Section II

Project Description

SECTION II - PROJECT DESCRIPTION

2-01. LOCATION

Lake Shelbyville is located in Shelby and Moultrie Counties of east-central Illinois. The dam site is located on the Kaskaskia River and about one-half mile east of Shelbyville, Illinois. The lake lies approximately 113 miles northeast of St. Louis, Missouri and 54 miles southeast of Springfield, Illinois. Highways providing direct access to the project area include: Illinois Route 16 running east-west on the south side of the project; Illinois Route 121 running generally east-west on the north side of the project; Illinois Route 128 running north-south on the west side of the project; and Illinois Route 32 running north-south on the east side of the project. The location of the lake and adjacent lands is shown on Plate 1, and the regional highway network is presented on Plate 4.

2-02. PROJECT DATA

a. Basin Hydrologic and Climate Summary. The plan of project operation provides for flood control, water supply, water quality control, navigation, low-water flow, recreation, and fish and wildlife conservation.

(1) Pertinent data related to project features and additional information is presented on Table 1.

(2) The Lake Shelbyville area is situated in the humid continental climatic region, which comprises the largest climatic region in Illinois. This broad region, extending southward from the northern cool-summer region to the ridges of southern Illinois, provides a moderate climate.

b. Temperature. The temperature in the Lake Shelbyville area is quite variable. Air masses of polar origin meet with warm masses from tropical regions that produce frontal activities resulting in a variety of water types. The average annual temperature in this area is about 55^{o} F and the average monthly temperature ranges from 78^{o} F during July to 30^{o} F in January. The winters are usually short and moderate, although temperatures below zero are occasionally experienced. An extreme low of minus 34^{o} F was recorded to the northwest in Lincoln, Illinois in January 1927, and minus 28^{o} F was recorded to the west in Morrisonville, Illinois just outside the basin boundary. Occasional temperatures of 100^{o} F or higher, have been experienced. The maximum observed temperature of 115^{o} F occurred to the southwest at Centralia, Illinois on 22 July 1901, and again to the southwest at Greenville, Illinois on 12 July 1936.

c. Wind Movement. Winds in the project area average 5-15 miles per hour with no set pattern of wind direction. The migration of air masses over this relatively flat area is the determining factor. Available data indicates that a larger percentage of wind movements come from a south-southwesterly direction.

d. Humidity. The mean relative humidity varies from about 59 to 86 percent in the winter, and from 51 to 89 percent during the other seasons of the year.

e. Precipitation. The average annual precipitation over the drainage area is 38.6 inches, of which about 22 percent falls in May and June. Rainstorms are frequent in the spring. Local snowfall is usually limited to the period from November through March and seldom covers the ground for more than a few days at a time. The average snowfall amounts to about 20 inches per year.

f. Lake and Shoreline. The lake is confined by relatively abrupt slopes and has many timbered arms. The abrupt slopes and the erodible soils have resulted in a shoreline erosion problem impacting project facilities, although, this is not impacting pool storage as this erosion was considered during the project design. The maximum relief at the dam site area is approximately 125 feet. The topography changes from a streambed elevation of about 535 feet NGVD to an elevation of 650 to 660 feet NGVD at the bordering uplands. Many small tributaries enter the river above the dam site, and the resulting ravines and valleys form a very irregular shoreline. Most of the valley slopes are covered with some virgin, but primarily second growth forest. The lake has a water surface area of 11,100 acres at joint-use pool elevation 599.7 feet NGVD. The pool at this elevation extends upstream from the dam approximately 20 miles and varies in width at this elevation from 0.25 to 1.0 mile. The depth of water from the valley floor at the dam to joint-use pool elevation is about 53 feet.

g. Project Structures.

(1) Main Dam. The main dam consists of a compacted earthen embankment extending across the main valley floor and a gated concrete spillway founded on rock in the right abutment, with a concrete chute leading to a stilling basin in the flood plain. A gravity outlet structure, extending through the concrete section, discharges into the spillway stilling basin. The crest of the embankment is at elevation 643.0, approximately 108 feet above the riverbed. The total length of the dam and spillway is approximately 3,025 feet.

(2) Remedial Works and Relocation. The reservoir necessitated relocations and remedial measures to railroads, highways, and utilities. These consisted of the following:

(a) Raising the Illinois Central Railroad at West Okaw and Kaskaskia River crossings, including two new bridges and approximately 6,800 feet of track and embankment.

(b) Protection of existing embankment of the Chicago & Eastern Illinois Railway at West Okaw River crossing.

(c) On State Route No. 121, constructing three bridges and placing approximately 7,300 feet of concrete pavement.

(d) On State Route No. 32, constructing one bridge and placing approximately 3,600 feet of concrete pavement.

(e) On FAS Highway Route 642, constructing one bridge 3,174 feet long and 1,326 linear feet of macadam road.

(f) Construction of approximately 10 miles of new secondary roads and removal of 26 county road bridges.

(g) Relocating 56.2 miles of power lines and approximately 45.5 miles of telephone lines.

(h) Minor alterations to cemeteries.

(i) Relocations and alterations to approximately 17,000 linear feet of affected gas and oil pipelines.

TABLE 1
LAKE SHELBYVILLE
General Pertinent Data

Project Purposes: Flood control, water supply, navigation, fish and wildlife conservation, and recreation.

Location of Dam:	
Stream	Kaskaskia River, Illinois
River mile, above mouth	221.8
County	Shelby
Nearest town	Shelbyville, Illinois
Location of Lake:	
River Mile above mouth	221.8 to 280.0
Counties	Shelby and Moultrie

Drainage area:	
Upstream from dam site (sq. mi.)	1,030
Upstream from mouth (sq. mi.)	5,840
Lake	
Inactive pool (minimum pool)	
Top elevation, NGVD	573.0
Area, acres of water	3,000
Depth of water, feet*	26.0
Shoreline, miles	55.0
Joint-use pool (normal recreational pool)	
Top elevation, NGVD	599.7
Area, acres of water	11,100
Total joint-use storage, acre-feet	210,000
Water supply storage acre-feet	25,000
Depth of water, feet*	53.0
Shoreline, miles	172.0
Project Fee Lands	24,733
Flowage Easement Lands	6,237
Flood Control Pool	
Top elevation, NGVD	626.5
Area, acres of water	25,300
Storage, acre feet	474,000
Depth of water, feet*	80
Shoreline, miles	376.0

*Average over valley floor at dam

Main Dam	
Type	Earth Embankment
Elevation, top of dam, NGVD	643.0
Height above streamed, feet	108.0
Length of crest, feet	3,025.0
Main Spillway	
Type	Concrete Gate Controlled
Width, feet	136.0
Elevation of crest NGVD	593
Crest gates	
Number	3
Size, ft.	45 x 37
Type	Tainter
Elevation, top of gate (closed), ft.	627.5
Tailwater elevation for discharge	
Minimum release, 10 cfs	532.1
Maximum release, 4,500 cfs	548.7
Outlet sluices	
Number	2
Size intake	5.5' x 11'
Intake invert elevation	555.0
Outlet Works	
Size, feet	2 sluices each 5 x 11 ft.
Flowline, NGVD	549.0
Approximate fee-taking line, m.s.l	626.5 + 300 feet horizontal or 630.5, whichever is greater

NOTE: All elevations in this report are based on mean sea level.

2-03. LAKE REGULATION

The plan for lake regulation provides for flood control, water releases for navigation on the Kaskaskia River, water supply, low water flow augmentation for water quality control, recreation, and fish and wildlife conservation.

a. General. Pool fluctuations at Lake Shelbyville are seasonal in nature, usually occurring in the late winter/early spring period. Low flow releases are made through two sluice gates. The fluctuations of Lake Shelbyville, particularly during the intensive recreation season, June through September, compliment the recreational use of the project. Pool fluctuations are shown on Plates 21 and 22. Actual lake level fluctuation hydrographs for the period 1978 through 2001 are shown on Plate 21. Pool stage duration and frequency curves are shown on Plate 22 for the period 1971 through 2002. A detailed plan of regulation and pertinent information relative to Lake Shelbyville is contained in the Water Control Manual, Appendix A to the Kaskaskia River Basin - Master Reservoir Regulation Manual. Storage allocations for various uses are given in Table 1.

b. Joint-Use Pool. The general plan for operation of the lake provides for a minimum downstream release of 10 cubic feet per second (cfs) when the lake level is in the joint-use pool zone (elevation 573.0 to 599.7). This is done for water quality purposes.

c. Flood Control Pool. In the flood control zone (elevation 599.7 to 626.5) releases are made through the outlet works and the three 45' x 37' tainter gates.

d. Storage Allocations. The three storage levels of the lake and respective purposes are detailed in the following paragraphs.

(1) Inactive Storage Pool. The inactive storage pool is that portion of the lake below elevation 573.0. At this elevation, the lake has a storage capacity of 30,000 acre-feet. This capacity is sufficient to allow for 100 years of silt accumulation.

(2) Joint-Use Storage Pool. The joint-use pool is that portion of the lake between elevations 573.0 to 599.7. This zone has a storage capacity of 474,000 acre-feet and a surface area of 11,100 acres. The following are authorized uses of the joint-use pool:

(a) Water Supply. Allocated for water supply are 25,000 acre-feet of the joint-use storage pool. Water supply withdrawal rates have been based on 17.1 cubic feet per second.

(b) Low-flow Regulation. A minimum release of 10 cubic feet per second is maintained to assure downstream flows for water quality control. Zero flow has been experienced several times during the period of record.

(c) Navigation. Within the joint-use pool, 155,000 acre-feet are allocated to navigation water storage.

(d) Fish and Wildlife and Recreation. The fluctuations of Lake Shelbyville, particularly during the intensive recreation season, June through September, are favorable for recreational use. Water management compliments utilization by waterfowl and other species of wildlife. Except during a period when water level is critical for flooding, it is a fish management goal to maintain a consistent lake level between 15 May and 15 June. This lake level management technique creates a more productive environment for the spring spawning period. The lake project office relays fish spawning information to the pertinent agencies.

(e) Pool Fluctuation. Over the period of record, pool fluctuations for the lake are shown on Plates 21 and 22. Fluctuations of lake levels are indicated, together with pool elevation duration and frequency curves.

(3) Flood Control Storage Pool. The flood control pool is that portion of the lake between elevations 599.7 and 626.5, having a storage capacity of 474,000 acre-feet with a surface area of 25,300 acres.

2-04. VISITATION DATA

a. General. The visitation unit used to estimate recreation use until Fiscal Year (FY) 92 was Recreation Days. In FY 92, the Visitor Estimation Reporting System (VERS) was installed at the lake project to administer visitation reporting. Two units of measurement in VERS are visitor hours and visits. The Lake Shelbyville Project Office calculated Recreation Days beyond FY 92 for comparison purposes only. Recreation Days are no longer calculated.

Visitor hours represent the presence of one or more persons recreating on land or water for periods of time aggregating to sixty minutes. It takes into consideration the number of participants and duration of stay and provides a good estimate of the amount of use.

Visits are simply a ‘head count’ of visitors to a project. It does not reflect the amount of use or length of stay. It represents the entry of one person into a recreation area or site to carry on one or more recreation activities.

A Recreation Day is similar to a Visit but reflects the duration of the visit in days. It is the unit of measure for determining recreation benefits at water resource development projects.

b. Past and Current Visitation. It was estimated in the original Lake Shelbyville Master Plan that by 1972 visitation would approach 4,690,000 recreation days if federal, state, local governments and private enterprise

provided the required facilities, services and commodities that were proposed in the plan. In 1972, the actual visitation was 3,901,000 recreation days, or approximately 83% of the projected number. However, in 1974 high water for an extended period of time during the recreation season reduced visitation to 2,828,000 recreation days, or approximately 60% of the projected number. Visitation from 1992 through 2003 has remained stable with a yearly average of 3,020,543 visits. It is speculated that the year to year variations have been due to changes in water, lake levels, cost and supply of gasoline, the economy in general, the level of development in facilities actually occurring on the lake, and people attending special events occurring within a 60 mile radius of Lake Shelbyville. The development of recreational facilities at other lakes has also affected the visitation at Lake Shelbyville. Table 2 presents a summary of actual visitation from 1970 through 2003.

c. Projected Visitation. A discussion of projected user demand at Lake Shelbyville is presented in Paragraph 5-12.b.

TABLE 2
LAKE SHELBYVILLE
ACTUAL VISITATION DATA 1970 - 2003

Year	Recreation Days	Fiscal Year	Visitor Hours	Visits
1970	1,193,000			
1971	2,628,000			
1972	3,901,000			
1973	2,803,000			
1974	2,828,000			
1975	3,077,000			
1976	2,997,000			
1977	3,542,000			
1978	2,937,241			
1979	2,640,415			
1980	2,813,522			
1981	2,636,245			
1982	2,777,302			
1983	2,815,026			
1984	3,108,404			
1985	3,275,904			
1986	3,390,884			
1987	3,201,590			
1988	3,410,220			
1989	3,704,914			
1990	3,622,523			
1991	4,010,874			
1992	3,688,976	FY 92	32,239,045	2,880,925
1993	3,536,086	FY 93	34,390,100	2,989,892
1994	3,069,358	FY 94	28,287,617	2,651,996
1995	3,001,489	FY 95	31,620,212	3,032,087
1996	2,804,417	FY 96	30,560,124	2,842,717
1997	2,908,891	FY97	32,548,319	2,931,996
1998	2,958,829	FY98	33,476,615	2,996,709
1999	2,927,405	FY99	33,891,043	3,102,280
2000	2,884,436	FY00	34,828,527	3,218,075
2001	3,060,415	FY01	34,452,239	3,323,149
2002		FY02	34,385,104	3,021,764
2003		FY03	36,921,269	3,254,928