

WHITE RIVER WATERSHED  
ARKANSAS AND MISSOURI

WHITE RIVER  
TABLE ROCK LAKE

DESIGN MEMORANDUM NO. 17-E

UPDATED MASTER PLAN FOR  
DEVELOPMENT AND MANAGEMENT  
OF TABLE ROCK LAKE



DEPARTMENT OF THE ARMY  
LITTLE ROCK DISTRICT ENGINEERS  
LITTLE ROCK, ARKANSAS  
SEPTEMBER 1974

WHITE RIVER WATERSHED  
ARKANSAS AND MISSOURI

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PREVIOUSLY ISSUED AND CURRENTLY SCHEDULED DESIGN MEMORANDUMS

<u>Memo No.</u>	<u>Subject</u>	<u>Date submitted or scheduled</u>	<u>Date approved</u>
1	Access Facilities	1 Jul 52	5 Aug 52
2	Office, Service Buildings, and Utilities	3 Jul 52	9 Sep 52
3	Power Features	9 Jul 52	2 Oct 52
4	Spillway, Conduits, and Stilling Basin	24 Jul 52	13 Oct 52
5	Source of Aggregate for Concrete Works	12 Aug 52	16 Sep 52
6	Foundations - Preparation and Treatment	22 Aug 52	17 Oct 52
7	Embankment Design (Supplement)	23 Dec 54	9 Feb 55
8	Hydrology	6 Aug 52	9 Dec 52
9	Temperature and Stress Control for Concrete	11 May 53	15 Jun 53
10	Concrete Properties for Dam	23 Feb 54	5 May 54
11-1	Relocations - Cemeteries	10 Sep 54	19 Oct 54
11-2A	Relocations - State Highways	23 Nov 54	4 Mar 55
11-2B	Relocations - Local Roads	30 Dec 54	8 Jun 55
11-3A	Relocations - Utilities	6 Apr 55	10 Jun 55
11-3B	Relocations - Railroad (Revised)	7 Jan 58	10 Apr 58
12	Reservoir Clearing (Supplement)	6 Mar 57	1 Apr 57
13-1		26 Feb 53	18 Mar 53
thru		thru	thru
13-15	Power Plant Design	2 Mar 56	22 Oct 56
14	Sediment Ranges	26 Jan 53	24 Nov 53
15	Instrumentation Program	8 Jun 53	22 Jul 53
16-1	Real Estate - Dam Site, Work Area, and Access Road	25 Jul 52	20 Aug 52
16-2	Real Estate - Quarry Area	9 Apr 54	27 May 54
16-3	Real Estate - Reservoir Area	8 Nov 54	18 Feb 55
16-4	Real Estate - Access Roads to Public-Use Areas	6 Nov 58	24 Nov 58

## PREVIOUSLY ISSUED AND CURRENTLY SCHEDULED DESIGN MEMORANDUMS (con.)

<u>Memo No.</u>	<u>Subject</u>	<u>Date submitted or scheduled</u>	<u>Date approved</u>
17	Table Rock Dam and Reservoir, White River, Missouri and Arkansas, Design Memorandum No. 17, Reservoir Management	26 Sep 55	19 Jan 56
-	Table Rock Dam and Reservoir, White River, Missouri and Arkansas, Master Plan for Reservoir Development and Management	24 Dec 57	29 Jun 59
-	Supplement No. 1, Table Rock Dam and Reservoir, White River, Missouri and Arkansas, Master Plan for Reservoir Development and Management	3 Aug 62	6 Sep 62
17-C	Table Rock Dam and Reservoir, Updated Master Plan for Reservoir Development and Management	8 Oct 65	19 Aug 66
17-D	Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	16 Mar 70	30 Sep 70
-	Supplement No. 1, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	14 Apr 71	Not approved.
-	Supplement No. 2, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	2 Mar 73	23 Apr 73
-	Supplement No. 3, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	28 Aug 73	2 Oct 73
-	Supplement No. 4, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	5 Jul 74	31 Oct 74

PREVIOUSLY ISSUED AND CUREENTLY SCHEUDLED DESIGN MEMORANDUMS (con.)

<u>Memo No.</u>	<u>Subject</u>	<u>Date submitted or scheduled</u>	<u>Date approved</u>
-	Supplement No. 5, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	28 Feb 75	21 Mar 75
-	Suppment No. 6, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	2 Feb 76	8 Mar 76
-	Supplement No. 7, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	15 Jul 76	19 Aug 76
-	Supplement No. 8, Table Rock Dam and Reservoir, Updated Master Plan for Development and Management of Table Rock Reservoir	30 Jul 76	-
17-E	Table Rock Lake, Updated Master Plan for Development and Management of Table Rock Lake	Sep 76	-
18	Dam and Appurtenant Works	26 Jan 56	(1)
19	Operational Facilities	29 Oct 59	6 Jun 60
19	Enhancement of Public Areas of the Powerhouse	6 Sep 72	15 Feb 73
20	Resident Office and Visitor Center	31 Aug 72	16 Nov 73

(1) Summarizes previous submissions and approvals.

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A	Project Resource Management Plan	6 Dec 72	9 Apr 74
B	Forest Management Plan	30 Jun 76	10 Sep 76
C	Fire Protection Plan	21 Jun 76	24 Aug 76
D	Fish and Wildlife Management Plan	5 Dec 75	26 Feb 76
E	Project Safety Plan	6 Jul 72	25 Jul 72
F	Lakeshore Management Plan	10 Apr 75	16 Mar 76

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SECTION I

INTRODUCTION

1-01. Project authorization. The Table Rock Lake project was authorized by the Flood Control Act approved 28 June 1938 (Public Law No. 761, 75th Congress, 3rd Session) as modified by the Flood Control Act approved 18 August 1941 (Public Law No. 228, 77th Congress, 1st Session) to include the authorization of the project for flood control and generation of hydroelectric power. Section 4 of the Flood Control Act approved 22 December 1944 (58 stat 889), as amended by Section 4 of the Flood Control Act approved 24 July 1946 (60 stat 642), as amended by Section 209 of the Flood Control Act approved 3 September 1954, as further amended by Section 207 of the Flood Control Act of 1962, as further amended by Section 2 of the Land and Water Conservation Fund Act of 1965; and Section 210 of the Rivers and Harbors Flood Control Act of 1968 authorized the Chief of Engineers, under supervision of the Secretary of the Army, to provide for recreational development and use of the lake projects under his control. Public Law 86-93, 86th Congress, (s. 42, approved 17 July 1959) modified the authorization of the project to include, without reimbursement, 27,000 acre-feet of storage to provide water for operation of a fish hatchery by the State of Missouri.

1-02. Project Purposes and Other Beneficial Uses. Table Rock is a multiple-purpose power generation and flood control project and a major unit in a comprehensive plan for development of the water resources of the White River Basin in Missouri and Arkansas. Other beneficial uses include recreation, fish and wildlife enhancement, and increases in the power outputs of downstream Empire District Electric Company and Bull Shoals power stations due to the regulated flow from the Table Rock project.

1-03. Purpose and Scope of Report. This report updates Design Memorandum No. 17-D, Updated Master Plan for Development and Management of Table Rock Reservoir approved 30 September 1970. The plan presented in this report establishes policies, objectives, and programs for the preservation, enhancement, development, maintenance, administration and management of all project resources and provides for the necessary facilities to enhance opportunities for public enjoyment. Reappraisal of current conditions at the project indicated that present facilities must

be expanded or improved if projected requirements are to be met. This report considers many aspects of recreation on the lake and using available and projected visitation and use data provides for changes, where necessary, to fulfill these requirements.

1-04. Application of Public Laws and Executive Orders.

a. Public Law 93-303. This law was enacted on 7 June 1974. It provides for the collection of fees at camping areas and classifies the camping areas by availability of facilities into Classes A, B, C, and D. Also, at each Corps Lake where camping is permitted, at least one primitive campground will be provided where no fee will be charged.

b. Federal Water Project Recreation Act of 1965 (Public Law 89-72). In accordance with current cost sharing policy established by the Secretary of the Army in coordination with the Office of Management and Budget, development of all future parks will require participation by a non-Federal body furnishing at least 50 percent of the cost of recreational development and providing operation and maintenance upon completion of the development. Also, all recreational development will be subject to the cost sharing policy after FY 1974 with the exception of urgently needed facilities to meet sanitation needs.

c. Public Law 89-80. This act was designed to provide for the optimum development of the nation's natural resources through coordinated planning of water and related land resources. It provides authority for the establishment of a water resources council and river basin commissions.

A comprehensive study of the White River Basin was initiated prior to the passage of the act by the Ad Hoc Water Resources Council. This study was completed in 1968. Volume V of the study focused on outdoor recreation resources of the White River Basin. A study was authorized by a resolution of the Senate Public Works Committee dated 26 March 1971 to determine if the Beaver, Table Rock, Bull Shoals, and Norfolk lakes should be designated as a National Recreation Area (NRA). This study is inactive due to lack of funds for continuation of the study and other reasons.

d. Fish and Wildlife Coordination Act of 1958 as amended (Public Law 85-624). Fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resources development programs.

e. Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). The objective of this act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters.

f. Safe Drinking Water Act (Public Law 93-523). This act amends the Public Health Service Act to assure that the public is provided with safe drinking water.

g. Federal Environmental Pesticide Control Act of 1972 (Public Law 92-516). This act regulates the use of pesticides to protect man and his environment.

h. Motor Vehicle Air Pollution Control Act and Solid Waste Disposal Act (Public Law 89-272). These acts require standards for controlling the emission of pollutants from certain motor vehicles, and authorize a research and development program with respect to solid-waste disposal. These acts are a part of the amendments to the Clean Air Act, Section 202.

i. Archeological Preservation Act (Public Law 93-291). This law authorized Federal agencies to submit a separate line item on budget requests for cultural resources considerations. Up to one percent of project funds can be allocated for identification and management of cultural resources.

j. Executive Order 11593 of the President-Protection and Enhancement of the Cultural Environment. This order sets out a policy for the Federal Government to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation.

k. Executive Order 11752 of the President - Prevention, Control, and Abatement of Environmental Pollution at Federal Facilities. This order directs that the Federal Government shall provide leadership in the nationwide effort to protect and enhance the quality of our air, water, and land resources and in the prevention of environmental pollution.

1-05. Project Status. Construction of Table Rock Dam was initiated in November 1954. The dam was completed in August 1958, and the powerhouse and switchyard were completed in June 1959. The lake was declared operational for public use in March 1960. Twenty-four parks have been developed around the project with facilities to enhance the recreational experience of the visiting public. Twenty one of these parks have been partially developed by the Corps of Engineers and three developed by others. The project has attracted considerable public interest with many private developments being established in the project area.

## SECTION II

### PROJECT DESCRIPTION

2-01. General. The project is located in the scenic Ozark Mountain region of southwest Missouri and northwest Arkansas. The total area contained in the Table Rock project, including both land and water surface, consists of 65,604 acres. Of this total, 1,835 acres are flooded national forest land, 57,745 acres were acquired in fee, 2,896 acres are in flowage easement, 78 acres are under permit, and 3,050 acres are in the streambed. The region is characterized by narrow ridges between deeply cut valleys that are well wooded with deciduous trees and scattered pine and cedar. When the lake is at the top of the conservation pool, the water area comprises 43,100 acres and 745 miles of shoreline. The shoreline is irregular with steep bluffs to gently sloping points.

2-02. Location. Table Rock Dam is located at river mile 528.8 on the White River in Stone and Taney Counties, Missouri, about 6 miles southwest of Branson, Missouri. The lake extends westerly along the White River to Beaver Dam at mile 609.0 and comprises lands in Taney, Stone, and Barry Counties, Missouri, and in Boone and Carroll Counties, Arkansas. The project is easily accessible by a network of Federal, State, and county roads. At the School of the Ozarks, about 3 miles west of Hollister, Missouri, there is an airport with a paved landing strip 100 feet wide and 3,600 feet long. The strip is well lighted and has a parallel taxiway. Also available are an airport office, pilot's lounge, hangar facilities, a rotating beacon, and a nondirectional radio beacon. There are several small landing strips in the vicinity of the lake. No commercial flights are scheduled at any of these airfields. Scheduled bus service is available at Branson, Missouri, and Eureka Springs, Arkansas. Railroad freight service is available at Branson on the Missouri Pacific Lines. Table Rock Lake is one of a series of five lakes in the Upper White River Basin in northern Arkansas and southern Missouri. The other lakes in the series are Beaver, located upstream, Taneycomo and Bull Shoals located downstream on the White River, and Norfork on the North Fork River.

2-03. Project Data. The Table Rock project includes a concrete gravity-type dam with embankment extensions and a hydro-electric generating plant. The dam is comprised of 1,602 feet of concrete gravity section and 4,821 feet of embankments at a height of 252 feet above the streambed. The spillway section, 531 feet long, is located above the river channel and is controlled by 10 tainter crest gates 37 feet high by 45 feet long. In the base of the concrete section are four, 4-foot by 9-foot conduits and four, 18-foot diameter power penstocks. The power generating plant consist of four 50,000 kilowatt generating units. Table II-1 summarizes the pertinent engineering data on the project. Real estate acquisition limits are shown in Table II-2 and the reservoir clearing limits are shown in Table II-3.



2-04. Project Operation. The operation of the project consists of the impoundment of water in the lake during periods of high runoff and its release through the hydroelectric power plant to produce electricity which is marketed by the Southwestern Power Administration, U.S. Department of the Interior. The dam was designed for maximum pool elevation of 942 feet m.s.l., and is operated for a nominal flood control pool at an elevation of 931 feet m.s.l. Under normal conditions, the lake elevation fluctuates between 915 feet m.s.l., which is the top of the conservation pool, and 881 feet m.s.l., the bottom of the conservation drawdown pool. Under extreme conditions of extended low rainfall and runoff, the reservoir may be drawn as low as the maximum probable drawdown, elevation 846 feet m.s.l. to meet the long-range hydro-electric power commitments. During flood conditions, the lake level may rise into the flood control pool, and may exceed the top of the flood control pool by as much as four or five feet during the surcharge operation. A summary of the natural flows at the dam location for the 37-year period from 1922 to 1959 is shown in Table II-4. The area-capacity data for various elevations are furnished on Figure 2-1, the experienced lake levels and pool duration data are given on Figures 2-2.1 and 2-2.2, and the frequency data are shown on Figure 2-3.

TABLE II-1

## PERTINENT DATA OF THE DAM AND LAKE

Item	Design Data
<u>General information:</u>	
Purpose	FC,P(1)
Stream	White River
States	Missouri & Arkansas
Drainage area, square miles	4,020
Average annual rainfall over the drainage area, inches, approximately	45.4
<u>Dam:</u>	
Length, in feet	6,423
Height, feet above streambed	252
Top of dam elevation, feet above mean sea level	947
<u>Generators:</u>	
Main units, number	4
Rated capacity each unit, kilowatts	50,000
Station service units, number	2
Rated capacity each unit, kilowatts	700
<u>Lake:</u>	
Nominal bottom of power drawdown	
Elevation, feet above mean sea level	881
Area, acres	27,300
Nominal top of conservation pool	
Elevation, feet above mean sea level	915
Area, acres	43,100
Length of shoreline, miles	745
Nominal top of flood-control pool	
Elevation, feet above mean sea level	931
Area, acres	52,300
Length of shoreline, miles	857
<u>Five-Year frequency pool:</u>	
Elevation, feet above mean sea level (flood pool)	922
Elevation, feet above mean sea level (drawdown)	891

(1) FC - flood control, P - power

TABLE II-2

## REAL ESTATE ACQUISITION LIMITS

Item	:	Design Data
Contour for land acquisition:	:	
Fee, feet above mean sea level	:	923
Flowage easements, elevation, feet above m.s.l.	:	936

TABLE II-3

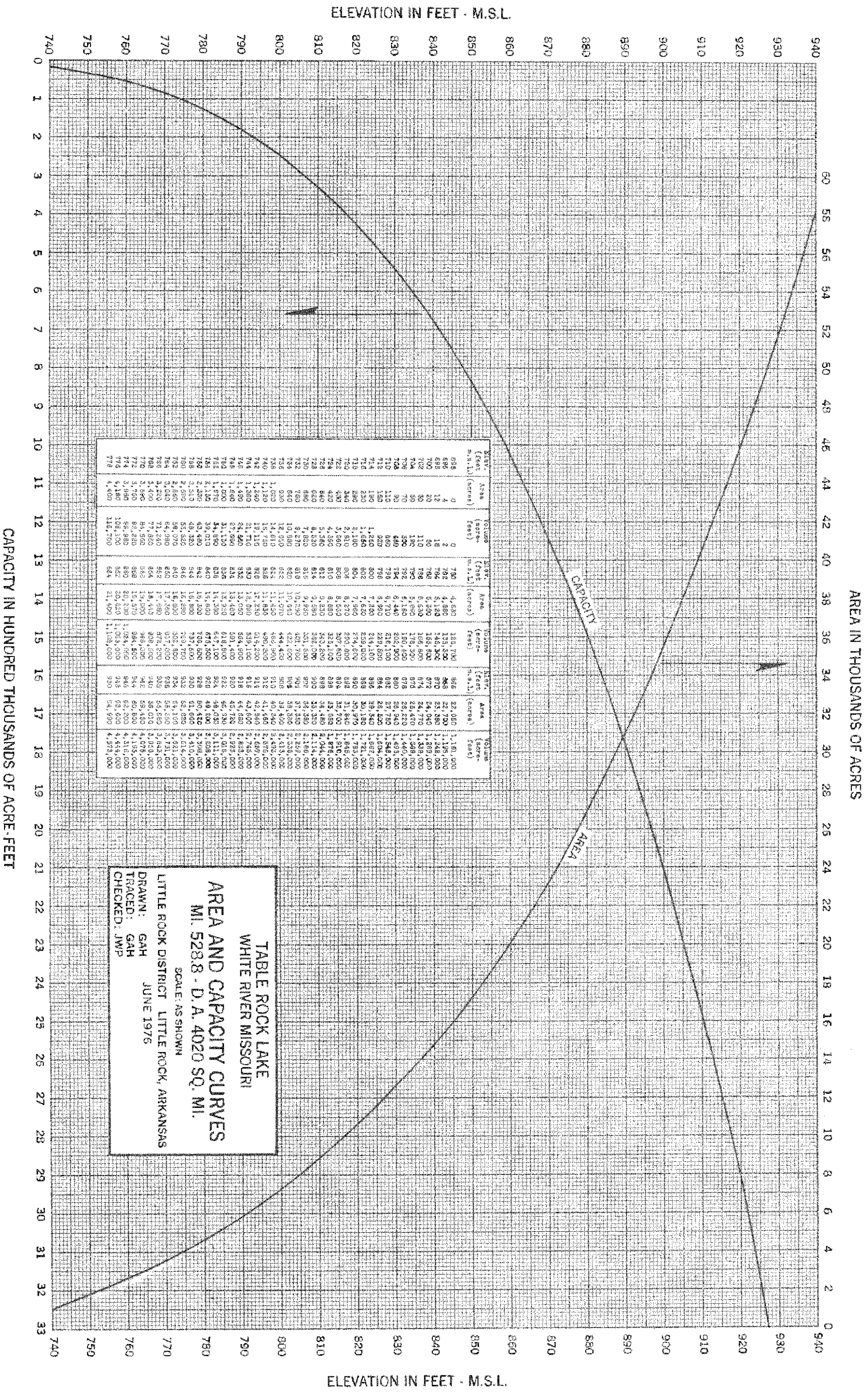
## LIMITS OF CLEARING

Item	:	Design Data
Limits of clearing:	:	
Upper limit, feet above mean sea level	:	915
Lower limits, feet above mean sea level	:	
In vicinity of parks	:	840
Other cleared areas	:	874
Horizontal limits, mile	:	
Proximity of parks	:	.5
Proximity of populated areas	:	1
Proximity of highway crossings	:	.5

TABLE II-4

NATURAL FLOWS AT TABLE ROCK DAM SITE  
1922 - 1959

Item	:	Acre-feet	:	Average rate (c.f.s.)
Average annual 37 years	:	3,190,500	:	4,410
Maximum annual (1927)	:	7,365,300	:	10,190
Minimum annual (1954)	:	528,100	:	730
Maximum month (April 1945)	:	2,290,400	:	38,560
Minimum month (August 1954)	:	3,150	:	51



Area (thous. acres)	Capacity (hundred thous. acre-feet)	Elevation (feet - M.S.L.)
0	0	740
1	0.1	745
2	0.2	750
3	0.3	755
4	0.4	760
5	0.5	765
6	0.6	770
7	0.7	775
8	0.8	780
9	0.9	785
10	1.0	790
11	1.1	795
12	1.2	800
13	1.3	805
14	1.4	810
15	1.5	815
16	1.6	820
17	1.7	825
18	1.8	830
19	1.9	835
20	2.0	840
21	2.1	845
22	2.2	850
23	2.3	855
24	2.4	860
25	2.5	865
26	2.6	870
27	2.7	875
28	2.8	880
29	2.9	885
30	3.0	890
31	3.1	895
32	3.2	900
33	3.3	905

TABLE ROCK LAKE  
WHITE RIVER MISSOURI

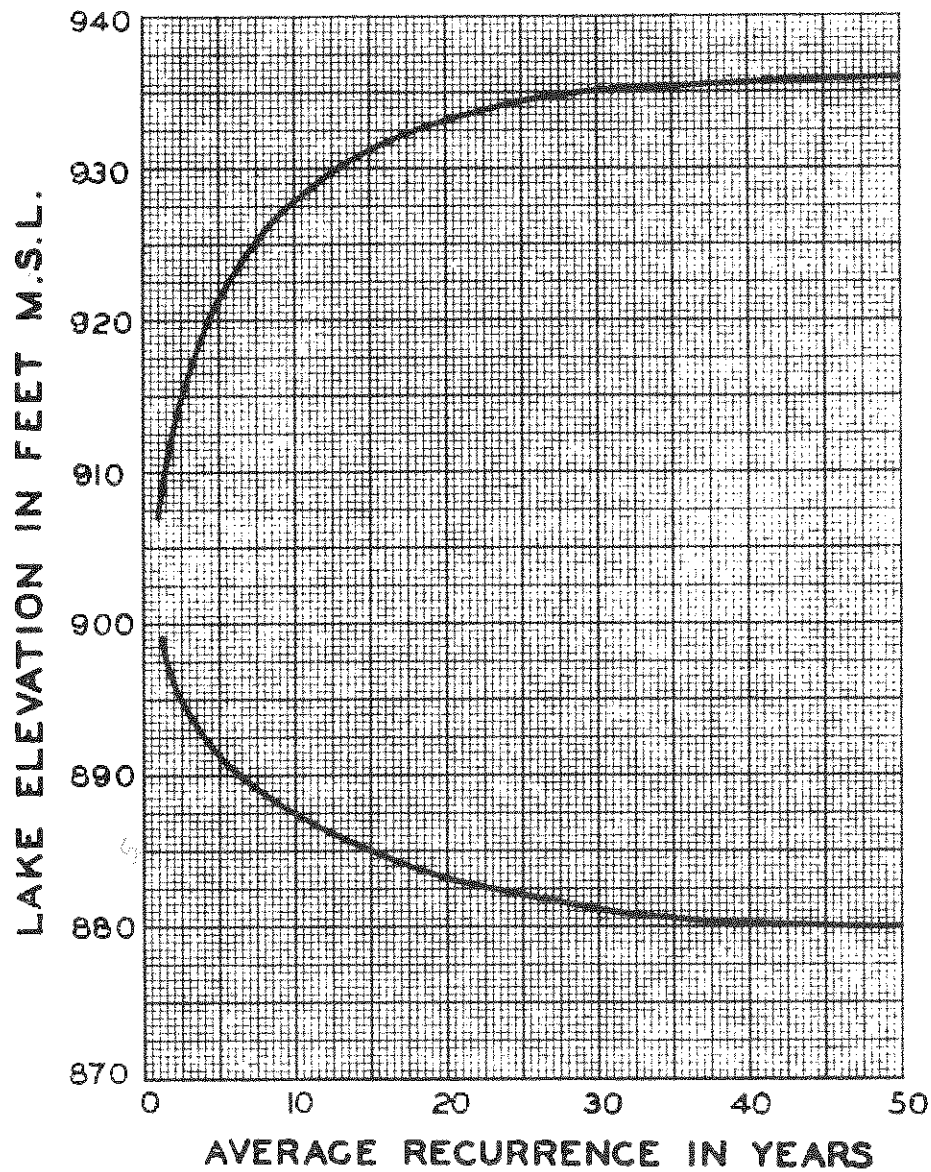
AREA AND CAPACITY CURVES  
MI. 528.8 - D.A. 4020 SQ. MI.

SCALE: AS SHOWN

LITTLE ROCK DISTRICT LITTLE ROCK, ARKANSAS

DRAWN: GAH  
TRACED: GAH  
CHECKED: JWP

JUNE 1976



WHITE RIVER WATERSHED      WHITE RIVER, ARK. AND MO.  
UPDATED MASTER RECREATION PLAN  
TABLE ROCK LAKE  
FREQUENCY OF LAKE ELEVATION  
SCALE: AS SHOWN  
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK  
LITTLE ROCK, ARKANSAS, JULY 1976  
DESIGNED: JWP  
TRACED: DB  
CHECKED: DRB

### SECTION III

#### PROJECT RECREATIONAL AND ENVIRONMENTAL RESOURCES INFLUENCING DEVELOPMENT AND MANAGEMENT

3-01. General. The project area, located in the Ozark Mountain region, is a popular vacation and retirement area due to the mild climate and quality environment. About 75 percent of the project area is located in the Mark Twain National Forest. The predominant trees and shrubs around the lake shore consist of persimmon, honey locust, black walnut, oak, hickory, elm, maple, black gum, ash, cottonwood, hawthorn (the State flower of Missouri), dogwood, redbud, coralberry, snowberry, and sumac. Red cedar, the principle evergreen, is dispersed throughout the region and is found in many large scattered groups.

Numerous subdivisions, resorts, motels and other types of tourist attractions have been developed in the vicinity of the project. Of the many complimentary tourist attractions in the Table Rock area, two outstanding examples are the Shepherd of the Hills Farm and Silver Dollar City. The Shepherd of the Hills Farm was the setting for Harold Bell Wright's novel "Shepherd of the Hills" and is preserved in the motif of the novel period. The theme of development for Silver Dollar City is native arts and crafts of the 1870's period. This is also the site of the famous Marvel Cave. These developments are nationally advertised and are visited by more than 4 million people per year. The extent of Table Rock Lake and the structural features of the project also contribute to the tremendous attraction for tourists to this area. The quality recreational and environmental resources of the project have greatly influenced the development of the surrounding area.

#### 3-02. Geology, topography, and soils.

##### a. Geology.

(1) Physiography. Table Rock Lake is on the southwest flank of the Ozark uplift, a structural and topographic high, which is often referred to as the Ozark Plateaus province. The plateau surfaces of this province are underlain by bedrock gently dipping sedimentary strata. The highest ridges in the area surrounding the lake are a part of the Springfield Plateau, the middle level of the plateau province, which in this region rises to an elevation of about 1,400 feet. In this region the river and its tributaries have entrenched themselves about 700 feet below the plateau surface. As a result, the plateau has been deeply dissected by erosion and the original surface is present only as the tops of narrow steep ridges.

(2) Stratigraphy. Bedrock strata exposed in the uplands bordering the lake are of Mississippian and Ordovician age. The formations of



Mississippian age underlie the plateau surface and most of the higher slopes of the basin and in most areas are well away from the lake and associated lake shore developments. Strata of the Jefferson City-Cotter Formation of Ordovician age underlie the lake and the adjoining slopes. This formation is predominantly dolomite but contains subordinate amounts of chert, quartzite, sandstone, and shale. Most of the strata are more or less argillaceous, and several have been silicified in various degrees. Chert occurs as nodules, and in thin beds along with sandstone or quartzite. Shale occurs as material along partings, and as thin seams fractions of an inch thick along bedding planes.

(3) Structure. The strata about the lake appear to be nearly horizontal, but are warped gently over a large area by the Osage-Verona anticline, the crest of which is aligned over the Kings River arm of the lake. Two major faults are in the lake area. These are very old and there are no indications of recent movement along them. One, a part of the Shell Knob - Eagle Rock structure crosses Roaring River where it empties into the lake. It trends about N. 37° E., and is downthrown on the east. It has no effect on the strata beyond the immediate vicinity of the fault. The other, Lampe fault crosses under the Highway 13 White River bridge. It trends N. 30° E., has a displacement of about 190 feet, and is downthrown on the east. Joints observed in rock along the lake are nearly vertical and do not carry through many beds. The strike of the most prominent set ranges from N. 5° E. to N. 10° W. A secondary, more poorly developed set inter-sects these at near right angles.

(4) Earthquake history. The region surrounding Table Rock Dam is subject to infrequent, mild, seismic shocks but not within recorded history are any shocks of sufficient intensity to damage structures.

(5) Weathering. Although the bedrock of the region is soluble, most of the basin where it is underlain by the dolomites of the Jefferson City-Cotter Formation is characterized by surface drainage. This is indicated by the scarcity of important sinks, the absence of large areas without surface drainage, and a well developed stream system with normal well-branched tributaries. Two caves, Marvel Cave and Fairy Cave, are operated commercially in the region of the lake. Both caves are in the Boone Formation and extend into the Jefferson City-Cotter Formation. However, it should be noted that over most of the area in the Jefferson City-Cotter Formation is not favorable to the extensive development of caves, and those noted in the formation are small.

(6) Ground water. Three of the large springs of Missouri feed into Table Rock Lake. Reed's Spring is at the town of the same name in Stone County; Crystal Springs is one-half mile north of Cassville in Barry County; and Roaring River Spring is in Roaring River State Park

7 Miles south of Cassville. A great many unnamed springs, both permanent and intermittent, are in the lake area, and all appear to derive their water from higher ground. Information from wells and small springs in the area indicates that the water table under the higher part of that portion of the lake rim is probably near elevation 900. Many impermeable zones exist which create perched water tables, and many of the shallow wells obtain their water from perched ground water pools. However, because of solution widened joints and structures in the rock, an interchange of water occurs between the formations that underlie the area and leaky aquifers are common. Additionally, because of exposed fractured, weathered, permeable rock, percolation of surface water into the water table is common place.

(7) Conclusions. The geology of the area imposes no unusual restraints on construction. However, ground water pollution is a potentially severe problem because of the easy access of surface water into the water table and of the free interchange of water between rock formations.

b. Topography. The most significant factor limiting the development of project land is topography. The typical ruggedness of this area hampers intensive development in many locations, and limits the number of sites containing appropriate slopes and adequately-sized areas of land desirable for the location of water access recreation facilities. Extensive alteration of landforms is not acceptable under Corps of Engineers guidelines. At present, the shortage of suitable areas is not a crucial problem; however, the situation will become more critical as demand for recreational facilities increases.

c. Soils.

(1) General Data. Soils around the lake, except in the flood plain, and terrace deposits along the streams, are principally residual material formed by decomposition of the dolomite beds. Generally, they are silt loams over clay subsoil, both containing chert fragments from sand size up to small boulders. The material is loose and friable near the surface but becomes harder and more compact with depth. Contacts of leached chert, disintegrated limestone, and plasticity also increase with depth. As much as 20 feet of residual soil has been encountered by borings, but at most places it is less than 8 feet thick and in some places it is entirely absent. Flood plain material consists of silt and sand over sandy, chert gravel at many places in stream channels. Most of the soils in the vicinity of the lake are low in fertility.

The following four soils associations are found in and around the Table Rock Project area: Clarksville-Noark, Captina-Nixa, Caydon-Pembroke-Sogn, and the Caydon-Sogn. The soil association descriptions



are given below. Table III-1 furnishes general use limitations for the soils series which make up the soils associations in the project area and Table III-2 furnishes the major soil series found in each park. The soils map for the two counties in Arkansas is furnished as Figure 3-1. Missouri soils maps are not available.

**CLARKSVILLE-NOARK ASSOCIATION:** Moderately deep and deep, moderately well to somewhat excessively drained, rapidly to very slowly permeable acid, loamy soils developed from cherty limestone. This association is on gently sloping narrow ridgetops and steep side slopes. Clarksville 30%, Noark 50% (inclusions of Corydon, Sogn, Captina, and Pembroke 20%). The somewhat excessively drained Clarksville soils are grayish-brown, over pale brown, very cherty silt loam. In most places they are deep, but are shallow to massive chert in some places. The well drained Noark soils have brown cherty silt loam surface soil over yellowish-red or red cherty silty clay or clay subsoil.

**CAPTINA-NIXA ASSOCIATION:** Deep and moderately deep, moderately well drained, slowly and very slowly permeable, acid, loamy soils developed over cherty limestone on broad, nearly level to gently sloping uplands. Captina 50%, Nixa 30% (inclusions of Pembroke, Clarksville, and Baxter 20%). Captina soils have brown silt loam or cherty silt loam surface soil over yellowish-brown silty clay loam subsoil that has a gray, mottled fragipan in the lower part. Nixa soils have grayish-brown cherty silt loam surface soil over yellowish-brown, mottled cherty silt loam or cherty silty clay loam subsoil that is a fragipan.

**CORYDON-PEMBROKE-SOGN ASSOCIATION:** Deep to shallow, well and somewhat excessively drained, moderately to slowly permeable, acid and neutral soils overlying limestone and cherty limestone. This association is on gently sloping to moderately sloping uplands. Corydon 50%, Pembroke 20%, Sogn 15% (inclusions of Captina, Baxter, and Nixa 15%). The well drained Corydon soils have dark brown cherty silt loam surface soil over reddish-brown, mottled clay subsoil. They are 20 to 40 inches deep to limestone bedrock. The well drained Pembroke soils have brown silt loam surface soil over yellowish-red silty clay loam subsoil. The somewhat excessively drained Sogn soils are dark grayish-brown or black silt loam to stony silt loam less than 20 inches thick over limestone bedrock.

**CORYDON-SOGN ASSOCIATION:** Moderately deep and shallow, well and somewhat excessively drained, moderately slowly and moderately permeable, neutral to acid, loamy soils developed from limestone and cherty limestone on moderately sloping to steep hillsides. Corydon 40%, Sogn 35% (inclusions of Clarksville, Nixa, Razort, and Pembroke soils, and rock outcrop 25%). The well drained Corydon soils have dark brown cherty silt loam surface soil over reddish-brown, mottled clay subsoil. They are 20 to 40 inches deep to limestone bedrock. The somewhat excessively drained Sogn soils are dark grayish-brown or black stony silt loam less than 20 inches thick over limestone bedrock.

TABLE III-1  
SOILS SERIES FACILITY DEVELOPMENT LIMITS

SERIES	SEPTIC TANK			SEWAGE LAGOON			PARK ROADS			CAMP AREAS			PICNIC AREAS			PLAYGROUNDS			PATHS & TRAILS		
	LIMITS	REASONS		LIMITS	REASONS		LIMITS	REASONS		LIMITS	REASONS		LIMITS	REASONS		LIMITS	REASONS		LIMITS	REASONS	
CAPTINA	SLIGHT			SLIGHT			SLIGHT			SLIGHT			SLIGHT			SLIGHT			SLIGHT		
	MODERATE			MODERATE			MODERATE			MODERATE			MODERATE			MODERATE			MODERATE		
CLARKSVILLE	SEVERE			SEVERE			SEVERE			SEVERE			SEVERE			SEVERE			SEVERE		
		DEPTH TO ROCK, SLOW PERC			DEPTH TO ROCK, SLOW PERC			LOW STRENGTH SLOPE			WETNESS SLOW PERC SLOPE			SLOPE			WETNESS SLOW PERC SLOPE			SLOPE	
CORYDON																					
		SLOPE			SEEPAGE SMALL STONES			FROST ACTION, SLOPE			SMALL STONES			SMALL STONES			SMALL STONES			SMALL STONES	
NOARK																					
		ROCK AND LARGE STONES			ROCK AND LARGE STONES			ROCK AND LARGE STONES			LARGE STONES			LARGE STONES			LARGE STONES			SLOPE AND LARGE STONES	
NIXA																					
		DEPTH TO ROCK LARGE STONES			DEPTH TO ROCK SEEPAGE			DEPTH TO ROCK LARGE STONES			LARGE STONES			LARGE STONES			DEPTH TO ROCK LARGE STONES			LARGE STONES	
PEMBROKE																					
		SLOW PERC DEPTH TO ROCK SLOPE			SMALL STONES SLOPE			LOW STRENGTH SLOPE			SLOW PERC SLOPE			SMALL STONES SLOPE			SLOW PERC SLOPE SMALL STONES			SMALL STONES SLOPE	
SOCN																					
		SLOPE			SEEPAGE SLOPE			LOW STRENGTH SLOPE			SLOPE TOO CLAYEY			SLOPE TOO CLAYEY			SLOPE TOO CLAYEY			SLOPE TOO CLAYEY	
		DEPTH TO ROCK			DEPTH TO ROCK			DEPTH TO ROCK			SLOPE TOO CLAYEY			SLOPE TOO CLAYEY			DEPTH TO ROCK			TOO CLAYEY	

TABLE III-2

SOILS SERIES IN PARK AREAS

<u>Parks</u>	<u>Major Soils Series Found in Park</u>	<u>Acres Above Normal Pool</u>
Baird Mountain	Clarksville & Sogn	212
Long Creek	Clarksville & Sogn	57
Cricket Creek	Clarksville & Noark	57
Old Highway 86	Clarksville & Sogn	47
Coombs Ferry	Clarksville & Sogn	66
Indian Point	Clarksville & Sogn	84
Cow Creek	Corydon & Sogn	56
Highway 13	Clarksville & Noark	140
Mill Creek	Clarksville & Sogn	52
Joe Bald	Clarksville & Noark	77
Aunt's Creek	Clarksville & Sogn	62
Cape Fair	Clarksville & Sogn	80
Baxter	Clarksville & Sogn	59
Big Indian	Clarksville & Noark	48
Campbell Point	Clarksville & Sogn	109
Viola	Clarksville & Sogn	33
Kings River	Clarksville & Sogn	45
Viney Creek	Clarksville & Sogn	96
Big M	Clarksville & Sogn	101
Eagle Rock	Clarksville & Noark	39
Beaver	Noark	16

Note: The Sogn series is a close parallel to the Gasconade series which in some cases might replace the Sogn series in Missouri.

In the park areas, the Clarksville series is generally found on the lower slopes and the Sogn series is on the higher levels and ridge tops.

GENERALIZED SOILS MAP OF THE TWO  
MISSOURI COUNTIES UNAVAILABLE AT  
PRESENT.

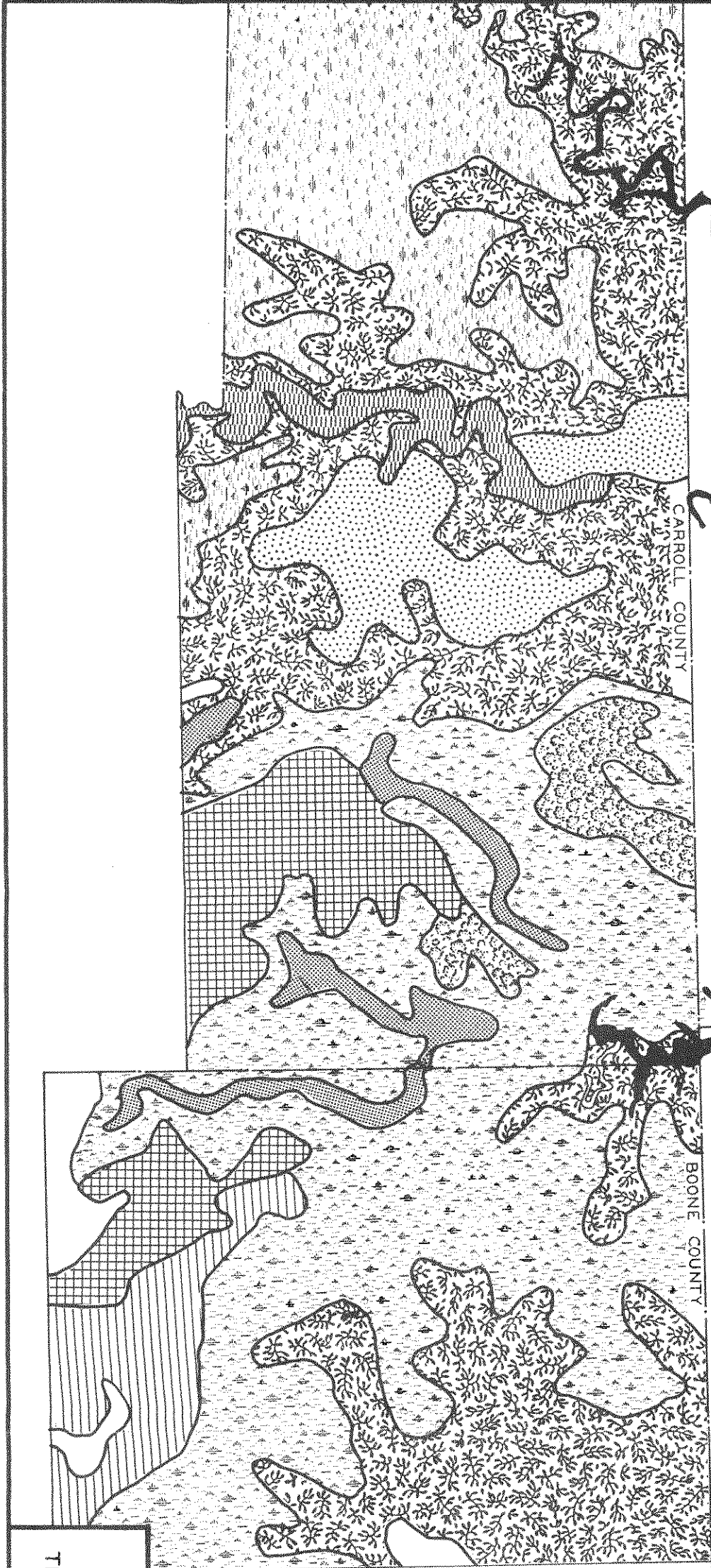
TABLE ROCK LAKE

STONE COUNTY  
TANEY COUNTY

TABLE ROCK DAM

- BAXTER-NIXA ASSOCIATION
- CAPTINA-NIXA ASSOCIATION
- CORYDON-SOON ASSOCIATION
- CORYDON-PEMBROKE-SOON ASSOC.
- CLARKSVILLE-NOARK ASSOCIATION
- RAZORT-BRUNO-PEMBROKE ASSOC.
- LINKER-MOUNTAINBURC-LEADVALE ASSOCIATION
- CLEORA-LOCUST-ALLEN ASSOCIATION

MISSOURI  
ARKANSAS



The management characteristics of the soils associations above are all basically the same. The top soil is poor and rocky and requires moderate seeding and fertilizing for turf control. The soils are easily erodable on slopes. The corrosivity is usually moderate to high for concrete and low for steel. Foundation and road fill characteristics are fair to good, however, the materials are poor as base materials directly under bituminous pavements. Shrinkage and swell of the soils are very low. Cap areas, picnic areas, playgrounds and other recreation related facilities are usually hampered by the rough rocky surface and sloping terrain. The suitability for wildlife habitat is poor to fair. Other specific management and use limitations are shown in Table III-1.

(2) Conclusions. Most of the soils found in the Table Rock project do have characteristics which must be considered in development. The ability of soils to withstand intensive use should be investigated prior to initiation of construction. Trampling on these sites may cause soil compaction, resulting in increased surface runoff and accelerated erosion. Also, vegetative cover may be affected because of the reduction of air and water holding capacity of the soil. It should be noted, however, that soil compaction on use sites is not now a major problem because most of the soils are stoney and resist compaction. Another factor in some areas is shoreline erosion resulting from wave action which may cause serious problems in maintenance and hamper development of water related facilities.

3-03. Ecological Resources. Resource management and land use planning include operation and management in several related fields of endeavor. Some of these include fish and wildlife, timber, agricultural and grazing leases, insect and vector control and problems, and air pollution.

a. Fish and Wildlife. The lake contains an abundance of many species of sport fishes and the cold tailwater is stocked with rainbow trout in which a most important sport fishery has developed. There has been minimal management of wildlife resources through habitat protection and food supply on Corps of Engineers lands. The construction and operation of parks has removed habitat essential to wildlife, as has roads and parking areas. Almost 1,100 acres are used for these purposes. Shoreline clearing, mowing, and similar removal of vegetation has resulted in an overall decline in the quantity and quality of wildlife habitat around the lake. A comprehensive fish and wildlife management plan for Table Rock Lake has been prepared and is included as Appendix D of this master plan.

b. Agricultural and Grazing Leases. Since 31 December 1971, Government-owned land at Table Rock Lake has not been available for agricultural or grazing leases because of the small amount of land suitable for economical agricultural leases. As a result, preference is given to wildlife benefits. Prior to that date, 27 acres were leased for grazing purposes.

c. Insect and Vector Problems and Control. Insecticides, herbicides, and other chemicals may be used to control insects, weeds, and other pests which may be harmful to the health and safety of the public or detrimental to the natural features of the project when they cannot be controlled by other methods. The use of biological or mechanical control other than chemical pesticides is encouraged where practical. All spraying and control activities will be coordinated through the Little Rock District biologist. Proper sanitation and litter control, such as screened restrooms and regular solid waste collection in the parks, provide for effective control of flies, mosquitoes, ticks, rats, and other prominent disease vectors. Fluctuation of the lake, mowing of the vegetation, and wind and wave action eliminate some mosquito breeding areas.

d. Air Pollution. Table Rock Lake is located in the Ozark Mountains, remote from heavy smoke-producing industry or large mining operations. The air is very clean and smog is virtually unknown in this region. None of the present operations of the project contribute to air pollution. State laws of both Arkansas and Missouri are quite restrictive pertaining to open burning. Open burning is allowed only in residential areas and in certain controlled agricultural, forestry, wildlife, and industrial activities. Ceremonial fires and campfires are excluded from control by the law.

### 3-04. Environmental and Scenic Resources.

a. Scenic. Steeply eroded hills, knobs, and escarpments characterize the rugged upland topography which is covered by a thin, limestone soil mantle which supports a grass under-story and an oak-cedar overstory. The rugged valley walls are covered with broken limestone, the hills are mostly topped with cedar glades, and the slopes become less wooded to the waters' edge. The overall scenic effect is very pleasing. With the steep and rugged shoreline of the lake, its scenic values are attractive, thus contributing greatly to the area's recreational experiences. All scenic resources of the project will be preserved, protected, and enhanced wherever possible.

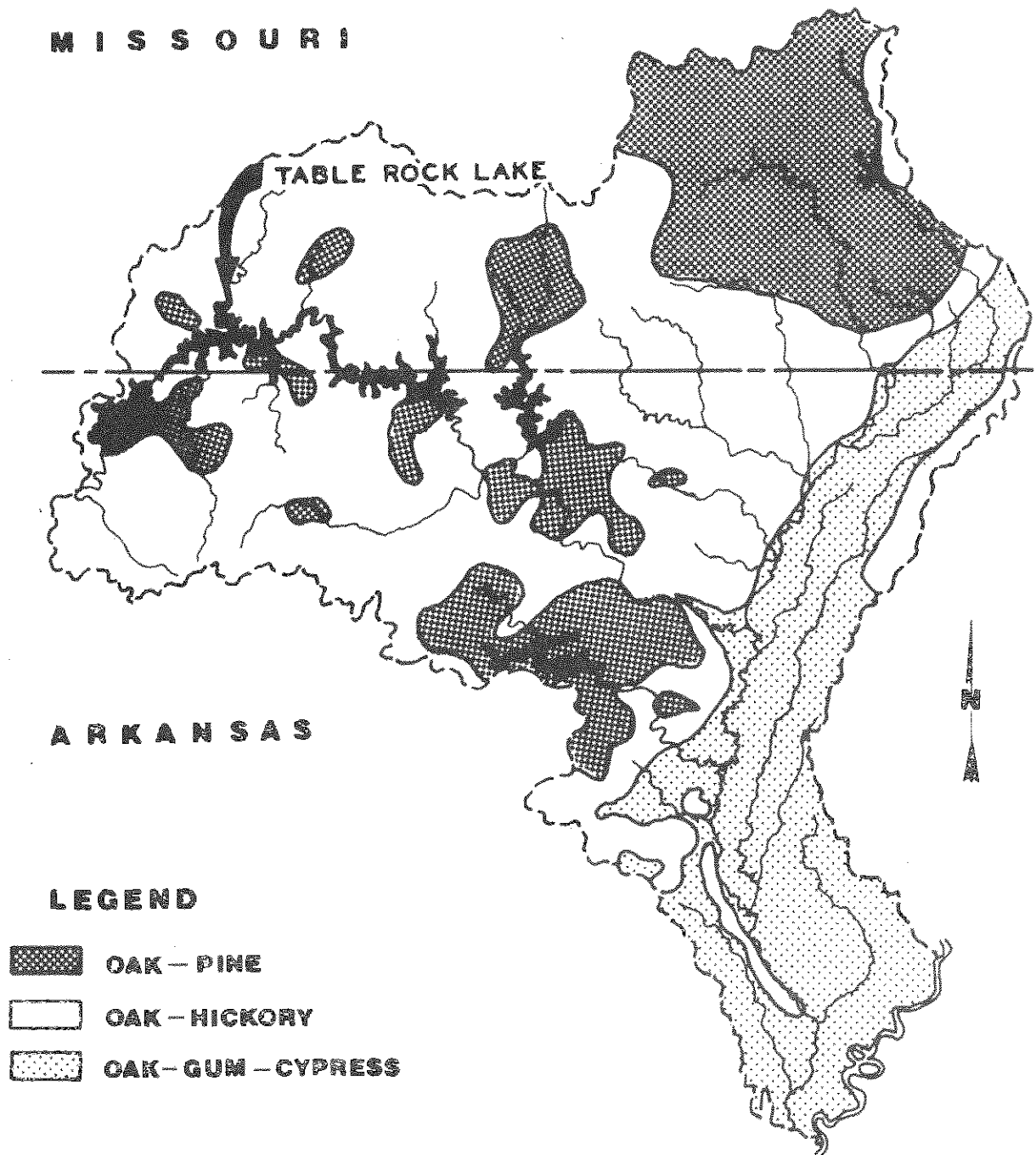
b. Vegetative Resources. The project area surrounding the lake is heavily forested. About 75 percent of the lake area is located in the Mark Twain National Forest. Trees and shrubs around the lakeshore include persimmon, honey locust, hawthorn (the State flower of Missouri), dogwood, redbud, coralberry, snowberry, and sumac. Redcedar, the principal evergreen, is dispersed throughout the region and found in many large,

scattered groups. Ground cover consists of green briars, sedge, and native grasses. See Figure 3-2 for a general vegetative map around the project area. A more complete analysis of the existing vegetation at each of the park sites can be found in the "Recreational Forest and Vegetation Management Plan" for Table Rock Lake prepared by the U.S. Forest Service, U.S. Department of Agriculture.

c. Water Quality. The surface water quality in the lake area is good to excellent. Pollution from municipal sewage in certain tributaries entering Table Rock Lake has decreased due to improved sewage treatment, and the water quality of tributaries such as the James River will continue to improve as planned sewage treatment facilities are completed. Lake fluctuations, associated with power production and flood control procedures, produce changes in the environment along the shoreline of the lake. Turbidity adversely affects Table Rock Lake only for very short periods of time after heavy rains. During these periods of heavy runoff, urban areas and other parts of the terrain especially those that have had the protective vegetation removed, contribute silt and other suspended particles to the tributaries. The particles eventually settle to the bottom and the water clears without adverse effects on the environment. Table Rock, like all other lakes of its size in the Ozark region, stratifies chemically and thermally in the late spring with stratification extending into late fall and early winter. This naturally occurring phenomenon causes portions of the lake below the thermocline to be unfit for fish habitat because of low concentrations of dissolved oxygen. This undesirable water, when discharged downstream may cause some problems in the tailwaters. To combat this problem, power generation is being limited as much as possible to times when the dissolved oxygen content above the dam is at an acceptable level. A highly productive trout fishery has been established in Lake Taneycomo by the Missouri Conservation Commission because of the available discharge of cold water from the dam.

3-05. Recreational Resources. The recreational resource of the Table Rock Lake is considered to be of great importance to this Ozark Mountain resort region. The project offers many recreational activities such as swimming and skin diving, boating, water skiing, fishing, picnicking, and camping. There are 21 parks on Table Rock Lake presently operated by the Corps of Engineers and one State park operated by the State of Missouri, emphasizing picnicking and camping, also there is one commercial campground (Yogi Bear Jellystone Campground) developed and operated by private interest. The U.S. Forest Service has developed two parks which they maintain and operate. The many recreation activities available for the public to experience are considered to be of good quality.

3-06. Archeological and Historical Resources. The area surrounding the lake and along White River is called "the heart of the Ozark Bluff Dweller distribution" and is rich in prehistoric Indian artifacts. Historic Indians in the area were the Osage, the Delaware, Peoria, and Piankashaw tribes. The Ozark country of southwestern Missouri and northwestern Arkansas had few, if any, white settlers before the Nineteenth Century. Henry Schoolcraft, the first traveler to write about this section, traveled this portion of the White and James Rivers in 1818 and 1819 while making a survey of lead mines in southwestern



**FIGURE 3-2**



Missouri. The turbulent period of the Civil War was keenly felt in southwestern Missouri and northwestern Arkansas. Two of the major battles west of the Mississippi were fought in this part of the country - one in southwestern Missouri at Wilson's Creek and one in the northwestern corner of Arkansas, the Battle of Pea Ridge. The National Register of Historic Places has been consulted and no national historic properties are affected by the operation and maintenance of the property; and, in the case of new Federal developments within the project, contact will be made with the appropriate State Liaison Officer for historic preservation.

a. Archeological. The State of Missouri is rich with archeological resources, dating man's habitation of the area to over 12,000 years ago. Since the waterways provided food, water and transportation, most of man's early activities were centered around them. The waterways are so important archeologically that the archeological survey of Missouri has subdivided the major physiographic regions of the State by stream drainages to facilitate the survey and excavation of the archeological resources. A survey of the Table Rock Lake area was conducted under the supervision of Carl Chapman, University of Missouri, in 1951 with additional excavations and testing being conducted by Chapman from 1955 through 1959 during the construction phase of Table Rock Dam. At the conclusion of the work in 1959, 872 sites had been identified in and around Table Rock Lake. The 71 investigations conducted throughout the area revealed the full range of archeological sites made up of open camp sites, shelter and cave sites, rock cairns and earth mound sites. Less than 1 percent of the known sites within the lake area were excavated or tested in any manner. However, Chapman concluded that a reasonable picture was obtained of the archeological potential in the lake area.

The resident office and visitor center will house an interpretive center relating man's habitation of the Ozarks to his environment. Archeological artifacts along with native plant materials and unique audio visual aids will help communicate his relationship. Artifacts recovered by earlier excavations will be changed periodically to keep the displays interesting. All artifacts recovered on Federal lands are Government property regardless of the curator and may be recalled at any time.

Additional work is recommended to insure continued protection of the resource. A Cultural Resources Reconnaissance is included in a future year budget request for FY 80 pursuant to PL 93-291, which provides expenditures of up to 1 percent of the project funds for such purposes. Limited testing and excavation of selected inundated sites should be accomplished to not only recover important scientific data but also to determine to what extent, if any, the resource is damaged or lost due to inundation. Local divers who are familiar with the lake could be employed by the Missouri Archeological Survey and the Arkansas Archeological Survey, to assist in the work.

b. Historic. The lake area has several historical sites that are significant on the local and regional level and one National Military Park. With the exception of the National Military Park, none of these sites have National significance. However, when combined with others like them across the country they record the theme of the American way of life. Marvel Cave, which is located at Silver Dollar City, Missouri, the largest privately owned commercial tourist attraction in the Table Rock Lake area, is listed on the National Registry of natural landmarks. Also, a section of Eureka Springs, Arkansas which is about seven miles from Beaver, Arkansas, on the upper end of the lake is listed on the National Register of Historic Places. Other sites on the National Register of Historic Places include the "Natural Bridge Archeological Site" and "The Old Courow House", both in Barry County.

The small town of Beaver itself has a rich historic significance. Also, Beaver Park which borders the little community of Beaver was the home place of Squire Beaver, a legendary resident of the portion of the White River which is now the upper end of Table Rock Lake. Beaver Park is the only project property with any specific historical significance. This entire portion of the Ozarks, however, represents a heritage of determined mountain dwellers who adapted to a rough way of life in order to survive. Examples of how dwellers of the Ozarks lived in years past can be seen in some of the private tourist attractions of the area.

### 3-07. Fish and Wildlife Resources.

a. Fish. The impoundment of the White River and other tributary streams and rivers which form Table Rock Lake resulted in changes in the composition of the fish populations. Small mouth bass was the principal game fish found in the White River prior to impoundment. Largemouth bass, spotted bass, channel catfish, longear sunfish, green sunfish, and several other sunfish were also present in appreciable numbers. All of these species were able to survive in the new lake habitat; however after impoundment, largemouth bass, white bass, and crappie became the most important species in sport fisherman harvest.

The impoundment of Table Rock Lake caused environmental changes in the tailwater portion of the White River downstream from the dam. The Missouri Department of Conservation realized that the cold water discharges from Table Rock Lake would necessitate a change in their fisheries management program for Lake Taneycomo, a 1,730 acre river lake formed by the construction of Powersite Dam on the White River in Taney County, Missouri. Rainbow trout were stocked in Lake Taneycomo to replace the warm-water fishery. This cold-water fishery is a success. However, because of various unfavorable environmental factors such as lack of suitable substrate, fluctuation of water temperatures, and pulsation of current and water level, trout reproduction has been unsatisfactory. Shepherd of the Hills trout hatchery has been established downstream from Table Rock Dam by the Missouri Department of Conservation. Public Law 86-93 provided that 27,000 acre-feet in the power drawdown storage not to exceed 22 cubic feet per second would be for the use of this hatchery. Approximately 9,000,000 rainbow trout have been stocked in

Lake Taneycomo from Shepherd of the Hills Hatchery and from hatcheries of the U.S. Fish and Wildlife Service since 1958. The trout fishery has flourished and become widely known among anglers. Fishing effort has increased from approximately 25,000 fishing trips in 1959 to 249,000 fishing trips in 1974.

The Missouri Department of Conservation is currently evaluating introductions of striped bass, northern pike, and muskellunge in other large impoundments. These large predatory species may improve additional predator-prey balance in large artificial lakes as well as provide additional diversity to anglers. It may be that one or more of these species would be desirable for Table Rock Lake. Further evaluation of their current status in the other lakes is needed before such a decision is made. Paddlefish have been introduced into Table Rock Lake on an experimental basis to add diversity. It is unlikely they will be maintained by natural reproduction.

b. Wildlife. White-tailed deer and eastern wild turkey are common big game animals found and hunted in the Table Rock Lake area. Black bear were introduced in Arkansas by the Arkansas Game and Fish Commission and some sightings of black bear have occurred in Missouri. These are thought to be migrants from the Arkansas introductions.

The principal small game species found in the Table Rock Lake area are bobwhite quail, cottontail rabbit, mourning dove, gray and fox squirrel. Quail, rabbit, and squirrel populations vary with habitat quality and mourning dove numbers increase during the fall migration, but generally there is a low population of doves throughout the area. More recently, the wooded areas are being cleared and planted to fescue. The outcome of this practice and how it will affect small game populations over a long period of time is yet to be observed.

The Mallard duck is the predominant water species visiting the Table Rock project. However, they are only transient visitors as their characteristic feeding habits of obtaining food from shallow lakes or ponds discourage them from obtaining food from the deep, clear waters of Table Rock Lake. Migratory geese common to the area are blue geese with lesser numbers of Canada geese. Giant Canada geese were introduced to the area by the Missouri Department of Conservation in 1971 and 1972 creating a resident flock.

Principal furbearing animals found in the project are mink, muskrat, beaver, and raccoon.

The southern bald eagle and the arctic peregrine falcon, migrants to the area, are listed as endangered species. Also, another migrant to the area, the American osprey is declining in numbers but at this time is not on the endangered species list published by the Department of the Interior. The red wolf in all probability is biologically extinct but its former range included the Table Rock Lake area and is included here in the remote possibility that it may still exist. The Indiana bat may inhabit caves in the lake area. Although not on the endangered species list the gray myotis and Ozark big-eared bat are declining in numbers and will be given protection consideration when observed.

## SECTION IV

### FACILITY LOAD AND OTHER DESIGN CRITERIA

4-01. General. The criteria discussed in this section are of a basic nature to be used for the planning, development, and management of the project with consideration being given to the latest trends in recreational activities and needs. These criteria furnish guidelines for determining the type and number of facilities needed to satisfy the current and projected demand and also furnishes guidelines for serviceability, operation, and maintenance of facilities. Considerations for the physically handicapped will be included in the design of facilities. Criteria presented relates to six types of recreational facilities: roads and parking, boat launching ramps, picnicking day-use areas, camping facilities, swimming areas and hiking trails. Criteria applicable to overall facility development are contained in the following references:

- a. EM 1110-2-400 dated 1 September 1971, Recreation Planning and Design Criteria.
- b. ER 1110-2-400 dated 1 February 1971, Design of Recreation Sites, Areas and Facilities.
- c. ER 1120-2-400 dated 1 November 1971, Recreation Resources Planning.
- d. ER 1130-2-400 dated 28 May 1971, Recreation Resource Management of Civil Works Water Resource Projects.
- e. ER 1165-2-400 dated 3 August 1970, Recreational Planning, Development, and Management Policies.
- f. ER 1130-2-406 dated 13 December 1974, Lakeshore Management at Civil Works Projects.
- g. TR D-53 dated November 1975, Design Guidelines for Recreational Roads, published by Construction Engineering Research Laboratory.
- h. Park Practice Design Manual.
- i. Public Law 93-303, enacted 7 June 1974, which provides for collection of fees at Corps of Engineers parks.

#### 4-02. Facility siting.

a. General. The siting of facilities and development of parks should be of the highest quality, should be safe, and should promote the health, welfare, and aesthetic enjoyment of the public. The siting of each facility should result in the compromise between conservation of the natural environment and providing for public use. Only the most adaptable terrain should be used for siting of overall

facilities with consideration given to the natural features so that the most scenic parts of the site may remain undeveloped for the enjoyment of visitors. Facility siting should be in harmony as much as feasible with the environment in which they are to be placed to avoid excessive grading and clearing for site preparation.

b. Facilities. Water supply points and sanitary facilities should, where practicable, be centrally located for convenience to the intended users with consideration given to flood elevations and State public health regulations. Site selection for most facilities will be influenced primarily by the need, adaptability of the terrain and the relation between the siting elevation and the frequency of the corresponding pool level. A general guide for siting of new facilities in correlation with various pool levels is shown in figure 4-1. Pool levels for Table Rock Lake are shown in Table IV-1.

TABLE IV-1

POOL ELEVATIONS FOR SITING FACILITIES

Pool Description	Pool Elevation(m.s.l.)
Flood control pool	: 931
Estimated 50-year frequency pool	: 936.5
Estimated 10-year frequency pool	: 928.0
Estimated 5-year frequency pool	: 921.5
Conservation pool	: 915.0
Estimated 10-year drawdown pool	: 887.5
	:

4-03. Roads and parking.

a. Roads. Most of the roads remaining to be constructed and shown as proposed development on plates 14 through 37 are primarily for further development of camp and picnic areas in existing parks and are classed as local and sublocal recreational roads. Baird Mountain Park which is virtually undeveloped and James River Future Park, will require major road construction; therefore, criteria for all classes of recreational roads are furnished. Most roads within recreation areas should be located and designed to respect the terrain with "grass root" grades; that is, so that the road is laid lightly on the land. Based on public travel desires, land uses, and the goal of achieving system continuity, recreational roads are grouped in the following classes:

(1) Primary Access. This class provides for through traffic movement of public vehicles into and between access areas and to abutting property.

(2) Circulation. This class provides for movement of public vehicles between activity sites within an access area and to abutting property.

(3) Local. This class provides public access to individual activity sites such as boat launching ramps, campgrounds, or picnic groves. Use may be restricted to certain types of vehicles.

(4) Sublocal. This class provides for public movement within an activity area such as internal campground roads. Use may be restricted to certain types of vehicles.

With reference to the recreational road classes above, the following guides will be utilized where feasible for design and construction of roads for this project:

Road Type	Road Width (ft.)	Max. Grade (%)	Design Speed (mph)	Shoulder Width (ft.)	Min. Radius (ft.)
Primary Access	22	10	40	4	395
Circulation	20	12	30	4	220
Local	20	12	20	0-3	90
Sublocal	20	12	10	0	60
One-way sublocal	12	12	10	0	60

All roads will be constructed with compacted subgrade, crushed stone or gravel base course and bituminous surface course, with the exception of overflow camping roads and roads built for the specific purpose of allowing service vehicle access to facilities. These roads will be gravel surfaced. The final thickness of the road section will be based on soil studies for each specific area.

b. Parking areas. Parking areas basically serve two purposes. First, they allow access and use of facilities in the area. Second, they provide campground parking pads for various types of camping equipment. Parking for access to and use of facilities will be designed for size and type on an individual basis to fit the expected needs. Parking for camping equipment will be designed with consideration given to the following: (1) Should be large enough to accommodate anticipated recreational vehicles. (2) Should permit maneuvering into and out of spurs with reasonable ease. (3) Should provide a reasonably level and suitable camping surface under all weather conditions. Generally, camping spurs should be a minimum of 40-feet long from the edge of the roadway and approximately 10-feet wide. Various camp spur configurations have been used and the choice of a particular layout will be controlled by the overall campground layout, space restrictions, topography, and intended use of the camping pad. Construction of parking areas will be equivalent to that provided for roads.

4-04. Boat Launching Ramps. All existing parks have at least one boat launching ramp in the area. Additional launching ramps are proposed based on the visitation load furnished in Section V. Design load criteria require one launching lane per 40,000 annual visitors or the number of ramps required to prevent not more than 1 hour delay in launching or haulout. Ramps will consist of poured concrete with a rough finish for traction placed on an optimum grade of 14 percent. Lane width shall be 14 feet or where ramps are pre-cast and later placed in position, they may be 18 feet including 6-inch curbs for safety. See paragraph 4-02 for siting limits.

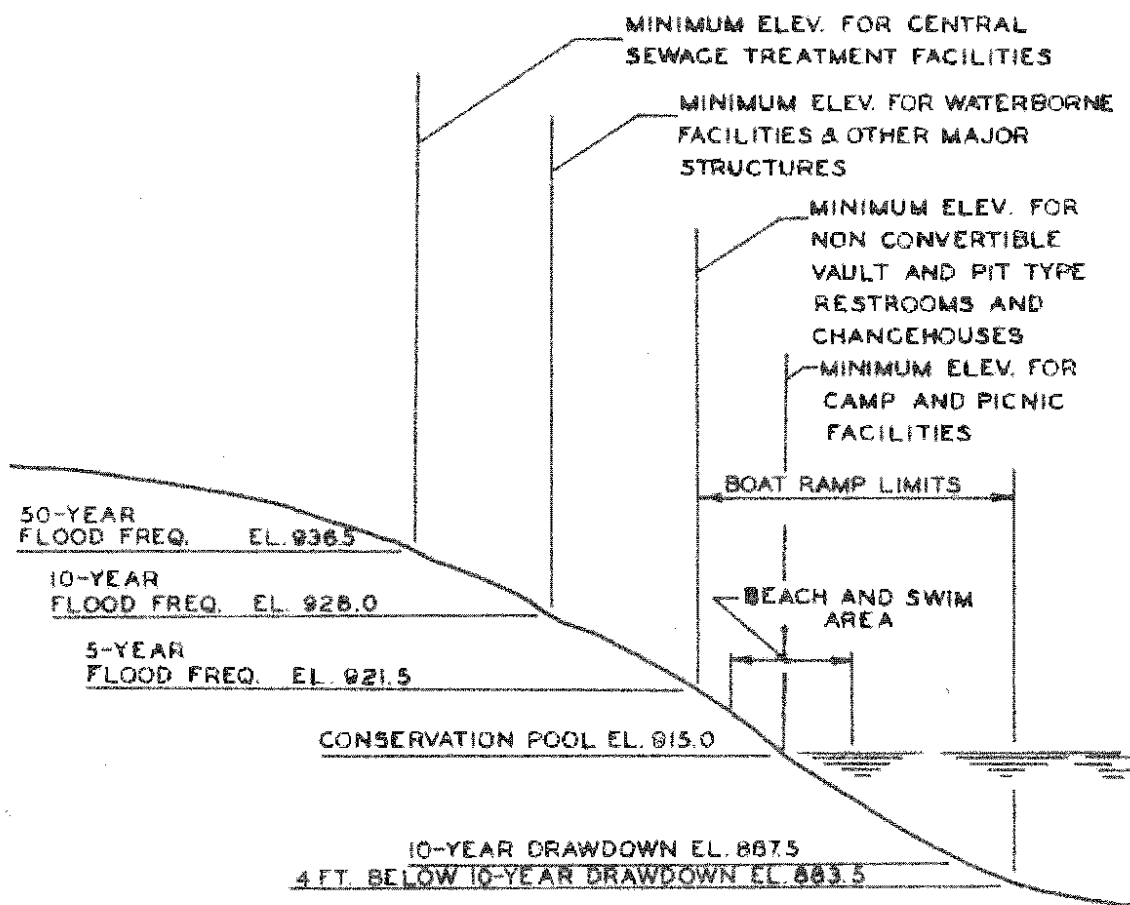


FIGURE 4-1 FACILITY SITING DIAGRAM-TABLE ROCK LAKE

4-05. Boat Docks and Mooring Facilities. Public courtesy docks and mooring facilities are not available in the parks; however, commercial facilities are available in many of the parks. Public floating courtesy docks are not practical for operation and maintenance reasons due to the frequent and wide range of pool fluctuations.

4-06. Picnic and Camp Facilities.

a. General. Visitation survey data indicates a lesser demand for day-use/picnic facilities than for camp facilities.

b. Picnic facilities.

(1) A picnic unit consists of a picnic table, fireplace with grate or charcoal grill and a small utility table. In recent years the trend for charcoal cooking has become very popular and it is estimated that picnickers and campers desire the charcoal type grill at a ratio of 3 to 1 over the fireplace. For new proposed facilities, it will be assumed that 75 percent of all picnic sites and campsites will be furnished with a charcoal type cooking grill. The grill selected for use should be of a heavy duty type, vandal resistant, and adjustable.

(2) The picnic table being used at this project is a combination concrete table and bench, 7-feet in length, built on a concrete wearing pad. The same type of table will be used at proposed sites. Table spacing should not exceed a density of 12 tables per acre or a minimum distance of 50 feet apart.

(3) Trash receptacles will be furnished at the rate of one per three to five tables.

(4) Facility load for picnic units is one unit for each 10 to 15 picnickers per day.

c. Camping facilities.

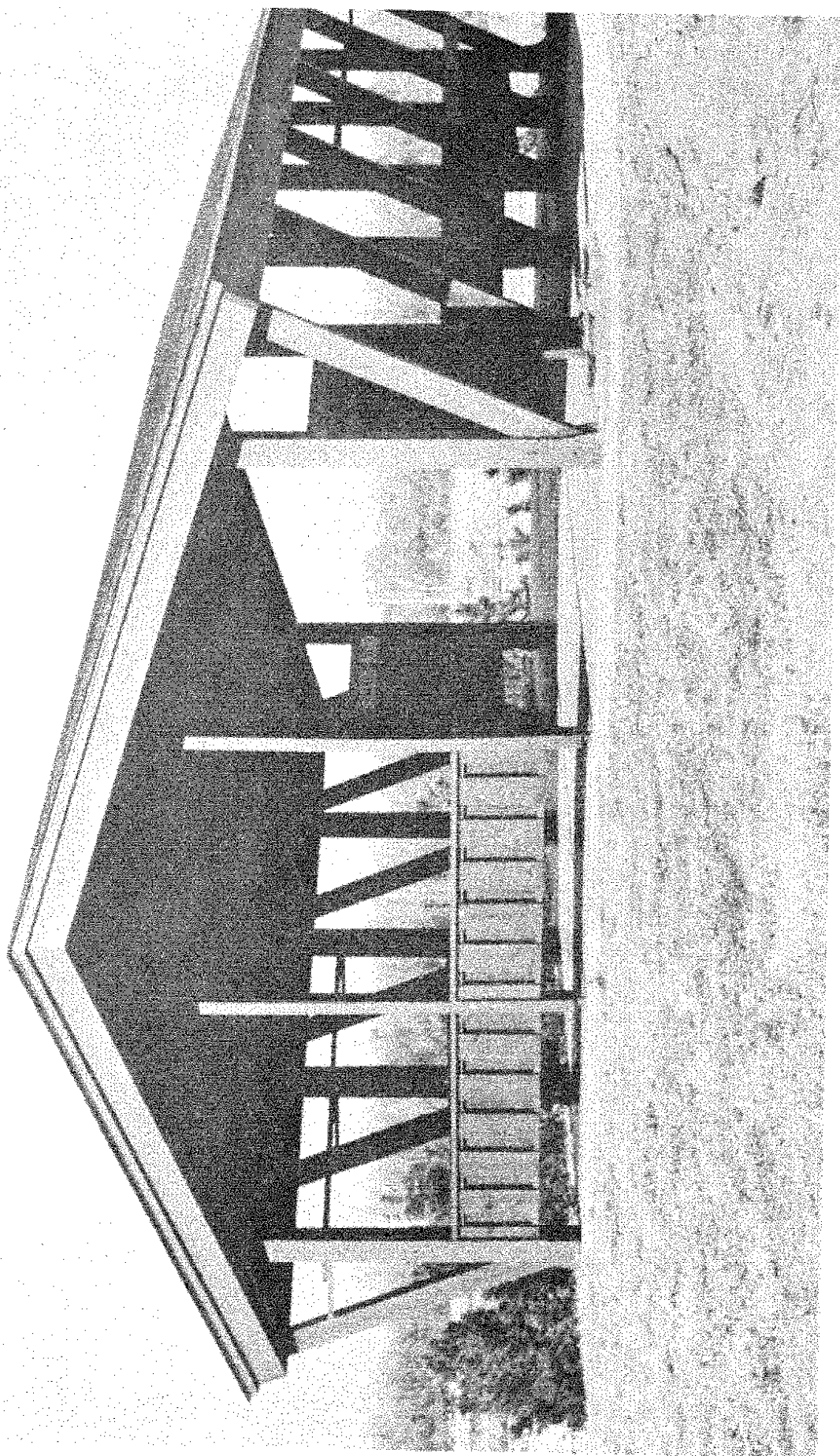
(1) A camp unit is very similar to a picnic unit with the exception of recreation vehicle parking pads and tent pads. The type of tables, fireplaces and grills will be the same as those for picnic units, see subparagraph 4-06b above.

(2) A campsite will include a suitable recreational vehicle parking pad (see subparagraph 4-03b) and approximately 50 percent of the campsites, where terrain permits, will have a 15-foot by 15-foot graded and well drained area suitable for a tent pad. Campsites should be spaced approximately 75 feet apart allowing adjustment to fit terrain and cause the minimum amount of disturbance to the forest and other vegetative cover. In an effort to satisfy the growing demand for multi-family camping, approximately 25 percent of the camp spaces in most parks have been arranged and sited for this purpose. Walk-in camping areas are proposed on a limited basis.





TYPICAL PICNIC SITE



TYPICAL GROUP PICNIC SHELTER

(3) Trash receptacles will be furnished at the rate of one for each two camping spaces.

(4) Electrical service outlets are proposed for approximately 50 percent of the existing and proposed campsites. All service lines will be placed underground up to the outlet socket panel unless conditions make installation impractical.

(5) Facility load for campsites is one campsite for each five individual campers on a normal summer weekend day.

d. Group picnic shelters. The facility load for group picnic shelters is 1 shelter for each 225 picnickers per normal summer weekend day.

e. Individual picnic table shelters. Picnic table shelters may be provided for table sites where there is no tree cover available in picnic and camp areas. Table shelters shall not be provided below the 5-year frequency pool elevation 921.5.

f. Water supply points. Water supply in the parks will be furnished mainly by deep wells and pressure systems unless a commercial water source becomes economically feasible on a park basis. Water storage tanks may be required if the water wells will not yield a sufficient supply or if the demand becomes too great for wells alone. Picnic areas should be provided with one water well or combination drinking fountain-hydrant. Camping areas should be provided with 1 water well for each 25 campsites or a minimum of 1 self-closing water hydrant for each 8 campsites. Hydrants should be placed where practicable but not more than 150 feet from farthest site.

g. Trails. Foot trails should be provided as required for hiking and to interconnect recreation areas or sites. The foot trails will be primitive in character with a treadway of natural materials constructed similar to that shown in the "Park Practice Design Manual," plates 341-B, 342-B, 343-B, and 339-B. Clearing for the trails should be a minimum of 6-feet wide and 7.5 feet for vertical clearance.

h. Amphitheater. Provide 1 for each 200 or more campers or 1 per park.

#### 4-07. Swimming Beach.

a. The popularity of swimming areas, beaches, and sunbathing space has greatly increased in recent years. This is probably related to the upward trend in camping activities. Beach areas that are already developed in the parks are highly used. Since a great number of the users of the swimming facilities are campers, experience has shown that several small beach areas located in the nucleus of a park or the active areas of parks are preferable to a few major areas for the overall project. At locations where day-use needs exist, the swimming facilities will be designed large enough to serve these needs.

b. The design of a beach and sunbathing area is a function of several factors. These include the required swimming area, underwater beach gradient, vertical pool fluctuations and the desired depth of swimming water. For the purpose of design of the facility, the pool level for establishment of the water's edge will be assumed to be the conservation pool elevation 915.0. The upper limit of the developed beach area will be governed by the 5-year frequency pool elevation 921.5 or a maximum distance of 30-feet landward of the conservation pool level. Smooth graded turfed sunbathing areas may be provided beyond the limits of the developed beach area as required. The lower limit of the developed beach area shall be 6 feet below the conservation pool. The beach and underwater development should be on a constant slope of 4 to 5 percent.

c. The developed beach will consist of a poured concrete retainer curb around the beach area, filled with sand. The curb has several functions; deflects surface run-off and retards beach erosion, defines the beach area and retains the sand filler.

d. The water area should be outlined with buoys in accordance with recommendations of the American Red Cross. Warning buoys for boaters, a minimum of two, should be provided at a minimum of 100 feet beyond the buoyed safety line defining the swimming area.

e. The facility load for swimming beaches is 25 linear feet of shoreline for each 50 swimmers at one time per normal summer weekend day. This corresponds to approximately 50 square feet per individual, while required buoyed water area has been established to be 30 square feet per swimmer.

f. Change houses will be provided only at swimming areas which receive a day-use activity. Swimming areas which are used primarily by campers do not require a change house.

#### 4-08. Sanitary facilities.

a. There are five restroom designs currently in use in the Little Rock District. Others will be developed as funds become available should they be needed.

(1) Type I vault features a double unit (men and women, two seats each) with a sealed vault.

(2) Type II vault features a double unit and sealed vault with provisions for future conversion to waterborne. The size and style of building for the types I and II features split face concrete masonry walls and concrete flat roof.

(3) Type III vault features a double unit and sealed vault with provisions for future conversion to waterborne including showers. This facility is a larger size and different style building than the other vault types. This building features split face concrete masonry units



MASONRY VAULT TYPE III RESTROOM



with a gable type wood structured roof covered with shingles. The building can be varied in appearance by using a different color scheme for the wood trim and selecting different color and style of shingles.

(4) The Waterborne type features all wall mounted waterborne fixtures and flush type sanitary facilities. This building is similar in style to the vault type I and type II but is a little larger due to a pipe chase between the mens' and womens' side of the building.

(5) The Waterborne type with showers features all wall mounted waterborne fixtures, flush type sanitary facilities and two shower stalls for each side of the building. The style of the building is similar to the waterborne type facility except the size has been enlarged to accommodate the shower facilities.

b. In areas where vault type I or vault type II restroom facilities are proposed and the architectural style of the vault type III building is desired, alternate designs for the vault types I and II may be developed or consideration may be given to using the vault type III design with the plumbing features altered as appropriate to fit the desired needs for the structure.

c. The number and type of restrooms provided in picnic areas are governed by the expected annual visitation to the area. Waterborne facilities are required in areas with an expected annual visitation of 50,000 or greater. For areas with expected visitation of less than 50,000 annual visits, vault-type restrooms may be used. One vault-type restroom is required for each 2,500 normal summer weekend day visitors.

d. Facility load for restrooms in camping areas requires 1 waterborne facility for each 50 camp spaces and additional vault type facilities for those sections of camp areas which are more than 300 feet from the nearest waterborne facility. Vault-type facilities may be provided in areas containing fewer than 50 camp spaces or where terrain would not permit provision of waterborne facilities. Where practicable, site vault facilities not more than 300 feet from farthest space.

e. Campers washhouse. Shower facilities and hand laundry facilities are desirable in most camp areas. A washhouse may not be needed if showers are available in some of the park's waterborne restrooms. However, if showers are not available in an area or if additional shower and wash facilities are needed, a washhouse may be provided to serve a minimum of 50 camp units and a maximum of 100 camp units in addition to restrooms. The facility should provide hot water, laundry tubs, showers and toilet facilities. The toilet facilities may vary to fit the needs in the park, depending on the number of facilities already existing in the area.

f. Sanitary waste stations. Waste stations will be provided for both water and land recreational activities.

(1) Trailer sanitary stations are provided for 50-200 camp spaces.

(2) Marine sanitary stations are provided in the necessary commercial boat dock areas to supply the overall project need.

(3) Sanitary waste stations are to be constructed to conform with public health laws.

g. Sewage disposal and treatment.

(1) Sewage disposal from the vault type restrooms will be collected by tank trucks periodically and discharged into the Table Rock State Park sewage oxidation lagoon.

(2) Sewage from waterborne facilities will be disposed of by sand filter or sewage treatment plant. Subsurface disposal in most areas is not feasible where a large sewage flow is expected due to the low soil permeability characteristics in this region; therefore, sewage collection systems and treatment plants will usually be required. The design of any sewage treatment system would require the use of design criteria for sewage effluent as established in the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers, Recommended Standards For Sewage Works. Based on the expected average sewage flow, raw waste load characteristics, and lake usage, design criteria for this project may be stricter than the minimum criteria furnished in the above standard. Furthermore, any treatment process must adhere to guidelines as established by the United States Environmental Protection Agency (E.P.A.).

(3) The collection of sewage by sanitary sewers will conform to CE 600.01 and TMS-814-1 specifications. Furthermore, sewer design will adhere to the parameters of the applicable Arkansas and Missouri State health regulations. The sewage treatment plant may be located in an area which will require a sewage lift station and force main as part of the collection system. Due to the preliminary nature of design effort in this updated Master Plan, proposed treatment plants were sited at the lowest elevation possible in order to reduce the requirements for lift stations. Detailed design will be accomplished in the event funds become available for construction to determine best locations for treatment plants. Sewage treatment plants will be located above the estimated 50-year flood elevation 936.5. Effluent discharge into the lake will require tertiary treatment including a clear well and backwash storage. The plant could be constructed on the site or be a package treatment system. Provisions will be made in the design and layout of the system to allow for easy plant expansion. The site itself will be planned to allow for future construction of aeration tanks and secondary settling tanks with minimum changes in piping and hydraulics of the system. Furthermore, the chlorine contact tank will be sized to facilitate its use with future expansion. With consideration given to these expansion provisions, a package treatment plant with modifications could be adopted for this system. An important aspect of the sewage loading to this plant will be the peak loading occurring during a weekend day. A surge or equalization tank will be sized at the head of the plant to provide for these shock loads. Emergency power generation equipment will be necessary for the treatment plant as per the Federal Environmental Protection Agency requirements. The discharge points for the discharge of effluent into the lake will be located downstream from the swimming areas within the same park area. The discharge piping will be a gravity or force main system, with the invert elevation of the discharge located 5 feet below the top of the power pool.

(4) Solid waste management in parks is an important consideration. Solid waste for most of the areas will be deposited in containers in the activity areas and collected daily. The daily waste collection will be taken to a main collection area which will usually be located near the entrance of the park and deposited in a large commercial type container. The commercial container will be periodically transported by truck to a sanitary landfill site.

4-09. Play area. Where practical, small play areas will be provided (approximately 100' by 100') in camp areas of 25 spaces or more with equipment to consist of permanently installed slides, climbers, swing sets and other similar equipment. The equipment should be vandal resistant as much as practicable. Play areas may be provided at day-use locations. Fencing or curbing filled with sand or wood chips as appropriate will be used for proper delineation and identification.



## SECTION V

### REGIONAL FACTORS INFLUENCING VISITATION AND RECREATION DEVELOPMENT

#### 5-01. General.

a. Recreational development is directly related to project visitation. Therefore, accurate visitation surveys from which visitation projection calculations can be made are valuable in planning and developing a project. Information such as visitor count, length of stay, activities participated in, and distance traveled is recorded for each automobile coming into the park being surveyed. Surveys are conducted on one weekday and one weekend day in selected Table Rock Lake parks in the spring, summer, and fall seasons of each year. This information is then sent in to the District Office for analysis where it is computerized. The computer stores the information and later applies it to monthly traffic counts recorded in each park on the lake to establish activity occasions for each activity. A further discussion of recorded visitation and how it is used is found in paragraph 5-08a.

b. The Table Rock Lake Zone of Influence has been determined from visitor surveys to include those counties situated with at least 50 percent of their population within 250 highway miles of the lake. The zone includes counties in Missouri, Arkansas, Oklahoma, and Kansas, and is shown on Plate 1. This zone represents the area in which approximately 75 percent of the day-use visitors and 60 percent of the overnight visitors to Table Rock reside. It therefore has a direct influence upon the use of the lake and its parks. Table Rock Lake, its public and commercial facilities, and the scenic qualities of the area are nationally advertised in vacation and sporting publications. The lake is well suited for the types of recreational development for which it is being utilized. Further project development as proposed will not adversely affect the integrity of the resource characteristics. Development plans and management practices will continue to be periodically evaluated to assure proper resource use as well as the validity of planning assumptions utilized in this plan. A number of diverse factors were studied in preparation of this master plan. The following is a discussion of those factors influencing planning and management of Table Rock Lake.

5-02. Demographic. Population, per capita income, and total income within the Table Rock Lake Zone of Influence is projected to increase through the year 2020 as shown in Table V-1. This zone includes the urban areas of Kansas City and St Louis in Missouri, as well as Tulsa and Oklahoma City, Oklahoma; Little Rock, Arkansas; and Memphis, Tennessee. Other cities of significant size within the zone of influence include Springfield, Joplin, Jefferson City, and Columbia, Missouri; Fort Smith, Jonesboro and Pine Bluff, Arkansas; and Muskogee, Oklahoma.

TABLE V-1

POPULATION - INCOME PROJECTIONS FOR THE 75 PERCENT VISITATION  
ZONE OF INFLUENCE - TABLE ROCK LAKE

Year	Estimated Population	PCPI (1969 dollars)	Total Personal Income for Zone (1,000,000's)	Growth Factor
1975(base year)	9,217,089	\$3,427	\$31,588	1.00
1980	9,657,286	4,007	38,700	1.225
1990	10,044,551	5,156	53,835	1.704
2000	11,000,239	6,933	76,263	2.414
2010	11,500,428	9,075	104,310	3.302
2020	12,026,022	11,733	141,100	4.467

a. The tourism generated by Table Rock and its surrounding attractions is the basis for the economic and population growth of the immediate area of the lake.

b. Population density varies from 10,000 persons per square mile in St. Louis proper to only a few per square mile in many rural counties throughout the zone. Birth and mortality rates do not vary significantly from the average national rates. Population within the zone continues to grow with the most significant growth occurring in the cities. This is due to the younger people moving from rural to urban areas, and workers continuing to move from farming to industrial jobs.

5-03. Area standard of living. Per capita income within the Table Rock Lake Zone of Influence is steadily increasing as it has for the past twenty years. The most rapid economic growth has occurred in Arkansas where the economy increased about 50 percent during the 1960's. All four States within the zone are experiencing more economic contribution by industry with Kansas remaining the only State of the four in which agriculture is not on a decline. Kansas City and St. Louis, both within the zone are important trading centers for large regions. They rank among the foremost in the nation as grain and cattle markets. Food processing, aerospace, transportation equipment, pet foods, prefab houses, mobile homes, greeting cards, tires, paint, appliances, fuels, and chemical processing are among the major types of manufacturing playing major roles in the economy of the zone. Agriculture makes a substantial contribution to the zone's economy with livestock, dairy, hogs, poultry, soybeans, cotton and rice production among the most influential. Tourism is becoming increasingly important in Arkansas and Missouri with contributions of millions of dollars annually to each State's economy. The State of Missouri ranks among the top 10 in banking and finance. Public education programs have been below average within the zone; however, progress is being made in this area. All four states within the zone have advanced education programs with numerous state supported colleges and universities. Cultural opportunities vary within the Table Rock Zone of Influence, from Ozark folk culture found throughout northern Arkansas and southern Missouri to professional symphony and ballet

companies as well as concert facilities, professional sports teams, museums, art galleries, and other such activities available in Kansas City and St. Louis.

5-04. Accessibility. Visitors from the north may reach Table Rock Lake by way of US Highway 65 to the east end of the lake or Missouri State Highway 39 off US 60 to the west end. Both US Highways 60 and 65 serve Springfield, Missouri. Visitors from St. Louis may reach Springfield on Interstate Highway 44 while visitors from Kansas City may travel State Highway 13. Visitors from all points south may travel US 65 to the east end of the lake or take US Highway 62 off US 65 about 5 miles north of Harrison to the west end of the lake. The lake is surrounded by State and county roads, making access possible at many points in any given area of the lake. There are approximately 290 subdivisions around the lake which add to the accessibility to minor points. Missouri State Highway 76 borders Table Rock Lake on the north while Missouri State Highway 86 borders it on the south side. Missouri State Highway 13 crosses the main body of the lake at Kimberling City, Missouri, about 15 miles upstream of the dam, while State Highway 39 crosses it another 27 miles upstream. Missouri State Highway 86 crosses the lake adjacent to Long Creek Park at the eastern end of the lake. It also crosses the Kings River arm just west of Carr Lane, Missouri, and again at Eagle Rock Park at the east end. There are also crossings at Beaver Park on Arkansas State Highway 187 in the upper reaches of the lake, and at Cape Fair, Missouri, on State Highway 76 on the James River arm of the lake. There are crossings in the upper reaches of several creeks on county and state roads.

5-05. Climate. Climate within the Table Rock Lake Zone of Influence is temperate, with summer extremes lasting for longer periods throughout southern Arkansas, and winter temperatures being more influential in the zone's northern reaches in Missouri. Extremes may vary from lows around 0° F usually caused by Canadian air masses to highs above 100° occurring from southern Arkansas to central Missouri during the summer months. Extreme temperatures may occur for short periods of time at any location within the zone. Rainfall averages vary from 40 to 48 inches throughout the zone.

5-06. Competing recreational projects.

a. There are 33 other completed Corps of Engineers lakes and 13 river navigation pools offering similar recreational opportunities within 250 highway miles of Table Rock Lake. The total 1974 visitation to these projects was 61,221,400. A list of these projects and their 1968 and 1974 visitations are shown on Table V-2. Despite this competition, annual visitation to Table Rock has increased from 3,931,800 in 1968 to 6,188,100 in 1975. Other Corps of Engineers projects currently authorized or under construction are shown in Table V-3.

TABLE V-2

VISITATION TO CORPS OF ENGINEERS LAKES AND NAVIGATION POOLS  
WITHIN 250 HIGHWAY MILES OF TABLE ROCK LAKE

Lake	1968 Visitation	1974 Visitation
Blakely Mountain	2,186,000	2,137,800
Ozark	Not complete	543,100
Arkansas River Pools 1-6	Not complete	2,080,200
Arkansas River Pools 7-9 & 13	Not complete	871,600
Millwood	1,357,100	2,557,500
DeGray	Not complete	1,529,100
Narrows	773,400	1,885,500
Nimrod	320,000	493,500
Blue Mountain	265,000	262,500
Dardanelle	1,033,600	2,325,600
Greers Ferry	2,006,600	3,423,600
Beaver	1,781,800	3,478,500
Bull Shoals	2,781,300	3,695,300
Norfork	1,767,100	3,196,900
Clearwater	608,900	861,300
Wappapello	1,319,600	2,120,600
Pomme de Terre	1,476,200	1,724,700
Stockton	Not complete	1,665,400
Hulah	498,700	578,200
Oologah	1,092,600	1,219,900
Keystone	1,833,400	3,674,200
Fort Gibson	2,406,500	4,083,100
Tenkiller Ferry	1,465,500	5,001,700
Eufala	2,312,900	4,562,400
Wister	686,800	999,400
Pomona	776,000	1,056,700
Webbers Falls	Not complete	206,700
Robert S. Kerr	Not complete	658,600
Broken Bow	Not complete	1,037,900
Pine Creek	Not complete	492,900
John Redmond	765,100	441,200
Toronto	332,000	513,200
Fall River	386,200	375,800
Elk City	661,800	504,300
Heyburn	289,000	589,100
W. D. Mayo L&D	Not complete	89,600
Chouteau L&D	Not complete	184,500
Newt Graham L&D	Not complete	99,300
Total		61,221,400

TABLE V-3

CORPS LAKES AND NAVIGATION PROJECTS UNDER  
CONSTRUCTION WITHIN 250 HIGHWAY MILES OF TABLE ROCK LAKE

Arkansas	Kansas	Missouri	Oklahoma
DeQueen	Clinton	Smithville	Kaw
Gillham	Hillsdale	Meramec Park	Copan
Dierks	Melvorn	Harry S. Truman	Birch
	Big Hill		Skiatook
			Clayton
			Lukfata
			Hugo

b. There are many lakes within 250 highway miles of Table Rock owned by other Federal and State agencies, private power companies, and municipalities which contribute significantly to the area's recreational opportunities.

5-07. Visitation - Experienced and projected.

a. Experienced visitation. Visitation data collection began on Table Rock Lake in 1960 when a total of 2,407,900 visitors was recorded. The yearly attendance has increased as shown in Table V-4, with the years 1963, 1964, 1966, 1971, 1973, and 1974 showing decreases from previous years while the remaining years showed small to significant increases. The lake's highest attendance was 6,328,300 recorded in 1972. Visitation then dropped to 5,754,800 in 1973 and 5,591,000 in 1974 probably due to the extreme high water conditions which existed during the spring and early summer of both years.

TABLE V-4

## ANNUAL ATTENDANCE FROM 1960 TO 1975

1960	-	2,407,900
1961	-	3,360,900
1962	-	3,501,145
1963	-	3,258,900
1964	-	2,872,300
1965	-	3,331,600
1966	-	3,217,000
1967	-	3,377,000
1968	-	3,931,800
1969	-	4,876,800
1970	-	6,084,200
1971	-	5,552,900
1972	-	6,328,300
1973	-	5,754,800
1974	-	5,591,000
1975	-	6,188,100

The average monthly breakdown by percent of the total annual visitation is shown in Figure 5-1 below. These percentages were derived from monthly visitation data from 1972 through 1975.

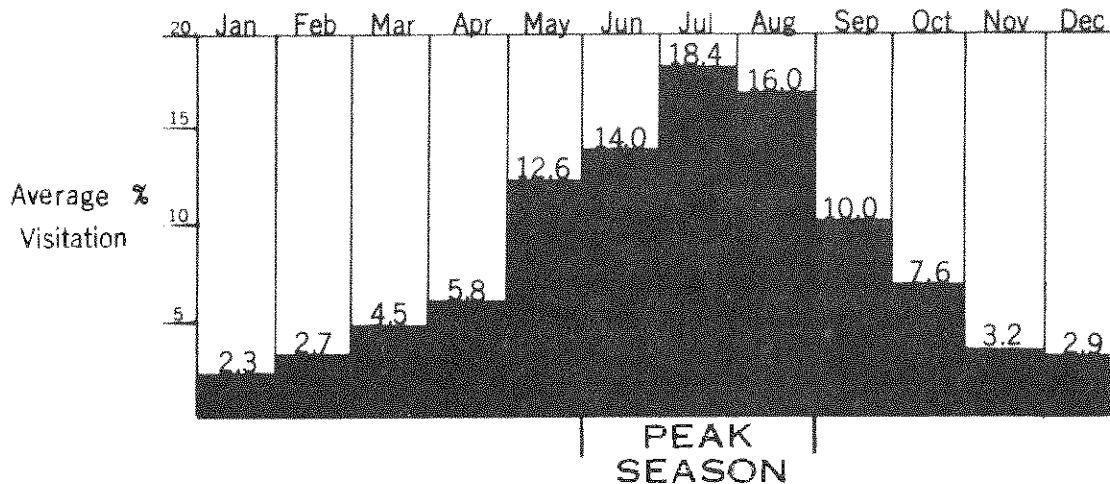


FIGURE 5-1 ANNUAL VISITATION DISTRIBUTION BY MONTH

The 1975 user survey of park visitors on Table Rock Lake shows:

Percent of Summer Park Users on Weekdays - 53%

Percent of Summer Park Users on Weekend - 47%

The annual distribution of recreation activity by the percent of visitors participating in each activity is shown in Figure 5-2. These percentages represent the average participation rates for years 1972-1975. They will be referred to as participation rates in paragraph 5-08.

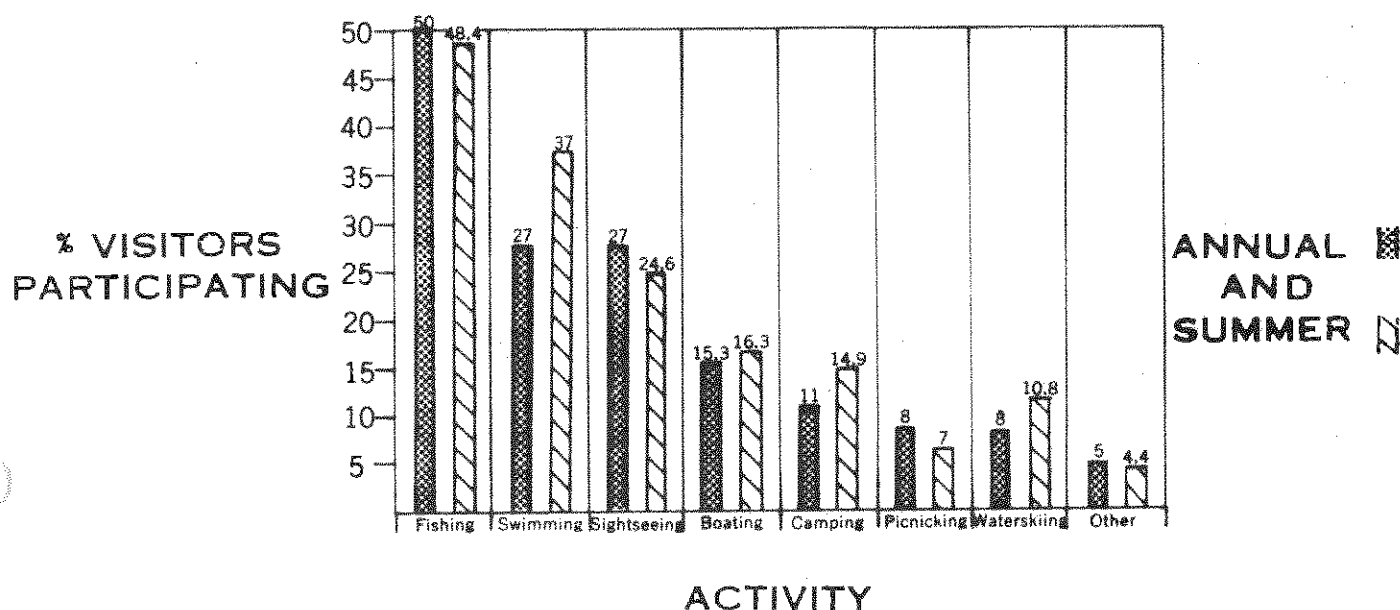


FIGURE 5-2 DISTRIBUTION OF RECREATION ACTIVITY

b. Projected visitation.

(1) Method of projection. Future visitation projections were based upon the relationship between personal income and recreation participation within the zone of influence. This method was derived by using ER 1120-2-403 and Technical Report No. 2 (Sacramento Study) as a guide. The zone of influence and the relationship of its total income to Table Rock Lake visitation have been established from past visitor surveys. A base year visitation rate was therefore derived based on the population of the total zone. This established a direct relationship between visitation and the total zone rather than breaking visitation rates down into smaller mileage zones. Total income is the area's population times the area's per capita personal income. Therefore the rate of growth of the total income takes into account population growth as well as increases in individual income levels.

(2) Basic assumptions. It was assumed in projecting Table Rock visitation that outdoor recreation demand will continue the same general relationship to personal income growth as it has in the past. It was also assumed that approximately 75 percent of Table Rock Lake visitors will continue to emanate from within the zone of influence made up of the counties within which at least one-half their population lies within 250 highway miles of the lake.

(3) Procedure.

(a) Based upon past recreation user surveys, the Table Rock Lake zone of influence was determined to include those counties which have at least one-half of their population residing within 250 highway miles of the lake. The user surveys revealed that approximately 75 percent of the Table Rock Park visitors reside within this zone.

(b) Population and per capita personal income for the zone of influence were derived from the 1970 Census of Population (for Arkansas, Missouri, Oklahoma, and Kansas) and OBERS Projections, Economic Activity in the United States, Vol 3, 1972. The zone of influence includes Water Resources Subareas 1111-Lower Arkansas, 802-Mississippi-St. Francis, 1101-White, 1029-Osage-Gasconade, 1030-Missouri-Kansas City, and parts of 1107-Verdigris-Neosho, 804-Ouachita, 1110-Lower Canadian, 714-Mississippi-Kaskaskia-St. Louis, 1114-Lower Red. The populations derived from the census tabulations were used to form a data base for the counties in each subarea. The data was then applied to the applicable data from the OBERS Projections to derive per capita personal income.

(c) Population was multiplied by the per capita personal income for each sub-area to find each sub-area's total income. These totals were then added to find the total income for the zone of influence (see Table V-1).

(d) The amount of total income increase for the years 1980, 1990, 2010, and 2020 was derived by using 1975 as the base year (see Table V-1), since 1975 is the latest full year for which visitation is recorded.

(e) The 1975 visitation was then multiplied by the growth factor for each year in order to project the visitation at the same rate of growth (see Table V-5).

(f) The carrying capacity of the project has been determined to be limited by the park lands available for development. Picnickers and other day users are dispersed throughout the lake area and may or may not require facilities while camping is allowed only in developed parks.



In the summer picnicking participation decreases proportionate to total park visitors while camping participation increases. The picnic units provided are supplemented by the units in the park picnic shelters when they are not in use by groups. Camping is therefore the most significant activity influencing park development on Table Rock Lake, so ultimate development of present parks will be limited by the maximum amount of camping visitation that can be accommodated. There are presently 1,426 campsites developed on Table Rock including the Corps' 21 developed parks as well as Table Rock State Park and Big Bay and Shell Knob Park developed and operated by the U.S. Forest Service. Since a campsite can accommodate 5 campers per day, a maximum number of 7,130 campers can be accommodated on Table Rock with present development. Based on 1975 visitation reports, the average summer weekend day camping visitation for 1975 was 7,956. This represents 826 more campers per average summer weekend day than the project is equipped for. There is therefore an immediate need of 166 campsites. This is about 8 campsites for each of the Corps' developed parks, therefore, Table Rock Lake parks are being slightly overused. Tables V-10 and V-11 show facility requirements.

TABLE V-5

VISITATION PROJECTIONS BASED ON TOTAL INCOME GROWTH  
TABLE ROCK LAKE ZONE OF INFLUENCE

Year	Growth Factor (See Table V-1)	Projected Visitation
1975 (base year)	1.00	6,188,100
1980	1.225	7,580,400
1990	1.704	10,544,500
2000	2.414 ✓	14,938,000
2010	3.302	20,433,100
2020	4.467	27,642,200

(4) Evaluation of results. Since it is impossible to predict how unforeseen events may affect recreation participation, all projections must be based on factors which can be identified as having influenced past visitation. The results from the projections based on the assumption that visitation will increase proportionately to the total personal income within the zone of influence appear to be in line with recreation use trends on Corps of Engineers recreation facilities. However, since the relationships between these casual factors and recreation use may change significantly with time, visitation projections decrease in reliability over longer periods from the base year. Three other important factors which were considered for their possible effects on visitation were fuel cost and availability, competition of public and private recreation facilities, and the carrying capacity of Table Rock Lake.

(a) Fuel cost and availability. The energy crisis of 1974 was expected to have a great impact upon recreation activity. Visitation was down from 5,754,000 in 1973 to 5,591,000 in 1974, is considered to

and the availability of fuel for travel is considered to have been one of several factors that contributed to the decline. The 1975 visitation was back up to 6,188,100. Therefore, it was concluded no adjustment should be made to visitation to allow for fuel costs and availability.

(b) Competition of public and private recreation facilities.

There are several large water based facilities within the Table Rock Lake zone of influence as shown on Plate 1. There is no indication that the influence of existing private or public lakes upon Table Rock visitation will change in the future. The only large nearby Corps project under construction is Harry S. Truman Dam and Reservoir being built by the Kansas City District about halfway between Kansas City and Table Rock. Truman's zone of influence will include a large portion of the Table Rock zone. It will no doubt receive a large amount of visitation from the Kansas City area where a lot of Table Rock's visitation presently originates. However, Stockton Lake, immediately south, Pomme de Terre Lake immediately southeast, and privately owned Lake of the Ozarks, immediately east of Truman Dam are already drawing visitors from the same area, and the visitations of these lakes are more likely to be directly affected than that of Table Rock. It should also be pointed out that new lakes in the zone of influence have never had a large impact on Table Rock visitation in the past. This is most likely due to the fact that there is a continually increasing outdoor recreation demand. Therefore, in most cases new lakes relieve much of the additional pressure an existing lake would otherwise have had to bear. Also, a new lake tends to generate some demand that would not exist had the new lake not been constructed. Other than Lake of the Ozarks, already mentioned, there are no private lakes existing or planned that will impact on the Table Rock visitation. For the above reasons, no adjustment was made to compensate for competing projects.

(c) Carrying capacity. Two levels of carrying capacity were determined for development of Table Rock Lake. One level was determined based on optimum development of existing and proposed designated park lands. It was determined that if developed to optimum, the presently designated park lands can accommodate park visitation as projected to the year 1982 as shown in Figure 5-3. The other level was determined based on carrying capacity of the water area. It was determined that the water area could accommodate visitation projected to the year 1992 provided the required supporting park lands could be made available for development. In light of the above, project carrying capacity is a factor limiting visitation. If no other park lands are made available project visitation should reach approximately 7,924,000 which is projected to occur in 1982. If supporting park lands can be made available, Table Rock Lake should support a visitation of 11,230,800 which is projected to occur in the year 1992. A more detailed account of the project carrying capacity is found in paragraph 5-09.

5-08. Facility Needs for Anticipated Attendance. Needs for recreational facilities were derived by applying seasonal percentages and activity participation rates as discussed below to the expected future visitations as shown in Table V-5.

a. Anticipated Attendance and Participation Rates. Table Rock visitation is computerized monthly by traffic counts collected by project ranger personnel. The computer identifies the number of activity occasions represented by each park or access road traffic counter reading. An activity occasion is defined as the participation of one person in one activity in one day. A person participating in two activities in one day is counted as two activity occasions. A person participating in one activity two times in one day is counted as one activity occasion. These activity occasions are computed as a result of past visitor surveys in which the total number of activity occasions recorded are converted to percentages of the total number of persons surveyed. These percentages are defined as participation rates and are used to indicate what proportion of the future visitors are expected to participate in the various activities. Expected visitation for Table Rock by activity for the average summer weekend day for projected years was derived as follows.

(1) Summer season participation rates were established on the total project by adding the summer months activity occasions for each activity and dividing each total by the three summer months visitation. Computer printouts of activity occasions for years 1972 through 1975 were utilized to compute average participation rates for each activity. These are shown in Table V-6 along with the average annual participation rates.

(2) The average summer weekend day visitation was computed for future years by extracting 48.4 percent (the average percent total visitation for years 1972-1975 occurring in summer) of projected visitation. This summer visitation was then divided by 13 (the number of summer weeks) to determine the average summer week visitation. This figure was then multiplied by 47% which according to visitor surveys is the percentage of summer visitation occurring on weekends. Since the surveys show that weekend visitation is evenly distributed on Saturday and Sunday, the average summer weekend visitation was divided by two to determine the average summer weekend day visitation.

TABLE V-6

AVERAGE PARTICIPATION RATES, ANNUAL AND SUMMER SEASON,  
1972 - 1975 TABLE ROCK LAKE

Activity	Annual	Summer Season
Sightseeing	.27	.246
Fishing	.50	.484
Swimming	.27	.370
Camping	.11	.149
Picnicking	.08	.070
Boating	.15	.163
Skiing	.08	.108
Other	.05	.044

(3) The average summer participation rates were then applied to the average summer weekend day visitation to determine the expected activity occasions for each activity on the average summer weekend day.

b. Projected recreational use. Recreation demand is expressed in terms of activity occasions for projected average summer weekend day, summer season, and annual activities in Tables V-7, V-8, and V-9, respectively. Summer and annual activity occasions were calculated using the same method as for the average summer weekend day.

TABLE V-7

PROJECTED AVERAGE SUMMER WEEKEND ~~DAY~~ USE IN ACTIVITY  
OCCASIONS - TABLE ROCK LAKE

Activity	1975*	1980	**Optimum based on Available Park Land	1990	***Optimum based on Water Surface	2000
	(base yr)					
Sightseeing	13,135	16,315	17,055	22,695	24,174	32,151
Fishing	25,845	32,100	33,555	44,652	47,563	63,257
Swimming	19,575	24,540	25,652	34,135	36,360	48,358
Camping	7,956	9,882	10,330	13,746	14,642	19,474
Picnicking	3,738	4,642	4,853	6,458	6,879	9,149
Boating	8,704	10,810	11,301	15,038	16,018	21,303
Skiing	5,767	7,163	7,488	9,964	10,613	14,115
Other	2,350	2,918	3,050	4,059	4,324	5,751

\*Based on recorded summer visitation.

\*\*Occurring in 1882.

\*\*\*Occurring in 1992.

TABLE V-8

PROJECTED SUMMER SEASON USE IN ACTIVITY OCCASIONS  
TABLE ROCK LAKE

Activity	1975*	1980	**Optimum based on Available Park Land	1990	***Optimum based on Water Surface	2000
	(base yr)					
Sightseeing	679,589	902,553	943,462	1,255,470	1,337,305	1,778,578
Fishing	1,473,866	1,775,754	1,856,243	2,470,112	2,631,121	3,499,316
Swimming	1,126,233	1,357,498	1,419,029	1,868,309	2,011,394	2,675,097
Camping	436,177	546,668	571,447	760,427	809,994	1,077,269
Picnicking	221,917	256,824	268,465	357,248	380,534	506,099
Boating	494,871	598,033	625,140	831,877	886,101	1,178,489
Skiing	328,893	396,243	414,203	551,182	587,110	780,839
Other	135,239	161,432	168,749	224,556	239,193	318,120

\*Based on recorded summer visitation.

\*\*Occurring in 1882.

\*\*\*Occurring in 1992.

TABLE V-9

PROJECTED ANNUAL USE IN ACTIVITY OCCASIONS  
TABLE ROCK LAKE

Activity	1975* (base yr)	1980	**Optimum based on Available Park Land	1990	***Optimum based on Water Surface	2000
Sightseeing	1,670,787	2,046,708	2,139,480	2,847,015	3,032,640	4,033,260
Fishing	3,094,050	3,790,200	3,962,000	5,272,250	5,616,000	7,469,000
Swimming	1,670,787	2,046,708	2,139,480	2,847,015	3,032,640	4,033,260
Camping	680,691	833,844	871,640	1,159,895	1,235,520	1,643,180
Picnicking	495,048	606,432	633,920	843,560	898,560	1,195,040
Boating	952,967	1,167,382	1,220,296	1,623,853	1,729,728	2,300,452
Skiing	495,048	606,432	633,920	843,560	898,560	1,195,040
Other	309,405	379,020	396,200	527,225	561,600	746,900

\*Based on recorded annual visitation of 6,188,100.

\*\*Occurring in 1882.

\*\*\*Occurring in 1992.

c. Anticipated demand for specific recreation activities. Appropriate recreation planning and design criteria as set forth in EM 1110-2-400, dated 1 September 1971, and discussed in Section IV were applied to the average summer weekend day activity occasion projects contained in Table V-7 in order to determine immediate and anticipated demand for specific types of recreation facilities. Table V-10 is a listing of these facilities, design criteria, and 1975 facility requirements, inventory, and deficiencies. Table V-11 shows projected facility requirements for future years which were also calculated by applying the design criteria to projections in Table V-7. Primary facilities are basically assigned on a project wide basis while supporting facilities such as restrooms, water facilities, etc., are based on the needs of individual sites.

TABLE V-10

FACILITY DESIGN CRITERIA AND INVENTORY, 1975  
TABLE ROCK LAKE

Facility	Design Criteria	1975 Requirements	1975 Inventory	1975 Deficiencies
<u>Primary:</u>				
Picnic Tables	1/ea 10-15 picnickers/ average summer weekend day	250	**156	94
Group Picnic Shelters	1/ea 225 picnickers/ average summer weekend day	17	9	8
Camping Units	1/ea 5 individual campers/average summer weekend day	1,591	**1,393	198
Swimming beaches	25 lineal ft of shore- line/50 swimmers and 30 sq. ft. of buoyed water area/swimmer/ average summer weekend day	9,879 lin. ft. of shoreline and 592,710 sq. ft. of buoyed area	Approx. 6,000 lin. ft. of shoreline & 350,000 buoyed area	Approx. 3,900 lin. ft. of shoreline & 242,700 sq. ft. of buoyed area
Launching Lanes	1/40,000 annual visi- tors, or minimum of 1/40 boat launchings per average summer weekend day at any one area or required to prevent not more than 1 hour delay	155	**95	60
<u>Supporting:</u>				
Changehouses	1/ea park receiving substantial day use swimming visitation	6	3	3
Restrooms	Waterborne restrooms for areas having over 50,000 visitation and vault with less than 50,000.			
Picnic Areas	1/ea 2,500/average summer weekend day			
Camping Areas	Areas over 50 campsites - 1 waterborne restroom/ 50 sites with addi- tional vault type for those sites over 200 ft from waterborne - Areas less than 50 sites, vault restroom not more than 300 ft from each site. Campers washhouses may be provided to serve a minimum of 50 camp units and a maximum of 100 camp units.	*58	***48	10
Swimming Areas	Waterborne restrooms at beach with 600 or more swimmers/peak day and vault restrooms with less than 600 swimmers/ peak day--1/75,000 annual recreation day users			
Sanitary waste dumping stations - Trailer	1/ea 50-200 camp spaces. Second station for areas exceeding 200 camp spaces	20	18	2

\*Computed on a by park basis.

\*\*Includes Big Bay and Shell Knob operated by U.S. Forest Service.

\*\*\*Does not include 17 existing wooden restrooms most of which are planned for replacement.

TABLE V-11  
FACILITY REQUIREMENTS

Facility	1980	**Optimum based on Available Park Land		***Optimum based on Water Surface		2000
		1990	1990	1990	1990	
Picnic Tables	309	323	431	459	610	
Group Picnic Shelters	21	22	29	31	41	
Camping Units	1,976	2,029	2,749	2,927	3,895	
Beaches -						
Lin. ft. of shoreline/	12,270/	12,822/	17,068/	18,177/	24,179/	
sq. ft. water surf.	736,200	76,933	1,024,050	1,090,613	1,450,740	
Launching Ramps*	190	199	264	281	373	
Restrooms	81	85	113	120	160	

\*Based on one ramp/40,000 annual visitors, an additional 20 launching sites have been developed by subdivision, counties, and resort leases under real estate outgrants.

\*\*Occurring in 1982.

\*\*\*Occurring in 1992.

d. Comparison of projections - Missouri and Arkansas SCORP'S.

(1) SCORP display of facility needs. Table Rock Lake is located in Planning Region Number 17, Missouri and Planning Region Number 1, Arkansas. Table V-12 shows the needs of these two regions as shown in the Missouri and Arkansas Statewide Comprehensive Outdoor Recreation Plans. Recreational needs are given as the difference in supply and demand expressed in activity occasions. These data are presented for purposes of comparison only.

(2) Visitation Projection Based on SCORP. Figure 5-3 contains a visitation projection curve based on recreational demand data from the Missouri and Arkansas SCORP's which was derived as follows:

Region 17, Missouri demand and Region 1, Arkansas demand was tabulated for the activities which can be accommodated on Table Rock Lake. A rate of increase from base year 1975 was established for 1980 and 1985. The average per capita use rate to Table Rock from within the zone of influence (75 percent of total visitation/zonal population for same year) was then found for the years 1968 through 1975. This average per capita use rate was multiplied by the rate of demand increase explained above to derive a per capita use factor for the zone of influence. This per capita use factor was applied to the zone of influence population to arrive at the visitation from the zone of influence. Total project visitation was then determined by dividing this figure by 75 percent (since the visitation from the zone of influence represents 75 percent of total project visitation).

The SCORP visitation projection curve was plotted on the visitation projection graph in Figure 5-3 for comparison to the visitation projection curve based on zonal total income. Using this method a project total visitation of 7,597,100 was projected for 1980 and 10,049,425 was projected for 1985.

TABLE V-12

REGIONAL NEEDS AS PRESENTED IN MISSOURI AND ARKANSAS  
STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLANS

Region 17, Missouri as presented in 1976 Draft, Missouri SCORP

Activity	1972 Supply	1970	1975	1980	1985
Sightseeing (act days)		707,000	859,000	1,029,000	1,219,000
Fishing (acres)	93,226	+78,462	+72,101	+64,657	+55,990
Swimming (sq ft)	72,785	69,239	76,215	85,715	99,215
Camping (acres)	452	+362	+304	+226	+124
Picnicking (acres)	541	+9	457	704	949
Boating (acres)	93,331	+50,109	32,331	+13,072	10,039

+ indicates surplus

Region 1, Arkansas as Presented in 1974 Arkansas SCORP

Activity	1975	1980	1985	1990
Sightseeing (act occ)	1,161,746	1,300,763	1,522,649	1,763,168
Fishing (acres)	13,541	15,696	18,382	21,555
Swimming (sq ft)	0	0	0	0
Camping, Tent(sites)	141	195	248	315
Camping, Group (beds)	217	262	305	362
Camping, Trailer (sites)	0	0	0	0
Picnicking (sites)	1,236	1,436	1,660	1,915
Boating (acres)	1,116	1,843	2,871	4,139



# EXPERIENCED AND PROJECTED VISITATION

## FOR TABLE ROCK LAKE

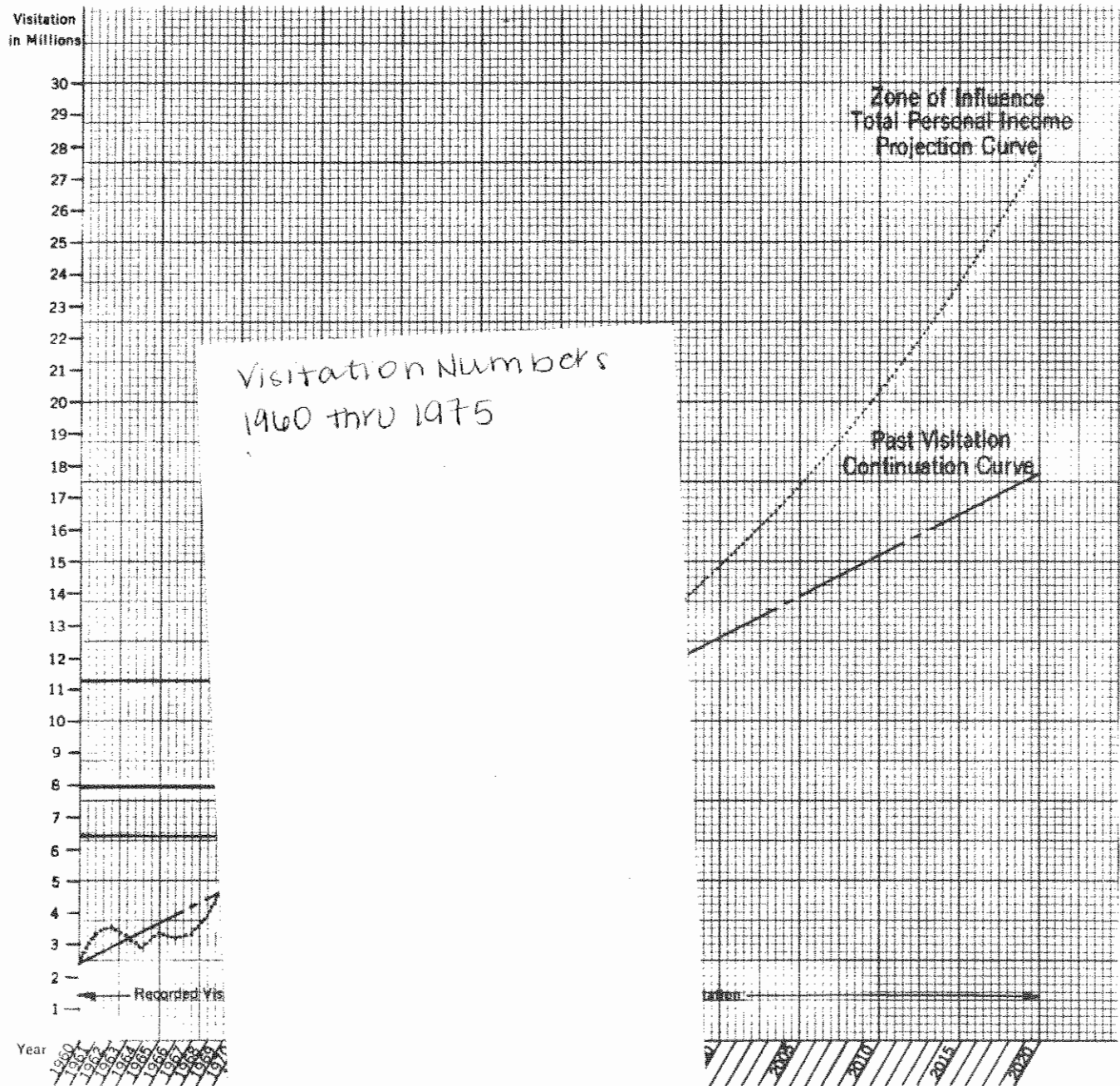


FIGURE 5-3

5.09. Availability of project lands and water to accommodate anticipated recreational demand. The main factor which will constrain Table Rock Lake visitation growth is the amount of available park acreage. Park lands should never exceed that needed to support water area capacity or the water area will become overcrowded. However, if park lands were available to support the optimum use of the lake water area capacity, approximately 50 percent more visitation could be accommodated than with optimum development of presently designated park acreage. The following is a discussion of the two levels of calculated project carrying capacity, one of which was based on available park land, and the other based on water area capacity.

a. Available park lands. Project carrying capacity based on available park land was calculated to be approximately 7,924,000 occurring in 1982 as shown in Figure 5-3. This was determined by calculating optimum park use based on the maximum camping visitation which can be provided for in the parks if developed as shown in this master plan. Optimum park use was based on camping because it is the most significant activity influencing park development. While picnicking, boating, fishing, and other activities can be pursued at undeveloped areas and adjacent to private development, camping is confined to parks. Picnicking participation decreases proportionate to total park visitors in the summer while camping participation increases. The optimum number of campsites which can be developed in the present park lands is 2,029. This includes development of the Corps' 21 existing parks as well as Table Rock State Park, the U.S. Forest Service's Big Bay and Shell Knob Parks, and the Corps' future James River Park. This optimum total project visitation based on 2,029 campsites was derived as follows:

- (1)  $2,029 \text{ campsites} \times 5 \text{ campers/site/day} = 10,145 \text{ campers/ASWD}$
- (2)  $10,145 \text{ campers/ASWD} \div .149 \text{ (summer camping participation rate)} = 68,087 \text{ visitors/ASWD}$
- (3)  $68,087 \times 2 \text{ (weekend days/weekend)} = 136,174 \text{ visitors/summer weekend.}$
- (4)  $136,174 \div 47\% \text{ (Average \% summer week visitation occurring on weekend)} = 289,733 \text{ visitors}$
- (5)  $289,733 \times 13 \text{ summer weeks} = 3,766,529 \text{ summer visitation}$
- (6)  $3,766,529 \div 48.4\% \text{ (Average \% visitation occurring in summer)} = 7,782,084 \text{ optimum project visitation based on development of available park lands.}$

b. Water area capacity. The optimum project visitation was found based on water area capacity in order to determine how much more visitation the project could accommodate with sufficient additional park lands to support it. This optimum visitation was found to be approximately 11,232,000 which would occur in about 1992 projected as shown in Figure 5-3. This optimum visitation figure was derived using the following method:

(1) An average acreage per boat was determined for each water user activity using Outdoor Recreation Space Standards, Department of the Interior, Bureau of Outdoor Recreation; the Missouri SCORP; and the Arkansas SCORP. They were found to be:

(a) 14 acres/pleasure boat.

(b) 23 acres/ski boat.

(c) 10 acres/fishing boat.

(2) The above acreages per boat are overlapping since boating and skiing are compatible activities, and fishing usually occurs in the early morning and late afternoon when boating and skiing are at a low. So in a day's time, Table Rock Lake, at top of conservation pool elevation 915, could accommodate 18,526 boats as shown below:

43,100 surface acres + 10 acres/fishing boat =	4,310 fishing boats/day
+ 14 acres/pleasure boat =	3,079 pleasure boats/day
+ 23 acres/ski boat =	<u>1,874</u> ski boats/day
Total	9,263 boats

There is a turnover rate of two for each activity so  $9,263 \times 2 = 18,526$  boats/day optimum.

(3) The average number of persons per boat used for each activity was two persons/fishing boat, four persons/pleasure boat, and four persons/ski boat.

(4) Percentages of total water users for each activity was established.

(a) Total summer participation rates = 1.634 (See Table V-6)

(b) Total water use participation rates =	Boating	.163
	Skiing	.108
	Fishing	<u>.484</u>
	Total	.755 (46% of 1.634)

- (c) Fishing = .484/.755 or 64% of water users  
 Boating = .163/.755 or 22% of water users  
 Skiing = .108/.755 or 14% of water users

(d) These percentages of users were converted to percentage of boats. Since it takes two times the number of boats for fishermen as skiers and pleasure boaters, the percentage of boats for each activity was computed as follows:

$$\begin{array}{rcl} 64\% \times 2 & = & 128 \\ 22\% \times 1 & = & 22 \\ 14\% \times 1 & = & 14 \\ \hline & & 164 \end{array}$$

$$100/164 = 61\%$$

$$\begin{array}{rcl} 128 \times 61\% & = & 78\% \text{ fishing boats} \\ 22 \times 61\% & = & 13.5\% \text{ pleasure boats} \\ 14 \times 61\% & = & 8.5\% \text{ ski boats} \\ \hline & & 100.0\% \end{array}$$

(5) These percentages were then applied to the optimum number of boats per day to find optimum visitation for each water use activity.

$$\begin{array}{rcl} 18,526 \times .78 & = & 14,450 \text{ fishing boats/day} \\ & & 14,450 \times 2 \text{ persons/boat} = 28,900 \text{ optimum fishermen} \\ 18,526 \times .135 & = & 2,501 \text{ pleasure boats/day} \\ & & 2,501 \times 4 \text{ persons/boat} = 10,004 \text{ optimum pleasure boaters} \\ 18,526 \times .085 & = & 1,575 \text{ ski boats/day} \\ & & 1,575 \times 4 \text{ person/boat} = 6,300 \text{ optimum skiers} \\ \text{Optimum water use visitation/day} & & 45,204 \end{array}$$

(6) Water user visitation represents an average 46% of summer visitation. This was therefore applied to the optimum water use visitation/day, and the optimum visitation was derived as follows:

$$45,204 \div .46 = 98,270 \text{ optimum ASWD visitation based on water surface}$$

$$98,270 \times 2 \text{ (no. days/wkend)} = 196,540 \text{ optimum average summer weekend visitation}$$

$$196,540 \div .47 \text{ (\% summer visitation occurring on weekend)} = 418,170 \text{ average summer week visitation}$$

$$418,170 \times 13 \text{ summer weeks} = 5,436,200 \text{ optimum summer visitation}$$

$$5,436,200 \div .484 \text{ (\% of total visitation occurring in summer)} = 11,232,000 \text{ optimum annual visitation}$$

Therefore, only about two-thirds of the park lands needed to accommodate Table Rock Lake to its potential is available for development. A discussion of needs for additional land is contained in paragraph 7-02(d).

## SECTION VI

### COORDINATION WITH OTHER AGENCIES AND LOCAL INTERESTS

6-01. Initial Coordination. Initial coordination for recreational development of Table Rock Lake was accomplished by a public hearing at Branson, Missouri, on 5 June 1957 as well as by submission of reports and recommendations from interested Federal, State, and local agencies.

6-02. Subsequent Coordination.

a. U.S. Forest Service. A special meeting was held with the U.S. Forest Service, Mark Twain National Forest on 28 September 1965 to coordinate recreational planning on Forest Service owned property adjacent to the lake. The Corps operates Cow Creek Park on Forest Service land and the Forest Service operates Shell Knob and Big Boy Parks on their property adjacent to the lake.

b. Local Interests. Local towns and communities expressed interest in assuming responsibility of operation and maintenance of parks during the first few years of operation of the project. Eleven licenses were issued to accommodate these local communities. Due to a lack of funds, each of these communities requested that the licenses be terminated. The Corps then terminated the licenses, thus resuming responsibility for each of the parks.

c. Project Management. In 1969, private docks had become so numerous on Table Rock Lake that the Little Rock District started considering the formation and implementation of a shoreline management plan. This was to control and protect scenic and natural areas and prevent the development of overcrowded conditions; as a result of this, OCE implemented shoreline management plans Corps wide. Public meetings were held for public coordination of the Table Rock Lakeshore Management Plan (see Appendix F) at Shell Knob, Missouri, and at Kimberling City, Missouri, on 11 December 1972. There were meetings again at Shell Knob and at Kimberling City on 4 May 1973 for further public coordination. After the proposed plan had been drafted by the District Office, public meetings were held at School of the Ozarks, Point Lookout, Missouri, on 9 April 1975 and at Shell Knob, Missouri, on 22 April 1975 to explain the plan to the public. The Table Rock plan was submitted to Southwest Division Office on 10 April 1975 and approved on 16 March 1976. Congressional resolutions adopted on 2 August 1973 and 11 April 1974 requested the study of the advisability of modifying the operation of the existing White River Basin Lakes. Public hearings were held at a central location to each lake involved to attain public response as to their desires and needs concerning the possible modifications. The meeting for Table Rock was held on 26 March 1975 at Point Lookout, Missouri. In addition to the public meetings, written correspondence was sent to concerned agencies. The survey report is currently scheduled to be completed in the early 1980's.

6-03. Recent coordination. Written inquiries were submitted to Federal, State, and local agencies concerning the updating of this master plan. A copy of each reply received is included in this section. Below is a listing of agencies contacted with the date of reply noted.

a. Federal agencies.

(1) Agricultural Stabilization and Conservation Service.

Berryville, Arkansas - No reply  
Harrison, Arkansas - No reply  
Cassville, Missouri - No reply  
Forsyth, Missouri - No reply

(2) U.S. Forest Service, Rolla, Missouri - No reply

(3) U.S. Fish and Wildlife Service, Atlanta, Georgia - Reply dated 21 July 1975.

b. State agencies.

(1) Missouri Office of Administration, Jefferson City, Missouri - Reply dated 5 September 1975 with comments from Missouri Department of Conservation attached. Reply dated 12 September 1975 with comments from Missouri Department of Natural Resources.

(2) Arkansas Archeological Survey, Fayetteville, Arkansas - Reply dated 25 July 1975.

(3) Arkansas Game and Fish Commission, Little Rock, Arkansas - Reply dated 26 June 1975.

(4) Arkansas State Department of Health, Little Rock, Arkansas - Reply dated 7 July 1975.

(5) Arkansas Historic Preservation Program, Little Rock, Arkansas - Reply dated 14 July 1975.

(6) Arkansas Department of Parks and Tourism, Little Rock, Arkansas - Reply dated 25 July 1975.

(7) Arkansas Department of Planning, Little Rock, Arkansas - No reply

(8) Arkansas Department of Pollution Control and Ecology, Little Rock, Arkansas - No reply.

(9) State of Arkansas - Department of Local Services, Little Rock, Arkansas - Reply dated 30 August 1976.

(10) State of Missouri - Office of Administration, Jefferson City, Missouri - Reply dated 12 August 1976 (2 letters).



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

17 EXECUTIVE PARK DRIVE, N. E.  
ATLANTA, GEORGIA 30329

JUL 21 1975

District Engineer  
U.S. Army Corps of Engineers  
P.O. Box 867  
Little Rock, Arkansas 72203

Dear Sir:

Reference is made to your June 12, 1975, letter requesting our review of the updated Master Plan for Development and Management of Table Rock Lake located in Barry, Stone, and Taney Counties, Missouri, and Carroll and Boone Counties, Arkansas.

In general, the plan will enhance the recreational resources of the project area and preserve the current environmental setting. We recommend that your agency work closely with the Missouri Conservation Commission in regulating reservoir levels and spillway discharges to enhance fishery management.

The opportunity to comment on this management plan is appreciated.

Sincerely yours,

Deputy Regional Director



*Save Energy and You Serve America!*

Christopher S. Bond  
Governor



State of Missouri  
OFFICE OF ADMINISTRATION  
Jefferson City 65101

J. Neil Nielsen  
Commissioner

Mark L. Edelman  
Deputy Commissioner

September 5, 1975

Mr. D. R. Rippey  
Chief, Engineering Division  
Little Rock District, ACE  
P.O. Box 867  
Little Rock, Arkansas 72203

Dear Mr. Rippey:

The Design Memorandum No. 17-D, Updated Master Plan for Development and Management of Table Rock Reservoir, and A Brief Survey of the Historical Resources of Table Rock Reservoir Area have been circulated to selected state agencies.

The Missouri Department of Conservation commented on a draft of the Master Plan in August, 1974. Many of the comments in that reply still apply to this document. Further comments they wish to submit are:

1. The Vegetative Management Program with the Corps at Table Rock Lake should be mentioned in the new Design Memorandum.
2. The present plan should recognize the natural area on the Kings River Arm which is referred to as Rock Spring Bluff.
3. The Master Plan should give consideration to all of the rare and endangered species and rare ecosystems which exist in this portion of the state. A survey should be made to determine their presence and plans made to protect the species.
4. Interpretative programs on the natural history of the area would be one means of education that could be a meaningful addition to the Corps plan.

Copies of their letter and a letter from them sent directly to your office are attached. Please let us know what action is taken on these comments concerning this document.



Mr. D. R. Rippey  
September 5, 1975  
Page 2

The other state agencies have made no adverse comments at this time regarding this document.

Thank you for the opportunity to comment on the Master Plan.

Sincerely,

*Gene Horton* G.H.

Gene Horton, Chief  
Natural Resources and  
Development Section

mh

Attachments



MISSOURI DEPARTMENT OF CONSERVATION

COMMISSIONER • DEPUTY COMMISSIONER • ASSISTANT COMMISSIONER

CHIEF OF BUREAU • CHIEF OF DIVISION • CHIEF OF OFFICE

MISSOURI DEPARTMENT OF CONSERVATION

September 2, 1975

Mr. Gene Horton  
Division of State Planning and Analysis  
Office of Administration  
State Capitol Building  
Jefferson City, Missouri 65101

RECEIVED

SEP 4 1975

DIVISION OF STATE  
PLANNING AND ANALYSIS

Dear Mr. Horton:

The Missouri Department of Conservation has reviewed the Army Corps of Engineers Design Memorandum No. 17-D - An Updated Master Plan for Development and Management of Table Rock Reservoir and Appendix D - Fish and Wildlife Management Plan. Our detailed comments are appended.

The Department commented on a draft of this document on 21 August 1974. Many of the observations and comments in that reply still apply to the document just reviewed.

Since our last review of this Design Memorandum, the Department's Forestry Division has entered into a Vegetative Management Program with the Corps at Table Rock Lake. Under this program, recreation sites have been hardened and camping areas expanded to the limits of available land. This program, which should be mentioned in the new design memorandum has been developed with the realization that the Table Rock recreation lands receive very heterogeneous use. Parks on the northern and eastern extremities of the lake get heavier use than those in the upper reaches on the south side, a fact not recognized in the present draft.

The present plan should recognize the natural area on the Kings River Arm which is referred to as Rock Spring Bluff. This bluff features some very old ashe juniper along with red cedar and shortleaf pine. The Master Plan should give consideration to all of the rare and endangered species and rare ecosystems which exist in this portion of the state. Some of these species and ecosystems may be found on Corps land. A survey should be made to determine their presence and plans made to protect the species and the ecosystems with which they are associated. The poppy mallow, purple beard-tongue,

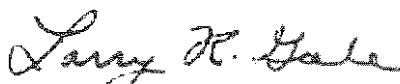
Mr. Gene Horton  
September 2, 1975  
Page Two

Ozark chinquapin, Amorpha brachycarpa (no common name), muhly grass, bald grass, and Trelease's larkspur are some of the plants which might be found on Corps land that are represented on the Smithsonian list of endangered and threatened species.

The Corps now has a Visitor Center which merits discussion. Interpretative programs on the natural history of the area would be one means of education that could be a meaningful addition to the Corps plan.

We appreciate the opportunity to review the Master Plan for Table Rock Lake. The Department of Conservation has cooperated with the Corps of Engineers in the management of these lands in the past and looks forward to continued cooperation in these matters.

Sincerely,



LARRY R. GALE  
DEPUTY DIRECTOR

cc: U. S. Fish and Wildlife Service  
Vicksburg, Mississippi

C O M M E N T S

of the

MISSOURI DEPARTMENT OF CONSERVATION

on the

TABLE ROCK DAM AND RESERVOIR DESIGN MEMORANDUM NO. 17-D  
UPDATED MASTER PLAN FOR DEVELOPMENT AND MANAGEMENT OF  
TABLE ROCK RESERVOIR - OCTOBER 1969

- Page 5, 2-05.c: The discussion on water quality problems and potential solutions needs to be updated. See our comments for the appropriate sections in Appendix D.
- Page 6, 3-02.b: Add shortleaf pine and ashe juniper to the list of trees.
- Page 30, 7-05.b: The area licensed to the Missouri Conservation Commission contains 211 acres, not 301 acres.

## ISSUED BY DEPARTMENT OF CONSERVATION

[illegible]

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

September 2, 1975

Colonel Charles E. Edgar III  
District Engineer  
U. S. Army Engineer District  
Little Rock Corps of Engineers  
700 West Capitol - Box 867  
Little Rock, Arkansas 72203

Re: SWLCO-L

Dear Colonel Edgar:

The Missouri Department of Conservation has reviewed the draft Fish and Wildlife Management Plan for Table Rock Lake, Design Memorandum No. 17-D, Appendix D. The detailed comments on this document are appended.

The major fault we find with the document is the general lack of plans for non-consumptive use of the resource. Section X briefly mentions that efforts will be made to attract non-game species to park areas for the benefit of visitors but there are no concrete discussions on how this will be accomplished in Sections III or IV.

We are pleased to have the opportunity to review this draft. If the Department can be of further assistance in the development of your updated Master Plan, please do not hesitate to call upon us.

Sincerely,

LARRY R. GALE  
DEPUTY DIRECTOR

c: U. S. Fish and Wildlife Service  
Vicksburg, Mississippi

cc: Mr. Gene Horton  
Office of Administration

MISSOURI DEPARTMENT OF CONSERVATION

COMMENTS ON THE

FISH AND WILDLIFE MANAGEMENT PLAN

APPENDIX D - DESIGN MEMORANDUM 17-D

UPDATED MASTER PLAN FOR LAKE DEVELOPMENT AND MANAGEMENT

Page

- 11                   The ability of rainbow trout to survive in Table Rock Lake by utilizing water below the epilimnion is questionable. The reference to carp, carpsuckers, etc. should be changed to non-game sport fish.
- 11, 3.01:           Reword the last three sentences as follows: "The goal of state fishery programs is to protect and assure optimum use of fishery resources. The fisheries management program is geared to assure a variety of fishing opportunities and use experience quality levels commensurate with public needs and resource capability. The Corps policy will be to cooperate with and support studies and subsequent fisheries management recommendations of the state wildlife agencies consistent with Public Law 85-624."
- 12, 3.02:           A fish species list has been previously provided and should be used here.
- 12, 3.03:           We question the term, "highly commercialized" in reference to the Lake Taneycomo trout fishery.
- 14, 3.09:           Lake stratification is not necessarily a function of size.
- 16, 3.10-c:          Change second sentence to: "This is usually accomplished with minimum length limits for predator species and/or by reducing creel numbers." Delete the last sentence.

Page

Comment

- 16, 3.10-f: There is no demonstrated need for this technique at Table Rock Lake.
- 26, 4.03-f: The potential for waterfowl management is limited by the availability of sharecropping fields, therefore, the statement about the ability to increase the food supply is overly optimistic. The statement "overriding demands for flood control makes such regulated drawdowns impractical" is not consonant with PL 85-624.
- 29, 4-06-e(4): Sunflowers and Korean lespedeza have no erosion control value.
- 34, 6.02-c: Change Greers Ferry to Table Rock Lake.
- Section X, 10-01.h: Delete the second and third sentences and insert: "This fishery downstream has been hurt by the low DO content of the outflow water. Water quality standards have not been met, and although a method of injecting liquid oxygen into the water in the penstock area has been used, it is very expensive and future uses are questionable.
- Exhibit I: The suitability of grain and seed crops for waterfowl at Table Rock Lake will not be "excellent" due to the limited extent of sharecropping fields and shallow water areas. Wetland food and cover plants do not rate a "good" due to their limited supply.
- Exhibit II: A list of fishes was sent in September 1973 and is not included here.

Christopher S. Bond  
Governor



State of Missouri  
OFFICE OF ADMINISTRATION  
Jefferson City 65101

J. Neil Nielsen  
Commissioner

Mark L. Edelman  
Deputy Commissioner

September 12, 1975

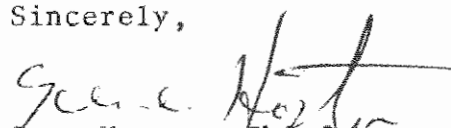
Mr. D. R. Rippey  
Chief, Engineering Division  
Little Rock District, ACE  
P. O. Box 867  
Little Rock, Arkansas 72203

Dear Mr. Rippey:

Our office has received additional comments on the Brief Survey of the Historic Resources of Table Rock Reservoir Area. Attached is a copy of the letter from Department of Natural Resources stating their comments regarding this survey.

We appreciate very much the opportunity to comment.

Sincerely,

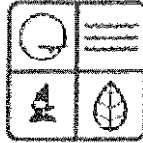
  
Gene Horton, Chief  
Natural Resources and  
Development Section

mh

Attachment



CHRISTOPHER S. DOND  
GOVERNOR



JAMES L. WILSON  
DIRECTOR

## missouri department of natural resources

P.O. Box 176

Jefferson City, Missouri 65101

314-751-3332

September 4, 1975

Mr. Gene Horton  
Office of Administration  
Room B-9, State Capitol Building  
Jefferson City, Missouri 65101

RE: Table Rock Reservoir Reports

Dear Gene:

The Department of Natural Resources has reviewed the above noted reports and has the following comments to offer.

### A Brief Survey of the Historic Resources of Table Rock Reservoir Area.

This survey being more than 20 years old is now out of date and incomplete. Throughout the report updated material needs to be obtained. For example, on page 5 there is a description of the Pea Ridge and Wilson's Creek Civil War Battlefields, which at that time were in private ownership but now have passed into federal ownership. Other information that might be of use in updating the survey is that Alf Bolin, who is mentioned on page 6, spent a lot of time at an unusual rock formation called "Murder Rocks". The description of this rock formation will appear in our forthcoming publication on the unusual geologic features of the State. Also on page 4 the Yocum Dollar is mentioned. I have enclosed an article from "True West" magazine which might provide some more information.

This survey is neither extensive nor intensive enough to comply with current Federal Regulations (Executive Order 11593). Since this survey was completed in 1954 it now seems appropriate that a reassessment of cultural resources should be considered. A cultural resources survey could be achieved through the Archaeological Conservation Act of 1974 which authorizes the Corps to expend operation funds for a survey and inventory of all cultural resources on non-inundated Corps owned lands. I would hope that a survey of the cultural resources of the Table Rock area could be accomplished. This office would be happy to assist the Corps in any way possible.

Mr. Gene Horton  
September 4, 1975  
Page 2

Design Memorandum No. 17-D, Updated Master Plan for Development and Management of Table Rock Reservoir.

If it is determined necessary to acquire additional lands for recreation purposes at Table Rock Reservoir, the State of Missouri encourages the acquisition of lands adjacent to the present state park areas on either side of the dam. It is the Department of Natural Resources' hope to expand services at Table Rock State Park to meet the increasing outdoor recreation needs of the public. Through acquisition and leasing of these lands to the Department of Natural Resources, the Corps of Engineers could make this possible.

Sincerely yours,

DEPARTMENT OF NATURAL RESOURCES

James L. Wilson  
Director

Enc.

JLW:crp



## ARKANSAS ARCHEOLOGICAL SURVEY

DIRECTOR • CHARLES R. MCGIMSEY III  
STATE ARCHEOLOGIST • HESTER A. DAVIS

Coordinating Office  
University of Arkansas Museum  
Fayetteville, AR 72701

25 July 1975

Mr. D. R. Rippey  
Chief, Engineering Division  
Little Rock District, Corps of Engineers  
P. O. Box 867  
Little Rock, AR 72203

Attention: SWLED-PV

Dear Mr. Rippey,

I have received your letter of 12 June requesting information appropriate in planning for further development of Table Rock Lake.

An updated Master Plan for Development and Management of Table Rock Lake should include provision for additional archeological investigation in the area of the lake. The archeological research in the reservoir area prior to construction was limited to those areas to be inundated by the reservoir and did not include areas now being affected by operation and maintenance activities and recreational developments. Therefore, plans should be made to continue archeological investigation whenever work on any new structures, facilities or parks are planned.

In addition, it has become evident that lakes such as Table Rock are eroding previously undiscovered sites as the water level fluctuates. Plans should be made for a shoreline survey to assess the impact of lake fluctuation on the archeological resources.

Plans should be made to inventory and assess the archeological and historical resources within the area controlled by the Corps of Engineers in compliance with Executive Order 11593, and procedures instituted to assure the Corps plans and programs contribute to the preservation and enhancement of these resources.

Sincerely,

Charles R. McGimsey III  
Director

CRM:tb

ANDREW H. HULSEY, Director

JOE D. SCOTT  
CHAIRMAN  
NASHVILLE

RALPH B. GRIFFIN  
VICE CHAIRMAN  
JONESBORO

R. A. NELSON  
BLYTHEVILLE

GUY FENTER  
CHARLESTON

DR. RALPH H. BOWERS  
HARRISON

MICHAEL F. MAHONY  
EL DORADO

WM. F. WRIGHT  
NORTH LITTLE ROCK

DR. P. M. JOHNSTON  
FAYETTEVILLE



# Arkansas

## Game and Fish Commission

LITTLE ROCK, ARKANSAS 72201



June 26, 1975

Mr. D. R. Rippey  
Chief, Engineering Division  
Department of the Army  
Little Rock District, Corps of Engineers  
Post Office Box 867  
Little Rock, Arkansas 72203

RE: SWLED-PX

Dear Mr. Rippey:

Reference is made to your letter dated June 12, 1975, enclosing an updated Master Plan for the development and management of Table Rock Reservoir.

This Plan has been reviewed and the Arkansas Game and Fish Commission has no comments.

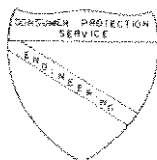
Thank you for the opportunity to comment on this Plan.

Very truly yours,

Andrew H. Hulsey  
Director

AHH:LJ:gs

ARKANSAS STATE DEPARTMENT OF HEALTH  
4915 WEST MARKHAM STREET  
LITTLE ROCK



July 7, 1975

Department of the Army  
Little Rock District Corps of Engineers  
P. O. Box 867  
Little Rock, Arkansas 72203

Attention: D. R. Rippey  
Chief, Engineering Division

Re: SWLED-PV  
Table Rock Dam and Reservoir  
75 E 681

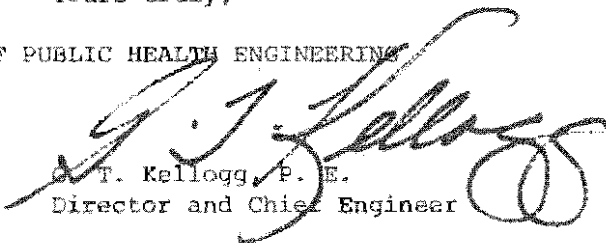
Gentlemen:

We acknowledge receipt of your Design Memorandum No. 17-D for Table Rock Reservoir.

Our review indicates no public health significance in correcting the overuse of existing public use areas through the construction of new areas, provided all new areas have an adequate water supply, sewage, and solid waste disposal.

Yours truly,

BUREAU OF PUBLIC HEALTH ENGINEERING

  
G. T. Kellogg, P. E.  
Director and Chief Engineer

GTK:bn

# ARKANSAS HISTORIC PRESERVATION PROGRAM

1023 WEST THIRD STREET, LITTLE ROCK, ARKANSAS 72201 501-374-0375



"THE OLD STATE HOUSE" 300 WEST MARKHAM

LITTLE ROCK, ARKANSAS 72201  
TELEPHONE - 501 371-1639

July 14, 1975

Mr. D. R. Rippey  
Chief, Engineering Division  
Department of the Army  
Little Rock District, Corps of Engineers  
Post Office Box 867  
Little Rock, Arkansas 72203

Re: Master Plan for development  
and management of Table Rock  
Lake

Dear Mr. Rippey:

This letter is written in response to your inquiry of June 12, 1975, regarding properties of architectural and historical significance in the area of the proposed master plan for development and management of Table Rock Lake.

The professional staff of the Arkansas Historic Preservation Program has reviewed the available material which pertains to the area in question. The staff of the Historic Preservation Program has reported that there are no additional historic sites to be added to "A Brief Survey of the Historical Resources of the Table Rock Reservoir Area".

Sincerely,

Gene Richardson  
State Historic Preservation Officer

GR:dmk



# ARKANSAS DEPARTMENT OF PARKS & TOURISM

149 State Capitol

Little Rock, Arkansas 72201

Telephone (501) 371-1511

David Pryor  
*Governor*

William E. Henderson  
*Director*

Jack E. Miller  
*Director of State Parks*

Lou Oberste  
*Travel Director*

Dr. John L. Ferguson  
*Director - History Division*

July 25, 1975

Mr. D. R. Rippey  
Chief, Engineering Division  
Department of the Army  
Little Rock District, Corps of Engineers  
P. O. Box 867  
Little Rock, Arkansas 72203

Dear Mr. Rippey:

Thank you for inviting our department to make comments concerning the Master Plans for Recreational Development on the Arkansas River.

I have forwarded this material and your letter to the State Parks Division in order that they may provide you with any appropriate comments.

Sincerely yours,

William E. Henderson

WEH/vs

cc: Jack E. Miller  
State Parks Director

Christopher S. Bond  
Governor



State of Missouri  
OFFICE OF ADMINISTRATION  
Jefferson City 65101

J. Neil Nielsen  
Commissioner

Mark L. Edelman  
Deputy Commissioner

August 12, 1976

Mr. D. R. Rippey  
Chief, Engineering Division  
Department of the Army  
Little Rock District  
Corps of Engineers  
P.O. Box 867  
Little Rock, Arkansas 72203

Dear Mr. Rippey:

Subject: 76070113

The State Clearinghouse, in cooperation with state agencies interested or possibly affected, has completed the A-95 review on the Table Rock Dam and Lake Design Memorandum No. 17-E Updated Master Plan for development and management of Table Rock Lake.

None of the state agencies involved in the review had comments or recommendations to offer at this time.

Sincerely,

*George Lineberry*  
George Lineberry  
Chief, Grants Coordination





Christopher S. Bond  
Governor

State of Missouri  
OFFICE OF ADMINISTRATION  
Jefferson City 65101

J. Neil Nielsen  
Commissioner

August 12, 1976

Mr. D. R. Rippey  
Chief, Engineering Division  
Department of the Army  
Little Rock District  
Corps of Engineers  
P. O. Box 867  
Little Rock, Arkansas 72203

Dear Mr. Rippey:

Subject: 76070113

In regard to the above referred project proposal concerning this office's review through OMB Circular A-95 review procedures, the enclosed comment has been received since the mailing of our letter dated August 12, 1976.

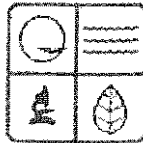
Please include this comment for consideration.

Sincerely,

*George Lineberry*  
George Lineberry  
Chief, Grants Coordination

GL:dc

CHRISTOPHER S. BOND  
GOVERNOR



JAMES L. WILSON  
DIRECTOR

## missouri department of natural resources

P.O. Box 176

Jefferson City, Missouri 65101

314-751-3302

August 11, 1976

**RECEIVED**

AUG 12 1976

DIVISION OF  
BUDGET AND PLANNING

Mr. George Lineberry  
Office of Administration  
Room B-9, Capitol Building  
Jefferson City, Missouri 65101

RE: A-95 Review #76070113 - White River - Table Rock  
Lake Design Memorandum No. 17-E Updated Master Plan  
for Development and Management

Dear Mr. Lineberry:

The Department of Natural Resources has reviewed the above noted project and has the following comments.

1. Natural Areas - pages 7-5 to 7-7.

With no formal designation process, such areas will inevitably be challenged by "individual requests for minor development" which, although "weighed against environmental considerations" (p 7-6) may destroy the sites. This points to the need for Corps involvement in the State Natural Areas System. One of the areas (Rock Springs Bluff) has been designated by the Missouri State Department of Conservation.

2. No mention is made of the Piney Creek Wilderness which lies on the west side of the James River arm. This wilderness is included as a study area in legislation now before the U. S. Congress (House and Senate). Forty acres of Corps land is included in this area. The wilderness will provide a significant element of diversity of land management in the project area. The Governor, Department of Natural Resources and Department of Conservation officially support the area.

Mr. George Lineberry  
Page 2  
August 11, 1976

3. The Table Rock Recreation Map (1972) inaccurately shows a road passing through the southeast portion of the Wilderness (see attached). This should be corrected on current maps. If such a road is planned, then it should not be constructed.

Sincerely yours,

DEPARTMENT OF NATURAL RESOURCES

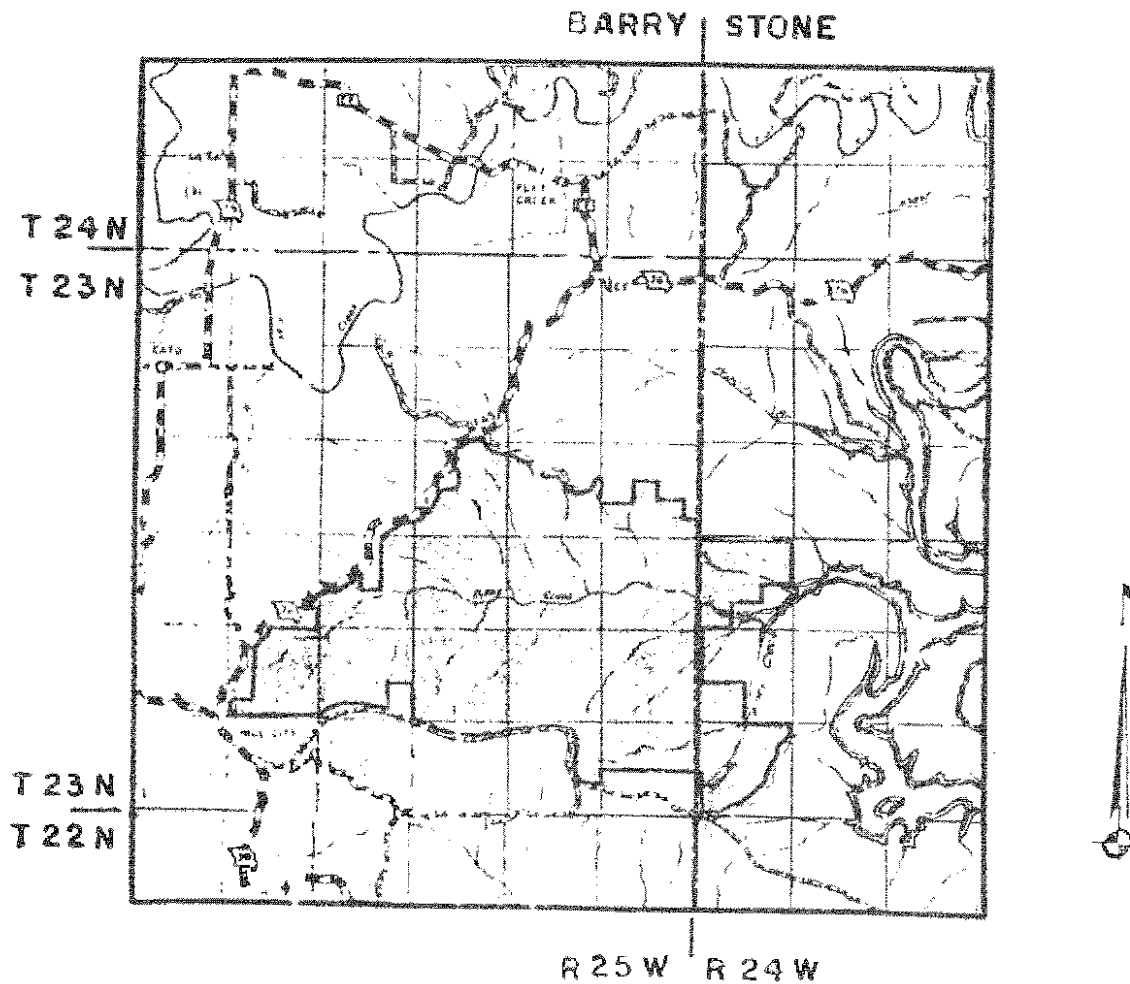
James L. Wilson  
Director

JLW:JK:rjk

Enclosure

6. Piney Creek Wilderness - This 8,432 acre proposal would protect the entire watershed of Piney Creek for scientific and recreational purposes. It would be a fine complement to the adjacent Table Rock Lake Area. The area supports important habitat for great blue heron, bald eagle, and pileated woodpecker.

PINEY CREEK WILDERNESS  
(Barry & Stone Counties)





STATE OF ARKANSAS  
DEPARTMENT OF LOCAL SERVICES

SUITE 900 • FIRST NATIONAL BUILDING  
LITTLE ROCK 72201

*ccj 8/31/76*  
DAVID PRYOR  
GOVERNOR

RONALD R. COPELAND  
DIRECTOR

August 30, 1976

Mr. D. R. Rippey  
Chief, Engineering Division  
Little Rock District, Corps of Engineers  
P.O. Box 867  
Little Rock, Arkansas 72201

Re: Table Rock Lake Updated Master  
Plan

Dear Mr. Rippey:

The State Planning and Development Clearinghouse is in receipt of the above Updated Master Plan. The Department of Local Services has reviewed this document and has no comment.

If we can be of further assistance, please don't hesitate to call on us.

Sincerely,

A handwritten signature in cursive script that reads "Fred Kleihauer".

Fred Kleihauer  
Director, State Clearinghouse

FK:mh

## SECTION VII

### PHYSICAL PLAN OF DEVELOPMENT

7-01. General. Table Rock Lake is a multipurpose project constructed primarily for flood control and generation of hydroelectric power. Recreation is a third resource created by the impounding of water, but utilization and management of this resource must not conflict with the regulation of the lake for the two primary purposes for which it was authorized. The principal concept in planning Table Rock Lake was for public use and benefit. This concept has been implemented, and first among priorities for public use are stringent standards for public health, safety and sanitation. The plan of development considers these standards in land use allocations and in planning for the recreational activities associated with the project.

a. To provide the greatest possible recreational/outdoor experience, safeguards have been implemented over the use of Government-owned land adjacent to the lakeshore. At Table Rock Lake, much of the shoreline is being retained in its rugged, natural state. Forest management practices are implemented to maintain existing vegetation in a healthy state while juvenile plant material is being planted to revegetate open spaces.

b. Ownership of land adjacent to Government-owned land is not considered sufficient reason to allow the adjacent owner to have private and exclusive access to the lake across Government-owned land. To satisfy the public demand for access to the lake, access roads and docks of quasi-public nature are permitted provided that the nature and extent of these facilities may be considered supplying a demand that is in harmony with the overall development of the lake and not in conflict with management practices as determined by the District Engineer.

7-02. Land use. The lands required for project operation purposes and recreation have been indicated on the land use maps, Plates 3 through 13. The lands described in the various designations throughout the lake are very similar in general characteristics of soil, topography, and vegetative cover typical of the foothills of the Ozark Mountains.

a. Project lands. Project lands total 65,604 acres which include 3,050 acres in the stream bed, 2,896 acres of easement lands, and 1,835 acres of flooded U.S. Forest Service lands. The easement lands lie above or landward of the fee acquisition line but below the 936 elevation and are indicated by the brown color on the land use maps. The easement lands are under private ownership and the Corps of Engineers has only the right to flood these lands. Lands specifically required for the operation of the project total 52,705 acres, which include the fee and easement lands, lands below the flood control pool, and 405 acres of land for the dam and appurtenant works. The remaining lands are allocated for recreation use and for the preservation of natural resources.

b. Allocation of lands. All lands in the Table Rock Lake project are classified as project operations lands acquired and allocated to provide for safe, efficient operation of the project. Project operations lands reserved for recreational purposes and lands reserved for preservation of natural resources are indicated by color coding on the land use maps. Land use allocations are discussed as follows:

(1) Project operations. The project lands, excluding easement lands, included in this allocation for operation of the project lie below the flood control pool elevation 931, except for the dam and work area. On the land use maps these lands are color coded dark blue, which is the conservation pool below elevation 915, and light blue, which is the flood control pool below elevation 931. The dam area and appurtenant works allocated for operation of the project are color coded white with a cross-hatched symbol. The portion of these lands within the limits of the parks and between elevation 915 and 931 will have a dual allocation for operations and recreation-intensive use. Lands between the 931 and 936 elevations are available for infrequent flooding to allow for surcharge operation of the project corresponding to the 50-year flat pool level. These lands are owned in fee easement or are under permit. Those that are owned in fee have been included in the following land use allocations since these uses do not interfere with occasional use for surcharge storage.

(2) Operations: Recreation-Intensive Use. Recreation-intensive use lands are those acquired for project operations and allocated for use as parks or other areas for intensive recreational activities by the visiting public. These lands are color coded in red on the land use maps. There are 21 partially developed parks, operated by the Corps of Engineers, 1 future park to be developed, and 1 park developed by the State of Missouri, all on project lands and totaling 1,888 acres. Two other parks adjacent to the project were developed by the U.S. Forest Service on Forest Service lands totaling 39 acres. The acreages listed above for the parks are the lands above the conservation pool elevation 915 and have a dual allocation for operations and recreation-intensive use on that part of the park land that lies between the 915 elevation and the flood control pool elevation 931. The dual allocation zone in the park areas is color coded light blue since the primary use is for project operations. In addition to the park areas, there are two concession leases, two mixed concession leases and two quasi-public recreation leases on the project that are related to intensive recreational activities and are allocated for recreation-intensive use. The location of these leases are indicated by a red identification number on the land use maps. These leases are for the Rock Lane Lodge Boat Dock, Hideaway Boat Dock, Holiday Island Marina, Jelly Stone Park, Rock Lane Lodge play area, and the Kimberling Cove Resort swim area.

(3) Operations: Recreation-Low Density Use. Recreation-low density use lands are those acquired for project operations and allocated for low density recreation activities for the visiting public. These areas are shown by the yellow color on the land use maps and are designated for buffer zones between intensive recreational developments and incompatible land use on or off the project, hiking trails, primitive camping, limited lake access points, and other similar low density activities. These activities are designed to play a significant role in promoting public

understanding and appreciation of the environment. Private floating facilities may be permitted in accordance with ER 1130-2-406 and the Lakeshore Management Plan when such use will not detract from the natural setting of the shoreline. Private floating facilities may be for an individual or it may be for a motel or resort. Tramways may be allowed by license agreement after due consideration of the compatibility with the desired natural setting of the shoreline. Requests for private floating facilities and tramways will not be given favorable consideration on lands allocated for Recreation Low Density Use when such allocation is for park buffering, development of trails, public access, or will in any way restrict use of the shoreline. These lands indicated by the yellow color extend down to the conservation pool elevation 915, and the zone between elevation 931 and 915 is a dual-use allocation for operations and recreation-low density use but is shown as light blue since the primary use is for project operations. Some of the low-density use areas are completely within the dual-use zone and the yellow color does not appear. These areas are indicated by the term "LOW DENSITY RECREATION USE LIMITS" on the land use maps.

(4) Operations: Natural Area. These are lands, indicated with the color green on the land use maps and are usually narrow bands of project land between the flood control pool and the project boundary. These lands acquired for project operations are allocated for preservation of scenic, historical, archaeological, scientific, or ecological values. To retain the value and character of these lands, little or no development is planned in these areas. All development will be discouraged on these areas; however, individual requests for minor development will be weighed against environmental considerations. Three specific areas on the project have special scenic and historical qualities and the remaining areas are allocated for preservation for their natural character, beauty and scenic values. The three specific areas are discussed as follows:

(a) The Rock Springs Bluff area is located on the Kings River arm of the lake in Stone County, SW $\frac{1}{4}$  of Section One and the NE $\frac{1}{4}$  of Section Two, Township 21N, Range 25W. The natural features of this 15-acre area consists of about 1/2 mile of limestone bluff, ashe juniper, eastern red cedar, and shortleaf pine (three of the four native Missouri conifers). Some of the ashe junipers are 500 plus years old and are the oldest known stand of trees in Missouri. One section of the bluff's trees are festooned with beard lichen and is a nesting site for the Parula Warbler which is not common in Missouri. Collared lizards and roadrunners also use this bluff.

(b) The Virgin Bluff area is located on the James River Arm of the lake in Stone County, NW $\frac{1}{4}$  of Section 15, Township 23N and Range 24W. This area is a sheer bluff and has scenic qualities when viewed from across the lake. The area is a well known local landmark and possesses historical value for that area.



(c) The Coombs Ferry Bluff is located along the access road into the Coombs Ferry Park. This bluff area is very high in elevation and has a magnificent vista of the lake in that area. The bluff area is known as a winter nesting area for the bald eagle. Also the bluff is faced with very old ashe juniper, the approximate age unknown.

(5) Operations; Wildlife Management. These are lands acquired for project operations and allocated as habitat for fish and wildlife or for propagation of such species. These lands are available for recreational activities. Special food-plot location for wildlife management are shown by the color orange on the land use maps and total approximately 60 acres. The Missouri Department of Conservation has been licensed 51,300 acres of land and water for the management of fish and wildlife. In addition to the above acreage, 211 acres of project land immediately downstream from the dam and north of the river is licensed to the Missouri Department of Conservation on which the Department has constructed and is operating the Shepherd of the Hills Fish Hatchery. The production of trout for maintenance of the trout fishery in Table Rock Lake, the White River downstream from the dam, and Lake Taneycomo is the principal purpose of the hatchery. The original license to the Missouri Department of Conservation was for 301 acres; however, on 1 March 1971 90 acres on the south side of the White River, which is now the Baird Mountain Park was returned to Corps of Engineers management.

(6) Operations: Reserve forest land. On lands allocated for low-density use, timber will be harvested only when required to achieve other management objectives, such as wildlife habitat improvement. Timber planting and vegetation manipulation may be required for erosion control.

(7) Operations: Other.

(a) Collateral and Interim Uses. Uses of the projects lands discussed above include low scale timber management, wildlife management for habitat improvement and leases for motel/resort, commercial concessions, and quasi-public recreation. Agricultural and grazing leases are not permitted on the project due to the very narrow band of project lands available but highly unsuitable for this use.

(b) Use agreements. Easements, licenses and leases are noted and numerically identified on the Land Use Maps, Plates 3 through 13. These use agreements are for rights-of-way, installation of utilities, and structures for access to the water. As noted, most leases, licenses, and easements are for a specific period or term and must be reinstated for continued use. Permits are issued for private floating facilities and other forms of lakeshore use as set forth in ER 1130-2-406. There are as of 1 January 1976, 119 limited motel/resort leases, 13 commercial concession leases of which 11 are located in the parks, 2 mixed concession leases and 2 quasi-public recreation leases. The use of the

shoreline shall be coordinated with the Lakeshore Management Plan as outlined in Appendix "F" of this master plan.

(c) The Table Rock Lake project has only one area on project lands that has historical significance and that is the Beaver Park area. This is discussed in paragraph 3-06 of this master plan. Considerable archaeological significance exists in the project area and this topic is also discussed in paragraph 3-06.

c. Preservation of Existing Vegetation, Reforestation and Beautification. Table Rock Lake is basically surrounded by forested areas preserved for aesthetic value. These forests provide part of the outing experience for those who visit the lake. It is important to note that the Resident Engineer has adopted a policy of preserving as much site vegetation as possible. Additionally, Title 36, Chapter III, part 311 of the Code of Federal Regulations provides for the enforcement of rules regarding visitors destroying existing vegetation. The implementation of these policies and regulations has assisted in preserving the natural character of the Table Rock Lake.

(1) The present procedure for revegetating large areas within the project boundary that are sparse is to plant pure stands of shortleaf pine. Although in most instances, this provides rapid revegetation, the monoculture is not conducive to attracting wildlife species. A more natural process of plant succession is to revegetate with the pioneer plant species. These species provide quick cover and produce the necessary elements of shade and mulch for the establishment of climax vegetation. The pioneer species consist primarily of the common persimmon, sumac, sweet gum, hawthorn, dogwood, and honey locust associations. Although these species are not typical timber-type vegetation, they do provide habitat for wildlife and a good cover until the oak-hickory association, climax vegetation can establish. These pioneer species can be mixed with the shortleaf pine and form a more complimentary unit of vegetation.

(2) A point of interest and problem has developed with the impounding of water. A new environment has been created along the lake perimeter with this impoundment of water. The fluctuating water level has practically eradicated all trees between the contour lines 915 and 920. Presently, the species that have survived this fluctuating water level are the sweet gum and willow oak. Additional water-tolerant vegetation will need to be introduced to correct this void created by the fluctuating water. Black willow, sycamore, common witch hazel, eastern cottonwood, and tupelo gum are species commonly found in areas where occasional flooding will inundate their root systems. Introducing these species along the shores of Table Rock Lake will accelerate the reestablishment of revegetation in this zone.

(3) The ornamental characteristics of vegetation should also be discussed for use around areas of pedestrian and vehicular concentration. Indigenous plant materials will be used for ornamentals because of their hardiness. Small trees and shrubs that produce spring and summer

flowers are the dogwoods, redbuds, hawthorn, buttonbush and red buckeye. Fall color can generally be attributed to the changing of the leaves, but certain plant materials have fruiting characteristics that are worth mentioning. The sumac is topped with a large cluster of crimson fruit that persists into the winter after the leaves have dropped. The yaupon hollies have a red berry that lines the branches giving an interesting contrast with the evergreen leaves. Although the deciduous hollies lose their leaves, a striking contrast is created between the bright orange berries and the light gray branching structure.

d. Needs for additional land. Based on the determinations of carrying capacity for the project considering available park lands (paragraph 5.09a) and water area capacity (paragraph 5.09b) it has been determined that with additional lands project carrying capacity can be increased by 50 percent. Considering that 1927 acres are now available, an additional 963 acres are needed in order to accommodate future demands. Actions to secure additional recreation lands will be considered in connection with the White River Lakes study mentioned in paragraph 1.04c.

7-03. Parks. Recreational facilities have been developed in 21 parks on Corps of Engineers land which includes the Table Rock State Park developed by the State of Missouri. Further development of the Corps parks will require implementation of the current cost-sharing policy as discussed in paragraphs 8-04 and 10-02. Ten of the parks contain commercial boat docks which provide boats, motors, bait, general concessions and other allied merchandise and services under a lease agreement. There is one future park (James River Park) proposed for development on Corps of Engineers land. Three parks have been developed on Forest Service lands including the Cow Creek Park, which is a Corps of Engineers development, with the other two parks being Forest Service developments. The Cow Creek development is by permit from the U.S. Forest Service, Department of Agriculture. Special recreation trends, facilities, and park descriptions are discussed in the subsequent paragraphs. The parks are shown on Plates 14 through 37.

a. Special considerations. Paramount in our planning process is the preservation of existing features and integrating these features into the site development plan. An example of integrating existing features into the development plan is the idea of using an existing group picnic shelter (which does not ordinarily receive intensive use) and developing a dual use concept that will be more attractive to both picnickers and campers. Efforts have been made to identify and utilize unique features of the project, although many may have been overlooked. Prior to the development of proposed facilities in the updated master plan, a landscape architect, park planner, park designer and the Resident Engineer should make a detailed site survey and note any desirable existing features for preservation. Special items for park planning are discussed in the following subparagraphs:

(1) Entrance station. Each park is provided with an entrance station. Some parks have a temporary station due to the limited development in the park at this time. A new station is proposed for these parks when development in the park warrants the better facility.

The arrangement of the entrance station should provide for traffic control with an entrance gate, a turnaround area outside the gate for late arrivals, and a parking lane off the main road to avoid interference with normal traffic flow. Each station consists of a gatehouse, a park attendant trailer space with picnic table, electric hook-up, water and sewage connection, and an overflow camp area. A solid waste collection area is located near the entrance station for convenience of collection and for visitors coming in and out of the park. Night lights are desirable near the entrance for a sense of security and for night time activities around the station.

(2) Public health and safety are prime considerations in preparing this plan of development. Sanitary drinking water will be supplied from deep wells or local municipal water supplies. At present, sanitary facilities are a combination of vault and waterborne restrooms. This plan proposes that future development proceed along the same pattern with consideration given to present and future needs for waterborne restrooms and the selection made accordingly for initial or convertible type waterborne facilities. Effluent will be processed at tertiary treatment plants located within the park area when they become economically feasible; until then, treatment will be provided by individual treatment fields. Trailer sanitary stations will be located within close proximity to the entrance of parks to receive effluent from recreational vehicles, also marine sanitary stations are located in some of the commercial dock areas.

Shower facilities are planned for every park in the form of proposed facilities or by conversion of convertible type facilities in the future. Some of the parks that experience heavy use will have campers washhouses planned to provide additional shower facilities and wash facilities. Aerators (small compressed air units) will be provided in all new vault type restrooms to help reduce odors around the restroom areas and produce a fresher sewage which would be more amenable to treatment at the Table Rock State Park sewage oxidation lagoon.

(3) Electrical outlets. Electrical outlets are provided for approximately 50 percent of all campsites. The electrical outlets are needed to accommodate the growing demand of recreational vehicle and travel-trailer type campers. Most of this equipment is operational without electricity; however, these users enjoy the convenience and cleanliness of electricity.

(4) Play areas. Play areas are provided where the terrain permits and where they will physically fit in the nucleus of large camp areas. Play areas are also popular around swim areas and these have been provided where space, terrain, and parking are suitable for the development of this facility. Play areas consist of a few pieces of playground equipment, swing set, slide, climbers, etc., designed basically for children.

(5) Foot trails. Foot trails are provided within the parks for pedestrian circulation and access between various activity locations. The foot trails will be primitive in character to blend in with natural settings in the park. The State Park and the Cow Creek Park contain trails that extend beyond the park limits and are classified as project trails. The State Park Trail will be tied into the new development at

the Visitor Center, the Dam, the overlook and the Baird Mountain Park with a proposed trail system to link together all these focal and activity locations for a unique recreational experience for all types of visitors.

(6) Historical markers. An historical marker of some type will be placed to mark the location of the home site of Squire Beaver, the founder of the Beaver Settlement.

(7) Amphitheater. In order to provide evening interpretive programs, an amphitheater is recommended. The amphitheater illustrated in the "Park Practice Program," Index No. 4306, is adequate to meet the needs at Table Rock Lake. The seating capacity should accommodate about 100 persons.

The construction of the amphitheater seats may be of native logs sawn in half and placed on notched posts set in the ground, or more conventional seating may be provided. An effort will be made to provide a rustic atmosphere in the total development. Electricity will be provided for audio-visual equipment.

(8) Tent and recreational vehicle pads. Where terrain permits, selected sites should have an area graded and smoothed and made suitable for a tent pad. Tent pads may be provided by using large treated timbers laid out in a rectangular shape fastened at the corners, filled with soil, and topped with small pea gravel. This type of built up pad is particularly good for areas where tent staking or leveling is difficult. Each camp turnout and parking space shall be laid out to fit the terrain for level parking as much as practicable. This should be accomplished where possible for recreation vehicles.

(9) Walk-In camping. Walk-in-camping areas are provided in three of the parks; Cow Creek, Aunts Creek, and Kings River. The facilities at the Cow Creek area will be the group type consisting of a group fireplace and grill with two to three tables at each group site. Walk-in-camping in the past has not been in large demand; therefore, these facilities are not proposed on a large scale.

(10) Group camp areas. Group camp areas are provided in several of the parks to accommodate group camping. These areas, where possible, are located in separate areas to cause as little disturbance as possible to other campers. Group areas are provided in the Joe Bald, Highway 13, Big M., Long Creek, Cricket Creek, and Viola Parks.

(11) Group picnic/camp complex. This facility provides for dual use, group picnicking and camping, utilizing an existing group picnic shelter. The facility is composed of the group shelter with the following features added to make the complex more useable and desirable; additional parking, individual table sites, a fireplace for the shelter, a patio with barbecue cooker, and a drinking fountain. The facility can be used by groups on a reservation basis or by individuals as the needs develop. The complex is provided at two parks, Mill Creek and Joe Bald. Due to the low visitation and limited space of Mill Creek Park, the complex will also be used as an overflow area.

(12) Dual-Use camp area. This type of facility is designed specifically to accommodate large groups on a reservation basis. The area will be complete with water, sanitary facility, camping facilities, and a gate at the entrance of the area for control. When the area is not reserved for group use, it can be used by individuals the same as other areas. The project will have two parks with this type of arrangement, Joe Bald and Indian Point. Both areas are expected to attract this type of group use and each area is separated from the rest of the park so as to cause the least amount of disturbance to others.

b. State park development. This area is shown on Plates 14 and 15 and contains 449 acres available to the public. The area was selected for major development by reason of its proximity to the dam, existing highways, exceptionally favorable terrain, and nearness to existing resort areas. The Missouri State Park Board has a license for use and development of the 449 acres of Government-owned land. The area contains roads, parking, camping, picnicking, and boat launching facilities. Other facilities are proposed for the area.

c. Corps developed parks. The following is a list of parks operated and maintained on Table Rock Lake by the Corps of Engineers. The acreages in each park description represents that land above conservation pool.

(1) Baird Mountain. This site containing 90 acres is located immediately downstream from the dam on the south side of the White River. This area was originally a part of the land licensed to the Missouri Department of Conservation and was recently returned to the Corps. The area contains an access road, gravel launching ramp, and two wooden vault-type restrooms. The area has good potential for development along the bank of the White River. The planned recreational development in the park will enhance fee collection to recover all operation, maintenance, and replacement costs in accordance with the provisions in EC 1130-2-121 dated 23 May 1973, paragraph 11a.

This area will require major development and the proposed facilities include roads, parking, boat launching ramps, foot trails, picnicking, and camping units, park entrance station, sanitary facilities, tertiary treatment plant, amphitheater, water supply, and night lights. A special feature for travel trailer groups is planned for this park due to its convenient proximity to many tourist attractions. The travel trailer complex consists of forty-three spaces, each with water and electrical hookups. (See Plate 16.)

(2) Long Creek. This 56-acre site is located on the east shore of the Long Creek arm of the lake. Access is by paved road from Missouri Highway 86 and U.S. Highway 65 to the park entrance station. In addition to the concessionaire operated boat docks, the area offers picnic and camp units, water system, sanitary facilities, roads, swim area, parking, and launching areas.

Proposed facilities include a new camp loop, additional campsites in existing areas, electrical outlets, sanitary facilities, tertiary treatment plant, amphitheater, water supply points, and night lights. (See Plate 17.)

(3) Cricket Creek. This site, containing 57 acres, is located on the east shore of the Long Creek arm and is easily accessible by paved Arkansas State Highway 14 from U.S. Highway 65. The area is situated on the Boone-Carroll County line in Arkansas and is the only boat dock on Table Rock Lake in Arkansas. The area contains an entrance station, roads, parking areas, launching ramp, sanitary facilities, water system, picnicking, camping facilities, and swim area. It is adaptable to a variety of recreational activities and is bordered on the north by a protective cove suitable for the concessionaire operated boat dock.

Proposed facilities include an overflow camp area, camp loop, additional camp sites in existing areas, electrical outlets, sanitary facilities, tertiary treatment plant, amphitheater, water supply points, and night lights. (See Plate 18.)

(4) Old Highway 86. This 61-acre area is situated on the west shore of the Long Creek arm of the lake at the severed end of old Missouri State Highway 86. A spectacular view of a large expanse of the lake is afforded visitors to this site. The existing paved road provides excellent access and helps attract many boat owners. The area contains a beach and changehouse with showers, a picnic shelter, water and sanitary facilities, camp units, and a launching area.

Proposed facilities include a revised entrance station, overflow camp area, roads and a camp area, additional campsites, electrical outlets, swim area, play areas, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. Consideration will be given to alternate restroom designs with architectural features to compliment the wood siding and cedar shake roof type existing on the changehouse. (See Plate 19.)

(5) Coombs Ferry. This 66-acre site is located at the severed end of Missouri State Highway "J-J" on the south shore of the main reservoir. The scenic access road, about 6 miles in length from Missouri State Highway 86, aids in attracting visitors to the site. Developments include a launching area, roads, parking area, sanitary facilities, a water supply, and facilities for swimming picnicking, and camping.

Proposed facilities include new camp loops with camping units, electrical outlets, revised entrance station with an overflow camp area, swim area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 20.)

(6) Indian Point. This site, containing 92 acres, is situated on the east shore of the North Indian Creek arm immediately north of its confluence with the main body of the lake. About 3 miles of paved road provides access to the area from paved Missouri State Highway 76. Development includes an entrance station, roads, parking areas, launching ramps, amphitheater, sanitary facilities, water supply, picnicking, camping, and swimming facilities, and a commercial boat dock. The concessionaire provides electric service to some of the camp units. A large protective cove on the west provides excellent protection for the commercial facilities. The Indian Point boat dock concessionaire also operates a concession site in connection with the Rock Lane Lodge. (See Plate 5.)

Proposed facilities include a new camp loop with camping units, electrical outlets, picnic units, play areas, sanitary facilities, campers washhouse, tertiary treatment plant, water points, and night lights. (See Plate 21.)

(7) Cow Creek. This 56-acre tree covered area is located on the south side of the lake between Missouri State Highway 13 and Missouri State Highway "J-J". Access is by about 2 miles of paved road and 1/2 mile of graveled road north from Missouri State Highway 86. Development in the area includes an entrance station, roads, a launching area, group picnic shelter, water supply, parking area, sanitary facilities, and facilities for camping, swimming, and picnicking. This area has been made available to the Corps of Engineers by the Department of Agriculture's Forest Service under a Special Use Permit dated 12 February 1960.

Proposed facilities includes development of a new area within the park consisting of roads, parking, launching ramp, campsites, and sanitary facilities. Other general development in the park includes sanitary facilities, tertiary treatment plant, amphitheater, water points, night lights, and walk-in group camping. (See Plate 22.)

(8) Highway 13. This area, consisting of approximately 151 acres, is located on the north shore of the main body of the lake east of the Kimberling City. The area contains entrance stations, roads, parking areas, water supply, sanitary facilities, tertiary treatment plant, launching ramps, swim area, picnicking and camping units, multi-purpose courts, and commercial development. The concessionaire provides electric service to some of the camp units. Access to the area is available from Missouri State Highway 13. The site is partially wooded with terrain readily adaptable to a variety of recreational activities. A large cove in the area provides protection for commercial docking facilities.

Proposed facilities include additional camp units, electrical outlets, swim and play areas, sanitary facilities, campers washhouse, amphitheater, water points, and night lights. (See Plate 23.)

(9) Mill Creek. This 32-acre area with scattered groups of trees along the shoreline is located on a peninsula on the south side of the lake near the mouth of Mill Creek. It is about 3 miles upstream from where Missouri State Highway 13 crosses the lake, and access to the area is by way of a short graveled road west from Missouri State Highway 13. Development in the area includes an entrance station, a launching area, water supply, sanitary facilities, a group picnic shelter, a swimming beach, changehouse with showers, roads, parking areas, and picnicking and camping facilities.

Proposed facilities include additional camp facilities, electrical outlets, play area, sanitary facilities, amphitheater, water points, night lights, and conversion of an existing picnic shelter into a group picnic/camp complex. (See Plate 24.)



(10) Joe Bald. This 81-acre area is situated on the north shore of the main body of the lake at the confluence of the James River and White River. Access is by 6 miles of paved road from Missouri State Highway 13. Developments consist of an entrance station, a launching area, roads, parking area, sanitary facilities, water supply, and facilities for picnicking, swimming, and camping.

Proposed facilities include additional camping facilities, electrical outlets, a swim area, sanitary facilities, tertiary treatment plant, amphitheater, water points, night lights, and conversion of an existing picnic shelter into a group picnic/camp complex. (See Plate 25.)

(11) Aunt's Creek. This 56-acre site lies on the east shore of the Aunt's Creek arm, a tributary of James River, and is about 3 miles from Missouri State Highway 13. Development includes an entrance station, roads, parking areas, launching areas; swimming, picnicking, and camping facilities; sanitary facilities, water supplies, and a beach with changehouse.

Proposed facilities include a new camping loop with camp units, electrical outlets, picnic units, play areas, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 26.)

(12) Cape Fair. This 78-acre site located about 1 mile southwest of the town of Cape Fair, Missouri, is served by State Highway 76 from the east and west, and State Highway 173 from the north. It is on the right bank of the James River arm approximately 22 river miles from the main body of the lake. Recreational development includes an entrance station, roads, parking areas, launching ramps, group shelter, swim area, sanitary facilities, water system, and picnicking and camping facilities. There is also a commercial boat dock in the area.

Proposed facilities include additional camp units, electrical outlets, swim area, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 27.)

(13) Baxter. This 61-acre area is located on the east side of the Big Indian Creek arm at the severed end of Missouri State Highway "H". The area is scenically attractive with an excellent view of a large expanse of water. Heavy to light tree cover and variable slopes make the area conducive to many types of recreational activities. The development contains an entrance station, a water system, restroom and shower facilities, a trailer sanitary station, picnic and camp units, swim area, and a launching area. The boat docks are commercially operated by a concessionaire.

Proposed facilities include a new camp area with camp units, water and sanitary facilities, launching ramp, and swim area. Other general facilities for the park include a picnic area, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 28.)

(14) Big Indian. This 50-acre site is situated on the west shoreline of the Big Indian Creek arm of the lake and at the severed end of Missouri State Highway "H". The area is scenically attractive with an excellent view of a large expanse of water. Heavy to light tree cover and variable slopes make the area conducive to many types of recreational activities. Present development includes an entrance station, roads, parking areas, launching area, swimming, picnicking, and camping facilities, masonry restrooms, a water supply, and a group shelter.

Proposed facilities include an overflow camp area, camping units, new camp loop with camp units, electrical outlets, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 29.)

(15) Campbell Point. This 112-acre site is located on the north shore of the main body of the lake about 5 miles east of the town of Shell Knob, Missouri. Access to the area is provided by about 4 miles of paved Missouri State Highway "YY" which intersects Missouri State Highway 39 about 1 mile east of Shell Knob. This highway affords access to the area from either side of the lake. The terrain is heavily wooded and suitable for a variety of recreational activities. The area contains entrance roads, parking areas, a launching ramp, restroom and shower facilities, water system, multi-purpose courts, and picnicking, swimming, and camping facilities. There is a commercial boat dock in the area, and the concessionaire provides electric service to some of the camp units.

Proposed facilities include camping and picnicking facilities, electrical outlets, swim area, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, night lights, and a bank fishing area. (See Plate 30.)

(16) Viola. This 34-acre site located on the east shore of the Kings River arm about 1 mile southwest of the town of Viola, Missouri, is accessible by 3/4 mile of paved road from Missouri State Highway 39. In addition to the concessionaire operated boat dock facility, there is an entrance station, picnic and camp facilities, swim area, water system, sanitary facilities, roads, and parking areas available. The concessionaire provides electrical service to some of the camp units.

Proposed facilities include electrical outlets, parking areas, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 31.)

(17) Kings River. This 38-acre site lies on the west shoreline of the Kings River arm of the lake, accessible by about 4 miles of paved State Highway "RA" northwest of Golden, Missouri. Development consists of an entrance station, roads, parking areas, launching area, water supply, sanitary facilities, camping, picnicking, and a swimming area.

Proposed facilities include overflow camp area, additional camp units, electrical outlets, sanitary facilities, tertiary treatment plant, amphitheater, water points, night lights, and walk-in camping. (See Plate 32.)

(18) Viney Creek. This 82-acre site with its exceptional scenic view is located on the south shore of the main lake body at the severed end of Missouri State Highway "J". It has been developed with an entrance station, roads, parking areas, swimming, picnicking, and camping areas, sanitary facilities, water supply, and launching areas. Heavy to moderate tree cover throughout the area adds to the recreational potential for camping, picnicking, and other varied recreational opportunities.

Proposed facilities include a revised entrance station with an overflow camping area, camping facilities, electrical outlets, play area, sanitary facilities, tertiary treatment plant, amphitheater, water points, and night lights. (See Plate 33.)

(19) Big "M". This 96-acre site is located on the north shore of the main lake at the severed end of Missouri State Highway "M". The area is about 15 miles by highway southwest of Cassville, Missouri, and about 9 miles due east of Roaring River State Park. The terrain in the area provides an excellent location for the boat dock. Facilities provided in the area include an entrance station, picnicking and camping units, sanitary facilities, tertiary treatment plant, water system, and launching areas. The boat docking facilities and electrical service to some camp units are commercially operated by a concessionaire.

Proposed facilities include an overflow camp area, additional camp units, electrical outlets, picnic facilities, play area, sanitary facilities, amphitheater, water hydrants, and night lights. (See Plate 34.)

(20) Eagle Rock. This 41-acre area is located on the north shore of the main lake at Missouri State Highway 86 crossing about 2 miles southeast of the town of Eagle Rock, Missouri. The site is about 10 miles due north of Eureka Springs, Arkansas, and about 5 miles southeast of Roaring River State Park. Easy access to the area is provided from the south by paved Arkansas State Highway 23 and paved Missouri State Highway "P", and from the north by paved Missouri State Highway 112 and by paved Missouri State Highway "P". The terrain in the area is adaptable to a variety of recreational activities. The docking facilities are protected from prevailing winds by the highway embankment section of the bridge crossing. In addition to concessionaire operated boat dock facilities, development in the area includes an entrance station, roads, parking areas, swimming area, picnicking, and camping units, restrooms and showers, water system, and launching areas.

Proposed facilities include additional camping units, electrical outlets, play area, sanitary facilities, amphitheater, water points, and night lights.

It is also proposed to add 5 acres above the conservation pool to Lease No. DACW03-1-70-897 as shown on Plate 35. The present lease includes 6 acres and provides for the operation of a commercial boat dock and marine repair service. Operation and maintenance of all development in the lease area will be assumed by the concessionaire.

Concessionaire plans for further development include the redevelopment of 10 of the existing campsites, removal of 4 campsites, and the addition of 30 new campsites. A utility island will be constructed at each of the 40 campsite pads to furnish potable water and 30 amperage, 120 volt electric service for self-contained recreational vehicles. All utility islands would be constructed on risers protected by a 6" diameter post, 36" high, set in concrete.

Concessionaire plans for support development include construction of a marine service repair shop, additional boat dock facilities, a four-lane launch ramp, and a swim facility. A 2,000 gallon gasoline tank will be installed within the lease area in accordance with paragraph 7e of LRDR "Safety Regulation for Commercial Concession Docks, Boat Storage Docks, and Gasoline Docks," dated 23 August 1974. Swim facilities will include three sun-bathing floats, a diving float with four diving boards, a water slide, and a changehouse. The changehouse will be built on skid timbers, so it can be moved up and down with water fluctuation. The small marine repair shop building will be placed within the leased area at an approved location. A drawing of the dock arrangement, as submitted by the concessionaire, is shown on Plate 35. The office dock includes restrooms with adequate holding tanks to be installed to accommodate them.

All commercial development will be at the expense of the concessionaire. The concessionaire estimates his cost of development to be in excess of \$36,600. He has also agreed to operate and maintain all facilities located within the lease area. (See Plate 35.)

(21) Beaver. This 10-acre area lies adjacent to the town of Beaver, Arkansas, near the upper end of the main lake. Access to the area is provided by a 5-mile paved road joining U.S. Highway 62 to the west. A 3-mile paved road from Arkansas State Highway 23 to the southeast provides an extremely scenic access route. The Beaver, Arkansas, area is rich with history. This history is preserved in the many remaining landmarks which were erected during the mid 1800's. Development in the area consists of an entrance station, roads, parking, restroom, water supply, camping, and picnicking facilities, swimming area, and launching area.

Proposed facilities include additional camp units, electrical outlets, play area, trailer sanitary station, water points, and night lights. A historical marker is also proposed for the area based on the historical setting in and around the park. (See Plate 36.)

d. Future park development. One additional area is reserved for development when increased visitation warrants and a non-Federal sponsor provides the local cost sharing assurance requirements. A description of the area selected for future development is as follows:

James River. This 39-acre site is situated on the west shore of the James River arm. Access to the area is provided by a U.S. Forest Service road which intersects Missouri State Highway 39 at Hill City, Missouri. The area is about 13 miles from the highway intersection and is expected to attract fishermen, campers, and picknickers who desire a secluded area for recreational purposes. A launching ramp, parking area, roads, water supply, sanitary facilities, and facilities for picnicking and camping are proposed. (See Plate 37.)

e. Parks developed by other Federal agencies.

(1) Big Bay. This 31-acre area was developed by the U.S. Forest Service on their lands on the Big Creek arm of the lake in the vicinity of Campbell Point Boat Dock. Access to the area is by paved road from Missouri State Highway "YY." Developments include roads, parking areas, water system, sanitary facilities, launching area, trails, and picnicking and camping facilities. The campground contains two waterborne restrooms and a sewage treatment facility. (See Plate 11.)

(2) Shell Knob. This 8-acre area is located adjacent to Missouri State Highway "YY" near the town of Shell Knob, Missouri, and was developed by the U.S. Forest Service primarily for camping. The Forest Supervisor advises that the area is designed ultimately for 20 family camp units, but the recent trend in home building and subdivision construction in the area may necessitate changing the area into a day-use picnic area. (See Plate 11.)

7-04 Fish and wildlife conservation. The Corps of Engineers and the Missouri Department of Conservation have implemented a vegetative program to enhance wildlife populations in the Table Rock Lake area. Land management practices favor and encourage plant species conducive to game and nongame species. Preservation of the existing vegetation surrounding Table Rock Lake is a primary objective in the wildlife development plan. Management of the fishery resources in Table Rock Lake is the responsibility of the Missouri Department of Conservation and the Arkansas Game and Fish Commission. The Corps will cooperate with these agencies in carrying out their programs consistent with Public Law 85-624. The Missouri Department of Conservation is currently expanding and rehabilitating the Shepherd of the Hills Trout Hatchery and this facility will make a valuable contribution in providing a rainbow trout fishery.

7-05 Project structures. Project structures primarily consist of the dam and powerhouse and supporting structures for the project. These structures are discussed below.

a. Dam and powerhouse. The dam is a concrete gravity-type structure with embankment extensions and includes a concrete structure for housing the hydro-electric generating plant. Details of this structure are furnished in Section 2, paragraph 2-03. In connection with the main structure as described above, an electric power plant switch yard is located just downstream from the powerhouse on the left bank.

b. Maintenance buildings and storage area. A new Resident Office located in the Visitor Center Building has just been completed in which the administrative offices are located. The previous Resident Office has been converted to a maintenance facility. The maintenance facilities include office space, storage space, and a fenced compound area. Also, connected with this facility is a vehicle storage shed which belongs to the Missouri Department of Conservation. There is a second maintenance area located near the dam.

c. Overlook. The original overlook structure for observation of the dam during construction has been removed. A new overlook and observation area has been established on the rock bluff on the right bank overlooking the dam and downstream area. The overlook consists of a platform area built with native stone. No other shelter-type structure is proposed for the overlook in order to preserve the natural setting of the rock bluff and stone observation area.

d. Radio Tower. A tower for radio communication is located on the high bluff on the right bank in the vicinity of the overlook.

e. Resident Office and Visitors Center. A new resident office and visitor center building was completed in July 1976. The building was designed to complement and blend with the massive man-made Table Rock Dam. The building itself has five major use areas; the public circulation area, the observation deck, the administrative area, the auditorium, and the interpretive center. The theme of the interpretive center is MAN AND NATURE IN THE OZARKS and exhibits presented in the center accent the theme with natural rocks, stuffed animals and birds, artificial native plants, Indian artifacts, and other items of display materials to orient the visitor with historic and natural objects. The exhibit concept is unique in its presentation of each of the four seasons with transitional zones between each of the seasonal exhibits. Free information is available in the lobby for the visitors to the center. Personnel are on duty to answer questions concerning the area's facilities and activities, while additional information is subject to recall on a recorded program. The center, which will be open year round (12 hours a day in summer and 8 hours a day the rest of the year) will also furnish the visitor with information about the history of the Ozarks from 12,000 B.C. to modern times. The 175 seat theater will be used for interpretive talks, recorded film presentations, and it will be made available for use by local clubs and groups for meetings. The observation deck at the rear of the center affords a view of Table Rock Lake and its surroundings. A path from near the observation deck leads to the shoreline or to a nearby nature trail. A boat dock to moor Corps craft with mooring space for visitors to the new resident office and visitor center, estimated to cost \$20,000, will be programmed for construction with O&M funds.

## SECTION VIII - SPECIAL PROBLEMS

8-01 Natural resource preservation and interpretation. The development and management of the project is based on the principle of conservation of resources so that they are not exhausted by public use, but are sustained to provide recreation enjoyment for future generations. The land use allocation plan, described in Section VII, paragraph 7-02, of this report, is a principal device for assuring that the natural resources of the project are designated on the basis of their highest and best use. The forest and wildlife management plans for the project function as corollary programs for implementation of proper management practices in conjunction with these land use allocations.

The implementation of interpretive programs in the future will enhance the overall conservation program for the project by promoting greater public understanding of natural resources and greater respect for the benefits which they provide.

8-02 Archeological and historical resources. In accordance with EC 1105-2-37, dated 8 August 1975, a program will be developed to insure consideration and protection of cultural resources at existing Corps-operated projects. It is intended that such a plan be developed and included as a supplement to Appendix A of the Master Plan. It is further intended that this be done in a timely manner since we will continue to lose this irreplaceable resource until such action is taken. The lake was publicized in the spring of 1976 in a diver magazine for artifact collecting despite the illegality of taking of artifacts, which are Government property. Also, historical areas should be properly identified and preserved before the significance of these areas is lost forever.

8-03 Fee system and collection. It is the policy of the Corps of Engineers that no access or entrance fees be charged at any of the Corps recreation facilities. User fees, however, may be used as a means to defray management costs in park use areas and are authorized by Public Laws 90-483, 92-347, 93-81, and 93-303. Public Law 93-303, enacted 7 June 1974, provides for the collection of fees at family camping and group camping areas having the following facilities: tent or trailer spaces, drinking water, access roads, refuse containers, restroom facilities, personal collection of the fee by an employee of the Federal agency operating the facility, reasonable visitor protection, and a simple device for containing a campfire. A system of fee collection has been implemented in accordance with this Public Law. Two parks, Cow Creek and Coombs Ferry, have been selected as free parks.

Special facilities which may be reserved for group activities are provided in three parks. These are Mill Creek, Joe Bald, and Indian Point. When not reserved for group use, the sites within the group areas will be operated as individual sites.

8-04. Cost-sharing policy. The projection data shown in Section V indicate that additional facilities will be needed to satisfy future recreational demands. However under present policies, development is limited to cost-sharing development ventures. Since there has been insufficient response from non-Federal public agencies interested in cost sharing recreational development on Table Rock, development has been curtailed. With no program for further expansion of recreational facilities, it may become necessary to establish more control and initiate an overall reservation system to provide a fair and equal opportunity for all visitors to utilize the recreational facilities rather than allowing over use of the facilities.



## SECTION IX

### PROJECT ACCOMPLISHMENTS, BENEFITS, AND ECONOMIC VALUES

9-01 Project accomplishments. The project has produced 7,305,137,000 kilowatt hours of electric energy through June 1975, which has been marketed by the Southwestern Power Administration, Department of the Interior, with income of \$26,406,105. The accumulated flood losses prevented through June 1975 are estimated at \$17,754,000. The flood losses prevented through 1975 on an annual basis exceeds the estimated annual flood losses which were presented in justifying the construction of the project.

9-02 Collateral benefits and economic values. Prior to impoundment of the Table Rock Lake in 1959, recreational use of the lake area consisted of bank, trotline, and float fishing, and hunting of deer, waterfowl, and upland game. Nearby residents were the principal recreation users. No information is available as to the number of people who utilized the lake area for recreational pursuits prior to construction of the project. Between the years 1960 and 1975, visitation to the lake has increased from 2,407,900 to 6,188,100. Based upon standards for the evaluation of recreational benefits contained in Supplement No. 1 to Senate Document No. 97, 87th Congress, 2d session, Evaluation Standards for Primary Outdoor Recreation Benefits, the estimated value of an average visitor to Table Rock Lake is \$1.50. Application of this value to the visitation of 6,188,100 experienced in 1975 yields a gross benefit of \$9,282,150. The full economic impact of Table Rock Lake upon the general area may be better visualized through the comparison of various economic data as presented in Table IX-1.

TABLE IX-1

## DATA RELATING TO COLLATERAL BENEFITS OF PROJECT

Item	:Year prior to:	
	: impoundment :	1975
	: (1958) :	
Number of vacation resorts, cottages, camps, lodges, hotels, and similar accommodations where overnight facilities are provided in vicinity of lake	: 41 :	293
Number of overnight accommodations available in above establishments	: 1,353 :	10,391
Number of restaurants, cafes, and public dining rooms in vicinity of lake	: 26 :	112
Assessed valuation of all taxable property in counties in which lake is located: Taney, Stone, and Barry in Missouri; Carroll and Boone in Arkansas		
Taney	: \$12,226,281 :	\$42,733,724
Stone	: 8,628,647 :	29,805,379
Barry	: 20,461,160 :	32,320,116
Carroll	: 6,881,775 :	19,272,800
Boone	: 7,102,747 :	28,968,630
Total	: 53,300,610 :	153,100,649
Number of real estate transfers in counties in which the lake is located	: 3,816 :	8,386

## SECTION X - COST ESTIMATES

10-01 General. The following paragraphs and tables are presented to facilitate review of estimates of cost for public park facilities and the expenditures for existing facilities completed through Fiscal Year 1976 transition quarter. The total estimated cost for the proposed facilities is \$11,557,600.

### 10-02 Cost-sharing policy.

In accordance with current cost-sharing policy which was developed subsequent to the enactment of PL 89-72 and established by the Secretary of the Army, in coordination with the Office Management and Budget, further development of all parks will require participation by a non-Federal public body furnishing at least 50 percent of the cost of further recreational development. In addition they would be responsible for providing for operation and maintenance of that park. The exception to that policy is that urgently needed sanitary facilities may be provided at full Federal expense. All recreational development became subject to this policy in FY 75.

### 10-03 Facility costs.

a. All cost estimates are based on October 1976 price levels, as applied to experienced cost of similar facilities in the Little Rock District. Costs for facilities not previously constructed were based on other data sources.

b. A resume' of allocation and expenditure to date and a schedule of funds by Fiscal Years for recreational development are shown in Table X-1.

c. A summary of the operation and maintenance costs are shown in Table X-2. The estimated total cost of construction for the proposed public park facilities is \$11,548,400. A summary of estimated cost for additional development by parks is shown in Table X-3. A summary of estimated cost for additional development planned is shown in Table X-4. A detailed estimate for additional recreational facilities in each park are shown in Tables X-5 through X-27.

TABLE X-1

## ALLOCATION AND EXPENDITURE OF FUNDS

## RECREATION FACILITIES

Item	:	Cost
Cost of initial construction	:	\$974,000
Total 719 funds allocated thru FY 76 TQ	:	<u>1,401,500</u>
Allocation thru FY 76 TQ including initial construction	:	2,375,500
Cost of needed facilities	:	11,548,400
Proposed total project cost	:	13,923,900

## SCHEDULE OF FUNDS REQUIRED BY FISCAL YEARS FOR RECREATIONAL FACILITIES

Item	:	1977	:	1978	:	1979	:	1980	:	1981	:	1982
Urgently required sanitary facilities	:	:	:	:	:	:	:	:	:	:	:	:
	:	33,000:	:	34,000	:	120,000:	:	120,000:	:	120,000:	:	120,000
Needed development for public demand	:	:	:	:	:	:	:	:	:	:	:	:
Federal	:	0:	:	0	:	1,383,500	:	1,383,500:	:	1,383,600:	:	1,383,600
Non-Federal	:	0:	:	0	:	1,383,500	:	1,383,500:	:	1,383,600:	:	1,383,600

TABLE X-2

SUMMARY OF OPERATION AND MAINTENANCE  
COSTS FOR RECREATIONAL FACILITIES AND  
REAL ESTATE MANAGEMENT SERVICES

Item	Public Use	Real Estate Activities
<u>Fiscal Year 1975</u>		
Real Estate	-0-	\$90,000*
Recreational Facilities:	\$470,000	-0-
S&I & Overhead	<u>63,000</u>	<u>12,000</u>
Total	533,000	102,000
<u>Fiscal Year 1980</u>		
Real Estate	-0-	60,000*
Recreational Facilities:	576,000	-0-
S&I & Overhead	<u>77,000</u>	<u>8,000</u>
Total	653,000	68,000
<u>Ultimate</u>		
Real Estate	-0-	75,000
Recreational Facilities:	786,000	-0-
S&I & Overhead	<u>105,000</u>	<u>10,000</u>
Total	891,000	85,000

\*Reason for decrease from 1975 to 1980 is expected decline in number of encroachments requiring resolution.

TABLE X-3

SUMMARY OF ESTIMATED COST FOR NEEDED  
RECREATIONAL FACILITIES BY PARKS

Reference Table	Park Name	Estimated Cost
X-5	Dam Area and State Park	\$3,000
X-6	Baird Mountain	1,071,000
X-7	Long Creek	392,900
X-8	Cricket Creek	258,700
X-9	Old Highway 86	676,900
X-10	Coombs Ferry	573,800
X-11	Indian Point	509,300
X-12	Cow Creek	555,700
X-13	Highway 13	602,800
X-14	Mill Creek	184,400
X-15	Joe Bald	380,700
X-16	Aunts Creek	457,700
X-17	Cape Fair	485,900
X-18	Baxter	471,000
X-19	Big Indian	440,800
X-20	Campbell Point	395,400
X-21	Viola	335,500
X-22	Kings River	340,200
X-23	Viney Creek	396,500
X-24	Big M	330,500
X-25	Eagle Rock	160,200
X-26	Beaver	118,500
X-27	James River (Future)	814,200
Total direct cost		9,955,600
Engineering & design		995,500
Supervision & administration		597,300
Total		11,548,400

Note: The proposed boat dock to moor Corps craft and serve visitors at the new resident office and visitor center is estimated to cost \$20,000 and will be programmed for construction with O&M funds.

TABLE X-4

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## PROJECT SUMMARY

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		90,900		
a. New construction	do	22.00		27,000	594,000
b. Existing gravel	do	15.00			
b. 18 feet wide					
1. Gravel surface	do		2,550		
2. Bituminous pavement	do		35,700		
a. New construction	do		-	-	
b. Existing gravel	do	13.50	-	2,550	34,450
C. 16 feet wide					
1. Gravel surface	do		2,350		
2. Bituminous pavement	do		25,750	-	
a. New construction	do		-	-	
b. Existing gravel	do	11.00	-	2,250	24,750
D. 12 feet wide					
1. Gravel surface	do	4.00	15,230	9,225	36,900
2. Bituminous pavement	do		42,900		
a. New construction	do	15.00	-	21,930	328,950
b. Existing gravel	do	10.50	-	10,080	105,900
PARKING AREAS					
A. Gravel	S.Y.		18,300		
B. Bituminous pavement	do		193,200		
1. New construction		10.00		25,595	255,950
2. Existing gravel	do	8.00		2,830	22,700
ROADS DELETED	L.F.	3.00		550	1,650
CAUSEWAY	S.J.			2	37,500
LAUNCHING LANES, CONCRETE	do	31,500	95	5	157,500
CAMPING TURNOUTS, PAVED	do		745	-	
A. New construction	do	530	-	723	383,200
B. Gravel to be paved	do	400	421	424	169,600
PARK ENTRANCE STATION					
A. Gate house	do	4,000	23	4	16,000
B. Control gate	do	1,500	-	24	36,000
C. Mercury vapor light	do	400	1	20	8,000
D. Attendant trailer space	do	2,100	18	8	16,800

TABLE X-4 (Con.)

## PROJECT SUMMARY

Item	Unit	Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	28	4	80,000
b. Vault Type II	do	25,000:	-	4	100,000
c. Vault Type III	do	28,000:	6	39	1,092,000
2. Waterborne	do	38,000:	6	2	76,000
3. Waterborne with showers	do	44,000:	7	3	132,000
4. Convert to waterborne	do	8,000:	-	13	104,000
5. Convert to waterborne/showers	do	16,700:	-	44	734,800
B. Wooden, vault	do		17	-	-
CAMPERS WASHHOUSE	do	60,000:	1	6	360,000
SEWAGE SYSTEM	S.J.		3	20	1,640,500
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	18	4	28,000
B. Marine	Ea.	16,000:	4	5	80,000
WATER DISTRIBUTION SYSTEM	S.J.		18	19	194,000
DRINKING FOUNTAIN	Ea.	2,200:	50	35	77,000
WATER HYDRANT	do	800:	29	210	168,000
WATER WELL w/HAND PUMP	do	8,200:	2	1	8,200
PICNIC UNITS	do	1,000:	107	70	70,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:	-	2	15,000
CAMP UNITS	do	2,500:	1,327	**603	1,442,500
WALK-IN CAMP UNITS	do	2,500:	-	31	77,500
WALK-IN GROUP CAMP UNITS	do	6,000:	-	2	12,000
TABLE SHELTER	do	2,000:	30	49	98,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	-	10	19	176,500
ELECTRICAL OUTLETS	Ea.	450:	81	826	371,700
GROUP PICNIC SHELTER	do	18,500:	9	3	55,500
SWIM BEACH	do	5,500:	23	11	60,500
CHANGEHOUSE	do	12,000:	*3	5	60,000
PLAY AREA	do	2,500:	3	29	72,500
AMPHITHEATER	do	5,000:	2	18	90,000
TRAILS	L.F.	2.50:	7,475	37,550	93,900
MERCURY VAPOR LIGHTS	Ea.	400:	30	47	18,800
TRAFFIC CONTROL GATES	do	500:	8	7	3,500
LANDSCAPING & BEAUTIFICATION	S.J.				133,350
TOTAL					9,955,600

\*Two with showers (Old Hwy. 86 &amp; Mill Creek).

\*\*Fourteen existing camp units and 26 proposed camp units are under Eagle Rock lease and are not reflected in cost.



TABLE X- 5

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## DAM AREA &amp; STATE PARK

Acres 449 (including Plate 15)

See Plates 14 &amp; 15

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do				
a. New construction	do	22.00:			
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		21,900		
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:			
2. Bituminous pavement	do		8,400		
a. New construction	do	15.00:			
b. Existing gravel	do	10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		21,550		
1. New construction		10.00:			
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	9		
CAMPING TURNOUTS, PAVED	do		195		
A. New construction	do	530:			
B. Gravel to be paved	do	400:			
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	2		
B. Control gate	do	1,500:			
C. Mercury vapor light	do	400:			
D. Attendant trailer	do	2,100:			
space					

TABLE X- 5 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:			
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:			
2. Waterborne	do	38,000:	2		
3. Waterborne with showers	do	44,000:	1		
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:			
B. Wooden, vault	do		5		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.		1		
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:			
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.		1		
DRINKING FOUNTAIN	Ea.	2,200:	22		
WATER HYDRANT	do	800:			
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	31		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	195		
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.		1		
ELECTRICAL OUTLETS	Ea.	450:	20		
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:	1		
AMPHITHEATER	do	5,000:	1		
TRAILS	L.F.	2.50:	3,400	1,100	3,000
MERCURY VAPOR LIGHTS	Ea.	400:	4		
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				
TOTAL					3,000

TABLE X-6

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## BAIRD MOUNTAIN PARK

Acres 90

See Plate 16

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities FY 76 Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		2,300		
a. New construction	do	22.00:		3,450	75,900
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do		400		
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:		400	4,400
D. 12 feet wide					
1. Gravel surface	do	4.00:			
2. Bituminous pavement	do				
a. New construction	do	15.00:		4,700	70,500
b. Existing gravel		10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		1,100		
1. New construction		10.00:		3,600	3,600
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:		2	63,000
CAMPING TURNOUTS, PAVED	do				
A. New construction	do	530:		107	56,700
B. Gravel to be paved	do	400:			
PARK ENTRANCE STATION					
A. Gate house	do	4,000:		1	4,000
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:		1	2,100

TABLE X-6 (Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:		1	20,000
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:			
2. Waterborne	do	38,000:		2	76,000
3. Waterborne with showers	do	44,000:		1	44,000
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:			
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	85,000:		1	85,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:		1	7,000
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	10,000:		1	10,000
DRINKING FOUNTAIN	Ea.	2,200:		4	8,800
WATER HYDRANT	do	800:		11	8,800
WATER WELL w/HAND PUMP	do	8,200:		1	8,200
PICNIC UNITS	do	1,000:		16	16,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:		97	242,500
WALK-IN CAMP UNITS	do	2,500:		8	20,000
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:		20	40,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,000:		1	8,000
ELECTRICAL OUTLETS	Ea.	450:		56	25,200
GROUP PICNIC SHELTER	do	18,500:		1	18,500
SWIM BEACH	do	5,500:			
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		16,500	41,300
MERCURY VAPOR LIGHTS	Ea.	400:		3	1,200
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				8,500
TOTAL					1,071,000

TABLE X- 7

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## LONG CREEK PARK

Acres 56

See Plate 17

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		3,550		
a. New construction	do	22.00:		300	6,600
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do		150		
2. Bituminous pavement	do		700		
a. New construction	do				
b. Existing gravel	do	13.50:		150	2,050
C. 16 feet wide					
1. Gravel surface	do		100		
2. Bituminous pavement	do		350		
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	350	375	1,500
2. Bituminous pavement	do		2,400		
a. New construction	do	15.00:		1,300	19,500
b. Existing gravel	do	10.50:		350	3,650
PARKING AREAS					
A. Gravel	S.Y.		900		
B. Bituminous pavement	do		13,900		
1. New construction		10.00:		330	3,300
2. Existing gravel	do	8.00:		100	800
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	2		
CAMPING TURNOUTS, PAVED	do		24		
A. New construction	do	530:		25	13,250
B. Gravel to be paved	do	400:	9	9	3,600
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:	1		

TABLE X- 7 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		3	84,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	77,000:		1	77,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:		1	16,000
WATER DISTRIBUTION SYSTEM	S.J.	10,000:	1	1	10,000
DRINKING FOUNTAIN	Ea.	2,200:	3	1	2,200
WATER HYDRANT	do	800:		10	8,000
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	5		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	44	23	57,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.		1		
ELECTRICAL OUTLETS	Ea.	450:		28	12,600
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:			
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	3	1	400
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				5,950
TOTAL					393,900

TABLE X-8

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## CRICKET CREEK PARK

Acres: 57		See Plate: 18				
Item	Unit	Unit Cost	Existing	Proposed Facilities		
			Facilities			
			FY 76	Quantity	Cost	
			Quantity	Quantity	Cost	
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do					
a. New construction	do	22.00:	4,700	100	2,200	
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do		400			
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	13.50:		400	5,400	
C. 16 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		1,800			
a. New construction	do					
b. Existing gravel	do	11.00:				
D. 12 feet wide						
1. Gravel surface	do	4.00:		1,900	7,600	
2. Bituminous pavement	do		1,600			
a. New construction	do	15.00:		600	9,000	
b. Existing gravel	do	10.50:				
PARKING AREAS						
A. Gravel	S.Y.		670			
B. Bituminous pavement	do		5,080			
1. New construction		10.00:		700	7,000	
2. Existing gravel	do	8.00:		670	5,400	
ROADS DELETED						
CAUSEWAY	L.F.	3.00:				
LAUNCHING LANES, CONCRETE	S.J.					
CAMPING TURNOUTS, PAVED	do	31,500:	3			
A. New construction	do	530:		21	11,150	
B. Gravel to be paved	do	400:	19	19	7,600	
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:		1	1,500	
C. Mercury vapor light	do	400:		1	400	
D. Attendant trailer space	do	2,100:	1			

TABLE X-8 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:	1	1	28,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		2	16,000
5. Convert to waterborne/showers	do	16,700:			
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	67,000:		1	67,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:		1	16,000
WATER DISTRIBUTION SYSTEM	S.J.	10,000:	1	1	10,000
DRINKING FOUNTAIN	Ea.	2,200:	1	3	6,600
WATER HYDRANT	do	800:	1	6	4,800
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	5		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	43	11	27,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.		1		
ELECTRICAL OUTLETS	Ea.	450:	10	25	11,250
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	1	2	800
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				6,000
TOTAL					258,700



TABLE X-9

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## OLD HIGHWAY 86 PARK

Acres: 61				See Plate : 19		
Item	Unit	Unit Cost	Existing	Proposed Facilities		
			Facilities	Facilities		
			FY 76	Quantity	Cost	
			Quantity			
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do		5,100			
a. New construction	do	22.00:		3,600	79,000	
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		200			
a. New construction	do					
b. Existing gravel	do	13.50:				
C. 16 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	11.00:				
D. 12 feet wide						
1. Gravel surface	do	4.00:	350	1,100	4,400	
2. Bituminous pavement	do		4,000			
a. New construction	do	15.00:		1,200	18,000	
b. Existing gravel	do	10.50:				
PARKING AREAS						
A. Gravel	S.Y.					
B. Bituminous pavement	do		3,830			
1. New construction		10.00:		1,940	19,400	
2. Existing gravel	do	8.00:				
ROADS DELETED						
	L.F.	*3.00:		100	300	
CAUSEWAY	S.J.			1	18,750	
LAUNCHING LANES, CONCRETE	do	31,500:	4			
CAMPING TURNOUTS, PAVED	do		12			
A. New construction	do	530:		67	35,500	
B. Gravel to be paved	do	400:	34	34	13,600	
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:		1	1,500	
C. Mercury vapor light	do	400:				
D. Attendant trailer space	do	2,100:	1			

TABLE X-9 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000	1		
b. Vault Type II	do	25,000		1	25,000
c. Vault Type III	do	28,000		3	84,000
2. Waterborne	do	38,000	1		
3. Waterborne with showers	do	44,000			
4. Convert to waterborne	do	8,000		1	8,000
5. Convert to waterborne/showers	do	16,700		3	50,100
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000			
SEWAGE SYSTEM	S.J.	110,000		1	110,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000	1		
B. Marine	Ea.	16,000			
WATER DISTRIBUTION SYSTEM	S.J.	12,000	1	1	12,000
DRINKING FOUNTAIN	Ea.	2,200	3	1	2,200
WATER HYDRANT	do	800		12	9,600
WATER WELL w/HAND PUMP	do	8,200			
PICNIC UNITS	do	1,000	6		
GROUP PICNIC/CAMP COMPLEX	do	7,500			
CAMP UNITS	do	2,500	80	39	97,500
WALK-IN CAMP UNITS	do	2,500			
WALK-IN GROUP CAMP UNITS	do	6,000			
TABLE SHELTER	do	2,000	10	12	24,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	10,000		1	10,000
ELECTRICAL OUTLETS	Ea.	450		61	27,450
GROUP PICNIC SHELTER	do	18,500	1		
SWIM BEACH	do	5,500	2	1	5,500
CHANGEHOUSE WITH SHOWERS	do	12,000	1		
PLAY AREA	do	2,500		3	7,500
AMPHITHEATER	do	5,000		1	5,000
TRAILS	L.F.	2.50			
MERCURY VAPOR LIGHTS	Ea.	400	3	1	400
TRAFFIC CONTROL GATES	do	500			
LANDSCAPING & BEAUTIFICATION	S.J.				8,000
TOTAL					676,900

TABLE X-10

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## COOMBS FERRY PARK

Acres: 66			See Plate: 20		
Item	Unit	Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
			Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		4,750		
a. New construction	do	22.00:		1,450	31,900
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:		1,700	6,800
2. Bituminous pavement	do		2,000		
a. New construction	do	15.00:		3,200	48,000
b. Existing gravel		10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		2,900		
1. New construction		10.00:		780	7,800
2. Existing gravel	do	8.00:			
ROADS DELETED					
CAUSEWAY	S.J.	3.00:			
LAUNCHING LANES, CONCRETE	do	13,500:	6		
CAMPING TURNOUTS, PAVED	do		17		
A. New construction	do	530:		63	33,400
B. Gravel to be paved	do	400:			
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1	1	4,000
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:		1	2,100
space					

TABLE X- 1(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		2	16,000
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	110,000:		1	110,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	12,000:	1	1	12,000
DRINKING FOUNTAIN	Ea.	2,200:			
WATER HYDRANT	do	800:	2	9	7,200
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	1	2	2,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	39	38	95,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	10,000:		1	10,000
ELECTRICAL OUTLETS	Ea.	450:		40	18,000
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:			
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:		2	800
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				7,000
TOTAL					573,800

TABLE X-11

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## INDIAN POINT PARK

ACRES: 92

SEE PLATE: 21

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		6,300		
a. New construction	do	22.00:		500	11,000
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do		100		
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:		100	1,350
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		6,600		
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	1,630		
2. Bituminous pavement	do		2,700		
a. New construction	do	15.00:		1,100	16,500
b. Existing gravel	do	10.50:		130	1,350
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		10,500		
1. New construction		10.00:		360	3,600
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:		300	900
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do		62		
A. New construction	do	530:		23	12,200
B. Gravel to be paved	do	400:	20	20	8,000
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:			
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:	1		

TABLE X-11(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	3		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:	1	2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		3	50,000
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	115,000:		1	115,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:	1	1	16,000
WATER DISTRIBUTION SYSTEM	S.J.	12,000:	1	1	12,000
DRINKING FOUNTAIN	Ea.	2,200:	3	1	2,200
WATER HYDRANT	do	500:	2	11	8,800
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	1	3	3,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	82	19	47,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	20,000:	1	1	20,000
ELECTRICAL OUTLETS	Ea.	450:		49	22,050
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:		1	12,000
PLAY AREA	do	2,500:		2	5,000
AMPHITHEATER	do	5,000:	1		
TRAILS	L.F.	2.50:		2,700	6,750
MERCURY VAPOR LIGHTS	Ea.	400:		4	1,600
TRAFFIC CONTROL GATES	do	500:	3	4	2,000
LANDSCAPING & BEAUTIFICATION	S.J.				6,000
TOTAL					509,300

TABLE X-12

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## COW CREEK PARK

ACRES: 56

See Plate 22

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		3,100		
a. New construction	do	22.00:		4,000	88,000
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:		900	3,600
2. Bituminous pavement	do		1,000		
a. New construction	do	15.00:		400	6,000
b. Existing gravel	do	10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		4,100		
1. New construction		10.00:		4,190	41,900
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	2	1	31,500
CAMPING TURNOUTS, PAVED	do		26		
A. New construction	do	530:		26	13,750
B. Gravel to be paved	do	400:		5	2,000
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		2	3,000
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:	1		

TABLE X-12(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		3	84,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	83,000:		1	83,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:		1	7,000
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.		1		
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:	3	7	5,600
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	5		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	27	26	65,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:		2	12,000
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,000:		1	8,000
ELECTRICAL OUTLETS	Ea.	450:		28	12,600
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:		1	12,000
PLAY AREA	do	2,500:			
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:	4,075	700	1,750
MERCURY VAPOR LIGHTS	Ea.	400:		2	800
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				3,000
TOTAL					555,700



TABLE X-13

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## HIGHWAY 13 PARK

ACRES: 151

See Plate 23

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		10,600		
a. New construction	do	22.00:		800	17,600
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		1,250		
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do		1,000		
2. Bituminous pavement	do		8,000		
a. New construction	do				
b. Existing gravel	do	11.00:		1,000	11,000
D. 12 feet wide					
1. Gravel surface	do	4.00:	4,100		
2. Bituminous pavement	do		600		
a. New construction	do	15.00:			
b. Existing gravel	do	10.50:		1,500	15,750
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		16,700		
1. New construction		10.00:		220	2,200
2. Existing gravel	do	8.00:		90	700
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	10		
CAMPING TURNOUTS, PAVED	do		90		
A. New construction	do	530:		28	14,850
B. Gravel to be paved	do	400:	59	59	23,600
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	2		
B. Control gate	do	1,500:		2	3,000
C. Mercury vapor light	do	400:		2	800
D. Attendant trailer space	do	2,100:	2		

TABLE X-13(Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2		
b. Vault Type II	do	25,000:		1	25,000
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:	1		
3. Waterborne with showers	do	44,000:	2	1	44,000
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do		2		
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	110,000:		1	110,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:	1		
WATER DISTRIBUTION SYSTEM	S.J.	15,000:		1	15,000
DRINKING FOUNTAIN	Ea.	2,200:	3	5	11,000
WATER HYDRANT	do	800:	1	30	24,000
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:			
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	148	26	65,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.				10,000
ELECTRICAL OUTLETS	Ea.	450:	10	63	28,350
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	2	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:	1	3	7,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:		4	1,600
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				11,950
TOTAL					602,800

TABLE X-14

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## MILL CREEK PARK

ACRES: 32

See Plate 24

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		2,700		
a. New construction	do	22.00:			
b. Existing gravel	do	15.00:			
B. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		2,600		
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		100		
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:			
2. Bituminous pavement	do		350		
a. New construction	do	15.00:		600	9,000
b. Existing gravel	do	10.50:		600	6,300
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		10,500		
1. New construction		10.00:		810	8,100
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.			1	18,750
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do		40		
A. New construction	do	530:		18	9,550
B. Gravel to be paved	do	400:	6	6	2,400
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:	1		

TABLE X-14(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2		
b. Vault Type II	do	25,000:		1	25,000
c. Vault Type III	do	28,000:			
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		1	16,700
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	20,000:		1	20,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.		1		
DRINKING FOUNTAIN	Ea.	2,200:	3	5	11,000
WATER HYDRANT	do	800:			
WATER WELL w/HAND PUMP	do	8,200:	1		
PICNIC UNITS	do	1,000:	8	3	3,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:		1	7,500
CAMP UNITS	do	2,500:	55	4	10,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	5,000:		1	5,000
ELECTRICAL OUTLETS	Ea.	450:		33	14,850
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:	1		
PLAY AREA	do	2,500:		2	5,000
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	2	1	400
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				4,950
TOTAL					184,400

TABLE X-15

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

JOE BALD PARK

ACRES: 81

SEE PLATE: 25

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		4,100		
a. New construction	do	22.00		700	15,400
b. Existing gravel	do	15.00			
b. 18 feet wide					
1. Gravel surface	do		200		
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50		200	2,700
C. 16 feet wide					
1. Gravel surface	do		200		
2. Bituminous pavement	do		3,600		
a. New construction	do				
b. Existing gravel	do	11.00		200	2,200
D. 12 feet wide					
1. Gravel surface	do	4.00		600	2,400
2. Bituminous pavement	do		2,800		
a. New construction	do	15.00		900	13,500
b. Existing gravel		10.50			
PARKING AREAS					
A. Gravel	S.Y.		140		
B. Bituminous pavement	do		4,300		
1. New construction		10.00		330	3,300
2. Existing gravel	do	8.00		130	1,050
ROADS DELETED	L.F.	3.00		150	450
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500	2		
CAMPING TURNOUTS, PAVED	do		29		
A. New construction	do	530		37	19,600
B. Gravel to be paved	do	400	8	8	3,200
PARK ENTRANCE STATION					
A. Gate house	do	4,000	1		
B. Control gate	do	1,500		1	1,500
C. Mercury vapor light	do	400		1	400
D. Attendant trailer space	do	2,100	1		

TABLE X-15(Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities	FY 76	
			Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:	1	2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	83,000:		1	83,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	9,000:	1	1	9,000
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:	6	9	7,200
WATER WELL w/HAND PUMP	do	8,200:	1		
PICNIC UNITS	do	1,000:	2	5	5,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:		1	7,500
CAMP UNITS	do	2,500:	17	19	47,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
ELECTRICAL OUTLETS	Ea.	450:		40	18,000
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		500	1,250
MERCURY VAPOR LIGHTS	Ea.	400:	2	2	800
TRAFFIC CONTROL GATES	do	500:		2	1,000
LANDSCAPING & BEAUTIFICATION	S.J.				4,950
TOTAL					380,700

TABLE X-16

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## AUNTS CREEK PARK

ACRES: 56		SEE PLATE; 26				
Item	Unit	Unit Cost	Existing	Proposed Facilities		
			Facilities	Facilities		
			FY 76	Quantity	Cost	
			Quantity	Quantity	Cost	
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do		5,700			
a. New construction	do	22.00:		750	16,500	
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		1,250			
a. New construction	do					
b. Existing gravel	do	13.50:				
C. 16 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	11.00:				
D. 12 feet wide						
1. Gravel surface	do	4.00:	350			
2. Bituminous pavement	do		1,850			
a. New construction	do	15.00:		550	8,250	
b. Existing gravel		10.50:				
PARKING AREAS						
A. Gravel	S.Y.		10,300			
B. Bituminous pavement	do					
1. New construction		10.00:		480	4,800	
2. Existing gravel	do	8.00:				
ROADS DELETED						
	L.F.	3.00:				
CAUSEWAY						
	S.J.					
LAUNCHING LANES, CONCRETE	do	31,500:	6			
CAMPING TURNOUTS, PAVED	do		58			
A. New construction	do	530:		29	15,350	
B. Gravel to be paved	do	400:				
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:		1	1,500	
C. Mercury vapor light	do	400:		1	400	
D. Attendant trailer	do	2,100:	1			
space						

TABLE X-16 (Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2	1	20,000
b. Vault Type II	do	25,000:		3	84,000
c. Vault Type III	do	28,000:			
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do	2,500:	1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	83,000:		1	83,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	9,000:		1	9,000
DRINKING FOUNTAIN	Ea.	2,200:		2	4,400
WATER HYDRANT	do	800:	1	12	9,600
WATER WELL w/HAND PUMP	do	8,200:	1		
PICNIC UNITS	do	1,000:	3	5	5,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	55	29	72,500
WALK-IN CAMP UNITS	do	2,500:		4	10,000
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
ELECTRICAL OUTLETS	Ea.	450:		43	19,350
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:	1		
PLAY AREA	do	2,500:		3	7,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		700	1,750
MERCURY VAPOR LIGHTS	Ea.	400:	1	3	1,200
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				12,000
TOTAL					457,700



TABLE X-17

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## CAPE FAIR PARK

ACRES: 78

SEE PLATE: 27

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		5,900		
a. New construction	do	22.00:		850	18,700
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do		900		
2. Bituminous pavement	do		2,600		
a. New construction	do				
b. Existing gravel	do	13.50:		900	12,150
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	350		
2. Bituminous pavement	do		3,100		
a. New construction	do	15.00:		600	9,000
b. Existing gravel	do	10.50:		350	3,700
PARKING AREAS					
A. Gravel	S.Y.		335		
B. Bituminous pavement	do		10,700		
1. New construction	do	10.00:			
2. Existing gravel	do	8.00:		330	2,650
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do		25		
A. New construction	do	530:		22	11,650
B. Gravel to be paved	do	400:	43	43	17,200
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:		1	2,100

TABLE X-17(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	3		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		3	84,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		2	16,000
5. Convert to waterborne/showers	do	16,700:	2	3	50,100
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	105,000:		1	105,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	15,000:	1	1	15,000
DRINKING FOUNTAIN	Ea.	2,200:	3	2	4,400
WATER HYDRANT	do	800:		14	11,200
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	4		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	71	21	52,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:		6	12,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	10,500:		1	10,500
ELECTRICAL OUTLETS	Ea.	450:		50	22,500
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:		4	1,600
TRAFFIC CONTROL GATES	do	500:	2		
LANDSCAPING & BEAUTIFICATION	S.J.				9,050
TOTAL					485,900

TABLE X-18

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## BAXTER PARK

ACRES: 61

SEE PLATE: 28

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities		
			FY 76	Quantity	Cost
Quantity					
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		2,800		
a. New construction	do	22.00:		2,150	47,300
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do		800		
2. Bituminous pavement	do		700		
a. New construction	do				
b. Existing gravel	do	13.50:		800	10,800
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		1,900		
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:			
2. Bituminous pavement	do		1,500		
a. New construction	do	15.00:			
b. Existing gravel		10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		10,260		
1. New construction		10.00:		3,600	36,000
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4	1	31,500
CAMPING TURNOUTS, PAVED	do		50		
A. New construction	do	530:		29	15,350
B. Gravel to be paved	do	400:			
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:			
D. Attendant trailer space	do	2,100:	1		

TABLE X-18(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:		1	25,000
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:	1		
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	83,000:		1	83,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:	1		
WATER DISTRIBUTION SYSTEM	S.J.	9,000:	1	1	9,000
DRINKING FOUNTAIN	Ea.	2,200:	2		
WATER HYDRANT	do	800:		10	8,000
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	3	3	3,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	48	26	65,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
ELECTRICAL OUTLETS	Ea.	450:		40	18,000
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	3	4	1,600
TRAFFIC CONTROL GATES	do	500:	2		
LANDSCAPING & BEAUTIFICATION	S.J.				5,050
TOTAL					471,000

TABLE X- 19

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## BIG INDIAN PARK

ACRES: 50

See Plate 29

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		950		
a. New construction	do	22.00:		2,250	49,500
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do		3,000		
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	1,000		
2. Bituminous pavement	do		550		
a. New construction	do	15.00:			
b. Existing gravel	do	10.50:		800	8,400
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		6,450		
1. New construction		10.00:		310	3,100
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do				
A. New construction	do	530:		46	24,400
B. Gravel to be paved	do	400:	16	16	6,400
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer space	do	2,100:	3		

TABLE X-19(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	2		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		1	28,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		1	16,700
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	100,000:		1	100,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.				
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:		12	9,600
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	2		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	30	35	87,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	9,000:		1	9,000
ELECTRICAL OUTLETS	Ea.	450:		32	14,400
GROUP PICNIC SHELTER	do	18,500:	1		
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:		3	1,200
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				3,000
TOTAL					440,800

TABLE X-20

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## CAMPBELL POINT PARK

ACRES: 112

See Plate 30

Item	Unit	Unit Cost	Existing Facilities		Proposed Facilities	
			FY 76			
			Quantity		Quantity	Cost
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do		5,400			
a. New construction	do	22.00:			200	4,400
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	13.50:				
C. 16 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		400			
a. New construction	do					
b. Existing gravel	do	11.00:				
D. 12 feet wide						
1. Gravel surface	do	4.00:	900			
2. Bituminous pavement	do		1,700			
a. New construction	do	15.00:			1,400	21,000
b. Existing gravel	do	10.50:			900	9,450
PARKING AREAS						
A. Gravel	S.Y.					
B. Bituminous pavement	do		10,550			
1. New construction	do	10.00:			1,520	15,200
2. Existing gravel	do	8.00:				
ROADS DELETED	L.F.	3.00:				
CAUSEWAY	S.J.					
LAUNCHING LANES, CONCRETE	do	31,500:	7			
CAMPING TURNOUTS, PAVED	do		34			
A. New construction	do	530:			12	6,350
B. Gravel to be paved	do	400:	46		46	18,400
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:			1	1,500
C. Mercury vapor light	do	400:			1	400
D. Attendant trailer space	do	2,100:	1			

TABLE X-20 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:	1	1	44,000
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	63,500:	1	1	63,500
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:	1		
WATER DISTRIBUTION SYSTEM	S.J.	9,000:	1	1	9,000
DRINKING FOUNTAIN	Ea.	2,200:	5	1	2,200
WATER HYDRANT	do	800:		7	5,600
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	3	9	9,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	83	12	30,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,000:	1	1	8,000
ELECTRICAL OUTLETS	Ea.	450:	22	38	17,100
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:		1	12,000
PLAY AREA	do	2,500:	2	1	2,500
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		3,400	8,500
MERCURY VAPOR LIGHTS	Ea.	400:	3	1	400
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				7,000
TOTAL					395,400



TABLE X-21

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## VIOLA PARK

ACRES: 34

SEE PLATE: 31

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity		
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		3,650		
a. New construction	do	22.00:			
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	2,350		
2. Bituminous pavement	do		1,950		
a. New construction	do	15.00:			
b. Existing gravel		10.50:		1,950	20,500
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do		11,000		
1. New construction		10.00:		155	1,550
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do		26		
A. New construction	do	530:		9	4,750
B. Gravel to be paved	do	400:	48	48	19,200
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:		1	2,100
space					

TABLE X-21 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:	2	1	28,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:		1	8,000
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	83,000:		1	83,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:		1	16,000
WATER DISTRIBUTION SYSTEM	S.J.	9,000:	1	1	9,000
DRINKING FOUNTAIN	Ea.	2,200:	1	1	2,200
WATER HYDRANT	do	800:	6	7	5,600
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	3		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	60	20	50,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
ELECTRICAL OUTLETS	Ea.	450:	11	39	17,550
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:			
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	1		
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				5,050
TOTAL					335,500

TABLE X-22

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## KING'S RIVER PARK

ACRES: 38

SEE PLATE: 32

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities		
			FY 76	Quantity	Quantity
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do		2,400		
a. New construction	do	22.00:			
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	250	900	3,600
2. Bituminous pavement	do				
a. New construction	do	15.00:		930	13,950
b. Existing gravel		10.50:		250	2,650
PARKING AREAS					
A. Gravel	S.Y.		380		
B. Bituminous pavement	do		2,520		
1. New construction		10.00:		1,150	11,500
2. Existing gravel	do	8.00:		380	3,050
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	1		
CAMPING TURNOUTS, PAVED	do				
A. New construction	do	530:		25	13,250
B. Gravel to be paved	do	400:	6	6	2,400
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:		1	2,100
space					

TABLE X-22(Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities		
			FY 76	Quantity	Cost
			Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:		1	20,000
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:	1	1	28,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do	2,500:	1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	65,000:		1	65,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:	2	5	4,000
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	3		
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	13	16	40,000
WALK-IN CAMP UNITS	do	2,500:		19	47,500
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,500:		1	8,500
ELECTRICAL OUTLETS	Ea.	450:		16	7,200
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:			
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		5,650	14,100
MERCURY VAPOR LIGHTS	Ea.	400:		1	400
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				2,000
TOTAL					340,200

TABLE X-23

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## VINEY CREEK PARK

ACRES: 82

SEE PLATE: 33

Item	Unit	Cost	Existing	Proposed Facilities	
			FY 76	Quantity	Cost
			Quantity	Quantity	Cost
<b>ROADS</b>					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do				
a. New construction	do	22.00:	7,200	400	8,800
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:	800	500	2,000
2. Bituminous pavement	do		3,300		
a. New construction	do	15.00:		2,300	34,500
b. Existing gravel	do	10.50:		800	8,400
<b>PARKING AREAS</b>					
A. Gravel	S.Y.				
B. Bituminous pavement	do		6,560		
1. New construction		10.00:		690	6,900
2. Existing gravel	do	8.00:			
<b>ROADS DELETED</b>					
	L.F.	3.00:			
<b>CAUSEWAY</b>					
	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	5		
CAMPING TURNOUTS, PAVED	do		15		
A. New construction	do	530:		39	20,700
B. Gravel to be paved	do	400:	12	12	4,800
<b>PARK ENTRANCE STATION</b>					
A. Gate house	do	4,000:	1	1	4,000
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:	1	1	2,100
space					

TABLE X-23(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do		1		
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.	80,000:		1	80,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	8,500:	1	1	8,500
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:	4	6	4,800
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	2	3	3,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	39	27	67,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	8,000:		1	8,000
ELECTRICAL OUTLETS	Ea.	450:		28	12,600
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1	1	5,500
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		2	5,000
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		1,500	3,750
MERCURY VAPOR LIGHTS	Ea.	400:		3	1,200
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				5,950
TOTAL					396,500

TABLE X-24

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## BIG M PARK

ACRES: 96

SEE PLATE: 34

			Existing			
			Facilities	Proposed Facilities		
		Unit	FY 76			
Item	Unit	Cost	Quantity	Quantity	Cost	
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do		8,400			
a. New construction	do	22.00:				
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		1,500			
a. New construction	do					
b. Existing gravel	do	13.50:				
C. 16 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do		3,000			
a. New construction	do					
b. Existing gravel	do	11.00:				
D. 12 feet wide						
1. Gravel surface	do	4.00:	1,850	700	2,800	
2. Bituminous pavement	do		3,100			
a. New construction	do	15.00:		1,600	24,000	
b. Existing gravel		10.50:		1,500	15,750	
PARKING AREAS						
A. Gravel	S.Y.		680			
B. Bituminous pavement	do		11,900			
1. New construction		10.00:		260	2,600	
2. Existing gravel	do	8.00:		680	5,450	
ROADS DELETED	L.F.	3.00:				
CAUSEWAY	S.J.					
LAUNCHING LANES, CONCRETE	do	31,500:	3			
CAMPING TURNOUTS, PAVED	do		42			
A. New construction	do	530:		20	10,600	
B. Gravel to be paved	do	400:	46	46	18,400	
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:		2	3,000	
C. Mercury vapor light	do	400:		1	400	
D. Attendant trailer	do	2,100:	1			
space						

TABLE X-24(Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1		
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		2	56,000
2. Waterborne	do	38,000:	1		
3. Waterborne with showers	do	44,000:	2		
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		2	33,400
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.		1		
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:	1		
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	8,000:	1	1	8,000
DRINKING FOUNTAIN	Ea.	2,200:	1	2	4,400
WATER HYDRANT	do	800:		17	13,600
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	3	10	10,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	105	18	45,000
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:	19	4	8,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	7,500:	1	1	7,500
ELECTRICAL OUTLETS	Ea.	450:	8	56	25,200
GROUP PICNIC SHELTER	do	18,500:			
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:		1	12,000
PLAY AREA	do	2,500:		2	5,000
AMPHITHEATER	do	5,000:		1	5,000
TRAILS	L.F.	2.50:		2,800	7,000
MERCURY VAPOR LIGHTS	Ea.	400:	2	1	400
TRAFFIC CONTROL GATES	do	500:	1		
LANDSCAPING & BEAUTIFICATION	S.J.				7,000
TOTAL					330,500



TABLE X- 25

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## EAGLE ROCK PARK

ACRES: 41

SEE PLATE: 35

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities FY 76	Quantity	Cost
			Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do				
a. New construction	do	22.00:			
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:			
2. Bituminous pavement	do				
a. New construction	do	15.00:			
b. Existing gravel	do	10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do				
1. New construction		10.00:			
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:	4		
CAMPING TURNOUTS, PAVED	do		3		
A. New construction	do	530:		11	5,850
B. Gravel to be paved	do	400:	22	22	8,800
PARK ENTRANCE STATION					
A. Gate house	do	4,000:	1		
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:	1		
space					

TABLE X- 25(Con.)

Item	Unit	Unit Cost	Existing	Proposed Facilities	
			Facilities		
			FY 76	Quantity	Cost
			Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000			
b. Vault Type II	do	25,000			
c. Vault Type III	do	28,000		1	28,000
2. Waterborne	do	38,000			
3. Waterborne with showers	do	44,000			
4. Convert to waterborne	do	8,000			
5. Convert to waterborne/showers	do	16,700		1	16,700
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000	1		
SEWAGE SYSTEM	S.J.	8,000		1	8,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000	1		
B. Marine	Ea.	16,000		1	16,000
WATER DISTRIBUTION SYSTEM	S.J.	8,000	1	1	8,000
DRINKING FOUNTAIN	Ea.	2,200	1		
WATER HYDRANT	do	800	1	5	4,000
WATER WELL w/HAND PUMP	do	8,200			
PICNIC UNITS	do	1,000	4		
GROUP PICNIC/CAMP COMPLEX	do	7,500			
CAMP UNITS	do	2,500	*38	**34	20,000
WALK-IN CAMP UNITS	do	2,500			
WALK-IN GROUP CAMP UNITS	do	6,000			
TABLE SHELTER	do	2,000		5	10,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	5,000		1	5,000
ELECTRICAL OUTLETS	Ea.	450		19	8,550
GROUP PICNIC SHELTER	do	18,500			
SWIM BEACH	do	5,500	1		
CHANGEHOUSE	do	12,000			
PLAY AREA	do	2,500		1	2,500
AMPHITHEATER	do	5,000		1	5,000
TRAILS	L.F.	2.50		1,900	4,750
MERCURY VAPOR LIGHTS	Ea.	400		3	1,200
TRAFFIC CONTROL GATES	do	500			
LANDSCAPING & BEAUTIFICATION	S.J.				5,950
TOTAL					160,200

\*Fourteen campsites to be operated by Concessionaire.

\*\*Twenty-six campsites to be added by Concessionaire, therefore, only 8 included in cost.

TABLE X-26

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## BEAVER PARK

ACRES: 10

SEE PLATE: 36

Item	Unit	Cost	Existing	Proposed Facilities		
			Facilities			
			FY 76	Quantity	Cost	
ROADS						
A. 20 feet wide						
1. Gravel surface	L.F.					
2. Bituminous pavement	do		1,300			
a. New construction	do	22.00:				
b. Existing gravel	do	15.00:				
b. 18 feet wide						
1. Gravel surface	do					
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	13.50:				
C. 16 feet wide						
1. Gravel surface	do		650			
2. Bituminous pavement	do					
a. New construction	do					
b. Existing gravel	do	11.00:		650	7,150	
D. 12 feet wide						
1. Gravel surface	do	4.00:	950			
2. Bituminous pavement	do					
a. New construction	do	15.00:				
b. Existing gravel		10.50:		950	10,000	
PARKING AREAS						
A. Gravel	S.Y.					
B. Bituminous pavement	do		18,500			
1. New construction		10.00:		70	700	
2. Existing gravel	do	8.00:		450	3,600	
ROADS DELETED						
CAUSEWAY	S.J.	3.00:				
LAUNCHING LANES, CONCRETE	do	31,500:	5			
CAMPING TURNOUTS, PAVED	do					
A. New construction	do	530:		3	1,600	
B. Gravel to be paved	do	400:	25	25	10,000	
PARK ENTRANCE STATION						
A. Gate house	do	4,000:	1			
B. Control gate	do	1,500:		1	1,500	
C. Mercury vapor light	do	400:	1			
D. Attendant trailer	do	2,100:		1	2,100	
space						

TABLE X-26 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:	1	1	20,000
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:			
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:			
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:			
SEWAGE SYSTEM	S.J.				
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:		1	7,000
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	8,000:	1	1	8,000
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:	1	1	800
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:	5	4	4,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:	25		
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:	1	2	4,000
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	5,000:		1	5,000
ELECTRICAL OUTLETS	Ea.	450:		10	4,500
GROUP PICNIC SHELTER	do	18,500:		1	18,500
SWIM BEACH	do	5,500:	1		
CHANGEHOUSE	do	12,000:			
PLAY AREA	do	2,500:		2	5,000
AMPHITHEATER	do	5,000:			
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:	1	1	400
TRAFFIC CONTROL GATES	do	500:		1	500
LANDSCAPING & BEAUTIFICATION	S.J.				1,950
TOTAL					118,500

TABLE X- 27

## DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

## JAMES RIVER FUTURE PARK

ACRES: 39			SEE PLATE: 37		
Item	Unit	Cost	Existing	Proposed Facilities	
			Facilities : FY 76 : Quantity	Quantity	Cost
ROADS					
A. 20 feet wide					
1. Gravel surface	L.F.				
2. Bituminous pavement	do				
a. New construction	do	22.00:		5,500	121,000
b. Existing gravel	do	15.00:			
b. 18 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	13.50:			
C. 16 feet wide					
1. Gravel surface	do				
2. Bituminous pavement	do				
a. New construction	do				
b. Existing gravel	do	11.00:			
D. 12 feet wide					
1. Gravel surface	do	4.00:		550	2,200
2. Bituminous pavement	do				
a. New construction	do	15.00:		550	8,250
b. Existing gravel	do	10.50:			
PARKING AREAS					
A. Gravel	S.Y.				
B. Bituminous pavement	do				
1. New construction		10.00:		4,100	41,000
2. Existing gravel	do	8.00:			
ROADS DELETED	L.F.	3.00:			
CAUSEWAY	S.J.				
LAUNCHING LANES, CONCRETE	do	31,500:		1	31,500
CAMPING TURNOUTS, PAVED	do				
A. New construction	do	530:		63	33,400
B. Gravel to be paved	do	400:			
PARK ENTRANCE STATION					
A. Gate house	do	4,000:		1	4,000
B. Control gate	do	1,500:		1	1,500
C. Mercury vapor light	do	400:		1	400
D. Attendant trailer	do	2,100:		1	2,100
space					

TABLE X-27 (Con.)

Item	Unit	Unit Cost	Existing Facilities	Proposed Facilities	
			FY 76 Quantity	Quantity	Cost
RESTROOMS					
A. Masonry					
1. Vault					
a. Vault Type I	Ea.	20,000:			
b. Vault Type II	do	25,000:			
c. Vault Type III	do	28,000:		3	84,000
2. Waterborne	do	38,000:			
3. Waterborne with showers	do	44,000:			
4. Convert to waterborne	do	8,000:			
5. Convert to waterborne/showers	do	16,700:		3	50,100
B. Wooden, vault	do				
CAMPERS WASHHOUSE	do	60,000:		1	60,000
SEWAGE SYSTEM	S.J.	110,000:		1	110,000
SANITARY STATIONS					
A. Travel trailer	Ea.	7,000:		1	7,000
B. Marine	Ea.	16,000:			
WATER DISTRIBUTION SYSTEM	S.J.	12,000:		1	12,000
DRINKING FOUNTAIN	Ea.	2,200:		1	2,200
WATER HYDRANT	do	800:		9	7,200
WATER WELL w/HAND PUMP	do	8,200:			
PICNIC UNITS	do	1,000:		7	7,000
GROUP PICNIC/CAMP COMPLEX	do	7,500:			
CAMP UNITS	do	2,500:		63	157,500
WALK-IN CAMP UNITS	do	2,500:			
WALK-IN GROUP CAMP UNITS	do	6,000:			
TABLE SHELTER	do	2,000:			
ELECTRICAL DISTRIBUTION SYSTEM	S.J.	10,000:		1	10,000
ELECTRICAL OUTLETS	Ea.	450:		32	14,400
GROUP PICNIC SHELTER	do	18,500:		1	18,500
SWIM BEACH	do	5,500:		2	11,000
CHANGEHOUSE	do	12,000:		1	12,000
PLAY AREA	do	2,500:		1	2,500
AMPHITHEATER	do	5,000:			
TRAILS	L.F.	2.50:			
MERCURY VAPOR LIGHTS	Ea.	400:		1	400
TRAFFIC CONTROL GATES	do	500:			
LANDSCAPING & BEAUTIFICATION	S.J.				3,050
TOTAL					814,200

## SECTION XI

### MANAGEMENT PLANS

11-01 General. Administration of the recreation resource requires effective action to achieve the basic objectives of Corps recreation management. Recreation administration requires a knowledge of basic policies, an appreciation of recreation use as one of the important project uses, and a foresight for meeting the increasing demands for water-oriented recreation by our expanding population in changing times. Thoughtful coordination of all resource management is essential to successful multiple-use management of Corps projects. This requires that all other operational aspects of the project be considered and that the objective be to provide for public recreation in such a manner that there will be the least possible conflict with project purposes.

11-02 Administration and management.

a. Management objectives. The created and natural resources of civil works projects are the public property of both present and future generations. The objective of all Corps resources management activity is the continued enjoyment and maximum sustained use by the public of the lands, waters, forests, and associated recreational resources, consistent with their carrying capacity and their aesthetic and biological values. Maintenance and administration of recreation areas, where they might remain under Corps jurisdiction, is but one subfunction of the overall management job to preserve and protect all project resources at a high level of quality. Major specific continuing requirements include, beyond management of recreation facilities themselves:

- (1) Protection of project visitors and employees.
- (2) Protection of project resources, including enforcement of zoning requirements to prevent conflict between recreation uses.
- (3) Prevention of visual and physical encroachments upon project lands and waters.
- (4) Preservation and enhancement of the aesthetic integrity of banks and shorelines and keeping them open and available for public use.
- (5) Prevention or elimination of unauthorized structures and habitation on project lands or on the water surface.
- (6) Insure compatibility between recreation uses and equipment employed in recreation activity and established water quality standards.
- (7) Improvement of the project environment by landscape treatment.
- (8) Monitoring all types of public recreation use and recreation technology being used so as to insure management practices and future recreation developments are consistent with discernible public preferences.

(9) Encouragement of local officials to adopt and enforce zoning and building codes to control private developments adjacent to any project reservation and to avoid resultant problems in water pollution from septic tank drain fields or sewage disposal, visual pollution due to poor siting or design, solid waste disposal on public areas, or use of project roads for access to private property.

b. Administration. Sound and efficient management requires that the staffing and organization at each project should provide for expertise in the disciplines necessary for light construction, maintenance of facilities, and effective administration and management of the project and its related resources. A manager is responsible for all aspects of management and administration of a water resource project and its associated natural and developed resources. A background in the natural sciences is essential to the effective implementation of such activities as forest management, fish and wildlife management, soil erosion control, interpretive programs, vector and pest control, and park and recreation administration.

#### 11.03 Project Resource Management Plan (Appendix A).

a. Authority. The Project Resource Management Plan was prepared in accordance with the requirements of ER 1130-2-400. The purpose of the plan is to establish the operational concepts for the management of the Table Rock project. The authorized purposes of the project are hydroelectric power generation and flood control. Project recreation management must be accomplished within the constraints offered by the authorized project purposes.

b. Office and maintenance facilities. Maintenance facilities are located at the maintenance compound downstream of Table Rock Dam. These consist of administrative offices, maintenance office and shops, and equipment and storage facilities.

c. Resource Management personnel. In addition to the resource manager and those in positions of administrative authority above him, there are resource rangers and operation and maintenance personnel assigned to the project. Rangers should have a basic foundation in the biological or natural sciences. They should have knowledge in the fields of safety and rescue operations, basic forest and wildlife management, park administration, public speaking, and surveying. Specially trained, full time maintenance personnel will be limited to the minimum number required for proper operation and maintenance of project facilities.

d. User fee areas. User fees are collected at public use areas operated by the Corps and designated as fee areas by the Secretary of the Army in accordance with applicable law. Fees are collected at all parks except Cow Creek and Coombs Ferry Parks which are free areas.

e. Cooperative agencies. Cooperative activities with other agencies include the Missouri State Park Board, the Missouri Department of Conservation, the U.S. Forest Service, the U.S. Coast Guard, the Missouri Boating Commission, the Missouri and Arkansas Departments of Health, the Missouri and Arkansas Water Pollution Boards, and the Arkansas Game and Fish Commission.



f. Law enforcement. Ranger personnel have jurisdiction over all activities that are conducted on project land and the impounded waters of Table Rock Lake. They do not have arrest authority but do have the power of citation, and must rely on close cooperation with local, State, and Federal law enforcement officials.

g. Safety - visitors and employees. Safety and informational signs as well as personal contacts by rangers are methods used to call the attention of visitors to safety hazards. In addition, preventive measures are applied to areas to be visited. For employees, safety meetings and safety equipment are the order of the day. Employees are encouraged to look for and report obvious safety hazards. A Project Safety Plan, Appendix E to this master plan, covers safety in greater detail.

h. Concessionaire activities. Rental boats, storage docks, and rental stalls are provided at concessionaire areas. In addition, individual concessionaires may furnish the following services: pontoon boats, ski boats, guide service, diving equipment and air, party excursions, gasoline, live and artificial bait, tackle, and a restaurant.

i. Encroachments. The fee owned project lands above the top of conservation pool level is a narrow band, seldom wider than 400 feet, which extends around the 745 miles of shoreline. Temporary and permanent encroachments occur frequently. It is felt that future encroachments can be reduced by more frequent patrol, maintaining strict requirements on survey data furnished with any construction application, and the elimination of any kind of profit realized by encroachers. Monumentation of the project which is about 58 percent complete, should add to the effectiveness of the patrol for these encroachments.

j. In-Service training. Education is a continuing process at Corps projects. Organized training programs in public and employee safety, public relations, communications, and fire fighting techniques are conducted by supervisory rangers and the facility maintenance superintendent.

k. Visitor education and interpretation. An interpretative program serves to educate the public as to the multi-purpose aspect of the project and the historical and natural features of the area. Programs are geared to showing the steps the Corps is taking to protect and serve the public interest and to make each individual cognizant of his part in the scheme of things. A visitors center, complete with exhibits and other interpretative materials will be opened to the public about July 1976. The changing programs will show the history and nature of the region and how it relates to the Corps of Engineers project.

l. Pest control program. The control of flies is the largest pest problem in the parks during the summer season. This is primarily a sanitation problem. Flies are controlled around restrooms by the use of a product called Sugar Bait. Mosquitos are a problem due to the deep coves and the steep shoreline.

m. Signs. Project signs are installed in parks in accordance with the requirements of the SWD Sign Handbook. These consist of both wooden routed signs and metal signs.

n. Pollution control. Pollution control consists of sewage and solid waste disposal and surveillance of all activities which are potential air, land, and water pollutants.

#### 11-04 Forest Management Plan (Appendix B).

a. Authority and purpose. This plan was prepared in accordance with ER 1165-2-400, ER 1120-2-400, ER 405-23-912, and ER 1130-2-400. The purpose is to establish policies, standards, and aids for the orderly management of Corps woodlands on the Table Rock project; to protect the real estate of the Government from depreciation, exploitation, and depletion; to protect and improve the wildlife, recreational and scenic value of the forested land; and to control soil erosion.

b. Management objectives. The objectives of the management program are to increase the value of project lands for recreation and wildlife, and to promote natural ecological conditions by following accepted conservation practices. The removal of vegetation, living or dead, will be done only with sound justification such as urgent disease control, urgent insect pest control, fire hazard reduction, removal for construction of recreational facilities, or specific essential uses.

#### 11.05 Fire Protection Plan (Appendix C).

a. Authority and purpose. The Fire Protection Plan, Appendix C, to the Master Plan, was prepared in accordance with ER 1130-2-400. The purpose of this plan is to establish policies, procedures, equipment, and to train personnel in the protection of woodlands from forest fires at the Table Rock project. A total land area of 17,936 acres is subject to woods fire protection on the project.

b. Cooperative services. The Arkansas Forestry Commission, the Missouri Department of Conservation, and the U.S. Forest Service are responsible for fire protection on State, private, and National forest lands adjoining project lands. State or other Federal agencies are not responsible for woods fire control on Corps administered lands except in those cases in which appropriate agreements have been made. All Corps fee-owned lands in Missouri outside of park areas and 211 acres downstream of the dam comprising the Shepherd of the Hills Fish Hatchery is licensed to the Missouri Department of Conservation. In addition, the Missouri Division of Parks, Department of Natural Resources, operates Table Rock State Park under license agreement. Licensing agreements provide for fire protection. Lands administered by the U.S. Forest Service adjoin Table Rock project lands in numerous locations. The Forest Service also administers one park, Big Bay, with water frontage, and another park, Shell Knob, which lies in close proximity to Corps administered lands. The major agencies, therefore, with woodland fire suppression capabilities at Table Rock, are the Missouri Department of Conservation and the U.S. Forest Service. The Arkansas Forestry Commission has fire suppression capabilities on a small portion of Table Rock lands lying in Arkansas. Corps of Engineers policy prohibits reimbursement of State agencies for woods fire suppression, therefore, efforts will continue toward development of cooperative agreements with all concerned agencies. Agreements with private cooperators will be reached where advantageous to the Corps.

11.06 Fish and Wildlife Management Plan (Appendix D).

a. Authority and purpose. This plan was prepared in accordance with ER 1130-2-400. The consideration of fish and wildlife on an equal basis with other project purposes is authorized by the Fish and Wildlife Coordination Act of 1958 (Public Law 85-624).

b. The ownership of fish and wildlife rests in the State. The State has the responsibility to regulate and control fish and wildlife resources within its boundaries and the Corps has responsibility for management of fish and resident wildlife on land and water areas under its administration. The U.S. Fish and Wildlife Service and the states are responsible for similar management of migratory waterfowl. This plan (Appendix D) sets forth the areas of responsibility of all Federal and State agencies involved. The scope of this plan is to biologically evaluate fish and wildlife habitat and prescribe practices for improving or maintaining habitat on the area, to evaluate the success of the plan as it relates to wildlife production, and to maintain cooperation between the Corps of Engineers and other Federal and State agencies in the development of water resource programs.

11-07 Project Safety Plan (Appendix E).

a. Authority and purpose. This plan (Appendix E) was prepared in accordance with ER 1130-2-400. The safety plan identifies common recurring hazards or unsafe conditions in each major phase or area of project operation. The plan prescribes precautionary actions to be taken to prevent, reduce, or control hazardous situations. Areas considered in the plan include construction, maintenance, park facilities, visitor protection, equipment operation, and office operations.

b. General. Crowd control activities will be handled by ranger patrols, two-way radio, and coordination with local law enforcement. Health, safety, and welfare activities concern weekly safety meetings, safety equipment and its proper use, and vehicle safety.

11-08 Lakeshore Management Plan (Appendix F).

a. Authority and purpose. This plan was prepared in accordance with the requirements of ER 1130-2-406 dated 13 December 1974. The Lakeshore Management Plan (Appendix F) establishes policy and furnishes guidelines for the protection and preservation of the desirable environmental characteristics of project shorelines. The plan also considers means of restoration of the shoreline where degradation has occurred because of private exclusive use.

b. General policies. It is the policy of the Chief of Engineers to manage and protect the shorelines of all lakes under Corps of Engineers jurisdiction; to properly establish and maintain acceptable fish and wildlife habitat, esthetic quality, and natural environmental conditions; and to promote the safe and healthful use of these shorelines for recreational purposes by all of the American people. It is the objective of the Corps to manage private exclusive use of public property to the degree necessary to gain maximum benefits to the general public.

## SECTION XII

### CONCLUSIONS AND RECOMMENDATIONS

#### 12-01 Conclusions.

a. The Table Rock Lake Project should be developed in accordance with this master plan. Its utilization will assure that all project lands and waters are developed according to the best and highest use and conserved and wisely managed to provide recreational opportunities for present and future generations.

b. This master plan is considered to be a flexible plan of action, establishing the basic direction for development and management of the Table Rock project consonant with the capabilities of the resource and the public demand. The master plan will be periodically reviewed to facilitate the evaluation and utilization of new information as it becomes available.

12-02 Recommendation. It is recommended that this master plan be approved as the basis for future development and management of the Table Rock land and water resources.