



**Greers Ferry Lake and Lake Ouachita,
Arkansas**

US Army Corps
of Engineers
Little Rock District

**WATER SUPPLY STORAGE
REALLOCATION REPORT**

**Reallocation of Storage at Greers Ferry Lake
and Lake Ouachita, Arkansas for the Mid
Arkansas Water Alliance**

August 2006

Executive Summary

Mid Arkansas Water Alliance Water Supply Storage Reallocation from Greers Ferry Lake and Lake Ouachita, Arkansas

This report presents the results of a study to reallocate storage in Greers Ferry Lake and Lake Ouachita to the Mid Arkansas Water Alliance (MAWA) in Arkansas for municipal and industrial (M&I) water supply. This reallocation study comes at the request of the Mid Arkansas Water Alliance to purchase enough storage to yield 15 MGD in Greers Ferry Lake and 20 MGD in Lake Ouachita. This report includes an environmental assessment as directed by the National Environmental Policy Act and is included as Appendix E.

This report concluded that 18,730 acre-feet of storage in the flood pool in Greers Ferry Lake is available and could be reallocated to MAWA to meet the present and future needs of central Arkansas through the year 2025. Of the 18,730 acre-feet available, 18,556 would be available for MAWA to provide an expected yield of 15 MGD. The remaining 174 acre-feet would be provided to existing users as dependable yield mitigation storage (DYMS) to maintain their current expected yields. This storage represents 2.01% of the current 934,000 acre-feet of flood storage in the lake or 1.13% of the current 1,650,500 acre-feet of useable storage in Greers Ferry Lake. The top of the conservation pool would be increased by 0.6 feet. This reallocation will leave 14,558 acre-feet of the Chief's Discretionary Storage remaining in Greers Ferry Lake.

This report also concluded that 33,303 acre-feet of storage in the flood pool is available and could be reallocated to MAWA in Lake Ouachita. Of the 33,303 acre-feet available, 33,181 acre-feet would be utilized by MAWA to provide an expected yield of 20 MGD to meet the needs of central Arkansas through the year 2025. The remaining 122 acre-feet would be provided to the existing users as DYMS to maintain their current expected yields. This storage represents 5.40% of the current 617,000 acre-feet of flood storage in the lake or 1.75% of the current 1,903,000 acre-feet of useable storage in the lake. The top of the conservation pool would increase by about 0.82 feet. This reallocation will leave 10,061 acre-feet of the Chief's Discretionary Storage in Lake Ouachita.

Any additional requests for storage by the Mid Arkansas Water Alliance would require a new water supply storage agreement between the Mid Arkansas Water Alliance and the United States Government. An unexecuted copy of the agreement for each lake is included as Appendix D to this report. This report and the agreement are being submitted to the US Army Corps of Engineers Headquarters in Washington D.C. for approval. Upon approval the agreement will be executed and the reallocation of storage will be made.

A flood pool reallocation was determined to be the National Economic Development (NED) Plan for both lakes because a flood pool reallocation will have the least impact on project purposes. If an agreement between the Mid Arkansas Water Alliance and the United States Government was executed for this water supply storage reallocation, an annual cost of \$170,290 for storage within Greers Ferry Lake and \$267,187 for storage within Lake Ouachita would be required by MAWA. Joint-use O&M costs of \$20,616 and \$9,711 are included in these annual payments for Greers Ferry Lake and Lake Ouachita, respectively.

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LIST OF TERMS, REFERENCES, AND ACRONYMS

AF or Acre-Foot - a unit for measuring the volume of water. It is equal to the quantity of water required to cover 1.0 acre to a depth of 1.0 foot and is equal to 43,560 cubic feet. It is used in measuring volumes of water used or stored.

Authorized Project - A project specifically authorized by Congress for construction, generally, through language in an authorization or appropriation act, or a project authorized pursuant to Section 201, of the 1965 Flood Control Act.

Construction Cost - The total expenditures to physically build the project including the cost of lands, relocations, engineering, design, administration, and supervision. This cost is sometimes referred to as the "first cost."

Cost Allocation - A systematic distribution of costs among the project purposes of a multipurpose project.

Cost Sharing - The division of cost among various entities which gain benefit including Federal, state, local, or private interests.

CWCCIS or Civil Works Construction Cost Index System - This refers to the cost index used to inflate construction costs to present day values.

DYMS or dependable yield mitigation storage or mitigation storage - is defined as the storage necessary to keep existing users whole to compensate for the reduction in the dependable yield which occurs when the conservation pool is expanded into the flood pool.

EA - Environmental Assessment

ENR - Engineering News Record is used to inflate construction costs to present day values.

ER 1105-2-100 - Policy and Planning Guidance For Conducting Civil Works Planning Studies, 22 April 2000

Financial Feasibility - Criterion of project acceptability, based upon the financial value of the returns to the sponsoring entity exceeding the financial value of the costs to the sponsoring entity.

Government fiscal year - October 1 to September 30

gpm – gallons per minute

HQUACE or Headquarters United States Army Corps of Engineers.

Immediate need - is that storage that the local sponsor must begin payment on immediately upon final approval of the water supply agreement whether or not it is needed.

Investment or investment cost - The construction cost plus interest during construction. In water supply agreements, this is the construction cost allocated to that portion of the water supply storage space plus interest during construction for those projects paid out over time, but does not include (if there is any) interest on the unpaid balance.

Joint-use Costs - Total project costs less all specific costs.

MGD or million gallons per day - a unit for measuring the flow or discharge of a volume of water over a period of time.

M&I or municipal and industrial - while not defined in legislative history, the term has been defined by the Corps to mean supply for uses customarily found in the operation of municipal water systems and for uses in industrial processes. Industrial processes can include thermal power generation and mining operations.

NED or National Economic Development Plan - is defined as the plan with the greatest excess benefits over costs.

O&M - operation and maintenance.

Period of Analysis - The period determined by the estimated point in time at which the combined effect of physical depreciation, obsolescence, changing requirements for project services, and time and discount allowances will cause

the cost of continuing the project to exceed the benefits to be expected from continuation. It may be equal to or greater than the amortization period and may be equal to, but is generally less than, the physical life.

PMA's - Power Marketing Agencies

Public Law 85-500, Title III, Water Supply Act of 1958, as amended - 1958 River and Harbor Act, 3 July 1958. Title III of this act is entitled The Water Supply Act of 1958. Section 301 provided that storage may be included for present and future municipal or industrial water supply in Corps or Bureau of Reclamation projects, the costs plus interest to be repaid by non-Federal entities within the life of the project but not to exceed 50 years after first use for water supply. No more than 30 percent of total project costs may be allocated to future demands. An interest-free period, until supply is first used, but not to exceed ten years, was permitted (72 Stat. 319, 43, U.S.C. 390b). These provisions were modified by Section 10 of Public Law 87-88 and Section 932 of Public Law 99-662.

Safe, dependable or critical period yield - is defined as the maximum quantity of water reliably available throughout the most severe drought of record.

Storage - the volume in a reservoir project between two different elevations. The normal unit of storage space is acre-feet. There may or may not be any water available within this space.

SUPER Model – Model used to simulate the hydrology and hydraulics of the White River.

SWPA or Southwestern Power Administration

Water Supply Handbook - IWR Report 96-PS-4 (Revised)

WRDA or Water Resource Development Act - is an annual Act to provide for the conservation and development of water and related resources.

Yield - The quantity of water which can be taken, continuously, for any particular economic use. For municipal and industrial water supply purposes, this is normally taken as the flow which can be guaranteed during the 50-year drought on a 98% dependability.

SECTION A
GREERS FERRY LAKE
ANALYSIS

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WATER SUPPLY STORAGE REALLOCATION REPORT AT GREERS FERRY LAKE FOR THE MID ARKANSAS WATER ALLIANCE

1. PURPOSE OF REPORT

A. Reallocation Request

A U.S. Army Corps of Engineers study, “The Mid Arkansas Water Resource Study”, was completed in November 2002 for the Mid Arkansas Water Discussion Group to evaluate future water needs of central Arkansas and identify sources to meet those needs through the year 2050. Based upon the results of this study, the group decided that the best alternative for obtaining water for the central Arkansas area would be to purchase the remaining Corps of Engineers discretionary storage in Greers Ferry Lake and Lake Ouachita. On April 4, 2003 the Mid Arkansas Water Discussion Group evolved into the Mid Arkansas Water Alliance (MAWA) and was incorporated.

Another U.S. Army Corps of Engineers Study, “Mid-Arkansas Water Resource Study Update”, was completed in December 2004 to update the needs of the eight counties in central Arkansas that comprise MAWA because the member utilities doubled since the initial report was completed. The purpose of this study was primarily to consider the population and demand based on the new members. Furthermore, this study took into consideration the existing raw water sources that were available to Central Arkansas Water, which were not considered in the initial study. Based on these findings and after meetings with the Little Rock District, MAWA decided their goals could be met through the year 2025 by reducing their initial request. A letter requesting the purchase of storage to provide 15 MGD from Greers Ferry Lake and 20 MGD from Lake Ouachita was submitted to the Little Rock District on 9 May 2005 by MAWA.

This study was conducted by the Little Rock District with input and assistance from the Vicksburg District for the analysis of Lake Ouachita. Section A of this report will focus on the reallocation at Greers Ferry Lake and Section B will focus on the reallocation at Lake Ouachita.

B. Reallocation Authority

Authority for the Corps to reallocate existing storage space to M&I water supply is contained in Public Law 85-500, Title III, Water Supply Act of 1958, as amended. The Secretary of the Army is authorized to cooperate with local interests in providing storage space for M&I water supply in U.S. Army Corps of Engineers projects as long as the local interests agree to pay the costs associated with the storage space. The Corps has the discretionary authority to reallocate the lesser of 15% or 50,000 acre feet of the total storage capacity in Greers Ferry Lake provided the reallocation has no severe effect on other authorized purposes and will not involve major structural or operational changes.

2. PROJECT BACKGROUND

A. Project History

The Greers Ferry Reservoir project was authorized for flood control and other purposes by the Flood Control Act approved 28 June 1938. The Flood Control Act of 1954 modified the above-stated authorization of the Greers Ferry project to include the generation of hydroelectric power in conjunction with flood control, as recommended by the Chief of Engineers in House Document No. 499, 83rd Congress, 2nd session.

Construction for the Greers Ferry project was initiated on 7 June 1957 when construction of the office and service facilities was begun. These facilities were completed on 30 January 1958. Construction of the dam started 24 February 1959 and was completed sufficiently to start reservoir filling on 3 January 1962. Construction of the power plant started with contract for turbines on 19 January 1959 and was completed sufficiently to place the last unit on line on 6 May 1964. Flood control and power generation in-service dates are 1 February 1962, 1 April 1964 (Power Unit 1), and 1 June 1964 (Power Unit 2), respectively. Current project physical features are shown in Table 1.

TABLE 1
CURRENT PROJECT PHYSICAL FEATURES

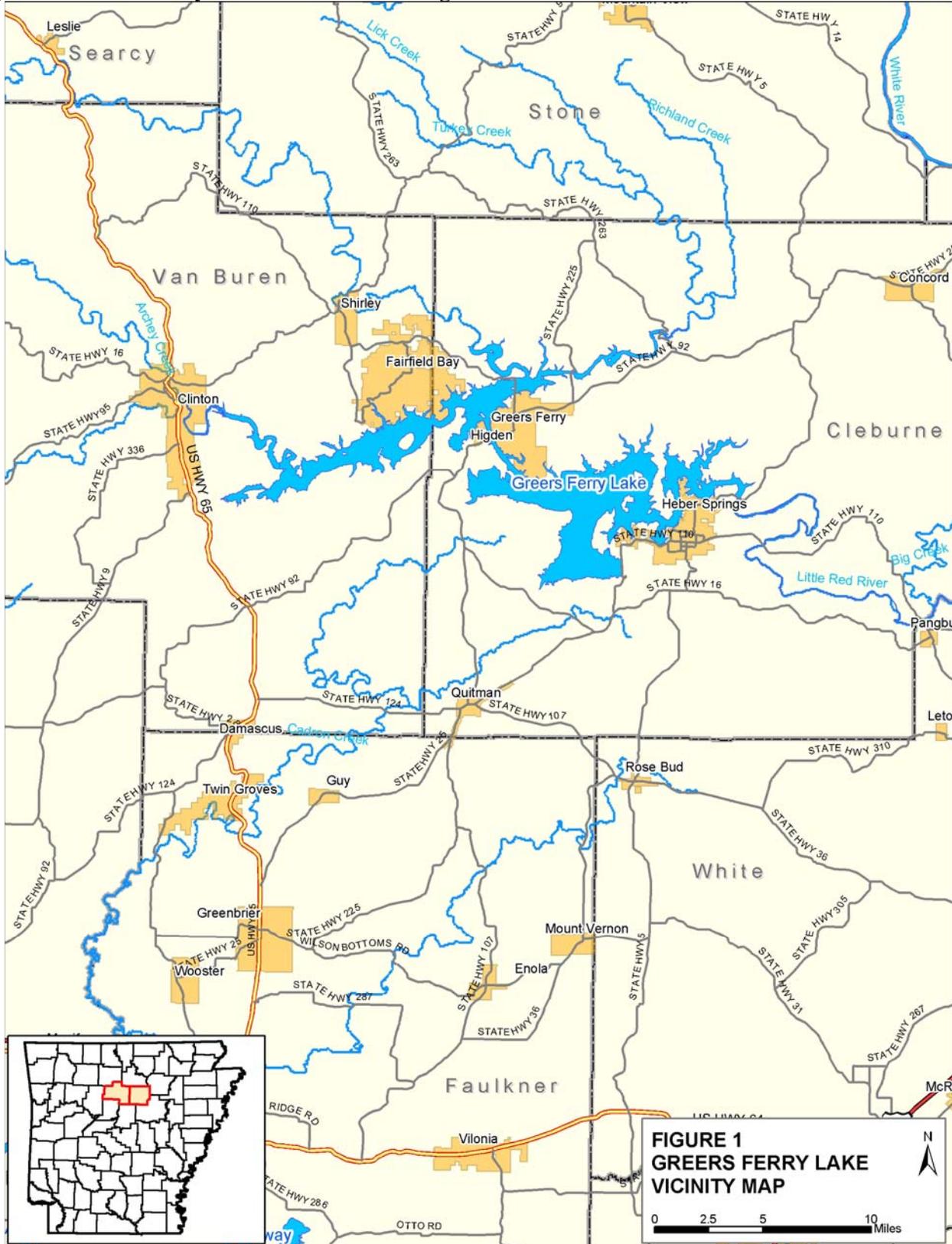
Feature	Elevation ^[1]	Area (acres)	Storage Volume (AF)	Equiv. Runoff ^[2] (inches)
Top of dam	498.00	----	----	
Top of flood control pool	487.00	40,000	2,844,500	46.5
Top of conservation pool	461.44	31,000	1,910,500	31.3
Top of inactive pool	435.00	24,000	1,194,000	19.5
Flood control storage	461.44 - 487.00	----	934,000	
Conservation Storage	435.00 - 461.44	----	716,500	
Inactive storage	Below elev. 435.00	----	1,194,000	

^[1] Above the National Geodetic Vertical Datum (NGVD29).
^[2] From 1,146 square miles of drainage area upstream from dam.

B. Project Purposes and Location

The Greers Ferry Dam is located on the Little Red River in Cleburne County approximately 79 miles upstream from its confluence with the White River. From the dam, the reservoir extends westward into Van Buren County. The reservoir collects drainage from 1,146 square miles of area upstream of the dam. A map of the area is shown in Figure 1.

Figure 1: Greers Ferry Lake and Surrounding Communities



C. Water Reallocations

There have been numerous M&I water supply reallocations from Greers Ferry Lake since the projects inception. The Corps has reallocated 16,713 acre-feet within its authority and 4,550 acre-feet by direction of Congress for M&I water supply storage at Greers Ferry Lake which is exhibited in Appendix A of this report. Since the congressional reallocations do not count against the Corps of Engineers Discretionary Authority which is the least of 15% or 50,000 acre-feet of the total storage, 18,730 acre-feet would be available to MAWA to help meet the needs of central Arkansas through the year 2025.

This reallocation requested by the Mid Arkansas Water Alliance for 18,730 acre-feet would leave 14,558 acre-feet of discretionary storage in Greers Ferry Lake. While the Corps reallocation authority is for storage and not dependable yield the intent and actual calculations are based on using the dependable yield requested by the customer to determine the amount of storage that will provide that yield. As stated in the Water Supply Handbook, IWR Report 96-PS-4 (Revised), page 2-3, "*Repayment agreements for storage space will base the amount of storage to be provided on the yield required by the non-Federal sponsor.*"

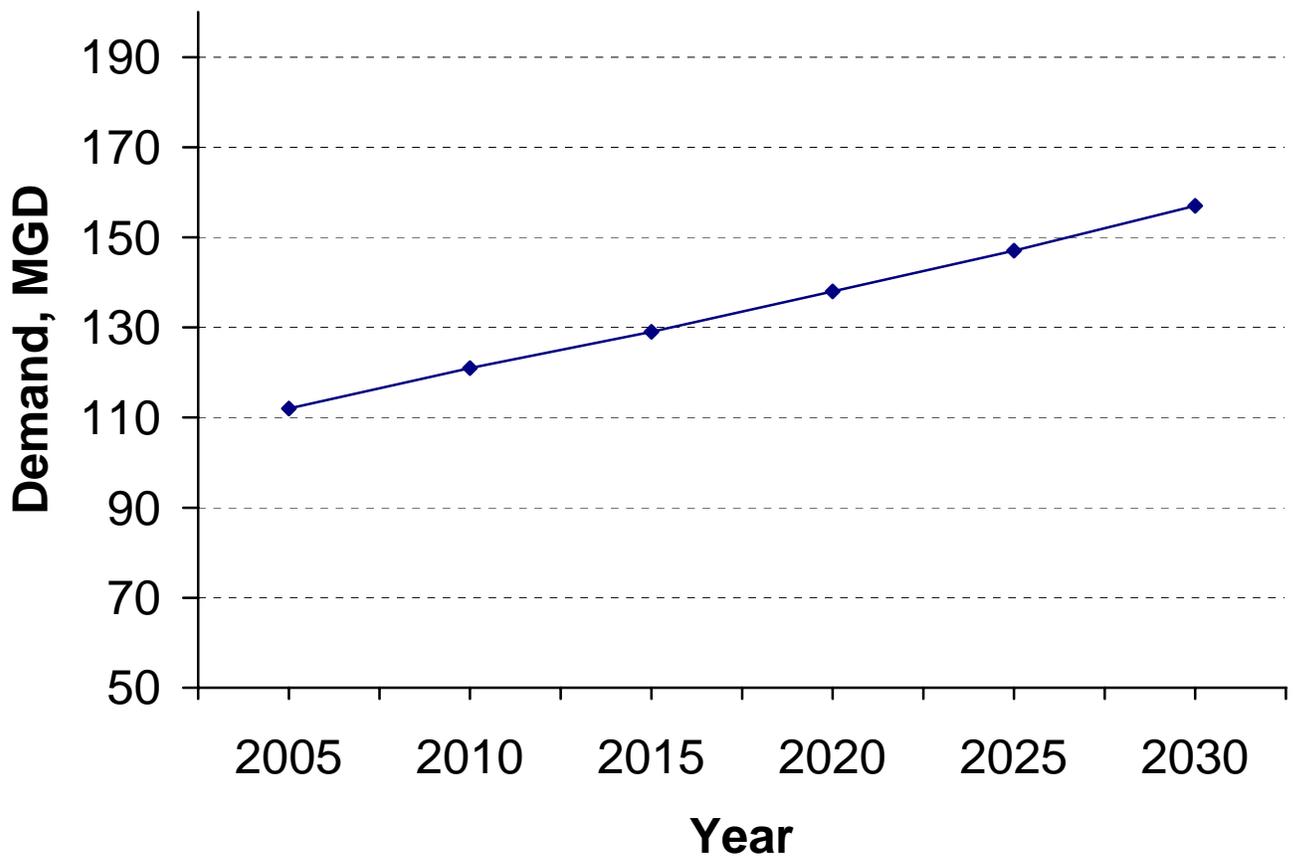
At the writing of this report, there are three reports pending approval or being prepared for reallocation from storage in Greers Ferry Lake: (1) the City of Heber Springs (Congressional Reallocation, 3,525.135 AF), (2) Searcy County Regional Water District (Discretionary Storage 5,000, AF) (3) The City of Clinton (Discretionary Storage, 2.5 MGD, acre-feet to be determined).

3. ECONOMIC ANALYSIS

A. Water Supply Demand Analysis

The Mid Arkansas Water Resource Study Update, December 2004, presented data that showed the population of participating entities would be 748,380 in the year 2005 and is projected to be about 1,000,000 in the year 2025. Water usage within central Arkansas averaged 112 MGD in 2005, with a peak usage of 204 MGD in the summer months. The current dependable yield for water supply available in central Arkansas is 174.73 MGD which may not currently meet peak usage during a drought. Central Arkansas has experienced rapid growth and development. As population in the area continues to increase, manufacturing and service industries will most surely follow. Figure 2 displays a graph of Central Arkansas' historical and projected water demand.

Figure 2
Central Arkansas Historical and Projected Water Average Demand



B. Analysis of Water Supply Alternatives

1) Groundwater

Groundwater in central Arkansas is drawn from two aquifer systems: the alluvial aquifer system and the Mississippi Embayment aquifer system. The alluvial system consists of the Arkansas River aquifer and the more extensive Mississippi River Valley aquifer.

The Mississippi Embayment aquifer underlies the alluvial aquifers although

these aquifers are connected to each other throughout eastern Arkansas. The alluvial aquifers can yield large quantities of water; properly constructed wells can yield 500 gpm almost anywhere in the system. Wells in the Mississippi River Valley system have been reported to yield as much as 5,000 gpm.

The Mississippi Embayment aquifer system is comprised of several aquifers: the Nacatoch, the Wilcox, the Sparta, and the Cockfield. The Sparta, the most productive aquifer, is capable of producing yields in excess of 1,000 gpm.

As a result of large scale groundwater withdrawals primarily for rice farming, groundwater levels in the state are declining. Declining aquifer water levels create a multitude of problems. Because of the excessive withdrawals of groundwater, the dependable yield has been approached or exceeded in the alluvial and Sparta aquifers. The Arkansas Natural Resources Commission has declared these aquifers at “critical groundwater levels” due to the dependable yield concerns relating to poor water quality and to saline intrusions consistent with declining groundwater levels. Therefore, alternatives utilizing groundwater sources will not be considered. Several of the existing entities currently use groundwater and are already experiencing difficulty in obtaining adequate water from their sources

2) Existing Surface Water Supplies

Several entities currently use surface water as their supply for drinking water and have joined the Mid Arkansas Water Alliance because their current supplies may not meet their demand through 2050. These include Central Arkansas Water (Lakes Winona and Maumelle), City of Conway and Conway County (Lake James H. Brewer), City of Perryville (Cedar Lake), Benton (North Fork of the Saline River and Lake Norrell), City of Hot Springs (Lake Hamilton), and Hot Springs Village (Middle Fork of Saline River and Lake Lago). All other water supply for entities in MAWA comes from groundwater. Based upon the November 2002 Mid Arkansas Water Resource Study, the most economical option would be to reallocate storage in Greers Ferry Lake and Lake Ouachita.

3) Stream Withdrawal

There are no streams within the study area capable of providing enough dependable yield for this purpose. The Arkansas River was briefly considered because it would be capable of serving the needs to the north and south. This alternative was eliminated because the Arkansas Department of Environmental Quality has listed it as not having enough dependable yield that would be available as a water supply.

4) New Lake and Pipeline

The water supply needs, for about a twenty-five year period, could be met by constructing a new reservoir on Bull Creek. This project would have consisted of constructing a 1,000 foot long by 93 feet high by 572 foot wide earthen dam containing 370,000 cubic yards of fill material. This project would have inundated 19 miles of Bull

Creek to form a 3,575 acre lake. This reservoir would have been recharged by a 50 square mile drainage area and would have had an approximate yield of 34 MGD

This project was proposed in the early 1980's to supply water in the north central region of this study area. It was also restudied in 2002 for the Mid Arkansas Regional Water Discussion Group. The results of both studies found that this alternative was not justifiable. The costs for constructing this reservoir are presented in Table 2.

The financial feasibility of constructing this reservoir will be revisited in this report.

TABLE 2 NEW LAKE AND PIPELINE ALTERNATIVE		
	Aug-95 Report	Updated Cost
Interest Rate	0.07375	0.05125
Period of Analysis (years)	30	30
Project First Costs:		
New Dam and Lake ¹	\$19,000,000	\$24,528,000
Treatment plant, pipeline and storage tank ¹	\$35,600,000	\$45,957,000
Total	\$54,600,000	\$70,485,000
Annual Cost:		
Interest & Amortization ²	\$5,469,000	\$5,273,000
Operation & Maintenance ³	\$771,000	\$789,000
Total	\$6,240,000	\$6,062,000

¹ Updated with the CWCCIS composite index from FY95 and FY06.

² Includes \$9,422,000 of interest during construction from a 5-yr construction period.

³ Updated O&M is based on the ratio of O&M to Total project costs of 1995 Estimate, 1.12%.

4. DERIVATION OF USER COST

A. YIELD/STORAGE ANALYSIS

1) General

Two options will be evaluated for reallocation of storage in Greers Ferry Lake. The effects of reallocating storage from current flood control storage or conservation (hydropower) storage will be considered. These are the only usable storage spaces in Greers Ferry Lake.

Current storage and associated expected yields are based on a conservation pool located between elevations 435 and 461 which contains 716,500 acre-feet of storage. The

dependable yield of this storage during the drought of record was determined to be about 588 MGD.

2) Conservation Pool

When storage is reallocated from the conservation pool there is no change in the yield/storage ratio of the pool. The reallocation is made directly from hydropower storage causing both a reduction in their existing storage and a reduction in their yield.

A reallocation from the existing conservation pool for MAWA of 18,405 acre-feet of hydropower storage to M&I water supply purposes is estimated to provide a dependable yield of 15.0 MGD. The reallocation will reduce hydropower yield by 15.0 MGD and their storage by 18,405 acre-feet.

3) Flood Pool

As the storage in the conservation pool is increased by reallocation from the flood pool, the yield/storage relationship changes. To determine the yield as the storage is increased it is necessary to reference the yield/storage curve for Greers Ferry Lake. The new dependable yield was determined by using the SUPER model. This method determined the 18,730 acre-feet of storage to provide a yield of 15.0 MGD and would raise the top of the conservation pool by 0.6 feet (7.2 inches), from 461.44 to 462.04. Although 50,000 acre-feet is the upper limit of the Corps of Engineers' authority there have been reallocations made at Corps projects based on congressional legislation in the past. These congressional reallocations are not counted against the 50,000 acre-feet Corps authority.

When storage is taken from the flood pool by raising the top of conservation pool the yield/storage ratio typically decreases and the amount of storage allocated to each existing water supply user must be increased to maintain their expected yield. This additional storage is called "dependable yield mitigation storage" or DYMS. As stated in EC 1105-2-216, Reallocation of Flood Control Storage to Municipal and Industrial Water Supply – Compensation Considerations, *"It is Corps policy not to provide DYMS for hydropower as is done for existing water supply users."* Therefore, no DYMS is added to hydropower which results in their storage remaining constant and their yield decreasing.

Each time additional storage is requested for reallocation from the flood pool a calculation is made estimating the requested dependable yield, and the DYMS for existing users. The cost of the DYMS is the responsibility of the water supply requestor, as stated in EC 1105-2-216, *"All costs associated with DYMS will be paid for by the new user of the new water supply storage space (i.e., the water supply requestor)."*

B. Hydropower Benefits Foregone

Hydropower benefits are based on the cost of the most likely alternative source of power. When storage is reallocated for water supply and an impact occurs to hydropower, the power benefits foregone are equivalent to the cost of replacing the lost power with the most likely alternative source of power.

The power benefits foregone can be divided into two components: The lost energy benefits and lost capacity benefits. In the case of water supply withdrawals, there is usually a loss of energy benefits, and lost energy benefits are based on the loss in

generation (both at-site and downstream) as a result of water being diverted from the reservoir for water supply rather than passing through the hydro plant.

In addition, there could be a loss of capacity benefits as a result of a loss in dependable capacity at the project. Dependable capacity could be lost as a result of;

a loss in head due to lower post-withdrawal reservoir elevations.

a reduction in the usability of the capacity due to inadequate energy to support the full capacity during low-flow periods.

The hydropower benefits foregone due to the two possible reallocations are listed in Table 3.

	Benefits Foregone	
	Flood Pool	Conservation Pool
Reduction in streamflow (mgd)	15.00	15.00
Annual energy losses (MWh) ¹	4,345	5,318
Energy value (mills/kwh) ²	31.97	31.97
Annual energy benefits foregone	\$138,923	\$170,008
Capacity losses (kilowatts) ¹	3.00	60.00
Capacity value (\$/kw-yr) ²	\$79.16	\$79.16
Annual capacity benefits foregone	\$237	\$4,750
Annual benefits foregone	\$139,160	\$174,758

^{1,2} Provided by Hydropower Analysis Center, Power Branch, Water Management Division, Northwestern Division, Corps of Engineers, Portland, Oregon, September 2005.

C. Hydropower Revenues Forgone

Hydropower revenues foregone are based on the value of the lost power based on the power marketing agency's rates. Southwestern Power Administration rates as of 13 July 2004 are:

Energy charge: 10.80 mills/kWh
 Capacity charge: \$32.94/kW-year

The energy charge is applied to the average annual energy losses and the capacity charge is applied to the loss in marketable capacity. The hydropower revenues foregone due to the two possible reallocations are listed in Table 4.

	Revenues Foregone	
	Flood Pool	Conservation Pool
Reduction in streamflow (mgd)	15.00	15.00
Annual energy losses (MWh) ¹	4,345	5,318
Energy value (mills/kwh) ²	10.80	10.80
Annual energy revenues foregone	\$46,930	\$57,432
Capacity losses (kilowatts) ¹	(170.00)	222.00
Capacity value (\$/kw-yr) ²	\$32.94	\$32.94
Annual capacity revenues foregone	(\$5,600)	\$7,313
Annual revenues foregone	\$41,331	\$64,744

^{1,2} Provided by Hydropower Analysis Center, Power Branch, Water Management Division, Northwestern Division, Corps of Engineers, Portland, Oregon, September 2005.

D. Hydropower Replacement Cost

The replacement cost of power as used for computing the cost of reallocated storage is an economic or National Economic Development (NED) cost. In the case of hydropower, the NED cost of replacement power is, by definition, identical to the power benefits foregone. Power benefits foregone are based on the cost of the most likely alternative, which in fact is the cost of replacement power. Therefore, the replacement cost of power is the value of the power benefits foregone as shown in Table 3.

E. Flood Control Benefits Foregone

1) Dependable Yield Mitigation Storage

The purpose of providing dependable yield mitigation storage is to maintain the current yield of existing users. When storage is reallocated from flood storage, the yield/storage ratio typically decreases. This means that the acre-feet of storage the existing water supply user is contracted for will provide less yield (MGD). Typically, when DYMS is provided to existing water users the requesting entity would be required to purchase additional storage to keep the existing users whole, i.e. maintain the yield of existing users. If this reallocation were made from the flood pool, DYMS would be provided from MAWA's requested storage. The amount of storage available for use by MAWA would be 18,556 acre-feet and 174 acre-feet of storage would be provided to the existing water supply users in the form of DYMS.

2) Lost Flood Control Benefits

If storage is reallocated from the flood control pool for water supply there will be flood control benefits foregone. A reallocation of 18,730 acre-feet would cause an incremental reduction of approximately \$18,610 in flood control benefits (See Appendix B).

3) Lost Hydropower Benefits

A flood pool reallocation will have an effect on hydropower benefits. Although no water is being reallocated from the power pool, a change in the volume of the power pool, caused by raising the power pool to reallocate water from the flood pool, will cause capacity and energy losses. These losses, although less severe than if water was reallocated from the power pool, need to be considered. The lost hydropower benefits from a flood pool reallocation, \$139,160, are listed in Table 3.

4) Other Costs

No associated costs are anticipated with a flood pool reallocation.

5) Total Costs

The total cost associated with a flood pool reallocation is summarized in Table 5.

ITEM	COST
Lost Flood Control Benefits	\$ 18,610
Lost Hydropower Benefits	\$ 139,160
Other Costs	-
TOTAL	\$ 157,770

F. Updated Cost of Storage

The Greers Ferry Lake project came online for flood control and power in 1962 and 1964, respectively, and deliberate impoundment of the reservoir was initiated in January 1962. All recorded costs, however, were based on actual project costs through 1965. Total and joint updated project costs are \$305,341,000 and \$219,909,000, respectively. The updated costs were based on the costs of the project as presented in the final cost allocation report. The costs were then inflated to present day price levels by use of the Engineering News Record (ENR) Construction Cost Index and the Corps of Engineers Civil Works Construction Cost Index System (CWCCIS). Tables 6 details the updated cost of the project.

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**TABLE 6
GREERS FERRY LAKE, ARKANSAS
UPDATED PROJECT COST ESTIMATE**

Categories	Initial Project Cost: 1965 Prices	1965 ENR Index ²	Jul 67 ENR Index	Jul 67 CWCCIS Index	FY 05 CWCCIS Index ¹	FY 05 Project Cost
Land and Damages:						
Recreation	79,500	971	1,074	100	583.90	513,000
Other	3,857,400	971	1,074	100	583.90	24,913,000
Relocation:	6,470,400	971	1,074	1,074	7,562.50	50,394,000
Reservoir & Pool Preparation:						
Recreation	732,000	971	1,074	100	633.16	5,126,000
Other	540,800	971	1,074	100	633.16	3,787,000
Dams:						
Main Dam	19,691,000	971	1,074	100	578.92	126,087,000
24-inch Water Line	18,900	971	1,074	100	578.92	121,000
Power Intake Works	1,043,500	971	1,074	100	578.92	6,682,000
Auxiliary Dams	2,029,700	971	1,074	100	578.92	12,997,000
Power Plant:	10,079,500	971	1,074	100	539.33	60,128,000
Roads, RR's, & Bridges	60,600	971	1,074	100	600.64	403,000
Recreation Facilities	1,590,000	971	1,074	100	582.41	10,243,000
Buildings, Grounds, & Utilities:						
Recreation	249,200	971	1,074	1,074	7,562.50	1,941,000
Other	82,300	971	1,074	1,074	7,562.50	641,000
Permanent Operating Equipment:						
Recreation	87,000	971	1,074	1,074	7,562.50	678,000
Other	88,200	971	1,074	1,074	7,562.50	687,000
TOTAL	46,700,000					305,341,000
SUMMARY						
Specific Costs:						
Recreation	2,737,700					18,501,000
Fish & Wildlife	18,900					121,000
Power	11,123,000					66,810,000
SUBTOTAL	13,879,600					85,432,000
Joint-Use Cost	32,820,400					219,909,000
TOTAL PROJECT COST	46,700,000					305,341,000

¹ CWCCIS factors are taken from EM1110-2-1304, dated 30 September 2004.

² ENR factors are taken from Engineering News Record,
<http://enr.construction.com/>, 03 October 2005.

E. National Economic Development Plan

National Economic Development Plan methodology is used to determine from which pool the reallocation will be made. The new dam construction alternative will be evaluated against the best reallocation plan. The plans that considered using groundwater and stream withdrawal have been eliminated because they are unable to provide the required dependable yield. Table 7 presents the project benefits that are impacted with a reallocation in Greers Ferry Lake. By comparison, a flood pool reallocation would be the NED Plan because it would have the least benefits foregone.

Table 7 National Economic Development Plan Lost Benefits	
Conservation Pool	
-Hydropower	\$ 174,758
Total Conservation Pool	\$ 174,758
Flood Pool	
-Flood Damages	\$ 18,610
-Hydropower	\$ 139,160
Total Flood Pool	\$ 157,770

F. Users Costs

The users cost is based on the higher of the preceding calculations; lost hydropower benefits, lost hydropower revenues, replacement cost of hydropower, lost flood control benefits, and updated cost of storage. Table 8 lists these costs.

TABLE 8 COMPARISON OF ALTERNATIVES TO OBTAIN USER COST FROM A FLOOD POOL REALLOCATION			
ITEM	Capital Cost (Annual \$'s)	O&M Cost (Annual \$'s)	User Cost (Annual \$'s)
Lost Hydropower Benefits	\$ 132,019	\$ 20,616	\$ 152,635
Lost Hydropower Revenues	39,210	20,616	59,826
Replacement Cost of Hydropower	132,019	20,616	152,635
Maximum Costs Associated with Lost Flood Control	149,674	20,616	170,290
Updated Cost of Storage	148,591	20,616	169,207

The users cost will be based on flood benefits foregone which was determined to be the highest. MAWA will have the option of making one lump sum payment of \$2,513,685 or paying for the storage annually for a maximum of 30 years. The user will be required to pay joint-use O&M costs for the life of the project. These costs are the users share of annual costs required to operate and maintain the project. Table 9 displays the users total annual payment.

ITEM	Amount
Storage Required, (AF)	18,729.71
Water Supply Yield, (mgd)	15.000
Interest Rate, (percent)	4.625%
Repayment Period, (years)	30
Usable Project Storage	
Flood Control (AF)	934,000
Power Drawdown and Water Supply, (AF)	716,500
TOTAL	1,650,500
Joint-Use Project Cost	
O&M (FY05)	\$1,816,733
Flood Damage Reduction Benefits Foregone	\$2,513,685
Annual Cost of Storage	
Investment ^[1]	\$149,674
O&M ^[2]	\$20,616
TOTAL	\$170,290

^[1] Based on 4.625% interest rate and 30-year repayment period

^[2] Based on 1.13% of the actual FY05 joint-use O&M cost.

5. TEST OF FINANCIAL FEASIBILITY

As a test of financial feasibility, the annual cost of the reallocated storage, (determined in paragraph 4g, is compared to the annual cost of the most likely, least costly, alternative that would provide an equivalent quality and quantity of water which the local interests would undertake in absence of utilizing the Federal project. Table 10 presents the cost of water supply storage space from Greers Ferry Lake expressed as an annual charge and is the flood damage reduction benefits foregone. The table also presents the estimated annual cost for the most likely non-Federal alternative; a new water supply lake. The cost is expressed as an estimated annual charge using a 4.625 percent interest rate and a 30-year period of analysis.

As depicted in Table 10, reallocation from Greers Ferry Lake is financially feasible compared with the most likely non-Federal alternative.

Alternative	Capital Cost	Annual Capital Cost	Annual OM&R Cost	Total Annual Cost
Greers Ferry Lake, Flood Pool	\$ 2,513,700	\$ 149,700	\$ 20,600	\$ 170,300
New Lake & Pipeline	\$ 70,485,000	\$ 5,273,000	\$ 789,000	\$ 6,062,000

6. COST ACCOUNT ADJUSTMENTS/CREDITS TO POWER MARKETING AGENCY

A water supply reallocation from Greers Ferry Lake will have an adverse affect on Southwestern Power Administration. Therefore, a credit to the accounting records could be made based on the estimated loss of power outputs and the current rates charged by Southwestern Power Administration. The period of analysis for the Greers Ferry Lake project will end in the 2062. At the writing of this report there were 58 years remaining in this period. The estimated annual credit to the accounting records is \$85,117. This credit is based on capacity credits and energy credits. The capacity credits are based on capacity benefits through 2015, \$237, and capacity revenues, (\$5,600), from 2016 to 2062. The energy credits are based on energy benefits through 2015, \$138,923, and energy revenues, \$46,930, from 2016 to 2062. All figures were brought to a present value using a 5.125-percent interest rate and a 58-year time horizon.

7. OTHER CONSIDERATIONS

A. NEPA DOCUMENTATION

The proposed storage reallocation will not change the Greers Ferry Lake project. Storage currently allocated to the power pool will be reallocated to municipal and industrial water supply; therefore, the current size of the conservation pool and flood pool will not change. This is considered to have no impact on the natural or cultural resources listed as being present. A determination of "no significant impacts" is made and a finding to that effect was prepared as part of the National Environmental Policy Act documentation. The completed Environmental Assessment (EA) is included in Appendix E.

B. Public Comment

Public law and engineering regulations require a 30-day public comment period for this reallocation of storage. The 30-day comment period was held beginning 24 August 2006 and ending 25 September 2006. The public review and comment is a requirement by the National Environmental Policy Act and Section 5 of Public Law 100-676. The public review was accomplished by running a news release in local newspapers, providing inspection copies of the draft reallocation report and draft EA at the project office, and sending a copy of the environmental assessment to interested state and Federal agencies and interested parties that requested a copy of the draft documents.

C. Views of Federal, State and Local Interests

TO BE COMPLETED AFTER COMPLETION OF NEPA DOCUMENTATION

8. CONCLUSIONS

The Mid Arkansas Water Alliance's request for municipal and industrial water supply storage from the flood pool in Greers Ferry Lake would be available to meet the future water supply needs of central Arkansas north of the Arkansas River. Of the 18,730 acre-feet required, 18,556 acre-feet would be available to MAWA and would provide an expected yield of 15.0 MGD. The remaining 174 acre-feet would provide an expected yield of 0.14 MGD, and be provided to the existing water supply users as DYMS to keep their existing contracts whole.

Impacts to hydropower and flood control were analyzed to determine which purpose would be impacted the least. Lost flood control benefits were determined to be \$157,770 annually and lost hydropower benefits were determined to be \$174,758 annually. According to National Economic Development Plan Analysis, the most economical reallocation alternative would be to reallocate from flood control storage in Greers Ferry Lake to meet the requests of MAWA.

MAWA would have the option of paying for the storage in one lump sum at a cost of \$2,513,685 or \$170,290 in annual payments for 30 years. The share of joint-use O&M costs for MAWA in FY 2005 were determined to be \$20,616 and are included in the annual payment.

SECTION B
LAKE OUACHITA
ANALYSIS

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WATER SUPPLY STORAGE REALLOCATION REPORT AT LAKE OUACHITA FOR THE MID ARKANSAS WATER ALLIANCE

1. PURPOSE

A. Reallocation Request

A U.S. Army Corps of Engineers study, The Mid Arkansas Water Resource Study, was completed in November 2002 for the Mid Arkansas Water Discussion Group to evaluate future water needs of central Arkansas and identify sources to meet those needs through the year 2050. Based upon the results of this study, the group decided that the best alternative for obtaining water for the central Arkansas area would be to purchase the remaining Corps of Engineers discretionary storage in Greers Ferry Lake and Lake Ouachita. On April 4, 2003 the Mid Arkansas Water Discussion Group evolved into the Mid Arkansas Water Alliance (MAWA) and was incorporated.

Another U.S. Army Corps of Engineers Study, Mid-Arkansas Water Resource Study Update, was completed in December 2004 to update the needs of the eight counties in central Arkansas that comprise MAWA because the member utilities doubled since the initial report was completed. The purpose of this study was primarily to consider the population and demand based on the new members. Furthermore, this study took into consideration the existing raw water sources that were available to Central Arkansas Water, which were not considered in the initial study. Based on these findings and after meetings with the Little Rock District, MAWA decided their goals could be met through the year 2025 by reducing their initial request. A letter requesting the purchase of storage to provide 15 MGD from Greers Ferry Lake and 20 MGD from Lake Ouachita was submitted to the Little Rock District on 9 May 2005 by MAWA.

This study was conducted by the Little Rock District with input and assistance from the Vicksburg District for the analysis of Lake Ouachita. Section A of this report will focus on the reallocation at Greers Ferry Lake and Section B will focus on the reallocation at Lake Ouachita.

B. Reallocation Authority

Authority for the Corps to reallocate existing storage space to M&I water supply is contained in Public Law 85-500, Title III, Water Supply Act of 1958, as amended. The Secretary of the Army is authorized to cooperate with local interests in providing storage space for M&I water supply in U.S. Army Corps of Engineers projects as long as the local interests agree to pay the costs associated with the storage space. The Corps has the discretionary authority to reallocate the lesser of 15% or 50,000 acre feet of the total storage capacity in Lake Ouachita provided the reallocation has no severe effect on other authorized purposes and will not involve major structural or operational changes.

2. PROJECT BACKGROUND

A. Project History

House Document No. 647, 78th Congress, 2d Session, recommended the construction of Blakely Mountain Dam – Lake Ouachita Project, Arkansas for flood control, hydroelectric power, and other purposes. The Flood Control Act of 1944 (Public Law 534, 78th Congress, 2d Session) Authorized the construction, operation and maintenance of this project.

Current project physical features are shown in Table 11.

Feature	Elevation ^[1]	Area (acres)	Storage Volume (acre-feet)	Equiv. Runoff ^[2] (inches)
Top of dam	616.00	----	----	
Top of flood control pool	592.00	48,300	2,768,000	47.0
Top of conservation pool	578.00 ^[3]	40,100	2,151,000	36.5
Top of inactive pool	535.00	20,900	865,000	14.7
Flood control storage	578.00 - 592.00	----	617,000	
Conservation Storage	535.00 - 578.00	----	1,286,000	
Inactive storage	Below elev. 535.00	----	865,000	

^[1] Above the National Geodetic Vertical Datum (NGVD29).
^[2] From 1,105 square miles of drainage area upstream from dam.
^[3] Current top of conservation pool is 578.04 due to a previously approved reallocation

B. Project Purposes and Location

Specifically authorized project purposes are flood control and hydroelectric power. Other functions benefiting from the project include recreation, fish and wildlife, and navigation. The project has been available for control of floods since February 1953 and in operation for the generation of power since 1 October 1955. Power is marketed by the Southwestern Power Administration (SWPA).

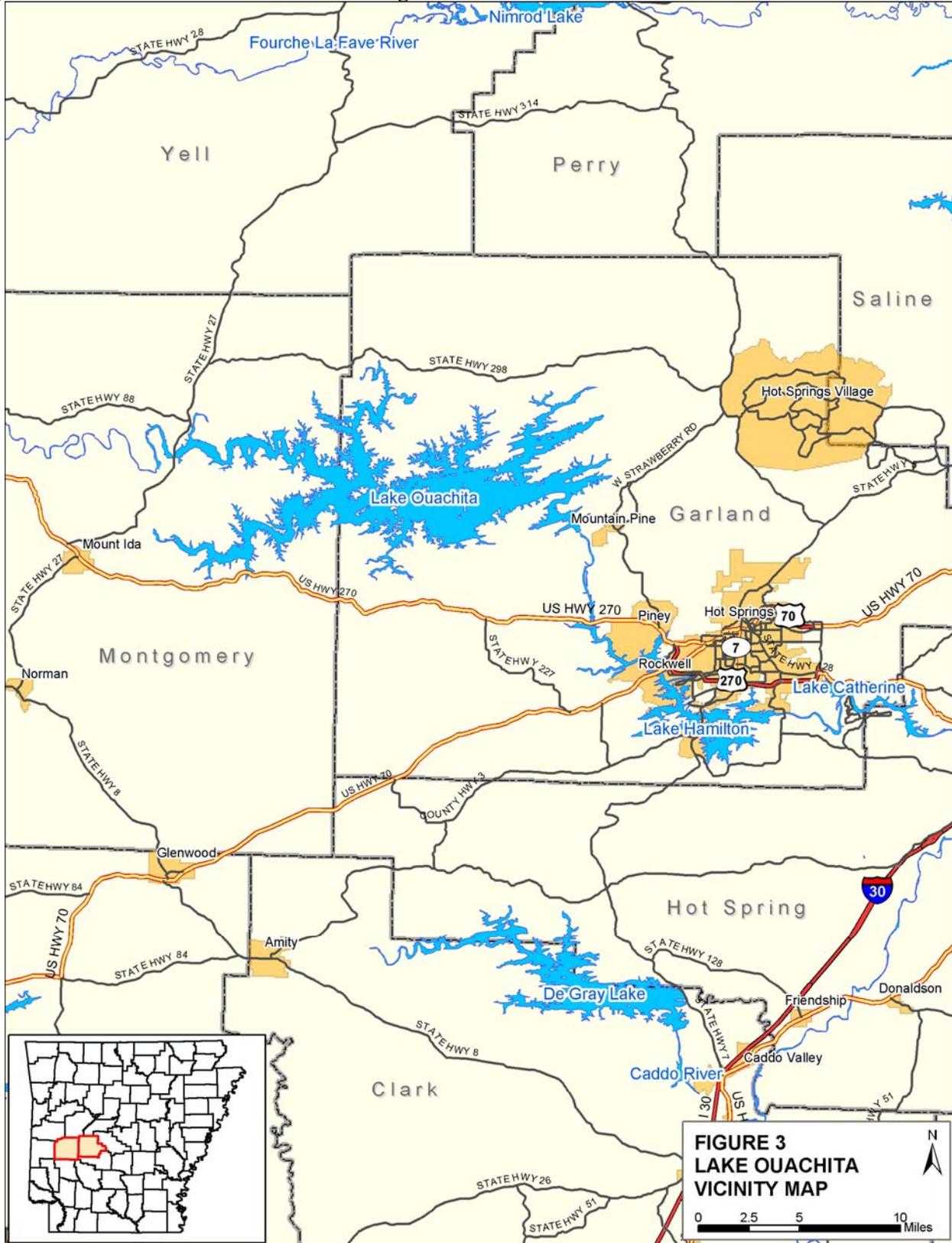
The Blakely Mountain Project consists of an earth-fill dam, a saddle spillway, flood control and power intake structure, flood control conduit and stilling basin, power conduit, surge tank, penstocks, powerhouse, switchyard and appurtenant structures. The dam is 1,100 feet long and has an average height of 205 feet above the streambed. The reservoir has a total storage capacity of 2,768,000 acre-feet at the top of the flood control pool with 617,000 acre-feet of that available for flood control storage. The conservation

pool has a total capacity of 1,286,000 acre-feet of storage and covers 40,100 acres at the top. The basin captures runoff from 1,105 square miles of drainage area above the dam.

Blakely Mountain Dam is located on the Ouachita River approximately 13 miles northwest of Hot Springs, Garland County, Arkansas. A Vicinity Map of Lake Ouachita is included as Figure 1-1.

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Figure 1: Lake Ouachita and Surrounding Communities



**FIGURE 3
LAKE OUACHITA
VICINITY MAP**

C. Water Reallocations

Storage for water supply has been reallocated once since the construction of Blakely Mountain Dam – Lake Ouachita. This water supply agreement was executed in February 14, 1996 between the North Garland County Regional Water District (NGCRWD) and the United States Government. The agreement was for 1,575 acre-feet (current yield analysis data requires 1,659 acre-feet to provide 1 MGD) of storage to provide a yield of 1 million gallons per day (MGD). Currently, a second request by the NGCRWD for 3 MGD is being processed by the Vicksburg District. This will require the reallocation of about 5,004 acre-feet of storage. Based on the past reallocation, it is assumed that the second reallocation request would be made from the flood control pool, and after dependable yield mitigation storage is accounted for, 33,303 acre-feet would be available for MAWA. A reallocation of flood control storage to the conservation pool would allow MAWA to purchase 33,303 acre-feet of storage in Lake Ouachita.

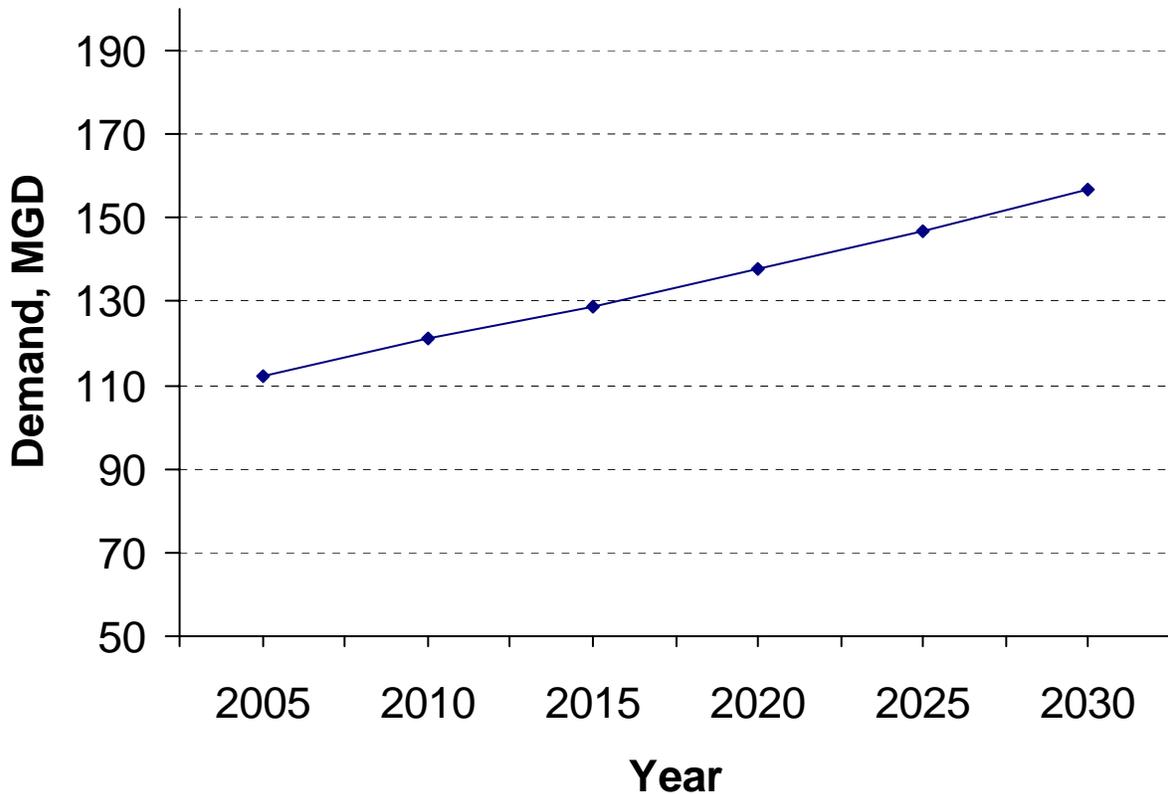
This reallocation requested by the Mid Arkansas Water Alliance for 33,303 acre-feet would leave 10,183 acre-feet of discretionary storage remaining. While the Corps reallocation authority is for storage and not dependable yield the intent and actual calculations are based on using the dependable yield requested by the customer to determine the amount of storage that will provide that yield. As stated in the Water Supply Handbook, IWR Report 96-PS-4 (Revised), page 2-3, "*Repayment agreements for storage space will base the amount of storage to be provided on the yield required by the non-Federal sponsor.*"

3. Economic Analysis

A. Water Supply Demand Analysis

The Mid Arkansas Water Resource Study Update, December 2004, presented data that showed the population of participating entities would be 748,380 in the year 2005 and is projected to be about 1,000,000 in the year 2025. Water usage within central Arkansas averaged 112 MGD in 2005, with a peak usage of 204 MGD in the summer months. The current dependable yield for water supply available in central Arkansas is 174.73 MGD which may not currently meet peak usage during a drought. Central Arkansas has experienced rapid growth and development. As population in the area continues to increase, manufacturing and service industries will most surely follow. Figure 2 of Section B displays a graph of Central Arkansas' historical and projected water demand.

Figure 2
Central Arkansas Historical and Projected Water Demand



B. Analysis of Water Supply Alternatives

1) Groundwater

Groundwater in central Arkansas is drawn from two aquifer systems: the alluvial aquifer system and the Mississippi Embayment aquifer system. The alluvial system consists of the Arkansas River aquifer and the more extensive Mississippi River Valley aquifer.

The Mississippi Embayment aquifer underlies the alluvial aquifers although these aquifers are connected to each other throughout eastern Arkansas. The alluvial aquifers can yield large quantities of water; properly constructed wells can yield 500

gallons per minute (gpm) almost anywhere in the system. Wells in the Mississippi River Valley system have been reported to yield as much as 5,000 gpm.

The Mississippi Embayment aquifer system is comprised of several aquifers: the Nacatoch, the Wilcox, the Sparta, and the Cockfield. The Sparta, the most productive aquifer, is capable of producing yields in excess of 1,000 gpm.

As a result of large scale groundwater withdrawals primarily for rice farming, groundwater levels in the state are declining. Declining aquifer water levels create a multitude of problems. Because of the excessive withdrawals of groundwater, the dependable yield has been approached or exceeded in the alluvial and Sparta aquifers. The Natural Resources Commission has declared these aquifers at “critical groundwater levels” due to the dependable yield concerns relating to poor water quality and to saline intrusions consistent with declining groundwater levels. Therefore, alternatives utilizing groundwater sources will not be considered. Several of the existing entities currently use groundwater and are already experiencing difficulty in obtaining adequate water from their sources.

2) Existing Surface Water Supplies

Several entities currently use surface water as their supply for drinking water and have joined the Mid Arkansas Water Alliance because their current supplies may not meet their demand through 2050. These include Central Arkansas Water (Lakes Winona and Maumelle), City of Conway and Conway County (Lake James H. Brewer), City of Perryville (Cedar Lake), Benton (North Fork of the Saline River and Lake Norrell), City of Hot Springs (Lake Hamilton), and Hot Springs Village (Middle Fork of Saline River and Lake Lago). All other water supply for entities in MAWA comes from groundwater. Based upon the November 2002 Mid Arkansas Water Resource Study, the most economical option would be to reallocate storage in Greers Ferry Lake and Lake Ouachita.

3) Stream Withdrawal

There are no streams within the study area capable of providing enough dependable yield for this purpose. The Arkansas River was briefly considered because it would be capable of serving the needs to the north and south. This alternative was eliminated because the Arkansas Department of Environmental Quality has listed it as not having enough dependable yield that would be available as a water supply.

4) New Lake and Pipeline

The water supply needs, for a about a twenty-five year period, could be met by constructing a new reservoir on Bull Creek. This project would have consisted of constructing a 1,000 foot long by 93 feet high by 572 foot wide earthen dam containing 370,000 cubic yards of fill material. This project would have inundated 19 miles of Bull Creek to form a 3,575 acre lake. This reservoir would have been recharged by a 50 square mile drainage area and would have had an approximate yield of 34 MGD

This project was proposed in the early 1980's to supply water in the north central region of this study area. It was also restudied in 2002 for the Mid Arkansas Regional Water Discussion Group. The results of both studies found that this alternative was not justifiable. The costs for constructing this reservoir are presented in Table 12.

The financial feasibility of constructing this reservoir will be revisited in this report.

	Aug-95 Report	Updated Cost
Interest Rate	0.07375	0.05125
Period of Analysis (years)	30	30
Project First Costs:		
New Dam and Lake ¹	\$19,000,000	\$24,528,000
Treatment plant, pipeline and storage tank ¹	\$35,600,000	\$45,957,000
Total	\$54,600,000	\$70,485,000
Annual Cost:		
Interest & Amortization ²	\$5,469,000	\$5,273,000
Operation & Maintenance ³	\$771,000	\$789,000
Total	\$6,240,000	\$6,062,000

¹ Updated with the CWCCIS composite index from FY95 and FY03.

² Includes \$9,422,000 of interest during construction from a 5-yr construction period.

³ Updated O&M is based on the ratio of O&M to Total project costs of 1995 Estimate, 1.12%.

4. DERIVATION OF USER COST

A. YIELD/STORAGE ANALYSIS

1) General

Two options will be evaluated for reallocation of storage in Lake Ouachita. The effects of reallocating storage from current flood control or hydropower storage will be considered. These are the only usable storage spaces in Lake Ouachita. Current storage and yields are based on a conservation pool located between elevations 535.00 and 578.00 which contains 1,286,000 acre-feet of storage. The dependable yield of this storage during the drought of record is 793 MGD.

2) Conservation Pool

When storage is reallocated from the conservation pool there is no change in the yield of the pool. The reallocation is made directly from hydropower storage causing both a reduction in their existing storage and a reduction in their yield.

A reallocation from the existing conservation pool for MAWA of 32,573 acre-feet of hydropower storage to M&I water supply purposes is estimated to provide a dependable yield of 20.0 MGD. The reallocation will reduce hydropower yield by 20.0 MGD and their storage by 32,573 acre-feet.

3) Flood Pool

As the storage in the conservation pool is increased by reallocation from the flood pool, the yield/storage relationship typically decreases. To determine the change in the yield / storage ratio as the top of conservation pool is raised it is necessary to reference the yield/storage curve for Lake Ouachita. This method determined 33,303 acre-feet of storage is required to provide MAWA an expected yield of 20.0 MGD while maintaining the expected yield of the existing user. Providing this storage from flood pool would raise the top of the conservation pool by 0.82 feet (9.8 inches), from 578.16 to 578.98.

When storage is taken from the flood pool, the amount of storage allocated to each existing water supply user must be increased to maintain their expected yield. This additional storage is called "dependable yield mitigation storage" or DYMS. As stated in EC 1105-2-216, Reallocation of Flood Control Storage to Municipal and Industrial Water Supply – Compensation Considerations, *"It is Corps policy not to provide DYMS for hydropower as is done for existing water supply users."* Therefore, no DYMS is added to hydropower which results in their storage remaining constant and their yield decreasing. Each time additional storage is requested for reallocation from the flood pool a calculation is made estimating the requested dependable yield, and the DYMS for existing users. The cost of the DYMS is the responsibility of the water supply requestor, as stated in EC 1105-2-216, *"All costs associated with DYMS will be paid for by the new user of the new water supply storage space (i.e., the water supply requestor)."*

B. Hydropower Benefits Foregone

Hydropower benefits are based on the cost of the most likely alternative source of power. When storage is reallocated for water supply and an impact occurs to hydropower, the power benefits foregone are equivalent to the cost of replacing the lost power with the most likely alternative source of power.

The power benefits foregone can be divided into two components: The lost energy benefits and lost capacity benefits. In the case of water supply withdrawals, there is usually a loss of energy benefits, and lost energy benefits are based on the loss in generation (both at-site and downstream) as a result of water being diverted from the reservoir for water supply rather than passing through the hydro plant.

In addition, there could be a loss of capacity benefits as a result of a loss in dependable capacity at the project. Dependable capacity could be lost as a result of;

- a loss in head due to lower post-withdrawal reservoir elevations.

- a reduction in the usability of the capacity due to inadequate energy to support the full capacity during low-flow periods.

The hydropower benefits foregone due to the two possible reallocations are listed in Table 13.

TABLE 13 HYDROPOWER BENEFIT LOSSES DUE TO WATER WITHDRAWALS		
	Benefits Foregone	
	Flood Pool	Conservation Pool
Reduction in streamflow (MGD)	20.00	20.00
Annual energy losses (MWh)	4,068.63	5,490.68
Energy value (mills/kwh)	31.92	31.92
Annual energy benefits foregone	\$129,871	\$175,263
Capacity losses (kilowatts)	1,162.00	1,802.00
Capacity value (\$/kw-yr)	\$79.16	\$79.16
Annual capacity benefits foregone	\$91,984	\$142,646
Annual benefits foregone ¹	\$221,855	\$317,909

¹ Provided by Hydropower Analysis Center, Power Branch, Water Management Division, Northwestern Division, Corps of Engineers, Portland, Oregon, September 2005.

C. Hydropower Revenues Forgone

Hydropower revenues foregone are based on the value of the lost power based on the power marketing agency's rates. Southwestern Power Administration rates as of 13 July 2004 are:

Energy charge:	10.80 mills/kWh
Capacity charge:	\$32.94 /kW-year

The energy charge is applied to the average annual energy losses and the capacity charge is applied to the loss in marketable capacity. The hydropower revenues foregone due to the two possible reallocations are listed in Table 14.

**TABLE 14
HYDROPOWER REVENUE LOSSES DUE TO WATER WITHDRAWALS**

	Revenues Foregone	
	Flood Pool	Conservation Pool
Reduction in streamflow (MGD)	20.00	20.00
Annual energy losses (MWh)	4,068.63	5,490.68
Energy value (mills/kwh)	10.80	10.80
Annual energy revenues foregone	\$43,941	\$59,299
Capacity losses (kilowatts)	2,151.00	2,416.00
Capacity value (\$/kw-yr)	\$32.94	\$32.94
Annual capacity revenues foregone	\$70,854	\$79,583
Annual revenues foregone ¹	\$114,795	\$138,882

¹ Provided by Hydropower Analysis Center, Power Branch, Water Management Division, Northwestern Division, Corps of Engineers, Portland, Oregon, September 2005.

D. Hydropower Replacement Cost

The replacement cost of power as used for computing the cost of reallocated storage is an economic or National Economic Development (NED) cost. In the case of hydropower, the NED cost of replacement power is, by definition, identical to the power benefits foregone. Power benefits foregone are based on the cost of the most likely alternative, which in fact is the cost of replacement power. Therefore, the replacement cost of power is the value of the power benefits foregone as shown in Table 13.

E. Flood Control Benefits Foregone

1) Dependable Yield Mitigation Storage

The purpose of providing dependable yield mitigation storage is to maintain the current yield of existing users. When storage is reallocated from flood storage, the yield/storage ratio decreases. This means that the acre-feet of storage the existing water supply user is contracted for will provide less yield (MGD). Typically, when DYMS is provided to existing water users the requesting entity would be required to purchase additional storage to keep the existing users whole, i.e. maintain the yield of existing users. Since

the storage for this reallocation would be reallocated from flood storage, DYMS would be provided from MAWA's requested storage. The amount of storage available for use by MAWA would be 33,181 acre-feet and 122 acre-feet of storage would be provided to the existing water supply users in the form of DYMS.

2) Lost Flood Control Benefits

If storage is reallocated from the flood control pool for water supply there will be flood control benefits foregone. An estimate of the flood control benefits foregone is made using historical data and the annual flood losses prevented. These values are factored to current price levels and averaged over the period of collected data. A reallocation of 33,303 acre-feet would cause an incremental reduction of approximately \$49,550 in flood control benefits.

Calculations of lost flood control benefits are included in Appendix B.

3) Lost Hydropower Benefits

A flood pool reallocation will have an effect on hydropower benefits. Although no water is being reallocated from the power pool, a change in the volume of the power pool, caused by raising the power pool to reallocate water from the flood pool, will cause capacity and energy losses. These losses, although less severe than if water was reallocated from the power pool, need to be considered. The lost hydropower benefits from a flood pool reallocation, \$221,855, are listed in Table 13.

4) Other Costs

No associated costs are anticipated with a flood pool reallocation.

5) Total Costs

The total benefits foregone associated with a flood pool reallocation is summarized in Table 15.

TABLE 15	
TOTAL COST WITH REALLOCATION FROM FLOOD CONTROL STORAGE	
ITEM	COST
Lost Flood Control Benefits	\$ 49,550
Lost Hydropower Benefits	\$ 221,855
Other Costs	-
TOTAL	\$ 271,405

F. Updated Cost of Storage

The Lake Ouachita project came online for flood control and hydropower in 1953 and 1955, respectively, and deliberate impoundment of the reservoir was initiated in 1952. All recorded costs, however, were based on actual project costs through 1957. Total and joint updated project costs are \$266,802,000 and \$109,674,000, respectively. The updated costs were based on the costs of the project as presented in the final cost allocation report. The costs were then inflated to present day price levels by use of the Engineering News Record (ENR) Construction Cost Index and the Corps of Engineers Civil Works Construction Cost Index System (CWCCIS). Table 16 details the updated costs of the project.

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TABLE 16
LAKE OUACHITA, ARKANSAS
UPDATED PROJECT COST ESTIMATE

Categories	Initial Project Cost 1957 Prices	1957 ENR Index ²	Jul 67 ENR Index	Jul 67 CWCCIS Index	FY 05 CWCCIS Index ¹	FY 05 Project Cost	
Land and Damages	2,361,600	724	1,074	100	583.90	20,456,000	J
Relocation	1,083,700	724	1,074	1,074	7,562.50	11,320,000	J
Reservoir	2,009,900	724	1,074	100	633.16	18,878,000	J
Dam and Spillway							
Main Dam	6,306,500	724	1,074	100	578.92	54,159,000	J
Power Intake Works	6,724,900	724	1,074	100	578.92	57,752,000	P
Flood Control Outlet Works	3,275,300	724	1,074	100	578.92	28,128,000	F
Powerplant	7,479,800	724	1,074	100	539.33	59,843,000	P
Roads	347,200	724	1,074	100	600.64	3,094,000	J
Buildings	169,200	724	1,074	1,074	7,562.50	1,767,000	J
Equipment	1,091,900	724	1,074	1,074	7,562.50	11,405,000	P
TOTAL	30,850,000					266,802,000	
SUMMARY							
Specific Costs							
Flood Control	3,275,300					28,128,000	FC
Power	15,296,600					129,000,000	P
SUBTOTAL	18,571,900					157,128,000	
Joint-Use Cost	12,278,100					109,674,000	
TOTAL PROJECT COST	30,850,000					266,802,000	

¹ CWCCIS factors are taken from EM1110-2-1304, dated 30 September 2004.

² ENR factors are taken from Engineering News Record,
<http://enr.construction.com/>, 03 October 2005.

G. National Economic Development Plan

National Economic Development Plan methodology is used to determine which pool the reallocation will be made. The new dam construction alternative will be evaluated against the best reallocation plan. The plans that considered using groundwater and stream withdrawal have been eliminated because they are unable to provide the required dependable yield. Table 17 presents the project benefits that are impacted with a reallocation in Lake Ouachita. By comparison, a flood pool reallocation would be the NED Plan because it would have the least benefits foregone.

Lost Benefits	
Conservation Pool	
-Hydropower	317,909
Total Conservation Pool	\$ 317,909
Flood Pool	
-Flood Damages	49,550
-Hydropower	221,855
Total Flood Pool	\$ 271,405

H. Users Costs

The users cost is based on the higher of the preceding calculations; lost hydropower benefits, lost hydropower revenues, replacement cost of hydropower, lost flood control benefits, and updated cost of storage. Table 18 lists these costs.

ITEM	Capital Cost (Annual \$'s)	O&M Cost (Annual \$'s)	User Cost (Annual \$'s)
Lost Hydropower Benefits	\$210,469	\$9,711	\$220,180
Lost Hydropower Revenues	108,904	9,711	118,615
Replacement Cost of Hydropower	210,469	9,711	220,180
Maximum Costs Associated with Lost Flood Control	257,476	9,711	267,187
Updated Cost of Storage	114,282	9,711	123,993

The users cost will be based on the lost flood control benefits which was determined to be the highest. MAWA will have the option of making one lump sum payment of \$4,324,167 or paying for the storage annually for a maximum of 30 years. The user will be required to pay joint-use O&M costs for the life of the project. These costs are the users share of annual costs required to operate and maintain the project. Table 19 displays the users total annual payment.

TABLE 19 ANNUAL REPAYMENT COST FOR REALLOCATION STORAGE	
ITEM	Amount
Storage Required, (AF)	33,302.69
Water Supply Yield, (mgd)	20.000
Interest Rate, (percent)	4.625%
Repayment Period, (years)	30
Usable Project Storage	
Flood Control (AF)	617,000
Power Drawdown and Water Supply, (AF)	1,286,000
TOTAL	1,903,000
Joint-Use Project Cost	
O&M (FY04)	\$554,897
Flood Control Benefits Foregone	\$4,324,167
Annual Cost of Storage	
Investment ^[1]	\$257,476
O&M ^[2]	\$9,711
TOTAL	\$267,187

^[1] Based on 4.625% interest rate and 30-year repayment period

^[2] Based on 1.75% of the actual FY05 joint-use O&M cost.

5. TEST OF FINANCIAL FEASIBILITY

As a test of financial feasibility, the users cost of the reallocated storage, (determined in paragraph 4G), is compared to the annual cost of the most likely, least costly, alternative that would provide an equivalent quality and quantity of water which the local interests would undertake in absence of utilizing the Federal project. Table 20 presents the cost of water supply storage space from Lake Ouachita expressed as an annual charge and is sum of the lost flood control benefits and OMRR&R. The table also presents the estimated annual cost the most likely non-Federal alternative; a new water supply lake. The cost is expressed as an estimated annual charge using a 4.625 percent interest rate and a 50-year period of analysis.

As depicted in Table 20, reallocation from Lake Ouachita is financially feasible compared with the most likely non-Federal alternative.

TABLE 20 TEST OF FINANCIAL FEASIBILITY				
Alternative	Capital Cost	Annual Capacity Benefits Foregone	Annual OMRR&R Cost	Total Annual Cost
Lake Ouachita, Flood Pool	\$ 4,324,200	\$ 257,500	\$ 9,700	\$ 267,200
	Capital Cost	Annual Capital Cost	Annual OMRR&R Cost	Total Annual Cost
New Lake & Pipeline	\$ 70,485,000	\$ 5,273,000	\$ 789,000	\$ 6,062,000

6. COST ACCOUNT ADJUSTMENTS/CREDITS TO POWER MARKETING AGENCY

A water supply reallocation from Lake Ouachita will have an adverse effect on Southwestern Power Administration. Therefore, a credit to the accounting records could be made based on the estimated loss of power outputs and the current rates charged by Southwestern Power Administration. The period of analysis for the Lake Ouachita project will end in the 2054. At the writing of this report there were 50 years remaining in this period. The estimated annual credit to the accounting records is \$164,126. This credit is based on capacity credits and energy credits. The capacity credits are based on capacity benefits through 2015, \$91,984, and capacity revenues, \$70,854, from 2016 to 2054. The energy credits are based on energy benefits through 2015, \$129,871, and energy revenues, \$43,941, from 2016 to 2054. All figures were brought to a present value using a 5.125-percent interest rate and a 50-year time horizon.

7. OTHER CONSIDERATIONS

A. NEPA DOCUMENTATION

The proposed storage reallocation will not change the Lake Ouachita project. Storage currently allocated to the flood pool will be reallocated to municipal and industrial water supply; therefore, the current size of the conservation pool and flood pool will not change. This is considered to have no impact on the natural or cultural resources listed as being present. A determination of "no significant impacts" is made and a finding to that effect was prepared as part of the National Environmental Policy Act documentation. The completed Environmental Assessment (EA) is attached.

B. Public Comment

Public law and engineering regulations require a 30-day public comment period for this reallocation of storage. The 30-day comment period was held beginning 24 August 2006 and ending 25 September 2006. The public review and comment is a requirement by the National Environmental Policy Act and Section 5 of Public Law 100-676. The public review was accomplished by running a news release in local newspapers, providing inspection copies of the draft reallocation report and draft EA at the project office, and sending a copy of the environmental assessment to interested state and Federal agencies and interested parties that requested a copy of the draft documents.

D. Views of Federal, State and Local Interests

TO BE COMPLETED AFTER COMPLETION OF NEPA DOCUMENTATION

8. CONCLUSIONS

The Mid Arkansas Water Alliance's request for the municipal and industrial water supply storage from the flood pool in Lake Ouachita would be available to meet the future water supply needs of central Arkansas south of the Arkansas River. Of the 33,303 acre-feet, 33,181 acre-feet would be available to MAWA and would provide a yield of 20.0 MGD. The remaining 122 acre-feet would yield 0.07 MGD, and be provided to the North Garland County Regional Water District as DYMS to keep their existing contract and current request whole.

Impacts to hydropower and flood control were analyzed to determine which purpose would be impacted the least. Lost flood control benefits were determined to be \$271,405 annually and lost hydropower benefits were determined to be \$317,909 annually. According to National Economic Development Plan Analysis, the most economical reallocation alternative would be to reallocate from flood control storage in Lake Ouachita to meet the requests of MAWA.

MAWA would have the option of paying for the storage in one lump sum at a cost of \$4,324,167 or \$267,187 in annual payments for 30 years. The share of joint-use O&M costs for MAWA in FY 2005 were determined to be \$9,711 and are included in the annual payment.

APPENDIX A

CURRENT USERS AND DEPENDABLE YIELD MITIGATION STORAGE DETERMINATION

**DEPENDABLE YIELD MITIGATION STORAGE DETERMINATIONS
AT
GREERS FERRY LAKE**

Water Supply User	Proposed Conservation Pool Top EL 462.04 FT		
	Proposed Yield MGD	Proposed Storage AF	DYMS AF
MAWA	15.000	18556.050	-
Searcy County (pending)	4.075	5,041.060	41.060
Clinton	1.762	2,179.717	17.765
Tannenbaum	0.073	90.306	0.736
City of Heber Springs (pending)	2.873	3,554.102	28.967
Thunderbird	0.045	55.668	0.454
CWS3	3.500	4,329.745	35.289
Red Apple Inn	0.053	65.565	0.534
CWS2	3.087	3,818.835	31.125
CWS1	0.185	228.858	1.865
Clinton	0.738	912.958	7.441
City of Heber Springs	0.835	1,032.953	8.419
Hydropower	573.569	709,545.575	-
Total Yield (as per SUPER data)	605.795		173.655
Total Storage (as per SUPER data)		749411.392	
Yield/Storage Ratio	0.0008083617		

**DEPENDABLE YIELD MITIGATION STORAGE DETERMINATIONS
AT
LAKE OUACHITA**

Water Supply User	Proposed Conservation Pool Top EL 578.98 FT		
	Proposed Yield MGD	Proposed Storage AF	DYMS AF
MAWA	20.000	33,181.000	-
North Garland County 2 (requested)	3.000	4,977.261	91.266
North Garland County 1	1.000	1,659.087	30.422
Hydropower	775.230	1,286,173.552	-
Total Yield (as per MVK data)	799.229		121.688
Total Cons. Storage (as per MVK data)		1325990.900	
Yield/Storage Ratio	0.0006027411		

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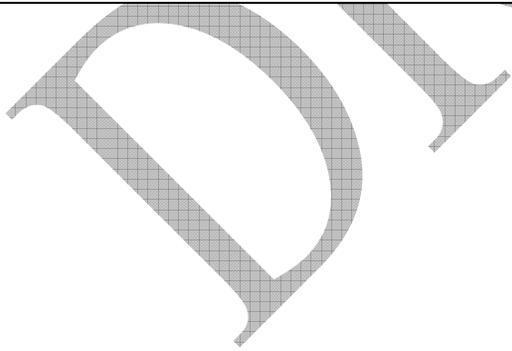
APPENDIX B
FLOOD DAMAGE CALCULATIONS

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GREERS FERRY LAKE						
AVERAGE ANNUAL FLOOD DAMAGES PREVENTED CURRENT PRICE LEVELS						
	Year	Flood Damages Prevented	Prices Recv'd by Farmers ⁽¹⁾	Factor of Increase	FDP at Current Prices	
	1	1962	16,000	243	2.901	46,420
	2	1963	0	243	2.901	0
	3	1964	49,000	237	2.975	145,759
	4	1965	7,000	245	2.878	20,143
	5	1966	264,000	264	2.670	705,000
	6	1967	24,000	250	2.820	67,680
	7	1968	118,000	255	2.765	326,235
	8	1969	62,000	268	2.631	163,097
	9	1970	138,000	274	2.573	355,073
	10	1971	127,000	281	2.509	318,630
	11	1972	246,000	313	2.252	554,089
	12	1973	499,000	447	1.577	787,013
	13	1974	845,000	481	1.466	1,238,514
	14	1975	317,000	466	1.513	479,582
	15	1976	358,000	475	1.484	531,347
	16	1977	289,000	462	1.526	441,006
	17	1978	262,000	529	1.333	349,168
	18	1979	437,000	600	1.175	513,475
	19	1980	596,000	624	1.130	673,365
	20	1981	29,000	634	1.112	32,248
	21	1982	1,276,000	598	1.179	1,504,314
	22	1983	7,941,000	625	1.128	8,957,448
	23	1984	795,000	641	1.100	874,376
	24	1985	1,677,000	579	1.218	2,041,943
	25	1986	404,000	554	1.273	514,116
	26	1987	256,000	563	1.252	320,568
	27	1988	774,000	627	1.124	870,287
	28	1989	1,588,000	659	1.070	1,698,847
	29	1990	2,542,500	660	1.068	2,715,852
	30	1991	1,856,200	632	1.116	2,070,603
	31	1992	889,860	626	1.126	1,002,159
	32	1993	537,220	643	1.096	589,020
	33	1994	635,850	634	1.112	707,057
	34	1995	914,200	646	1.091	997,695
	35	1996	865,940	712	0.990	857,427
	36	1997	308,500	678	1.040	320,785
	37	1998	334,400	644	1.095	366,075
	38	1999	324,900	607	1.161	377,355
	39	2000	1,010,300	611	1.154	1,165,731
	40	2001	505,700	649	1.086	549,335
	41	2002	974,500	621	1.135	1,106,316
	42	2003	544,100	677	1.041	566,603
	43	2004	1,985,900	705	1.000	1,985,900
Total		\$33,624,070				\$39,908,000
Avg. Annual		\$782,000				\$928,000
(1)						
The Index of Prices Received by Farmers was used because the flood damages prevented were largely agricultural. The index is for All U.S. Farm Products and was obtained from the National Agricultural Statistic Service.						

GREERS FERRY LAKE
 FLOOD DAMAGE BENEFIT REDUCTION DUE TO
 REALLOCATION FROM FLOOD CONTROL STORAGE

<u>Cumulative Damages Prevented</u> Years in Operation	=	Avg Annual Damage Prevented		
<u>\$39,908,000</u> 43	=	\$928,000		
		Yrs		
Incremental Annual Benefit Reduction	=	\$928,000	x	<u>Reallocated Storage</u> Flood Control Storage
Incremental Annual Benefit Reduction	=	\$928,000	x	<u>18,729.7</u> AF 934,000 AF
Incremental Annual Benefit Reduction	=	\$18,610		
Cumulative Annual Benefit Reduction	=	\$928,000	x	<u>Cum. Reallocated Storage</u> Flood Control Storage
Cumulative Annual Benefit Reduction	=	\$928,000	x	<u>29,178.7</u> AF 934,000 AF
Cumulative Annual Benefit Reduction	=	\$28,990		



**LAKE OUACHITA
AVERAGE ANNUAL FLOOD DAMAGES PREVENTED
CURRENT PRICE LEVELS**

	Year	Flood Damages Prevented	Prices Recv'd by Farmers ⁽¹⁾	Factor of Increase	FDP at Current Prices
1	1955	0	243	2.901	0
2	1956	1,005,000	243	2.901	2,915,741
3	1957	747,000	243	2.901	2,167,222
4	1958	515,000	243	2.901	1,494,136
5	1959	824,000	243	2.901	2,390,617
6	1960	871,000	243	2.901	2,526,975
7	1961	747,000	243	2.901	2,167,222
8	1962	850,000	243	2.901	2,466,049
9	1963	953,000	243	2.901	2,764,877
10	1964	685,000	237	2.975	2,037,658
11	1965	902,000	245	2.878	2,595,551
12	1966	696,000	264	2.670	1,858,636
13	1967	618,000	250	2.820	1,742,760
14	1968	515,000	255	2.765	1,423,824
15	1969	515,000	268	2.631	1,354,757
16	1970	927,000	274	2.573	2,385,164
17	1971	0	281	2.509	0
18	1972	0	313	2.252	0
19	1973	592,000	447	1.577	933,691
20	1974	592,000	481	1.466	867,692
21	1975	902,000	466	1.513	1,364,614
22	1976	927,000	475	1.484	1,375,863
23	1977	953,000	462	1.526	1,454,253
24	1978	953,000	529	1.333	1,270,066
25	1979	0	600	1.175	0
26	1980	0	624	1.130	0
27	1981	464,000	634	1.112	515,962
28	1982	0	598	1.179	0
29	1983	362,000	625	1.128	408,336
30	1984	860,000	641	1.100	945,866
31	1985	0	579	1.218	0
32	1986	0	554	1.273	0
33	1987	0	563	1.252	0
34	1988	234,000	627	1.124	263,110
35	1989	119,000	659	1.070	127,307
36	1990	19,000	660	1.068	20,295
37	1991	2,323,000	632	1.116	2,591,321
38	1992	124,000	626	1.126	139,649
39	1993	0	643	1.096	0
40	1994	135,000	634	1.112	150,118
41	1995	61,000	646	1.091	66,571
42	1996	61,000	712	0.990	60,400
43	1997	99,000	678	1.040	102,942
44	1998	293,000	644	1.095	320,753
45	1999	25,000	607	1.161	29,036
46	2000	214,000	611	1.154	246,923
47	2001	86,000	649	1.086	93,421
48	2002	25,000	621	1.135	28,382
49	2003	217,000	677	1.041	225,975
50	2004	6,000	705	1.000	6,000
Total		\$22,016,000			\$45,900,000
Avg. Annual		\$440,000			\$918,000

(1)The Index of Prices Received by Farmers was used because the flood damages prevented were largely agricultural. The index is for All U.S. Farm Products and was obtained from the National Agricultural Statistic Service.

LAKE OUACHITA
 FLOOD DAMAGE BENEFIT REDUCTION DUE TO
 REALLOCATION FROM FLOOD CONTROL STORAGE

Cumulative Damages Prevented = Avg Annual Damage Prevented
 Years in Operation

\$45,900,000 = \$918,000
 50 Yrs

Incremental Annual Benefit Reduction = \$918,000 x Reallocated Storage
 Flood Control Storage

Incremental Annual Benefit Reduction = \$918,000 x 33,181.0 AF
 617,000 AF

Incremental Annual Benefit Reduction = \$49,370

Cumulative Annual Benefit Reduction = \$918,000 x Cum. Reallocated Storage
 Flood Control Storage

Cumulative Annual Benefit Reduction = \$918,000 x 39,695.7 AF
 617,000 AF

Cumulative Annual Benefit Reduction = \$59,060

APPENDIX C

PERTINENT CORRESPONDENCE

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APPENDIX D
WATER SUPPLY AGREEMENTS

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WATER STORAGE AGREEMENT
BETWEEN THE UNITED STATES OF AMERICA
AND
THE MID ARKANSAS WATER ALLIANCE
FOR
WATER STORAGE SPACE IN GREERS FERRY LAKE, ARKANSAS

THIS AGREEMENT, entered into this ____ day of _____, 19____, by and between THE UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the District Engineer executing this agreement, and The Mid Arkansas Water Alliance (hereinafter called the "User");

WITNESSETH THAT:

WHEREAS, the **Flood Control Act of 1938 (Public Law 534, 78th Congress), authorized the construction, operation, and maintenance of the Greers Ferry Dam*** on the White River, Arkansas, (hereinafter called the "Project"); and

WHEREAS, the User desires to enter into an agreement with the Government for the use of storage included in the Project for municipal and industrial water supply, and for payment of the cost thereof in accordance with the provisions of the Water Supply Act of 1958, as amended (43 U.S.C. 390b-f); and

WHEREAS, the User as shown in Exhibit "A: attached to and made a part of this agreement, is empowered to enter into an agreement with the Government and is vested with all necessary powers of accomplishment of the purposes of this agreement, [including those required by Section 221 of the Flood Control Act of 1970 (42 U.S.C. 1962d-5d) (as amended);]

WHEREAS, provided as Exhibit "_": attached to and made a part of this agreement, is a reallocation report entitled "_Reallocation of Storage at Greers Ferry Lake and Lake Ouachita, Arkansas for the Mid Arkansas Water Alliance," dated: August 2006, which provides information pertinent to the reallocation of storage space in the Project for use by the User;

NOW, THEREFORE, the Government and the User agree as follows:

ARTICLE 1 - Water Storage Space.

a. Project Construction. The Government, subject to the directions of Federal law and any limitations imposed thereby, shall modify the Project so as to include therein space for the storage of water by the User.

b. Rights of User.

(1) The User shall have the right to utilize an undivided 1.13 percent (estimated to contain 18,730 acre-feet after adjustment for sediment deposits) of the usable storage space in the Project between elevations 435.0 feet and 462.04 feet above National Geodetic Vertical Datum, which usable conservation storage space is estimated to contain acre-feet after adjustment for sediment deposits. This storage space is to be used to impound water for present demand or need for municipal and industrial water supply.

(2) The User shall have the right to withdraw water from the lake, or to request releases to be made by the Government through the outlet works in the Dam, subject to the provisions of Article 1c and to

ER 1105-2-100

15 January 1998

the extent the aforesaid storage space will provide; and shall have the right to construct all such works, plants, pipelines, and appurtenances as may be necessary and convenient for the purpose of diversion or withdrawals, subject to the approval of the District Engineer as to design and location. The grant of an easement for right-of-way, across, in and upon land of the Government at the Project shall be by a separate instrument in a form satisfactory to the Secretary of the Army, without additional cost to the User, under the authority of and in accordance with the provisions of 10 U.S.C. 2669 and such other authorities as may be necessary. Subject to the conditions of such easement, the User shall have the right to use so much of the Project land as may reasonably be required in the exercise of the rights and privileges granted under this agreement.

c. Rights Reserved. The Government reserves the right to control and use all storage in the project in accordance with authorized Project purposes. The Government further reserves the right to take such measures as may be necessary in the operation of the Project to preserve life and/or property, including the right not to make downstream releases during such periods of time as are deemed necessary, in its sole discretion, to inspect, maintain, or repair the Project.

d. Quality or Availability of Water. The User recognizes that this agreement provides storage space for raw water only. The Government makes no representations with respect to the quality or availability of water and assumes no responsibility therefor, or for the treatment of the water.

e. Sedimentation Surveys.

(1) Sedimentation surveys will be made by the District Engineer during the term of this agreement at intervals not to exceed fifteen (15) years unless [the District Engineer determines that such surveys are unnecessary] [otherwise agreed to in writing by both parties]. When, in the opinion of the District Engineer, the findings of such survey indicate any Project purpose will be affected by unanticipated sedimentation distribution, there shall be an equitable redistribution of the sediment reserve storage space among the purposes served by the Project including municipal and industrial water supply. The total available remaining storage space in the Project will then be divided among the various Project features in the same ratio as was initially utilized. Adjusted pool elevations will be rounded to the nearest one-half foot. Such findings and the storage space allocated to municipal and industrial water supply shall be defined and described as an exhibit which will be made a part of this agreement and the water control manual will be modified accordingly.

(2) The Government assumes no responsibility for deviations from estimated rates of sedimentation, or the distribution thereof. Such deviations may cause unequal distribution of sediment reserve storage greater than estimated, and/or encroachment on the total storage at the Project.

ARTICLE 2 - Regulation of and Right to Use of Water. The regulation of the use of water withdrawn or released from the aforesaid storage space shall be the sole responsibility of the User. The User has the full responsibility to acquire in accordance with State laws and regulations, and, if necessary, to establish or defend, any and all water rights needed for utilization of the storage provided under this agreement. The Government shall not be responsible for diversions by others, nor will it become a party to any controversies involving the use of the storage space by the User except as such controversies may affect the operations of the Project by the Government.

ARTICLE 3 - Operation and Maintenance. The Government shall operate and maintain the Project and the User shall pay to the Government a share of the costs of such operation and maintenance as provided in Article 5. The User shall be responsible for operation and maintenance of all installations and facilities which it may construct for the diversion or withdrawal of water, and shall bear all costs of construction, operation and maintenance of such installations and facilities.

ARTICLE 4 - Measurement of Withdrawals and Releases. The User agrees to furnish and install, without cost to the Government, suitable meters or measuring devices satisfactory to the District Engineer for the measurement of water which is withdrawn from the Project by any means other than through the Project outlet works. The User shall furnish to the Government monthly statements of all such withdrawals. Prior to the construction of any facilities for withdrawal of water from the Project, the User will obtain the District Engineer's approval of the design, location and installation of the facilities including the meters or measuring devices. Such devices shall be available for inspection by Government representatives at all reasonable times. Releases from the water supply storage space through the Project outlet works shall be made in accordance with written schedules furnished by the User and approved by the District Engineer and shall be subject to Article 1c. The measure of all such releases shall be by means of a rating curve of the outlet works, or by such other suitable means as may be agreed upon prior to use of the water supply storage space.

ARTICLE 5 - Payments. In consideration of the right to utilize the aforesaid storage space [and the water supply conduit] in the Project for municipal and industrial water supply purposes, the User shall pay the following sums to the Government:

(a) Project Investment Costs.

(1) The User shall repay to the Government, at the times and with interest on the unpaid balance as hereinafter specified, the amounts stated below which, as shown in Exhibit "B" attached to and made a part of this agreement, constitute the entire actual amount of costs allocated to the water storage right acquired by the User under this contract. The amount of costs is based on [revenues foregone] [benefits foregone] [replacement cost] [updated cost of storage] [provisions of Section 322 of Public Law 101-640] [(other as appropriate)]. The interest rate to be used for purposes of computing interest on the unpaid balance will be the yield rate adjusted at five-year intervals as determined by the Secretary of the Treasury on the basis set forth in Section 932 of the 1986 Water Resources Development Act. For this agreement, the starting interest rate shall be that rate in effect at the time the agreement is approved. For FY 2006, such rate is 4.625 percent. Should the agreement not be signed in FY 2006, the amounts due herein will be adjusted to reflect the application of the appropriate rate.

(2) The cost allocated to the storage space indicated in Article 1b(1) is currently estimated at \$ 2,513,685 on the basis of the costs presented in Exhibit "B". These costs shall be repaid within the life of the Project in not to exceed 30 years from the date of approval of this agreement by the Secretary of the Army. The payments shall be in equal consecutive annual installments, adjusted a 5-year intervals as shown in Exhibit "C". The first payment shall be due and payable within 30 days after the User is notified by the District Engineer of approval of this agreement by the Secretary of the Army. Annual installments thereafter will be due and payable on the anniversary date of the date of notification. Except for the first payment which will be applied solely to the retirement of principal all installments shall include accrued interest on the unpaid balance at the rate provided above. The last annual installment shall be adjusted upward or downward when due to assure repayment of all of the investment costs allocated to the storage within 30 years from the above date.]

(3) The Project construction costs allocated to the storage space indicated in Article 1b(1) as being provided for present demand is currently estimated at \$ -0- , on the basis of the costs presented in Exhibit "B". The costs shall be repaid during the period of construction in the following manner. The last payment shall be adjusted upward or downward as appropriate to assure repayment of all

the construction cost allocated to the Users storage right during the period of construction.

b. Repair, Rehabilitation, and Replacement Costs. The User will be required to pay 100 percent of the cost of any repair, rehabilitation, or replacement of specific water supply facilities. In addition, the User will be required to pay 1.13 percent of the cost of joint-use repair, rehabilitation, or replacement of Project features. Payment of these costs shall be made either incrementally during construction or in lump sum (including interest during construction) upon completion of construction.

c. Annual Operation and Maintenance (O&M) Expense.

(1) Present Use Storage. The User will be required to pay 100 percent of the annual O&M expense of specific water supply facilities. In addition, the User will be required to pay 1.13 percent of the annual experienced joint-use O&M expense of the Project.

(2) Payment. Payments for O&M expense are due and payable in advance on the date for payment of Project investment costs as set forth in Article 5a(2) and shall be based on O&M expense for the Project in the Government fiscal year most recently ended. The amount of each annual payment will be the actual experienced O&M expense specific plus allocated joint-use for the preceding fiscal year or an estimate thereof when actual expense information is not available. Should future increment usage during the ten-year interest-free period commence on other than the anniversary date of present usage, O&M expense for that portion of a year would be prorated by months in use prior to said anniversary date on the basis of the actual experienced joint-use O&M expense for the preceding Government fiscal year. The first payment, in such a case, shall be due and payable within 30 days from the date of scheduled first use of storage space. Subsequent annual payments shall be made on the date for payment of project investment costs as set forth in Article 5a(2).

d. Prepayment. The User shall have the right at any time to prepay the indebtedness under this Article, subject to redetermination of costs as provided for in Article 6, in whole or in part, with accrued interest thereon to the date of such prepayment.

e. Delinquent Payments. If the User shall fail to make any of the aforesaid payments when due, then the overdue payments shall bear interest compounded annually until paid. The interest rate to be used for overdue payments due under the provisions of Articles 5a, 5b, 5c and 5d above shall be that determined by the Department of Treasury's Treasury Fiscal Requirements Manual (1 TFRM 6-8000, "Cash Management"). The amount charged on payments overdue for a period of less than one year shall be figured on a monthly basis. For example, if the payment is made within the first month after being overdue after a 15-day grace period from the anniversary date of the date of notification, one month's interest shall be charged. Thereafter a month's interest will be charged for any portion of each succeeding month that the payment is delinquent. This provision shall not be construed as giving the User a choice of either making payments when due or paying interest, nor shall it be construed as waiving any other rights of the Government, at law or in equity, which might result from any default by the User.

ARTICLE 6 - Duration of Agreement. This agreement shall become effective when approved by the Secretary of the Army or his duly authorized representative and shall continue in full force and effect for the life of the Project.

ARTICLE 7 - Permanent Rights to Storage. Upon completion of payments by the User, as provided in Article 5a herein, the User shall have a

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permanent right, under the provisions of the Act of 16 October 1963 (Public Law 88-140, 43 U.S.C. 390e), to the use of the water supply storage space in the Project as provided in Article 1, subject to the following:

a. The User shall continue payment of annual operation and maintenance costs allocated to water supply.

b. The User shall bear the costs allocated to water supply of any necessary reconstruction, rehabilitation, or replacement of Project features which may be required to continue satisfactory operation of the Project. Such costs will be established by the District Engineer and repayment arrangements shall be in writing in accordance with the terms and conditions set forth in Article 5b for reconstruction, rehabilitation, and replacement costs, and be made a part of this agreement.

c. Upon completion of payments by the User as provided in Article 5a, the District Engineer shall redetermine the storage space for municipal and industrial water supply in accordance with the provisions of Article 1e. Such redetermination of reservoir storage capacity may be further adjusted from time to time as the result of sedimentation resurveys to reflect actual rates of sedimentation and the exhibit revised to show the revised storage space allocated to municipal and industrial water supply.

d. The permanent rights of the User under this agreement shall be continued so long as the Government continues to operate the Project. In the event the Government no longer operates the Project, such rights may be continued subject to the execution of a separate agreement or additional supplemental agreement providing for:

(1) Continued operation by the User of such part of the facility as is necessary for utilization of the water supply storage space allocated to it;

(2) Terms which will protect the public interest; and,

(3) Effective absolvment of the Government by the User from all liability in connection with such continued operation.

ARTICLE 8 - Release of Claims. The User shall hold and save the Government, including its officers, agents and employees harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of the storage in the Project, or withdrawal or release of water from the Project, made or ordered by the User or as a result of the construction, operation, or maintenance of the water supply facilities and appurtenances thereto owned and operated by the User except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE 9 - Transfers and Assignments.

a. The User shall not transfer or assign this agreement nor any rights acquired thereunder, nor suballot said water supply storage space or any part thereof, nor grant any interest, privilege or license whatsoever in connection with this agreement, without the approval of the Secretary of the Army, or his duly authorized representative provided that, unless contrary to the public interest, this restriction shall not be construed to apply to any water that may be obtained from the water supply storage space by the User and furnished to any third party or parties, nor any method of allocation thereof.

b. Regarding approval of assignments, references to restriction of assignments shall not apply to any transfer or assignment to the Rural Economic Community Development (RECD, formerly Farmers Home

Administration) or its successor agency, or nominee, given in connection with the pledging of this water storage agreement as security for any loans or arising out of the foreclosure or liquidation of said loans. The User will notify the Corps in writing 15 days prior to applying for a RECD loan. A copy of the final loan instrument will be furnished to the Corps for their record.

ARTICLE 10 - Officials Not to Benefit. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

ARTICLE 11 - Covenant Against Contingent Fees. The User warrants that no person or selling agency has been employed or retained to solicit or secure this agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the User for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this agreement without liability or in its discretion to add to the price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 12 - Environmental Quality. During any construction, operation, and maintenance by User of any facilities, specific actions will be taken to control environmental pollution which could result from such activity and to comply with applicable Federal, State, and local laws and regulations concerning environmental pollution. Particular attention should be given to:

- a. Reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases, and of smoke from temporary heaters;
- b. Reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion;
- c. Minimization of noise levels;
- d. On-site and off-site disposal of waste and spoil; and,
- e. Prevention of landscape defacement and damage.

ARTICLE 13 - Federal and State Laws.

a. Compliance. In acting under its rights and obligations hereunder, the User agrees to comply with all applicable Federal and State laws and regulations, including but not limited to the provisions of the Davis-Bacon Act (40 U.S.C. 276a et seq.); the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333); Title 29, Code of Federal Regulations, Part 3; and Sections 210 and 305 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646).

b. Civil Rights Act. The User furnishes, as part of this agreement, an assurance (Exhibit D) that it will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 241, 42 U.S.C. 2000d, et seq.) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations.

c. Regulatory Program. Any discharges of water or pollutants into a navigable stream or tributary thereof resulting from the User's facilities and operations undertaken under this agreement shall be

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performed only in accordance with applicable Federal, State, and local laws and regulations.

d. Lobbying Activities. The User furnishes, as part of this agreement, a certification (Exhibit E and if applicable, a Disclosure of Lobbying Activities) that it will comply with Title 31 U.S.C. Section 1352 of the limitation on use of appropriated funds to influence certain Federal contracting and financial transactions (Public Law 101-121, October 23, 1989) and Federal Acquisition Regulation 52.203-12 issued pursuant thereto.

ARTICLE 14 - Definitions. (Delete those inappropriate)

a. Project investment costs. The initial cost of the Project, including: land acquisition; construction; interest during construction on the value of land, labor, and materials used for planning and construction of the Project.

b. Interest Payments.

(1). Interest during construction. An amount of interest which accrues on expenditures for the establishment of Project services during the period between the actual outlay and the time the Project is first made available for water storage.

(2). Interest on the Unpaid Balance. An amount of interest which is computed on the unpaid balance in the amortization schedule. When payments are made in "lump sum," there is no amortization schedule and therefore, no "interest on the unpaid balance."

(3). Accrued Interest. An amount of interest compounded following the end of the 10-year interest free period until payments begin to be made. If payments are made in "lump sum" following completion of construction, "accrued Interest" will be applicable.

c. Specific costs. The costs of Project features normally serving only one particular Project purpose.

d. Joint-use costs. The costs of features used for any two or more Project purposes.

e. Plant-in-service date. This date is the date that the Project is physically available to initiate deliberate impoundment for water supply purposes.

f. Annual operation and maintenance (O&M) expense. Annual expenses funded under the O&M, General account. These expenses include the daily Project O&M costs as well as those O&M costs which are not capitalized.

g. Repair, rehabilitation and replacement. Costs funded in part under the Operation and Maintenance, General, or Construction, General accounts but not associated with initial Project investment costs. Such expenditures are for costly, infrequent work and are intended to ensure continued satisfactory operation of the Project.

h. Fiscal Year. Refers to the Government's fiscal year. This year begins on 1 October and ends on 30 September. The September calendar year corresponds to the fiscal year.

i. Life of the Project. This is the physical life of the Project.

j. District Engineer. Refers to the District Engineer of the District of the United States Army Corps of Engineers, or his/her successor or designee.

ARTICLE 15 - Approval of Agreement. This agreement shall be subject to the written approval of the Secretary of the Army or his duly authorized representative and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first above written.

APPROVED:

THE UNITED STATES OF AMERICA

1/

By _____
Colonel Wally Z. Walters
Commander, Little Rock District

DATE: _____

Steve Morgan, President, MAWA

(Necessary approvals and countersignatures required by State and local law with respect to execution on behalf of the User must be ascertained by the District Engineer and his Counsel and added to the signature block.)

1/ Fill-in Title of appropriate approving government official if other than District Commander. The approving official for HQUSACE is the Director of Civil Works.

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EXHIBIT-A
CERTIFICATION

I _____, Attorney for the _____,
have reviewed the foregoing agreement executed by _____,
and as principal legal officer of/for the _____ certify
that [I have considered the legal effect of Section 221 of the 1970
Flood Control Act (Public Law 91-611) and find that] _____ is
legally and financially capable of entering into the contractual
obligations contained in the foregoing agreement and that, upon
acceptance, it will be legally enforceable.

Given under my hand, this _____ day of _____ 19__.

Attorney for the _____

EXHIBIT B COST COMPUTATIONS

I - LAKE STORAGE

<u>Feature</u>	<u>Elevation</u> (ft., NGVD)	<u>Usable</u> <u>Storage*</u> (ac. ft.)	<u>Percent of</u>	
			<u>Conservation</u> <u>Storage</u>	<u>Water</u> <u>Supply</u> <u>Storage</u>
Flood control	461.00 - 487.00	934,000		
Conservation	435.00 - 461.00	716,500	100.00	
Water Supply	_____ - _____	(_____)	_____	100.00
User		(_____)	_____	_____
Present		(_____)	_____	_____
Future		(_____)	_____	_____
Others		(_____)	_____	_____
Other purposes	<435.00 - 435.00	_____	_____	_____
Other purposes	_____ - _____	_____	_____	_____
		1,194.000		

Total

*Storage remaining after 100 years of sedimentation from the date the project is operational.

II - ALLOCATION OF ESTIMATED CONSTRUCTION COST

<u>Feature</u>	<u>Cost (\$)</u>	<u>Percent of</u>
		<u>Project Joint-</u> <u>Use Construction</u> <u>Cost</u>
Flood control	_____	
Specific	(_____)	
Joint-use	(_____)	
Recreation		
Specific	18,501,000	
Joint-use	47,623,097	21.6
Water Supply		
Specific	(_____)	
Joint-use	(_____)	
Other Purposes		
Specific	66,931,000	
Joint-use	172,285,904	78.4
Road Betterments (specific)	_____	
Cultural Resources (specific)	_____	
Total	305,341,000	100.00

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EXHIBIT B (CONT)

III - INVESTMENT COSTS TO BE REPAYED BY USER FOR WATER
SUPPLY STORAGE

Present Use: 1/

Cost of <u>18,730</u> acre-feet of water	= <u>\$2,513,685</u>
Cost of specific facilities	= <u> -0- </u>
Subtotal	= <u>\$2,513,685</u>
Total investment present use	<u>\$2,513,685</u>

Notes:

1/ If appropriate, add to present use costs, the cost of interest due to the lapse of the 10-year interest free period.

EXHIBIT B (CONT)

IV - TOTAL ANNUAL COST TO USER FOR PRESENT USE OF WATER
SUPPLY STORAGE

Interest and amortization

\$2,513,685 based on 30 payments,
with interest at 4.625 % . = \$149,674

Operation and maintenance^{1/}

Joint-use [actual for FY05]
1.13%^{2/} X \$1,816,733 = \$20,616

TOTAL ESTIMATED ANNUAL COST \$170,290

Notes:

^{1/} Payment due and payable on the date specified in Article 5(a)(2).

^{2/} Percent of Project joint-use operation and maintenance cost allocated to water supply.

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EXHIBIT C
 AMORTIZATION SCHEDULE
 PRESENT DEMAND 1/

Payment Intervals Per Year:	1
Total	30
Present Value of Cost:	\$ 2,513,685
Interest Rate: <u>2</u> /	4.6250%

	Payment	Interest	Principle	Balance
1	\$ 149,674	\$ -	\$ 149,674	\$ 2,364,011
2	149,674	109,336	40,338	2,323,673
3	149,674	107,470	42,204	2,281,469
4	149,674	105,518	44,156	2,237,313
5	149,674	103,476	46,198	2,191,115
6	149,674	101,339	48,335	2,142,781
7	149,674	99,104	50,570	2,092,210
8	149,674	96,765	52,909	2,039,301
9	149,674	94,318	55,356	1,983,945
10	149,674	91,757	57,916	1,926,029
11	149,674	89,079	60,595	1,865,434
12	149,674	86,276	63,397	1,802,037
13	149,674	83,344	66,330	1,735,707
14	149,674	80,276	69,397	1,666,310
15	149,674	77,067	72,607	1,593,703
16	149,674	73,709	75,965	1,517,738
17	149,674	70,195	79,478	1,438,259
18	149,674	66,519	83,154	1,355,105
19	149,674	62,674	87,000	1,268,105
20	149,674	58,650	91,024	1,177,081
21	149,674	54,440	95,234	1,081,847
22	149,674	50,035	99,638	982,209
23	149,674	45,427	104,247	877,962
24	149,674	40,606	109,068	768,894
25	149,674	35,561	114,112	654,782
26	149,674	30,284	119,390	535,392
27	149,674	24,762	124,912	410,480
28	149,674	18,985	130,689	279,791
29	149,674	12,940	136,733	143,057
30	149,674	6,616	143,057	(0)
		\$ 1,976,528	\$ 2,513,685	

Notes:

1/ This 30 year amortization schedule is applicable to:

- a. Those projects not operational or under construction as of

17 November 1986 which will be repaid over time in lieu of during construction; and

b. All reallocations.

2/ In accordance with Section 932 of the Water Resources Development Act of 1986, this interest rate will be adjusted at five year intervals throughout the repayment period. The rate is the yield rate as determined by the Secretary of the Treasury plus $1/8$ %.

3/ The last (30th) payment will be adjusted upward or downward to assure all costs are repaid within 30 years of approval of the agreement.

WATER STORAGE AGREEMENT
BETWEEN THE UNITED STATES OF AMERICA
AND
THE MID ARKANSAS WATER ALLIANCE
FOR
WATER STORAGE SPACE IN LAKE OUACHITA, ARKANSAS

THIS AGREEMENT, entered into this ____ day of _____, 19____, by and between THE UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the District Engineer executing this agreement, and The Mid Arkansas Water Alliance (hereinafter called the "User");

WITNESSETH THAT:

WHEREAS, the **Flood Control Act of 1938 (Public Law 534, 78th Congress), authorized the construction, operation, and maintenance of the Blakely Mountain Dam*** on the Ouachita, (hereinafter called the "Project"); and

WHEREAS, the User desires to enter into an agreement with the Government for the use of storage included in the Project for municipal and industrial water supply, and for payment of the cost thereof in accordance with the provisions of the Water Supply Act of 1958, as amended (43 U.S.C. 390b-f); and

WHEREAS, the User as shown in Exhibit "A: attached to and made a part of this agreement, is empowered to enter into an agreement with the Government and is vested with all necessary powers of accomplishment of the purposes of this agreement, [including those required by Section 221 of the Flood Control Act of 1970 (42 U.S.C. 1962d-5d) (as amended);]

WHEREAS, provided as Exhibit "_": attached to and made a part of this agreement, is a reallocation report entitled " Reallocation of Storage at Greers Ferry Lake and Lake Ouachita, Arkansas for the Mid Arkansas Water Alliance," dated: August 2006, which provides information pertinent to the reallocation of storage space in the Project for use by the User;

NOW, THEREFORE, the Government and the User agree as follows:

ARTICLE 1 - Water Storage Space.

a. Project Construction. The Government, subject to the directions of Federal law and any limitations imposed thereby, shall modify the Project so as to include therein space for the storage of water by the User.

b. Rights of User.

(1) The User shall have the right to utilize an undivided 1.75 percent (estimated to contain 33,303 acre-feet after adjustment for sediment deposits) of the usable storage space in the Project between elevations 578.0 feet and 578.98 feet above National Geodetic Vertical Datum, which usable conservation storage space is estimated to contain acre-feet after adjustment for sediment deposits. This storage space is to be used to impound water for present demand or need for municipal and industrial water supply.

(2) The User shall have the right to withdraw water from the lake, or to request releases to be made by the Government through the outlet works in the Dam, subject to the provisions of Article 1c and to the extent the aforesaid storage space will provide; and shall have the

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right to construct all such works, plants, pipelines, and appurtenances as may be necessary and convenient for the purpose of diversion or withdrawals, subject to the approval of the District Engineer as to design and location. The grant of an easement for right-of-way, across, in and upon land of the Government at the Project shall be by a separate instrument in a form satisfactory to the Secretary of the Army, without additional cost to the User, under the authority of and in accordance with the provisions of 10 U.S.C. 2669 and such other authorities as may be necessary. Subject to the conditions of such easement, the User shall have the right to use so much of the Project land as may reasonably be required in the exercise of the rights and privileges granted under this agreement.

c. Rights Reserved. The Government reserves the right to control and use all storage in the project in accordance with authorized Project purposes. The Government further reserves the right to take such measures as may be necessary in the operation of the Project to preserve life and/or property, including the right not to make downstream releases during such periods of time as are deemed necessary, in its sole discretion, to inspect, maintain, or repair the Project.

d. Quality or Availability of Water. The User recognizes that this agreement provides storage space for raw water only. The Government makes no representations with respect to the quality or availability of water and assumes no responsibility therefor, or for the treatment of the water.

e. Sedimentation Surveys.

(1) Sedimentation surveys will be made by the District Engineer during the term of this agreement at intervals not to exceed fifteen (15) years unless the District Engineer determines that such surveys are unnecessary. When, in the opinion of the District Engineer, the findings of such survey indicate any Project purpose will be affected by unanticipated sedimentation distribution, there shall be an equitable redistribution of the sediment reserve storage space among the purposes served by the Project including municipal and industrial water supply. The total available remaining storage space in the Project will then be divided among the various Project features in the same ratio as was initially utilized. Adjusted pool elevations will be rounded to the nearest one-half foot. Such findings and the storage space allocated to municipal and industrial water supply shall be defined and described as an exhibit which will be made a part of this agreement and the water control manual will be modified accordingly.

(2) The Government assumes no responsibility for deviations from estimated rates of sedimentation, or the distribution thereof. Such deviations may cause unequal distribution of sediment reserve storage greater than estimated, and/or encroachment on the total storage at the Project.

ARTICLE 2 - Regulation of and Right to Use of Water. The regulation of the use of water withdrawn or released from the aforesaid storage space shall be the sole responsibility of the User. The User has the full responsibility to acquire in accordance with State laws and regulations, and, if necessary, to establish or defend, any and all water rights needed for utilization of the storage provided under this agreement. The Government shall not be responsible for diversions by others, nor will it become a party to any controversies involving the use of the storage space by the User except as such controversies may affect the operations of the Project by the Government.

ARTICLE 3 - Operation and Maintenance. The Government shall operate and maintain the Project and the User shall pay to the Government a share of the costs of such operation and maintenance as provided in Article 5. The User shall be responsible for operation and maintenance of all installations and facilities which it may construct for the diversion or withdrawal of water, and shall bear all costs of construction, operation and maintenance of such installations and facilities.

ARTICLE 4 - Measurement of Withdrawals and Releases. The User agrees to furnish and install, without cost to the Government, suitable meters or measuring devices satisfactory to the District Engineer for the measurement of water which is withdrawn from the Project by any means other than through the Project outlet works. The User shall furnish to the Government monthly statements of all such withdrawals. Prior to the construction of any facilities for withdrawal of water from the Project, the User will obtain the District Engineer's approval of the design, location and installation of the facilities including the meters or measuring devices. Such devices shall be available for inspection by Government representatives at all reasonable times. Releases from the water supply storage space through the Project outlet works shall be made in accordance with written schedules furnished by the User and approved by the District Engineer and shall be subject to Article 1c. The measure of all such releases shall be by means of a rating curve of the outlet works, or by such other suitable means as may be agreed upon prior to use of the water supply storage space.

ARTICLE 5 - Payments. In consideration of the right to utilize the aforesaid storage space [and the water supply conduit] in the Project for municipal and industrial water supply purposes, the User shall pay the following sums to the Government:

a. Project Investment Costs.

(1) The User shall repay to the Government, at the times and with interest on the unpaid balance as hereinafter specified, the amounts stated below which, as shown in Exhibit "B" attached to and made a part of this agreement, constitute the entire actual amount of costs allocated to the water storage right acquired by the User under this contract. The amount of costs is based on [revenues foregone] [benefits foregone] [replacement cost] [updated cost of storage] [provisions of Section 322 of Public Law 101-640] [(other as appropriate)]. The interest rate to be used for purposes of computing interest on the unpaid balance will be the yield rate adjusted at five-year intervals as determined by the Secretary of the Treasury on the basis set forth in Section 932 of the 1986 Water Resources Development Act. For this agreement, the starting interest rate shall be that rate in effect at the time the agreement is approved. For FY 2006, such rate is 4.625 percent. Should the agreement not be signed in FY 2006, the amounts due herein will be adjusted to reflect the application of the appropriate rate.

(2) The cost allocated to the storage space indicated in Article 1b(1) is currently estimated at \$ 4,324,167 on the basis of the costs presented in Exhibit "B". These costs shall be repaid within the life of the Project in not to exceed 30 years from the date of approval of this agreement by the Secretary of the Army. The payments shall be in equal consecutive annual installments, adjusted a 5-year intervals as shown in Exhibit "C". The first payment shall be due and payable within 30 days after the User is notified by the District Engineer of approval of this agreement by the Secretary of the Army. Annual installments thereafter will be due and payable on the anniversary date of the date of notification. Except for the first payment which will be applied solely to the retirement of principal all installments shall include accrued interest on the unpaid balance at the rate provided above. The last annual installment shall be adjusted upward or downward when due to assure repayment of all of the investment costs allocated to the storage within 30 years from the above date.]

(3) The Project construction costs allocated to the storage space indicated in Article 1b(1) as being provided for present demand [and the water supply conduit] is currently estimated at \$_____-0-_____, on the basis of the costs presented in Exhibit "B". The costs shall be repaid during the period of construction in the following manner. The last payment shall be adjusted upward or downward as appropriate to assure repayment of all the construction cost allocated to the Users storage right during the period of construction.

b. Repair, Rehabilitation, and Replacement Costs. The User will be required to pay 100 percent of the cost of any repair, rehabilitation, or replacement of specific water supply facilities. In addition, the User will be required to pay 1.75 percent of the cost of joint-use repair, rehabilitation, or replacement of Project features. Payment of these costs shall be made either incrementally during construction or in lump sum (including interest during construction) upon completion of construction.

c. Annual Operation and Maintenance (O&M) Expense.

(1) Present Use Storage. The User will be required to pay 100 percent of the annual O&M expense of specific water supply facilities. In addition, the User will be required to pay 1.75 percent of the annual experienced joint-use O&M expense of the Project.

(2) Payment. Payments for O&M expense are due and payable in advance on the date for payment of Project investment costs as set forth in Article 5a(2) and shall be based on O&M expense for the Project in the Government fiscal year most recently ended. The amount of each annual payment will be the actual experienced O&M expense specific plus allocated joint-use for the preceding fiscal year or an estimate thereof when actual expense information is not available. Should future increment usage during the ten-year interest-free period commence on other than the anniversary date of present usage, O&M expense for that portion of a year would be prorated by months in use prior to said anniversary date on the basis of the actual experienced joint-use O&M expense for the preceding Government fiscal year. The first payment, in such a case, shall be due and payable within 30 days from the date of scheduled first use of storage space. Subsequent annual payments shall be made on the date for payment of project investment costs as set forth in Article 5a(2).

d. Prepayment. The User shall have the right at any time to prepay the indebtedness under this Article, subject to redetermination of costs as provided for in Article 6, in whole or in part, with accrued interest thereon to the date of such prepayment.

e. Delinquent Payments. If the User shall fail to make any of the aforesaid payments when due, then the overdue payments shall bear interest compounded annually until paid. The interest rate to be used for overdue payments due under the provisions of Articles 5a, 5b, 5c and 5d above shall be that determined by the Department of Treasury's Treasury Fiscal Requirements Manual (1 TFRM 6-8000, "Cash Management"). The amount charged on payments overdue for a period of less than one year shall be figured on a monthly basis. For example, if the payment is made within the first month after being overdue after a 15-day grace period from the anniversary date of the date of notification, one month's interest shall be charged. Thereafter a month's interest will be charged for any portion of each succeeding month that the payment is delinquent. This provision shall not be construed as giving the User a choice of either making payments when due or paying interest, nor shall it be construed as waiving any other rights of the Government, at law or in equity, which might result from any default by the User.

ARTICLE 6 - Duration of Agreement. This agreement shall become effective when approved by the Secretary of the Army or his duly authorized representative and shall continue in full force and effect for the life of the Project.

ARTICLE 7 - Permanent Rights to Storage. Upon completion of payments by the User, as provided in Article 5a herein, the User shall have a permanent right, under the provisions of the Act of 16 October 1963 (Public Law 88-140, 43 U.S.C. 390e), to the use of the water supply

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storage space in the Project as provided in Article 1, subject to the following:

- a. The User shall continue payment of annual operation and maintenance costs allocated to water supply.
- b. The User shall bear the costs allocated to water supply of any necessary reconstruction, rehabilitation, or replacement of Project features which may be required to continue satisfactory operation of the Project. Such costs will be established by the District Engineer and repayment arrangements shall be in writing in accordance with the terms and conditions set forth in Article 5b for reconstruction, rehabilitation, and replacement costs, and be made a part of this agreement.
- c. Upon completion of payments by the User as provided in Article 5a, the District Engineer shall redetermine the storage space for municipal and industrial water supply in accordance with the provisions of Article 1e. Such redetermination of reservoir storage capacity may be further adjusted from time to time as the result of sedimentation resurveys to reflect actual rates of sedimentation and the exhibit revised to show the revised storage space allocated to municipal and industrial water supply.
- d. The permanent rights of the User under this agreement shall be continued so long as the Government continues to operate the Project. In the event the Government no longer operates the Project, such rights may be continued subject to the execution of a separate agreement or additional supplemental agreement providing for:

- (1) Continued operation by the User of such part of the facility as is necessary for utilization of the water supply storage space allocated to it;
- (2) Terms which will protect the public interest; and,
- (3) Effective absolvment of the Government by the User from all liability in connection with such continued operation.

ARTICLE 8 - Release of Claims. The User shall hold and save the Government, including its officers, agents and employees harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of the storage in the Project, or withdrawal or release of water from the Project, made or ordered by the User or as a result of the construction, operation, or maintenance of the water supply facilities and appurtenances thereto owned and operated by the User except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE 9 - Transfers and Assignments.

- a. The User shall not transfer or assign this agreement nor any rights acquired thereunder, nor suballot said water supply storage space or any part thereof, nor grant any interest, privilege or license whatsoever in connection with this agreement, without the approval of the Secretary of the Army, or his duly authorized representative provided that, unless contrary to the public interest, this restriction shall not be construed to apply to any water that may be obtained from the water supply storage space by the User and furnished to any third party or parties, nor any method of allocation thereof.
- b. Regarding approval of assignments, references to restriction of assignments shall not apply to any transfer or assignment to the Rural Economic Community Development (RECD, formerly Farmers Home Administration) or its successor agency, or nominee, given in connection with the pledging of this water storage agreement as security for any

loans or arising out of the foreclosure or liquidation of said loans. The User will notify the Corps in writing 15 days prior to applying for a RECD loan. A copy of the final loan instrument will be furnished to the Corps for their record.

ARTICLE 10 - Officials Not to Benefit. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

ARTICLE 11 - Covenant Against Contingent Fees. The User warrants that no person or selling agency has been employed or retained to solicit or secure this agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the User for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this agreement without liability or in its discretion to add to the price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 12 - Environmental Quality. During any construction, operation, and maintenance by User of any facilities, specific actions will be taken to control environmental pollution which could result from such activity and to comply with applicable Federal, State, and local laws and regulations concerning environmental pollution. Particular attention should be given to:

- a. Reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases, and of smoke from temporary heaters;
- b. Reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion;
- c. Minimization of noise levels;
- d. On-site and off-site disposal of waste and spoil; and,
- e. Prevention of landscape defacement and damage.

ARTICLE 13 - Federal and State Laws.

a. Compliance. In acting under its rights and obligations hereunder, the User agrees to comply with all applicable Federal and State laws and regulations, including but not limited to the provisions of the Davis-Bacon Act (40 U.S.C. 276a et seq.); the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333); Title 29, Code of Federal Regulations, Part 3; and Sections 210 and 305 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646).

b. Civil Rights Act. The User furnishes, as part of this agreement, an assurance (Exhibit D) that it will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 241, 42 U.S.C. 2000d, et seq.) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations.

c. Regulatory Program. Any discharges of water or pollutants into a navigable stream or tributary thereof resulting from the User's facilities and operations undertaken under this agreement shall be performed only in accordance with applicable Federal, State, and local laws and regulations.

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d. Lobbying Activities. The User furnishes, as part of this agreement, a certification (Exhibit E and if applicable, a Disclosure of Lobbying Activities) that it will comply with Title 31 U.S.C. Section 1352 of the limitation on use of appropriated funds to influence certain Federal contracting and financial transactions (Public Law 101-121, October 23, 1989) and Federal Acquisition Regulation 52.203-12 issued pursuant thereto.

ARTICLE 14 - Definitions. (Delete those inappropriate)

a. Project investment costs. The initial cost of the Project, including: land acquisition; construction; interest during construction on the value of land, labor, and materials used for planning and construction of the Project.

b. Interest Payments.

(1). Interest during construction. An amount of interest which accrues on expenditures for the establishment of Project services during the period between the actual outlay and the time the Project is first made available for water storage.

(2). Interest on the Unpaid Balance. An amount of interest which is computed on the unpaid balance in the amortization schedule. When payments are made in "lump sum," there is no amortization schedule and therefore, no "interest on the unpaid balance."

(3). Accrued Interest. An amount of interest compounded following the end of the 10-year interest free period until payments begin to be made. If payments are made in "lump sum" following completion of construction, "accrued Interest" will be applicable.

c. Specific costs. The costs of Project features normally serving only one particular Project purpose.

d. Joint-use costs. The costs of features used for any two or more Project purposes.

e. Plant-in-service date. This date is the date that the Project is physically available to initiate deliberate impoundment for water supply purposes.

f. Annual operation and maintenance (O&M) expense. Annual expenses funded under the O&M, General account. These expenses include the daily Project O&M costs as well as those O&M costs which are not capitalized.

g. Repair, rehabilitation and replacement. Costs funded in part under the Operation and Maintenance, General, or Construction, General accounts but not associated with initial Project investment costs. Such expenditures are for costly, infrequent work and are intended to ensure continued satisfactory operation of the Project.

h. Fiscal Year. Refers to the Government's fiscal year. This year begins on 1 October and ends on 30 September. The September calendar year corresponds to the fiscal year.

i. Life of the Project. This is the physical life of the Project.

j. District Engineer. Refers to the District Engineer of the District of the United States Army Corps of Engineers, or his/her successor or designee.

ARTICLE 15 - Approval of Agreement. This agreement shall be subject to the written approval of the Secretary of the Army or his duly authorized representative and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first above written.

APPROVED:

THE UNITED STATES OF AMERICA

1/

By _____
(District Engineer)

DATE: _____

[Insert name of User]

By

[Title]

(Necessary approvals and countersignatures required by State and local law with respect to execution on behalf of the User must be ascertained by the District Engineer and his Counsel and added to the signature block.)

1/ Fill-in Title of appropriate approving government official if other than District Commander. The approving official for HQUSACE is the Director of Civil Works.

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EXHIBIT-A
CERTIFICATION

I _____, Attorney for the _____,
have reviewed the foregoing agreement executed by _____,
and as principal legal officer of/for the _____ certify
that [I have considered the legal effect of Section 221 of the 1970
Flood Control Act (Public Law 91-611) and find that] _____ is
legally and financially capable of entering into the contractual
obligations contained in the foregoing agreement and that, upon
acceptance, it will be legally enforceable.

Given under my hand, this _____ day of _____ 19__.

Attorney for the _____

EXHIBIT B COST COMPUTATIONS

I - LAKE STORAGE

<u>Feature</u>	<u>Elevation</u> (ft., NGVD)	<u>Usable</u> <u>Storage*</u> (ac. ft.)	<u>Percent of</u>	
			<u>Conservation</u> <u>Storage</u>	<u>Water</u> <u>Supply</u> <u>Storage</u>
Flood control	<u>578.0</u> - <u>592.0</u>	617,000		
Conservation	<u>535.0</u> - <u>578.0</u>	<u>1,286,000</u>	100.00	
Water Supply	_____ - _____	(_____)	_____	100.00
User		(_____)	_____	_____
Present		(_____)	_____	_____
Future		(_____)	_____	_____
Others		(_____)	_____	_____
Other purposes	< <u>535.0</u> - <u>535.0</u>	865,000	_____	_____
Other purposes	_____ - _____	_____	_____	_____

Total 2,768,000

*Storage remaining after 100 years of sedimentation from the date the project is operational.

II - ALLOCATION OF ESTIMATED CONSTRUCTION COST

<u>Feature</u>	<u>Cost (\$)</u>	<u>Percent of</u> <u>Project Joint-</u> <u>Use Construction</u> <u>Cost</u>
Flood control		
Specific	<u>28,128,000</u>	
Joint-use	19,741,000	<u>18</u>
Recreation		
Specific	(_____)	
Joint-use	(_____)	<u>82</u>
Water Supply		
Specific	(_____)	
Joint-use	(_____)	_____
Other Purposes		
Specific	129,000,000	
Joint-use	89,933,000	100
Road Betterments (specific)	_____	
Cultural Resources (specific)	_____	
Total	<u>266,802,000</u>	
100.00		

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EXHIBIT B (CONT)

III - INVESTMENT COSTS TO BE REPAYED BY USER FOR WATER
SUPPLY STORAGE

Present Use: 1/

Cost of <u>33,303</u> acre-feet of water	=	\$4,324,167
Cost of specific facilities	=	<u> -0- </u>
Subtotal	=	<u> </u>
Total investment present use		\$4,324,167

Notes:

1/ If appropriate, add to present use costs, the cost of interest due to the lapse of the 10-year interest free period.

EXHIBIT B (CONT)

IV - TOTAL ANNUAL COST TO USER FOR PRESENT USE OF WATER
SUPPLY STORAGE

Interest and amortization

\$4,324,167 factor based on 30 payments,
with interest at 4.625 %. = \$ _____

Operation and maintenance^{1/}

Joint-use [actual for FY05]
1.75%^{2/} X \$554,897 = \$9,711

TOTAL ESTIMATED ANNUAL COST \$ 267,187

Notes:

^{1/} Payment due and payable on the date specified in Article 5(a)(2).

^{2/} Percent of Project joint-use operation and maintenance cost
allocated
to water supply.

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EXHIBIT C
 AMORTIZATION SCHEDULE
 PRESENT DEMAND 1/

Payment Intervals Per Year:	1
Total	30
Present Value of Cost:	\$4,324,167
Interest Rate: 2/	4.6250%

	Payment	Interest	Principle	Balance
1	\$257,476	\$ -	\$ 257,476	\$ 4,066,691
2	257,476	188,084	69,392	3,997,299
3	257,476	184,875	72,601	3,924,698
4	257,476	181,517	75,959	3,848,738
5	257,476	178,004	79,472	3,769,266
6	257,476	174,329	83,148	3,686,119
7	257,476	170,483	86,993	3,599,125
8	257,476	166,460	91,017	3,508,108
9	257,476	162,250	95,226	3,412,882
10	257,476	157,846	99,631	3,313,252
11	257,476	153,238	104,238	3,209,013
12	257,476	148,417	109,059	3,099,954
13	257,476	143,373	114,103	2,985,850
14	257,476	138,096	119,381	2,866,470
15	257,476	132,574	124,902	2,741,567
16	257,476	126,797	130,679	2,610,889
17	257,476	120,754	136,723	2,474,166
18	257,476	114,430	143,046	2,331,120
19	257,476	107,814	149,662	2,181,458
20	257,476	100,892	156,584	2,024,874
21	257,476	93,650	163,826	1,861,048
22	257,476	86,073	171,403	1,689,645
23	257,476	78,146	179,330	1,510,315
24	257,476	69,852	187,624	1,322,691
25	257,476	61,174	196,302	1,126,389
26	257,476	52,095	205,381	921,008
27	257,476	42,597	214,880	706,128
28	257,476	32,658	224,818	481,310
29	257,476	22,261	235,216	246,094
30	257,476	11,382	246,094	(0)
3/		\$ 3,400,123	\$4,324,167	

Notes:

1/ This 30 year amortization schedule is applicable to:

- a. Those projects not operational or under construction as of 17 November 1986 which will be repaid over time in lieu of during construction; and
- b. All reallocations.

2/ In accordance with Section 932 of the Water Resources Development Act of 1986, this interest rate will be adjusted at five year intervals throughout the repayment period. The rate is the yield rate as determined by the Secretary of the Treasury plus 1/8 %.

3/ The last (30th) payment will be adjusted upward or downward to assure all costs are repaid within 30 years of approval of the agreement.

APPENDIX E

**NEPA DOCUMENTATION
ENVIRONMENTAL ASSESSMENT**

(SEE ACCOMPANYING DOCUMENT)