Cover Sheet

Proposed Action:	The U.S. Army Corps of Engineers is proposing to update and revise the Water Control Plans for Carlyle Lake and Lake Shelbyville to clarify inconsistencies in the current plans and include some feasible minor adjustments as suggested by the project partners and stakeholders.
Type of statement:	Environmental Assessment (EA)
Lead Agency:	U.S. Army Corps of Engineers

For further information and to submit comments:

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This environmental assessment can also be viewed on the St. Louis District website:http://www.mvs.usace.army.mil/

All available, cited regulations in this environmental assessment and in the water control management documents can be found at the following link: www.usace.army.mil/publications

How to read this EA: Sections 1 and 2 are an Executive Summary and Sections 3 and 4 contain supporting information. Section 2 includes a matrix that presents a comparison of the alternatives.

Draft Environmental Assessment

and

Unsigned Finding of No Significant Impact (FONSI)

Update and Revision of the Carlyle Lake and Lake Shelbyville Water Control Plans

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Contents

1 Purpose of and Need for Action

1.1 Proposed Action: The U.S. Army Corps of Engineers (Corps) is proposing to revise and update the Lake Shelbyville and Carlyle Lake Water Control Plans (WCPs). Inconsistencies in the current plans would be rectified and some of the feasible minor adjustments suggested by the stakeholders would be incorporated into the WCPs.

1.2 Need and Purpose of Action: Appendices A and B of the Master Reservoir Regulation Manual contain the authorized WCPs (Chapter 7) for the Lake Shelbyville and Carlyle Lake projects located in the Kaskaskia watershed. Revision of these WCPs is needed to assure timely and effective water control management and to avoid or limit physical, biological, social, and economic impacts in the watershed. The St. Louis District Water Control Management Office (WCMO) controls the water releases from Carlyle and Shelbyville dams on the Kaskaskia River by monitoring flow at various gauges.

1.2.1 Associations and groups have been formed to represent the various and sometimes competing interests of stakeholders in the river basin including the agricultural and recreational segments. However, in recent years the groups have worked together under the Kaskaskia Watershed Association. The WCMO and the project staffs at Carlyle Lake and Lake Shelbyville have consulted with the various stakeholder groups in an attempt to regulate the flows in an equitable way to address all project purposes, within the guidelines of the approved WCPs.

1.2.2 Agencies including the Corps, the U.S. Fish and Wildlife Service (FWS) and the Illinois Department of Natural Resources (IDNR) have responsibility for the biological resources, water supply and water quality interests of the watershed. Communication with these agencies and watershed groups has resulted in better understanding of the issues and concerns of all stakeholders and permitted a cooperative approach to water flow regulation.

1.2.3 Issues Related to Revising the Water Control Plans

1.2.3.1 The WCMO has been operating under its current WCPs for more than 20 years. To avoid or reduce negative impacts related to water control management, the WCMO has requested and used temporary minor deviations to the current WCPs.

1.2.3.2 Recognition of the need to provide clear and responsive WCPs has culminated in this update effort. Inconsistencies in the current WCPs have sometimes made it confusing to the public what management action would be supported by the WCPs. Updating and revising the WCPs for each project would permit timely and effective water control management.

1.3 Project Objectives: Three project objectives have been identified:

1. Eliminate inconsistencies in each WCP.

2. Reorganize the WCPs in the proper format.

3. Incorporate new regulation criteria with stated tolerances, e.g., dates and elevations, in each WCP that would enable water control managers to avoid or limit impacts to the physical, biological, social and economic environment of the watershed without the need to request temporary deviations.

1.4 Related Documents

1.4.1 Project Authorization:

1.4.1.1 Carlyle Lake was authorized by the Flood Control Act of 1938 and modified by the Flood Control Act of 1958 based on the Chief of Engineer's recommendations presented in House Document No. 232, Eighty-fifth Congress, 1st Session. The authorized purposes of the project include flood control on the Kaskaskia and Mississippi Rivers, navigation releases for the Kaskaskia and Mississippi Rivers, domestic and industrial water supply, water quality enhancement, fish and wildlife conservation, and recreation.

1.4.1.2 Lake Shelbyville was authorized by the Flood Control Act of July 3 1958 based on the Chief of Engineer's recommendations presented in House Document No. 232, Eighty-fifth Congress, 1st Session. The purposes of the project include flood control on the Kaskaskia and Mississippi Rivers, navigation releases for the Kaskaskia River, domestic and industrial water supply, water quality enhancement, fish and wildlife conservation, and recreation. In addition to the dam and impoundment, six federal levee districts between Cowden and Vandalia were authorized; however, only one was constructed, the Dively Drainage and Levee District (see Plate 2).

1.4.1.3 The operation of Lake Shelbyville, together with Carlyle Lake, was authorized to afford protection for approximately 69,000 acres of bottomlands.

1.4.2 Environmental Documentation: Project Environmental Impact Statements (EISs) were completed in 1974 for both Carlyle Lake and Lake Shelbyville operations and maintenance activities. Environmental Assessments (EAs) or environmental reviews have been completed for some of the deviations requested from the Division Water Control Management Office since the authorization of the current WCPs. A list of typical authorized temporary deviations that have been implemented over the preceding 23 years along with the purposes for each deviation is included in Table EA-1

1.5 Decision Options: This EA will determine if the impacts associated with the update and revision of the WCPs for Carlyle Lake and Lake Shelbyville are significant.

1.6 Scoping

1.6.1 Four initial public meetings were conducted in December 2005 and January 2006 at Carlyle, Germantown, Shelbyville and Vandalia in Illinois. Proposed changes to the WCPs, based on comments from the initial meetings, were discussed at a second round of meetings at the same locations in March and April of 2006. All meeting and mail-in comments were analyzed and the feasible proposals were incorporated into the proposed WCPs. Appendix 3 includes the comments received and responses developed by the WCMO.

1.6.2 Two agencies, the IDNR and the FWS, were requested to provide a listing of threatened and endangered species in the project area and information related to the biological resources of the project area. Internal to the Corps, the Office of Counsel and the Curation and Archives Analysis Branch also provided input to this assessment. Agency coordination letters are included in Appendix 2.

1.6.3 The project area for the purpose of assessing impacts has been defined as the area from the upper end of Lake Shelbyville (RM 295) to Fayetteville, Illinois (RM 50) and is shown on Plate 1, the Kaskaskia Watershed Map. The area includes the Kaskaskia/Shoal and Carlyle Reaches and the portion of the Upper Kaskaskia Reach surrounding Lake Shelbyville

1.7 Relevant Resources

1.7.1 Biological Resources: Federal and State, threatened and endangered species that occur in the project area are listed in Section 3.4. Impacts to these species are expected to be minimal. The FWS, however, has expressed concern that the winter drawdown in the Carlyle pool may negatively impact the Eastern massasauga rattlesnake. The Eastern massasauga rattlesnake is a federal candidate species and endangered State species known to be extant in several Illinois counties. The massasauga is especially important in relation to water control management because of the location of its hibernacula around Carlyle Lake.

1.7.1.1 Potential negative impacts to bottomland timber both upstream and downstream were identified by the FWS and others. Bottomland timber makes up much of the identified wetlands in the Kaskaskia River basin especially in the upper reaches of Carlyle Lake and river bottomlands above New Athens and below Route 15.

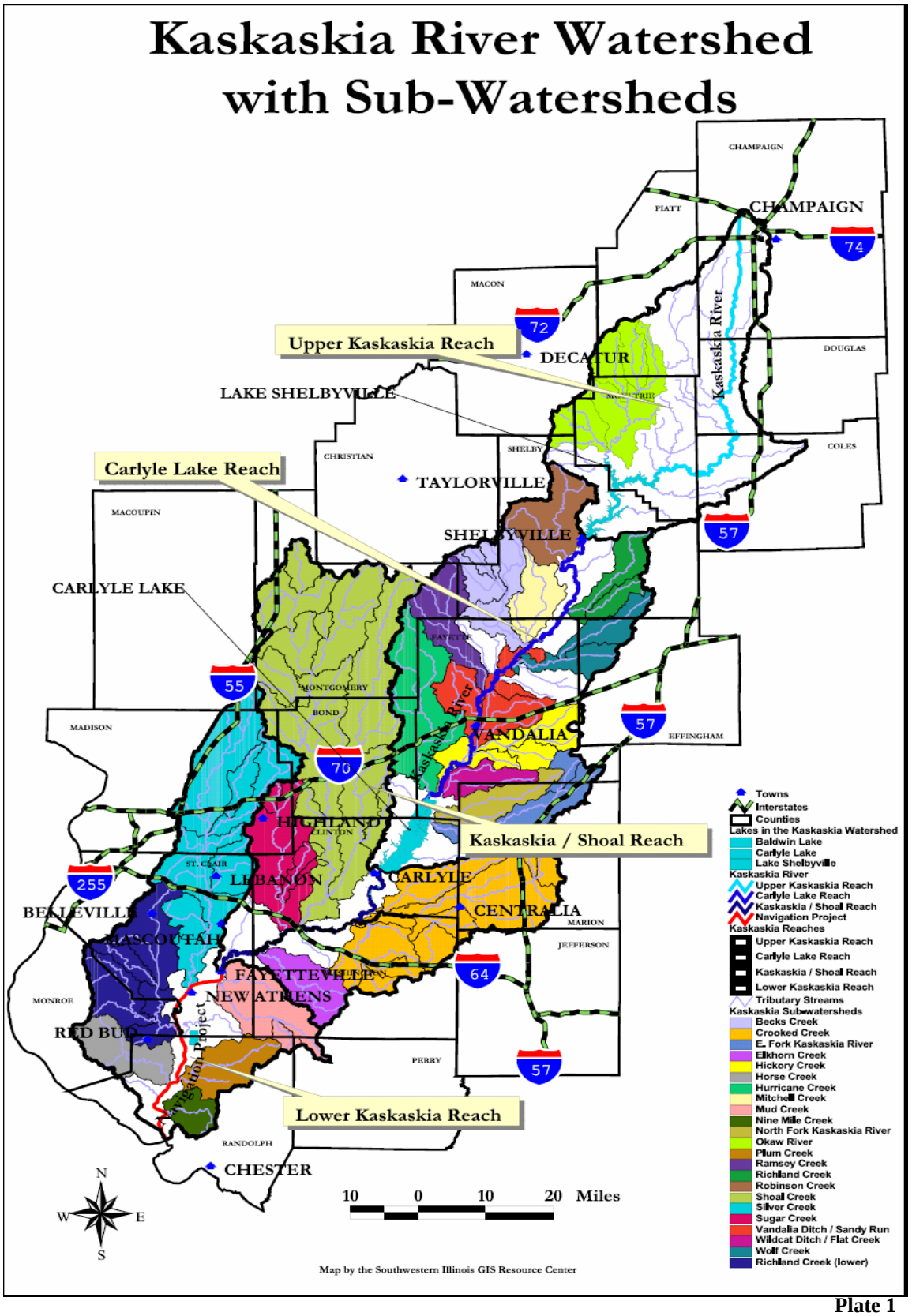

Kaskaskia River Watershed
with Sub-Watersheds
Upper Kaskaskia Reach
Carlyle Lake Reach
Kaskaskia / Shoal Reach
Lower Kaskaskia Reach
CHAMPAIGN
DECATUR
LAKE SHELBYVILLE
TAYLORVILLE
SHELBYVILLE
CARLYLE LAKE
VANDALIA
HIGHLAND
LEBANON
CARLYLE
CENTRALIA
BELLEVILLE
MASCOUTAH
FAYETTEVILLE
NEW ATHENS
RED BUD
CHESTER
Kaskaskia River
Navigation Project
10 0 10 20 Miles
N
W
E
S
Towns
Interstates
Counties
Lakes in the Kaskaskia Watershed
Baldwin Lake
Carlyle Lake
Lake Shelbyville
Kaskaskia River
Upper Kaskaskia Reach
Carlyle Lake Reach
Kaskaskia / Shoal Reach
Navigation Project
Kaskaskia Reaches
Upper Kaskaskia Reach
Carlyle Lake Reach
Kaskaskia / Shoal Reach
Lower Kaskaskia Reach
Tributary Streams
Kaskaskia Sub-watersheds
Becks Creek
Crooked Creek
E. Fork Kaskaskia River
Elkhorn Creek
Hickory Creek
Horse Creek
Hurricane Creek
Mitchell Creek
Mud Creek
Nine Mile Creek
North Fork Kaskaskia River
Okaw River
Plum Creek
Ramsey Creek
Richland Creek
Robinson Creek
Shoal Creek
Silver Creek
Sugar Creek
Vandalia Ditch / Sandy Run
Wildcat Ditch / Flat Creek
Wolf Creek
Richland Creek (lower)
Map by the Southwestern Illinois GIS Resource Center

Plate 1

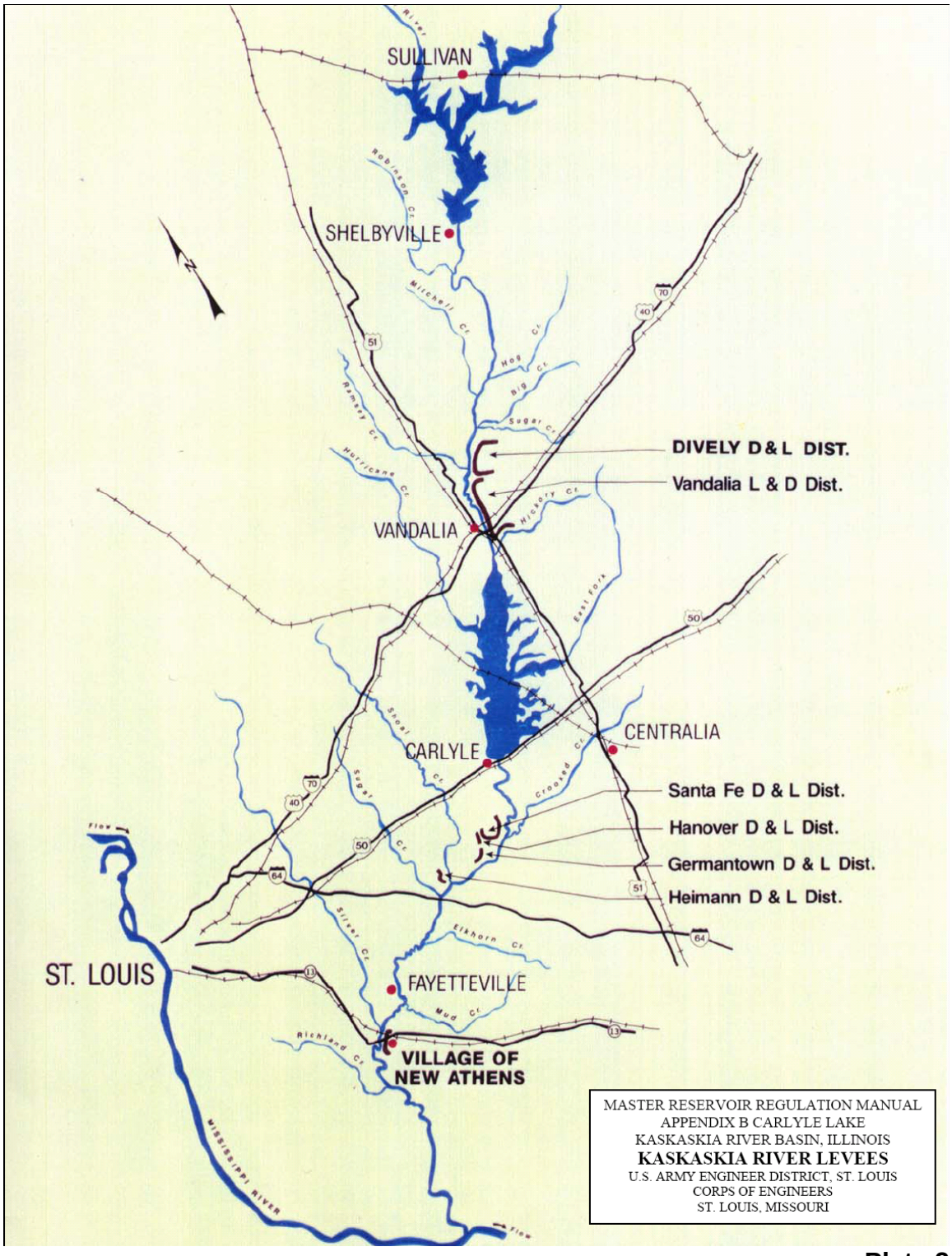

SULLIVAN
SHELBYVILLE
VANDALIA
CARLYLE
CENTRALIA
FAYETTEVILLE
VILLAGE OF NEW ATHENS
ST. LOUIS
DIVELY D & L DIST.
Vandalia L & D Dist.
Santa Fe D & L Dist.
Hanover D & L Dist.
Germantown D & L Dist.
Heimann D & L Dist.
MASTER RESERVOIR REGULATION MANUAL
APPENDIX B CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
KASKASKIA RIVER LEVEES
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

Plate 2

1.7.2 Socio-Economic: Agricultural and recreational activities impacted by water levels include crop farming, duck hunting, marina operations, swimming and boating activities. Proposed changes to the WCPs have been driven by the desire to reduce impacts to these sectors and their subsequent economic impacts. Cultural resource sites within the project area are not expected to be impacted.

1.8 Permits

1.8.1 The proposed project will not involve the placement of dredged or fill materials into waters of the United States and consequentially assessments under sections 404 and 401 of the Clean Water Act are not required.

2 Alternatives Including the Proposed Action

2.1 Formulation: This chapter describes and compares the alternatives in terms of their environmental impacts and their achievement of project objectives. Alternatives were formulated from proposals provided by the stakeholder organizations, the public and government agencies. The proposed changes to the Carlyle Lake and Lake Shelbyville WCPs are presented in Table EA-2 and represent the new criteria that would allow more latitude by the WCMO to adjust the water control releases in a way that considers impacts to all project purposes. The alternatives are defined and summarized in Section 2.2.

2.1.1 The alternatives were evaluated relative to the project objectives cited in paragraph 1.3: the preferred alternative would include a clear, well-organized plan without inconsistencies and the WCP would include criteria that incorporate the more commonly requested temporary deviations. Environmental impacts to endangered species, agriculture, recreation and bottomland timber were particularly considered in the analysis and evaluation of alternatives.

2.2 Alternatives: The alternatives are described in the following paragraphs and are compared and summarized in Table EA - 3.

2.2.1 Alternative A: No Action: Under this alternative the WCPs would include specific dates for seasonal changes, specific elevations that govern water control releases, a rigid discharge curve when the target pool elevation is exceeded, and a release restriction based on Mississippi River levels. This alternative also includes requests for temporary deviations from the rule curves to accommodate the requests or needs of upstream and downstream user groups and to address impacts to other project purposes. See Table EA-1 for a listing of typically requested deviations and the purpose of each. The no action alternative takes into consideration past actions, current actions and future actions and represents the baseline condition for the proposed changes.

2.2.1.1 Past Actions: Several versions of the WCPs were implemented until the current WCPs were authorized more than 20 years ago. The current WCPs that are being revised have been followed except when temporary deviations have been requested and approved.

2.2.1.2 Current Actions: Currently, temporary deviations are authorized on a case by case basis. Some of these deviations require an environmental review to determine if there are any significant impacts. Identified impacts to physical, socio-economic and biological resources associated with the implementation of the temporary deviations have been minor or limited.

2.2.1.3 Future Actions: If no action is taken, the current WCPs would continue to be in effect and the temporary deviations would continue to be requested and authorized on a case by case basis. Environmental reviews for some of the requested deviations would have to be performed which could slow the authorization process. Although these deviations have been consistently approved in the past, there is no assurance that they will continue to be approved in the future. Potentially, this could affect the ability of the St. Louis District WCMO to respond to unique hydrologic and hydraulic (precipitation and flow) situations.

Table EA - 1 Typical Deviations Requested and Implemented - The following is a list of deviations grouped by type that have been implemented at Carlyle Lake and Lake Shelbyville for more than 20 years.

Minor Deviations	**Purpose**
Lift release rate restrictions while Mississippi River is in flood or forecasted to be in flood from Chester to Cairo, Ill.	This will allow better timing of releases from Carlyle Lake and Lake Shelbyville and allows flood control storage to be more effectively utilized and provides benefits to other project purposes other than flood control.
Lift mandatory release rates during summer months while downstream conditions are rising due to precipitation or forecasted precipitation.	To prevent further downstream flooding.
Remain at higher release rates past dates that plans allow.	To provide greater flood control protection in the spring, increase benefits to recreation and increase chances of successful fish spawn
Allow pool/ release rate to deviate from the WCPs	To allow work to be accomplished/ completed.
Increase release rates past maximum required release rates to prevent larger required release rates when surcharge pool elevations are reached	To prevent greater downstream flooding and reduce potential pool elevations and subsequent impacts.
Increase release rates past maximum required releases to prevent larger mandatory release rates when certain pool elevations are reached.	To prevent greater downstream flooding and reduce potential pool elevations.
Delay of winter drawdown to benefit waterfowl season.	To provide habitat for waterfowl and recreation opportunities.
Reduce release rates to lower river levels..	To allow agricultural fields downstream to dry out.
Major Deviation	
Increase release rates past maximum required release rates to prevent larger mandatory release rates when surcharge pool elevations are reached.	To prevent greater downstream flooding and reduce potential pool elevations as well as environmental impacts.
Emergency Deviation	
No emergency deviations have been required	n/a

Required procedures to obtain deviations are listed in Chapter 7 of each Water Control Manual.

2.2.2 Alternative B (Preferred Alternative) would incorporate some of the actions associated with previously requested temporary deviations as well as others suggested by the public into each project's WCP to allow flexibility in managing the pools and releases from each lake. In general, proposed revisions to the WCPs for Lake Shelbyville and Carlyle Lake include the following: instead of specific dates, all dates have an allowable variance of plus or minus 14 days; instead of specific elevations, all elevations other than winter drawdown level, 594.0 ft. NGVD (National Geodetic Vertical Datum) at Lake Shelbyville and 443.0 ft. NGVD at Carlyle Lake, and the top of the flood control pool (626.5/462.5) have an allowable variance of plus or minus one-half foot; instead of implementing a rigid discharge curve when the target pool elevations (610/450) are exceeded, cutbacks or increases in releases from that shown as a guide on Plate 6-7 in each Water Control Manual are allowed at the discretion of the Chief of Water Control Operations up to 614.8 (Lake Shelbyville) or 455.6 (Carlyle Lake); modification of the restriction on water releases during Mississippi River flooding; incorporation of specific authority for moderating pool fluctuations to accommodate fish spawning activities below certain elevations instead of requesting individual deviations; specifically mentioning in the WCPs that ice impacts, upstream and downstream, can be taken into account when regulating the project; and revising the end of summer restrictions from 1 October or "completion of harvest" to 1 November. These proposed changes are presented in Table EA-2.

2.2.3 Alternative C proposes using the current WCPs without the use of authorized temporary deviations. The current plan (the same as the No Action Alternative but without the deviations) would be in effect without the authorized temporary deviations. No adjustments, i.e., temporary deviations, would be made to adjust the WCPs based on the potential impacts to the various project purposes.

2.3 Alternative Impacts

2.3.1 Impacts related to the three alternatives were developed based on Sections 3 and 4 of this EA. They are synopsized in Table EA-3 to help in the identification of the preferred alternative.

Table EA - 2 Current and Proposed Changes to Water Control Plans

Current Plan	Proposed Plan
Dates	
Specific Dates	All dates have an allowable variance of +/- 14 days.
Elevations	
Specific Elevations	All elevations other than winter drawdown (594.0 ft. NGVD at Lake Shelbyville and 443.0 ft. NGVD at Carlyle Lake) and the top of the flood control pool have an allowable variance of +/- 0.5 feet.
Cutbacks at elevation above 610{Shelbyville), 450 (Carlyle)	
When the pool reaches 610/450 the release is set by a rigid discharge curve up to the top of the flood control pool.	Cutbacks or increases in releases from that shown as a guide on Plate 6-7 of each Water Control Manual are allowed at the discretion of the Chief of Water Control Operations up to 614.8 (Lake Shelbyville) or 455.6 (Carlyle Lake)
Restrictions due to Mississippi River Flooding	
At Lake Shelbyville the release is restricted to 1,000 cubic feet per second (cfs) while the pool is below 614.8 and the Mississippi River between Chester and Cairo, Illinois is in flood or flooding is imminent.	Remove restriction at Lake Shelbyville
Carlyle Lake releases are restricted to 5000 cfs when the pool is below 455.6 and flooding is imminent between Chester and Cairo on the Mississippi River.	Recession side of Mississippi River flooding restriction is lifted.
Fish Spawn	
Coordinated with IDNR to moderate fluctuations during fish spawn. Sometimes requiring a deviation, sometimes within authority.	Coordination with IDNR, to moderate fluctuations with specific authority, is spelled out below certain elevations (602, 447).
Ice Impacts	
No specific mention in the plan but within authority.	Specifically mentions that ice impacts upstream and downstream can be taken into account when regulating the project.
End of Summer Restriction of Flows	
Mentions 1 October and "when completion of harvest".	Uses 1 November as a guide when the harvest is normally complete

Table EA - 3

Summary and Comparison of Alternatives				
Alternative	**Socio-Economic**	**Biological**	**Physical**	**Meets Project Objectives**
A - No Action – Continue to request deviations to the WCPs when necessary, but do not update or revise the WCPs.	If deviations are not obtained or are delayed, greater impacts could occur in the agricultural and recreational sectors. Cultural resources will continue to experience adverse impacts. Aesthetics will be impacted due to erosion.	If deviations are not obtained greater flows and higher water levels could result in more impacts to the vegetative resources and the aquatic habitat.	Impacts to the physical environment, if deviations cannot be obtained, could include increased erosion and sedimentation.	No. Does not address the need for revision of the WCPs and may limit flexibility in addressing impacts to project resources due to the continued need to request deviations.
B – Incorporate some actions associated with typical deviations and revise the WCPs	Incorporating actions typically requested in deviations would permit flexibility in responding to river flows and help avoid or reduce impacts to agricultural, recreational and cultural resources. Aesthetics will be impacted due to erosion.	This alternative would reduce the number of temporary deviations. This will allow the WCMO to be more responsive to the need of the stakeholders and potentially lessen the negative impact to vegetative resources and the aquatic habitat.	With more moderate flows, Impacts to the physical environment would be potentially reduced, i.e., erosion along the river corridor and sedimentation in the river and lakes.	Yes. The need for flexibility is incorporated into WCPs and the inconsistencies in the WCPs have been eliminated while potentially reducing impacts to other project resources.
C – Use the current WCP but without deviations; strict enforcement of the current WCRSs and no requests for temporary deviations.	No requests for deviations would be permitted; therefore, the recreational and agricultural resources could be adversely affected. Cultural resources could be more adversely impacted. Aesthetics will be impacted due to erosion.	No exception would be made for the fish spawn which could ultimately affect the lake's sport fisheries. Greater flows would impact vegetative resources, aquatic habitat and T&E species.	Potentially damaging flows could not be averted or reduced. More drastic river level changes based on strict adherence to the WCP may cause more erosion and sedimentation of lakes and river.	No. The WCPs would not be revised and impacts to the project resources are not reduced because no deviations are allowed. All project purposes cannot be addressed.

3 Affected Environment

3.1 General Description: The existing environment affected by this project includes both natural and man-made features, i.e., the Kaskaskia River, Carlyle Lake and Lake Shelbyville. The watershed is generally rural in nature, largely influenced by the agricultural industry. The lakes and river attract visitors to the area to recreate in the numerous recreation areas and along miles of river environment. The scope of the resource descriptions is focused primarily on the lakes, and the river immediately below the lakes, which represent the project area. Additional information on the physical, socioeconomic and biological resources of the middle Kaskaskia River can be found in the Final EISs for Carlyle Lake and Lake Shelbyville as well as more recent referenced documents. The following sections provide an overview of the river resources affected by the proposed update and revisions to the WCPs.

3.2 Physical Resources

3.2.1 The basin geology within the study limits generally consists of flat to gently sloping glacial till plains crossed by low, broad end moraines. The highest elevation is 885 ft. NGVD in Champaign County to 385 ft. NGVD at Fayetteville, IL. Generally, most of the upland relief is not great, and water drainage along the upper end of the tributaries is poor. As a result, channelization (ditching) by private landowners has been performed to improve water drainage along the upper ends of many of the major tributaries and feeder creeks of the Kaskaskia River.

3.2.1.1 The tributary streams flowing into the main stem of the Kaskaskia River generally flow in either a southwest or southeast direction. The streams can be characterized as gently sloping streams. Field observation indicated that the riverbeds consist primarily of course to medium graded sands and gravels. There is also evidence of a fair amount of fine material in the form of sand, silt, and clay intermixed with the course material.

3.2.1.2 The main stem of the Kaskaskia River flows in a general southwest direction in a meandering pattern. The average slope of the middle Kaskaskia River is approximately 1.0 feet per mile. The physical changes that have taken place on the Kaskaskia River within the last 75 years imply that the physical type or physical classification of the river has changed. The river, originally a narrow sinuous channel, has been transformed to a wider, less sinuous channel with an associated increase in channel sediment (sand bars) (COE 2003).

3.2.1.3 The modern floodplain in the Kaskaskia River area is typical bottomland, of relatively low relief in the southern portion of the project area and more steeply sided and sloped in the northern portion around Lake Shelbyville. Soils range

from sandy to clayey and are formed on alluvium transported by water and redeposited in the floodplain. In low areas, the natural drainage is poor resulting in flooding and ponding that limits any non-farm use. The climate is generally characterized by warm summers and moderately cold winters. Average annual rainfall is approximately 40 inches. Historical shifting of the river channel has created numerous oxbow lakes and meander scars on the floodplain.

3.2.1.4 Lakes were created when dams were put into operation at Carlyle in 1967 and Shelbyville in 1970. As flood control structures, they were designed to reduce the peak flows that occur during flood events which could substantially reduce the amount of erosive energy supplied to the river. Dams at Shelbyville and Carlyle formed lakes of 11,000 and 26,000 acres respectively.

3.2.1.5 Plates 1 and 2 show the Kaskaskia River watershed and sub-watersheds and levees in the project area.

3.2.2 Water Quality. The Kaskaskia River water quality is typical for slow moving streams draining an agricultural basin. The water is generally shallow, turbid, and has high nutrient concentrations. Row cropping, mining activities, and some point source sewage treatment plant discharges do not significantly degrade the river, but do contribute most of the sediment and nutrients. An analysis of the biological, physicochemical, physical-habitat, and toxicity data indicate that the Kaskaskia River in the project area is in full attainment of its designated use (good condition) except for one 13 mile stretch above Carlyle Lake, which has been designated as fair (CLWTC 2002). Minimum releases from the lakes are required to maintain acceptable water quality. The river is used as municipal water supply by several small towns and industries.

3.2.3 Processes

3.2.3.1 Ground water recharge areas: Little site-specific ground water information is currently available for the Kaskaskia River valley, but the occurrence and character of ground water sources are typical of regional alluvial valley ground water systems. These systems consist primarily of water bearing zones in glacial drift formations of the area. Such geologic units are known to be generally discontinuous and non-homogeneous: the variable geology leads to variation in aquifer location. In general, sand and gravel aquifers of the Kaskaskia River valley produce yields of less than 100 gpm (gallons per minute). Ground water levels in the general area represent a subdued reflection of regional topography. Higher water table elevations are present in the upland areas. These gradually decrease as lowland areas are approached, thus resulting in a relatively flat regional water table gradient (COE 1992).

3.2.3.2 Sedimentation is a major issue throughout the watershed, and is documented in the Corps studies. Siltation makes water bodies more shallow (and thus warmer in the summer) and murkier (because of particles stirred up by

fish and watercraft). Siltation also impacts water quality and aquatic habitat. However, siltation in Carlyle Lake has not exceeded projections as described in the Corps sedimentation study (COE 1999).

3.2.3.3 Bank Failure Mechanisms: Typical bank failure mechanisms contributing to the bank erosion on the Kaskaskia River include two related to river hydraulics or flow(COE 2003):

3.2.3.3.1 Parallel Hydraulic Erosion Forces. Bank material is removed by parallel hydraulic sheer forces against the bank during high flow events. This is probably the primary dominant force causing bank erosion on the river. Streambank erosion annually contributes 123, 800 tons of sediment to Carlyle Lake (CLWTC 2002).

3.2.3.3.2 Sheet Erosion, Rilling, and Gullying. Some bank material is removed by adjacent floodplain water drainage flowing back into the river channel. "Return" water during flood recession or during localized rainfall events in the floodplain forms small rills and gullies along the adjacent floodplain and down the sides of all eroding banks. However, much of the sediment produced by sheet and rill erosion is deposited before entering the stream or drainage ditch system (CLWTC 2002)

3.2.3.4 The river banks are generally composed of approximately a 5 to 15 foot conglomerate layer of silt/clay loam, underlain with a 20 to 30 foot layer of fine to medium graded sands. The predominance of sandy banks provides very low resistance to erosion. As a comparison, banks in rivers and streams containing predominantly clays are much more resistant to erosion.

3.2.3.4.1 The majority of bank erosion on the Kaskaskia River probably occurs at bankfull stage and higher when overbank scour occurs. Farmers have noted that most bank erosion along the river had taken place after sustained high water events. Overbank scour is defined as erosion occurring across the floodplain and in most cases, results from the lack of riparian zone located along the outside of channel bends (COE 2003).

3.2.3.5 Lake Shorelines: Shorelines at the lakes are subjected to wave action and are susceptible to erosion. Where protection of the shoreline was not required to protect facilities or private property the shoreline has been allowed to erode to a natural 1:14 slope. The fluctuating lake levels have made it difficult to establish natural erosion protection measures. However, the shoreline has been riprapped in various locations to protect recreational facilities and private property.

3.2.4 Water Resources Management:

3.2.4.1 Water Control Release Schedule (WCRS): Water stages in the Kaskaskia River are controlled by the operation of dams at Carlyle Lake (RM(river mile) 94.2) and Lake Shelbyville (RM 197.9) Based on the WCPs for Carlyle Lake and Lake Shelbyville, the projects are currently regulated using the WCRSs along with temporary deviations. In the authorized plans of operation, pool levels are indicated on the WCRSs as well as the releases at any particular time. The WCRSs for Carlyle Lake and Lake Shelbyville are shown in Appendix 1, Plates A and B.

3.2.4.2 Lake Regulation - Lake Shelbyville

3.2.4.2.1 Lake Shelbyville is located in Shelby and Moultrie Counties of east-central Illinois. The dam is on the Kaskaskia River approximately one-half mile east of Shelbyville and 221.8 miles upstream from its confluence with the Mississippi River. The lake extends approximately 20 miles upstream from the dam and ranges in width from 0.25 to 1 mile. Lake Shelbyville covers 11,000 acres at normal summer pool elevation (599.7 ft MSL) to a maximum depth of 53 feet and has 172 miles of shoreline.

3.2.4.2.2 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.

3.2.4.2.3 For the river below Shelbyville, bankfull is equal to about 1800 cfs; farther downstream, bankfull would require a higher volume. Releases above the bankfull level results in flooding of the downstream floodplain which generally means agricultural fields would be impacted.

3.2.4.2.4 The Corps manages Lake Shelbyville and owns the land surrounding the lake and 6,237 acres of flowage easements adjacent to project lands. The Corps and IDNR operate recreational areas and manage the public lands and fisheries of the lake.

3.2.4.2.5 Pool fluctuations at Lake Shelbyville are common, usually occurring in the late winter/early spring period. Releases are usually made through two sluice gates. The fluctuations of Lake Shelbyville, particularly during the intensive recreation season, May through October, complement the recreational use of the project (See WCRS on Plate B). A detailed plan of regulation and pertinent information relative to Lake Shelbyville is contained in Appendix A to the KASKASKIA RIVER BASIN - MASTER RESERVOIR REGULATION MANUAL.

3.2.4.2.6 Flood Control Storage

3.2.4.2.7 At Lake Shelbyville there are two levels of flood control capacities, the flood control pool and the surcharge pool. The flood control pool is that portion above elevation 599.7 (top of joint use pool) ft. NGVD and below elevation 626.5 ft. NGVD and contains 474,000 acre-feet of storage. The main purpose of this pool is to store inflows that exceed downstream channel capacities (1,800 cfs). The range of releases from this pool can vary from 10 cfs to 4,500 cfs. The surcharge pool is the flood control capacity above the flood control pool.

3.2.4.2.8 If Lake Shelbyville were non-existent, then the daily storage values would be added to the downstream tributary effect causing more severe flooding of the basin. The present plan of regulation (Appendix 1 – Plate B) for Lake Shelbyville is to maintain the lake at pool elevation 599.7 from 1 May to 15 December. The pool will be lowered to the winter drawdown level of 594.0 ft. NGVD. Fluctuations of the lake level will be most noticeable when heavy precipitation in the basin increases the inflow into the lake at a rate that would cause flooding downstream if passed through the dam and not stored. Downstream releases may exceed full bank (1,800 cfs) during the winter months. This will cause flooding in the low lands, but at that time of the year the crops have been harvested and the trees are dormant.

3.2.4.2.9 As indicated in the 1974 Lake Shelbyville Environmental Impact Statement, the operation of Lake Shelbyville is intended to achieve the greatest possible benefit for each project purpose over the long run. Compromises are an inherent part of the operations and some adverse impacts are inevitable.

3.2.4.3 Lake Regulation - Carlyle Lake

3.2.4.3.1 Carlyle Lake is in Clinton, Bond, Marion and Fayette Counties, approximately 0.5 miles from Carlyle and approximately 50 miles due east of St. Louis. The dam is on the Kaskaskia River approximately 95 miles upstream from its confluence with the Mississippi River.

3.2.4.3.2 The lake is twelve miles long and 1-3 miles wide and has approximately 26,000 acres of water surface at summer pool and a maximum depth of 25 feet (at 445.0 ft. NGVD). The lake shoreline is 83 miles and there are approximately 11,000 acres of public land associated with the project. The Corps owns 24,972 acres of flowage easements (450.0-462.5 ft. NGVD) within the flood control pool that allows the Corps to flood private property when the lake rises. A minimum downstream release of 50 cfs is assured. The pool at 445 extends upstream from the dam approximately 15 miles; at elevation 462.5, water would be backed up approximately 25 miles from the dam and would cover 57,500 acres. Tributaries to the lake in addition to the Kaskaskia River include

the East Fork of the Kaskaskia River, Hurricane Creek, Coles Creek, Allen Branch and other minor tributaries.

3.2.4.3.3 For the river below Carlyle, bankfull is equal to about 4000 cfs; farther downstream, bankfull would require a higher volume. Releases above the bankfull level result in flooding of the downstream floodplain which generally means agricultural fields or bottomland forest is impacted.

3.2.4.3.4 Pool fluctuations are common, usually occurring in late winter/early spring. (See WCRS on Plate A). A detailed plan of regulation and pertinent information relative to Carlyle Lake is contained in the Appendix B of the KASKASKIA RIVER BASIN, MASTER RESERVOIR REGULATION MANUAL.

3.2.4.4 Flood Control Storage.

3.2.4.4.1 Carlyle Lake has two levels of flood control capacities, the flood control pool and the surcharge pool. The flood control pool is that portion above elevation 445.0 (top of conservation pool) and below 462.5, and contains 700,000 acre-feet of storage. The main purpose of this pool is to store inflows which exceed downstream channel capacities (4,000 cfs). The range of releases from this pool can vary from 50 cfs to 4,000 cfs under normal conditions. The surcharge pool is the flood control capacity above the flood control pool.

3.2.4.4.2 From Carlyle Lake to the mouth of the Kaskaskia River, there are five major tributaries, namely, Crooked Creek, Sugar Creek, Shoal Creek, Silver Creek, and Richland Creek. Since the plan of regulation of Carlyle Lake uses a downstream “control point,” Venedy Station, Illinois (Washington County) has been selected as the principle gage. Therefore, in order to minimize flood damage from Carlyle, Illinois, to the mouth of the Kaskaskia River, the release, under normal conditions, and considering weather conditions, from Carlyle Lake is equal to the bank full flow at Venedy Station minus the sum of the flows of the above five tributaries minus the flow value of the ungauged local area, all adjusted to their respective travel times to Venedy Station. This means that the releases from Carlyle Lake are reduced until the crests of the five tributaries enter the main stem. Should the tributaries contribute above flood stage flows, then the Carlyle Lake releases are kept at a minimum until the downstream stage recedes to below bank full flows.

3.2.4.4.3 This method of operation actually reduces the adverse effects on the environment. If Carlyle Lake were non-existent, then the daily storage values would be added to the downstream tributary effect causing severe flooding of the basin with a resulting loss of property and perhaps danger to human life.

3.2.4.4.4 The present plan of regulation for Carlyle Lake is to maintain the lake at pool elevation 445 ft. NGVD from 1 May to 1 December (Appendix 1 - Plate A). The pool will be lowered to the winter drawdown level of 443.0 ft. NGVD.

Fluctuations of the lake level will be most noticeable when heavy precipitation in the basin increases the inflow into the lake at a rate that would cause flooding downstream if passed through the dam and not stored. Downstream releases may exceed full bank (4,000 cfs) during the winter months, which will cause flooding in the low lands. However, at that time of the year the crops have been harvested and the trees are dormant.

3.2.4.5 Kaskaskia River between Lake Shelbyville and Carlyle Lake

3.2.4.5.1 The Kaskaskia River flows 91 miles southwest from Lake Shelbyville to Carlyle Lake through Shelby and Fayette Counties. Most of this land is privately owned, agricultural cropland. Other flood control projects along the river include the federal Dively Drainage and Levee District (RM 160 LB (left bank)) and the private Vandalia Levee (RM 140-157 LB).

3.2.4.5.2 For landowners along the Kaskaskia River between Lake Shelbyville and Carlyle Lake, flooding can occur due to storms in the watershed area between the lakes (vast majority of the cases), releases from Lake Shelbyville, and high water levels in Carlyle Lake (on flowage easement ground).

3.2.5 Adverse Effects of Flood Control: Shelbyville

3.2.5.1 Downstream – The degree of adverse effects on the downstream landowners depends on the severity of the storm causing flooding, and the elevation to which the lake is raised above the top of the joint-use pool. When the level of the lake is below elevation 610 ft. NGVD and a storm producing heavy runoff both above and below the dam occurs, the releases from the reservoir will be low until the tributaries and the Kaskaskia River downstream of Shelbyville Dam have crested and within-bank flows can be maintained. An adverse effect of this plan of regulation is that the duration of high flow is extended considerably. The prolonged high river stage raises the ground water level to a point where downstream landowners' fields, though not flooded by surface flow, are completely saturated and unworkable. When the lake rises above elevation 610 ft. NGVD, the plan is to release between 1,800 and 4,500 cfs from the lake. The releases will flood the lands downstream of the dam and could occur frequently. In addition, it could adversely affect the planting, growing, and harvesting of crops.

3.2.5.2 Upstream - As the level of the lake rises, portions of land used for recreation are inundated, thereby restricting their use. The degree and length of restriction depends upon the severity of the flood. A flood of the magnitude that can be expected frequently will have some detrimental effects upon recreation at the lake. All of the recreation areas will remain open; however, some swimming, picnic, camping, and boat launching facilities will be inundated. Side effects of the area being inundated include the destruction of grass turf, loss of trees, accumulation of driftwood, reduction of visitation, and loss of marina income.

The soils here are highly erosive and fluctuation of the water level plus wave action from wind and boats cause an eroded condition along the shoreline. Erosion also produces excessive turbidity along the water's edge. Vegetation destruction because of flooding increases possible erosion due to storm water runoff. Frequently occurring floods cause proportionately greater damages. The fish population could be adversely affected if spawning coincides with receding high water.

3.2.6 Adverse Effects of Flood Control: Carlyle

3.2.6.1 Downstream – The degree of adverse effects on the downstream landowners depends on the severity of the storm causing flooding and the elevation to which the lake is raised above the top of the joint-use pool. When the level of the lake is below 445 ft. NGVD and a storm producing heavy runoff both above and below the dam occurs, the releases from the reservoir will be low until the tributaries downstream of Carlyle Dam have peaked and the main Kaskaskia River gauges are falling. The releases from the dam will then be increased to a maximum non-damaging flow. The adverse effects of this plan of regulation are that the duration of high flow is extended considerably. This prolonged high river stage raises the ground water level to a point where downstream landowners' fields, though not flooded by surface flow, are completely saturated and unworkable. When the lake is in the flood control pool at the start of a storm runoff and rises above elevation 450.0 ft. NGVD, the plan is to release between 4,000 and 10,000 cfs from the dam. This release will flood approximately 40,000 to 44,000 acres downstream of the dam and could adversely affect the planting, growing and/or harvest of crops.

3.2.6.2 Upstream – As the level of the lake rises, portions of land used for recreation are inundated, thereby restricting their use. The degree and length of restriction depend upon the severity of the flood. A flood of the magnitude that can be expected frequently (450 ft. NGVD) will have some detrimental effects upon recreation at the lake. All of the recreation areas will remain open; however, some swimming, picnic, camping, and boat launching facilities will be inundated. Adverse side effects will include the destruction of grass turf, loss of trees, accumulation of driftwood in mowed areas, erosion of the shoreline, reduction of visitation, and loss of marina income. Floods in excess of a five-year flood will cause proportionately greater damages. The fish population would be adversely affected if spawning coincides with receding high water.

3.3 Socio-Economic Environment

3.3.1 The eight main counties through which the Kaskaskia and its tributaries flow have a mixed economy where manufacturing is relatively more robust than statewide. Service industries have become important too, and the larger employers now include hospitals and state facilities such as prisons. Agricultural activities are significant within the watershed and are far and away the leading

source of income for residents within the many rural communities found here. The northern sections of the watershed focus on row-crop production, while the southern reaches contain a mixture of livestock and row-crop production. The inclusion of buffer programs, the Conservation Reserve Program, the Wetlands Reserve Program and no till incentive in past Farm Bills have assisted in reducing the amounts of nutrients, pesticides and sediments reaching the river throughout the watershed. (SWRCD 2002)

3.3.2 Recreation – The Corps and the IDNR operate recreational areas and manage the public lands and fisheries of the lake. Recreation activities within the watershed are extremely popular and are a very important economic benefit to the region, especially around the two USACE projects at Carlyle Lake and Lake Shelbyville. Fishing, including tournaments, sailing and sailing regattas, hunting, camping, swimming, boating, bicycling and walking are very popular and the lakes attract millions of visits each year. Water related recreation has tremendous local economic impact in the counties surrounding each project; negative local economic impacts occur when extended high water closes land-based recreational facilities at the lakes. Access to Carlyle Lake has been hampered at times by high water, but recent efforts by the Corps and the State has resulted in improvements and plans to provide greater access for boaters and land-based recreational activities. Shoreline erosion that threatened numerous facilities at Lake Shelbyville has been addressed through implementation of the *Shoreline Erosion Plan*.

3.3.3 Aesthetics: The project area is represented by river and lake landscapes that attract thousands to recreate and inhabit. The topography of gently rolling hills and valleys with some steeper sloped areas along major creeks and streams provides a deviation from the flat fields converted from bottomland forest or prairie (CLWTC 2002).

3.3.4 Cultural Resources: There are more than 700 known cultural properties at in Clinton, Fayette and Shelbyville Counties and perhaps several hundred unknown sites (CLWTC 2002). Water management activities that affect the physical environment would have the potential to impact known and unknown cultural sites. Most known cultural sites at Carlyle Lake and Lake Shelbyville are located in shoreline contexts. The majority of the prehistoric sites in the area are recent and represent Late Archaic (ca. 1,000 B.C.), Woodland (ca. 500 B.C. to AD. 900), and Mississippian sites (ca. AD. 900 to AD. 1,500). Most of these sites are being adversely impacted by water level fluctuations at the reservoirs.

3.4 Biological Resources

3.4.1 General: The study area includes the great prairie region and areas to the south of the great prairie region. The northern areas of the watershed were more or less open and composed of prairie and savannah while the southern portion was probably almost entirely covered by forests in pre-settlement times (Iverson

et ale 1989). The stream and river corridors in the upper half of the Kaskaskia River basin were wooded. Since that period, most, if not all, of the area has been disturbed by man. Terrestrial habitats in the study area include upland forests, agricultural lands, old fields, and other areas of previous disturbance now in various stages of re-vegetation. Wetlands and deepwater habitats in the study area include the river, creeks, remnant channels, old oxbows, permanent and temporary pools, marshes, and saturated open lands, and bottomland forest. Important natural areas within the watershed are shown on Plate 3, the Natural Areas map.

3.4.1.1 Vegetation: The plant resources at Lake Shelbyville and Carlyle Lake include a diverse forested area ranging from light-seeded species which usually populate stream valleys prone to seasonal flooding to the complex association on the upper slopes classified by the generic oak-hickory forest type which actually includes many other species of trees and shrubs. Occasional sightings of tall grass prairie species are a reminder that these persistent plants once populated the flat prairie adjacent to the forested river valley. In sharp contrast to the surrounding farmland, the vegetative resources and qualities of the project areas offer an aesthetic change of pace (COE 2004). Land cover in the Kaskaskia River basin is shown on Plate 4.

3.4.1.1.1 Bottomland hardwoods occur at the north end of Carlyle Lake and Lake Shelbyville and along the lower Middle Kaskaskia reach. Dominant bottomland species include cottonwood, silver maple, willow, and sycamore. Where flooding is somewhat less frequent, species such as box elder, green ash and elm may be common. Slightly drier sites support localized populations of bur oak, pin oak, white oak, swamp white oak, mulberry and black walnut (COE 1974). These hardwoods have been impacted by the operations of the reservoirs and do not exist to the extent that they once did.

3.4.1.2 Wildlife Resources. Located within the Lake Shelbyville, Carlyle Lake and Kaskaskia River bottomland areas are numerous species of wildlife native to this area of Illinois including numerous types of rodents, small game birds and mammals, waterfowl, shore birds, song birds, furbearers, white-tailed deer, wild turkey, and predatory mammals and birds. Wildlife management procedures on the lake lands have benefited the species present. The flooded timber areas provide nest trees for woodpeckers and wood ducks. In addition, the number and diversity of shore birds and waterfowl using these areas has steadily increased.

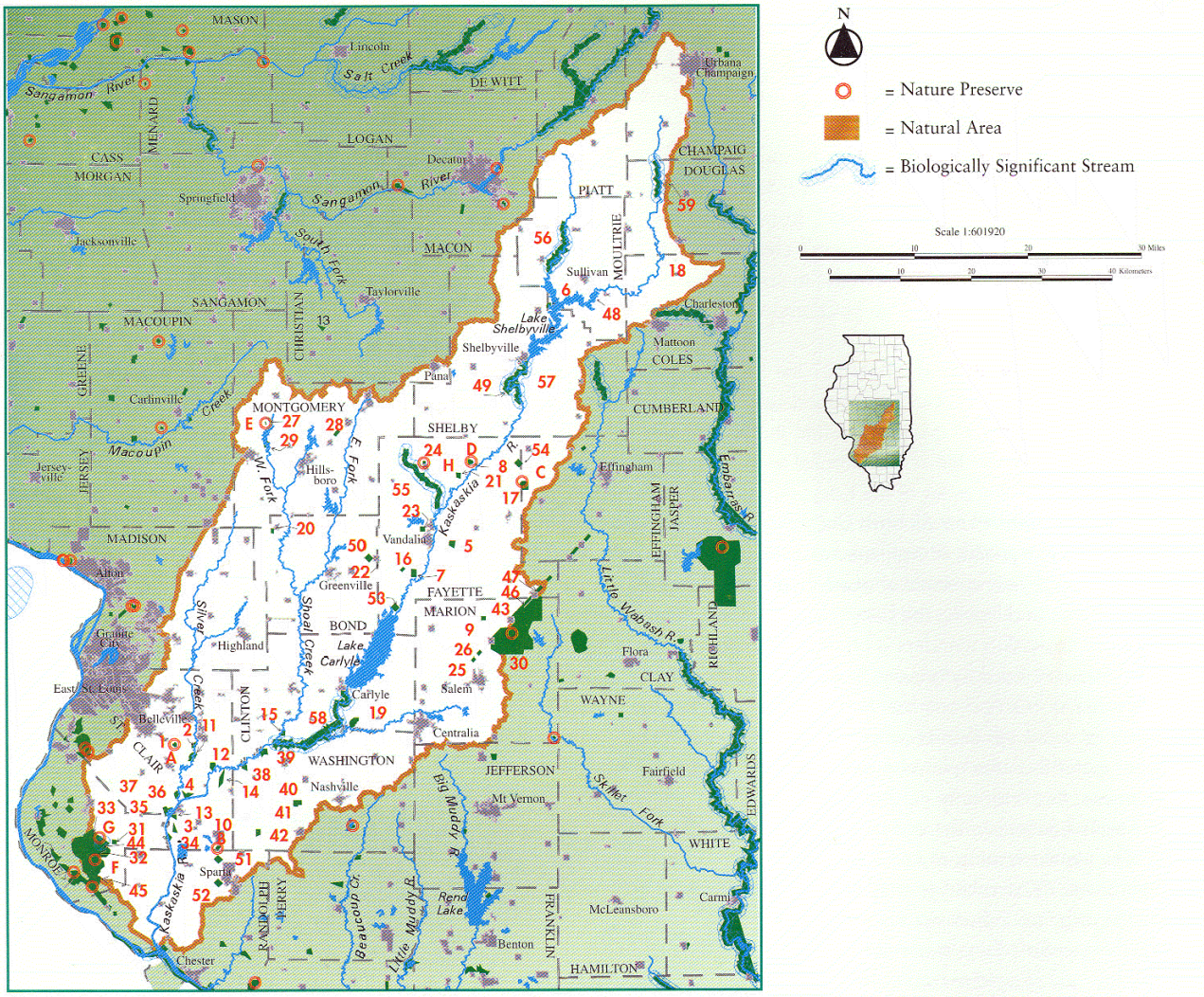
3.4.1.3 Threatened and Endangered Species – (Biological Assessment) In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, the Corps requested the FWS and IDNR to provide a listing of Federal and State, threatened and endangered species that may occur in the vicinity of the project area. The IDNR and FWS have indicated the species listed in Table

EA-4 may occur in the vicinity of the project area. There is no designated critical habitat in the project area at this time.

3.4.1.3.1 In addition to the listed threatened and endangered species, the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is a federal candidate species known to be extant in several Illinois counties. The largest known population in Illinois is found in the vicinity of Carlyle Lake (Clinton, Bond and Fayette Counties) where it hibernates near the southern lake shoreline. Massasaugas live in wet areas, including wet prairies, marshes and low areas along rivers and lakes. In many areas, massasaugas also use adjacent uplands, including forests, during part of the year. They often hibernate in crayfish burrows, but they also may be found under logs and tree roots or in small mammal burrows. Unlike other rattlesnakes, massasaugas hibernate alone (Johnson 2000).

3.4.1.3.2 Of the listed species, the only ones that would possibly be affected by the proposed changes would be the bald eagle, Indiana bat, least tern, pallid sturgeon, Kirtland's snake, western sand darter, Spike, Bigeye shiner, decurrent false aster and least bittern. Decurrent false aster and least tern are not known to occur on the Kaskaskia (Keevin, pers. comm.). The remainder of these species, whose habitat lies in or close to the river, would tend to be impacted the most by fluctuating water levels. However, the water levels in the lakes and river tend to range greatly and apparently these species have been able to adjust to these fluctuating water levels for more than 35 years.

Natural Areas, Nature Preserves, and Biologically Significant Stream Segments



Illinois Natural Areas Inventory Sites

1. Julius J. Knobeloch Woods
2. Silver Creek Marsh
3. Baer Brothers Woodlot
4. Freeburg Rod and Gun Club Woods
5. Sonneman Woods
6. Sullivan Woods
7. Fish Lake Woods
8. Dean Hills
9. Sandy Branch Woods
10. Marissa Woods
11. Freeburg Woods
12. Jackson Slough Woods
13. Lively Branch Woods
14. Wagon Lake
15. Eversgerd Flatwoods
16. Bauman Pond
17. Rock Cave
18. Humboldt Railroad Prairie
19. Lost Creek Prairie
20. Sorento Geological Area
21. Ramsey Marsh
22. Mulberry Grove Geological Area
23. Vandalia Geological area
24. Ramsey Lake Railroad Prairie
25. Salem Leckrone Airport Railroad Prairie
26. Alma Railroad Prairie
27. Roberts Cemetery Savanna
28. Irving Railroad Prairie
29. Shoal Creek Barrens
30. Prairie Ridge - Marion County
31. Bradley Branch Woods
32. Fogelpole Cave
33. Dry Run Cave System
34. Wirth Island
35. New Athens Woods
36. Silver Creek Woods
37. Floraville Geological Area
38. West End Sportsman's Club Woods
39. Sipple Slough Woods
40. Bohbrink Woods
41. Williams Creek Woods
42. Johnson Woods
43. Twelve Mile Prairie (tract No. 6)
44. Illinois Caverns Cave System
45. Renaul Cave System
46. Twelve Mile Prairie (tract No. 4)
47. Twelve Mile Prairie (tract No. 5)
48. Coneflower Hill Prairie
49. Harmon Cemetery Site
50. Mulberry Grove Railroad Prairie
51. Leemon Site
52. Sparta Site
53. Carlyle Lake Site
54. Wolf Creek Sedge Site
55. Ramsey Creek
56. West Okaw River
57. Kaskaskia River
58. Kaskaskia River - Carlyle
59. Kaskaskia River - Chicken Bristle

Illinois Nature Preserves

A. Julius J. Knobeloch Woods
B. Marissa Woods
C. Rock Cave
D. Dean Hills
E. Roberts Cemetery Prairie
F. Fogelpole Cave
G. Armin Krueger Speleological
H. Ramsey Railroad Prairie

Plate 3 Natural Areas

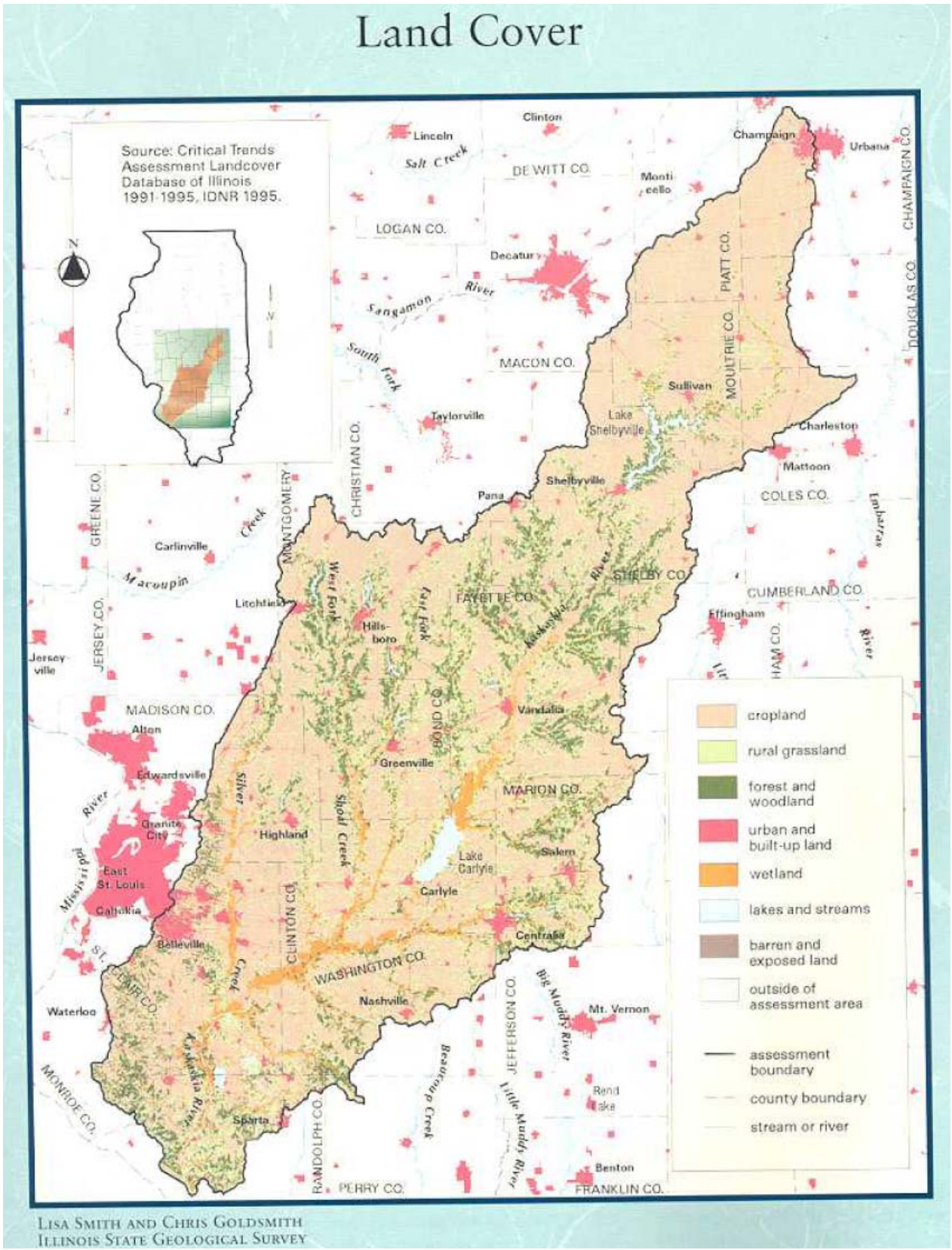


Plate 4 – Land Cover

Table EA – 4 - Federal and State Threatened and Endangered Species				
Federal	**State**	**Common Name**	**Scientific Name**	**Habitat**
T	T	Bald eagle	*Haliaeetus leucocephalus*	Breeds and winters along large rivers and major reservoirs
E	E	Least tern	*Sterna antillarum*	Bare alluvial and dredge spoil islands
E	E	Pallid sturgeon	*Scaphyrhynchus albus*	Rivers
E	E	Gray bat	*Myotis grisecens*	Caves; feeds along rivers and reservoirs adjacent to forests.
E	E	Indiana bat	*Myotis sodalis*	Caves, mines; small stream corridors with well developed riparian woods; upland and bottomland forests
E	E	Illinois cave amphipod	*Gammarus acherondytes*	Karst caves and streams
T	T	Decurrent false aster	*Boltonia decurrens*	Disturbed alluvial soils
N/A	E	Western sand darter	*Ammocrypta clarum*	Moderate current over sandy bottom, gravel or silt, benthic, in Kaskaskia River near Shelbyville (Sauer 1997).
N/A	T	Kirtland's snake	*Clonophis kirtlandii*	Wetland and wet grassy area; Upper and Middle Kaskaskia River watershed
N/A	E	Violet collinsia	*Collinsia violacea*	Shelby Co.
N/A	T	Spike (Mussel)	*Elliptio dilatata*	Streams and lakes in mud or gravel; Upper and Middle Kaskaskia
N/A	E	Mississippi kite	*Ictinia mississippiensis*	Riparian woodlands; mouth of Kaskaskia
N/A	T	Least bittern	*Ixobrychus exilis*	Marshes; Middle Kaskaskia
N/A	E	Bigeye shiner	*Notropis boops*	In river pools over sand or gravel; collected in Lake Shelbyville and the Lower Kaskaskia
N/A	E	Yellow-crowned night heron	*Nyctanassa violacea*	Swamps and marshes; Lower and Middle Kaskaskia
N/A	E	Osprey	*Pandion haliaetus*	Along rivers and lakes; Middle Kaskaskia
N/A	E	Spring ladies' tresses	*Spiranthes vernalis*	Orchid (Effingham and St. Clair Co.)
N/A	T	Buffalo clover	*Trifolium reflexum*	Drier, less fertile limestone soils; entire Kaskaskia watershed
C	E	Eastern massasauga	*Sistrurus catenatus catenatus*	Low, grassy areas near water; Carlyle Lake.

3.4.1.4 Aquatic Resources: Biologically Significant Stream (BSS) designation is based on a comprehensive evaluation of the state's aquatic resources, and indicates the presence of high quality aquatic systems. The criteria include fish populations, water quality, macroinvertebrates, endangered and threatened species, and mussel diversity. The database is maintained at the Illinois Natural History Survey and was current as of November 1995. The Kaskaskia below Carlyle dam (between US 50 and Shoal Creek) and Shelbyville dam (Route 16 to Howe Creek), the West Okaw River from its mouth to the Stringtown Bridge as well as the upper reaches of Ramsey Creek are designated as BSS. The West Okaw River and Ramsey Creek have an “A” rating (Unique Aquatic Resource) and the river locations below the Carlyle and Shelbyville dams are noted for their high mussel diversity.

3.4.1.5 The Kaskaskia River and its tributaries support a diverse community of fish, consisting primarily of cyprinids (minnows and carp), centrachids (sunfish), ictalurids (catfish), catostomids (suckers) and percids (darters) (Larrimore and Fritz , 1993). In 1997, Sauer’s sampling (IDNR) found that cyprinids accounted for 61 percent of all specimens, followed by centrachids (12%) and catostomids (8.5%) which was consistent with a 1982-83 IDNR survey. Although few Ictalurids were found in the 1997 survey due to sampling technique, they probably make up about 13 percent of the survey population (Sauer 1997).

3.4.1.6 The fish species of the lakes and their tailwaters are typical of midwestern waters. Major sport and forage species are white and black crappie, bluegill, green sunfish, longear sunfish, warmouth, muskie, white and yellow bass, walleye, sauger, yellow and black bullhead, channel and flathead catfish, largemouth bass, freshwater drum, carp, buffalo, bowfin, gizzard shad, carpsucker, brook silversides, and many species of minnows, shiners, and darters. There are approximately 124 species of fish found in the Kaskaskia River basin. The waters of the lake and tailwater support a diversity of forms of phytoplankton, zooplankton, aquatic insects, crustaceans, and mollusks which is an indication of the health of the food chain supporting the lake fisheries.

3.4.2 Wetland Resources: Wetlands account for an unusually higher percentage of the land cover in the Kaskaskia River basin, partly due to placing larger areas of it in protected public ownership. Bottomland forest is the most common wetland type, but the wetlands also include marshes, shrub swamps and seeps. The wetland type that would be influenced most by changes to the WCPs are the bottomland forests. As shown on Plate 4, the wetland resources are concentrated in the north end of Carlyle Lake and the Kaskaskia River north of New Athens and below Route 15. Generally, the bottomland hardwood forests have been experiencing some adverse impacts related to the changes in the water flows since the construction of the lock and dam.

4 Environmental Consequences

4.1 Introduction: This chapter is organized by alternatives. All resource impacts for each alternative appear under the discussion of that alternative. Impacts associated with the proposed changes are summarized in Table EA-5. All impacts associated with the proposed project and the two other alternatives appear in Table EA-6.

4.1.1 The physical size of the project area, the variable and almost infinite nature of water stages and finite funding of the analysis has resulted in a limited ability to analyze in detail the environmental impacts of the proposed changes to the WCPs. However, in general, the changes proposed to the WCPs are expected to reduce the frequency of water levels in the extreme ranges (high and low). Consequently, the negative impacts of water control management would be expected to be reduced by the proposed changes. In addition, the proposed changes include the typical temporary deviations that have been used on a consistent basis for more than 20 years to address all project purposes while managing the water flow. No major environmental impacts have been noted during that time period.

4.2 Alternative A: No Action Alternative: Use Current WCPs with Requests for Temporary Deviations

4.2.1 Physical Resources: Overall, no physical changes are expected other than those associated with normal river processes, i.e., bank and shoreline erosion, lake and river sedimentation, over the bank scouring and flooding that continue to make minor changes to the river corridor and lakes. However, if deviations are not obtained, the potential to avoid or reduce negative impacts to the physical environment is taken away.

4.2.2 Socio-economic Environment: If the temporary deviations are not obtained as requested, negative impacts could occur to the agricultural and recreational business sectors. Upstream impacts would impact lake recreational facilities, i.e., marinas and park facilities. Economic studies have shown that when the project lakes are essentially shut down, the economy in the counties within 30 miles of the projects would be negatively impacted. Downstream impacts would primarily affect agricultural interests during the crop season, generally 1 May to 1 November.

4.2.2.1 Impacts to cultural resources in shoreline contexts have been noted since lake operations were established and the impacts are considered adverse. Erosion and flooding would continue to cause negative impacts to aesthetics.

4.2.3 Biological Resources: Impacts to listed species have been addressed in previous environmental reviews or environmental assessments when necessary since the current water management plan has been put into effect. No major

impacts to listed species have been noted. Although it does not always require a deviation, the possibility exists that a needed deviation for the fish spawn could not be obtained and the failure to maintain a stable pool would impact fish populations for that year class.

4.2.3.1 Since lake operations were begun, much of the bottomland hardwood has been impacted by high lake levels and a change in the timing and duration of water flows. Due to these previous impacts and the affect of the temporary deviations to reduce extremes in water levels, it is not anticipated that continuation of the current WCP with deviations would affect in a major way the bottomland hardwood areas. However, if the requested deviations are not approved, limited impacts to the vegetative resources could occur

4.2.4 Cumulative Impacts: It is expected that the present conditions and impacts of the water control management plans would remain the same. There may be instances when a needed deviation could not be obtained and that might result in a minor negative impact, i.e., a reduction in the success of the fish spawn, higher flood levels for short durations or more prolonged flooding. Overtime, these impacts may result in a greater impact, i.e., added costs to the recreation and agricultural sectors of the economy.

4.3 Alternative B: Incorporate Some Actions Associated with Typical Deviations and Revise the WCPs

4.3.1 Physical Resources: Overall, no physical changes other than the normal river processes that continue to have minor impacts to the river corridor, i.e., erosion and sedimentation. The ability to use cutbacks between 610 and 614.8 at Lake Shelbyville and between 450 and 455.6 at Carlyle Lake while not increasing the duration or increasing the crest levels would reduce upstream and downstream impacts. This would be a more sure plan to manage atypical or unique flows because there will be no need to request deviations to avoid impacts to other project resources during flood control operations. Extreme flows and water levels in the lakes would still require a temporary deviation, e.g., going above the maximum release rate and probable additional environmental review.

4.3.2 Socio-economic Environment: Implementation of this alternative would allow adjustments for recreation and agricultural interests. Adjusting the start of the crop season and the dormant season would benefit other project purposes as discussed in Table EA-5. The ability to adjust winter drawdown would also permit the projects to continue to provide recreational opportunities later in the season, i.e., for waterfowl hunting in the area above the railroad tracks at Carlyle Lake.

4.3.2.1 Impacts to cultural resources in the shoreline contexts have been noted since lake operations were established and the impacts are considered adverse. Erosion and flooding would continue to cause negative impacts to aesthetics.

4.3.3 Biological Resources: The listed Federal and State, threatened and endangered species would not be impacted by the proposed revisions to the WCPs or incorporating actions associated with the typical deviations. The flows and lake levels associated with this alternative would be less extreme and have the tendency to lessen the impacts of water control management rather than increase the impacts. The physical environment and habitats of the listed species would be less impacted; consequently, fewer impacts to the species would be expected. This alternative would provide the optimum for the biological resources.

4.3.3.1 Concern has been expressed about the potential impact the changes in the WCP would have on the massasauga rattlesnake at Carlyle Lake. The concern expressed was related to the winter drawdown. The snake returns to its hibernacula in November and December. This is also the time the lake may be held higher (445.5) to accommodate hunting on the north end of the lake. At the beginning of December, the winter drawdown is implemented and the lake is lowered to a target of 443 (same for proposed plan). How the drawdown may affect the water table and the potential for decreased moisture levels in the hibernacula is not known. The FWS has indicated that decreased moisture levels may lead to desiccation or freezing of the snakes. A review of the historical lake levels during the winter drawdown periods over the last 10 years revealed there were only two years when the winter lake levels were able to be held close to 443. Otherwise, the winter lake levels fluctuate to 445 levels and higher rather frequently during the winter drawdowns. If a later drawdown were to have a drying effect on the massasauga hibernacula, its impact would in most years be offset by the fluctuating higher water levels during the winter drawdown period. In addition, the water table is rather flat around Carlyle Lake and the WCMO has stated that the water table would be only minimally impacted by the water levels in the lake, potentially varying by only a few inches.

4.3.4 Cumulative Impacts: Like alternative A, impacts would be similar to what they have been since the current WCP was implemented along with the temporary deviations. However, this alternative would permit greater flexibility in adjusting the water control releases based on all the project purposes and provide an opportunity to reduce flooding impacts by reducing crest or duration of flooding.

4.4 Alternative C: Use Current WCPs with No Deviations

4.4.1 Physical Resources: More impacts to the physical resources would result as Corps water control managers attempt to meet specific levels and dates. Water level changes may be more abrupt resulting in bank sloughing, overbank scouring and streambank erosion. Water may be held back longer at Lake Shelbyville in accordance with the restriction related to higher Mississippi levels. More flooding may occur downstream of Shelbyville in October due to the early end of summer season requirements.

4.4.2 Socio-economic Impacts: The current plan without the application of deviations is a less flexible water control regime that would impact downstream and upstream interests, i.e. agricultural and recreational. Flows and levels could not be moderated and would potentially result in more impacts.

4.4.2.1 Impacts to cultural resources in the shoreline contexts have been noted since lake operations were established and the impacts are considered adverse. This alternative may cause even greater impacts due to the potential for higher lake levels and increased shoreline erosion. Increased erosion and flooding would cause greater negative impacts to aesthetics.

4.4.3 Biological Resources: With this alternative the biological resources could be more impacted as greater extremes in height and duration of water levels may impact some T&E species as well as wetland habitats, i.e., impacts to bottomland hardwoods may affect summer roosts for Indiana bats and nesting, perching and roosting sites for bald eagles. This alternative would impact the fish spawn the most since water levels could not be stabilized to enable a successful spawn.

4.4.3.1 Limited bottomland hardwoods along the river between the lakes would suffer greater impacts as greater flows may kill or destroy more the floodplain vegetation. This loss would result in further impacts to the river ecology and game and non-game wildlife populations.

4.4.4 Cumulative Impacts: Cumulative impacts to project resources associated with this alternative would tend to be greater since the mechanisms to reduce water control management impacts would not be available, i.e., the flexibility in date and water levels.

4.5 Unavoidable Adverse Impacts: Unavoidable adverse impacts include impacts to the physical and cultural resources and have been previously described in the project Master Plans, project EISs and other documents. Table EA-6 indicates the impacts to the various resources for each alternative which includes the resources that may be adversely impacted. These impacts may be small or more important, depending on the resource and the alternative.

4.6 Relationship of Short-Term Uses and Long-Term Productivity: An outcome of the proposed action would be to establish a more sustainable water management program that would reduce adverse impacts in the short-term and that would permit continued viability in all the project purposes. Short-term would be defined as the impacts that may accrue over a couple years whereas long-term would be defined as the impacts that may span a decade or more. Continuing with the No Action Alternative (A) or the Update and Revision Alternative (B) would limit or reduce adverse impacts in the short-term, i.e., to recreational interests such as marinas, downstream farmers and permit the long-term viability of these businesses. Using the current WCP without the use of

deviations or proposed changes (Alternative C) would result in more severe short-term impacts to the physical and biological resources and could result in the loss of the long-term viability and economic productivity of some recreational businesses or farm operations.

4.7 Irreversible and Irretrievable Commitment of Resources: The proposed action would not cause the irreversible (not ever recoverable) commitment of resources. However, slight irretrievable (lost for a period of time) commitment of resources would be associated with Alternatives A and B. The irretrievable commitment of resources associated with Alternative C is greater due to the greater impacts to the physical, biological and socioeconomic resources.

4.8 Any Other Disclosures: There are no other disclosures.

Table EA- 5

Current Plan	Proposed Plan	Impacts
Dates		
Specific Dates	All dates have an allowable variance of +/- 14 days	Often due to wet or dry Springs the start of the crop season is adjusted to the benefit of all project purposes through the use of deviations. As a result of the timing of the Spring planting season the harvest is often early or delayed. In both cases, the start of the non-crop season is adjusted by the use of temporary deviation. The start of the winter drawdown has also been changed by use of deviation. This change institutionalizes what has been become standard practice and allows the WCMO greater flexibility to react to actual conditions to better provide for all project purposes.
Elevations		
Specific Elevations	All elevations other than winter drawdown (594.0 ft. NGVD at Lake Shelbyville and 443.0 ft. NGVD at Carlyle Lake) and the top of the flood control pool have an allowable variance of +/- 0.5 feet.	This flexibility should allow the WCMO to respond better to the needs of the stakeholders without the need for a deviation approval from MVD. It is likely that it will be used equally on the plus and minus side and instigated at the request of the stakeholders. No negative impact is anticipated.
Cutbacks at elevation above 610{Shelbyville), 450 (Carlyle)		
When the pool reaches 450/610 the discharge is set by a rigid discharge curve up to the top of the flood control pool.	When the target pool elevation (450/610) is exceeded, use cutbacks between 450 and 455.6 at Carlyle Lake and between 610 and 614.8 at Lake Shelbyville while not increasing the duration or increasing the crest levels up to one-half of the flood control pool.	The overall impact of the variance should not result in a higher crest on the pool elevation; downstream flood heights or duration the pool remains above the target pool elevation (450, 610). The goal is to reduce upstream and downstream damages by judicious use of this flexibility. Given that the crest both upstream and downstream should be lowered or at worst not increased, and the duration is not increased above the target elevation, this change is all positive.

Table EA-5 cont'd

Current Plan	Proposed Plan	Impacts
Restriction due to Mississippi River Flooding		
At Lake Shelbyville the discharge is restricted to 1,000 cfs while the pool is below 614.8 and Carlyle Lake is restricted to 5,000 cfs while the pool is below 455.6 and the Mississippi River between Chester and Cairo, Illinois is in flood or flooding is imminent.	Recession side of Mississippi River flooding restriction is lifted at Carlyle Lake and the restriction is lifted at Lake Shelbyville.	The ability to release water from Shelbyville will be greatly enhanced without negative impact to the Mississippi River because Carlyle Lake is downstream and controls discharge to the Mississippi. This action will not harm Carlyle Lake since the restriction about percentage of flood control storage at the two lakes stays in affect.
Fish Spawn		
Coordinated with IDNR to moderate fluctuations during fish spawn. Sometimes requiring a deviation sometimes within authority.	Coordinate with IDNR to moderate fluctuations with specific authority spelled out below certain elevations (602, 447).	This change will institutionalize the efforts taken by IDNR and the WCMO to improve the fisheries. It will make it clear that this is within the scope of the WCPs.
Ice Impacts		
No specific mention in the plan but within authority.	Specifically mentions that ice impacts upstream and downstream can be taken into account when regulating the project.	None. Clarification only.
End of Summer Restriction of Flows		
Mentions 1 October and "when completion of harvest".	Uses 1 November as a guide when harvest is normally complete.	None. Corrects conflicting information in old manual.

Table EA – 6: Comparison of Impacts for Each Alternative

Environmental Factors	Existing Conditions	**Alternative A**: No-Action: Current WCP with Requested Temporary Deviations	**Alternative B**: Incorporate Temporary Deviations and Changes to Current WCPs	**Alternative C**: Return to Current Plan
4.2 Physical	Typical Kaskaskia River morphology	Potential short term adverse impact	Small beneficial impact	Small adverse impact
4.3 Socio-Economic Cultural	Many known sites and possibly some unknown sites	Small adverse impact	Small adverse impact	Adverse impact
4.3 Socio-Economic Aesthetics	Bank and shoreline erosion are on-going.	Small adverse impact	Small adverse impact	Adverse impact
4.3 Socio-Economic Agriculture	Agriculture is integral to regional economics in the region.	Potential small adverse impact	Small beneficial impact	Adverse impact
4.3 Socio-Economic Recreation	Numerous recreation areas, marinas associated with the lakes which are integral to regional economics.	Potential small adverse impact	Small beneficial impact	Adverse impact
4.4 Biological Wetlands	Higher percentage than statewide located in river corridor, north end of Carlyle Lake and lower third of Kaskaskia basin.	Potential small adverse impact	Small beneficial impact	Adverse impact
4.5 Biological T&E Species	Massasaugas are located around the shoreline of Carlyle Lake	No anticipated impact	No anticipated impact.	No anticipated impact.

5. List of Agencies Consulted:

5.1. The U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources were contacted regarding this project.

Ms. Joyce A. Collins, Field Supervisor U.S. Fish and Wildlife Service Marion Illinois Suboffice (ES) 8588 Route 148 Marion, Illinois 62959	Mr. Robert Schanzel, Permit Program Manager Illinois Department of Natural Resources Office of Review and Coordination One Natural Resources Way Springfield, IL 62702-1271

6. Agencies, Organizations, and Persons Receiving the Environmental Assessment

The draft EA was sent to the following agencies, organization and individuals for comment and review:

Mr. Robert Schanzel, Permit Program Manager Illinois Department of Natural Resources Office of Review and Coordination One Natural Resources Way Springfield, IL 62702-1271	Mr. Erwin Red Becker Village of Fayetteville P.O. Box 287 Evansville, Illinois 62242
Honorable Jerry Costello U. S. House of Representatives 155 Lincoln Place Court Belleville, Illinois 62221	Mr. Larry Hasheider, President Kaskaskia Watershed Association 6067 Heron Road Okawville, IL 62271
Honorable Richard Durbin 332 Dirksen Senate Office Building Washington, DC 20510	Ms. Joyce A. Collins U.S. Fish and Wildlife Service 8588 Route 148 Marion, IL 62959
Honorable Barack Obama 555 Dirksen Senate Office Building Washington, DC 20510	Ed Weilbacker Southwestern RC &D, Inc. 406 East Main Street Mascoutah, Illinois 62258
Mr. Dan Reitz Illinois Representative 116th 128A West Main Street Sparta, Illinois 62286	Mr. Michael Kuhn, President Lower Kaskaskia Stakeholders, Inc. P. O. Box 100 Red Bud, Illinois 62278
Mr. Mike Bost Illinois Representative 115th 300 East Main Street Carbondale, Illinois 62901	Mr. George Andres, Manager Kaskaskia Regional Port District 154 South Main Red Bud, Illinois 62278
Senator Dave Luechtefeld Illinois Senate 58th 700 North Front Street Okawville, Illinois 62271	Ted Beier CLA/KWA, 5614 Rose Ave. St. Louis, MO 63109

Senator John O. Jones Illinois Senate 54th 2929 Broadway Mt. Vernon, Illinois 62864	Mr. Scott Flood Illinois Department of Natural Resources 4521 Alton Commerce Parkway Alton, Illinois 62002
Mr. Norm Rieso 4600 Bremmer Freeburg, Illinois 62243	Mr. Gary Tatham Illinois Department of Natural Resources 20100 Hazlet Park Road Carlyle, Illinois 62231
Karen Brinkman Heartland of Illinois RC&D 4004 College Park Rd Decatur, IL 62521	Mr. Jack Norman 906 North Metter Avenue Columbia, Illinois 62236
Gene Davis NRCS 111 N. Cedar, Suite 3 Shelbyville, IL 62565	Mr. Jim Capel IDNR, Region III 1556 State Route 54 East Clinton, IL 61727
Mr. Richard Golding, West Access Marina Carlyle, IL 62231	Mr. Russell Schwarm RR 1 Box 49 Loogootee, IL 62857
Gary Tatham, Site Supt. Eldon Hazlet State Park 20100 Hazlet Park Rd. Carlyle, IL 62231	Richard Glazebrook, Site Supt. Eagle Creek State Park P.O. Box 16 Findlay, IL, 62534
Nancy Cruitt Lithia Springs Marina RR 4, Box 103A Shelbyville, IL 62565	Dan Mohr Findlay Marina RR 1, Box 136 Shelbyville, IL 62565
Mr. Dennis Fayhee Sullivan Marina and Campground RR 2, Box 35 Sullivan, IL 61951	Mr. Becker OKAW 1003 Rt. 161 Bartelso, IL
Kathy Niksic Kaskia-Kaw Rivers Conservancy 711 E. North 9th St. Shelbyville, IL 62565	Gary Knolhoff ORBC Carlyle, IL
Steve Jurgens Upper Kaskaskia Eco Partnership RR 2, Box 76 Arthur, IL 61911-9314	Mr. Earl Schnitker ORBC 20486 Sassafras Road Hoyleton, IL 62803
Dean Struder, IEPA Div of Water Pollution Control 1021 N Grand Ave East PO Box 19276 Springfield, IL 62794-9276	Greg Kintz Tradewinds Marina, 400 Chesterfield Chesterfield, MO
Mr. Don Berdeaux Carlyle Marine, Carlyle, IL 62231	Bob Hamel, Carlyle Lake Fish and Wildlife Area R.R. #2 Vandalia, IL 62471
Mr. Stan Duzan Shelbyville Fish and Wildlife Area R.R. # 1 Box 42-A Bethany, IL 61914	Mr. Dennis Smith Boulder Marina 26000 Boulder Access Rd. Carlyle, IL 62231

7. References

Johnson et al. 2000. The Eastern Massasauga Rattlesnake: A Handbook for Land Managers. U.S. Fish and Wildlife Service, Fort Snelling, MN 55111-4056 52pp. + appdx.

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Sauer, R.W. 1997. Stream fisheries assessment of the Kaskaskia River Basin, 1996-97. Illinois Dept. of Natural Resources, Office of Resource Conservation, Carlyle.

Southwestern Illinois Resource Conservation and Development District (SWRCD), 2002. *Kaskaskia River Watershed: An Ecosystem Approach to Issues and Opportunities*

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Carlyle Lake Watershed Technical Committee, 2002. *Carlyle Lake Watershed Plan,*.

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U.S. Army Corps of Engineers, 2003. *Bank Erosion and Historical River Morphology Study of the Kaskaskia River: Lake Shelbyville Spillway to Upper End of Carlyle Lake*

U.S. Army Corps of Engineers, 1992. *Kaskaskia River Navigation Project Environmental Assessment*

U.S. Army Corps of Engineers, 1999. *Report of Sedimentation, Resurvey, Carlyle Reservoir, Upper Mississippi River Basin, Kaskaskia River, Illinois*

Keevin, Thomas. 2006. Personal communication. 24 April.

8. List of Preparers:

Name	Job Description	Area of Expertise
Francis Walton	Biologist	16 years Experience, Planning/ Environmental Impact Assessment
Ms. Joan Stemler	Chief, Water Control Operations	15 years, Water Control Management
Ms. Mary Miles	Water Control Manager	2 years, Water Control Management
Mr. Terry Norris	Archeologist	27 years, District Archeologist

Appendix I
Water Control Release Schedules

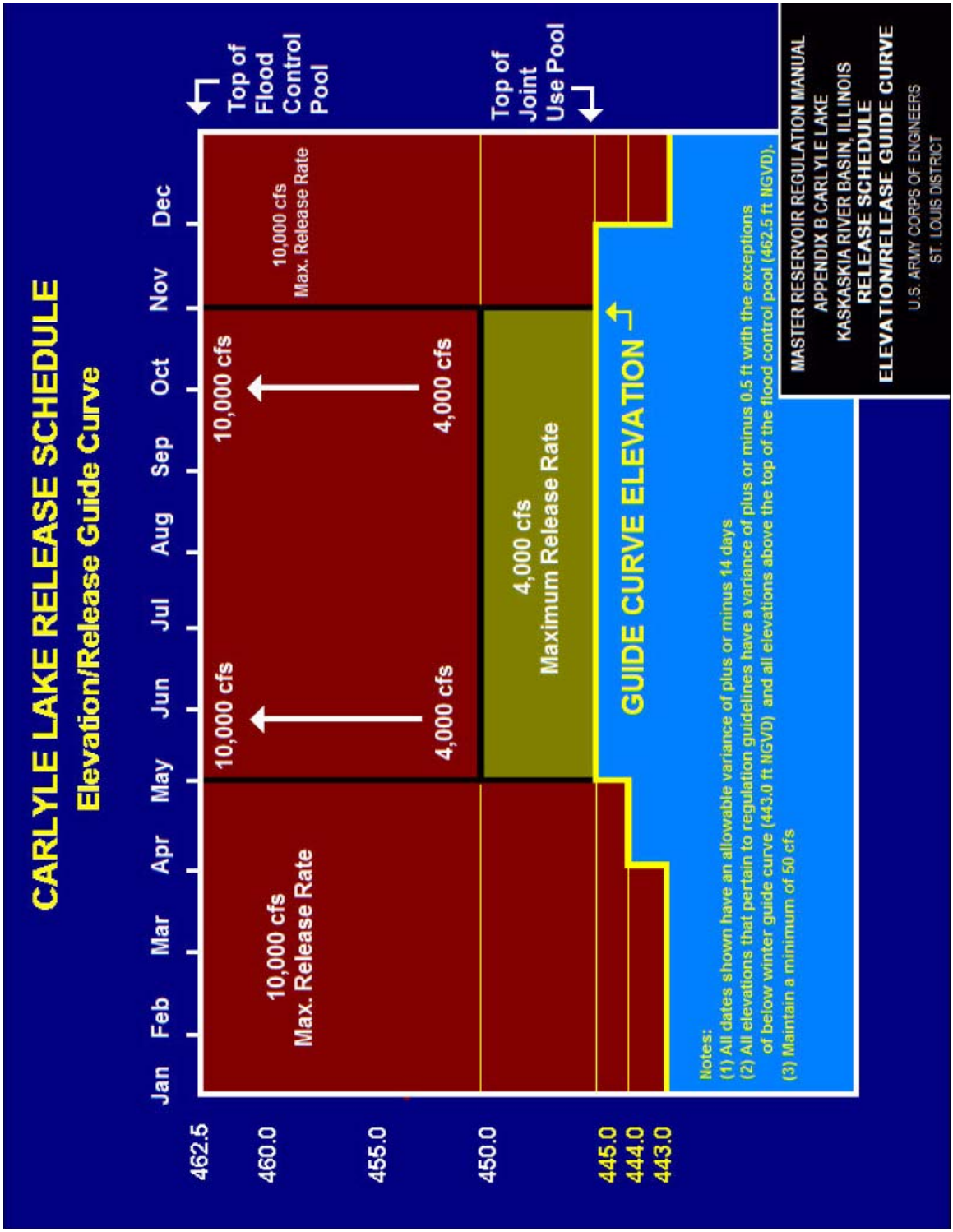
CARLYLE LAKE RELEASE SCHEDULE
Elevation/Release Guide Curve
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
462.5
460.0
455.0
450.0
445.0
444.0
443.0
10,000 cfs
Max. Release Rate
10,000 cfs
4,000 cfs
10,000 cfs
4,000 cfs
4,000 cfs
Maximum Release Rate
10,000 cfs
Max. Release Rate
Top of
Flood
Control
Pool
Top of
Joint
Use Pool
GUIDE CURVE ELEVATION
Notes:
(1) All dates shown have an allowable variance of plus or minus 14 days
(2) All elevations that pertain to regulation guidelines have a variance of plus or minus 0.5 ft with the exceptions
of below winter guide curve (443.0 ft NGVD) and all elevations above the top of the flood control pool (462.5 ft NGVD).
(3) Maintain a minimum of 50 cfs
MASTER RESERVOIR REGULATION MANUAL
APPENDIX B CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
RELEASE SCHEDULE
ELEVATION/RELEASE GUIDE CURVE
U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT

Plate A

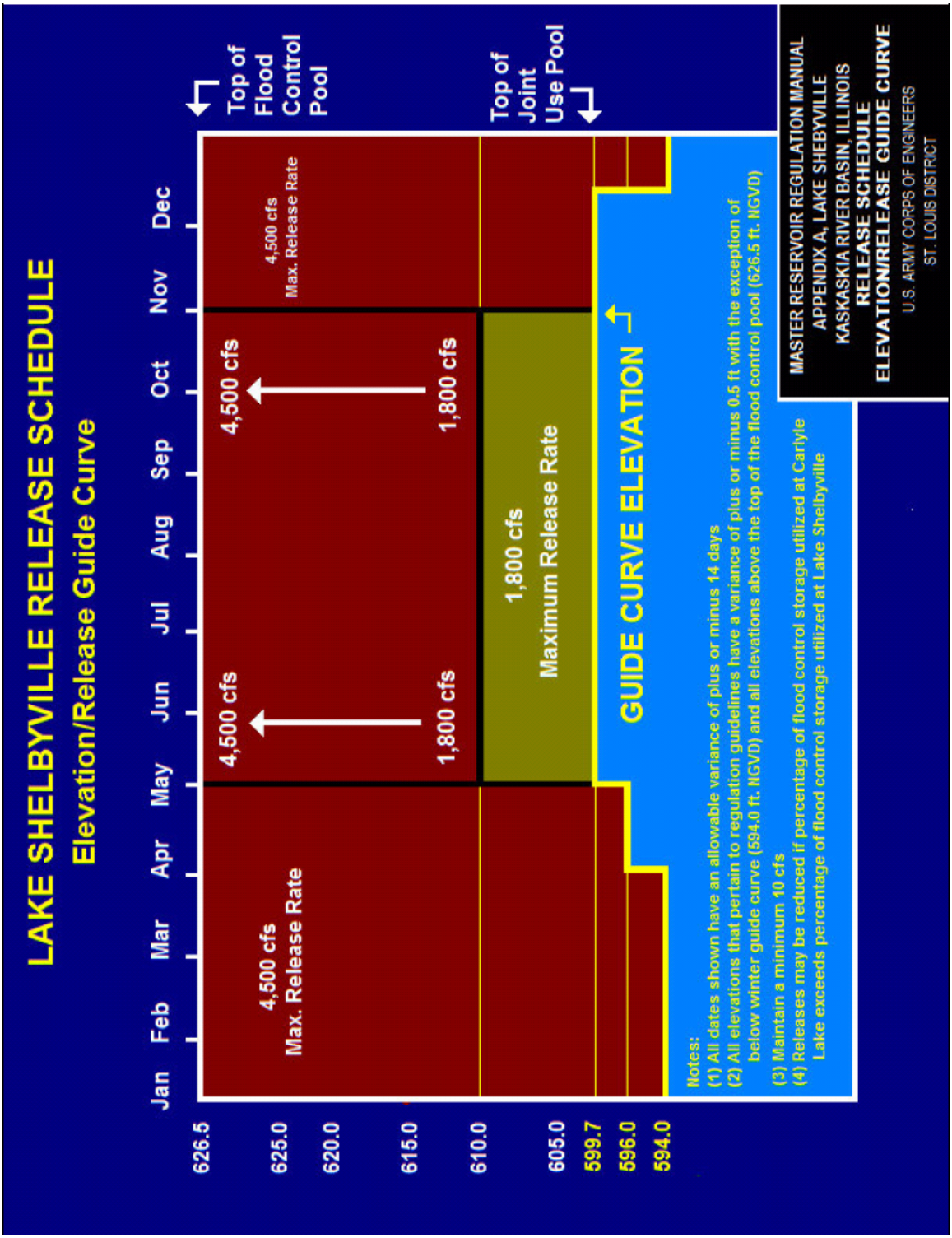
LAKE SHELBYVILLE RELEASE SCHEDULE
Elevation/Release Guide Curve
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
626.5
625.0
620.0
615.0
610.0
605.0
599.7
596.0
594.0
Top of Flood Control Pool
Top of Joint Use Pool
4,500 cfs Max. Release Rate
4,500 cfs
1,800 cfs
1,800 cfs
4,500 cfs
1,800 cfs Maximum Release Rate
GUIDE CURVE ELEVATION
Notes:
(1) All dates shown have an allowable variance of plus or minus 14 days
(2) All elevations that pertain to regulation guidelines have a variance of plus or minus 0.5 ft with the exception of below winter guide curve (594.0 ft. NGVD) and all elevations above the top of the flood control pool (626.5 ft. NGVD)
(3) Maintain a minimum 10 cfs
(4) Releases may be reduced if percentage of flood control storage utilized at Carlyle Lake exceeds percentage of flood control storage utilized at Lake Shelbyville
MASTER RESERVOIR REGULATION MANUAL
APPENDIX A, LAKE SHEBYVILLE
KASKASKIA RIVER BASIN, ILLINOIS
RELEASE SCHEDULE
ELEVATION/RELEASE GUIDE CURVE
U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT

Plate B

Appendix 2
Coordination

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Marion Illinois Suboffice (ES)
8588 Route 148
Marion, IL 62959
(618) 997-3344

January 30, 2006

Colonel Lewis F. Setliff, III
U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

ATTN. Mr. Francis Walton, CEMVS-PM-EA

Dear Colonel Setliff:

This is in reference to the proposal by the U.S. Army Corps of Engineers to update the water control manuals for Carlyle and Shelbyville lakes in Illinois. The proposed changes in the manuals include measures to make permanent the temporary deviations that are now in place, make corrections to conflicting measures in the current plans and make any minor adjustments to the plan that may be feasible as suggested by the public. The project area includes the Kaskaskia River between Kaskaskia Lock and Dam and the north end of Lake Shelbyville (river miles 0.8 to 256.1) that are inundated during flood events.

In order to facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, and to assist your staff, the Fish and Wildlife Service (Service) has been requested to provide a listed of federal threatened, endangered or proposed species that may occur in the project vicinity. Therefore, we are furnishing you the following list of species that have ranges that include the concerned area:

Classification	Common Name	Scientific Name	Habitat
Threatened	Bald eagle	*Haliaeetus leucocephalus*	Breeds and winters along large rivers and major reservoirs
Endangered	Least tern	*Sterna antillarum*	Bare alluvial and dredge spoil islands
Endangered	Pallid sturgeon	*Scaphirhynchus albus*	Rivers

Classification	Common Name	Scientific Name	Habitat
Endangered	Gray bat	Myotis grisescens	Caves; feeds along rivers and reservoirs adjacent to forests
Endangered	Indiana bat	*Myotis sodalis*	Caves, mines; small stream corridors with well developed riparian woods; upland and bottomland forests
Endangered	Illinois cave amphipod	*Gammarus acherondytes*	Karst caves and streams
Threatened	Decurrent false aster	*Boltonia decurrens*	Disturbed alluvial soils

There is no designated critical habitat in the project area at this time.

In addition to the above, the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is a federal candidate species known to be extant in several Illinois counties. The largest known population in Illinois is found in the vicinity of Carlyle Lake (Clinton, Bond and Fayette Counties) where it hibernates near the lake shoreline. Massasaugas live in wet areas, including wet prairies, marshes, and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands, including forests, during part of the year. They often hibernate in crayfish burrows but they also may be found under logs and tree roots or in small mammal burrows. Unlike other rattlesnakes, massasaugas hibernate alone. Impacts to this species and its associated habitats should be avoided.

According to Johnson et al. (2000) water level fluctuations can have catastrophic effects on massasaugas if poorly timed or result in permanent habitat loss. The main concern is lowering water levels while snakes are inactive (i.e., during hibernation). We have attached additional information regarding this issue. Water level changes and potential impacts to eastern massasaguas should be considered during the proposed updating of the water control manuals.

Colonel Lewis F. Setliff, III 3.

Thank you for the opportunity to provide this information. Please contact me at 618/997-3344, ext. 340, should you have any questions.

Sincerely,

Joyce A. Collins
Assistant Field Supervisor

Attachment

cc: IDNR (Schanzle, Sauer, Kruse)

Illinois
Department of
Natural Resources
One Natural Resources Way · Springfield, Illinois 62702-1271
http://dnr.state.il.us
Rod R. Blagojevich, Governor

February 16, 2006

Francis Walton
Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, MO 63103-2833

Dear Francis,

I have reviewed the information you provided in your letter to Bob Schanzle dated January 20, 2006 requesting a search for the presence of state and federal endangered and threatened species in the Kaskaskia River betweer Lake Shelbyville and the Kaskaskia Lock and Dam. According to the Illinois Natural Heritage Database, the following endangered and threatened species occur in that river corridor, either in the river proper or adjacent t the river:

Scientific Name	**Common Name**
Ammocrypta clarum	western sand darter
Clonophis kirtlandii	Kirtland's snake
Collinsia violacea	violet collinsia
Elliptio dilatata	spike
Haliaeetus leucocephalus	bald eagle
Ictinia mississippiensis	Mississippi kite
Ixobrychus exilis	Least bittern
Notropis boops	bigeye shiner
Nyctanassa violacea	yellow-crowed night heron
Pandion haliaetus	osprey
Sistrurus catenatus	eastern massasauga
Spiranthes vernalis	spring ladies' tresses
Trifolium reflexum	buffalo clover

Please be aware that the Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of significant natural features in Illinois. The Department of Natural Resources can only summarize the existing information known to us at the time of the request. This report should not be regarded as a final statement on the area being considered, nor should it substitute for field surveys required for environmental assessments.

This letter is separate from the Illinois Department of Natural Resources consultation requirement under the Illinois Endangered Species Act (530 ILCS 10/11) and the Illinois Natural Areas Preservation Act (525 ILCS 30/17). For more information on this process, please contact the Illinois Department of Natural Resources, Division of Resource Review and Coordination, at One Natural Resources Way, Springfield, Illinois 62702-1271 or by telephone at (217)785-5500.

Sincerely,

Tara Kieninger

Tara Kieninger
Illinois Natural Heritage Database
Illinois Dept of Natural Resources - ORC
One Natural Resources Way
Springfield, IL 62702
(217)782-2685
tkieninger@dnrmail.state.il.us

cc: Bob Schanzle

Appendix 3
Workshop Comments

COMMENTS FOR CONSIDERATON OF CARLYLE LAKE
RE-WRITE OF WATER CONTROL MANUAL

MEETINGS HELD 12-8-05/CARLYLE LAKE
AND
1-5-06/GERMANTOWN

Comment: Before May 1st, match outflow to inflow up to 10,000 cfs without consideration of downstream conditions if pool is >448.
Response: Authority exists in current Water Control Plan

Comment: Delay winter drawdown to coincide with 30 days after start of waterfowl season.
Response: Tried to accommodate with the flexibility of +/- 14 days

Comment: No deviations from current plan.
Response: Would limit our ability to respond to unique situations

Comment: No deviations from dates from current plan.
Response: Would limit our ability to respond to unique situations

Comment: See 2nd bullet and change target elevation to 442 February and March.
Response: Significant change

Comment: During non-crop season, do not continue 10,000 cfs if pool <450 and falling 0.4 tenths of a foot or more per day.
Response: Would limit our ability to respond to unique situations

Comment: Target elevation 446 from 1 July through Labor Day weekend.
Response: Requires more study

Comment: Take into consideration downstream trees when temps <20 degrees exists.
Response: No change to current Water Control Plan

Comment: Take into consideration upstream trees when temps <20 degrees exists.
Response: No change to current Water Control Plan

Comment: Before changes in water control levels and dates or deviations, must consider financial investment of people who have made financial obligations on the lake.
Response: One of many factors we currently consider

Comment: Re-examine minimum outflow (100 cfs).
Response: Requires more study

Comment: Increase maximum outflow.
Response: Significant change

Comment: During crop season, take into consideration downstream conditions above 450.
Response: Part of the current Environmental Impact Statement (EIS)

Comment: Monitor Shoal Creek's gages.
Response: Part of the current Water Control Plan

Comment: Add gages to ungaged tribs.
Response: Not part of the Water Control Plan

Comment: Add gage to mouth of Shoal Creek.
Response: Not part of the Water Control Plan

Comment: Downstream flow study needed.
Response: Not part of the Water Control Plan

Comment: In winter, try to match inflow when feasible. Be more aggressive.
Response: Authority exists in current Water Control Plan

Comment: Outflows should be increased faster.
Response: Authority exists in current Water Control Plan

Comment: Winter - when inflow exceeds outflows by 50% or more bring outflows up to inflow, when it wouldn't impact downstream landowners.
Response: Authority exists in current Water Control Plan

Comment: Summer – when inflow exceeds outflow at 447 or above, flows should be equalized up to bank full.
Response: Significant change

Comment: When we know inflow is increasing, increase outflow and drop pool below target elevation in anticipation of increased inflows.
Response: Tried to accommodate with the flexibility of +/- 0.5 foot

Comment: More gages – a lot more – every 2 miles.
Response: Not part of the Water Control Plan

Comment: Better communication with Centralia Water Plant.
Response: No change to current Water Control Plan

Comment: Add gage on lake to monitor lake level (Lake Centralia).
Response: Not part of the Water Control Plan

Comment: Re-examine what actual bank full is downstream.
Response: Requires study

Comment: Add small release gate to tainter gage for low releases.
Response: Not part of the Water Control Plan

Comment: Target elevations should be adjustable by +/- 0.5 foot.
Response: Not significant

Comment: Spring (Mar-Apr) go to large releases to free up storage. Go to 10,000 when you have rainfall to stay at 445.
Response: Authority exists in current Water Control Plan

Comment: Target date elevation +/- 2 weeks.
Response: Not significant

Comment: Target date elevation +/- 3 weeks.
Response: Significant change

Comment: Keep current District Water Control Managers
Response: Not part of the Water Control Plan

Comment: Winter – Miss. flood restriction on releases should be Cairo reaching 45 ft, not 40 ft.
Response: Mississippi Valley Division (MVD) disapproved

Comment: Winter – Miss. flood restriction to be over when lake reaches 450 instead of 455.6
Response: MVD disapproved

Comment: When lake reaches 455-457 (non-crop season), considering weather conditions, consider larger than 10,000 cfs release.
Response: Significant change

Comment: During crop season, move upper limit of 10,000 to 13,000 for release curve.
Response: Significant change

Comment: FY08 include 10 gages in Carlyle budget.
Response: Not part of the Water Control Plan

Comment: Raise recreation facilities.
Response: Not part of the Water Control Plan

Comment: Downstream conditions considered when making releases.
Response: Authority exists in current Water Control Plan

Comment: Project purposes percentages incorporated into the Water Control Plan.
Response: Will be included in the Water Control Manual (in the description of the history of the project)

Comment: Allow +/- a foot for pool target elevation during the year for more flexibility.
Response: Significant change

Comment: Flow gages to be installed at the mouths of Shoal and Sugar Creeks.
Response: Not part of the Water Control Plan

Comment: Request to raise summer pool 1 to 2 feet due to silt causing the lake to become too shallow to recreate safely. Bigger boats are starting to move to other places.
Response: Significant change

Comment: Recommend a three-month period of April 1-June 30 to keep lake stabilized for successful spawning. Target of 1" per day maximum drop rate.
Response: Significant change without upper elevation restriction. Current EIS is 15 May – 15 June for spawn consideration.

Comment: Increase minimum outflow from 50 cfs to 100 cfs to enhance downstream conditions for fisheries.
Response: Requires more study

Comment: Start drawdown earlier.
Response: Significant change

Comment: Raise summer pool elevation by 1 foot to 446 and lower it back to the current 443 winter pool in the fall when the rainfall and inflow into the lake is greater.
Response: Significant change

COMMENTS FOR CONSIDERATION OF LAKE SHELBYVILLE
RE-WRITE OF WATER CONTROL MANUAL

MEETINGS HELD 1-17-06/LAKE SHELBYVILLE
AND
1-19-06/VANDALIA

Comment: During rain events, ability to stay cutback while tribs fall.
Response: Part of the current Environmental Impact Statement (EIS)

Comment: Keep winter drawdown to a slow rate.
Response: Authority exists in current Water Control Plan.

Comment: Increase flexibility on seasonal trends – take natural resources into consideration.
Response: Tried to accommodate with the flexibility of +/- 14 days and +/- 0.5 foot

Comment: Limit maximum outflow to 4,000 cfs up to elevation 620 until April. In April, be aggressive in getting rid of the water.
Response: Significant change

Comment: Eliminate drawdown to 599.2.
Response: Not significant

Comment: Flexibility of pool elevation +/- 0.5 foot.
Response: Not significant

Comment: Spawn consideration – hold lake steady for 30 days. Rise of no more than an inch and no more than ½ an inch fall for these 30 days.
Response: Significant change

Comment: April/May timeframe – smartweed consideration. After 599, slow rise of lake elevation.
Response: Authority exists in current Water Control Plan

Comment: Lift restriction of Miss. flooding.
Response: Mississippi Valley Division (MVD) approved

Comment: Allow for cutback for downstream tribs, even when above 610.
Response: Part of the current Environmental Impact Statement (EIS)

Comment: During crop season, lower the 1,800 cfs mandatory release when above 610 until weather is favorable.
Response: Significant change

Comment: Start winter drawdown early (15 Nov – assuming harvest is complete)
Response: Significant change

Comment: Start winter drawdown after waterfowl season.
Response: Part of the current EIS

Comment: During ice conditions when pool elevation is below 602, stop drawdown until thaw.
Response: Authority exists in current Water Control Plan

Comment: Marina location is not compatible to Water Control Plan – consider its minimum standards.
Response: Not part of the Water Control Plan

Comment: Stabilize pool elevation for spawn – no limit of pool elevation – from 1 May through mid-April (50 – 75 degrees)
Response: Significant change without upper elevation restriction. Current EIS is 15 May – 15 June for spawn consideration

Comment: Concern with release rates of 1,800 to 4,500 cfs in May when lake elevation reaches 610 and a rain event occurs.
Response: No suggested change

Comment: Flexibility in plan.
Response: Not significant

Comment: Continue good cooperation for lake operation and maintain flexibility of dates and target pool elevations to allow for smart decisions.
Response: Authority exists in current Water Control Plan

Comment: Project purposes percentages incorporated into the Water Control Plan.
Response: Will be included in the Water Control Manual (in the description of the history of the project)

Comment: Start drawdown around Thanksgiving.
Response: Significant

Comment: Sullivan Marina has insufficient depths during winter drawdown.
Response: Not part of the Water Control Plan

Comment: Sullivan Marina has insufficient depths due to wave action at 599.7.
Response: Not part of the Water Control Plan

Comment: Winter – Strive for an average winter discharge below 1,200 cfs and as close to 906 cfs as possible, especially critical while water temperatures are less than 8 degrees

Celsius. Keeping winter discharge variability to a minimum is also of utmost importance. Along these lines, gradual changes in discharge rates whenever possible would also benefit the fish in the river.
Response: Significant change

Comment: Spring – A conceptualized flow regime in spring would include a discharge increase around March with stabilized flows through the end of May. An avoidance of major and sudden discharge increases in June and July is also preferred.
Response: Significant change

Comment: Proposing a minimum flow rate of 100 cfs.
Response: Requires more study

Comment: Too much of a drop in summer pool elevation could expose bass if we get smartweed growth and water into the smartweed. If there is no smartweed, then there is no issue.
Response: No suggested change

Comment: Eliminate the requirement to get permission from MVD to lower or shut down water in spillway during emergency situations.
Response: Authority exists in current Water Control Plan

Finding of No Significant Impact (FONSI)

DRAFT FINDING OF NO SIGNIFICANT IMPACT

WATER CONTROL PLAN UPDATE
CARLYLE LAKE AND LAKE SHELBYVILLE
KASKASKIA RIVER BASIN, ILLINOIS

I. I have reviewed and evaluated the documents concerning the Water Control Plan (WCP) updates for Carlyle Lake and Lake Shelbyville on the Kaskaskia River, Illinois. As part of this evaluation, I have considered the following alternatives:

A. NO ACTION: CONTINUE TO USE THE CURRENT WCPs AND REQUEST TEMPORARY DEVIATIONS. This alternative is not responsive because of it does not address the need for revision of the WCPs and may limit the water control manager's flexibility in addressing other project purposes. Responding to unique hydrologic and hydraulic events would still mean requesting temporary deviations.

B. INCORPORATE SOME ACTIONS ASSOCIATED WITH TYPICAL DEVIATIONS AND REVISE THE WCPs (Preferred Alternative): The current WCPs will be revised to allow more flexibility in scheduling water control releases by the use of guide curves and other suggested changes. Project purposes other than flood control, i.e., fish and wildlife conservation and recreation could now be considered. The revised plans will also correct the inconsistencies in the current WCPs and incorporate other proposals as suggested by the project stakeholders, i.e., for fish spawn, and ice impacts.

C. A RETURN TO THE CURRENT WCPs WITHOUT THE USE OF AUTHORIZED TEMPORARY DEVIATIONS. The current plan (the same as the No Action Alternative but without the deviations) would be put back into effect without the authorized temporary deviations. No adjustments, i.e., temporary deviations, would be made to adjust the WCPs to avoid impacts to watershed resources.

II. The environmental consequences of the alternatives on the physical, biological, socio-economic, and cultural resources have been evaluated. Several factors were influential in my review:

A. Incorporation of the proposed changes is very much supported by stakeholders in the Kaskaskia River Basin.

B. No major impacts to Federal or State listed endangered and threatened species are anticipated.

C. Impacts to cultural resources are expected to continue and are considered adverse.

D. No major impacts to the aesthetic value, social or recreational resources, or general fish and wildlife values would result from the preferred alternative.

E. There would be no appreciable degradation to the physical environment.

III. Based on the disclosure of the preferred alternatives' impacts contained within the Environmental Assessment, no significant impacts to the environment are anticipated. The proposed project has been coordinated with the appropriate resource agencies, and there are no significant unresolved issues. Therefore, an Environmental Impact Statement will not be prepared prior to proceeding with the proposed update to the Carlyle Lake and Lake Shelbyville Water Control Plans.

_____ _____

Date

Lewis F. Setliff III
Colonel, U.S. Army
District Engineer