LAKE SHELBYVILLE MASTER PLAN

KASKASKIA RIVER WATERSHED
SHELBYVILLE ILLLINOIS

CHAPTER 1 - INTRODUCTION

1.1. PROJECT AUTHORIZATION

Federal laws provide that land and water areas of Department of the Army reservoirs, constructed for the primary purposes of flood risk management, navigation, and/or power, shall be administered to encourage and develop all collateral uses such as water supply, public parks and recreation, conservation of fish and wildlife resources, pollution abatement, and other purposes in the public interest.

Lake Shelbyville was authorized by the Flood Control Act of 1938 and modified by the Flood Control Act of 1958 in accordance with the Chief of Engineer's recommendations contained in House Document #232, 85th Congress, 1st session.

1.2. PROJECT PURPOSES

Lake Shelbyville is managed and operated by the U.S. Army Corps of Engineers (Corps) for the authorized purposes of flood risk management, recreation, water supply, navigation, and fish and wildlife conservation. The following Corps of Engineers Civil Works mission statement provides the base for these purposes:

> *"Civil Works' Mission and Vision: Dedicated to providing quality, responsive service to the nation in peace and war. The Directorate of Civil Works is a major component of the U.S. Army Corps of Engineers. The Civil Works programs include water resource development activities including flood risk management, navigation, recreation, and infrastructure and environmental stewardship. Our mission also includes emergency response."*

The Environmental Operating Principles (EOP) were introduced in 2002 and have instilled environmental stewardship across business line practices from recycling and reduced energy use at Corps and customer facilities to a fuller consideration of the environmental impacts of Corps actions and meaningful collaboration within the larger environmental community. These principles dovetail with the Corps' mission by promoting sustainable development within its projects. They are:

•Foster sustainability as a way of life throughout the organization.
•Proactively consider environmental consequences of all Corps activities and act accordingly.
•Create mutually supporting economic and environmentally sustainable solutions.
•Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.
•Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
•Leverage scientific, economic and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
•Employ an open, transparent process that respects views of individuals and groups interested in Corps activities." *(Environmental Operating Principles, 2012)*

1.3. PURPOSE AND SCOPE OF THE MASTER PLAN

The original Master Plan, developed in 1964, was intended as a guide for the orderly and coordinated development and management of all lands and waters of Lake Shelbyville. It presented data on the scope of development considered adequate for initial public use and an estimate of future requirements. The 2004 revised Master Plan presented an inventory and assessment of land and water resources and physical improvements, analysis of resource use, and an evaluation of existing and future needs required to protect and improve the value of the resource base. The provision of quality and relevant services to the public was also evaluated. An economic evaluation of the market potential for resort and marina development was presented as one of the factors influencing resource development. It also included a Shoreline Erosion plan that was developed to alleviate problems in developed recreation areas.

This 2016 Master Plan updates and builds on those plans and development. It is primarily oriented to reflect current conditions and to eliminate outdated information concerning the allocation of project resources. Changing visitor preferences indicate camping facilities are generally adequate, although improvements to amenities are needed. Meeting the needs of those visitors who do not camp is important. Consideration is given to meeting today's standards for safety, accessibility, and design to maintain facilities. This revision not only reflects the current status of the project and land use but also any proposed plans, actions, and land use classification changes. This Master Plan includes the Letter Report, Lake Shelbyville, Illinois, Shoreline Erosion Management Plan and all actions taken pursuant to that action. The letter report complies with and reflects the Environmental Impact Statement for Operation and Maintenance of Lake Shelbyville, May 1974.

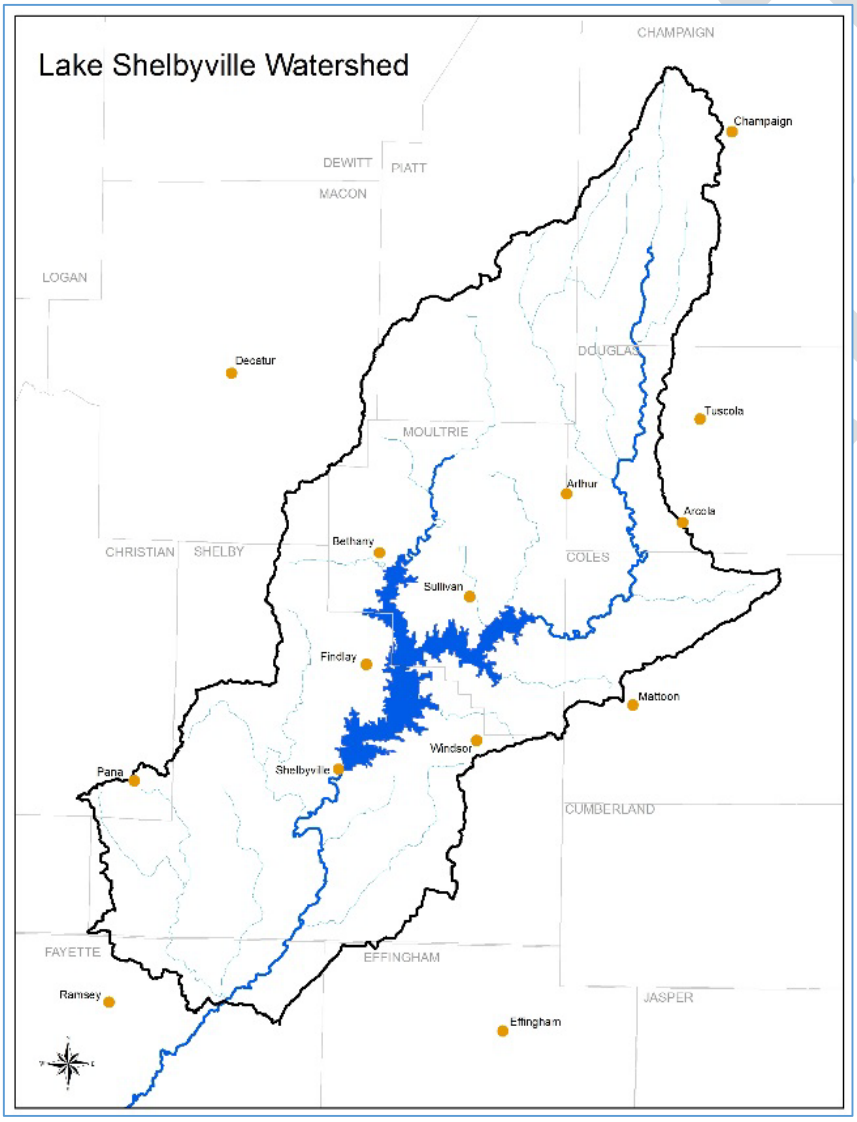
The Master Plan is not intended to address the specifics of regional water quality, shoreline management or water level management. These areas, if applicable, are covered in other project plans. However, specific issues identified through the Master Plan revision process can still be communicated and coordinated with the appropriate

internal Corps resource (e.g. Operations Division for shoreline management) or external resource agency (e.g. Illinois Department of Natural Resources for water quality) responsible for that specific area.

Lake Shelbyville's Operational Management Plan (OMP) uses Master Plan guidelines as a basis to outline upcoming projects. The OMP provides more detail to forthcoming construction and operation activities, which are then implemented through annual management plans. OMP's are updated more frequently to reflect changes in funding and operational priorities.

1.4. BRIEF WATERSHED AND PROJECT DESCRIPTION

Figure 1

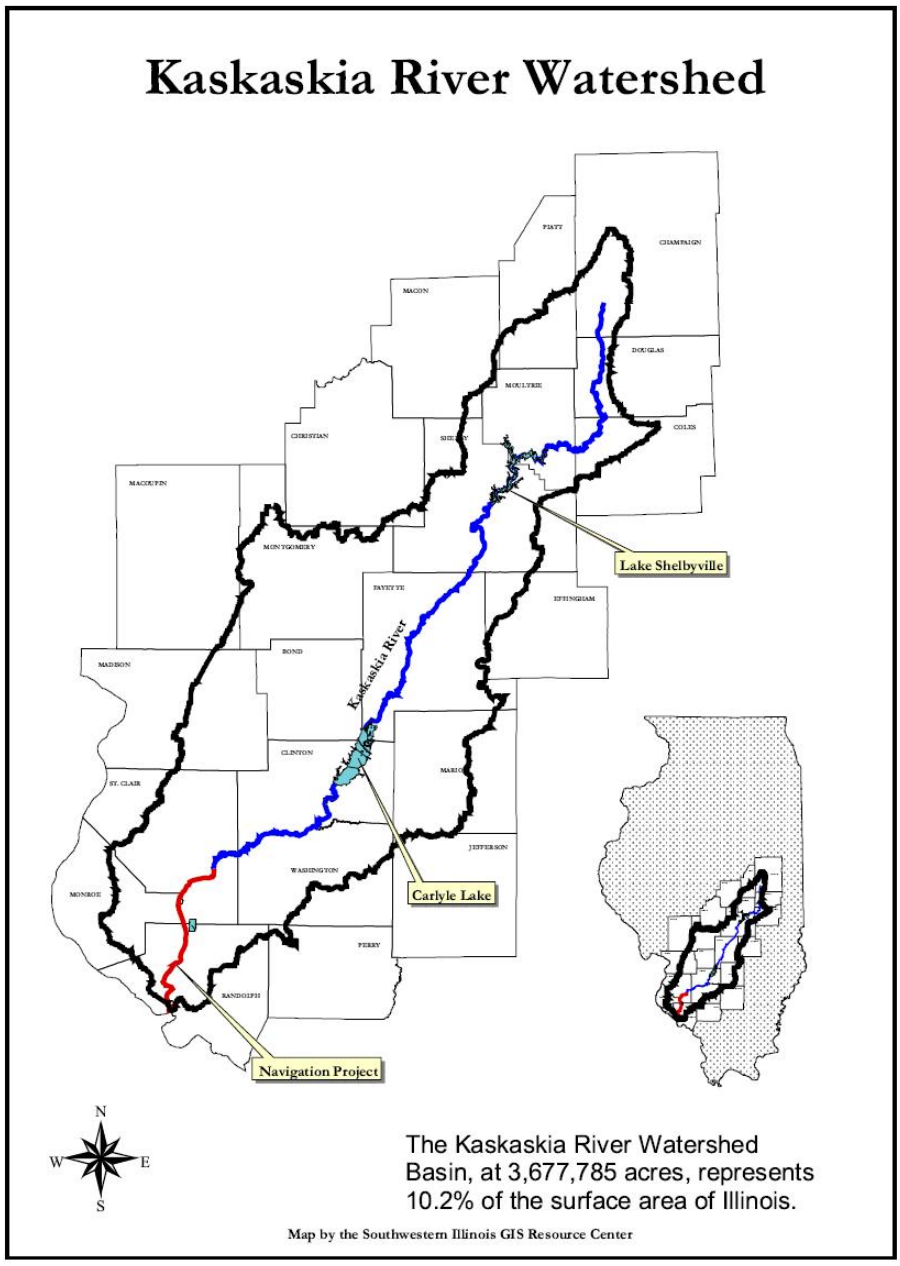


Lake Shelbyville is located in Shelby and Moultrie Counties of east-central Illinois. The dam site is located on the Kaskaskia River about one-half mile east of Shelbyville, Illinois. The lake lies approximately 113 miles northeast of St. Louis, Missouri and 60 miles southeast of Springfield, Illinois. 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 along with a regional highway network are shown on Plate 1.

Two rivers, the West Okaw and the Kaskaskia, drain into Lake Shelbyville. The Kaskaskia River begins its journey in Champaign County, while the West Okaw headwaters drain farmland from Piatt County

south. Much of the land in the Lake Shelbyville watershed is flat or gently sloping. However, the many small tributaries entering the river above the dam site have created ravines and valleys to form a very irregular shoreline. Many coves, both large and small, can be found as a result. Very little dead standing timber remains in these coves as most have decayed over the last 40 years.

Figure 2



At normal recreation pool, the 11,100 acre lake is approximately 20 miles long, varying in width from one-quarter to one mile. Average depth is 19 feet, much deeper in the original river channel.

The Kaskaskia River is an important and prominent natural feature in Central and Southwestern Illinois. The watershed, primarily agricultural, is the second largest river system within Illinois, originating in Champaign County and flowing in a southwesterly direction for approximately 292 miles, where it unites with the Mississippi River in Randolph County. The Kaskaskia River Watershed (KRW) covers all, or parts, of 22 counties and encompasses an area of 5,746 square miles (3,677,787 acres) or 10.2% of the entire state. There are 8,680 miles of tributary streams, including the main river channel, (33% of the state stream-miles), and 843 lakes or ponds covering 79,037 acres. Two large U.S.

Army Corps of Engineers (USACE) reservoirs, Carlyle Lake and Lake Shelbyville, add another 37,000+ acres of surface water. The elevation at the Kaskaskia River headwaters is 740 feet NGVD, and drops to 368 feet NGVD at the Corps' Kaskaskia River Project near the confluence with the Mississippi River.

Approximately 82% of the land in the Kaskaskia River Basin is used for agricultural purposes. Of that 82%, most is cropland, (63%), with other significant land utilized as grassland, (19%). Corn and soybeans are important to the region, but producers also grow 25% of the entire state's crop of wheat. Livestock production, including dairy, swine, poultry, and beef cattle is a significant industry, especially in Clinton, Randolph and Washington Counties. *(Southwestern, 2002)*

Forest cover within the watershed is significant (9% of land area 331,000 acres), particularly along the streams. Good wetland resources also occur (4.5% of land area, 165,500 acres), along streams, where clay soils drain poorly and flooding makes development improbable. The climatic differences from the headwaters to the mouth are substantial, and create a great diversity in the native flora and fauna found within the watershed.

The largest bottomland hardwood forest within Illinois, at 43,000 acres, is located on the Kaskaskia River floodplain between Carlyle Lake and Fayetteville. One tract within this forest is the single largest contiguous tract in Illinois (7,300 acres) and is approximately two miles wide at certain points. In addition, the vast majority of the state's high quality southern flat wood forest occurs within the watershed.

The population of the KRW in 2000 was approximately 553,000 with much of the population living in approximately 100 small villages and cities. Urban land use in 1990 was only 3% (110,300 acres) of the watershed, mostly concentrated in Madison and St. Clair Counties in the East Metropolitan St. Louis. Urban sprawl is a concern in this part of the watershed. *(Southwestern, 2002)*

Two important partners, the Kaskaskia Watershed Association and the Upper Kaskaskia Ecosystem Partnership, are working to improve the health and quality of the entire watershed. These two partners are described in more detail in Chapter 6.

1.5. LISTING OF PERTINENT PROJECT INFORMATON

TABLE 1
LAKE SHELBYVILLE PERTINENT DATA

LOCATION OF DAM	
Stream	Kaskaskia River, Illinois
River Mile, Above Mouth	197.5**
County (IL)	Shelby
Nearest Town	Shelbyville, Illinois
LOCATION OF LAKE	
River Mile Above Mouth	197.9**
Counties (IL)	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	23,240
Flowage Easement Lands	6,237
FLOOD CONTROL POOL	
Top Elevation, NGVD	626.5
Area, Acres of Water	25,300
Depth of Water, Feet*	80
Shoreline, Miles	376.0

DAM STATISTICS	
Main Dam	
Type	Earth Embankment
Elevation	643.0
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, Feet	45 x 37
Type	Tainter
Elevation, Top of Gate (Closed), Feet	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’
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

*Average over valley floor at dam
** Previous river mileage of 221.8 changed in 2005 due to channelization of the lower river
NOTE: All elevations in this report are based on mean sea level

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

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, complement the recreational use of the project. Pool stage duration and frequency curves are shown on Plate 2 for the period 1985 through 2016. 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, approved 27 October 2008. Storage allocations for various uses are given in Table 1.

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.

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.

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 177,795 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.

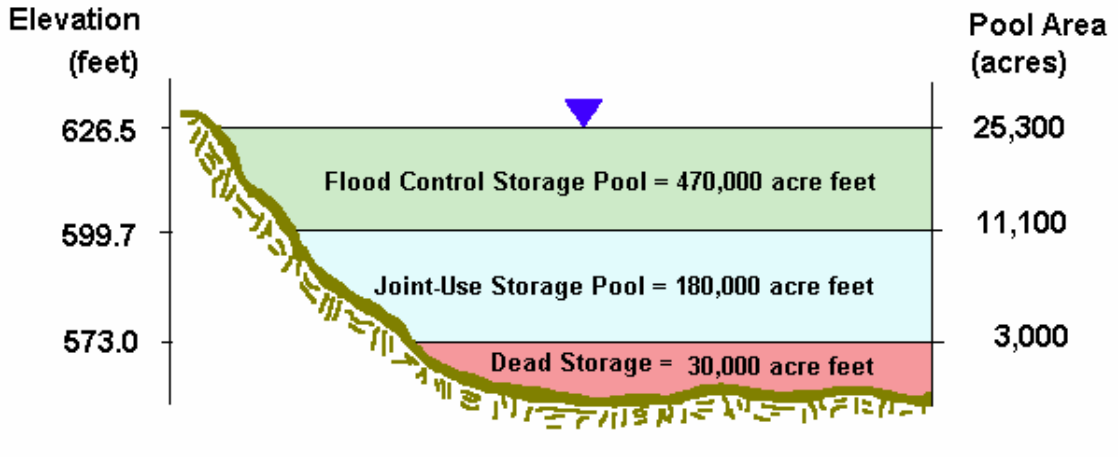
  (d) Fish and Wildlife and Recreation.
  The fluctuations of Lake Shelbyville, particularly during the intensive recreation season, June through September, are favorable for recreational use. Water management complements utilization by waterfowl and other species of wildlife. Except during a period when 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.

• (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.

Induced Surcharge Pool. The induced surcharge pool is that portion above elevation 626.5 feet NGVD and below 630.5 feet NGVD and has storage of 107,100 acre-feet. Releases from the induced surcharge pool shall be increased or decreased, on a sliding scale, according to the pool stage. The minimum release shall be 4,500 cfs at elevation 626.5 feet NGVD and the maximum release shall be 116,300 cfs at elevation 630.5 feet NGVD. Should elevation 630.5 feet NGVD be exceeded the spillway gates will be opened above the water surface and free outflow conditions will exist. Releases from the induced surcharge pool will result in flooding and damage to the downstream area.

Figure 3 - Approximate Area & Acre-Feet Each Storage Pool



(Knapp, 2012)