

ECONOMIC APPENDIX

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ECONOMIC APPENDIX

PREPARATION OF NATURE APPRECIATION FACILITIES DESIGN, ECONOMIC, AND ENVIRONMENTAL ANALYSIS FOR A LIMITED REEVALUATION REPORT (LRR) 1,750-ACRE BOTTOMLAND ACQUISITION, FOURCHE BAYOU BASIN, LITTLE ROCK, ARKANSAS

1.0 INTRODUCTION

The proposed park consists of 1,750 acres of bottomland hardwoods and swampland along Fourche Bayou in the southern portion of the city of Little Rock, Arkansas. A large variety of plant and animal life is found in this area. Presented in this section of the report is an economic assessment of the establishment of a nature appreciation area and associated facilities along a segment of Fourche Bayou. The assessment began with a field reconnaissance to determine the type and extent of resources found in the study area. The proposed development is intended to preserve the quality of the resources in this unique area, and provide public access to its innermost parts for nature appreciation and enjoyment.

The purpose of this section is to estimate the number of visitor/activity days that could be expected to utilize the facilities if the plan were to be implemented. Planned nature appreciation facilities would include hiking trails with wildlife observation areas. The improved access with parking and restrooms provided would increase opportunities for fishing and canoeing within the Fourche Bottoms. In order to determine the economic viability of the project, it is necessary to quantify the number and types of visitors that would utilize the proposed facilities.

2.0 DESCRIPTION OF AREA RESOURCES

Environmental resources of importance in the Fourche Bayou Basin consist of flora, fauna, unique habitats, recreational opportunities, and aesthetic qualities. Adding to the significance of this area is its location in metropolitan Little Rock, Arkansas. A green belt such as Fourche Bayou with its approximately 650 acres of wetlands, provides a welcome break for viewers from square miles of developed land covered by residences, businesses, and infrastructure facilities.

Flora found in wetland area of Fourche Bayou may include bald cypress, water tupelo, water elm, green ash, buttonbush, box elder, and hibiscus. The bottomland hardwood areas occur around the edge of the riverine swamp habitats and include plant species such as willow oak, post oak, cedar elm, American elm, red mulberry, sweetgum, swamp dogwood, and others. Fish species found in Fourche Creek include shiners, sunfishes, catfish, chain pickerel, bullheads, crappie, largemouth bass, and spotted bass as well as other species of fish. Several species of wading birds including great blue herons and egrets are common in the area as well as various migratory birds and songbirds. Duck species such as mallards, teals and woodducks are commonly found in the area. Terrestrial fauna occurring in the project site include swamp

rabbits, white-tail deer, mink, raccoons, opossums, fox and gray squirrels and beavers, among others. Fourche Bottoms also provides habitat for a wide variety of turtles, frogs, and snakes.

A request was submitted to the USFWS in 2002 for the notification of any wildlife management areas, swamps and marshes, wetlands, habitats for threatened and endangered species, and/or other sensitive ecological areas located within the project area. The USFWS submitted a Coordination Act Report (CAR) on 3 September 2004 in which it stated that no federally listed, threatened or endangered species are currently known to occur in the project impact area, and that the proposed action would not impact any listed species. The CAR is included in the Supplemental Environmental Impact Statement. No state listed species are known to occur in the project area.

3.0 SOURCES OF DATA

Data for this report was obtained from numerous federal, state, and local agencies that have indicated a strong interest in the proposed Fourche Bayou development. Included in this group are the Arkansas Natural Heritage Commission, Arkansas Nature Conservancy, the Audubon Society (Audubon Arkansas), and the Canoe Club of Arkansas. These agencies represent a coalition of partners that will assist with education and conservation programs on site. Audubon Arkansas intends to co-manage the site with the Little Rock Parks and Recreation Department, and will partner with federal and state agencies, private companies, and non-profit organizations to carry out the project purposes.

Additional important information was obtained from the Arkansas Department of Parks and Tourism (Research Division), the Arkansas Game and Fish Commission, Arkansas State Parks (Office of Outdoor Recreation Grants), Pinnacle Mountain State Park, the U.S. Fish and Wildlife Service (USFWS), and the U.S. Bureau of the Census. The University of Arkansas at Little Rock, Division of Demographic Research, provided important data on population projections for the study area. Other background information was obtained from an earlier (October 1979) study of the Fourche Bayou Basin by the U.S. Army Corps of Engineers, Little Rock District.

4.0 METHODOLOGY

Plans for the proposed development include the creation of facilities for four recreational activities: (1) hiking and walking -- three miles of hiking trails are planned, some sections with handicap access features for wildlife viewing; (2) wildlife observation -- wildlife observation platforms are proposed for viewing the areas varied and abundant wildlife; (3) fishing -- plans include dredging some of the borrow pits to compensate for the trails' fill placement. This will improve fishing opportunities along with the improved access. Also, as an adjunct to the project, the Arkansas Game and Fish Commission has plans to stock some of these ponds; and (4) canoeing -- the city is currently removing man-made obstacles and other debris, which will afford a unique canoeing experience for wildlife and nature lovers.

As was done in the earlier Corps of Engineers study, the initial step in this analysis was to estimate the overall recreational needs or demand that exists within the study area. This was accomplished primarily through the use of the *Statewide Comprehensive Outdoor Recreation*

Plan (SCORP 1995) report compiled by the Arkansas Department of Parks and Tourism, Outdoor Recreation Grants Section, along with information from Audubon Arkansas, the Nature Conservancy, and the Arkansas Department of Parks and Tourism. The 1995 SCORP placed a greater focus on the needs or demands of individual localities as opposed to regional needs, as was the case in earlier SCORP reports.

As a part of that report, a survey to determine recreation needs as well as facility utilization was conducted by the University of Arkansas at Little Rock. Interviews were obtained from a stratified random sample of adult Arkansans. By using a specific selection procedure, interviewers maintained a representative sample of the population with respect to age, gender, and income of the respondents at the time of the survey. The sample had a sampling error of slightly less than five percent at the 95 percent confidence interval.

Table 1 shows the results of the survey for a specific set of outdoor recreational activities that are of particular relevance to the subject study. The table shows the percentages of persons by age group who participated in various outdoor activities at least 10 times or more during the preceding 12-month period. Three of these activities are ones that are included in the plans for the proposed development: walking for pleasure, short hikes, and wildlife observation.

The activity labeled "Walked for Pleasure" appeared in each of the eight age groupings, while the activity "Wildlife Observation" appeared in six of the eight age groups. The latter activity is more popular with older segments of the population as can be seen from the results of the survey. While wildlife observation was not among the top 20 outdoor activities by order of popularity in the 1985 SCORP, it ranked as the seventh most popular activity in the 1995 SCORP. As the population ages, as it is predicted to do in almost every state, wildlife observation will most likely grow in popularity and importance.

Estimating the overall needs (or demand) in the study area involves merging the SCORP data shown in Table 1 with population figures for the study area. Both current and projected population data are required in order to estimate use over the life of the project. The study area for this report includes Pulaski and Saline counties, which is the same geographic area as that used in the original Fourche Basin study. Population figures for these counties, both historical and projected are given in Table 2. The projected figures are based on county projections of population prepared by the University of Arkansas at Little Rock. Since those projections extend only to the year 2012, projected data beyond that date are extrapolations of the 2002-2012 data.

5.0 DATA ANALYSIS

Table 3 shows estimated recreation demand, by recreation activity, for the proposed Fourche Bottoms park study area (or market area). For the purpose of estimating usage of the proposed park and its facilities, the primary pool of users was assumed to be the residents of Pulaski and Saline counties, which comprise the study area. This is the same study area used in the earlier Fourche Bayou Basin Feasibility Report published in 1979, and is the counties in which Fourche Bayou is located. The majority of potential users were estimated to come from the population of this area, with a small percentage of usage by visitors coming from outside the area, both from within and outside Arkansas.

Table 1. Outdoor Activities Participated in at Least 10 Times or More in the Past 12 Months--by Age^{1,2,3}

<u>Age 18 to 20</u>	Percent	<u>Age 55 to 59</u>	Percent
Total No.: 17,126	5%	Total No.: 21,900	7%
Walked for Pleasure	43%	Walked for Pleasure	31%
Swimming	43%	Wildlife Observation	24%
Fishing	36%	Fishing	17%
Driving for Pleasure	29%	Driving for Pleasure	17%
Bicycling	21%	Swimming	14%
<u>Age 21-24</u>		<u>Age 60-64</u>	
Total No.: 23,859	7%	Total No.: 17,528	5%
Driving for Pleasure	52%	Walked for Pleasure	46%
Swimming	39%	Driving for Pleasure	38%
Walked for Pleasure	39%	Wildlife Observation	32%
Wildlife Observation	30%	Fishing	19%
Fishing	26%	Swimming	14%
<u>Age 25-44</u>		<u>Age 65-74</u>	
Total No.: 137,604	41%	Total No.: 27,705	8%
Driving for Pleasure	46%	Walked for Pleasure	43%
Swimming	41%	Driving for Pleasure	42%
Walked for Pleasure	37%	Wildlife Observation	27%
Fishing	32%	Fishing	23%
Bicycling	31%	Short Hikes	21%
<u>Age 45-54</u>		<u>Age 75 and Over</u>	
Total No.: 62,655	19%	Total No.: 24,140	7%
Walked for Pleasure	49%	Driving for Pleasure	29%
Driving for Pleasure	31%	Wildlife Observation	29%
Wildlife Observation	23%	Walked for Pleasure	24%
Fishing	22%	Fishing	19%
Short Hikes	20%	Golf	10%

¹SCORP '95, Statewide Comprehensive Outdoor Recreation Plan, Arkansas, Arkansas State Parks, Recreation, and Travel Commission, December 1995, page A19.

²U.S. Census: PCT12 Sex by Age

Dataset: Census 2000 Summary Files 1, 100 Percent Data

³Total Population: 332,517

Table 2. Historical and Projected Population, Study Area and State of Arkansas

Area	U.S. Bureau of Census			UALR Projections ¹		
	1980	1990	2000	2005	2015	2025
State	2,286,357	2,350,624	2,673,400	2,805,767	3,067,491	3,282,094
% Change	--	2.8%	13.7%	5.0%	9.3%	7.0%
Study Area:						
Pulaski Co.	340,597	349,596	361,464	366,292	375,624	384,956
Saline Co.	53,156	64,183	83,520	92,985	101,415	107,500
Area Total	393,753	413,779	444,984	459,277	477,039	492,456
% Change	--	5.1%	7.5%	3.2%	3.9%	3.2%

¹Projected population figures shown were developed by the University of Arkansas at Little Rock (UALR), Institute for Economic Advancement. The UALR projections were for the period 2002 through 2012. The figures shown for the years 2015 and 2025 are extrapolations of the trends implied by the 2002-2012 projections. Area totals for the years 2035, 2045, and 2055, based on similar extrapolation, are 507,230, 522,210, and 537,880, respectively. These projections are shown in Table 3.

The target population used in estimating use was those persons 18-years old and over. This group was estimated to comprise about 74.5 percent of the total area population based on U.S. Census data. This proportion was assumed to hold constant throughout the analytical period, starting with the base year of 2005, and continuing to 2055. This segment of the population was the focus of a recreation survey conducted by the University of Arkansas at Little Rock for the Arkansas Department of Parks and Tourism and published in 1995 (SCORP). The results of this survey formed a large part of the analytical techniques used in estimating potential recreational demand for the Fourche Park study area. Derivation of estimated demands for each activity the park is proposed to accommodate is shown in Table 3. Techniques and methodology used in their derivation follows.

Table 3. Estimated Recreation Demand by Activity, Proposed Fourche Bottoms Park Study Area, Base Year and Projected to 2055

Activity	Base Year					
	2005	2015	2025	2035	2045	2055
Study Area Population ¹	459,277	477,039	492,456	507,230	522,210	537,880
Pct. Pop. 18 and Over	74.5%	74.5%	74.5%	74.5%	74.5%	74.5%
Pop. 18 & Over (No.)	342,161	355,394	366,880	377,886	389,046	400,721
1. Walking/Hiking						
Age-weighted Avg. Pct. ²	39.6%	39.6%	39.6%	39.6%	39.6%	39.6%
Potential No. of Users ³	135,496	140,736	145,284	149,643	154,062	158,685
Repeat Visit Factor	10	10	10	10	10	10
No. of Act. Occasions	1,354,959	1,407,360	1,452,844	1,496,430	1,540,624	1,586,854
Act. Occ./ Outside Area	422,719	436,246	449,333	460,568	469,778	479,174
Total Activity Occasions	1,777,678	1,843,607	1,902,177	1,956,997	2,010,402	2,066,028
2. Wildlife Observation						
Age-weighted Avg. Pct. ²	23.4%	23.4%	23.4%	23.4%	23.4%	23.4%
Potential No. of Users ³	80,066	83,162	85,850	88,425	91,037	93,769
Repeat Visit Factor	10	10	10	10	10	10
No. of Act. Occasions	800,658	831,622	858,499	884,254	910,369	937,686
Act. Occ./ Outside Area	249,789	257,782	265,515	272,154	277,596	283,149
Total Activity Occasions	1,050,446	1,089,404	1,124,014	1,156,408	1,187,965	1,220,835
3. Fishing⁴						
No. of Activity Occasions	3,000	3,000	3,000	3,000	3,000	3,000
4. Canoeing⁴						
No. of Activity Occasions	400	415	429	442	455	468

¹Study/Market Area of Proposed Park defined as Pulaski and Saline Counties, same as in 1979 Fourche Bayou Basin Report.

²Weighted average of participation (for 18+ age group) in this recreation activity. Estimated participation by detailed age groupings are taken from SCORP data and are shown in Table 1.

³Estimated number of persons, age 18 and over, who participated in this activity ten or more times during the previous 12-month period.

⁴Estimates derived from independent sources for the actual Fourche Bayou Park area. These data represent actual demand estimates, as opposed to potential activity occasions, which are represented in the first two categories (walking for pleasure and wildlife observation).

- 1. Walking/Hiking.** Using data from the SCORP, it was estimated that 39.6 percent of the population 18-years and over either walked or hiked at least 10 or more times during the past year. It was assumed that this activity rate would continue into the future. This percentage is a weighted average of all age groups of the study area population, 18-years and over, who participate in the activity. Multiplying this percentage by the estimated population 18-years old and over provided an estimate of potential users of walking/hiking trails in the study area, who engaged in the activity 10 or more times during the year. Expanding these estimates by a factor of 10 yielded the total number of estimated activity occasions (or demand) for this recreation pursuit by projected time period in the study area.

The existing and future projected population totals of Faulkner and Lonoke counties were used to estimate activity occasions from outside the study or market area (Pulaski and Saline counties). Faulkner and Lonoke counties are part of the Little Rock Metropolitan Statistical Area (MSA) and their combined population was reported by the 2000 Census at 138,842, or just below 25 percent of the MSA total. This population base was projected through the period of analysis using the same growth factors as shown in Table 2, and thus were used as a proxy for estimating activity occasions that would originate from outside the Pulaski/Saline county study area.

- 2. Wildlife Observation.** It was estimated that 23.4 percent of the population 18-years and over in the study area participates in wildlife observation and nature viewing at least 10 or more times during the year (SCORP). It was assumed that this activity rate would continue into the future. This percentage is a weighted average of all age groups of the study area population, 18-years and over, who participated in this activity. This percentage times the estimated population 18-years and over provided an estimate of the more active potential users engaging in this activity. Again, expanding these estimates by a factor of 10 yielded the total number of estimated activity occasions (or demand) for this recreation pursuit in the study area, by projected time period. The number of activity occasions by individuals and groups outside the two-county market areas was estimated using the same method that was used in the walking/hiking activity.
- 3. Fishing.** Estimated fishing activity occasions were confined to estimates of fishing activity in the area's city parks. The estimated number of fishing occasions (or demand) was based on a recent study of anglers conducted by the University of Arkansas at Pine Bluff (see attachment). This study provided considerable information on fishing numbers at parks in Little Rock. The estimates were derived by using total hours fished per month and assuming that two hours constituted an activity occasion. Based on the size of fishing ponds, an average number of activity occasions per acre of water area was derived. This factor was then multiplied by an estimate of water surface area to be made available for fishing in the proposed Fourche Bayou Park to arrive at an estimated number of fishing activity occasions the facilities would provide. It was assumed

that the activity rate used would continue unchanged for the base year and projected years.

4. **Canoeing.** The estimated number of canoeing activity occasions was derived using information provided by the Canoe Club of Arkansas. They expressed considerable interest in this aspect of the proposed facilities and indicated they would probably sponsor two or three organized group activities annually that would use the facilities. Also, it was their opinion that there would be a significant number of individual floats by their members. This echoed the sentiments on likely Fourche Bayou usage by the Arkansas Nature Conservancy. Additional data obtained from the Arkansas State Parks Department on usage of a similar canoe water trail at Pinnacle Mountain State Park were incorporated in the estimates. Based on this information, a total of 400 canoeing activity occasions was estimated for the base year. It can be expected that the number of activity occasions for this element will increase as more individuals and groups become aware of the opportunities afforded by the project. For consistency with other activities, the canoeing totals were projected to increase according to the rate of population growth (see Table 4).

6.0 VISITATION/USER ESTIMATES

The estimated utilization of the facilities (activity occasions) shown in Table 4 are based on the potential needs (demand) figures that were developed from the SCORP survey and population data for the study area (Table 3). In the original report, it was estimated that annual visitation would be about 50,000 persons, but they were not allocated by activity. As shown in Table 4, the current estimate for the base year is 43,200, a figure that increases to about 44,900 in 2015, and 46,300, 47,600, 48,900, and 50,200 in succeeding decades.

According to the SCORP 1995 report, the demand for and use of urban trail facilities in Arkansas far exceeds the supply. The report notes that urban trails should be provided for both the general population and people with disabilities. In a 1994 survey of state trail administrators, it was reported that trail use is on the rise, particularly in suburban areas. Given the uniqueness of the park's wetland area, easy road and trail access to some of its most remote sites, and the appeal of its nature and wildlife habitat for wildlife viewing, and other special recreational experiences, it was assumed it would receive considerable use from the unsatisfied recreation demand of the study area.

In this report, users of the walking and hiking activity were estimated separately from the wildlife observation experience. For many individuals, this distinction may not be completely valid. It was done mainly for two reasons. First, there will be many users who are interested mainly in the exercise and enjoyment of the walking experience. Secondly, there is likely to be a different value placed on the walking/hiking experience as opposed to those who visit the area primarily for the observation of wildlife, an activity which has greater educational value.

Table 4. Estimated Recreational Activity Occasions, Proposed Fourche Bottoms Park, Base Year, and Projected, 2005-2055

Activity	Base Year 2005	Future Years				
		2015	2025	2035	2045	2055
1. Walking / Hiking						
Potential No. Occasions ¹	1,777,678	1,843,607	1,902,177	1,956,997	2,010,402	2,066,028
Estimated No. Actual Visits:						
Individuals & Families	17,800	18,500	19,100	19,700	20,200	20,800
Schools & Other Groups ²	---	---	---	---	---	---
Total Activity Occasions	17,800	18,500	19,100	19,700	20,200	20,800
2. Wildlife Observation						
Potential No. Occasions ¹	1,050,446	1,089,404	1,124,014	1,156,408	1,187,965	1,220,835
Estimated No. Actual Visits:						
Individuals & Families	21,000	21,800	22,500	23,100	23,800	24,400
Schools & Other Groups ³	1,000	1,100	1,100	1,100	1,100	1,100
Total Activity Occasions	22,000	22,900	23,600	24,200	24,900	25,500
3. Fishing						
Estimated Activity Occasions	3,000	3000	3000	3000	3000	3000
4. Canoeing						
Estimated Activity Occasions	400	415	429	442	455	468
Total All Activity Occasions	43,200	44,815	46,129	47,342	48,555	49,768

¹Based on estimates from Table 3. See text for explanation of how activity occasions were derived.

²Schools and other groups were not included in this activity, since their purpose is mainly educational. Pinnacle Mountain State Park and the Little Rock School District were contacted to obtain information regarding field trips by school groups to park facilities and trails. The estimates shown are based upon information obtained from these two sources.

³Based on 50 groups in the base year, and 55 groups in succeeding decades, at 20 persons per group.

It is believed that school groups and other organized groups would use the facilities mainly for educational purposes, while many of the individuals and families would be there mainly for enjoyment and relaxation. The number of users in the walking/hiking category was estimated by a procedure similar to that used in the original 1979 study. That is, only a certain percentage of the overall needs or demand would be expected to utilize the trails.

In the original study, the percentage used in this calculation was about one percent of the total activity occasion demand, giving an estimate of about 16,000 activity occasions annually during the base year. This is believed to be a conservative estimate, given the assumptions used in the original study, which were: A nature appreciation area of 20 acres, 0.75 miles of foot trails, information signs, a restroom, access road, and parking area. The current proposal is adjusted to provide handicap accessible trails that include wildlife observation platforms.

The plan includes approximately three miles of foot trails (to include the authorized trails not included with the flood control channel), additional acreage, and it more fully incorporates the nature appreciation facilities into the area of the land acquisition.

Wildlife observation is likely to be the most popular activity within the proposed park for several reasons. First, the diverse nature of the resources found within the area will provide excellent nature and wildlife viewing opportunities. For that reason, the number of repeat visitations could be expected to be much greater than those who visit mainly to hike the trails for exercise and relaxation. Second, the SCORP data suggest that this activity is becoming much more popular with outdoor recreationists, and in fact, now ranks above camping and pleasure boating among outdoor recreationists in Arkansas (see SCORP 1995, page 23).

For these reasons, the estimated participation rate for the wildlife observation category was estimated to be about two percent of the total potential activity occasions. Using this percentage gives estimated totals of 22,000 user visits in the base year, with future increases to 22,900 in 2015, 23,600 in 2025, 24,200 in 2035, 24,900 in 2045, and 25,500 in the year 2055. According to the 1979 report, "the facility will conservatively experience an annual visitation in excess of 50,000." As shown in Table 4, total visitation in this analysis is estimated at 43,200 during the base year (2005), and 49,768 at the end of the period of analysis (2055).

The area containing the proposed recreation and nature appreciation facilities is known as the Fourche Creek Bottoms. As noted in other sections of the report it functions as a ponding or holding area, which absorbs the peak discharge during floods on Fourche Creek. This dampens the rate at which water is discharged into lower Fourche Creek, thus preventing flooding in the lower reaches.

Occasional flooding of the Bottoms area will impact recreation use to a limited extent. The access road, parking lot, observation platforms and trailheads are all at an elevation of 240 feet or more. Much of the three miles of hiking trail is above 240 feet as well. Past records show the water surface elevation in the Bottoms exceeds 240 feet in elevation for 53 days (15.5 percent of the time) during the course of an average year. Most of this is during late winter and early spring. For the months of May-August, a time of peak usage, only 10 days (eight percent) are likely to be lost to flooding. See Table 1, Engineering Appendix.

7.0 RECREATION BENEFITS

The benefits of the proposed recreation project were estimated by applying unit day values (UDV) obtained from Economic Guidance Memorandum 04-03, Unit Day Values for Recreation, Fiscal Year 2004, to estimated user days shown in Table 4. Using criteria enumerated in Table 1 of the Memorandum 04-03, the recreation facilities were evaluated and assigned a point value of 49. A value of 49 converts to a General Recreation unit-day value of \$6.31, which was used to derive annual recreation benefits. Table 5 describes the point allocation process and gives a brief explanation of the way in which points were assigned to each of the criteria listed in EGM 04-03.

Table 5. Point Assignment for Value of a Day of Recreation

Criteria	Number of Points	Explanation
Recreation Experience	13	Facility includes several general activities, with at least one of high quality value.
Availability of Opportunity	8	There are no more than one or two similar activities within 1 hour of travel time.
Carrying Capacity	8	The facilities are adequate for estimated usage without deterioration of the experience.
Accessibility	10	Site has fair access, good roads to site, and good roads within site, with good access to activities.
Environmental and Esthetic	10	Site has above average esthetic quality; limiting factors can be reasonable corrected.
Total Points	49	(A point total of 49 results in a UDV of \$6.31 using Conversion of Points to Dollar Values Table in EGM 04-03.)

Source: Economic Guidance Memorandum 04-03.

The UDV methodology requires that in order for a project to be justified there must be unmet or excess demand that is not being met by existing facilities. All trails in the area get heavy use. Those at Pinnacle Mountain State Park are being used almost to the point of abuse. (Personal communication, Ian Hope, State Trails Coordinator/Project Officer, Arkansas Department of Parks and Tourism Recreation, 4/28/04) A recent survey found that there are a total of 78.6 miles of trails in the cities of Little Rock and North Little Rock and at Pinnacle Mountain State Park. (Personal communication, Julia Smethurst, CESWL, 3/17/2004) The Arkansas Department of Parks and Tourism does not currently use the capacity method in planning for new trails. (Hope, 4/28/04) However, usage projections used in calculating recreation benefits in the original Fourche Bayou study used the following formula and assumptions from the 1974 Arkansas SCORP.

Units X users/unit X daily turnover X length of season = activity occasions per year/unit

Within the study area today this would result in a capacity of 1,509,120 activity days.

78.6 (miles) X 20 (hikers/mile) X 4 (T.O. rate) X 240 (days/year) = 1,509,120 user days

The very conservative estimate of 1,777,678 potential trail walking or hiking occasions (tables 3 and 4) exceeds the existing capacity by 18 percent. With the Fourche Bayou trail added, demand exceeds capacity by 13 percent. This demonstrated excess demand meets the COE requirements for using the capacity method to estimate recreation benefits accruing to the project. Recreation benefits for the base year and future years are shown in Table 6. From those values, estimated average annual equivalent benefits were derived using the current Federal discount rate of 5.375 percent. Base year benefits were estimated at just over \$272,000, increasing to \$314,000 during the 50-year period of analysis.

**Table 6. Estimated Recreation Benefits, Base Year (2005),
and Projected 2015 to 2055, October 2004**

Years	Activity Occasions	Unit-Day Value	Total Value
2005 (Base)	43,200	\$6.31	\$272,592
2015	44,815	\$6.31	282,783
2025	46,129	\$6.31	291,074
2035	47,342	\$6.31	298,728
2045	48,555	\$6.31	306,382
2055	49,768	\$6.31	314,036
Average Annual Benefits ¹			\$286,064

¹Based on a period of analysis of 50 years and a discount rate of 5.375 percent.

8.0 ECONOMIC ANALYSIS

An analysis of project costs and benefits is shown in Table 7. Total investment cost, including interest during construction, is estimated to be \$1,953,500. Average annual costs, including interest, amortization, and annual operation and maintenance costs were estimated at \$162,700, compared with average annual benefits of \$286,100, giving a benefit-to-cost ratio of 1.8.

Section 902 of WRDA 1986 requires that the cost of all post-authorization work added to a project not exceed certain limits. Additional permissions/authorizations are required if the cost of proposed new elements exceed the calculated cap. The cap is essentially the amount of the originally authorized total project cost indexed to a current dollar value plus a sum equal to 20 percent of the original total project cost (but not indexed forward). The original total project cost was calculated to be \$33,400,000 in October 1985 dollars. The *Civil Works Construction Cost Index System (CWCCIS)* was used to calculate an index (1.67) to bring the early year dollars to October 2005 levels. This amount was added with 20 percent of the original cost to calculate the cap of \$62,458,000 ($(\$33,400,000 * 1.67) + (\$33,400,000 * 0.2)$).

**Table 7. Economic Analysis, Fourche Bayou Basin, Nature
Appreciation Area, Little Rock, Arkansas
(Updated May 2005)**

Item	Amount
Period of Analysis (Years)	50
Construction Period	1
Interest Rate (Percent)	5.375%
Estimated Construction Cost	\$1,904,000
Access Road Land (1.5 acres)	3,000
Interest During Construction	46,500
Total Investment Cost	<u>\$1,953,500</u>
Annual Costs:	
Interest	\$105,000
Amortization	8,300
Operation & Maintenance	49,400
Total Annual Costs	<u>\$162,700</u>
Average Annual Benefits:	
Recreation Benefits	\$286,100
Benefit-to-Cost Ratio	1.8
Net Benefits	\$123,400

NOTE: Construction and O&M costs were provided by CESWL,
Cost Engineering and Support Section dated June 2004.

Little Rock District has calculated the cost of the constructed flood control portion of the project to be \$30,728,800. Estimates (including escalation) for the remaining additional elements are -- recreation facilities -- \$2,015,400; environmental restoration acquisition -- \$1,844,600 (to be acquired) + \$805,200 (value of acquired land); and, limited reevaluation report -- \$520,000. The sum of these estimates is \$35,914,000 or 58 percent of the calculated cap.

9.0 DATA SOURCES AND INFORMATION CONTACTS

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