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DRAFT ENVIRONMENTAL IMPACT STATEMENT
AND WILD AND SCENIC RIVER STUDY REPORT

RED RIVER

DANIEL BOONE NATIONAL FOREST



Forest Service
Southern Region



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RED RIVER

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United States
Department of
Agriculture

Forest Service
Southern Region



United States
Department of
Agriculture

Forest
Service

Daniel Boone
National
Forest

100 Vaught Road
Winchester, KY 40391

Reply to: 1920/1950

Date.

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Dear Reviewer:

Enclosed for your information and review is the Red River Wild and Scenic River Draft Environmental Impact Statement (DEIS), and Study Report that was transmitted to the Environmental Protection Agency for filing and made available for general public review today. The DEIS evaluates four alternatives for future management of the Red River in Kentucky and identifies a preferred alternative.

Comments are welcome and encouraged. Written comments should be sent to the Forest Supervisor at the above address. Public Meetings will be held in Campton, Frenchburg, Lexington, and Stanton. A schedule and time for these meetings will be announced at a future date.

Sincerely,

RICHARD H. WENGERT
Forest Supervisor

Enclosure



The following Federal agencies, in addition to those listed on page 90 were also sent copies of the DEIS:

Department of Defense
Department of the Army
Washington, DC

Department of Health & Human Services
Washington, DC

Department of Interior
Washington DC

Department of Housing and Human Services
Washington, DC

Department of Transportation
Washington, DC

Federal Energy Regulatory Commission
Washington, DC

Department of Energy
Washington, DC

Department of Agriculture
Soil Conservation Service

Department of Commerce
Washington, DC

Department of Agriculture
Rural Electrification Administration

In addition, the Governor of the Commonwealth of Kentucky was sent a copy.

Update for 1992 National Wild & Scenic Rivers Map

Big and Little Darby Creeks, OH

State of Ohio, Department of Natural Resources, Division of Natural Areas and Preserves, Scenic Rivers Program, 1889 Fountain Square, Bldg. F1, Columbus, OH 43224 614.265.6453

Big Darby Creek from the Champaign-Union County line to the Conrail railroad trestle (.9 miles upstream of U.S. 40); Big Darby Creek from the confluence with Little Darby Creek near Gerogesville to the Scioto River; the Little Darby Creek from Layfayette-Plain City Road Bridge to .8 mile upstream from the confluence with Big Darby Creek. (85.9 miles) Big Darby Creek Scenic River from its confluence with Little Darby Creek Scenic River upstream to the northern boundary of Battell-Darby Creek Metro Park; Big Darby Creek Scenic River from the U.S. Route 40 upstream to the Conrail Railroad trestle crossing; Little Darby Creek Scenic River from its confluence with Big Darby Creek Scenic River to a point eight tenths of a mile upstream. Surrounded by pastoral lands and wooded high bluffs, the Big Darby is characterized by its quiet pools and meandering nature. There are over 1 million people within a short driving distance of this stream.(3.4 miles)

Clarion River, PA

Allegheny Forest Service 222 Liberty St. P.O. Box 847 Warren, PA 16365 814.723.5150

Beginning just below Ridgway, this 52 miles of river meanders through mostly undeveloped mature forests providing recreationists with spectacular views and outstanding recreation opportunities on adjacent public lands. Unique flora include a nationally recognized area of virgin white pine and hemlock. The river is popular for canoeing as well as trophy brown trout and small mouth bass fishing. (51.9 miles)

Cossatot River, AR

Quachita National Forest, P.O. Box 1270, Federal Building, Hot Springs, AR 71902 501.394.2382

Arkansas State Parks Dept., One Capitol Mall, 4A-900, Little Rock, AR 72201 501.385.2201

Little Rock District, Corps of Engineers, P.O. Box 867, Little Rock, AR 72203 501.324.6237

Segment of the Cossatot River within the Boundaries of the Cossatot river State Park-Natural Area just above the State Highway 246 crossing, at the Ouachita National Forest boundary in Polk County to the crossing at State Highway 4 in Howard County. The Cossatot flows through steep mountain gorges and heavily wooded canyons. Having numerous falls and rapids, this river is probably the most challenging in the state. Good hiking, hunting, and bass fishing. (30.8 miles)

Brushy Creek: Segment of Brushy Creek within the boundaries of the Cossatot River State Park-Natural Area in Polk County. (.3 miles)

Elkhorn Creek, OR

Forest Service, P.O. Box 10607, Eugene, OR 97440

Bureau of Land Management 1717 Fabry Rd., SE, Salem, OR 97306 503.375.5646

This wild and scenic river consists of a 5.8 mile wild river area, extending from a point along the Willamette National Forest to its confluence with Buck Creek. A smaller tract of .6 miles designated as a scenic river area extends from the confluence of Buck Creek to that point where the segment leaves the Bureau of Land Management boundary in Township 9. (6.4 miles)

Farmington River, CT

National Park Service, 15 State Street, Boston, MA 02109

617.223.5142

Farmington River Coordinating Committee, 119 Beech Hill Rd., Winsted, CT 06098

The segment of the West Branch and mainstem extending from immediately below the Goodwin Dam and Hydroelectric Project in Hartland to the downstream end of the New Hartford/Canton town line. Topography and land-forms surrounding the river are unique to New England Upland area. River has a diversity of flow rates including flatwater and quickwater. (14 miles)

Klamath River, OR

Bureau of Land Management, Klamath Falls Resource Area, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon 97603

541.883.6916

Oregon Department of Parks & Recreation, 1115 Commercial Street, Northeast Salem, Oregon 97310-1001, 541.378.6378, ext. 235

From J.C. Boyle Powerhouse to the Oregon-California State line. The Klamath is noted for its wildlife and fish diversity, including Rainbow Trout as well as several endangered fish species. It is also utilized by three area Native American populations, has significant pre-historic and historic resources, and provides recreation including whitewater, fishing and hunting. (11.0 miles; see also "Klamath River, CA." on fold-out map).

Lamprey River, NH

National Park Service, 15 State Street, Boston, MA 02109

617.223.5142

From the southern Lee Town line to the confluence of the Lamprey and Piscassic rivers. The Lamprey River's shoreline, natural floodplain, and wetlands provide a range of wildlife habitats and the river hosts substantial numbers of freshwater mussel species. Currently the Lamprey has the largest quantity of anadromous fish to the Great Bay watershed. Included in the Lamprey's resources are two archaeological sites representing prehistoric and nineteenth century culture. (11.5 miles)

Maurice River, NJ

National Park Service, 200 Chestnut Street, Rm. 260, Philadelphia, PA 19106

215.597.1582

From the Route 670 Bridge at Mauicetown to the south side of the Millville sewage treatment plant; the Menantico Creek from its confluence with Maurice River to the base of the Impoundment at Menantico Lake; the Mamumuskin River from its confluence to the Pennsylvania Reading Seashore Line Railroad bridge. Flows through what was once an oyster harvesting town. You can still see buildings and activities related to this industry. (35.4 miles)

Red River, KY

Daniel Boone National Forest, 100 Vaught Road, Winchester, KY 40391

606.744.5656

Highway 746 bridge to School House Branch. The almost 20 miles of river, located in Powell, Wolfe, and Menifee counties, Kentucky contains wilderness habitat for rare and endangered species. The landscape character is one of rugged cliffs that almost rise perpendicularly from the water's edge, scenic gorge corridors, small waterfalls, thick vegetation, and areas of historical and archaeological importance. Red River Gorge Geological Area, National Natural Landmark, and the Clifty Wilderness are examples of outstanding corridor tracts. Opportunities exist for both novice and advanced canoeing and kayaking in some of the most spectacular white water anywhere in the eastern US. (19.4 miles)

Wallowa River, OR

Dept. of Parks and Recreation, 1115 Commercial St. NE, Salem OR 97310-1001 541.378.6378 ext. 235

Bureau of Land Management, Baker Resource Area, P.O. Box 987, Baker City, OR 97814 541.523.1303

From the confluence of the Wallowa and the Minam Rivers down stream to the confluence of the Wallowa and Grande Ronde Rivers. The Wallowa River provides habitat and spawning beds for a variety of salmonid species, and is home to a variety of wildlife including deer and elk. It offers outstanding hunting, hiking, boating, fishing and sightseeing opportunities. The Wallowa gets use today and historically, from the Nez Perce Tribe and other Sahpkin-speaking tribes. (10 miles)

Westfield River, MA

Pioneer Valley Planning Commission, 26 Central Street, West Springfield, MA 01089

National Park Service, 15 State Street, Boston, MA 02109

617.223.5142

The West Branch from a railway bridge 2000 feet downstream of the Becket Town Center to the Huntington/Chester town line; the Middle Branch from Peru/Worthington town line downstream to the confluence with Kinne Brook in Chester; Gendale Brook; the East Branch from the Windsor/Cumington Town line to the Knightville Reservoir. Diversity of challenging whitewater, including rapids of Class IV gradient. One of the last free-flowing , relatively undeveloped rivers in southeastern New England, Westfield River is has a historic Atlantic Salmon fishery. (43.3 miles)

Red River**Draft Environmental Impact Statement
and Wild and Scenic River Study Report****Daniel Boone National Forest****Menifee, Powell, and Wolfe Counties, Kentucky****Lead Agency: USDA - Forest Service****Cooperating Agencies: Department for Natural Resources and Environmental
Protection
Division of Water Resources
Frankfort, Kentucky****Responsible Official: Chief of Forest Service****For Additional Information Contact: Richard H. Wengert
Forest Supervisor
U.S. Forest Service
Daniel Boone National Forest
100 Vaught Road
Winchester, Kentucky 40391
Phone: 606/744-5656**

Abstract: This Draft Environmental Impact Statement (DEIS) and Wild and Scenic River Study Report evaluates four alternatives for future management of the Red River, Kentucky. The environmental statement describes effects of implementing each alternative. The preferred alternative, A, of the Forest Service recommends non-designation and continuation of current management of the 18.9 mile Study Segment. The other 3 Alternatives evaluates various options for designation.

Comments must be received by: MAR 15 1984

SUMMARY

Background and Purpose

This DEIS considers the potential designation of a portion of the Red River in Kentucky as a component of the National Wild and Scenic Rivers System, as provided by the Wild and Scenic Rivers Act, Public Law 90-542. The 18.9 miles of the river, located in Powell, Wolfe, and Menifee counties, Kentucky was identified for study as a possible candidate for National Wild and Scenic designation by an amendment (National Parks and Recreation Act PL 95-625) to this Act. During the course of this study, an additional .5 miles was added to the study segment. The purpose of this DEIS is to document the findings and respond to the President and Congress with a report that is consistent with the appropriate legal and regulatory requirements.

Following review of this Draft Environmental Impact Statement and Study Report, comments will be analyzed and a Final Environmental Impact Statement and Study Report will be prepared, reflecting and addressing those comments. These documents will be submitted to the President by the Secretary of Agriculture. The President then makes his recommendation to Congress. At which time, they may accept, modify, or reject the recommendations of the Red River as a part of the National Wild and Scenic Rivers System.

Preferred Alternative

Alternative A is the preferred alternative (See Map 1, p. x). This alternative would recommend non-designation and a continuation of current management of the 18.9 mile study corridor. The 9.1 mile upper river, that segment between the Highway 715 bridge and the Highway 746 bridge would remain as a State Wild River. The Forest Service would continue in its efforts to secure ownership within the present study corridor outside the Forest proclamation boundary to protect and enhance this segment.

Non-designation is judged to be more compatible with the overall management of the river and Red River Gorge and National Forest lands in general. This would allow continuation of planned recreation development which otherwise might be precluded by designation. This development has been identified as being essential to the overall management of the National Forest in this area.

The study segment is presently used for recreation and is already near or at visitor use capacity. Neither designation nor non-designation, therefore, is likely to make a significant difference in the way the area is managed in the future. The main difference between designation and non-designation is that designation would offer legislative protection rather than administrative protection of the river. Public awareness of the river would be increased by designation. Also, designation would possibly limit further alternatives for management of the area that well might be to the detriment of the area. Details of management planned under the preferred alternative are found on page 41.

Three other alternatives were evaluated:

Alternative B, (Designation of 19.4 miles of the River as a component of the National Wild and Scenic River System). (See map 4, p. 17)

Alternative B would designate 19.4 miles of the Red River, comprised of the 18.9 mile study segment plus the .5 mile segment down to the ford below Schoolhouse Branch. This alternative recommends additional acquisition in the form of easements.

Alternative C, (Designation of 19.4 miles of the River as a component of the National Wild and Scenic River System). (See map 5, p. 18)

Alternative C would designate the same segment as Alternative B, however, it recommends changes in the current act to allow acquisition in fee to all lands within the study corridor inside the present Forest proclamation boundary. The alternative also has the highest associated cost of implementation.

Alternative D would designate the 18.9 mile segment designated by Congress for study. This alternative offers the least amount of acquisition of any of the designation alternatives and had the lowest cost of implementation. However, it offers no additional protection than does non-designation. (See map 6, p. 19)

Major issues identified by the public include the effect designation would have on lifestyles of local people, land acquisition, upstream mining activities, the Red River Lake proposal, and future management of the Red River Gorge area.

In summary, the alternatives were developed after considering the range of possibilities allowable by law and regulation and after the public expressed an interest. Designation alternatives B, C or D emphasize environmental quality with D offering the least. Alternative A continues existing trends and management, provides a basis for assessing the impact of other plans, and gives considerable weight to environmental quality.

The comparison of alternatives are shown on the following tables..

ALTERNATIVES CONSIDERED - COMPARISON OF ALTERNATIVES
TABLE II-1

Resource	Alternative A No Action	Alternative B Designation 19.4 Miles	Alternative C Designation 19.4 Miles	Alternative D Designation 18.9 Miles
Hydrology and Water Quality	River remains free-flowing river. Water quality remains the same, and subject to EPA regulations. Potential degradation from area outside N.F. boundary.	River remains free-flowing. Water quality remains the same. Subject to EPA regulations. Some added protection from designation. Precludes potential lake.	19.4 miles of river remains free-flowing. Water quality remains the same, subject to EPA regulations. Some added protection from designation. Precludes potential lake.	18.9 miles of river remains free-flowing. Water quality remains the same subject to EPA regulations. Some added protection from designation. Precludes potential lake.
Soils	Insignificant,	Insignificant	Insignificant	Possible effects from private lands, greater than A, B, C.
Vegetation	Insignificant. Existing timber volume of 26,400,000 MBM would be uneffected, management in accordance with current regulations and policy.	Guarantees preservation of basic integrity of biological communities. Existing volume of 26,400,000 MBM subject management in accordance with provision of W&S Rivers Act	Guarantees preservation of basic integrity of biological communities. An additional 6256 MBM added to existing volume by acquisition management in accordance with provisions of W&S Rivers	Same as B,C. except .5 miles less, and no guarantees on private land. Existing volume of 26,400,000 MBM subject to management in accordance with provisions
Fish and Wildlife	Insignificant	Insignificant	Insignificant	Insignificant
Archaeology & History	No Effect	Insignificant	Insignificant	Insignificant
Socioeconomics	Small positive effect related to recreation activities.	Same as A	Same as A	Same as A

ALTERNATIVES CONSIDERED - COMPARISON OF ALTERNATIVES

TABLE 11-1

Resource	Alternative A No Action	Alternative B Designation 19.4 Miles	Alternative C Designation 19.4 Miles	Alternative D Designation 18.9 miles
Land Ownership & Use 1/	3300 acres in Federal ownership. No protection for 728 acres outside NF boundary. FS acquiring lands available on willing-seller basis.	3300 acres in Federal ownership. Protection for 718 ac. outside NF boundary and 762 acres within NF boundary by easement and fee acquisition of (2) 10 acre launch points. Total acquisition costs of \$722,400 (\$12,00 fee, 710,400 easements).	3300 acres in Federal ownership. Protection for 718 acres outside NF boundary by easement. Protection for 772 acres within NF boundary by fee acquisition, including fee acquisition for a 10 acre launch point at the Highway 746 Bridge. Total acquisition costs of \$813,840. (\$469,200 fee, \$344,640 easement).	Fee acquisition for 10 acre put-in and 10 acre take-out points at each end of river. Protection for only public lands within NF boundary. Private lands within and outside NF boundary and protection only by appropriate state and federal laws. Total acquisition costs of \$12,000 in fee acquisition.
Climate-Air Quality	Insignificant	Insignificant	Insignificant	Insignificant
Minerals	Insignificant	Insignificant. Government owned minerals within the "Wild" segment would be withdrawn from leasing. Leasing within the recreational segment would be judged based on its compatibility with the values under that classification.	Insignificant Same as B	Insignificant Same as B
Recreation	Retention of existing recreation opportunities and options within NF boundary for future development to capacity limits of area.	Statutory protection of existing recreation opportunities for 19.4 mile segment - Possible influence on future management policies and development of planned recreation facilities.	Statutory protection of existing recreation opportunities for 19.4 mile segment - Would guarantee potential for all planned recreation development.	Same as B, C except length of river 18.9 miles. Potential loss of some planned recreation development, because of limitations on acquisition.
Red River Lake	Potential remains (see Section IV for Environmental Consequences)	Lake eliminated	Lake eliminated	Lake eliminated

1/ Fee acquisition estimated at \$600.00/acre, easements estimated at 80% of appraised value.

ENVIRONMENTAL QUALITY COMPARISON - TABLE II-2

	Alternative A (No Action)	Alternative B Designation 19.4 Mi.	Alternative C Designation 19.4 Mi.	Alternative D Designation 18.9 Mi.
A. Miles preserved & Protected by Designation.				
1. Wild River Classification	0	9.1	9.1	9.1
2. Scenic River Classification	0	0	0	0
3. Recreational River Classification	0	10.3	10.3	9.8
4. Total Miles Designated	0	19.4	19.4	18.9
5. Miles Currently Afforded Protection ^{1/}	9.1	9.1	9.1	9.1
B. Adverse Effects Resulting From Potential Development Projects				
1. Construction of Red River Lake	11.3			
C. Cultural Resources				
1. Archaeological Sites	Negligible effect	Negligible effect	Negligible effect	
D. Recreational Resources				
1. Acres of Lake	0	0	0	0
2. Miles of Lake Shore Created	0	0	0	0
3. Miles of Fishable River				
a. Eliminated	0	0	0	0
b. Enhanced Fishery	0	0	0	0
c. Reduced Quality of Fishery	0	0	0	0
4. Miles of Whitewater Canoeing				
a. Eliminated	0	0	0	0
b. With Increased Access	10.3	19.4	19.4	18.9
E. Visual Resource				
1. Miles of River Returned in Natural Surroundings	19.4	19.4	19.4	18.9
F. Biological Resource				
1. Miles of River Habitat				
a. Afforded Protection	15.0	19.4	19.4	18.9
b. Eliminated	0	0	0	0
Net Relative Environmental Quality Benefit	High	Higher than A & C	Higher than A, B & C	Higher than A, Less than B, C

^{1/} Some protection currently afforded by 9.1 miles of river being classified as a State Wild River.

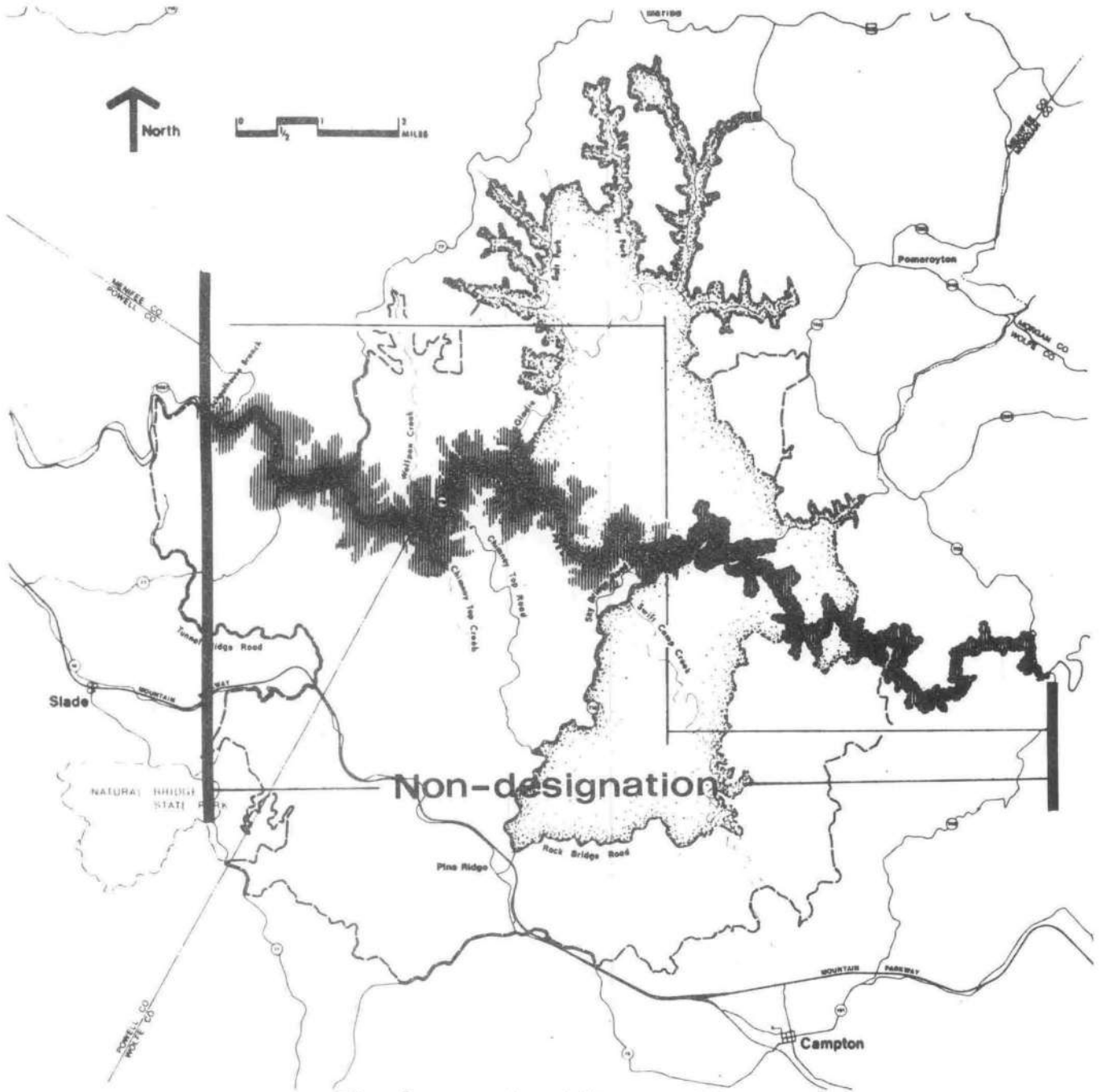
ECONOMIC ACCOUNT - COMPARISON TABLE II-3
 AVERAGE ANNUAL EFFECTS (1978 Dollars) (7 1/8% Discount)

	Alternative A (No Action)	Alternative B Designation 19.4 Mi.	Alternative C Designation 19.4 Mi.	Alternative D Designation 18.9 Mi.
<u>Effects</u>				
Developed Recreation				
Dispersed Recreation	4,785,945 <u>1/</u>	2,628,665 <u>2/</u>	2,628,665 <u>2/</u>	2,628,665 <u>2/</u>
<u>Costs</u>				
Costs of Recreation Facilities and Management	921,285	262,029	262,645	259,565
Land Acquisition				
<u>Total Effects</u>				
Beneficial Effects	4,785,945	2,628,665	2,628,665	2,628,665
Costs	<u>921,285</u>	<u>262,029</u>	<u>262,645</u>	<u>259,565</u>
Net Effects	<u>3,864,660</u>	<u>2,366,636</u>	<u>2,366,020</u>	<u>2,369,100</u>

^{1/} Alternative A assume development of facilities shown in Table IV-7.

^{2/} Alternatives B, C & D - Projected from current management. Planned facilities under Alternative A could still be built under B, C & D. This would generate additional recreation benefits at the same costs as Alternative A, however individual acquisition constrains under each designation alternative would be the controlling fact for future recreation development.

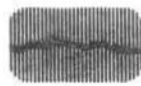
x1



**Preferred Alternative
Alternative A**



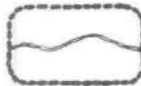
**Red River Gorge
Geological Area**



Study Corridor



**Proposed
Clifty Wilderness**



Kentucky Wild River

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I. PURPOSE OF AND NEED FOR ACTION

A. Background

Throughout our nation's history, America's streams and waterways have been an important source of transportation, energy, and economic development, providing food, beauty, and recreation. As our nation grew, we harnessed the power of our waterways with locks, dams, and other modifications. To complement the development policy, Congress passed the National Wild and Scenic Rivers Act (PL 90-542) in 1968. This act preserves selected rivers or sections of rivers in their free-flowing condition.

In 1978 Congress passed the National Parks and Recreation Act (PL 95-625) which amended the Wild and Scenic River Act and added seventeen (17) rivers for study. One of which was the Red River, in Kentucky, which flows through parts of Wolfe, Menifee, and Powell counties. The segment designated for study is:

"The segment from Highway numbered 746 (also known as the Spradlin Bridge) in Wolfe County, Kentucky downstream to the point where the river descends below seven-hundred feet above sea level (in its normal flow) which point is at the Menifee and Powell County line just downstream of the Iron Bridge where Kentucky Highway numbered 77 passes over the river."


B. Study Corridor

The study corridor is approximately fifty miles southeast of Lexington, Kentucky, in an area popularly known as the Red River Gorge.

A tributary of the Kentucky River, the Red River originates in Wolfe County, Kentucky, near the southeast-southwest junction of Wolfe and Magoffin counties and flows into the Ohio River.



REGIONAL LOCATION MAP



RED RIVER
WILD & SCENIC
RIVER STUDY and E.I.S.
CORRIDOR MAP

The corridor is along the North Fork of the Red River. It represents an area approximately 19.4 miles long and one-half mile wide. The 19.4 miles consists of 18.9 miles designated by Congress for study, plus an additional .5 mile identified by the study team. This includes one-quarter mile on each side of the river, except along sections where cliffs reduce the distance and along other sections where tributary streams extend the distance. The total study corridor comprises \pm 4,800 acres, 1500 acres of private land (772 acres inside National Forest boundary, and 728 outside boundary), and 3300 acres of National Forest lands. (See map 3, p. 3). The total drainage area for the Red River is 437 square miles; about 100 square miles are in the North Fork (Corps of Engineer 1974:48).

C. Purpose

The purpose of this DEIS is to document the findings and respond to the Congress with a report that is consistent with the appropriate legal and regulatory requirements.

This Draft Environmental Impact Statement Study Report is a threefold process. Each step in the process involves a decision to be made, which in turn effects the following steps.

First, the segment of the river designated for study by Congress must be evaluated on its eligibility to qualify as part of the National Wild and Scenic River System as defined by the 1968 Act (PL 90-542).

The study report in Appendix A evaluates characteristics of the river segment against established eligibility criteria. These criteria reflect the 1970 Guidelines and the revised 1982 Guidelines by the Departments of Agriculture and of the Interior and help define characteristics which determine a stream's eligibility in accordance with the 1968 Act.

If eligible the second step is to classify the river or its segments as wild, scenic, or recreational based upon its qualifications.

The third and final step is an evaluation of the various alternatives to determine whether the river or any portion of it should be recommended for designation as a component of the National Wild and Scenic Rivers System.

As a result of this DEIS, plus public comment, the preferred alternative will be identified in a Final Environmental Impact Statement/Study Report.

The DEIS meets requirements for an Environmental Impact Statement as required by the National Environmental Policy Act (PL 91-190). The Wild and Scenic Rivers Act requires this report to include: "the characteristics which make the area a worthy addition to the system, the current status of landownership and use in the area; the reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the National Wild and Scenic Rivers System; the Federal agency (which in the case of a river which is wholly or substantially within a National Forest, shall be the Department of Agriculture) by which it is proposed the area be administered; the extent to which it is proposed that administration, including the costs thereof, be shared by State and local agencies; and the estimated cost to the United States of acquiring necessary lands and interests in land and of administering the area as a component of the system."

D. Opportunities, Issues and Concerns

Throughout the development of this study, consultation with others has been a continuing process. The Forest Service has held four public meetings to disseminate information and to inform the

general public on the nature and content of the present study. These meetings, held at Campton, Frenchburg, Lexington, and Stanton, Kentucky, were not intended to serve as a forum for public response, but rather to inform each community of the process and intent of the study-report. As expected, the study-team gained valuable understanding of public issues and concerns. The team also contacted private landowners within the area of the study. Further, the team contacted other landowners (e.g., outside the corridor of the study), civic organizations, representatives of local county and state government, interested individuals (e.g., hikers, campers, and river-oriented recreationists), state-wide user-groups, and a landowner supported group, the Kentucky Rivers Coalition. All were important sources of information for the present study.

The following opportunities, public issues, and Forest Service concerns were identified during this study.

Opportunities

- Preserve the free-flowing character of the river.
- Maintain or enhance productivity of fish and wildlife
- Maintain or enhance outdoor recreational opportunities
- Maintain or enhance scenic, geologic, archeologic, and historic value of the area

Issues and Concerns

- What effect will increased numbers of users in the Gorge have on the lifestyles of local people in the area?
- What effect will designation have on resources upstream, especially coal?
- What change in management of the river and the Gorge will take place if the area is designated?

- How will designation affect the Red River Dam Proposal?
- How will designation effect water storage?
- How will designation effect flood-control benefits?
- How will social and economic well-being of the area and its residents be effected under designation?
- How will designation effect land acquisition?
- What effect will designation have on irreversible and irretrievable committment of resources and preserve freedom of choice for future generations?
- What effect will designation have on the social and economic well-being of the area and its residents?
- How will designation affect management of the rest of the Gorge?
- How will easements, rather than fee-acquisition, affect management of the rest of the Gorge and the designated sections of the Red River?
- Will designation result in an urmanageable increase in use?
How will designation of a wild and scenic river affect the Clifty Proposed Wilderness?

E. Introduction to the Document

This document is prepared in a format which combines the Wild and Scenic River Study Report and the Environmental Impact Statement . However, the process of evaluation of the river to determine its eligibility for addition to the National Wild and Scenic River System must be completed before alternatives and decisions can be addressed in the EIS process. The Study Report dealing with the eligibility and classification of the river will be included in the

Appendix of the document for reference in the EIS. This format is intended to help the reader to understand the document and the alternatives that were considered. More detail on the integration of these two documents will be addressed under "Process Used to Formulate the Alternative" contained in the next section of this document.

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. Process Used to Formulate the Alternatives

Identification and formulation of alternatives are based on the eligibility of the river for addition into the National Wild and Scenic Rivers System and the classification for which the river segment or segments of the river qualify. This information is contained in the appendix of this document. (Appendix A, p. A-1)

As previously stated, this is a three step process; before alternatives can be formulated, the eligibility and the classification of the river or any of its segments must be determined.

B. Alternative Eliminated from Detailed Study

Potentially, there are many alternative plans that might be considered for a given geographic area. Their number must be reduced by application of appropriate standards of legislation, administration, managerial feasibility, and, of course, common sense. For example, a proposed alternative must be reasonably consistent with the character of the area and objectives of current management, unless the latter are found to be substantially defective. To avoid excessive detail, the number of alternatives must be reduced to those that illustrate meaningful differences in impact. The Wild and Scenic Rivers Act requires consideration of important uses that will be enhanced, foreclosed, or curtailed by designation.

The study-team eliminated three alternatives from further consideration. The first alternative involves designating only part of the river in the Wild and Scenic Rivers System, thus allowing possible impoundments on other segments. For example, a proposed Red River Lake would leave the Upper Gorge free of impoundments at normal pool-level. It is therefore possible but highly improbably to combine impoundment of the Lower Gorge with designation of the Upper Gorge under the Wild and Scenic Rivers Act. Although many natural and scenic values would remain in the Gorge, there would not be a strong case for designation. The length of this segment is short (9.1 miles); also, up to a third of this segment would be included in the flood pool during peak periods of whitewater canoeing. This alternative would provide limited protection in terms of environmental quality.

The Red River Lake was eliminated from consideration as a alternative because the project is presently a authorized project, but has been placed on inactive status. A brief history of the project and the controversy that surrounds it is outlined in Appendix B, p. B-1.

The second involves designation of the total 19.4 miles with the segment within the National Forest boundary being administered by the Forest Service and the segment outside the boundary to the Highway 746 bridge by the State of Kentucky. This segment is currently a State Wild River, however, the state is opposed to administering a national component of the Wild and Scenic River's system. The third alternative involves designation of the 13.9 mile segment within the National Forest boundary and no designation for the segment between the N.F. boundary and Highway 746 bridge. This segment would remain a State Wild River with administration by the State of Kentucky according to their appropriate laws and regulations. This alternative would offer no protection or right of use to this segment outside of the National Forest boundary other than according to state regulations.

Also because of terrain, there would be no accessible put-in place at of the beginning of the national designation segment.

Additional segments of the river above the Highway 746 bridge and downstream from the lower terminus were considered; however due to the change in the character of the river and surrounding terrain these segments were not considered for further study.

C. Description of the Alternatives

The alternatives selected for intensive evaluation and comparison are listed below, with a comparison summary shown in Tables II-1, II-2, II-3, pages 13-16.

1. Alternative A: (No Action, Current Management - Preferred Alternative

Eligible segments would not be designated and given statutory protection under the Wild and Scenic Rivers Act. Management of the river would continue under existing authority and regulations. National Forest lands would be managed in accordance with provisions established in the Red River Unit Plan pending development of the Forest Land Management Plan, due for completion in 1983. If the recommended Clifty Wilderness becomes a reality, the river segment within that area would be managed in accordance with established procedures for managing wilderness. Management of private land in the corridor of the river would continue to be subject to applicable state and local laws and regulations. This alternative provides the basis for assessing the impact of other alternatives. Under this alternative, the possibility of construction of the Red River Lake still remain.

2. Alternative B: Wild and Scenic River Designation 19.4 Miles

This alternative would recommend designation of 19.4 miles of the Red River to the Wild and Scenic Rivers System. It emphasizes environmental quality and enhancement of a full range of recreational opportunities. The Red River is divided into two segments and classifications: 1) the Upper Gorge, "wild", and 2) the Lower Gorge, "recreational" (See map 4, p. 17). This alternative would recommend use of fee acquisition to acquire a put-in launch at the Highway 746 and a take-out launch at the ford below Schoolhouse Branch. Also easements would be recommended for all private lands with the study corridor, both within and outside the N.F. boundary.

3. Alternative C: Wild and Scenic River Designation, 19.4 Miles

This alternative would recommend designation of 19.4 miles of the river to the national system, with the Upper Gorge, as a Wild River and the Lower Gorge as recreational. Fee acquisition would be recommended for all private lands within the corridor between the lower terminus and the N.F. proclamation boundary and for a put-in canoe launch at Highway 746 bridge. Easements would be recommended for all private lands within the corridor outside of the proclamation boundary. It emphasizes environmental quality and enhancement of a full range of recreational opportunities. This alternative is also more compatible with present development and use of the area, than other designation alternatives (See map 5, p. 18).

4. Alternative D: Wild and Scenic Designation, 18.9 Miles

This alternative recommends designation of 18.9 miles to the National system, as specified for study. The Upper

Gorge, from the Highway 746 to the Highway 715 as "Wild" and the Lower Gorge from the Highway 715 to an area just below the Highway 77 bridge, "Recreational." Fee acquisition would be recommended for a "put-in" launch at the Highway 746 bridge and a "take-out" launch at the Ford below Schoolhouse Branch. (See map 6, p. 19)

ALTERNATIVES CONSIDERED - COMPARISON OF ALTERNATIVES
TABLE II-1

Resource	Alternative A No Action	Alternative B Designation 19.4 Miles	Alternative C Designation 19.4 Miles	Alternative D Designation 18.9 Miles
Hydrology and Water Quality	River remains free-flowing river. Water quality remains the same, and subject to EPA regulations. Potential degradation from area outside N.F. boundary.	River remains free-flowing. Water quality remains the same. Subject to EPA regulations. Some added protection from designation. Precludes potential lake.	19.4 miles of river remains free-flowing. Water quality remains the same, subject to EPA regulations. Some added protection from designation. Precludes potential lake.	18.9 miles of river remains free-flowing. Water quality remains the same subject to EPA regulations. Some added protection from designation. Precludes potential lake.
Soils	Insignificant,	Insignificant	Insignificant	Possible effects from private lands, greater than A, B, C.
Vegetation	Insignificant. Existing timber volume of 26,400,000 MBM would be unaffected, management in accordance with current regulations and policy.	Guarantees preservation of basic integrity of biological communities. Existing volume of 26,400,000 MBM subject management in accordance with provision of W&S Rivers Act	Guarantees preservation of basic integrity of biological communities. An additional 6256 MBM added to existing volume by acquisition management in accordance with provisions of W&S Rivers	Same as B.C. except .5 miles less, and no guarantees on private land. Existing volume of 26,400,000 MBM subject to management in accordance with provisions
Fish and Wildlife	Insignificant	Insignificant	Insignificant	Insignificant
Archaeology & History	No Effect	Insignificant	Insignificant	Insignificant
Socioeconomics	Small positive effect related to recreation activities.	Same as A	Same as A	Same as A

ALTERNATIVES CONSIDERED - COMPARISON OF ALTERNATIVES

TABLE II-1

Resource	Alternative A No Action	Alternative B Designation 19.4 Miles	Alternative C Designation 19.4 Miles	Alternative D Designation 18.9 miles
Land Ownership & Use 1/	3300 acres in Federal ownership. No protection for 728 acres outside NF boundary. FS acquiring lands available on willing-seller basis.	3300 acres in Federal ownership. Protection for 718 ac. outside NF boundary and 762 acres within NF boundary by easement and fee acquisition of (2) 10 acre launch points. Total acquisition costs of \$722,400 (\$12,00 fee, 710,400 easements).	3300 acres in Federal ownership. Protection for 718 acres outside NF boundary by easement. Protection for 772 acres within NF boundary by fee acquisition, including private lands within and outside NF boundary and protection only by appropriate state and federal laws. Total acquisition costs of \$813,840. (\$469,200 fee, \$344,640 easement).	Fee acquisition for 10 acre put-in and 10 acre take-out points at each end of river. Protection for only public lands within NF boundary. Private lands within and outside NF boundary and protection only by appropriate state and federal laws. Total acquisition costs of \$12,000 in fee acquisition.
Climate-Air Quality	Insignificant	Insignificant	Insignificant	Insignificant
Minerals	Insignificant	Insignificant. Government owned minerals within the "Wild" segment would be withdrawn from leasing. Leasing within the recreational segment would be judged based on its compatibility with the values under that classification.	Insignificant Same as B	Insignificant Same as B
Recreation	Retention of existing recreation opportunities and options within NF boundary for future development to capacity limits of area.	Statutory protection of existing recreation opportunities for 19.4 mile segment - Possible influence on future management policies and development of planned recreation facilities.	Statutory protection of existing recreation opportunities for 19.4 mile segment - Would guarantee potential for all planned recreation development.	Same as B, C except length of river 18.9 miles. Potential loss of some planned recreation development, because of limitations on acquisition.
Red River Lake	Potential remains (see Section IV for Environmental Consequences)	Lake eliminated	Lake eliminated	Lake eliminated

1/ Fee acquisition estimated at \$600.00/acre, easements estimated at 80% of appraised value.

ENVIRONMENTAL QUALITY COMPARISON - TABLE II-2

	Alternative A (No Action)	Alternative B Designation 19.4 Mi.	Alternative C Designation 19.4 Mi.	Alternative D Designation 18.9 Mi.
A. Miles preserved & Protected by Designation.				
1. Wild River Classification	0	9.1	9.1	9.1
2. Scenic River Classification	0	0	0	0
3. Recreational River Classification	0	10.3	10.3	9.8
4. Total Miles Designated	0	19.4	19.4	18.9
5. Miles Currently Afforded Protection ^{1/}	9.1	9.1	9.1	9.1
B. Adverse Effects Resulting From Potential Development Projects				
1. Construction of Red River Lake	11.3			
C. Cultural Resources				
1. Archaeological Sites	Negligible effect	Negligible effect	Negligible effect	
D. Recreational Resources				
1. Acres of Lake	0	0	0	0
2. Miles of Lake Shore Created	0	0	0	0
3. Miles of Fishable River				
a. Eliminated	0	0	0	0
b. Enhanced Fishery	0	0	0	0
c. Reduced Quality of Fishery	0	0	0	0
4. Miles of Whitewater Canoeing				
a. Eliminated	0	0	0	0
b. With Increased Access	10.3	19.4	19.4	18.9
E. Visual Resource				
1. Miles of River Returned in Natural Surroundings	19.4	19.4	19.4	18.9
F. Biological Resource				
1. Miles of River Habitat				
a. Afforded Protection	15.0	19.4	19.4	18.9
b. Eliminated	0	0	0	0
Net Relative Environmental Quality Benefit	High	Higher than A & C	Higher than A, B & C	Higher than A, Less than B, C

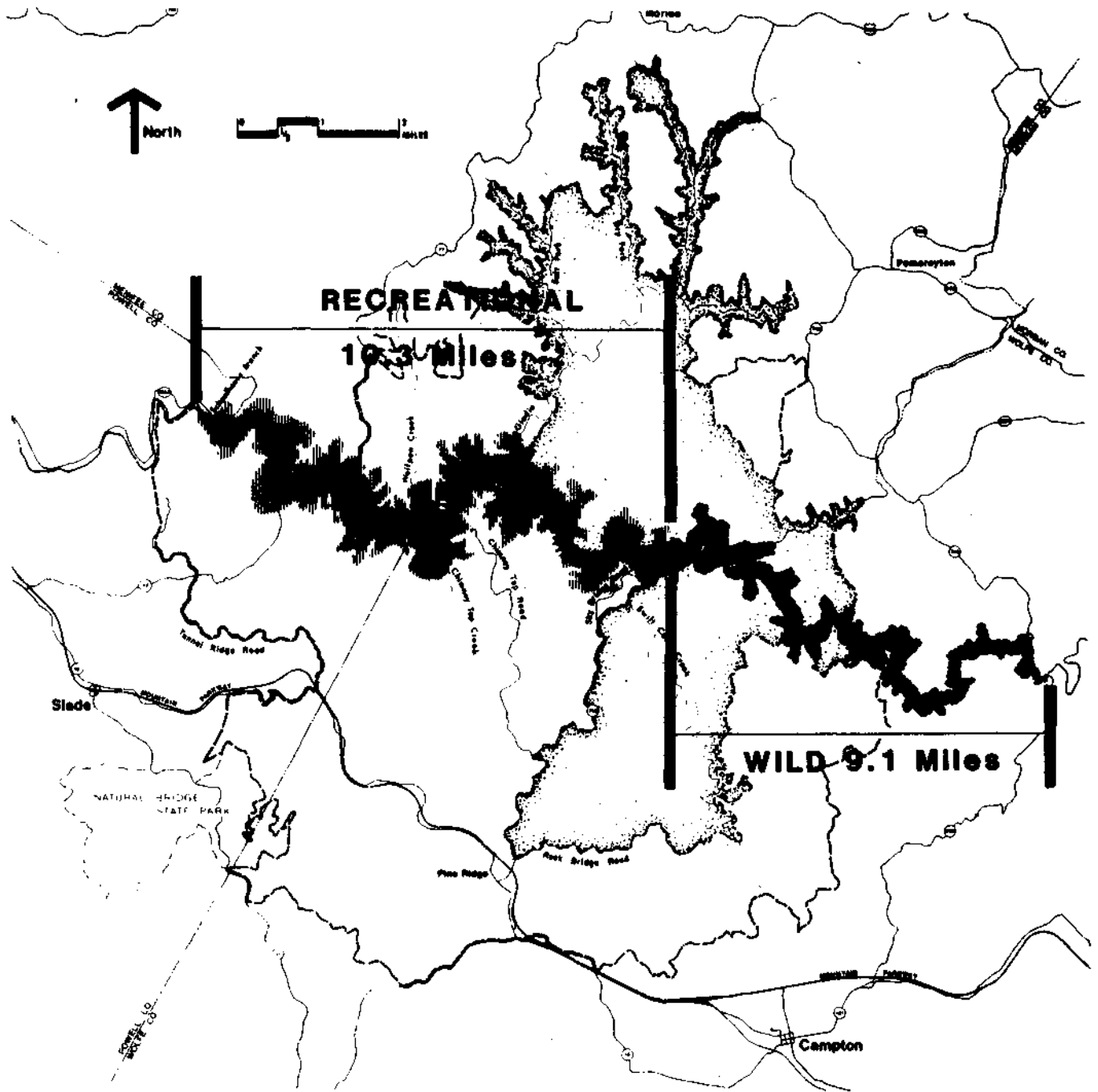
^{1/} Some protection currently afforded by 9.1 miles of river being classified as a State Wild River.

ECONOMIC ACCOUNT - COMPARISON TABLE II-3
 AVERAGE ANNUAL EFFECTS (1978 Dollars) (7 1/8% Discount)

	Alternative A (No Action)	Alternative B Designation 19.4 Mi.	Alternative C Designation 19.4 Mi.	Alternative D Designation 18.9 Mi.
<u>Effects</u>				
Developed Recreation	4,785,945 <u>1/</u>	2,628,665 <u>2/</u>	2,628,665 <u>2/</u>	2,628,665 <u>2/</u>
Dispersed Recreation				
<u>Costs</u>				
Costs of Recreation Facilities and Management	921,285	262,029	262,645	259,565
Land Acquisition				
<u>Total Effects</u>				
Beneficial Effects	4,785,945	2,628,665	2,628,665	2,628,665
Costs	<u>921,285</u>	<u>262,029</u>	<u>262,645</u>	<u>259,565</u>
Net Effects	3,864,660	2,366,636	2,366,020	2,369,100

^{1/} Alternative A assume development of facilities shown in Table IV-7.

^{2/} Alternatives B, C & D - Projected from current management. Planned facilities under Alternative A could still be built, under B, C & D. This would generate additional recreation benefits at the same costs as Alternative A, however individual acquisition constrains under each designation alternative would be the controlling fact for future recreation development.



ALTERNATIVE C

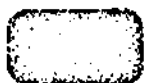
Designation 19.4 Miles



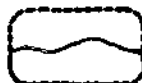
**Red River Gorge
Geological Area**



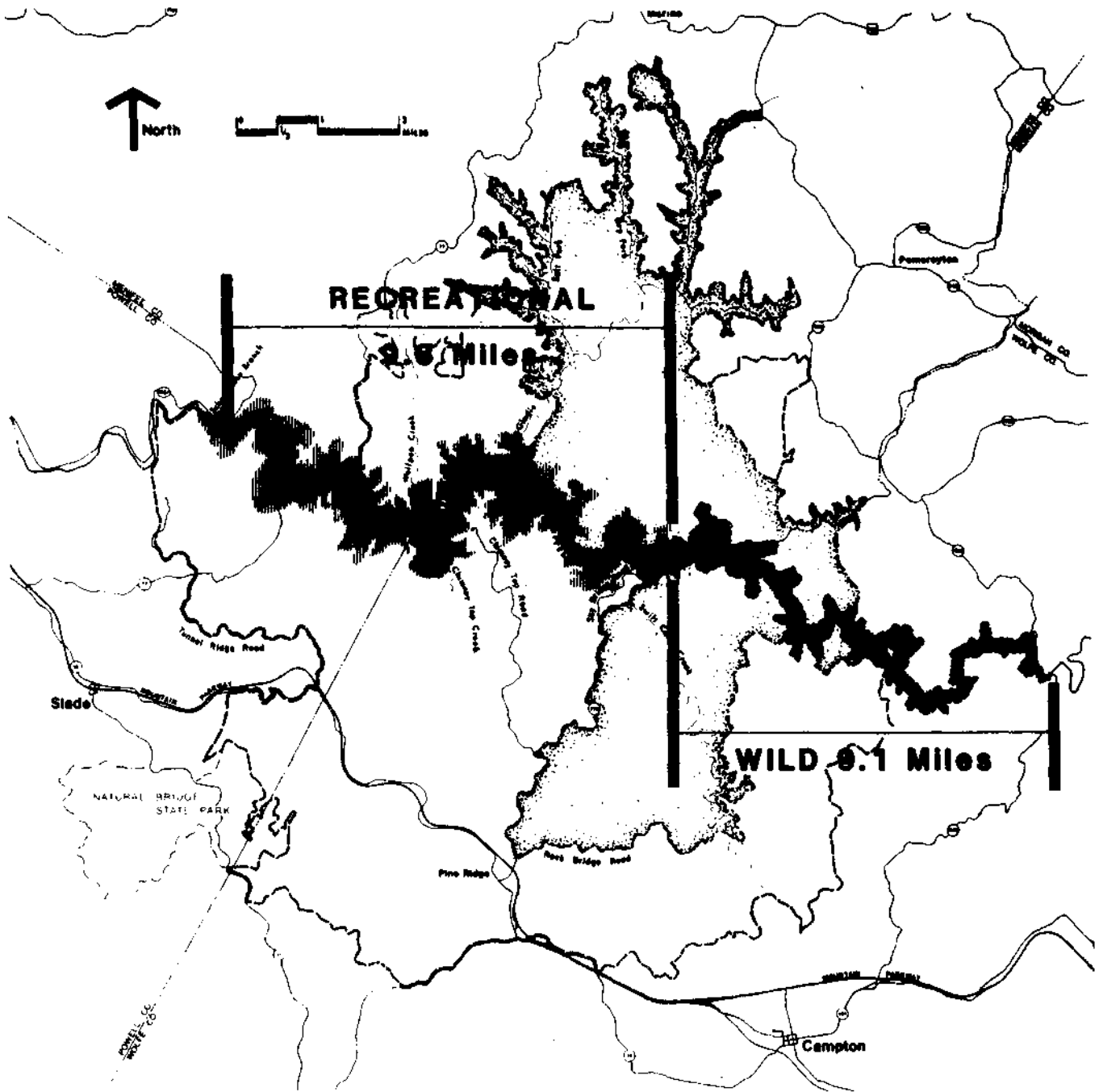
Study Corridor



**Proposed
Clifty Wilderness**





Kentucky Wild River



ALTERNATIVE D

Designation 18.9 Miles

-  Red River Gorge Geological Area
-  Proposed Clifty Wilderness

-  Study Corridor
-  Kentucky Wild River

D. Evaluation and Comparison of Alternatives

1. Alternative A: (No Action, Current Management)

This alternative continues present management. The Forest Land Management Plan will direct and control future management of land and resources. The possibility of the construction of Red River Dam still exists under this alternative, however, the potential for this facility appears very unlikely under current conditions.

The following items are evaluated on the basis that the Red River Dam is not built. (see Table II-1, II-2, II-3, p. 13-16)

a. Hydrology and Water Quality

The Forest Service administered lands within the total watershed area are 1%. The volume timing and quality of flows will not be significantly affected by Forest Service management with the study corridor. The segment of river outside the present National Forest boundary will be unprotected except for regulation imposed in relation to its status as a Kentucky Wild River. Water quality should remain at present levels and still be subject to possible changes from sources outside of National Forest ownership. Water quality will be measured and controlled by EPA and state regulations and standards.

b. Soils

The negligible amount of bottomland in the corridor limits agricultural production; thus relatively little land along the river is actually under cultivation; during 1979-1980, 72 acres were cultivated.

Current agricultural practices in and outside the corridor would be encouraged to continue. These practices are beneficial to wildlife and maintain the esthetic variety and landscape character of the river and gorge area. Minor soil compaction and soil movement would be expected with recreation facility development and use. These would be mitigated with standard design practices.

c. Vegetation

Production of timber would be of relatively minor importance, with levels of production and timber harvesting guided by current management plans. This alternative allows greatest flexibility for future management of timber. Present volumes of timber on National Forest lands are estimated at 8,000 MBM per acre for a standing volume total of 26,400,000 MBM. (See Table VI, p. 78) The average annual timber growth rate is assumed at 2%. Value is estimated at \$320 per acre. Problems with accessibility of the area caused by cliffs and very rugged terrain will cause timber harvesting to be held to a minimum within the corridor. Additionally, an approximate segment of 5 miles of the corridor is within the recommended Clifty Wilderness, which is deferred at the present time awaiting Congressional action.

d. Fish and Wildlife

Current fish and wildlife populations would remain the same. Habitat would be managed in accordance with approved plans for the area, which include emphasis for the enhancement of wildlife.

e. Archaeology and History

Archaeological and historical sites on N.F. lands would be protected and managed in accordance with current laws and regulation. Interpretative facilities would be developed to enhance, protect, and educate users of these sites. This includes a Visitor Information Center and satellite interpretative facilities.

f. Socioeconomics

Values derived from recreationists who visit the area and the capital and cost of operation and maintenance of the associated facilities would continue to impact the economics of the area, but only at insignificant levels. Development of future recreation facilities would generate small positive effects to the area in both income and employment with the greater effect during construction periods.

At the regional level, there have been, and would be, some losses in the output of agriculture and timber associated with acquisition of land and restrictions

of logging activities in the Gorge. There are losses in property taxes associated with acquisition of private land, but compensating programs make payments in lieu of taxes, based on appropriations by Congress. A new program that allows a minimum payment of \$.75 per acre to local governments for National Forest lands will raise contributions in the three-county area from \$11,343 (1976) to \$50,548 per year, based on current ownership. This is an increase of approximately 450%. Table III-3, row 9, page 62, gives figures for the three counties. As stands of timber mature, twenty-five percent of gross revenues from all activities that the Forest Service pays to local governments is expected to rise above the current \$.75 per-acre minimum. Since the program is Forest-wide, Menifee, Powell, and Wolfe counties would not be unduly penalized by limited cutting of timber.

g. Land Ownership and Use

There have been several problem areas dealing with private land ownership; 1) unmanaged harvesting of timber on these land caused problems by adversely affecting visual quality and increasing hazards from erosion; 2) uncontrolled residential subdivision development; 3) litter, soil compaction, erosion and vegetation damage at access points to the river. These problems have been resolved by acquisition of the lands where timber was removed and erosion occurred. Additionally a large portion of the residential subdivision along the river was also purchased. Other problems along the river are being resolved though the use of regulations and current authorities, such as Forest Supervisor's orders. Current management will continue in resolving these items with similar management.



V-2. Land at the base of Raven Rock that was subdivided and auctioned.



V-3. Litter at a campsite on private land in the study corridor. Note soil compaction

Acquisition by the Forest Service would remain the same as it is now. Emphasis would continue to be placed on acquiring private lands on a willing seller or exchange basis. The priority for acquisition would remain in the Recommended Clifty wilderness and along the Red River.

Land and Water Conservation Funds would be used to the extent available for acquisition because of the strong emphasis on recreation management within the study corridor and adjacent area.

The map on page 3 shows all privately owned land that falls within the corridor, including their approximate boundaries. Boundaries of tracts that fall outside the National Forest were more difficult to obtain. There are approximately 772 acres of private land within the study corridor inside the National Forest proclaimed boundaries.

Within river corridor outside the proclaimed boundary of the Forest, there are approximately 728 acres of private land. Land in this area could be acquired under existing authority. Forest would continue to acquire lands in this area on a willing seller basis. Currently some tracts are under option to the Forest Service.

h. Climate - Air Quality

No changes or impacts in climate or on air quality, would be expected under this alternative. The region would continue to meet Class II air quality standards.

i. Minerals

It is believed that activity would remain insignificant, with economic potential very low within the study corridor. However, privately owned mineral rights exist beneath National Forest surface. In the event of mineral operations, the Forest Service would make every effort to mitigate the impact. Any future leasing of government owned minerals would be in accordance with current regulation and policy. (See Table III-5 p. 67, Status of Mineral Rights within the Corridor.)

j. Recreation

The area within the study corridor, as well as the adjacent areas in the Red River Gorge, would be managed in accordance with current plans which emphasize dispersed recreation and the national and unique features of the area.

Current management plans and development would yield an estimated 627,000 Recreation Visitor Days in the year 2000.

Development within the present study corridor would emphasize protection of the river and the surrounding values while providing interpretation of the outstanding features of the gorge and providing for visitor safety. These facilities would include day-use area, trails and trailhead parking areas and interpretive items, and canoe launches. Camping facilities would be provided around the exterior of the area on sites more suitable for development; these facilities would cause less vehicular congestion.

Detailed projections and costs for recreation are contained in Section IV, p. 75, Environmental Consequences.

2. Alternative B: Wild and Scenic River Designation, 19.4 Miles

This alternative recommends designation of 19.4 miles of the Red River as a Wild and Scenic River (See map 4, p. 17).

a. Hydrology and Water Quality

Designation of the 9.1-mile stretch of the upper Red River "wild" and the lower 10.3 miles "recreational" would enhance the ability of the Forest Service to preserve outstanding values and qualities of the river. Although some sections are already, or would be receiving some level of protection under current designations such as Red River Gorge Geological Area, National Natural Landmark, and Recommended Clifty Wilderness, the degree and extent of protection offered by these designations are less than that which would be afforded under the Wild and Scenic Rivers Act because the former are administrative actions, while the latter is legislative. The 9.1 mile "Wild" portion of the river is also a Kentucky Wild River as enacted by the State of Kentucky.

Wild and recreational river-status might further protect the Red River from potentially damaging mining practices in the watershed. Some local citizens expressed this concern during early public-information meetings because designation would focus attention from both the general public and the federal government on the river and, at the same time, would focus more attention on mining in the watershed. Although existing state and federal regulations should assure that the quality of water not be endangered, designation of Kentucky Wild River, Recommended Clifty Wilderness, and Geological Area help to insure careful monitoring of mining operations. Designation would be simply an additional item that directs attention to the area.

b. Soils

Minor soil compaction and soil movement would result with recreational use and development of recreational facilities. These results would be similar to effects under the other alternatives; they would be mitigated by standard design practices.

c. Vegetation

Vegetation would be managed to protect and preserve the qualities which caused the river to qualify as a component of the Wild and Scenic River System. Cutting of timber would serve to maintain or enhance the outstanding scenic qualities of the river and to provide for user safety and enjoyment of the river. This alternative would guarantee preservation of the basic integrity of the existing biological communities within the river corridor on federal lands.

d. Fish and Wildlife

This alternative would not alter present fish and wildlife populations. Designation would offer added protection to the preservation of the existing habitat for these populations. Little change would be expected under this alternative in relation to Alternative A, (No Action).

e. Archaeology

Archaeological and historical sites on N.F. lands would be managed the same as under Alternative A (No Action). Additional interest might be generated for these sites by designation, however use is not expected to increase above levels of current management in Alternative A.

f. Socioeconomics

The same values in income and employment derived from recreationists as would occur under Alternative A, would be generated by designation under this alternative if the planned recreation development area is built. If these facilities are not built, because lack of acquisition, then these values to the region would be reduced.

g. Land Ownership and Use

Acquisition of private lands by the federal government would be under the authority of the Wild and Scenic Rivers Act. Acquisition under this authority has certain constraints: (16 USC 1271-1287)

1. An average of no more than 100 acres per river mile shall be acquired in fee title.
2. If 50 percent or more of the entire acreage within the river corridor is in public ownership, fee title will not be acquired by condemnation.
3. Condemnation may be used for acquisition of scenic easements or other easements which allow public access to the river.
4. Condemnation can be used to clear title, to acquire easements, and if ownership is less than that specified in the Act.

Under this alternative, 19.4 miles would be designated. The first constraint would limit acquisition to 1940 acres (19.4 miles x 100 acres/mile). Within the study corridor there are 1500 acres of privately owned land, 728 acres outside the National Forest boundary, and 772 acres within the boundary.

This means that all private land could be acquired in fee.

However, over 50 percent of the land within the study corridor is in federal ownership; therefore, condemnation could not be used to acquire private land in fee. Condemnation could be used to acquire easements and to clear title.

Easements would have to include the right for the federal government to control public access, types of development, types of land use and scenic quality of the private land.

Cost of easements to the government would range as high as 80 - 100% of the appraised value of the land.

In addition, the study corridor in the 9.1 mile upper segment, recommended as "Wild", includes some of the Recommended Clifty Wilderness. Within this overlapping area there is some private land which would also be needed for wilderness should Clifty be included in the National Wilderness Preservation System.

This alternative would recommend the use of easements for all private lands within the study corridor, except for the (2) canoe launch sites.

Fee title acquisition is needed for 2 sites, first a 10 acre parcel of land at the bridge where Kentucky Highway 746 crosses the Red River, and second a 10 acre parcel located at the Ford below Schoolhouse Branch. The Highway 746 site is located north of the river between the highway and the river. The other site is located in a field between the road and the river adjacent to the Ford. Here the Forest Service would develop access to accommodate users.

h. Climate-Air Quality

No changes to climate or air quality would occur with this alternative; the impact is the same as Alternative A, C and D.

i. Minerals

Outstanding and reserved mineral rights exist on N.F. lands within the river corridor. These are private

property rights which the owner has a right to exercise under specific condition prescribed by law. The Forest Service would make every effort to mitigate any impacts that would be adverse to the qualities that caused the river to be designated as part of the National Wild and Scenic Rivers System.

Government owned minerals within the "wild" segment would be withdrawn from leasing. The remaining recreational segment would be available for leasing if leasing was judged to be compatible with the values of the river under designation (See Table III-5, p. 67).

j. Recreation

The Red River would be preserved as a free flowing river providing river-related recreational activities and opportunities.

The objective of future management and development of facilities would be to protect or enhance the values which caused the river to be designated as part of the National System. Future recreational development, planned under Alternative A, (No Action), is expected to continue under designation; however, these developments are not essential to the management or designation of the river. These developments are judged to be compatible with designation and necessary for the overall management of the Red River Gorge area.

3. Alternative C: Designation 19.4 Miles Wild and Scenic

Alternative C would basically have the same effects as Alternative B, except fee acquisition would be recommended

for all private lands with the study corridor between the lower terminus and the National Forest Proclamation boundary, rather than easements.

a. Hydrology and Water Quality

Designation of the 9.1-mile segment of the upper Red River "wild" and the lower 10.3 miles "recreational" would enhance the ability of the Forest Service to preserve outstanding values and qualities of the river. Although sections are already, or would receive some level of protection under current or proposed designations, such as Kentucky Wild River, Red River Gorge Geological Area, National Natural Landmark, and Clifty Proposed Wilderness, the degree and extent of protection offered by these designations are less than that which would be afforded under the Wild and Scenic Rivers Act because the former are administrative actions, while the State and National Wild and Scenic designation are legislative.

National Wild and Scenic River-status might also further protect the Red River from potentially damaging mining practices in the watershed. Some local citizens expressed this concern during early public-information meetings because designation would focus attention from both the general public and the federal government on the river and, additionally focus more attention on mining in the watershed. Although existing state and federal regulations should assure that quality of water not be endangered, designation of Kentucky Wild River, Recommended Clifty Wilderness, and Geological Area helps to insure careful monitoring of mining operations. Wild and recreational status would be simply an additional designation that directs attention to a unique area.

b. Soils

Alternative C represents the same effects as Alternative B.

c. Vegetation

Same as Alternative B.

d. Fish and Wildlife

Same as Alternative B.

e. Archaeology and History

Same as Alternative B.

f. Socioeconomics

Same as Alternative B.

g. Land Ownership and Use

Acquisition of private lands by the federal government would be under the authority of the Wild and Scenic Rivers Act. In addition, specific legislation would be recommended under this alternative to allow acquisition in fee of all private lands in the study corridor from the lower terminus upstream to the point where the Forest proclamation boundary crosses the river. Current acquisition authority has certain stipulations: (16 USC 1271-1287)

1. An average of no more than 100 acres per river mile shall be acquired in fee title.

2. If 50 percent or more of the entire acreage within the river corridor is in public ownership, fee title will not be acquired by condemnation.

3. Condemnation may be used for acquisition of scenic easements or other easements which allow public access to the river.

4. Condemnation can be used to clear title, to acquire easements and if ownership is less than that specified in the Act.

Under this alternative, 19.4 miles would be designated. The first constraint would limit acquisition of 1,940 acres (19.4 miles x 100 acres/mile). Within the study corridor there are 1,500 acres of privately owned land, 728 acres outside the proclamation boundary, and 772 acres inside the boundary. This means that all private land could be acquired in fee title.

However, as stated in the second stipulation, over 50 percent of the land within the study corridor is in federal ownership; therefore, condemnation could not be used to acquire private land in fee title. Condemnation could be used to acquire easements and to clear title.

Private land from the lower terminus at the ford downstream from Schoolhouse Branch upstream to the Forest proclamation boundary is needed in fee title.

Easements would have to include the right of the federal government to control public access, types of development, types of land use, and scenic quality of the private land.

The cost of easements to the government would range as high as 80-100% of the appraised value of the land.

In addition, the study corridor in part of this segment includes some of the Recommended Clifty Wilderness. Within this overlapping area there is some private land which would also be needed for wilderness should Clifty be included in the National Wilderness Preservation System.

Authority within the Act is sufficient for acquisition of easements required for private land in the segment from the Forest proclamation boundary to the upper terminus with one exception. Fee title to a 10 acre parcel of land is necessary for a public access site at the Kentucky Highway 746 bridge. The tract is located north of the river between the highway and the river. Here the Forest Service would develop facilities to accommodate users.

If a landowner prefers to sell his land in fee rather than to sell an easement, the Forest Service will acquire all rights to the land in preference to obtaining the easement by condemnation, if advantageous to the public to do so.

h. Climate-Air Quality

Same as Alternative B.

i. Minerals

Same as Alternative B.

j. Recreation

Same as Alternative B.

4. Alternative D: Wild and Scenic Designation, 18.9 Miles

This alternative involves designation of 18.9 miles to the national system. The Upper Gorge as "Wild", and the Lower Gorge as "Recreational". However, this alternative differs substantially in the term of recommended acquisition. The only acquisition recommendations would be for fee acquisition at the Highway 746 bridge for a "put-in" launch and for a "take-out" point at the Ford below Schoolhouse Branch. This 18.9 mile segment represents the segment designated by Congress for study and does not include the additional .5 miles recommended in Alternative B, and C.

a. Hydrology and Water Quality

The free-flowing nature of the river would be preserved. Designation would enhance the ability of the Forest Service to maintain and improve the water quality of the river. However, the F.S. ability under this alternative would be less than Alternative B and C because of the reductions in acquisition in both fee and easements.

b. Soils

Minor soil compaction and soil movement would result with recreational use and development of recreational facilities. These results would be similar to effects under Alternative A, B, and C; they would be mitigated by standard design practices on Federal lands. However the potential for adverse effects from private lands with the corridor would remain.

c. Vegetation

Vegetation would be managed to protect and preserve the qualities which caused the river to qualify as a component of the Wild and Scenic River System. Cutting of timber would serve to maintain or enhance the outstanding scenic qualities of the river and to provide for user safety and enjoyment of the river. This alternative would guarantee preservation of the basic integrity of the existing biological communities within the river corridor on National Forest lands, however vegetation management on private lands could still present possible adverse effects.

d. Fish and Wildlife

This alternative would not alter present fish and wildlife populations. Designation would offer added protection to the preservation of the existing habitat for these populations. Little change would be expected under this alternative in relation to Alternative A, (No Action).

e. Archaeology

Archaeological and historical sites on N.F. lands would be managed the same as under Alternative A (No Action). Additional interest might be generated for these sites by designation, however use is not expected to increase above levels of current management in Alternative A.

f. Socioeconomics

The same values in income and employment derived from recreationists as would occur under Alternative A, B, C

would be generated by designation under this alternative if the planned recreation development area is built. If these facilities are not built, because lack of acquisition, then these values to the region would be reduced.

g. Land Ownership and Use

Acquisition of private lands would be under the authority of the Wild and Scenic Rivers Act. This would include only fee acquisition for two launch sites on the river, one at the Highway 746 bridge and one at the Ford below Schoolhouse Branch. All other private lands would be left in private ownership, unless purchased on a willing-seller basis in accordance with the provisions of the Wild and Scenic River Act. Potential for adverse effects from these private lands would remain.

h. Climate and Air Quality

No changes to climate or air quality would occur with this alternative, the impact would be the same as other alternatives.

i. Minerals

Same as Alternative B.

j. Recreation

The Red River would be preserved as a free flowing river providing river-related recreational activities and opportunities.

The objective of future management and development of facilities would be to protect or enhance the values which caused the river to be designated as part of the National System. Future recreational development, planned under Alternative A, (No Action), is expected to continue under designation; however, these developments are not essential to the management or designation of the river. These developments are judged to be compatible with designation and necessary for the overall management of the Red River Gorge area. Some of the planned future development may not be possible under this alternative if certain private lands cannot be purchased on a willing-seller-basis.

F. Identification of the Preferred Alternative

1. Preferred Alternative

Non-designation, Alternative A (No Action), is the preferred alternative. (See map 1, p. x)

The study segment is presently heavily used for recreation and is already near or at visitor use capacity. Although the area could be more intensively developed, it is not likely that designation would offer any additional opportunities than would current Forest Service Management. Therefore, neither designation nor non-designation is likely to make a significant difference in the way the area is managed in the future. The main difference between designation and non-designation is that designation would offer legislative protection rather than administrative protection of the river. This could help to resolve some issues identified in this area and to permanently direct the future management of the river.

However, acquisition constraints in the Wild and Scenic Rivers Act could restrict or preclude the development of planned recreation facilities which would effect the overall management of the Red River Gorge Area and adjacent National Forest lands in general. Designation could also limit the current acquisition alternatives of the Forest Service in the study corridor.

Therefore designation, in terms of both additional recreational opportunities, and economic benefits, is not more advantageous than the continuation of current management.

2. Reason for Non-Selection

Alternative B - This alternative was not selected because of acquisition constraints. Acquisition in the form of easements was specified for all lands within the study corridor except for two launch points. These lands must be acquired in fee, but the owners may not wish to sell and the cannot be acquired in fee against the wishes of the owners under this alternative. Acquisition and ownership restrictions under designation could restrict planned future development of recreation facilities for this area that have been identified as essential to the management of the area.

Alternative C - This alternative was not chosen because it would require changes to the existing Wild and Scenic Rivers Act, and the cost of acquisition would be extremely high. It would however, permit the development of all planned recreation facilities in the area.

Alternative D - This alternative would allow the most protection at the least cost, however, it was not chosen for the same reason Alternative B was not chosen. Easements would not provide a sufficient degree of ownership to permit all planned development that is needed for the management or the river and the Red River Gorge Area in general .

3. Plan of Management

Current management of the study segment will continue, we would prepare a plan of management whose objective would be to protect and enhance the values for which the river was designated. Specifically the plan would, provide guidelines to:

- maintain existing free-flowing character of the river from the bridge at KY 746 to the ford below Schoolhouse Branch;
- prevent degradation of existing quality of water;
- preserve natural scenic values in accord with visual objectives, while minimizing visual impact of any existing and future development on the river by using techniques, such as vegetation, natural rock, and paints that blend with natural surroundings;
- provide information for safe use of the river;
- provide recreational opportunities associated with a free-flowing river at a level of use that does not cause resources to deteriorate, while continuing current plan of management for dispersed recreation;
- stipulate future management for existing projects, such as access to boating facilities and take-outs for the bridge at KY 746, the bridge at KY 715, the bridge at KY 77, and the ford near the mouth of Schoolhouse Branch. These areas have minimal needs for facilities for parking and collection of garbage;
- provide public access, use, and interpretation to the corridor in a way that is reasonable and consistent with protection to and enhancement of the corridor;
- provide agricultural operations and low impact recreation along the recreation segment that minimize adverse impact on the river and its users and enhance enjoyment of the stream;

--provide protection, use, and enhancement of fish and wildlife resources within the framework of appropriate federal and state laws.

Some recreational facilities now planned by the Daniel Boone National Forest may have to be moved or eliminated, if lands planned for these uses could not be purchased on a willing seller basis.

Acquisition of land within the study corridors both inside and outside of the current Forest Proclamation Boundary would continue under current management based on the availability of funds.

III. AFFECTED ENVIRONMENT

A. Study Corridor

The portion of the Red River designated for study meanders through parts of Menifee, Powell, and Wolfe counties in eastern Kentucky. Immediately east of Stanton, the area is approximately fifty miles southeast of Lexington, Kentucky, in the region of the headwaters of the Red River Basin.

The corridor is along the North Fork of the Red River. It represents an area approximately 19.4 miles long and one-half mile wide. This includes one-quarter mile on each side of the river, except along sections where cliffs reduce the distance and along other sections where tributary streams extend and the corridor. The total study corridor comprises 4,800 acres (See map 3, p. 3). The total drainage area for the Red River is 437 square miles (Corps of Engineer 1974:48).

B. Transportation

Easily accessible to the public, Interstate Highway 64 and the Mountain Parkway pass respectively north and south of the corridor. U.S. Highway 460 passes just north of the corridor, while Highway 15 parallels the Mountain Parkway on the south; Kentucky Highway 746 passes on the east; and Kentucky Highways 77 and 715 pass through the corridor. People can also gain access to the river corridor via County Road 1067 and Forest Development Road 23. Approximately 94 million people reside within 500 miles of study segment of the Red River (See map 2, p. 2).

C. Climate

Temperatures in the corridor are generally moderate, with few days greater than 100 degrees or less than zero degrees Fahrenheit. For the most part, the weather is cool and moist during October through January and March, with February being cool and dry. June-August is the warmest and wettest period in the year. May and September are usually warm and relatively dry. Approximately thirty-seven percent of the average annual precipitation occurs from December through May, and sixty-three percent from June through November.

D. Hydrology

The analysis of water quality is based on two sources. First, the measurements of various parameters in accordance with the EPA Water Quality Criteria. Second, a study of the aquatic biota in the Red River. Biologists have found that species indigenous to a particular body of water can indicate its quality.

The U.S. Forest Service, the U.S. Geological Survey, and the Kentucky Nature Preserves Commission have collected water-quality data in the Red River Gorge area. Data from two stations of the

Forest Service and two stations of the Geological Survey provide measurements that can be compared with existing guidelines of the EPA. The U.S.G.S. station at Hazel Green, Kentucky, is above Highway 746, the proposed beginning point of designation. The station of the U.S.G.S. at Pine Ridge and the station of the Forest Service at Sky Bridge are in approximately the same location and fall about one-tenth mile downstream from Swift Camp Creek which is the recommended point of beginning for designating the river recreational. The second station is located at the point where Gray's Branch flows into the Red River near the bridge over the stream at Highway 77. In 1979, the Nature Preserves Commission collected data on aquatic species in the Red River near the bridge over the stream at Highway 746; this information is the final source for the present study (See Harker, Call, Warren, Camburn, and Wigley 1979).

The Red River is a free-flowing stream that has no major impoundments. Since potential for producing power is small, there are no serious proposals for hydroelectric projects. The average monthly flows are highest during December through May. Distribution of flows, compared with distribution of rainfall, indicates that geology influences movement of rainfall into the stream. This influence is an apparent capability to store rainfall as groundwater and slowly release this water as surface stream flow. (See Table III - 1, 2, p. 46, 47).

Moreover, the river contributes to problems from flooding along the Kentucky River. Due to the dissection of the watershed runoff from storms rapidly concentrate into peaks. Relationships of depth to frequency of flooding are not available for the river. Because of the "confinement" of the river, narrow flood plains, rapid "concentration" of water, and risk of floods, peril to the general public is considered to be moderate to-high. Peak flows for the 100-year flood at selected locations are outlined in Table III-1.

Table III-1 Peak Flows (CFS) for 100 Year Flood ^{1/}

Location	Flow (cfs)
Red River, Hazel Green, Ky.	9,190
Red River Clay City, Ky.	28,200

Recreational uses of surface water within the area under study are canoeing, swimming/wading, aesthetics, and warm-water fisheries. The State of Kentucky specifies water quality standards for aquatic life (i.e., dissolved oxygen, pH, temperature, and toxic substances) and recreation (total and fecal coliform). ^{2/} The United States Environmental Protection Agency (USEPA) has prepared guidelines and suggested standards for sediment. The Forest Service as a minimum complies with standards of the State of Kentucky, which are the same as EPA standards.

The Forest Service and the U.S. Geological Survey have collected data on quality of water at various locations. Available data on bacteriological quality of water (i.e., total and fecal coliform) are inconclusive. Samples continue to be taken to verify the bacteriological quality.

Except for iron, minerals found in the river are within standards or guidelines for the expected recreation uses. Concentrations of iron at Hazel Green and Pine Ridge, Kentucky, exceed guidelines for warm-water fisheries. Available data and information do not indicate the cause of these high concentrations. However, rock formations show unusual amounts of red coloration which is attributed to a high iron content. This indicates that iron content could be a natural background in the stream. To date, however, evidence indicates that cumulative levels of toxicity do not exceed accepted standards. ^{2/}

^{1/} Hannum, Curtis H., 1976. Technique for Estimating Magnitude and Frequency of Floods in Kentucky. U.S.G.S., U.S.D.I. Water Resources Investigations 76-62. pp. 44-45.

^{2/} Kentucky Nature Preserves Commission. 1979a. Aquatic Biota and Water Quality Survey of the Appalachian Province, Eastern Kentucky. Volume II. Kentucky Nature Preserves Commission Technical Report. Frankfort, Kentucky.

TABLE III - 2 WATER QUALITY FOR RED RIVER 2/10/70 - 9/12/72

Station	Parameter	# of Samples	Range	
Hazel Green	pH	3	6.8	- 7.3
	Conductivity	10	60	- 157
	Dissolved Solids	56	48	- 326
	Alkalinity	3	34	- 54
	Chloride	3	5.7	- 6.7
	Hardness	3	48	- 71
	Sulfates	3	13	- 19
	Fluoride	3	0.1	- 0.1
	Phosphorous	3	0.05	- 0.14
	Total Chromium	8	0	- 40
	Total Lead	8	6	- 33
	Total Arsenic	3	1	- 4
	Nitrate	3	1.4	- 5.0
3/20/69 to 10/01/74				
Pine Ridge	pH	51	6.7	- 7.8
	Conductivity	72	58	- 160
	Dissolved Solids	71	30	- 96
	Alkalinity	71	9	- 54
	Chloride	70	1.1	- 8
	Hardness	70	18	- 62
	Sulfates	71	9.2	- 22
	Fluoride	70	0	- 0.4
	Nitrate	69	0	- 5.0
	Phosphorous	6	0.01	- 0.07
	Total Iron	67	110	- 3900
	Total Manganese	66	0	- 310

From U.S. Geological Survey Data

The Kentucky Nature Preserves Commission recently investigated biota in the river to ascertain quality of water (See Harker, et al., 1979). The site where the Commission collected their information twice during 1978 is located just downstream from the bridge over the river at Highway 746. These data are particularly useful because the Commission collected comparable information on streams throughout eastern Kentucky. As a result information from the Red River can be judged in terms of a regional perspective.

Based on these investigations, the Nature Preserve Commission concludes, "This site appears to have some of the highest quality water observed in the Kentucky River Drainage" (Harker, et al., 1979a:721).

The Commission concludes that the algal flora from the Red River is the most distinct of any stream in the Kentucky River Drainage.

Several species of desmids (green algae) are found nowhere else in the drainage; these are *Cosmarium* cf. botrytis, *Euastrum* cf. insuare, and *Micraasterias* papillifera. The delicate chrysophyte, *Synura* uvella (a golden algae), also occurs only in the Red River. Four other types of algae are found only in one other stream in the Kentucky River Drainage.

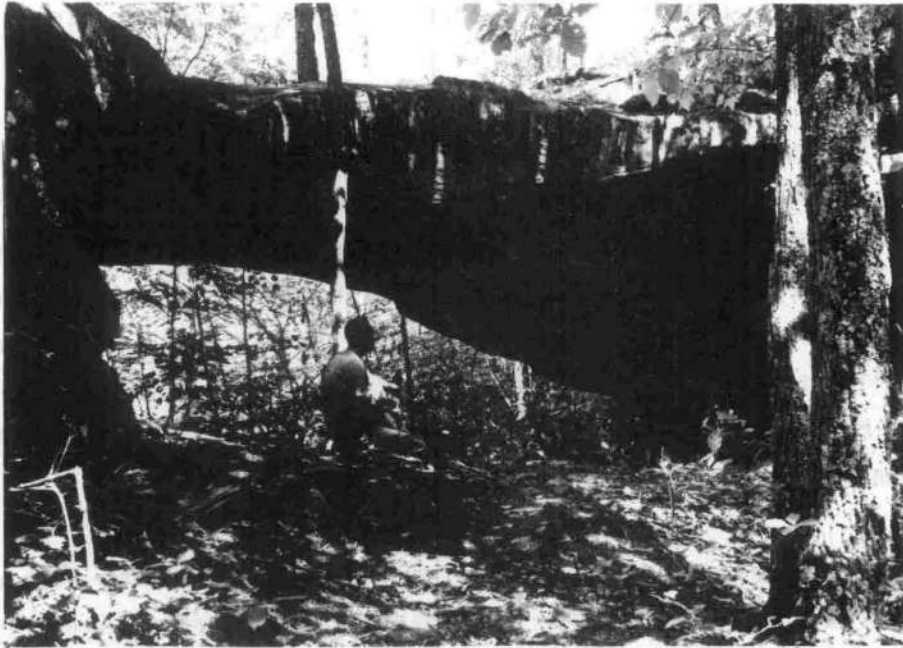
Benthic macroinvertebrate (organisms living on the bottoms of rivers) fauna in the stream also indicate the good quality of the water. The Nature Preserves Commission says, "The species representation (of benthic macroinvertebrates) at this site reflects the high quality of this stream" (KNPC 1979a; 722). Approximately fifteen species of clam fauna (Pelecypoda) also occur in the Red River. Such diversity is important because siltation has already eliminated many mussel beds in eastern Kentucky.

Several species of fish-fauna also indicate continuing high quality of water in the Red River. The eastern sand darter (*Ammocrypta* pellucida), "once reported as common in several of Kentucky's rivers" (Woolman 1892), has practically vanished because of channelization, construction of dams (Branson 1977), and siltation (Clay 1975). Because it requires clean sand in moderate-to-large rivers (Williams 1975), the eastern sand darter is no longer present in many of its former habitats, but is still present in the Red River. Several other darters are also among the endangered species in Kentucky's rivers because of destruction of their habitats. Branson and Batch (1974) have presented an excellent account of the various species of fish in the Red River drainage.

E. Geology and Geomorphology

The scenic characteristics, botanical diversity, and archaeological uniqueness of the Red River make it worthy of appreciation and protection. These outstanding features, however, are the result of geological processes that have been occurring in the Gorge for

millions of years. The area includes that part of Kentucky immediately east of the west-facing escarpment of the Appalachian Plateau. The plateau is a maturely dissected tableland of varying altitudes and relief, with local variations in character. It is a region of



III-1. Princess Arch



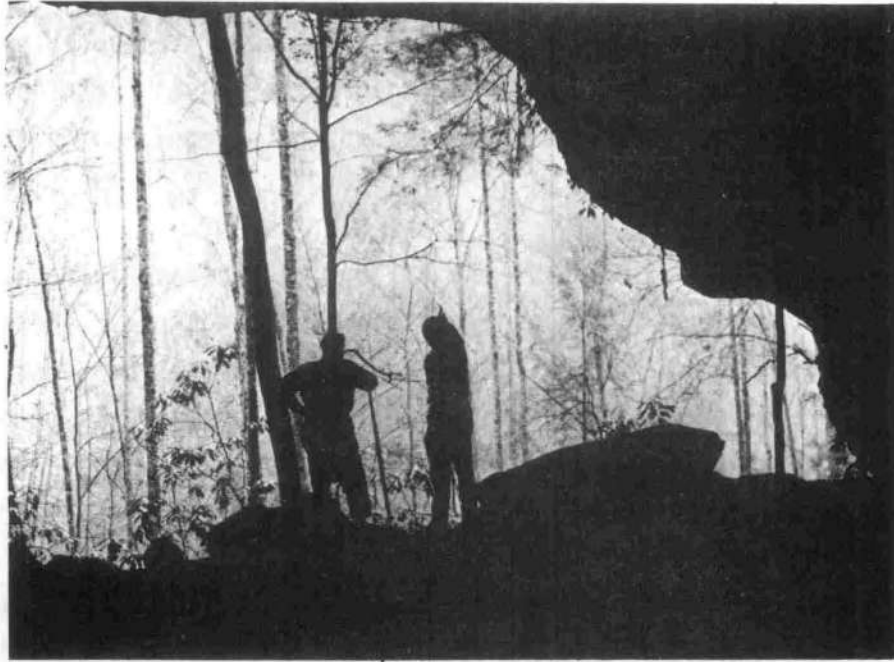
III-2. Sky Bridge

dendritic drainage and a complementary maze of irregularly winding, narrow-crested ridges, and deep, narrow valleys. Flat land occurs locally along bottomlands adjacent to the streams and on tops of plateaus.

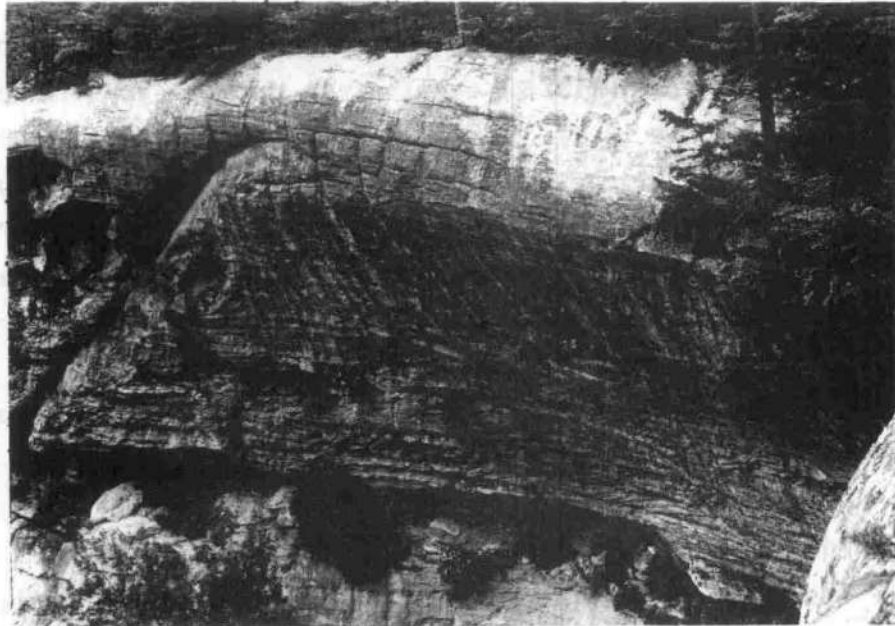
Varieties of rock found in the valleys of the Red River Gorge are sedimentary types: shale, limestone, and sandstone. These rocks were laid down during millions of years when shallow seas, swamps, and rivers covered the area. The oldest exposed rocks belong to the Mississippian period (about 300 million years ago). The uppermost layers were formed during the next geologic age, the Pennsylvanian period, which began approximately 260 million years ago. Although Pennsylvanian-aged deposits contain significant quantities of coal in other areas, most of these deposits have been eroded away in the Gorge. Only the very earliest deposits of the Pennsylvanian period remain and contain little coal.

Conditions that created the present geological wonderland began approximately forty-million years after the Pennsylvanian period, when an anticline (i.e., an uplifting of the surface of the earth) occurred. This elevation, called the Cincinnati Arch, thrust various beds of rock into a dome-like structure where they were subject to rapid erosion from the stream. Sandstone and conglomerate layers were more resistant than other layers. Moreover, erosion-resistant qualities of these layers led to the creation of the front of ridges known as the Pottsville Escarpment which forms the caplayer on tops of ridges (Ruchhoft 1966:10).

The unique rock shelters, windows, lighthouses, and arches are the result of differential weathering of the various strata of rock, because shale, limestone, and some beds of sandstone, erode faster than conglomerate sandstone. When such weathering occurs along sides of ridges, leaving overhangs of harder rock, this process forms rock houses or shelters (See Photos III-3, 4).



III-3. View from inside a rock shelter in the Gorge



III-4. Part of a rock shelter

When a large rock shelter is subject to persistent erosive forces on the side of a narrow ridge, the natural haven may eventually form an opening, initially called a lighthouse.

A lighthouse or window is a small natural arch; many such arches are found in the Red River region. Persistent weathering may form "true" arches. While it is difficult to date formation of these arches, geologists generally believe that it is a recent event, perhaps occurring as late as 10,000 years ago.

The natural process that laid down various strata of rock, uplifted deposits above later ones, also wore away these layers at different rates, making the region unique. The meandering rivers, shallow streams, and steep cliffs make the terrain rough and irregular, thus keeping human development to a minimum. Many ecological niches in the area offer abundant trees, shrubs, and wildflowers. Finally, native Americans were attracted to rock shelters because these formations provided protection from the elements and offered defense from hostile forces.

F. Soils

Soils in the study area are referred to collectively as forest soils and can be divided into two physiographic groups: 1) those occurring above sandstone cliffs, and 2) those occurring below sandstone cliffs. The predominant soils located above the prominent cliffs are of the Latham, Shelocta, and Steinsburg series. The predominant soils below the cliff lines are of the Rigley, Berks, Cranston, and Skidmore series.

The loamy soils found above the cliff lines are forming in residuum and colluvium from acid sandstone, siltstone and shales of the Breathitt Formation. These well-drained soils occur on narrow ridges, benches and steep side slopes and colluvial fans. They have low fertility, severe erosion hazard on bare surfaces, and moderate slump and slide hazard.

Soils found below the cliff lines have formed mostly in alluvium and/or colluvium from soils derived from acid sandstone, shale,

and siltstone of the Borden Formation. The exception is the Berks soils which have formed in residuum derived from high clay bearing siltstone and shales. These soils are well-drained, loamy soils rated as having severe erosion and slump and slide hazards. The Skidmore soils though have slight hazard, since they occur on nearly level bottoms and terraces. However, Skidmore soils are subject to periodic flooding. The inherent physical and chemical properties and qualities of Skidmore soils result in a productive capacity sufficient for rating by the Soil Conservation Service as a prime-farmland, forestland soil. However, due to periodic flooding in winter and spring along the Red River and its tributaries these soils aren't managed as prime farmland or forestland within the Forest but rather for timber, wildlife, and watershed values.

G. Vegetation

The study area is located in the Mixed Mesophytic Forest region of the Eastern Deciduous Hardwoods Forest, and vegetation can be characterized as to location and classified as to association with tops of ridges, slopes, and banks of streams. In general, the tops of ridges support an oak-pine community. The main species usually encountered in the overstory are shortleaf, Virginia, and pitch pine which occupy drier sites. The component of oak consists of black, scarlet, white, post, northern red, and chestnut. Various other species of hardwood, including pignut, shagbark, and sweet pignut hickory, are usually found in association with pine and oak. The understory of the forests on tops of ridges consists mainly of dogwood, red maple, downy serviceberry, devil's walking stick, and sourwood. The short slopes above the sandstone cliffs support an oak-hickory association. Below the cliffs, the canopy-layer of the forest consists of American beech, tulip poplar, American and white basswood, sweet birch, sugar and red maple, eastern hemlock, white pine, and yellow buckeye. The understory-layer consists mainly of young plants of the canopy-layer, plus magnolia and holly. Generally, shrubs consist of rosebay rhodo-

dendron, mountain laurel, spicebush, and hazelnut. Components on banks of streams contain species of the lower slopes and types found within broad-stream valleys. These species include American hornbeam, river birch, hazel alder, black willow, sycamore, and elm.

Wild flowers grow in profusion throughout the area, and a listing is extensive. However, a cross-section might include blue violet, aster, jack-in-the-pulpit, blue bells, wood lillies, dwarf asters, wild orchids, poppy foxglove, and wild rose. An extensive examination of the flora of the Red River Gorge is the subject of a master's thesis, "A Preliminary Survey of the Vascular Flora of the Red River Gorge of Kentucky," University of Louisville, 1970, by Paul Daniel Higgins. Higgins' investigation reveals that 555 different species of vascular plants, representing 100 families and 304 genera, are indigenous to the area.

Biological studies and surveys indicate that the Red River Gorge is a valuable area for studying common and rare flora and, to a lesser extent, fauna. Not only is there a rich collection of common species of flora, but also there are a large number of relic species. Such species presently occur in the north and are found rarely in the southern mountains. Persisting since the Pleistocene period, the Canadian yew, red-berried elder, and a rare goldenrod (Solidago alabopilosa) found refuge in coves and deep valleys. Also present are several other communities of plants not normally associated with the Appalachian Plateau. ^{3/}

Since virtually all timber in the vicinity of the Red River was cut over during the late 1800's and early 1900's, the wide variety of species is nearly all second growth, coming naturally after the logging operations. Oak-pine types are found on tops of ridges above sandstone cliffs. This is a common type in forests through-

^{3/} Kentucky Nature Preserves Commission, 1981. Rare Plants of Eastern Kentucky and the Daniel Boone National Forest. Frankfort, Kentucky.

out the Cumberland Plateau and includes such species as Virginia, shortleaf and pitch pine; black, scarlet, white, post, northern red, and chestnut oak; and various hickories.

On slopes below cliffs, variety increases; some common types are yellow poplar, eastern hemlock, beech, American and white basswood, red and sugar maple, and sweet birch. Rhododendron and mountain laurel, common in the understory, grow along banks of rivers, as well as river birch, sycamore, elm, black willow, and others. Hemlock is also prevalent along banks of tributaries that flow into the Red River. With the cessation of logging activities in the late 1800's and early 1900's, the area along the river grew back to become a mixture of species. Estimates within the study corridor reveal an average volume of approximately 8,000 MBM per acre with a 2% annual growth rate yielding 634 board feet per acre.

H. Fish and Wildlife

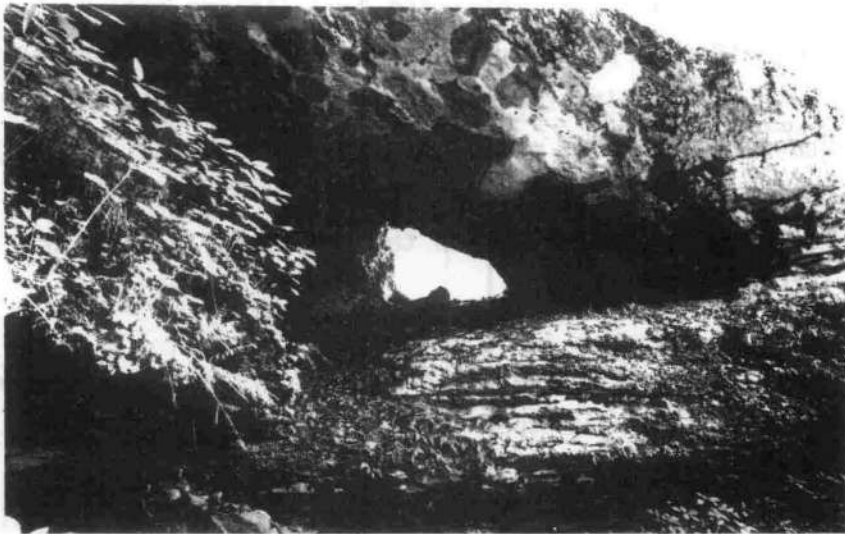
The study area supports a great diversity of fauna. Roger Barbour's compilation of vertebrate lists 261 species, including 59 fish, 31 amphibians, 30 reptiles, 105 resident birds, and 36 mammals (Corps of Engineers 1974). Moreover, the region supports a high-quality, warm-water stream fishery. Principal fish are rock bass, catfish, smallmouth bass, numerous sunfish, and muskellunge. The river is one of the few remaining free-flowing muskie streams in the Commonwealth and attracts both local and non-resident fishermen (See Branson and Batch).

A variety of species of darters are also present in the river, largely because the stream remains clean and unpolluted. Two species are worthy of mention. The undescribed "emerald darter" (Etheostoma Ulocentra sp.) is a species unique to Kentucky, found only in the Kentucky and Cumberland River drainages (Clay 1975). A new subgenus (Odontopholis) was recently described as a unique

darter, Percina (Odontopholis) sp. cf. P. cyamtotaenia; its trans-Mississippian relative is the blue-striped darter, P. cyamtotaenia (Page 1974). Dr. Bruce Thompson of Tulane University is currently evaluating the taxonomic status of this undescribed form. Branson (1974) has noted that the Red River will probably be chosen as the type of locality for both the "emerald" and "blue-striped" darter when they are finally described in the literature.

Among reptiles and amphibians are four relatively uncommon species. The four-toed salamander (Hemidactylum scutatum) is on the state list of rare and endangered species. The coal skink (Eumeces anthracinus) is one of the rarest reptiles in the state, although disjunct populations are reported from New York to Virginia and Kentucky (Conant 1975). Two other reptiles are on Kentucky's list of rare and endangered species: the eastern ribbon snake (Thamnophis sauritus) and the corn snake (Elaphe guttata).

The study area falls within the Cumberland Upland Avifaunal Region which Mengel (1965) considers the richest, in terms of diversity of species, of the five avifaunal regions in Kentucky. Although the region supports numerous species of birds, twelve are especially common. Of these, the following show affinity to some extent to mixed mesophytic forest association: whip-poor-will, scarlet tanager, black and white warbler, worm-eating warbler, ovenbird, prairie warbler, and American woodcock. Only the now-extinct peregrine falcon (e.g., extinct in this area) and common raven restrict their nesting to sandstone cliffs. However, the turkey vulture, black vulture, red-tailed hawk, sparrow hawk, great horned owl, eastern phoebe, and rough-winged swallow make considerable use of this ecological formation.



III-5. Moonshiner's Arch near the mouth of Swift Camp Creek



III-6. Cloud Splitter

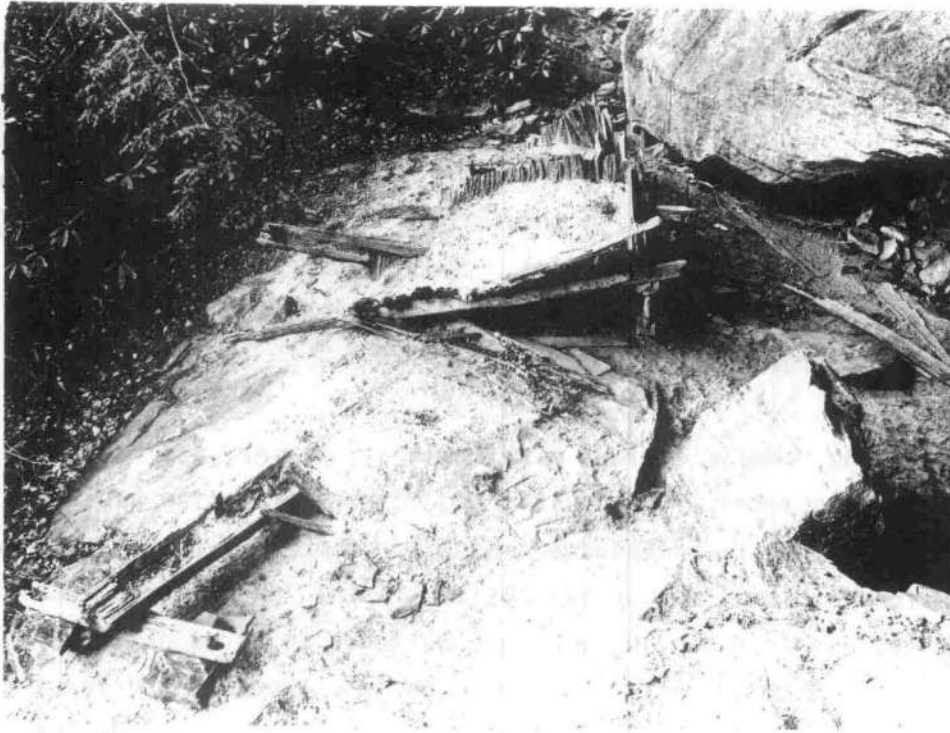
The ruffed grouse is the most sought after game bird in the area, a species not restricted to the Gorge. Within Kentucky, its range is limited now to the mountains. Populations of wild turkey are low to non-existent, in all probability because poaching deters re-establishment of this bird.

Fur-bearing mammals include mink, muskrat, beaver, and raccoon; all are associated with aquatic and adjacent riparian habitats. The Virginia white-tailed deer, a common member of the eastern deciduous forest biome, may or may not be present in any given locality. Poaching and free-ranging dogs are believed to be major factors which limit the population of this species. Bobcats and foxes represent the largest carnivores in the area. Further, sandstone cliffs and limestone caves provide suitable habitats for specialized species, such as the eastern spotted skunk, eastern wood rat, and several species of bats.

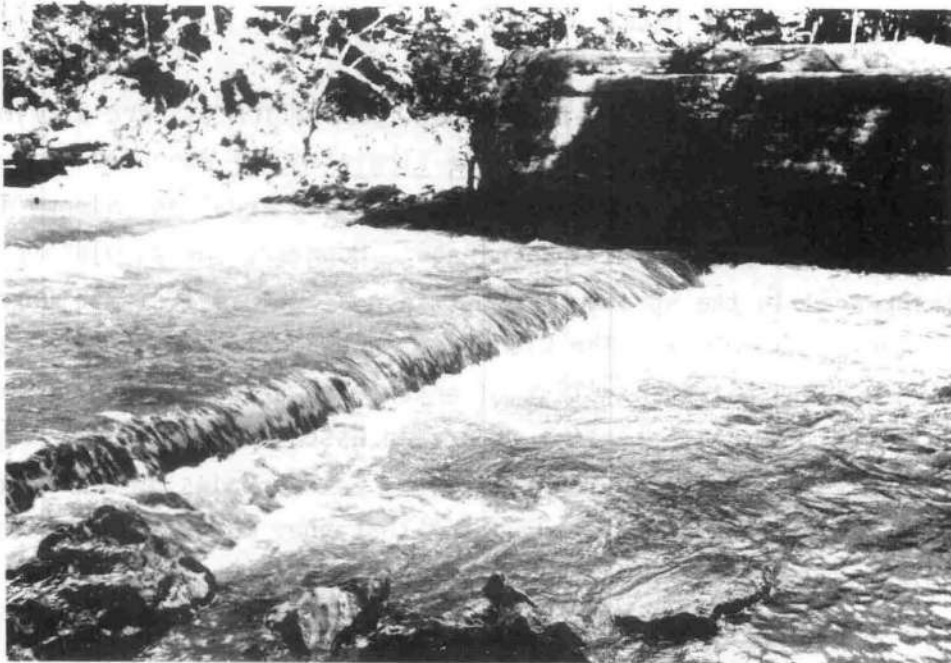
During the winter of 1977-78, a small population of rare Virginia big-eared bats (Plecotustownsendie virginianous) occupied a cave (located outside the boundaries of the study area) in Chimney Top Creek area on the Red River drainage. However, the population disappeared in the spring. Investigators believe that spelunkers disturbed the colony. The U.S. Fish and Wildlife Service has placed the big-eared bat on its list of endangered species. The endangered Indiana bat (Myotisoldalis) occurs in association with the big-eared bat in nearby Lee County. Since both species do not tolerate human disturbance, scholars suspect that they may utilize caves in the area of the Gorge, at least on an intermittent basis, when disturbed elsewhere.

I. Archaeology and History

The Red River Gorge is rich in prehistoric, historic, and cultural resources. The very dry and sheltered micro-environment, existing within many rock shelters, preserves normally perishable cultural materials. Nuts, seeds, cordage, leather, and other organic his-



III-7. Remains of a nitrate mine in the Gorge.



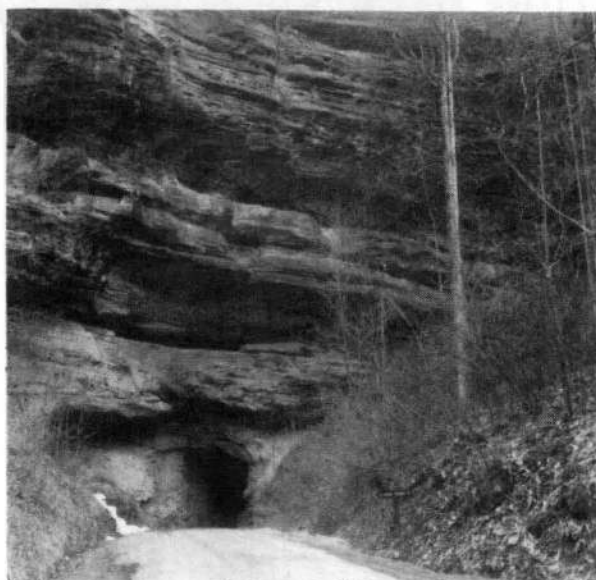
III-8. Part of a splash dam in the Upper Gorge

toric and prehistoric artifacts have been found in rock shelters (See Photos III-7-8). Within the area, scientific study of many sites reveals outstanding potential for yielding significant data about the life and culture of historic and prehistoric humans.

Some archaeologists have researched the area (See Cowan 1965; Cowan and Wilson 1977; Fryman 1967; Mayer-Oakes and Hughes 1975; Turnbow 1976; Wyss and Wyss 1977; Funkhouser and Webb 1930), but most investigations take the form of surveys to identify sites, rather than carefully controlled excavations designed to reconstruct the life-ways of former populations. Because of its significance, parts of the Red River Gorge will be nominated for inclusion in the National Register of Historic Places.

Humans have occupied and utilized the Red River Gorge for most of the past 8,000 years, perhaps longer (Wyss and Wyss 1977:27). Archaeologists divide the prehistory of the eastern United States into four "traditions": 1) Paleo-Indian, 2) Archaic, 3) Woodland, and 4) Fort Ancient. Paleo-Indian cultures (13,000-8,000 B.C.) apparently organized their communities around a subsistence base which focused on hunting large game, such as mastodon and extinct species of bison. Individuals probably organized themselves into small nomadic or seminomadic bands. At present, no evidence of Paleo-Indian occupation exists for the Red River area, but we cannot rule out the location of such sites.

Although little land is suitable for agriculture, settlement in the



III-9. Nada Tunnel was created by loggers for access of railroads to the Gorge

area began early because of other resources. For example, early settlers mined iron ore and saltpeter and built the first iron furnace west of the Alleghenies in Bath County, Kentucky, in 1790 (McFarlan 1943:434). From this time iron furnaces proliferated in Kentucky, and in 1840 the state was third in the nation in producing iron. During the Civil War, local residents mined extensive deposits of nitrate in rock shelters of

the Gorge. Several of these mines are still well preserved. (See photo III-7, p. 59).

Despite early industry, settlement was slow and scattered. Logging began in the 1880's, and oil and gas were discovered in the early 1900's. A poor system of transportation and rugged terrain hampered logging operations. The only feasible mode of transporting logs to sawmills was by floating them down streams in the area (See photo III-8, p. 59). The advent of the railroad improved greatly the efficiency of logging operations (See photo III-9). With advent of the Ragland Pool (e.g., both gas and oil) in Menifee and Bath counties, the railroad became an important method of transportation for the oil and gas industry.

The early railroad industry recognized the recreational potential of the Gorge and developed Natural Bridge as a resort. Special excursions ran every weekend to the resort from Cincinnati, Lexington, and other cities. During the 1920's timber-resources were depleted, and the local economy suffered a serious decline. Thus, in 1941, railroad service ceased, and the company removed the rails and sold them for scrap. Earlier, in 1934, the U.S. Forest Service began to purchase tracts of land in what is now the Daniel Boone National Forest.



III-10. Sky Bridge after the area was logged

J. Economy

In terms of population and growth (See Table III-3), recent industrial expansion centers on an interrelated complex of highway development (I-64 and Mountain Parkway), expansion of manufacturing in the region (Lexington, Winchester, Mount Sterling, and two local

TABLE III-3
ECONOMIC STATISTICS: Red River Gorge and Kentucky

		County			Kentucky
		Menifee	Powell	Wolfe	
1. Population	1940 ^{5/} , ^{6/}	5,691	7,671	9,997	2,416,630
	1970 ^{5/} , ^{6/}	4,050	7,704	5,669	3,219,311
2. Population Projections	1980 ^{5/}	4,627	9,060	6,436	3,529,445
	2000 ^{5/}	5,978	11,771	8,319	4,287,140
3. Civilian Labor Force 1977	^{7/}	1,365	3,102	2,120	1,508,000
4. Unemployment Rate	1977 ^{7/} (%)	7.7	10.6	6.7	4.6
5. Income: Median Family Income	^{8/} 1977 (\$)8,600		9,500	4,500	10,009
	Personal Income per capita ^{9/} 1976 (\$)3,104		3,789	2,958	5,414
6. Sources of Personal Income 1976	^{9/} (%)				
Private Sector Employment		22.4	30.8	39.2	63.2
Public Sector Employment		9.1	10.1	16.5	12.8
Net Commuter Income		37.8	30.6	5.2	.6
Dividends, Rent & Interest		6.1	6.3	8.0	12.0
Transfer Payments		26.2	24.5	33.9	15.6
Social Security Contributions		-1.6	-2.3	-2.7	-4.0
TOTAL		100.0	100.0	100.1	100.2
7. Families Below Poverty Line	1969 ^{10/} (%)	32.0	28.1	59.0	29.3
8. Population Receiving Aid to					
Dependent Children 1976	^{6/} (%)	8.1	9.7	16.2	6.0
9. Forest Service Contributions in Lieu of Property Taxes 1976					
	(# of Acres)	40,089	12,611	14,698	653,593
	Contribution @ \$.76/acre (\$)	30,067	9,458	11,023	490,195

^{5/} Kentucky Deskbook of Economic Statistics, 1978, Kentucky Department of Commerce, pp. 3, 26-28.

^{6/} Kentucky Development Data Service, IX, Gateway Development District, p. I-A4; Bluegrass Development District, p., I-A4; XII, Kentucky River Development District, p. I-A4; Commonwealth of Kentucky. Executive Department of Finance and Administration, Office for Local Government, June, 1973.

^{7/} Deskbook, pp. 29-31.

^{8/} Deskbook, pp. 29-31. Figure is for non-metro counties.

^{9/} Kentucky Personal Income Report, Kentucky Council of Economic Advisors, November, 1978, pp. 4, 100, 132, 169.

^{10/} County and City Data Book- 1977, U.S. Department of Commerce, Bureau of the Census, pp. 189, 201, 213. ADC recipients divided by an average of 1970 and 1980 population to arrive at percentages.

plants in Stanton and Campton), tourism (Natural Bridge State Park and the Red River Gorge area of the Daniel Boone National Forest), and a reemerging timber industry. Agriculture remains a source of income, with approximately forty-five percent of the area in farms; most are small enterprises.

Table III-3, row 6, demonstrates that Menifee and Powell counties have become important bedroom communities, with thirty-eight and thirty-one percent respectively of personal income earned by commuters. These figures are net of the small amount of earnings by those people who commute to other counties for work. The major source of outside work for residents of Menifee County is Mount Sterling and for residents of Powell County, it is Winchester, and Lexington, Kentucky.

Although there has been significant economic resurgence, the area remains depressed, with Wolfe County among the poorest in the state. Transfer payments (e.g., social security, unemployment compensation, welfare) comprise twenty-four to thirty-four percent of personal income, compared to sixteen percent for the state as a whole. Unemployment is double the average for Kentucky, and the number of families with cash income below the poverty level is substantial (fifty-nine percent in Wolfe County). These statistics are recorded in rows 4, 6, 7, and 8 of Table III-3, page 62.

Future development will depend largely on current trends. Agriculture, logging, and tourism will remain sources of income, but these industries will not provide a substantial base for growth. However, growth as a bedroom community will probably continue, unless curtailed by shortages of energy. The Mountain Parkway enhances the area as a location for industry, but many other factors affect such decisions. For example, in Powell County, sufficient land free from flooding and an adequate supply of water are cited as barriers to manufacturing plants. Basically, the area has few natural resources and is not ideally located. In the final analysis, prosperity will depend on careful development of its scenic and agricultural re-

source, its attractiveness as a place of residence, and its access to outside markets for labor.



III-11. A farm along the Red River near Gladie Creek (E.C. Scott photo)

K. Population

Population of Menifee, Powell, and Wolfe counties is predominantly rural. Table III-4 shows levels of population in the area for 1940, 1970 and 1980 and projections of growth for the year 2000. These data reveal that the population of Powell County grew between 1940 and 1980, while inhabitants in Menifee County declined and in Wolfe County dropped sharply.

Table III-4. Population of Menifee, Powell, and Wolfe Counties

<u>County</u>	<u>Population</u>			<u>% Change</u>	
	<u>1940</u>	<u>1970</u>	<u>1980</u>	<u>1940-1980</u>	<u>2000</u>
Menifee	5,691	4,050	5,117	10%	5,978
Powell	7,671	7,704	11,101	44.7%	11,771
Wolfe	9,997	5,669	6,698	33%	8,319

While the three counties project increases in population by the year 2000, Powell County is expected to gain substantially over its 1940 level of habitation.

L. Land Ownership and Use

The federal government currently owns sixty percent of the land within the study area.

Following approved plans, acquisition of private lands within the study corridor has been through willing seller or exchange actions. These acquisitions have been in fee title. In the area adjacent to the corridor, acquisition has been fee title on a willing seller exchange basis or through condemnation.

Tracts have been acquired using Land and Water Conservation Funds. Many landowners within the study corridor and the adjacent area have recently expressed an interest in selling their properties to the federal government. Current LWCF funding levels on the Daniel Boone National Forest are not sufficient to keep pace with this interest. Emphasis has been placed on acquiring private lands within the Proposed Clifty wilderness and along the river.

The goal of Federal acquisition is to acquire private land along the river and generally those private lands below the cliff lines in the adjacent area. This will allow management by the Forest Service to retain, protect, and enhance the intrinsic values of this area now being heavily impacted by the using public.

The study corridor above the Highway 715 bridge called the Upper Gorge is forested. Since the terrain is rugged, with towering cliffs beginning almost at the edge of the water, use of the land for purposes other than timber is not feasible. Even harvesting timber from banks of this section of the river is highly unlikely. Private individuals own all the land upstream from the boundary, including several other tracts in the Upper Gorge (see Map 3).

Downstream from Kentucky 715, usage changes somewhat. Significant portions are still forested, but these are bottomlands adjacent to the river that have been farmed in the recent past. Some farms are still under cultivation, with corn, soybeans, and vegetable gardens the principal crops. A few houses and farm-related structures and about a dozen cabins are in the vicinity and along the road that parallels the river (See photos III-11, p. 64); however, only two or three structures are actually visible. No trails follow the water for very long, but many paths lead from the road to the river.

National Forest and private land intermix freely along the segment from the proclaimed boundary of the National Forest to Schoolhouse Branch. There are numerous points of access in this segment. Such intermixing sometimes causes problems because hikers, canoeists, or campers often cannot determine public from private land. The relative absence of fences, signs, habitations, and other indications of ownership causes the problem.

M. Quality of Air

Quality of air in the corridor is excellent. From three stations in 1976-1977, the Stanton Ranger District monitored samplings (i.e., wet sampling) of the air. One station in the Gorge, near Sky Birdge, is within the corridor of the study. As anticipated, investigators detected negligible pollution because of the absence of significant sources of contamination near the area. For this reason, the region meets Class II standards of quality as established by the Clean Air Act, PL 95-95. Ambient quality does not affect adversely viewing of landscape in the area.

N. Minerals

In the study corridor and its watershed, coal generally has little economic potential. The only coal that has been mined is the Grassy Bed southwest of Valeria which has a reported thickness of twelve

TABLE III-5
STATUS OF MINERAL RIGHTS WITHIN THE CORRIDOR

Minerals	<u>OUTSTANDING</u>	# Acres	Minerals	<u>RESERVED</u>	# Acres	<u>ALL RIGHTS OWNED</u>	# Acres
O/S (P) Oil & Gas		330.54	Res. (P) Oil & Gas		515.10	894.31	
O/S (P) All Minerals		123.96	Res. (P) All Oil, Gas & Minerals excluding coal		49.58		
O/S (P) All Oil & Gas & Minerals excluding domestic coal		77.13	Res (P) All Oil & Gas & Minerals		427.88		
O/S (P) All Oil & Gas & minerals excluding coal		171.70					
O/S (P) All Minerals excluding coal		100.09					
[O/S (P)] Oil & Gas U.S. Fee ½ Oil & Gas]		44.99					
TOTAL O/S		848.41	TOTAL		992.56	894.31	

inches. Because the Grassy Bed and other beds of coal occurring in the Breathitt formation are thin and discontinuous, little commercial development of coal has taken place. Most coal is mined for house coal (heating) use. Prospects for future development of coal near the study corridor are poor.

Oil and gas development near the study corridor is generally limited to current efforts to revitalize the relatively small Tarr Ridge - Indian Creek pool near the Frenchburg Job Corps Center. Some old wells, dating back to 1950, are being reworked; a few new wells are being drilled, while the entire pool is undergoing water flooding to spur production.

Mineral rights in the study corridor are outstanding or reserved on about 1841 acres of National Forest land. The government owns all mineral rights on 894 acres. Mineral rights in the Red River Gorge,

an area adjacent to the study corridor, are reserved or outstanding on about 25,334 acres, and the United States owns all rights on about 9.739 acres. Additional mineral exploration outside the study corridor but within the Red River watershed is a probability. There are no federally owned minerals presently under lease in the study corridor, (See Table III-5, p. 67).

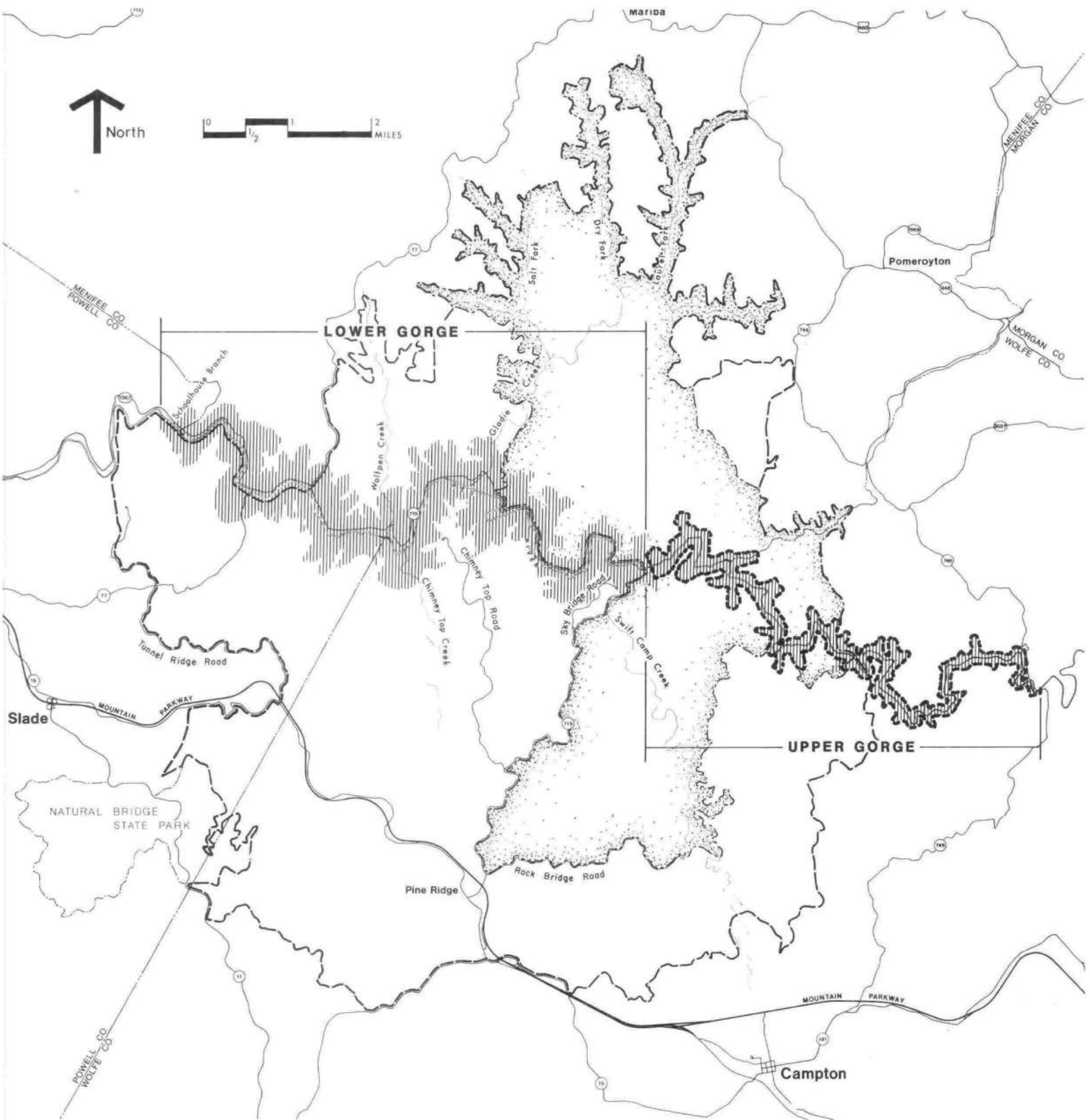
0. Recreation

There are two very distinct recreational zones along the section of the Red River studied for possible designation: the Upper Gorge and the Lower Gorge. (See map, p. 69).

1. Upper Gorge: At present, the Upper Gorge is undeveloped. The upper reach of the river is not very wide (only about twenty feet at KY 746 bridge in summer), and steep cliffs rise almost perpendicularly from the edge of the water. This segment of the river is only access-



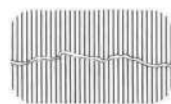
III-12. Canoeing near the Upper Gorge of the Red
Gorge of the Red
few rough, undeveloped trails, known primarily by local people, penetrate the thick vegetation and steep cliffs to the rivers edge. It is impossible to hike far along the river, except near the lower end of the Upper Gorge.



RECREATIONAL ZONES



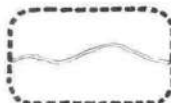
**Red River Gorge
Geological Area**



Study Corridor



**Proposed
Clifty Wilderness**



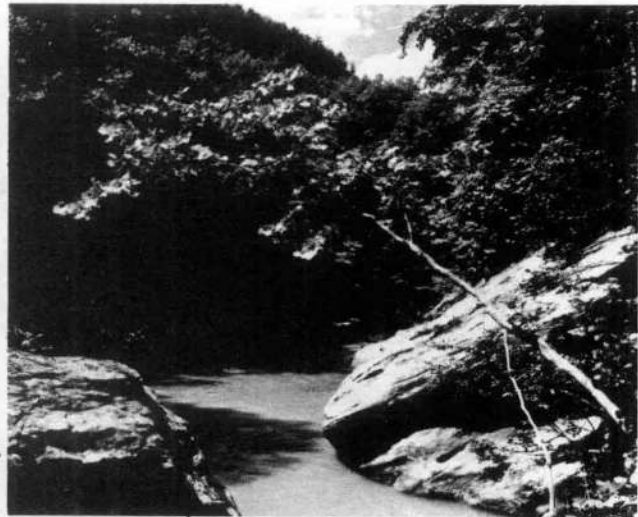
Kentucky Wild River



III-13. A kayaker surfing in the Gorge

For the canoeist, the Upper Gorge is a place of solitude and beauty mixed with enough boiling white water to challenge most experienced canoeists (See photos III-12-15). Both attributes make the upper stretch of the river "some of the most spectacular canoeing water anywhere in the eastern United States" (Sehlinger 1978:90).

The Upper Gorge has much to offer in terms of scenic beauty, with sufficient stretches of calm water to allow canoeists to enjoy massive boulders that dwarf people in their comparatively tiny boats. At numerous places in the cliffs there are rocks carved out by the elements, and in places the river flows beneath cavernous overhangs. Many creeks and branches flow into this stretch of the river, most entering from steep-sided mini-gorges of their own. The sight and sound of small waterfalls on some tributaries add to the pleasure of visitors. Dense growth of trees, brush, and rhododendron isolate the river and provide no glimpse of agricultural land on tops of ridges beyond the cliffs.



III-14. Massive boulders in the Upper gorge

The International Scale of River Difficulty classifies the river in the Upper Gorge as Class III; that is, it is a whitewater river suitable for intermediate and advanced paddlers. Generally runnable from December to early May and after good rains, the river is susceptible to flash floods and often rises quickly. For this reason the river is dangerous when water is high. At low level some strenuous walking is necessary.

Among the most challenging spots are the "falls" near the mouth of Calaboose Creek. The falls are about 1½ to 2½ feet high and must be portaged by all inexperienced paddlers. Further downstream is a half-mile series of three rapids known as the "Narrows of the Red," the second popularly known as "Dog Drowning Hole." The challenge and danger in this section are rocks to dodge, 2½ foot drops, turning chutes, and undercut rocks. The rapids on the Red River are difficult primarily because they allow so little margin for error. Since many canoes are destroyed each year on this stretch of the river, outfitters refuse to rent canoes to people who want to make the run.



III-15. The Upper Gorge during low water
summer

Many visitors including hikers, rockclimbers, and campers utilize the lower third of the Upper Gorge along both banks of the river. Countless paths have been beaten into surrounding brush by individuals exploring the many rock shelters and other points of geological interest. Much of the land along this section of the river

is currently under private ownership. Abundant trash is scattered along the trails; every rock shelter has been scarred by campfires;

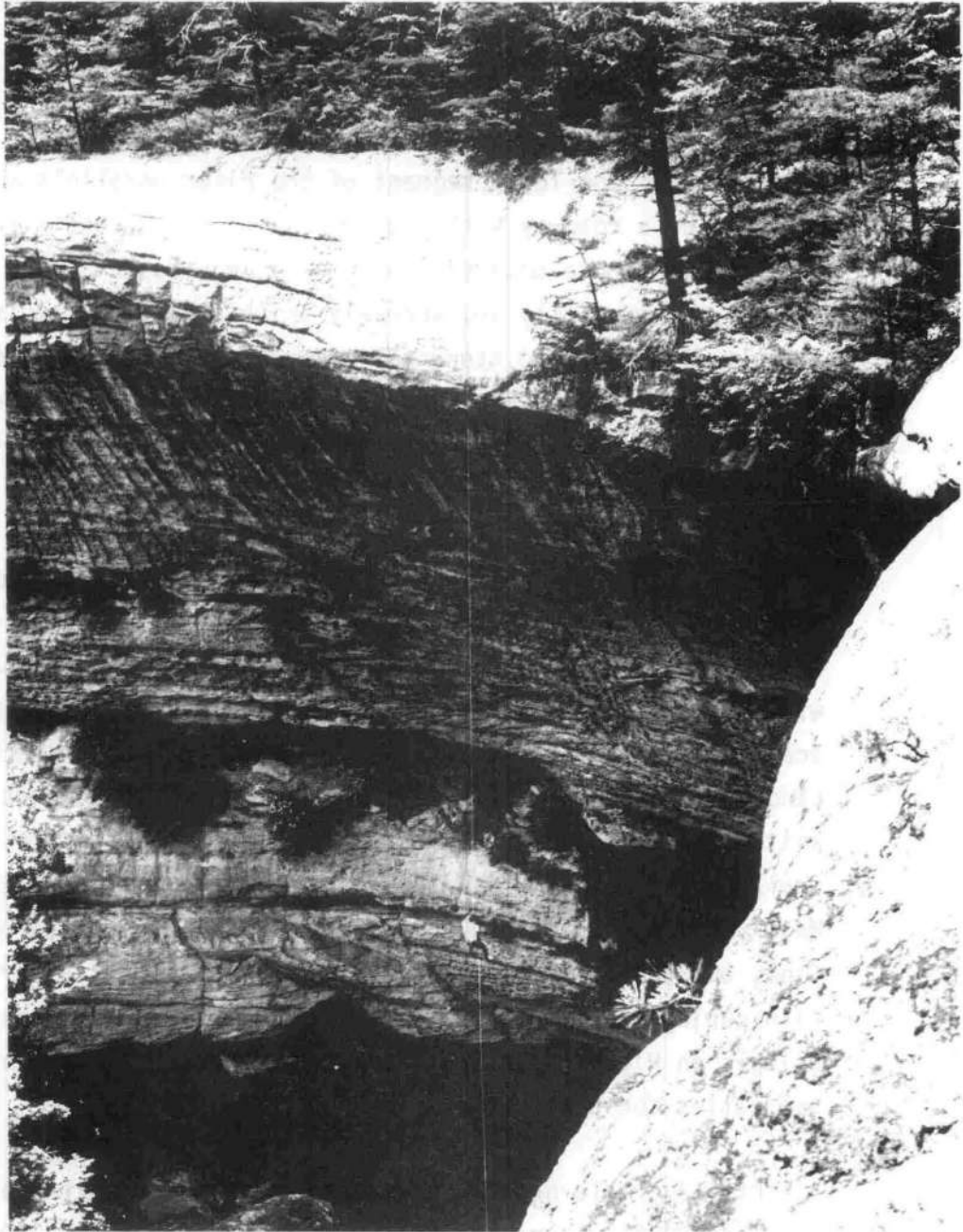
rocks and even the bark on trees have been worn smooth by feet and hands of passersby; and trees have been damaged or killed by people carving on them or trying to cut them for camp fires. Nevertheless, with good management the areas has potential for recreational use for camping, hiking, rockclimbing, nature study, fishing, sightseeing, picnicking, and birdwatching. Among the scenic attractions are Red Byrd Arch, Moonshiner's Arch, and Brier Shoot.

2. Lower Gorge: The lower segment of the river parallels and is in sight of a roadway with numerous points of access. The road is a popular route because the scenery is pleasant. The river normally flows slowly and serenely in this section, contrasting sharply with majestic stone palisades and geological formations that line and define the corridor. Chimney Top, Sky Bridge, Tower Rock, and Cloud Splitter are a few features a visitor can see and enjoy.

Canoeing this section is a much different experience from that of the other segment. Except at times of flooding, the river is gentle and tranquil, a good stream for beginning canoers, with Class I rating by The International Scale of River Difficulty Scale. This section is also popular with more experienced canoeists because the scenery is spectacular; though not a whitewater trip "numerous sharp turns, sandbars, riffles, and small ledges make the paddling interesting" (Sehlinger 1978:91). Most years one can canoe this section from November through June, but this portion has too little flow, except after a good rain during other months. Put-in and take-outs are possible at bridges on Highway 715 and 77, but the area has inadequate facilities for parking.

A forty-five mile network of trails exists within the general area around the corridor, and the Sheltopee Trace, a 250-mile national recreational trail passes through the Lower Gorge and

is the only developed trail that parallels and crosses the river, thus allowing hikers direct access to the edge of the river by a developed route. The trail enters the corridor on tops of ridges above Gladie Creek and allows hikers a panoramic view of the surrounding landscape. The trail then winds down to the river and follows Kentucky 715 and 77 for about



III-16. Rappelling down a cliff in the corridor (E.C. Scott photo)

four miles before crossing the bridge over the river at Kentucky 77 and passes out of the corridor. This trail is very popular with backpackers and long-distance hikers and establishes a link between Daniel Boone National Forest to the Jenny Wiley Trail (of the State of Kentucky) to the north and east and to the John Muir Trail to the south in Tennessee.

Two other trails are much shorter, but each provides access to outstanding scenic features. One trail leads to Sky Bridge, the most heavily visited and largest natural arch in the Red River Gorge; the other trail leads to Chimney Top Rock, a monolithic and virtually free-standing pillar that is several-hundred feet high. (See photos A-3, A-4, p. A-8, A-9).

Hiking cross country and on non-system paths created by repeated use is as popular in the lower section as in the upper section. The most popular locations for this activity are Copperas Creek and the Sal Branch drainages. Rockclimbing is another demanding and popular sport along the lower section of the river. Palisades and other unique geological formations in the corridor provide some of the best opportunities for climbing in the eastern United States. Three formations frequently climbed are Little Wall, Tower Rock, and Eagle Rock; climbing parties scale these formations every weekend in summer (See photo III-16, p. 73). Fishing from banks for muskie and bass is common on this stretch of the river. Another enjoyable activity along the banks of the lower Red River is dispersed picnicking.

There are no components of the National Wild and Scenic River System in Kentucky. The nearest components are located to the east and south in the Carolina's, Tennessee, and Virginia's. Associated with these are numerous opportunities for white-water canoeing and rafting.

The State of Kentucky manages a State Wild Rivers System including the 9.1 mile upper segment of the Red River is one. All of the rivers are located within the boundaries of the Daniel Boone National Forest. The Forest Service and the state have entered into a Joint Memorandum of Understanding for the management of these rivers.

Recreational use of rivers within the Forest is on an increase as indicated by the issuance of two Outfitter-Guide Special Use Permits for commercial canoeing and rafting on the Rockcastle and Cumberland Rivers during 1982. These two rivers along with the Red River and Big South Fork National River are the only rivers in the area which offer white-water canoeing or rafting opportunities.

3. Wilderness Resources

The segment under study flows approximately 4.5 miles through the Recommended Clifty Wilderness. The Clifty proposal is a result of the Forest Service's second Roadless Areas Review and Evaluation, RARE II, whose purpose was to identify roadless areas of high wilderness potential in the National Forest System. As a result of the review, the 13,260 acre Clifty area was the only area in Kentucky recommended for designation as a wilderness. Present management of the proposed wilderness is aimed at protecting the wilderness character pending completion of the RARE II Reevaluation and the Forest Plan for the Daniel Boone National Forest.

IV. ENVIRONMENTAL CONSEQUENCES

This section contains the scientific and analytic information that forms the basis for comparing of the alternatives. Also, it describes the consequences of implementing each alternative in terms of production costs and environmental change, including the short and long term effects and irreversible and irretrievable resource commitments of each alternative.

The consequences of the Red River Lake being built under Alternative A, are addressed in this section. Although, the Red River Lake was not identified as an alternative in this study, and as such was not used on the comparison of alternatives. The consequences would still occur.

A. Transportation

The transportation system under Alternatives A, B, C and D would be expanded, including additional roads for recreational development and access along the section of river from the Highway 715 bridge downstream to Schoolhouse branch. Additional trails would be constructed in the corridor for access to the river and to reduce compaction and erosion.

Alternative A would require relocation of State Highway 77 between Grays Branch and Duncan Branch, additional sections of State Highway 715 would have to be raised above new pool level if the lake, were built.

B. Hydrology

The Red River would remain a free-flowing stream with no impoundments under Alternative B, C, and D; flows would remain the same. However, under Alternative A, the Red River Lake could be constructed, inundating 11.3 miles of the river.

The likelihood of periodic flooding in Powell County, especially Clay City would remain under all alternatives except Alternative A, if the lake is built. However, other flood control alternatives could be considered to resolve or reduce this hazard. Alternative plans considered involve construction of a combination channel diversion and levee around the area of Clay City.

C. Water Quality

Water quality would remain relatively the same under all alternatives.

This would include the potential for increased bacterial counts, during warm summer months when flows approach minimum and river temperatures approach a maximum. Available data on total fecal coliform are inconclusive, and study would be continued to produce more conclusive data. Available data as to turbidity and sediment are also too inadequate and inconclusive to draw conclusions; however, no changes are expected. Mineral activity in the watershed would effect this if strip mining occurred; however, this is unlikely because of the known potential of coal in this area of the watershed.

Lake impoundment under Alternative A would cause ecological changes to the river. These changes would cause increases in biological productivity, decreases in overall capacity of the lake to assimilate organic water degradation of water quality in hypolimnetic waters, temperature increases in surface waters, and overall changes in floral and faunal composition.

D. Soils

Soils in the corridor would be effected by road construction and recreational developement for access along the river under all alternatives. Some compaction and minor erosion and soil movement would be associated with these practices as would be expected with similar activites in other areas. There should be no adverse effects to soils because of these planned facilities.

The lake would inundate 1,576 acres of soils at water supply pool level. These soils and their future production capabilities would be lost. An additional 1631 acres would be subject to flooding within the flood pool level of the lake. Production capabilities of these soils would be reduced because of frequent flooding. However, flooding and soil hazards would be reduced downstream from the dam.

E. Vegetation

The management of vegetation, especially merchantable timber, would be reduced under Alternatives B, C and D which include designation. The possibility of timber harvesting would continue, except it would involve use of modified silvicultural systems which would reduce future yields. The mixture of species and variety of ages would continue.

The lake construction would cause a loss of 1576 acres of vegetation due to inundation and another 1631 acres to frequent flooding within the flood level of the lake. The present value of the merchantable timber and future growth would be lost. This would involve the loss of 634 board feet of annual growth per acre at a value of \$25.00 per acre.

Alternative A (No Action) would allow timber harvesting according to existing management policies. At the present, this would have a minimum effect on the vegetation; however, future effects could involve increased cutting and more intensive management. Present volumes are estimated at 8,000 MBM per acre at a value of \$320 per acre. Average annual timber growth rate is assumed at 2%. The following table displays the estimated volume under each alternative.

TABLE IV-1 TIMBER VOLUMES
(In Thousands)

VOLUMES LANDS ON NF	ALTERNATIVES			
	A	B	C	D
Existing Volume	16,400 MBM	26,400 MBM	26,400 MBM	26,400 MBM
Additional Volumes (Associated with Acquisition)	<u>1/</u>	<u>2/</u>	6,256 MBM	<u>2/</u>
Totals	26,400 MBM	26,400 MBM	32,565 MBM	26,400 MBM

1/ Volumes would increase with additional purchases of land under willing seller basis

2/ Easement acquisition

F. Fish and Wildlife

Fish and wildlife would not be expected to change if Alternative A (No Action) continued. The Red River Lake alternative would cause a change in the fishery habitat in the lower 11.3 miles of the study corridor. This would probably result in a change in some species thus benefiting some species while adversely affecting others.

Species such as smallmouth bass, rock bass, and muskellunge are likely to be gradually eliminated. Other species such as channel catfish, crappie, and bluegill would increase.

If Alternatives B, C and D were implemented there would be no expected measurable change in species or populations of fish and wildlife.

G. Archeology and History

The archeological and cultural history of the corridor under Alternative A (No Action) would not be effected, other than continued problems of vandalism to formations and disturbance of rock shelters in areas adjacent to the river.

The consequences under Alternative B, C and D would be much the same as under A. Some increase in disturbance to sites could occur with increased numbers of users.

No sites of significance would be inundated under Alternative A, if the Red River Lake is built. However, moderate effect would be caused to lesser sites and to sites within the adjacent areas, as a result of easier access.

H. Socioeconomics

Under all Alternatives the effect of implementation would have little impact on increases or decreases in population

in the corridor or in adjacent lands. All alternatives would have a limiting effect on the numbers of private landowners in the study corridor because of acquisition trends and current land ownership. Employment in the region would remain similar under all alternatives with temporary increases in employment being generated by the lake construction. The pace of economic development should be increased within the region by agricultural and urban, water storage and supply benefits associated with the lake.

There has been no industrial development within the corridor, and this is expected to remain. There is a likelihood that the few commercial enterprises, such as a canoe-rental and country store will remain and probably expand with implementation of all alternatives.

Current management or designation would have little effect on the overall economics of the region in both income and employment.

The regional economy would continue to be based on agricultural, logging and tourism with access to outside labor market areas being the most pertinent factor in the stability of the region's economy.

I. Land Ownership and Use

The Alternative A, current management or designation, Alternative B, C would result in similar land ownership patterns. Private lands within the corridor would be acquired, or easements negotiated. Alternative A current management would result in fewer acres being acquired initially than would designation. However, eventually, Alternative A could result in the same acreage as designation, depending on the number of individuals willing to sell their land on a willing-seller basis. In either case current uses of the land, such as farming would be encouraged to continue. Alternative D, would require the least amount of acquisition, and thus the least affect on private lands.

Developed recreation facilities, canoe launches, day use areas, and interpretative facilities would be established. In general overall present land uses would not change, but rather ownership and future uses would be controlled and regulated. (See Table II, pg. 14 for a comparison of costs for each alternative.)

J. Quality of Air

No measurable adverse effects are anticipated under any alternative. However, some effects could be caused by motorized vehicle under any alternative, depending on increased use of the area. The potential lake construction under Alternative A represents the highest potential effects because of the excessive development associated with it.

K. Minerals

The mineral rights on 1841 acres within the corridor are outstanding or reserved. The effect of these rights are not considered to represent an adverse problem because of the insignificant potential associated with these lands. Minor impacts would be caused by mineral operations, such as access roads and drilling wells for oil and gas, if they occur. These would involve minor soil movement and possible chemical spills. Coal activity is not expected to occur within the study area.

Oil, gas, and coal operations could occur within the upper watersheds of the study corridor; these operations would have consequences on the water quality in the corridor. Again, because of the current available data on the minerals in this area, these should not have adverse effects on the river. Under designation all government own minerals within the recommended wil segment would be withdrawn from leasing.

L. Recreation

Alternative A (No Action) forms the current analytic basis for the comparison of other alternatives.

Since 1965, the Forest Service has collected data on recreational use in the Red River Gorge Unit.

The Forest Service has estimated capacity for the Red River Gorge and formed preliminary plans for developing capacity by the year 2000. The methods and plans themselves strengthen the presumption of reasonableness in our Y_2 projection of trends ^{2/} The following is an analysis of the least squares method used to project these trends.

TABLE IV-2. PROJECTIONS OF TRENDS OF VISITORS TO THE RED RIVER GORGE
(in thousands of visitors)

Year	Y_1	Y_2	Y_3
1978	283	260	236
1980	316	291	262
1985	399	369	329
1990	481	447	395
1993	564	525	461
2000	646	603	528

^{2/} The study-team used the "least-square" method to determine projection of trends. Least-squares is a procedure, using a mathematical model, to find the "best-fitting" straight line for a set of data plotted on a linear graph with a set of points to determine values that best minimize deviation of these points.

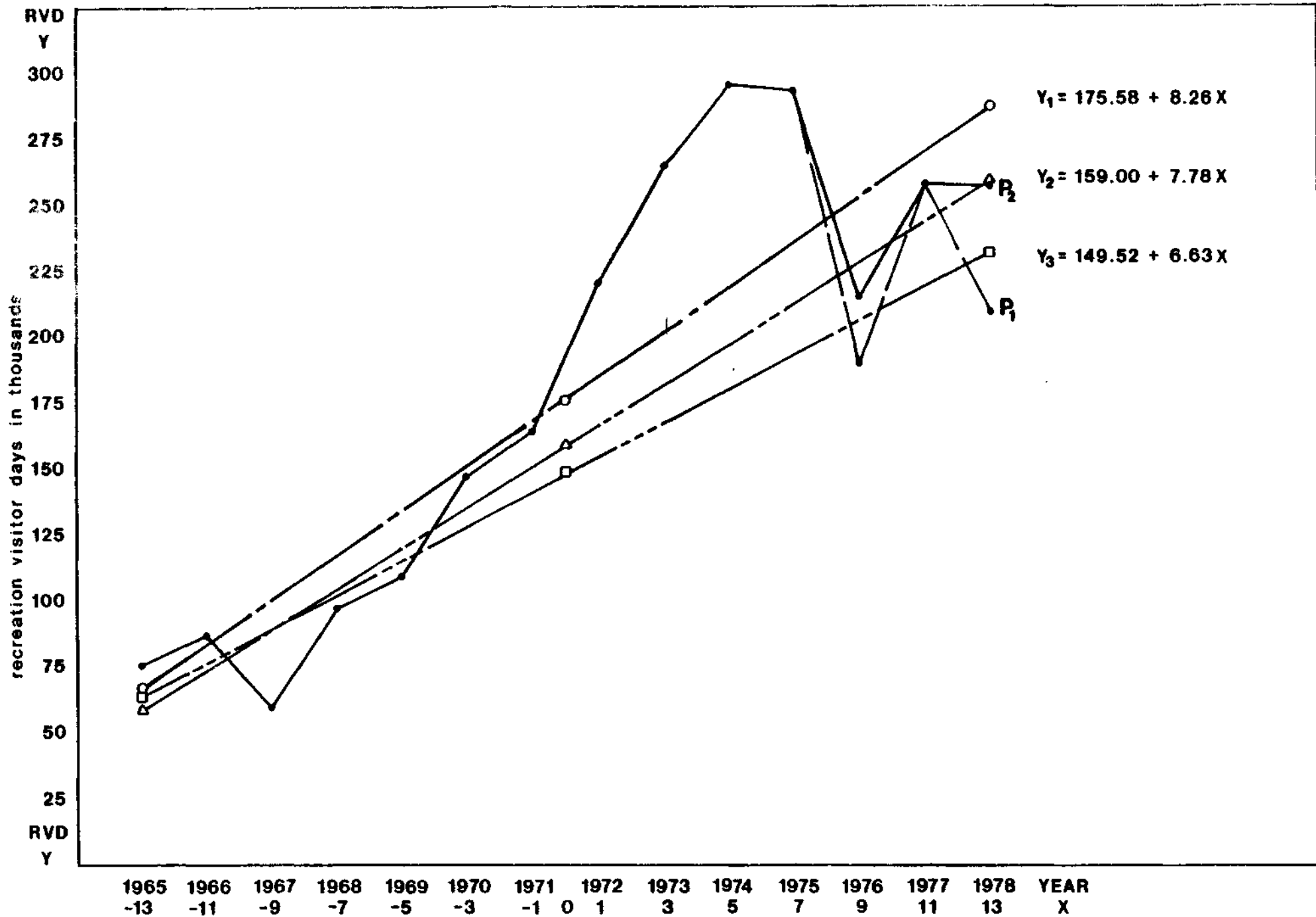


TABLE IV-3

ALTERNATIVE TRENDS IN RECREATION VISITOR DAYS

The lower line (P_1) shows actual data where the plot splits. (See Table IV-3) The three least-squares-trend lines represent different adjustments of data to obtain a reasonable basis for projecting future recreational use. The highest trend-line [$Y_1 = 175.58 + 8.26 X$] represents the actual data on recreational use collected by the Forest Service. The data were judged to be a poor basis for projection because controversy over Red River Lake generated enormous but temporary interest in the Red River Gorge during the mid-70's. The lowest trend-line [$Y_3 = 149.52 + 6.63 X$] was derived by removing the data for 1972 through 1975 from the calculation of trend. The intermediate trend [$Y_2 = 159 + 7.78 X$] is derived from taking into account the fact that the data points for 1976 and 1978 are artificially low. In 1976, Sky Bridge and other important observation points were cut off by road-building activities, leading to a substantial decrease in visitation. The closing of Koomer Ridge Campground for renovation in 1978 had a similar effect. For trend Y_2 the data were adjusted by adding the average of 1975 and 1977 visitation to the closed sites. The 1978 data were adjusted by adding the 1977 use of the Koomer Ridge facility. The 1972 through 1975 data are also eliminated in calculating the Y_2 trend. The results of adjustments are shown in the Y_2 trend.

Projection based on three trends are shown in Table IV-3, p. 83. By the year 2000, the difference between the highest and lowest projections (Y_1 vs. Y_3) is 118,000 visitor-days. The intermediate trend Y_2 is selected as the most reasonable because it is based on the most reliable long-term components of past recreational use.

On the basis of Kentucky's State Comprehensive Outdoor Recreation Plan (SCORP) which predicts a continued shortage of the types of recreational facilities found in the Gorge, the Forest Service plans presume that capacity, rather than demand, will limit the number of visitors. Recreational benefits, therefore, depend on development of capacity of the area.

Suitable areas for various kinds of expansion were established on the basis of natural conditions, such as type of soil, vegetation, and slope. Consistent with current philosophy of the Forest Service, each site will reach developmental capacity by the year 2000. Results are found in Table IV-4 below. Full development of suitable areas will add 351,000 visitor-days to capacity, yielding a total of 627,000 visitor-days. Present information suggests that we can develop capacity to handle projected 603,000 visitor-days.

TABLE IV-4. FOREST SERVICE ESTIMATES OF CAPACITY AND PROJECTION OF GROWTH
For the Year 2000
(in thousands)

1.	1978	
	Developed sites at 40% of theoretical capacity	142.3
	Dispersed sites: Use assumes equal to or exceeds capacity	133.4
2.	Planned additions to bring Geological Area to full capacity-use by 2000	351.0
3.	Total capacity for 2000	626.80

Table IV-5 below combines values of various available recreational activities and gives a breakdown of activities by proportion and numbers for 1976-78. Numbers represent average visitor-days values for three years in each activity. These activities summarize a "typical" annual-recreational benefit of \$1,180,900.

TABLE IV-5: DOLLAR VALUES FOR RECREATIONAL BENEFITS
Averages for 1976, 1977, and 1978

	Value	Proportional	Visitor Days	\$ Value
	Visitor Day ^{3/}	Use ^{4/}	(x10 ³) ^{4/}	(x10 ³)
Developed	\$ 3.00	.507	123.6	\$370.9
General Dispersed	5.50	.410	100.1	550.7
Specific Dispersed				
Big Game	10.50	.001	.3	3.2
Small Game	18.00	.045	11.1	199.2
Water Fowl	8.00	.005	1.2	9.3
Fishing	5.25	.017	4.1	21.5
Nature Study	7.25	.015	3.6	26.1

^{3/} Forest Service 1979 Review Draft of Alternative Program Direction 1981-2030, U.S. Department of Agriculture.

^{4/} Stanton District, Daniel Boone National Forest R.I.M.

Over the next twenty years, we do not expect important changes in the mixture of recreational activities. In part, this development is the result of constraints of capacity because many visitors tend to use a variety of facilities on a single visit. Therefore, the intermediate trend Y_2 is used in conjunction with current value of recreational benefits to project future advantages (See Table IV-2). Table IV-6 shows the result of this trend. Value of recreational benefits expands from \$1.4 million in 1980 to \$2.9 million in the year 2000.

The figures in Table IV-6 (page 86) do not correspond with the estimate of \$1,317,000 set by the Corps of Engineers for recreational benefits. The guidelines which establish cost-benefit studies restrict the Corps to a value of \$1.87 per visitor-day for recreation on the lake. Also, the estimate of the Corps is an annual equivalent of discounted, future recreational benefits through the year 2000. More important, estimates of the Corps are for visitors attracted to the area in addition to those that would be attracted to the area in the absence of a lake. The Corps estimates that the lake would have attracted an additional 540,000 visitor-days by 1980, and an additional 1,056,000 by the year 2030. These figures represent an addition of 1.7 times the Forest Service estimate of capacity of the area. It is clear that this could happen only if a marked change in the nature of recreational activity in the area occurs, one which emphasizes facilities for intense recreational use. With and without analysis of the project and optimal development of recreational facilities in the region show that net contribution of Red River Lake to recreational benefits will be lower than original projection of the Corps of Engineers.

TABLE IV-6: PROJECTIONS OF DOLLAR VALUES FOR RECREATIONAL BENEFITS
Intermediate Trend, Y_2
(thousands)

YEAR	Y_2 Trend	Value of Recreation Benefits
1980	291	\$1,408.4
1985	369	1,785.9
1990	447	2,163.4
1995	525	2,540.9
2000	603	2,918.4

1. Estimates of Cost

Projections of costs are based on data found in Tables IV-7 and IV-8 below. Capital expenditures are based on plans previously described to develop recreational capacity of the area under current philosophy of management. We anticipate completion of development by 1995 at current levels of expenditures (1980). Although some expenditures relate to facilities outside the corridor, these are included in Table IV-7 below.

Estimates of costs for acquisition in Table IV-7 are only for lands within the corridor.

TABLE IV-7: PROJECTED CAPITAL EXPENDITURES 1980-2000 RED RIVER GORGE				
(Alternative A, No Action)				
thousands	1985	1990	1995	Total
Land Acquisitions				
Fee-Simple	\$120		\$200	\$ 320
Facilities Camping Units				
Level 3	150	150		300
Level 1	14			14
Comfort-Stations	120	60		180
Picnic-Facilities	30	25	20	75
Pit Toilets	18	12	12	42
Road-Construction & Parking	100	100	100	300
Group Areas	180	90	90	360
Canoe-Launch Sites	180			180
Visitor-Information Facilities	3,250	3,250		6,500
Trails	90			90
Total				\$8,361

Projected costs of operation and maintenance are proportional to expected increase in visitation as depicted by Y_2 trend. We can expect some economic changes in the activities of management as the number of visitors increases within the same area. However, this tendency will be offset by need for more intensive maintenance and protection of ecologically sensitive areas and by costs associated with new activities, such as information and interpretative services. The most reasonable estimate would be to expand cost of operation and maintenance in direct proportion to expected increases in visitation (See Table IV-8 below).

TABLE IV-8: CURRENT AND PROJECTED COSTS FOR OPERATION AND MAINTENANCE 1971 to 2000 (in 1979 prices)*				
Year	1979	1985	1990	2000
Operation & Maintenance \$/Year	\$91,500	\$130,589	\$158,194	\$213,402

*These costs are for the total Red River Gorge in which the study corridor is a part.

Under Alternative B, C and D recreation would introduce more river related activities. Lake would be eliminated and thus any recreation opportunities associated with it would be lost.

The recommended Clifty Wilderness would have consequences on any alternatives since the river flows through the area. If enacted, it would impose more restrictive constraints and management of the river and lands within the corridor that coincide with the wilderness. Some types of recreation experiences would be eliminated and others restricted.

List of Preparers

The following members comprise the interdisciplinary study-team for the present study:

Clarence Moore:	Team Leader, Forester, USFS		
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John Vann:	Soil	Scientist,	USFS
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Billie Richard De Walt:	Sociologist,	University of	Kentucky

The following members provided technical data and edited the study:

Gary Pierson:	Landscape	Architect,	USFS
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APPENDIX A - STUDY REPORT

EVALUATION CRITERIA

A. Eligibility Criteria

Public Law 90-542 provides some general criteria for determining whether a river qualifies for inclusion in the National Wild and Scenic Rivers Systems. Specifically, the Wild and Scenic Rivers Act states in Section 2(b):

(b) A wild, scenic or recreational river area eligible to be included in the system is a free-flowing stream and the related adjacent land area that possesses one or more of the values referred to in section 1, subsection (b).

Section 1, subsection (b):

(b) It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition.

A supplement to these criteria is the subject of a joint publication of the Departments of the Interior and Agriculture: "Guidelines for Evaluating Wild, Scenic and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic River System under Section 2, Public Law 90-542" and the revised Federal Register Guidelines dated 9/7/82. The study-team evaluated the Red River and its immediate environs in terms of each criterion established in the law and in the guidelines. In applying these statements of policy to any specific situation, one should be aware of an additional qualification from the "Guidelines" (1980:1):

There is no way for these statements of criteria to be written so as to mechanically or automatically indicate which rivers are eligible and what class they must be. It is important to understand each criterion; but it is perhaps even more important to understand their collective intent. The investigator has to exercise his judgement, not only

on the specific criteria as they apply to a particular river, but on the river as a whole, and on their relative weights. For this reason, these guidelines are not absolutes. There may be extenuating circumstances which would lead the appropriate Secretary to recommend, or approve pursuant to Section 2 (a) (ii), a river area for inclusion in the system because it is exceptional in character and outstandingly remarkable even though it does not meet each of the criteria set forth in these guidelines. However, exceptions to these criteria should be recognized only in rare instance for compelling reasons.

One should also understand that the "Guidelines" define only minimum criteria for classification and management.

B. Individual Criteria

The following are definitions of the values used as criteria in this study.

1. Scenic Value:

Landform: To be of high scenic value landforms must have slopes over sixty percent with highly irregular, narrow ridge lines, deep narrow valleys with a variety of topographic features.

Rockform: To be outstanding, features of the landscape must be unusual with highly irregular palasades which are heavily dissected with arches, rock houses.

Vegetation: Highly scenic areas will have a mixed deciduous - coniferous tree cover. There should also be stringers of riparian vegetation and a wide diversity of plants, trees, shrubs, ground cover, and large, old growth timber.

Water Form: Streams having things such as falls, cascades, rapids, pools, or adjacent to outstanding landforms, rock-forms and vegetation will have a higher scenic value.

2. Recreational Value: As the influence of the recreational opportunity spreads from local, to state, to regional, to national, the recreational value increases. The more variety in recreation opportunities, the higher the recreation value. For example, an area offering opportunities to hike, camp, fish, swim, and picnic will have a higher recreation value than an area offering only a opportunity to camp.
3. Geologic Value: Formations and structures (e.g., by erosion from wind and water) are unusual and worthy of study and observation; and they are old or show many periods and variety or unusual geological features.
4. Fish and Wildlife Values: Populations of fish are self-sustaining and abundant, distinctive or highly visible; threatened and endangered species are found away from their geographic ranges; wildlife and communities of fish show abundance and/or variety of wildlife and/or fish are unusual for the area.
5. Historic and Cultural Values: Sites are easily viewed or interpreted; they are geographically important; they show distinct characteristics of a time period, construction or workmanship; and they are associated with significant events in the nation's state or local history -- even pre-history.

The following statements of policy are taken from the "Guidelines" which the study-team used to make its evaluation:

1. Free-Flowing River: The Wild and Scenic Rivers Act provides that rivers must be in a free-flowing condition, i.e., a flowing body of water or estuary or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes which are without impoundments, diversion, straightening, rip-rapping, or other modification. However, low dams, diversion works, and other minor structures will not automatically preclude the river bank unit from being included in the National Wild and Scenic River System, providing such structures do not unreasonably diminish the free-flowing nature of the stream and the scenic, scientific, geological, historical, cultural, recreational, and fish and wildlife values present in the area.
2. Meaningful Experience: The river or river unit must be long enough to provide a meaningful experience. Generally, any unit included in the system should be at least 25 miles long. However, a shorter river or segment that possesses outstanding qualifications may be included in the system.
3. Water Volume: There should be sufficient volume of water during normal years to permit, during recreational season, full enjoyment of water-related outdoor recreational activities generally associated with comparable rivers. In event the existing supply of water is inadequate, it would be necessary to show that additional water can be provided reasonably and economically without unreasonably diminishing the scenic, recreational, and fish-and-wildlife values of the area.
4. Water Quality: The river should be high-quality water or susceptible to restoration to that condition. A concept of non-degradation, whereby existing high quality of water will be maintained to the maximum extent feasible, will be followed in all river areas included in the national system.

C. Criteria Analysis

1. Outstanding Remarkable Values

a. Scenic Value

The Gorge is a scenic wonderland that is generally written about in well-deserved superlatives. Wyss and Wyss (1977), for example, state, "The Red River Gorge is one of the unique natural resources of the eastern United States. Its scenic beauty, geological formations and the concentration of natural arches rival those of the canyonlands of the Colorado." Robert Rucchoft writes that the Red River Gorge possesses "a marvelous collection of palisades, rock promontories, solitary pinnacles and spires, numerous natural arches and a multitude of cascading mountain streams" (1976:1). Bob Sehlinger describes the river as "some of the most spectacular canoeing waters anywhere in the eastern United States" (1978:90). He also says, "The scenery is spectacular without exception, with enormous hardwoods shading the stream and wildflowers in abundance" (1978:91). And Wendell Berry's The Unforeseen Wilderness: An Essay on Kentucky's Red River Gorge begins with the simple statement, "It is a country of overtowering edges" (1971:1).



A-1. Sky Bridge from KY 715

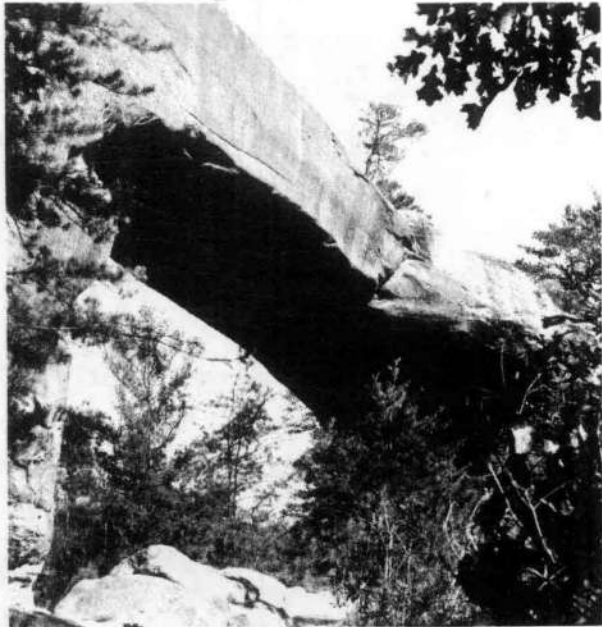
A-5

Whether the scenic qualities of the area are outstandingly remarkable is a matter of personal observation. However, accolades heaped on the area by the individuals quoted above are indicative of its scenic qualities.

The photographs that illustrate these pages also give some indication of the natural beauty of the region, although one must see the Gorge to appreciate it.

The visual resources of the segment under study were assessed in accordance with the requirements of the Forest Service Visual Resource Management System.^{1/} The segment is located within the Appalachian Plateau-landscape (e.g., indigenous as to character and type) and the Mountains and Eastern Coalfields sub-type. The topography of this sub-type is quite rugged and characterized by narrow, winding ridges, steep walls in the valleys, and limited bottomlands. Vegetation is predominantly deciduous, mainly oak, yellow poplar, and hickory. Virginia, short-leaf and pitch pine are common near cliffs and on narrow tops of ridges.

The Visual Resource Management System is based on the premise that all natural landscapes have some scenic value, but those with the most diversity or variety have the greatest potential for high scenic value. Therefore, landscapes with specific character-types (sub-types) are rated in terms of degree of visual variety: Distinctive, common, or minimal landscape.



A-2. Sky Bridge
Distinctive, common,

or minimal landscape.

^{1/} The Forest Service Visual Resource Management System contains management-directions and techniques for protecting and enhancing visual characteristics. The documents are available for review at the office of the Forest Supervisor, Daniel Boone National Forest.

A landscape is normally allocated to the highest variety-class for which it possesses one or more distinguishing characteristics. Visual quality of the segment under study qualifies as a Class A-distinctive landscape in all four elements: Landform, rockform, vegetation, and water form (See photos A-1-6).

b. Recreational Value

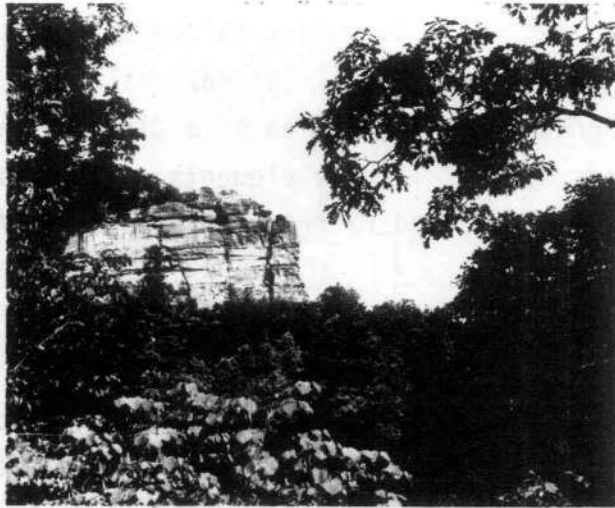
The Red River provides an excellent opportunity for recreation, especially dispersed recreation, in areas of completely undeveloped



land where the river flows through huge boulders, dense brush, and rhododendron. In these scenic regions of the Upper Gorge the river is classified Class III by the International Scale of River Difficulty. There are excellent opportunities

A-3. Aerial view of Chimney Top Rock for hiking in back country and wilderness settings in the Upper Gorge. By far, canoeing, hiking, and backpacking are the most popular activities. The Lower Gorge also offers an excellent opportunity for canoeing because the river is rated Class I. Along this segment, fishing, picnicking, sightseeing, and rockclimbing are popular activities.

The Sheltoewe Trace, a 250-mile National Recreation Trail, passes through this area and thus adds a connection to other opportunities in the area. Off-trail or cross-country hiking has developed into a popular activity in this segment.



A-4. Chimney Top Rock (E.C. Scott)

Rockclimbing, especially on Little Wall, Tower Rock, and Eagle Rock on summer weekends, is gaining in popularity (see photo A-5-6).

Recreational opportunities are many, with currently high use and even some overuse in isolated areas on summer weekends. All of these opportunities are unique and considered outstanding in this region.

c. Geological Value

The geological processes that laid down layers of rock, twisted the earth, and caused subsequent, incessant weathering and erosion created favorable conditions that make the area so outstanding in scenic, botanical, and archeological features. Instead of repeating geological processes described in earlier sections, we will outline briefly outstanding geographical features that fall within the proposed corridor of the wild and scenic river. It should be obvious, moreover, that many features described here are what make the area so outstanding in terms of scenic value.



A-5. Raven Rock in the Lower Gorge

An extremely rugged topography characterizes the Red River Gorge. Narrow ridges drop off precipitously to deep, narrow valleys carved by streams and creeks that flow through them. Many clifflines are nearly vertical, and those devoid of vegetation provide an imposing sight. Every ridge harbors a number of rock shelters beneath its cliffs, and some of these shelters have become windows or arches. On its tributaries many waterfalls plummet toward their confluence with the Red River.

Table A-1 lists the arches and windows that fall within the boundaries of the proposed corridor. These arches are some of the most spectacular in the entire region.

Table A-1. ARCHES AND WINDOWS IN THE CORRIDOR OF THE RIVER

Red-Byrd Arch	Tunnel Window
Moonshiner's Arch	Cherokee Arch
Hopewell Arch	Rat Windows
Sky Bridge	Princess Arch
Rock Window	Rango Arch
Hemlock Arch	



A-6. Tower Rock as seen from Highway 715

Many visitors get their first view of Sky Bridge from the road that parallels the Red River. From this vantage point, one easily recognizes how this arch got its name. Architecturally, Sky Bridge is a natural wonder; its graceful, smooth opening is seventy-three feet long and twenty-three feet high. At one end of the arch, a pinnacle hangs down as a kind of support, forming a smaller, separate opening nine-feet long and six-feet high (See photo A-2, p. A-6).

Princess Arch is not as large or spectacular as Sky Bridge. Its smooth and graceful appearance, however, makes it another fine example of a sandstone arch on top of a ridge. It is thirty-two-feet long and eight-feet high.

Moonshiner's Arch is different from the two arches described above. Underground water which worked its way through a thick limestone layer formed this arch. Eventually, such erosion forms a cave; the arch forms when the cave collapses, leaving a part of the roof as an arch. Moonshiner's Arch has a very large opening in front, but the smaller opening in back is only sixteen-feet long and nine-feet high. The arch supposedly got its name from the activities of moonshiner's who placed their stills inside the shelter under a five-foot hole (in diameter) in the span. This hole served as a natural chimney for the smoke, which wafted up from the distilling process below. Located on what is currently private property, the arch is only 100 yards from the Red River (See photo III-5, p. 57).

In addition to arches, several other geological features deserve comment; probably the most spectacular is Chimney Top Rock. Standing approximately 500 feet above the level of the river, Chimney Top is separated by a crack about $3\frac{1}{2}$ feet from the cliff to which it was onced joined, giving the appearance of a chimney (See photos A-3-4, p. A-8, A-9). Another important feature is Raven's Rock, a "gargantuan rock promontory" (Ruchhoft 1976:46) that looms up above canoeists in the river or drivers on Highway 715. High up on the rock is a small opening known as Raven's Window (See photo A-5, p. A-9). A solitary pinnacle, Tower Rock stands approximately 200 feet above the level of the river. The ridge has eroded away, leaving only this solitary tower of weather-resistant sandstone. Tower Rock is a favorite location for rock climbers (See photo A-6, p. A-10).

The outstanding features, e.g., massive boulders that dot the river, waterfalls and underground streams, and other natural wonders of nature, led the U.S. Forest Service to propose that approximately 25,663 acres of National Forest land be managed under authority in Title 36 CFR 294.1a as the Red River Gorge Geological Area, granted in 1974.

d. Fish and Wildlife

The outstandingly remarkable fish and wildlife occur because the high-quality habitat provides a natural base for various resident and visitor-species. The segment of the river under study supports a high-quality, warm-water fishery that includes such indigenous species as bass, catfish, smallmouth bass, numerous types of sunfish, and muskellunge; the river is also one of the few free-flowing muskie streams in Kentucky. The presence, or suspected presence, of numerous threatened, endangered, or special-interest species of wildlife supports designation of the study-segment. These special types occur either on the rare and endangered categories of the State of Kentucky or on the natural listing of endangered species of the U.S. Fish and Wildlife Service.

e. Historic and Culture

Archaeological study in the vicinity of the Red River has been discussed in an earlier section.^{2/}

It is important to stress that rock shelters found in the Red River constitute an outstandingly remarkable archaeological resource. The dry microclimates of these overhangs have preserved woven fiber slippers, fiber bags fil-

^{2/} Further studies are on hand in the office of the Forest Supervisor.

led with nuts, wooden tools, and remains of cultivated and uncultivated plants. This remarkable preservation offers a unique opportunity for archaeologists to interpret the lifeways of people who lived in the shelters (See photos A-7-8, p. A-13, A-14). Some recovered material has already been used to formulate hypotheses concerning development of horticulture in eastern North America (Yarnell 1972; Struever and Vickery 1973), although Ford (1979) noted the preliminary nature of the data.



A-7. Archaeological testing in a rock shelter

To indicate briefly what archaeologists have determined, based on excavations, we quote Wyss and Wyss (1977:22-3):

The prehistoric archaeological sites of the Red River Gorge area are well-known for excellent preservation of normally perishable ethnobotanic remains, the bulk of which have been recovered from sites of the Woodland Tradition. The remains of about fifty species are present in these collections.



A-8. Archaeological testing in a rock shelter

This statement summarizes our present knowledge of ways in which prehistoric inhabitants used the resources of the area.

f. Botany

The conjunction of several climatological, geographic, and topographic features created the diversity of plant life in the Gorge. First, geographic location of the area is midway between the northern and southern areas of the United States. Second, topography varies as much as 600 feet from tops of ridges to the floor in the valleys, thus creating a wide variety of climatic conditions. Third, ero-



A-9. One of many wildflowers that bloom along the Red River

sion has created considerable variability in layers of the surface because, as sandstone, limestone, shale, and other rocks eroded away, soils have been deposited in diverse concentrations on hillsides, terraces of the river, and floors of valleys. Thus, there are a variety of niches, each suitable for different types of plant life. Carl Clark describes the area:

The plateau top, with its thin soils, takes some of the character of the desert during hot, dry summer months. Deep in the Gorge, there is a cool, deep shade of the tropical nature, while hot and humid, subirrigated conditions exist in the open valley ... Plants that need shade flourish against the high palisade walls and under the canopy of tall forest trees; those that require open sun thrive, in endless variety, along old abandoned logging trails, country roads, railroad beds and farmstead clearings (Louisville Courier-Journal 3/3/68).



A-10. A Mountain Laurel blooming (E.D. Scott photo)

2. Criteria From the Guidelines

a. Free-Flowing River

Currently, the Red River is free-flowing because there are no impoundments, diversions, or other modifications, although a major dam is presently under consideration. If this dam is ultimately constructed, it will destroy the free-flowing condition of a large segment of the river under study.

b. Opportunity for Meaningful Experience

The segment of the river discussed in this study measures 19.4 miles, falling somewhat short of the generally recommended standard (e.g., at least twenty-five miles). With regard to the two criteria contained in this report, this segment of the Red River definitely qualifies because it possesses outstanding qualifications and is capable of providing meaningful recreational and aesthetic experiences. For example, the canoeist beginning at the bridge crossing Kentucky Highway 746 is hard-pressed to complete the run to the ford below Schoolhouse Branch in a single day. The necessity for scouting rapids and difficulty in portaging around areas dangerous for canoes and/or passengers in the Upper Gorge generally make a full, exhausting day between the bridges crossing highways 746 and 715. Stopping to enjoy the many scenic features further prolongs the trip. However, canoeing the Lower Gorge is possible in two-to-four hours.

Hiking and camping in the area around the river are very popular. Since only portions of the many miles of trails in the Gorge are actually contiguous to the river, it takes many weeks to explore all of them. Thus, one thing seems clear: This segment of the Red River, with its surrounding rugged terrain, diverse scenic, botanical, and

geological features, plus miles of developed hiking trails, is capable of providing anyone a meaningful recreational experience.

c. Volume of Water

The volume of water in the Red River is always sufficient for people to enjoy activities associated with the free-flowing river: fishing, wading, swimming (e.g., in naturally occurring deep holes), and experiencing the aesthetics of the area. For canoeing, the depth of the water is usually sufficient only during spring and winter (See Table III-1, p. 46). In the Upper Gorge the hazard from flooding is moderate to high because of the rapid rise of water, the narrow flood plains, and the steep sides of canyons. In dry periods during summer, the river is very shallow. Canoeing is possible and does occur after periods of rain, but flow drops off quickly as the weather becomes drier. Although canoeing becomes impractical as the level of water falls, many people take advantage of other recreational opportunities. The nature of the terrain in the Upper Gorge makes it impossible to appreciate its outstanding qualities during most of the year, except by canoe. During dry periods in summer, it is possible to wade in the river. The leisurely pace of wading forces individuals to see and appreciate the vast array of wildflowers, aquatic, and terrestrial fauna, to listen to falling water that seems to be everywhere, to fathom the massiveness of boulders that dot the landscape, and to enjoy the sounds of an area remote from the rush of civilization.

The depth of the river determines its recreational use. This is as it should be because the number of areas which humans have constructed for recreational use certainly outweigh the number of places where humans have the opportunity to adapt to nature.

d. Quality of Water

In the study-area quality of water is adequate, although there are potential hazards from high counts of human waste (e.g., fecal coliform). This potential could be a risk to public health, especially during warm, moist, summer months when flows are low, temperatures are warm, and swimming or wading is at its peak.

Concentrations of iron exceed guidelines set by the Environmental Protection Agency of the State of Kentucky for aquatic life.^{2/} However, at the present time, no toxic effects have been witnessed. At Haxel Green, Kentucky, temperatures occasionally exceed standards set by the State of Kentucky, resulting in a potential for defects of dissolved oxygen which affects adversely production in fisheries. A program to monitor the water quality needs to be implemented to define any public health hazards which might occur.

D. Conclusions

The Red River meets all established criteria for evaluating streams for potential inclusion in the National Wild and Scenic Rivers Systems.

Eligibility Criteria	Criteria Satisfied
Scenic Value	Yes
Recreational Value	Yes
Geological Value	Yes
Fish and Wildlife Values	Yes
Historic and Cultural Values	Yes
Free-Flowing River	Yes
Meaningful Experience Opportunity	Yes
Water Volume	Yes
Water Quality	Yes

^{2/} Kentucky Nature Preserves Commission. 1979a. Aquatic Biota and Water Quality Survey of the Appalachian Province, Eastern Kentucky. Frankfort, Kentucky.

E. Classification Criteria and Determination

There are three classifications of rivers in the Wild and Scenic Rivers Act:

1. Wild river areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
2. Scenic River areas - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
3. Recreational river areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The category of classification is based on the amount of development and human intrusion. The Red River has the potential to be classified as follows:

1. Upper Gorge Section

The 9.1 miles of the river from Spradlin Bridge (KY 746) to the mouth of Swift Camp Creek qualifies for classification as wild, based on:

- a. The segment is free of impoundments.
- b. Water quality is adequate.

- c. The shoreline and immediate environs are essentially primitive.
- d. No habitations or other signs of development can be seen from the stretch of the river.
- e. The segment is completely inaccessible except by trail.
- f. There are only two sites where easy access to the river is possible. This situation holds true until the lower reach of the segment, where an undeveloped trail parallels the river for approximately 2.5 miles.

2. Lower Gorge

The portion of the river from the mouth of Swift Camp Creek downstream 10.3 miles to the ford below Schoolhouse Branch is a recreational river segment based on:

- a. The segment is paralleled by Kentucky Highway 715 and 77.
- b. There is some development along the shoreline. The corridor of the segment is still primarily forested, with portions of agricultural land. Dwellings can be seen from the river, and some development in the form of commercial and subdivision development exist.
- c. The segment contains three bridges.

APPENDIX B - HISTORY RED RIVER LAKE

History - Red River Lake

Red River Lake has a long and controversial history. It was first proposed by the Army Corps of Engineers in 1954 as part of the Ohio River Basin Plan. The project was authorized as part of the flood control plan for the Kentucky River Basin in 1962. It was designed as a flood control and recreation project with an upstream damsite near Indian Creek (river mile 47.5). Initial planning and design funds were appropriated in fiscal year 1964, and construction funds for land acquisition were appropriated in fiscal year 1967.

In 1967, the first organized opposition to the reservoir was formed on the basis of the irreversible environmental damage that would occur in the Red River Gorge area. As a result of the controversy, Congress directed the Corps to study alternative sites for the dam. In 1968, water-supply benefits were added to the project design, in 1969, Kentucky Governor Nunn requested relocation of the dam to river mile 42.3.

Environmental opposition to the project reemerged. It was complemented by landowner opposition that resulted from the considerably larger quantities of private lands and homesites that would have been taken for the downstream project. The intensity of opposition increased after publication of the Final Environmental Impact Statement (FEIS) by the Corps of Engineers in January, 1974.

In August, 1974, a coalition of conservation and property owning groups and individuals obtained a temporary restraining order prohibiting the Corps from proceeding with any substantive activity on the project. In September, 1975, Kentucky Governor Carroll declared his opposition to the project, and, in accordance with their policy, the Corps placed the project on an inactive status.

The flood control recreation and water supply benefits estimated by the Corps resulted in a benefit-cost ratio of 1.7/1 - well in excess of the 1/1 required to demonstrate the net national economic development benefits required for project feasibility. Opponents challenged the estimates of all three categories of benefits as well as the discount rate used in calculating the B/C ratio. In addition they claimed that environmental impacts and family displacement were not adequately treated in the FEIS. The Corps responded that its estimates, calculations, and discussion were consistent with Congressional directives and Corps guidelines.

The following references provide documentation of the substantive issues in the controversy.

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The Red River Lake project was planned within the boundaries of the Stanton District of the Daniel Boone National Forest. By agreement with the Forest Service, the Corps would manage the dam and lake, while the Forest Service accepted responsibility for management of recreation activities and surrounding land uses. It remains an authorized project.

APPENDIX C

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