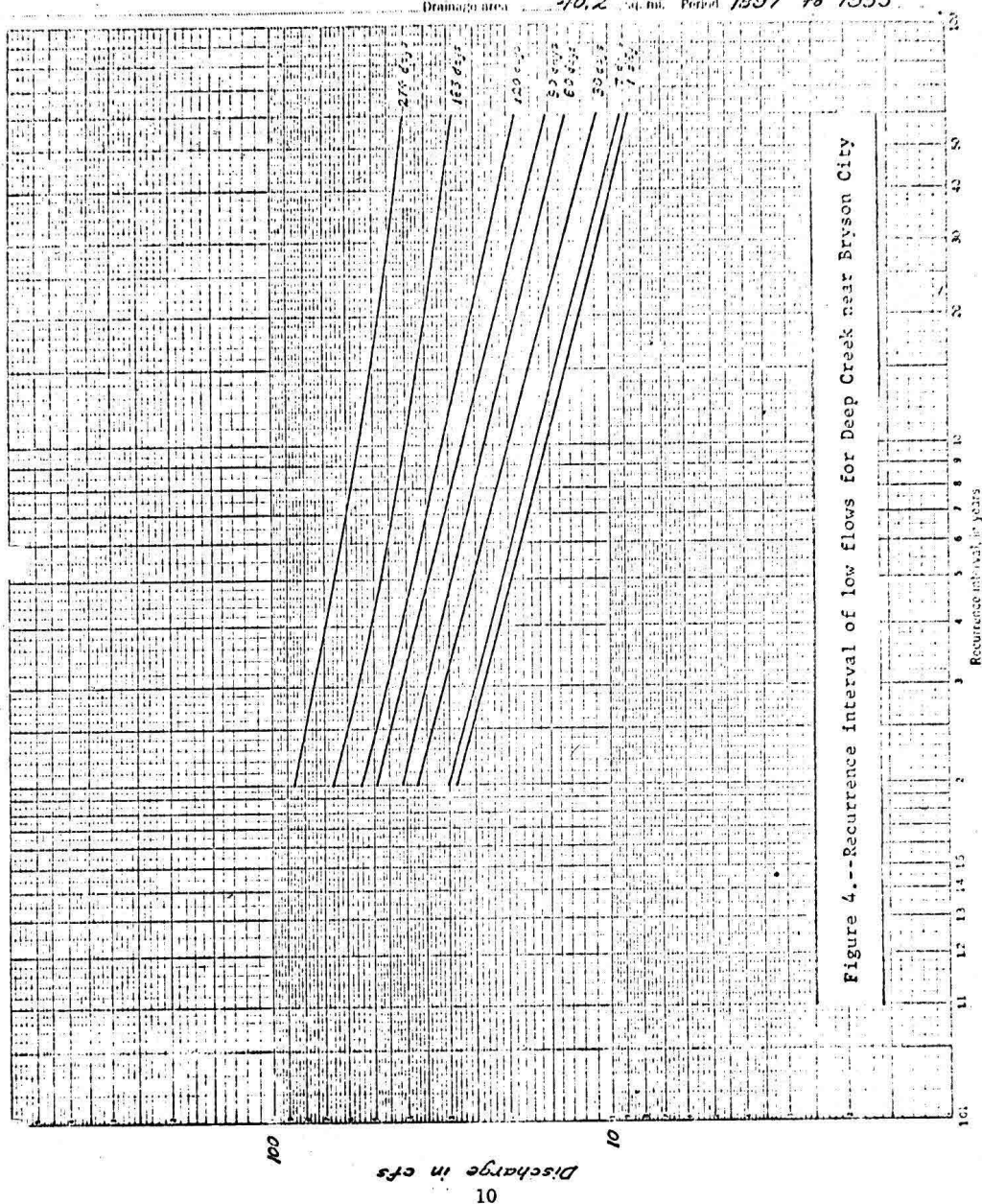


Figure 4.--Recurrence interval of low flows for Deep Creek near Bryson City

Sheet No. _____ of _____ Sheets. Prepared by _____ Date _____ Checked by _____ Date _____

U. S. GOVERNMENT PRINTING OFFICE: 1955 O - 348844

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

Table 2. Chemical
quality of water from
the Deep Creek Camp-
ground well.

W.R. Lab. No. NC 46151

Location Deep Creek Campground, Great Smoky Mtn. National Park, 3 miles North of Bryson City, N. C. - Swain Co.			
Source Drilled, cased 25'. Depth: 125 ft. Drilled: 6-9-66. Collected at well head. Owner: NPS, Gatlinburg, Tenn. Use: PS. WBF: Metamorphic complex. WL: Static 7.9 ft. below lip of casing. Yield: 93 gpm max.			
Sampled after pumping 8.			
Producing interval from 25-125.			
Date of collection June 15, 1966			
Gage height(ft.)		Discharge(sec.ft.)	
		Temp.(°F) 56	
(Parts per million)			
Silica (SiO ₂).....	21	Carbonate (CO ₃).....	0
Aluminum (Al).....	.0	Bicarbonate (HCO ₃).....	30
Iron (Fe).....	.01	Sulfate (SO ₄).....	1.0
Manganese (Mn).....	.01	Chloride (Cl).....	1.1
Calcium (Ca).....	4.8	Fluoride (F).....	.2
Magnesium (Mg).....	1.7	Nitrate (NO ₃).....	.1
Sodium (Na).....	3.0	Phosphate (PO ₄).....	.15
Potassium (K).....	1.2	.....	
Lithium (Li).....		.....	
(Parts per million)			
Dissolved solids:			
Sum.....	49	ABS.....	
Residue upon evapo- ration @ 180°C.....	46	Color.....	2
Hardness as CaCO ₃	19	.....	
Noncarbonate.....	0	.....	
			
.....	6.5	Specific conductance (micromhos at 25°C).....	51

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Table 3. Chemical
quality of water from
Juney Whank Branch.

WATER ANALYSIS

3-5126.14

W.R. Lab. No. NC 46740

Location <u>nr. Deep Creek Camp Ground - Smoky Mt. National Park</u>			
Source <u>Juney Whank Branch. Coll. above intake. Q = 0.22. Time: 1500.</u>			
Air temp: <u>76°</u>			
Date of collection <u>July 28, 1966</u>			
Gage height(ft.) _____ Discharge(sec.ft.) <u>0.22</u> Temp.(°F) <u>64</u>			
(Parts per million)			
Silica (SiO ₂).....	9.0	Carbonate (CO ₃).....	0
Aluminum (Al).....		Bicarbonate (HCO ₃).....	9
Iron (Fe).....	.00 <u>y</u>	Sulfate (SO ₄).....	1.4
Manganese (Mn).....		Chloride (Cl).....	1.2
Calcium (Ca).....	1.4	Fluoride (F).....	.0
Magnesium (Mg).....	.4	Nitrate (NO ₃).....	.2
Sodium (Na).....	.9	Phosphate (PO ₄).....	.00
Potassium (K).....	.4	.....	
Lithium (Li).....		.....	
(Parts per million)			
Dissolved solids:			
Sum.....	19	ABS.....	.00
Residue upon evapo- ration @ 180°C.....	13	Color.....	6
Hardness as CaCO ₃	5	.....	
Noncarbonate.....	0	.....	
pH.....	6.6	Specific conductance (micromhos at 25°C).....	16

y In solution when analyzed.

12

Unpublished report. Subject to revision

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

Table 4. Chemical
quality of water from
Deep Creek (sample dated
June 6, 1955).

3-5127.40

W.R. Lab. No. NC 15446

Location <u>Deep Creek near Bryson City, N. C. - Swain County</u>			
Source <u>Deep Creek, Coll. at bridge,</u>			
Time: <u>1400</u> Air Temp: <u>80°</u>			
Date of collection <u>6-6-55</u>			
Gage height(ft.) _____ Discharge(sec.ft.) <u>70.5</u> Temp.(°F) <u>62</u>			
(Parts per million)			
Silica (SiO ₂).....	6.6	Carbonate (CO ₃).....	0
Aluminum (Al).....		Bicarbonate (HCO ₃).....	7
Iron (Fe).....	.01	Sulfate (SO ₄).....	.2
Manganese (Mn).....		Chloride (Cl).....	.1
Calcium (Ca).....	.9	Fluoride (F).....	.0
Magnesium (Mg).....	.1	Nitrate (NO ₃).....	.3
Sodium (Na).....	1.0	Phosphate (PO ₄).....	
Potassium (K).....	.4	.....	
Lithium (Li).....		.....	
(Parts per million)			
Dissolved solids:		ABS.....	
Sum.....	13	Color.....	3
Residue upon evapo- ration @ 180°C.....		.....	
Hardness as CaCO ₃	2	.....	
Noncarbonate.....	0	.....	
.....			
pH.....	6.7	Specific conductance (micromhos at 25°C).....	11.6

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

Table 5. Chemical
quality of water from
Deep Creek (sample dated
July 28, 1966).

3-5127.40

W.R. Lab. No. NC 46741

Location <u>near Bryson City - Smoky Mtn. Nat. Park.</u>			
Source <u>Deep Creek. Coll. at bridge above Camp Ground.</u>			
Q = 40.5. Time: 1610. Air Temp: 73°			
Date of collection <u>July 28, 1966</u>			
Gage height(ft.) _____ Discharge(sec.ft.) <u>40.5</u> Temp.(°F) <u>70</u>			
(Parts per million)			
Silica (SiO ₂).....	6.8	Carbonate (CO ₃).....	0
Aluminum (Al).....		Bicarbonate (HCO ₃).....	7
Iron (Fe).....	.00 <u>✓</u>	Sulfate (SO ₄).....	1.8
Manganese (Mn).....		Chloride (Cl).....	.6
Calcium (Ca).....	1.3	Fluoride (F).....	.0
Magnesium (Mg).....	.2	Nitrate (NO ₃).....	.5
Sodium (Na).....	.6	Phosphate (PO ₄).....	.0
Potassium (K).....	.4	.....	
Lithium (Li).....		.....	
(Parts per million)			
Dissolved solids:		ABS.....	.00
Sum.....	15	Color.....	5
Residue upon evapo- ration @ 180°C.....	9	.....	
Hardness as CaCO ₃	4	.....	
Noncarbonate.....	0	.....	
pH.....	6.2	Specific conductance (micromhos at 25°C).....	14

✓ In solution when analyzed.

14

Unpublished records subject to revision

Great Smoky Mountains National Park		PCP No.																													
Location in Park	State(s)	U-169, 4																													
Deep Creek Campground	North Carolina	Master Plan No.																													
	County or Counties	NP-GSM 3211-C																													
☒ Contract and/or ☐ Day Labor	Swain	Master Plan Corrected By																													
Work Order Title		As Built Drawings By																													
Construction of Water and Sewer Lines in Campground Extension		EODC																													
		Date Started																													
		February 2, 1962																													
		Date Completed																													
		August 30, 1962																													
DESCRIPTION OF FIXED ASSETS (For completion by employee in charge of project)		TOTAL COSTS (For completion by FFO)																													
Utilities, Water System. 100.8-1																															
Extend distribution line from existing water system to Campground Extension, with 4" lines to comfort stations.		0,079.39																													
Utilities, Sewer System. 100.8-2																															
Extend sewer line from existing sewer system to Campground Extension, with additional manholes, and connections to comfort stations.		1,863.06																													
		7,442.45																													
See dwg 3217A in D&C files (No related narrative statement included)																															
<table border="1"> <tr> <td>DISTRIBUTION</td> <td colspan="3">THIS WORK SET, DESCRIBED ABOVE, IS HEREBY SUBMITTED IN COLOR AND WITH APPROPRIATE DRAWING LETTERS, NOTATIONS AND ALL OTHER DATA.</td> </tr> <tr> <td>No.</td> <td>To</td> <td>By</td> <td>Date</td> </tr> <tr> <td>1</td> <td>Director</td> <td>Submitted by: [Signature]</td> <td>6/27/63</td> </tr> <tr> <td>2</td> <td>Engineer</td> <td>Submitted by: [Signature]</td> <td>6/27/63</td> </tr> <tr> <td>3</td> <td>Architect</td> <td>Submitted by: [Signature]</td> <td>6/27/63</td> </tr> <tr> <td>4</td> <td>Superintendent</td> <td>Submitted by: [Signature]</td> <td>6/27/63</td> </tr> <tr> <td>5</td> <td>Officer</td> <td>Submitted by: [Signature]</td> <td>6/27/63</td> </tr> </table>				DISTRIBUTION	THIS WORK SET, DESCRIBED ABOVE, IS HEREBY SUBMITTED IN COLOR AND WITH APPROPRIATE DRAWING LETTERS, NOTATIONS AND ALL OTHER DATA.			No.	To	By	Date	1	Director	Submitted by: [Signature]	6/27/63	2	Engineer	Submitted by: [Signature]	6/27/63	3	Architect	Submitted by: [Signature]	6/27/63	4	Superintendent	Submitted by: [Signature]	6/27/63	5	Officer	Submitted by: [Signature]	6/27/63
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3	Architect	Submitted by: [Signature]	6/27/63																												
4	Superintendent	Submitted by: [Signature]	6/27/63																												
5	Officer	Submitted by: [Signature]	6/27/63																												

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



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 6-8, 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 area 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.

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L54 SER (OLW)

SEP 14 1965

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EVR 9/17
WRY

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, RORC (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:
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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. (D)	
Resource Studies	

X *Paul Hater*
Maine

Memorandum

To: Regional Director, Southeast Region

From: Superintendent, Great Smoky Mountains *lost file*

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.

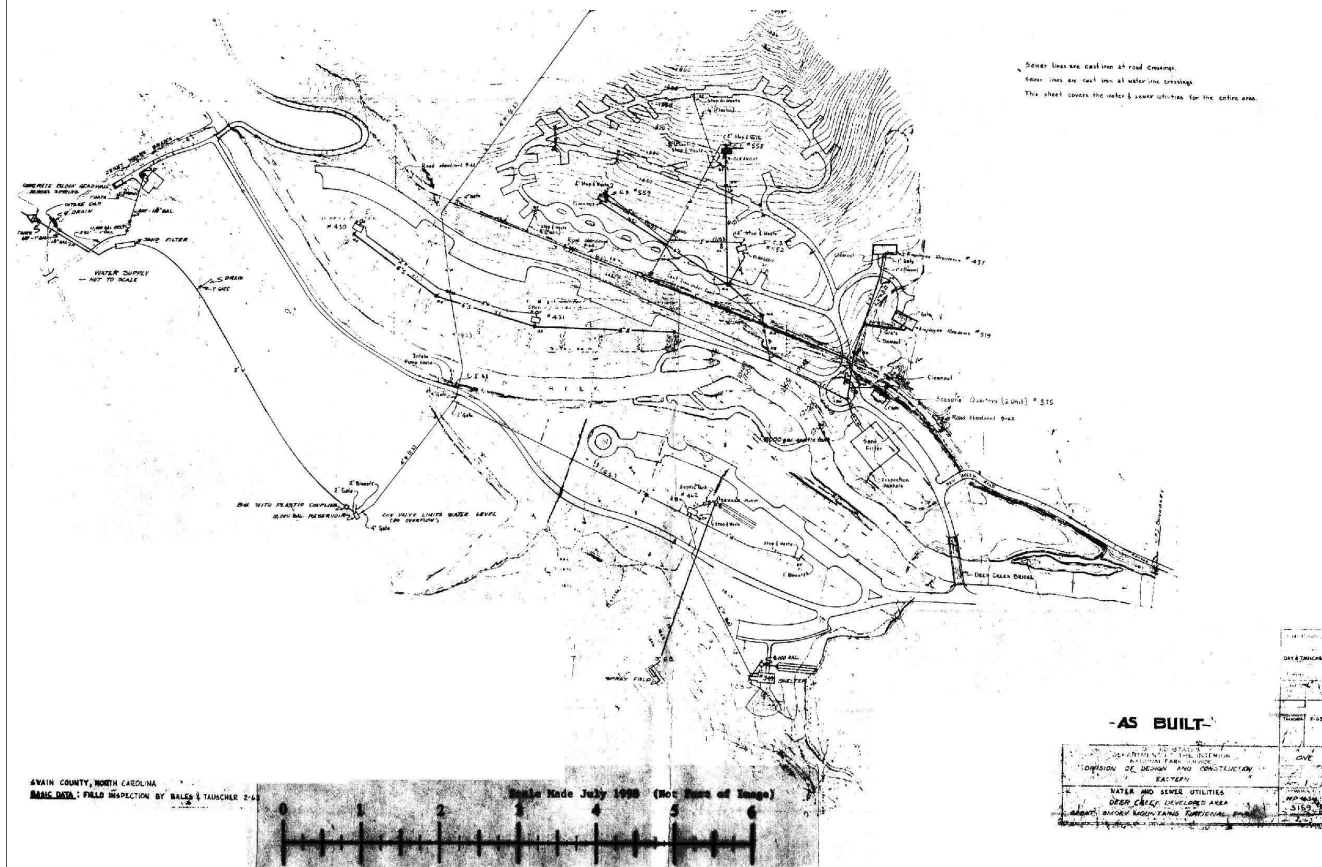
In an August 19 telephone conversation between Hydraulic Engineer Vick of your office and Chief of Maintenance Rowe, Mr. Vick had mentioned that he had put an over-ceiling item in his 1966 F.Y. Water Resources budget in the amount of \$24,000 to initiate a study of Park domestic water supply needs. We 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



Docket Information

Number of Documents in Docket 31

Documents Dated from 6/6/1955 to 9/28/1967

Docket Compiled: 3/29/2011