

**Clearwater Dam
Major Rehabilitation Study
Clearwater Lake, Missouri**

DRAFT ENVIRONMENTAL ASSESSMENT

March 2004



**US Army Corps
of Engineers
Little Rock District**

FINDING OF NO SIGNIFICANT IMPACT	2
1.0 INTRODUCTION	4
1.1 Scope and Purpose of the Proposed Action.....	4
1.2 Project Location.....	5
1.3 Environmental Compliance.....	8
1.4 Project Authority and Regulatory Requirements	9
2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES	10
2.1 Alternative 1 (Proposed Action).....	10
2.2 Alternatives to the Proposed Action	10
3.0 AFFECTED ENVIRONMENT	11
3.1 Project Use.....	11
3.2 Climate.....	11
3.3 Topography, Physiography and Soils	11
3.4 Water Resources	12
3.5 Cultural Resources	12
3.6 Biological Resources	12
3.6.1 Vegetation	12
3.6.2 Fish and Wildlife	13
3.6.3 Threatened and Endangered Species	13
3.7 Wetlands	13
3.8 Hazardous, Toxic and Radioactive Waste (HTRW)	13
3.9 Air Quality	13
3.10 Noise.....	13
3.11 Socioeconomics.....	14
4.0 ENVIRONMENTAL CONSEQUENCES	15
4.1 Land use	15
4.2 Topography, Physiography and Soils	15
4.3 Water Resources	15
4.3.1 Hydrologic Information & Operational Procedures.....	15
4.4 Cultural Resources	15
4.5 Biological Resources	16
4.5.1 Vegetation	16
4.5.2 Fish and Wildlife	16
4.5.3 Threatened and Endangered Species	16
4.6 Wetlands	16
4.7 Hazardous, Toxic and Radioactive Waste.....	16
4.8 Air Quality	17
4.9 Noise.....	17
4.10 Socioeconomic	17
4.11 Cumulative Impacts	17
5.0 FINDINGS	20
6.0 List of Preparers	21
7.0 References	21
APPENDIX A. CORRESPONDENCE	22

FINDING OF NO SIGNIFICANT IMPACT

NAME OF PROPOSED ACTION: Clearwater Dam Major Rehabilitation, Clearwater Lake, Piedmont, Missouri.

Project Authority and Regulatory Requirements

Congress originally authorized the Clearwater Dam and Reservoir project for construction in the Flood Control Act of June 1938 (Public Law No. 761, 75th Congress, 3d Session). There will be no need for a discharge into the waters of the U.S. during the course of the proposed action. All work will take place on top of the dam, well above the ordinary high water mark. Thus, under the terms of the Federal Clean Water Act and amendments, this action does not need Section 404 authorization. A National Pollutant Discharge Elimination System (NPDES) permit to discharge storm water during construction will be obtained prior to construction.

DESCRIPTION OF THE PROPOSED ACTION:

A concrete cutoff wall location would be placed in the centerline of the dam alignment. The total depth of the wall would be 230 feet with the same length and thickness. The total length would be about 4,300 feet. Extension of the impervious blanket would not be included. This alternative would detour the traffic that would normally use the segment of Missouri State Highway HH on top of the dam.

PROJECT ALTERNATIVES:

One structural alternative other than the proposed action was considered in detail for this study. Alternative 2 entailed a cement/bentonite slurry wall into bedrock placed 500 feet upstream from the toe of the dam and extending the existing impervious soil blanket to the top of the dam. The No Action alternative was considered and would entail the continued (but not expanded) seepage monitoring.

Other measures were considered during the initial planning phases of this project. These included nonstructural measures such as operating as a dry reservoir, removing the structure, dam breaching during emergencies, expansion of seepage monitoring, and changes to the water control plan. These measures were not considered any further since none met the planning objectives of the study. Some of these measures, such as operating as a dry reservoir or removing the structure, would not be acceptable to the local public.

Another structural measure initially considered early in the process included extending the existing impervious blanket only. This was eliminated since it would only address seepage below the dam, resulting in less benefit than the other measures.

ANTICIPATED ENVIRONMENTAL IMPACTS:

The proposed action would result in the rehabilitation of Clearwater Dam. No direct, indirect, or cumulative significant adverse impacts will occur to any natural resources due to the proposed action. The socioeconomic status of the surrounding area would remain the same.

CONCLUSIONS:

This EA has evaluated the alternatives for a major rehabilitation of Clearwater Dam in southeastern Missouri. In addition, the No Action alternative was also evaluated. There have been no significant negative impacts to the environment identified in this assessment due to any of the alternatives. Following a review of the analysis and evaluation of the alternatives presented in this Environmental Assessment, it has been determined that implementation of the proposed action will not result in any direct, indirect or cumulatively significant adverse impacts. Adverse impacts cannot be considered significant unless they meet the criteria for significance stated in CFR 1500, Sect 1508.27. The No Action alternative would allow the continued decline in the integrity of the dam.

Following a review of the analysis and evaluation of the alternatives presented in this Environmental Assessment, it has been determined that implementation of the proposed action will not result in any direct, indirect or cumulatively significant adverse impacts. Accordingly, the preparation of an Environmental Impact Statement in accordance with the National Environmental Policy Act of 1969 is not required. Consultation with regulatory agencies will be ongoing to ensure compliance with all federal, state, regional, and local regulations and guidelines.

It is determined that the project complies with the Section 404(b)(1) Guidelines and will not be contrary to the public interest, and the District Engineer's decision is to proceed with the work.

Date

BENJAMIN H. BUTLER
Colonel, US Army
District Engineer

ENVIRONMENTAL ASSESSMENT
Clearwater Dam Rehabilitation Study
Clearwater Lake, Missouri

1.0 INTRODUCTION

This Environment Assessment (EA) has been prepared pursuant to the implementing regulations to the National Environment Policy Act (NEPA), which require federal agencies to assess the environment impacts of a proposed action to determine whether the action requires the preparation of an Environmental Impact Statement (EIS) or if a Finding of No Significant Impact (FONSI) can be issued. NEPA requires that an EA provide an interdisciplinary review of the proposed action in order to identify possible, preferable alternatives and to identify mitigative measures that will prevent environmental impacts. If it is determined that the proposed action will have unavoidable significant environmental impacts, then an EIS should be prepared.

The Little Rock District, U.S. Army Corps of Engineers has prepared this EA in accordance with its regulations found in 33 CFR Part 230 (Procedures For Implementing NEPA). The Little Rock District has initiated a Major Rehabilitation Study on Clearwater Dam, Clearwater Lake near Piedmont, Missouri. The focus of this study is on a seepage issue that has plagued the structure for years. This Environmental Assessment (EA) examines the potential environmental impacts of dam rehabilitation.

Dam rehabilitation is defined in Engineer Pamphlet 1130-2-500 as consisting of one or both of two mutually exclusive categories: Reliability or Efficiency improvement. This study is focused on the Reliability of Clearwater Dam. According to this guidance, "Rehabilitation is major project feature restoration consisting of structural work on a Corps operated and maintained facility such as a lock, dam, hydropower plant, etc., intended to improve reliability of an existing structure, the result of which will be a deferral of capital expenditures to replace the structure" (Department of the Army 1996: 3-1).

1.1 Scope and Purpose of the Proposed Action

The purpose of the proposed project is to eliminate the seepage problem at Clearwater dam. The need for rehabilitation of Clearwater dam has been evident for years. The seepage problem at Clearwater Dam was detected and became pronounced as early as 1950 shortly after impoundment. Several modifications have been made to control seepage, including temporary changes to the operation and management of the lake and construction of a seepage berm in 1989. However, seepage problems have continued that may be affecting the long-term structural integrity of the dam. Since the embankment is constructed on highly porous rock it is possible that considerable movement of material is occurring beneath the structure without observable exterior evidence.

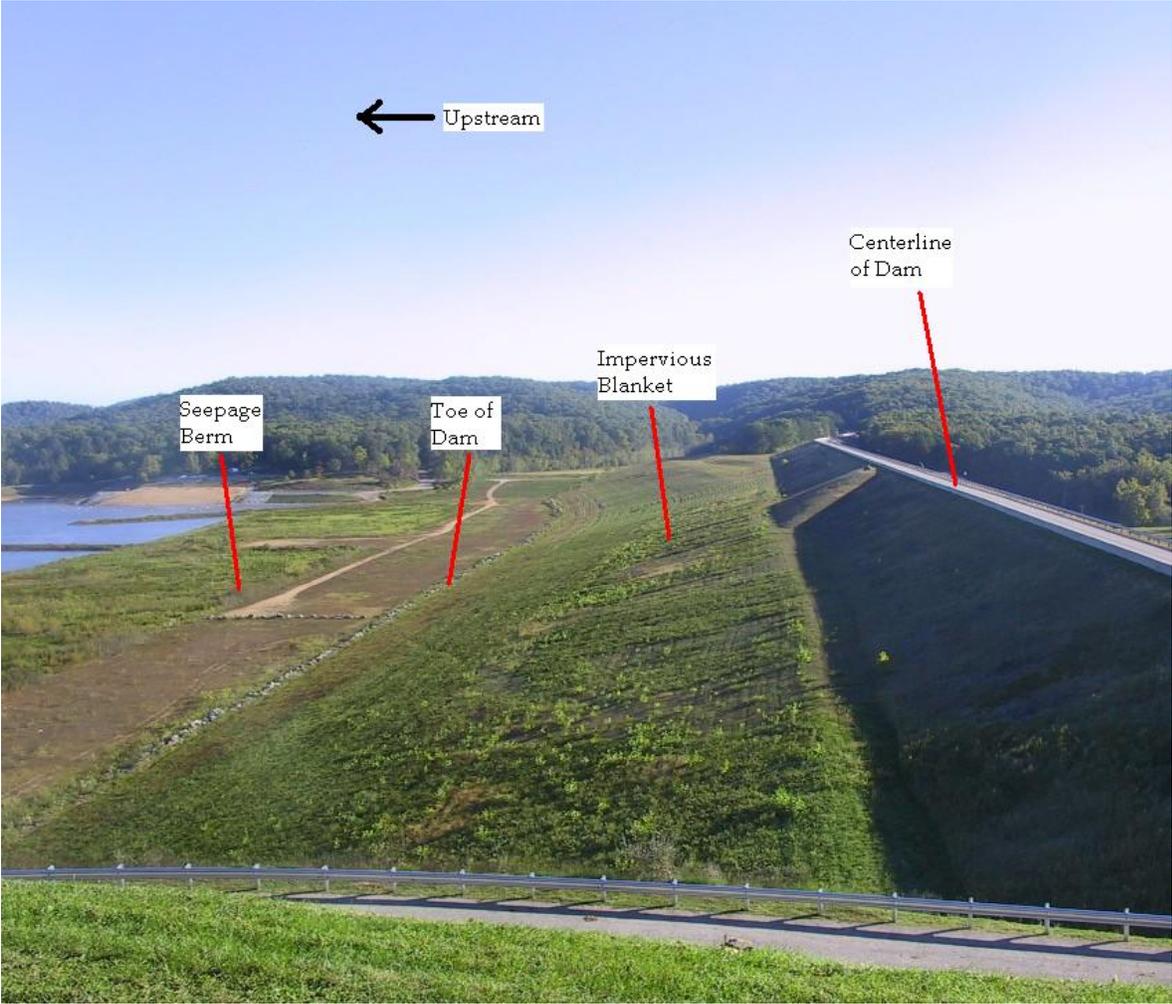
1.2 Project Location

Clearwater Lake is located on the Black River in Wayne and Reynolds Counties in southeast Missouri. The dam is about 43 miles north of the Missouri-Arkansas State line and is 257 river miles upstream from the mouth of the Black River. It is approximately 5 miles southwest of Piedmont, Missouri, the nearest town, and is 125 miles southwest of St. Louis, Missouri. The project is situated in a rural area in the eastern part of the Ozark Plateau. A vicinity map is presented in Figure 1, and a photograph of the dam is presented as Figure 2.

Figure 1. Vicinity Map of Project Area



Figure 2. Photograph of Upstream Face of Clearwater Dam.



1.3 Environmental Compliance

Federal Statutes

Compliance

Archaeological and Historic Preservation Act 16 U.S.C. 469, et. seq.	Full
Clean Air Act of 1977, as amended, 42 U.S.C. 7609, et. seq.	Full
Clean Water Act, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et. seq.	Partial
Coastal Zone Management Act, 16 U.S.C. 1451, et. seq.	N/A
Endangered Species Act, 16 U.S.C. 1531, et. seq.	Full
Estuary Protection Act, 16 U.S.C. 1221, et. seq.	N/A
Federal Water Project Recreation Act, 16 U.S.C. 460-12, et. seq.	Full
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et. seq.	Full
Land and Water Conservation Fund Act, 16 U.S.C. 460/-460-11, et. seq.	N/A
Marine Protection, Research and Sanctuary Act, 33 U.S.C. 1401, et. seq.	N/A
National Environmental Policy Act, 42 U.S.C. 4321, et. seq.	Full
National Historic Preservation Act, 16 U.S.C. 470a, et. seq.	Partial
Rivers and Harbor Act, 33 U.S.C. 401, et. seq.	N/A
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et. seq.	N/A
Wild and Scenic Rivers Act, 16 U.S.C. 1271, et. seq.	Full

Executive Orders, Memorandum, etc.

Compliance

Executive Order 11988, Floodplain Management, May 24, 1977 (42 CFR 26951; May 25, 1977)	Full
--	------

Executive Order 11990, Protection of Wetlands, May 24, 1977 (42 CFR 26961; May 25, 1977)	Full
Council on Environmental Quality Memorandum of August 11, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act	Full
Executive Order 12114, Environmental Effects Abroad of Major Federal Actions.	N/A

Note: The compliance categories used in this table were assigned based on the following definitions:

- a. Full Compliance – All requirements of the statute, executive order, or other policy and related regulations have been met for this stage of planning.
- b. Partial Compliance – Some requirements of the statute, executive order, or other policy and regulations remain to be met but if applicable will be met before construction commences (i.e. 404 permits).
- c. Noncompliance – None of the requirements have been met for this stage of planning.
- d. Not Applicable – Statute, executive order, or other policy not applicable.

1.4 Project Authority and Regulatory Requirements

Congress originally authorized the Clearwater Dam and Reservoir project for construction in the Flood Control Act of June 1938 (Public Law No. 761, 75th Congress, 3d Session). The basic legislation relating to the development and use of reservoir areas, under the control of the Department of the Army, for recreational and related purposes is contained in Section 4 of the Flood Control Act of 1944 approved 22 December 1944, as amended by Section 4 of the Flood Control Act 1946, and as further amended by Section 209 of the Flood Control Act approved 3 September 1954 (Public Law 780, 83rd Congress). The project purpose is flood control while providing a permanent conservation pool for recreational use and conservation of fish and wildlife.

Under the terms of the Federal Clean Water Act and amendments, this action will not require a Section 404 authorization. None of the construction activities presented in this report would require a discharge into the waters of the United States. All work will take place at least 5 feet above the ordinary high water mark. Any excavated material would be placed on the left abutment of the dam, well above the reservoir. A National Pollutant Discharge Elimination System (NPDES) storm water permit will be required and will be obtained prior to construction. All best management practices required by the NPDES permit will be fully implemented.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Alternative 1 (Proposed Action). Concrete Cutoff Wall into Rock through the Centerline of the Dam Alignment

A concrete cutoff wall location would be placed in the centerline of the dam alignment. The total depth of the wall would be 230 feet. The total length would be about 4,300 feet. Extension of the impervious blanket would not be included. This alternative would require detouring traffic that would normally use the segment of Missouri State Highway HH on top of the dam. This alternative has the highest technical confidence and reliability in addressing the seepage issue.

2.2 Alternatives to the Proposed Action

2.2.1 Alternative 2. Construct a Cement/Bentonite Slurry Wall with Bedrock Keyway 500 feet Upstream of the Toe of the Dam.

A cement/bentonite slurry cutoff wall could be installed within the upstream seepage berm, 500 feet upstream of the toe, with the mixture of a cement/bentonite slurry pumped into an excavation that extends from the ground surface into a keyway cut into bedrock. This type of keyed in cutoff wall would essentially prevent groundwater flow with a greater degree of certainty than the cutoff wall that rests upon the bedrock. Additionally, deep intermittent concrete cutoff wall panels would be extended 60 feet into rock where defects or voids are detected. The cutoff wall would have a depth of between 70 feet to rock and 130 feet for the deep cutoff panels areas. In addition, the existing impervious soil blanket would be extended to the top of the dam.

2.2.3 Alternative 3. No Action Alternative

The No Action alternative would entail the continued (but not expanded) seepage monitoring.

2.2.4 Other Considerations

During the planning process, an array of alternatives was considered. Some of these alternatives were eliminated for further consideration. These included nonstructural measures such as operating as a dry reservoir, removing the structure, dam breaching during emergencies, expansion of seepage monitoring, and changes to the water control plan. These measures were not considered any further since none met the planning objectives of the study. Some of these measures, such as operating as a dry reservoir or removing the structure, would not meet the authorized purpose of Clearwater Dam.

Another structural measure initially considered early in the process included extending the existing impervious blanket. This was eliminated since it would only address seepage below the dam, resulting in less benefit than the other measures.

It was determined that the environmental impacts of each of the remaining alternatives were comparable to one another. Thus, economics and technical feasibility were utilized to screen the remaining alternatives. Several alternatives are considered economically justified. Of those alternatives, the alternative(s) producing the highest net benefits were further screened for potential inclusion in the final array. Then, the alternative that would provide the highest technical feasibility was included in the final array. This process resulted in the no action plan, the most economic plan, and the best technical plan that is marginally justified. These are the three alternatives addressed in this Environmental Assessment.

3.0 AFFECTED ENVIRONMENT

3.1 Project Use

The Clearwater Dam and Lake are being used for the purposes of flood control and recreation. Thousands of people come to the lake each year to enjoy camping and water based-recreational opportunities. In fiscal year 2002, it is estimated there were 359,659 visits by people to Clearwater Lake. Flood control is an important purpose especially to private citizens and particularly farmers located downstream below the dam. Through fiscal year 2002, Clearwater Lake has prevented an estimated \$193,281,800 in flood damages.

3.2 Climate

The average summer temperature in the Clearwater Lake area is 75 degrees Fahrenheit, with an average daily maximum of 88 degrees Fahrenheit. During the winter, the average temperature is 35 degrees Fahrenheit, and the average daily minimum temperature is 24 degrees Fahrenheit.

The average total annual rainfall is 44 inches. Twenty-five inches (55 percent) usually falls in April through September, which includes the growing season for most crops. Twenty percent of the time the rainfall in April through September is less than 19 inches. Thunderstorms occur on about 46 days a year, mostly during the summer months.

The average relative humidity at dawn and mid-afternoon is 85 percent and 60 percent, respectively. The sun shines 65 percent of the time in summer and 50 percent of the time in winter. The prevailing wind is from the south, and the average wind speed is highest (12 miles per hour) in the spring (USDA 1991).

3.3 Topography, Physiography and Soils

The area around Clearwater Lake lies in the Ozark uplift, and is a region of karst topography. This area is characterized by steep hills and rocky soil. Local relief is generally 200 to 300 feet, but is larger in some areas.

Sediments in the Clearwater Dam region are mostly Cambrian and Ordovician in age. The two formations exposed at the dam site are the Eminence and Potosi formations of Cambrian age. The Potosi underlies the reservoir and most of the dam and comprises the largest part of the rim of the lake. The overlying Eminence makes up the rest of the lake rim and can be found in the

upper parts of the abutments. Both the Eminence and Potosi are carbonates and are subject to extensive solutioning.

3.4 Water Resources

Clearwater Lake is located on the Black River at river mile 257.4 in Wayne and Reynolds Counties in southeast Missouri. The Black River rises in the Ozark Plains of southeastern Missouri and flows southerly to form Clearwater Lake. The Black River basin contains approximately 8,558 square miles; of that, there are approximately 898 square miles of drainage area situated upstream of the dam. From the dam site, Black River flows southeasterly to Poplar Bluff, Missouri; thence southerly to the Arkansas-Missouri state line; thence southwesterly to its confluence with the White River near Newport, Arkansas. While the river is about 290 miles long from its mouth to where it splits into three forks, the basin has a length of about 150 miles and a width of 90 miles. Elevations in the basin range from about 656 feet at the convergence of the East, Middle, and West forks of Black River, to 328 feet at Poplar Bluff, to 278 feet at Corning, to 210 feet at Newport, Arkansas.

3.5 Cultural Resources

Clearwater Lake lies within the Ozark Mountain Range of Missouri. A thorough overview of the cultural history of this region can be found in *Human Adaptation in the Ozark and Ouachita Mountains* (Sabo et al. 1989) and need not be repeated here. The general area is rich in prehistoric archeological sites, and was considered to have the potential for research concerning the dynamics of upriver settlement patterns in relationship to down river settlement in the lowlands (MDNR 1987).

Clearwater Lake has only been subjected to two cultural resources surveys of note. A 1948 survey that lasted six days located 32 archeological sites. A survey conducted in 1981 located an additional 14 archeological sites (Wilkie 1982). Three of these sites were determined to be potentially eligible for inclusion into the National Register of Historic Places. These surveys, however, only covered approximately 25 percent of the fee and easement land at Clearwater Lake.

3.6 Biological Resources

3.6.1 Vegetation

Vegetation in the immediate project area of interest is minimal, and consists of grass and weeds, since the area consists of rock and earth fill. The area of the left abutment of the dam where the trench excavation fill would be placed is primarily an open, clear area that contains fill left over from the 1988 dam improvements. There is a small number of young (less than 15 years old) pine trees located on the left abutment that will need to be cut. These young trees were allowed to grow on the fill left over after the 1988 dam improvements and cover less than 1/2 acre. The amount of fill is estimated to be approximately 110,000 cubic yards.

3.6.2 Fish and Wildlife

The lake affects approximately 17 miles of the Black River upstream from the dam when water is stored to the top of the flood control pool. The important native game fish found in the lake include large and small mouth bass, warm mouth bass or google-eye, walleyed pike, crappie, several species of sunfish, and yellow bullhead.

Terrestrial wildlife species surrounding the lake include white-tailed deer, wild turkey, fox and gray squirrels, quail, opossum, rabbits, red and gray fox, raccoons, mink, beaver, striped skunk, muskrat, and migratory waterfowl. The region is forested for the most part and contains only limited agricultural and other openings in the forest cover. This substantial cover limits the abundance of species like quail, mourning dove, and cottontail rabbits. The Missouri Department of Conservation and the Corps of Engineers are currently carrying out wildlife management programs on project lands surrounding the lake. Wildlife habitat in the proposed construction area is extremely limited due to the lack of vegetation.

3.6.3 Threatened and Endangered Species

Coordination with the U.S. Fish and Wildlife Service indicates while Threatened and Endangered (T&E) species are present in the Clearwater Lake project area, none are known to occur within the immediate proposed project area.

3.7 Wetlands

No jurisdictional wetlands have been delineated within the proposed project area.

3.8 Hazardous, Toxic and Radioactive Waste (HTRW)

There are no known hazardous, toxic or radioactive wastes in the proposed project area.

3.9 Air Quality

Clearwater Lake is located in the Ozark Mountains, remote from heavy smoke-producing industry or large mining operations. The air is very clean and smog is virtually unknown in this region. According to the Missouri Department of Natural Resources (MDNR), this area of Missouri is in compliance with all EPA ambient air quality standards.

3.10 Noise

Noise levels around the lake are consistent with those normally associated with automotive transportation and outdoor water recreational activities. These noises emanate from cars and trucks utilizing state Highway 359 on top of the dam. Boats, jet skis, and other recreational vehicles and equipment utilize the lake adjacent to the dam.

3.11 Socioeconomics

The Clearwater study area is located in Southern Missouri and encompasses Butler and Wayne Counties. The study area stretches from the Clearwater Dam, down the Black River, to Poplar Bluff. Between the dam and Poplar Bluff there are six cities that are in areas of concern; they are Hendrickson, Hilliard, Leeper, Mill Spring Village, Piedmont, and Poplar Bluff. If the Clearwater Dam were to fail these cities would experience negative impacts from the failure.

Butler County ranks 31st in size out of Missouri's 75 counties and has a population of 40,867. It ranks 20th in population with the majority of the population, 93.4%, being White; the next largest demographic group is Black and represents 5.3% of the county's population. Butler County had 1,028 business establishments in 2001, with an annual payroll of \$333,953,000; a 2.9% and 109% increase from 1990, respectively. Retail Trade, Manufacturing, and Health and Social Services sectors are the largest employers in Butler County. 1999 median household income and per capita income were \$27,228 and \$15,721, respectively, and 18.6% of the county is below the federal poverty guideline.

Wayne County ranks 16th in size out of Missouri's 75 counties and has a population of 13,259. It ranks 75th in population with the majority of the population, 99%, being White. Wayne County had 245 business establishments in 2001, with an annual payroll of \$32,521,000; a 26.3% increase from 1990 for both figures. Since 1990, Manufacturing has been the largest employing sector in the county. Retail trade, while a distant second in the early 1990's, has steadily gained ground on the manufacturing sector. However, this change is not the effect of increased employment in the retail sector, but a steady decrease in the demand for labor by the manufacturing sector. Median household income and per capita income for 1999 were \$24,007 and \$13,434, respectively, and 21.9% of the county is below the federal poverty guideline.

Poplar Bluff, Missouri is located approximately 33 miles from Clearwater Dam, in Butler County. It is one the largest cities in Southeastern Missouri and has a population of approximately 16,651. There are over 7,871 housing units in Poplar Bluff of which approximately 90% are occupied; the median value of the units is \$50,200 and the majority of the housing units, 79.6%, were built before 1980.

Piedmont, Missouri and Mill Spring Village, Missouri are located approximately 4.5 and 7 miles from Clearwater Dam, respectively. Both cities are substantially smaller than Poplar Bluff and have populations of 1,992 and 219, respectively. Total housing units and the percentage of occupied housing units, shown in parentheses, for Piedmont and Mill Spring are 959 (90.6%) and 104 (77.9%), respectively. Both cities have lower median housing values than Poplar Bluff, \$45,100 and \$17,100, respectively, and a higher percentage of the housing units, 92.7% and 92.8%, were built prior to 1980, respectively.

Demographic information for Hilliard, Hendrickson, and Leeper, Missouri is unavailable. This implies the magnitude of these cities is relatively small and a reasonable assumption would be that these cities have characteristics similar to Mill Spring Village, i.e. small populations with older construction homes and low median housing unit values.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Land use

Only the Proposed Action would require a change in terrestrial land use. It would temporarily require detouring traffic during construction that would normally use the segment of Missouri State Highway HH on top of the dam.

4.2 Topography, Physiography and Soils

Alternative 2 would alter the current topography of the area slightly by extending the existing impervious blanket to the top of the dam. The blanket would be extended from its present elevation of 575 ft to an elevation of 608 ft. In addition, the excavated material would be placed on the left abutment of the dam. Neither the Proposed Action nor Alternative 3 (No Action) would affect the topography, physiography, or soils of the area.

4.3 Water Resources

None of the alternatives presented in this document would impact water resources. Any construction activities would take place at least five feet above normal pool elevation. Silt fences will be used to minimize impacts from storm water runoff. A National Pollutant Discharge Elimination System (NPDES) storm water permit will be required and will be obtained prior to construction. All best management practices required by the NPDES permit will be fully implemented. None of the surrounding aquifers will be affected by any of the alternatives.

4.3.1 Hydrologic Information & Operational Procedures

This study does not include a review of existing operational procedures at the lake. The lake will continue to operate under its existing management plan.

4.4 Cultural Resources

During the initial planning process, it was believed that Alternative 2 would be the proposed action. The District Archeologist reviewed this action and consulted with the State Historic Preservation Office (SHPO) and appropriate Native American tribes in compliance with the National Historic Preservation Act. It was determined that no cultural resources would be impacted by the implementation of Alternative 2.

Although the Missouri SHPO contended that the dam structure was eligible for the National Register of Historic Places, it was determined that Alternative 2 would take place within the area of the 1988 improvements. Thus, the historic fabric of the structure would not have been compromised.

Alternative 1 (the new proposed action) could possibly alter the historic fabric of the dam, since construction would take place at the centerline of the dam. It is important to note, however, that

after construction, and the outward appearance of the dam would be the same as before construction. The segment of Missouri Highway HH on top of the dam would be repaved. Nonetheless, if Alternative 1 were chosen, further consultation with the Missouri SHPO would be necessary before any construction activities could commence.

4.5 Biological Resources

4.5.1 Vegetation

None of the alternatives would have more than minor negative impacts towards vegetation, since very little vegetation exists on the seepage berm. Any spoil from construction of a cutoff wall will be placed on the left abutment, an open area that contains fill left over from the 1988 dam improvements. The amount of fill is estimated to be approximately 110,000 cubic yards. Extending the impervious blanket would likely require that less than 1/2 acre of less than 15 year old small pine trees be cut that are located just above the left abutment of the dam. The fill area would be approximately 1800 ft long, 500 ft wide, and 3 ft thick.

4.5.2 Fish and Wildlife

4.5.2.1 Fishery

None of the alternatives presented in this study would impact aquatic resources. Any construction activities on the seepage berm area would require the use of silt fences to prevent any runoff into the lake. Excavated material will be placed on the left abutment of the dam.

4.5.2.2 Wildlife

Given that any construction activities would take place on the seepage blanket, none of the alternatives presented in this study would have negative impacts to the wildlife habitat of the area.

4.5.3 Threatened and Endangered Species

No action presented in this EA would have impacts to any T & E species. Coordination with the U.S. Fish and Wildlife Service indicates that while T&E species are present in the Clearwater Lake project area, none are known to occur within the proposed project area.

4.6 Wetlands

None of the alternatives presented in this study would impact wetlands, because none are known to be present in the proposed project area.

4.7 Hazardous, Toxic and Radioactive Waste

None of the alternatives presented in this study would have any impact on hazardous, toxic or radioactive wastes, because none are present or would be produced in the proposed project area.

4.8 Air Quality

There is potential for short-term minor adverse impacts to air quality from dust and equipment emissions during any construction activities. Additionally, if the Proposed Action were selected, the segment of Missouri Highway HH on top of the dam would have to be temporarily closed. The rerouting of traffic in the area could lead to short-term minor adverse impacts due to increased automotive emissions on the detour roads.

There would be no beneficial or adverse effect to air quality if the No Action alternative were implemented.

4.9 Noise

There would be a short-term increase in noise levels during the construction activities. Additionally, if the Proposed Action were selected, the segment of Missouri Highway HH on top of the dam would have to be temporarily closed. The rerouting of traffic in the area could lead to short-term minor increases in automotive noise on the detour roads. No long-term impacts related to noise, however, would occur due to the implementation of any of the construction alternatives.

There would be no beneficial or adverse effect to noise levels if the No Action alternative were implemented.

4.10 Socioeconomic

Both of the construction alternatives would presumably maintain the status quo of Clearwater Lake, and thus its surrounding environs. The socioeconomic status of the area would therefore remain unchanged.

There would also be no beneficial or adverse effect to socioeconomic resources if the No Action alternative were implemented. It would, however, necessitate continued monitoring of the seepage issue and the construction projects to fix sinkholes and other problems would continue, presumably in increasing frequency with time.

4.11 Cumulative Impacts

All of the construction alternatives would presumably maintain the status quo of Clearwater Lake, and thus its surrounding environs. Therefore, none of the direct or indirect impacts resulting from any of these actions would differ from currently foreseeable conditions at Clearwater Lake. The only foreseeable additional project at the Clearwater Lake area is the construction of a 1.5 mile bicycle and hiking trail below the dam. This trail would presumably add to the recreational benefits of the Clearwater Lake area and could increase the number of visitors to the lake, but would not result in any cumulative impacts associated with the proposed project.

Also, the No Action alternative would require continued seepage monitoring and increasing cost for repair, but would also maintain the status quo of Clearwater Lake.

Table 1.

INSERT TABLE

5.0 FINDINGS

This EA has evaluated a proposed action and alternatives for a major rehabilitation of Clearwater Dam in southeastern Missouri. In addition, the No Action alternative was also evaluated.

Although this is a major rehabilitation study, there have been no significant negative impacts to the environment identified in this assessment due to any of the alternatives. These alternatives are focused on the repair of an artificial structure and appropriate measures, such as silt fencing to prevent runoff during construction, have been incorporated. The proposed action consists of the construction of a concrete cutoff wall placed in the centerline of the dam alignment.

Following a review of the analysis and evaluation of the alternatives presented in this Environmental Assessment, it has been determined that implementation of the proposed action will not result in any direct, indirect or cumulatively significant adverse impacts. Adverse impacts are not considered significant unless they meet the criteria for significance stated in CFR 1500, Sect 1508.27. The No Action alternative would allow the continued decline in the integrity of the dam.

6.0 List of Preparers

Christopher G. Davies, Archeologist, Planning, Environmental and Regulatory Division, U.S. Army Corps of Engineers, Little Rock District.

Michael Collis, Economist, Planning, Environmental, and Regulatory Division, U.S. Army Corps of Engineers, Little Rock District prepared the socioeconomic analysis.

7.0 References

Department of The Army, US Army Corps of Engineers, 1996. Engineer Pamphlet 1130-2-500.

Missouri Department of Natural Resources, Historic Preservation Program, 1987. *Master Plan for Archeological Resource Protection in Missouri*.

Sabo III, George, Ann M. Early, Jerome C. Rose, Barbara A Burnett, Louis Vogeles, Jr., and James P. Harcourt 1989. *Human Adaptation in the Ozark and Ouachita Mountains*. Arkansas Archeological Survey, Fayetteville, Arkansas. Report Submitted to the U.S. Army Corps of Engineers, Southwestern Division.

United States Department of Agriculture, Soil Conservation Service, 1991. *Soil Survey of Iron County, Missouri*.

Wilkie, Duncan C. 1982. Archaeological Reconnaissance Survey of the Shoreline of Clearwater Lake, Reynolds County, Missouri. Southeast Missouri State University, Cape Girardeau, Missouri. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

APPENDIX A. CORRESPONDENCE

Planning, Environmental and Regulatory Division
Planning Branch

«fn» «ln»
«title»
«agency»
«office»
«add1»
«add2»
«city», «state» «zip»

Dear «salutation» «ln»:

The Little Rock District, U.S. Army Corps of Engineers (Corps) proposes to study the rehabilitation of Clearwater Dam, Wayne County, Missouri. The proposed study will focus on the issue of seepage. No specific action has been identified at this time. A range of alternatives to deal with this issue will be analyzed, and the environmental impacts associated with any future proposed solution to the seepage problem will be determined. See attachment for map.

Initially, the Corps of Engineers planned to issue a categorical exclusion in lieu of an Environmental Assessment for repairs within the immediate dam site. The study has recently changed from a dam safety study to a major rehabilitation study. Therefore, the Corps plans to conduct an Environmental Assessment (EA) including public input.

The Corps of Engineers is requesting initial information and comments that would assist in the preparation of the Environmental Assessment during the rehabilitation study. Please submit initial comments by May 30, 2003. A copy of the draft EA will also be distributed for comments this summer. Please forward any comments and questions to the attention of Mr. Christopher G. Davies at (501) 324-5752.

Sincerely,

RANDY HATHAWAY, P.E.
Deputy Chief, Planning,
Environmental and Regulatory
Division

Enclosure

List of resource agencies to whom the 30-day coordination letter was sent.

Salutation	First Name	Last Name	Agency	Title	Office
Mr.	R. Mark	Wilson	U.S. Fish and Wildlife Service	Field Supervisor	Columbia Ecological Services Field Office
Mr.	Michael	Deihl	Southwestern Power Administration	Administrator	
Mr.	Ted	Coombes	Southwestern Power Resources Association	Executive Director	
Mr.	Ewell	Lawson	Office of Administration	Director	Intergovernmental Relations
Mr.	Mark	Miles	Missouri Department of Natural Resources		State Historic Preservation Office
Mr.	Stephen	Mahfood	Missouri Department of Natural Resources	Director	Division of Environmental Resources
Mr.	John	Hoskins	Missouri Department of Conservation	Director	Policy Coordination Section
Mr.	David	Skaer	U.S. Department of Agriculture	Area Resource Soil Scientist	Natural Resource Conservation Service
Mr.	Earnest	Quintana	National Park Service	Regional Director	Midwest Regional Office

APPENDIX B SECTION 404 PERMIT DOCUMENTS

SHORT FORM			
Evaluation of Section 404(b)(1) Guidelines			
<u>Formal Review Should Follow Close of Public Notice Comment Period.</u>			
APPLICANT: <u>USACOE, LRD</u>		APPLICATION NUMBER: <u>N/A</u>	
1. <u>Review of Compliance (Section 230.10(a)-(d)).</u> A review of the permit application indicates that:		<u>Preliminary 1/</u>	<u>Final 2/</u>
a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative);		YES [X] NO []* YES [X] NO []	
b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);		YES [X] NO []* YES [X] NO []	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2);		YES [X] NO []* YES [X] NO []	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5)		YES [X] NO []* YES [X] NO []	
*1/, 2/ see page 3.			
2. <u>Technical Evaluation Factors (Subparts C-F)</u>		<u>N/A</u>	<u>Not Significant</u> <u>Significant</u>
a. Physical and chemical characteristics of the Aquatic Ecosystem (Subpart C-F).			
1) Substrate impacts		X	
2) Suspended particulate/turbidity impacts.		X	
3) Water column impacts.		X	
4) Alteration of current patterns and water circulation		X	
5) Alteration of normal water fluctuations/hydroperiod.		X	
6) Alteration of salinity gradients.		X	
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
1) Effect on threatened/endangered species and their habitat.	X		
2) Effect on aquatic food web.	X		
3) Effect on other wildlife (mammals, birds, reptiles, amphibians).		X	
c. Special Aquatic Sites (Subpart E).			
1) sanctuaries and refuges.	X		
2) wetlands.	X		

3) mudflats.	X		
4) vegetated shallows.	X		
5) coral reefs.	X		
6) riffle and pool complexes	X		
d. Human Use Characteristics (Subpart F).	N/A	Not Significant	Significant
1) Effects on Municipal and Private Water Supplies.	X		
2) Recreational and Commercial Fisheries Impacts.	X		
3) Effects on Water-Related Recreation.	X		
4) Aesthetic Impacts.		X	
5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, similar preserves.	X		
REMARKS: Where a check is placed under the significant category, preparer should add explanation below.			
3. <u>Evaluation of Dredged or Fill Material (Subpart G) 3/</u>			
a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)			
1) Physical characteristics			
2) Hydrography in relation to known or anticipated sources of contaminants.			
3) Results from previous testing of the material or similar material in the vicinity of the project.			
4) Known, significant, sources of persistent pesticides from land runoff or percolation.			
5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances.			
6) Other public records of significant introduction of contaminants from industries, cities or other sources.			
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the			
8) Other sources (Specify).			
List appropriate references (attach sheet if necessary).			
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and that the dredged material will be constrained and not allowed to flow beyond the boundaries of the disposal site. The material meets the testing exclusion criteriaYES [X] NO[]			
4. <u>Disposal Site Delineation (Section 230.11(f)).</u>			
a. The following factors as appropriate, have been considered in evaluating the disposal site.			
1) Depth of water at disposal site.			
2) Current velocity, direction, and variability at disposal site.			
3) Degree of turbulence.			
4) Water column stratification.			
5) Discharge vessel speed and direction.			
6) Rate of discharge.			
7) Dredged material characteristics (constituents, amount, and type of material, settling velocities).			
8) Number of discharges per unit of time.			
9) Other factors affecting rates and patterns of mixing (Specify).			
List appropriate references (attach sheet if necessary).			

PROJECT DOCUMENTS

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable YES [X] NO []

5. Actions to minimize Adverse Effects (Subpart H).
All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge. YES [X] NO []
List action taken. (attach sheet if necessary)

REFERENCE CE1300, JUNE 1973, GUIDE SPECS.
CIVIL WORKS CONSTRUCTION-ENGINEERING PROTECTION

N.B. Return to section 1 for final stage of compliance review. See also note 3/, page 3.

6. Factual Determination (Section 230.11)
A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short or long-term environmental effects of the proposed discharge as related to:

- a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5 above) YES [X] NO []
- b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5) YES [X] NO []
- c. Suspended particulate/turbidity (review sections 2a, 3, 4, and 5) YES [X] NO []
- d. Contaminant availability (review sections 2a, 3, and 4) YES [X] NO []
- e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5) YES [X] NO []
- f. Disposal site (review sections 2, 4, and 5) YES [X] NO []
- g. Cumulative impact on the aquatic ecosystem YES [X] NO []
- h. Secondary impacts on the aquatic ecosystem YES [X] NO []

7. Evaluation Responsibility (*See page 3)

a. This evaluation was prepared by: Christopher G. Davies
Position: Archeologist, Planning Section
Date: 2/11/04

b. This evaluation was reviewed by: James D. Ellis
Position: Biologist, Planning Section
Date: 2/18/04

8. Findings

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines. [X]

b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following condition: (attach sheet if necessary)..... []

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reason(s):

- 1) There is a less damaging practicable alternative []
- 2) The proposed discharge will result in significant degradation of the aquatic ecosystem []
- 3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem []

SIGNATURE _____
Randy Hathaway, P.E.
Chief, Planning Division

* A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

1/ Negative responses to three or more of the compliance criteria at this stage indicates the proposed projects may not be evaluated using this “short term procedure”. Care should be used in assessing pertinent portions of the technical information of items 2a through d above before completing the final review of compliance.

2/ Negative responses to one of the compliance criteria at this stage indicates that the proposed project does not comply with guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the “short form evaluation process” is inappropriate.

3/ If the dredged or fill material cannot be excluded from the individual testing, the “short form evaluation process” is inappropriate.

Table 1. Comparative Impacts of Alternatives

	Cement Wall in Centerline of Dam	Bentonite/Slurry Wall 500 ft Upstream and Extension of Soil Blanket	No Action- Continued Seepage Monitoring
Land Use	Minor impacts due to rerouting automotive traffic	None	None
Topography, Phisography, and Soils	None	Minor, long term impacts from extension of seepage blanket and placement of excavated materials	None
Water Resources	None	None	None
Cultural Resources	Unknown: would require consultation with the Missouri SHPO	None	None
Biological Resources	Minor impacts to vegetation due to 1/2 acre of small pines cut for excavated material placement area	Minor impacts to vegetation due to 1/2 acre of small pines cut for excavated material placement area	None
Wetlands	None	None	None
Hazardous, Toxic, and Radioactive Waste	None	None	None
Air Quality	Minor, short term impacts from construction activities and traffic rerouting	Minor, short term impacts from construction activities	None
Noise	Minor, short term impacts from construction activities and traffic rerouting	Minor, short term impacts from construction activities	None
Socio-economics	None	None	None
Cumulative Impacts	None	None	None