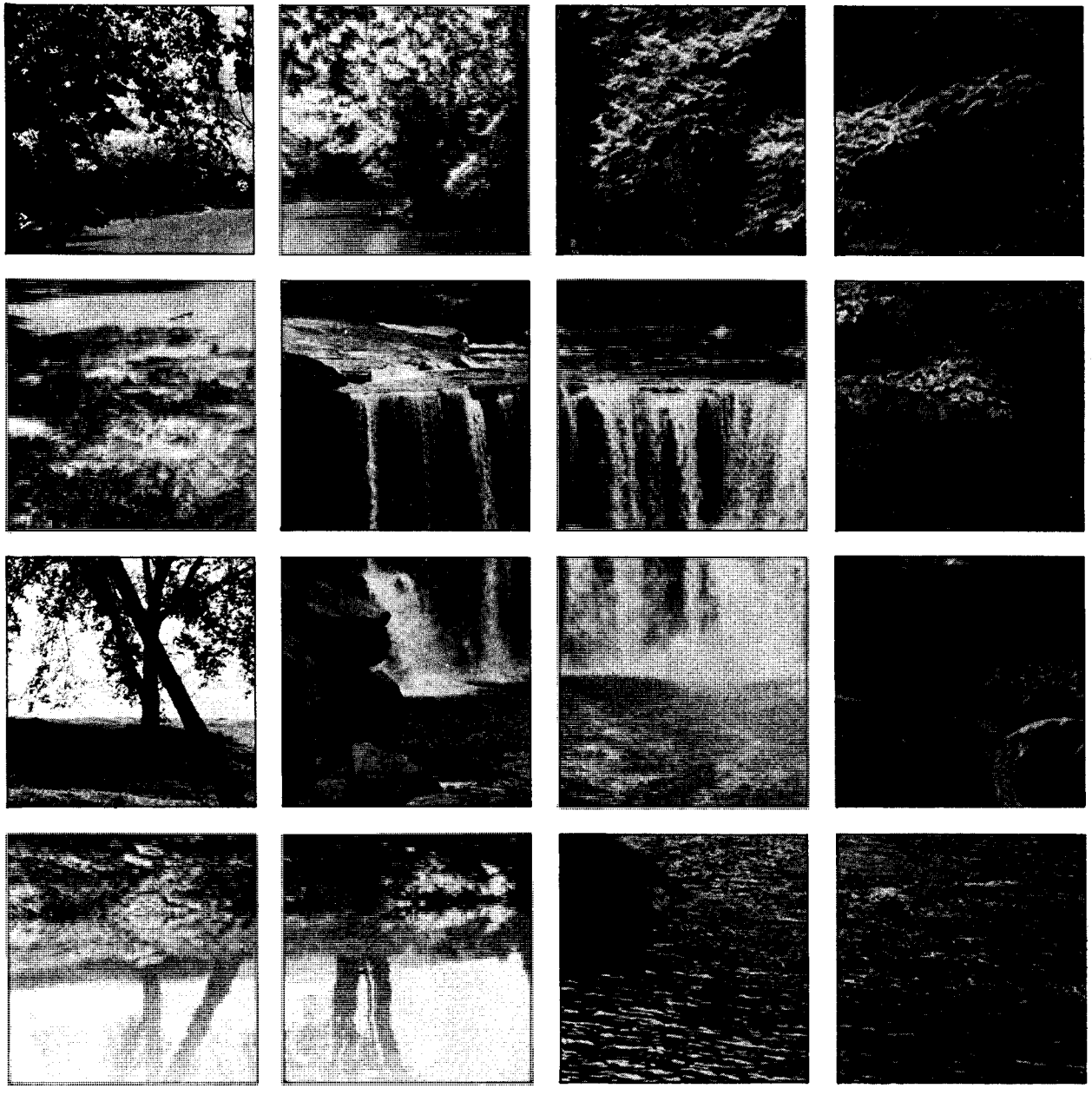
Kentucky Wild Rivers

Red River Management Plan



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BACKGROUND

PHOTO: MILLER/WIHRY/LEE INC.
CALM POOL OF THE RED RIVER

Across the country, Americans are becoming increasingly aware of the importance of preserving and protecting outstanding and significant natural and cultural resources, including river and stream corridors which possess unique natural and scenic qualities such as rare and endangered plant and animal species and significant archaeological and historical sites. Recognizing that portions of certain rivers and streams in Kentucky possess unique and significant environmental quality, the Kentucky General Assembly passed legislation, in 1972, providing for the establishment of a system of Wild Rivers. At the same time, the General Assembly set forth criteria for including rivers and streams in the system and designated certain streams for immediate inclusion in the system.

In accordance with KRS 146.230, streams which substantially meet the following criteria are eligible for inclusion in Kentucky's Wild Rivers system:

> Streams or sections of streams that are essentially free-flowing, with shorelines and scenic vistas essentially primitive and unchanged, free from evidence of the works of man and pleasing to the eye. The waters shall not be polluted beyond feasible correction and shall be kept unpolluted once corrected according to standards established by the Kentucky Water Pollution Control Commission. The area may provide a high quality fish and wildlife habitat, containing one or more unique or rare species for sport or observation. It may provide opportunities for scientific study or appreciation of essentially undisturbed ecological, geologic, or archaeologic conditions. It shall provide wilderness type recreation such as canoeing and hiking, or specialized uses without disturbing the primitive character of the area.

Portions of the Red, Rockcastle, Cumberland, Green and Big South Fork Cumberland River were included in the system in 1972, while portions of Rock Creek, Martins Fork and Little South Fork Cumberland River were added in 1974.

In establishing Kentucky's Wild River system, it was the intent of the General Assembly to achieve a number of objectives including:

(1) Preservation of Kentucky's outstanding river resources, in their natural state;

(2) Preservation and interpretation of outstanding and distinctive geological, botanical, zoological, archaeological and historical features within designated Wild River corridors;

(3) Provision of recreational opportunities within Wild River corridors, including sightseeing, canoeing, fishing, hiking, camping, hunting, nature study and scientific investigation, where appropriate; and

(4) Improvement of the State's tourist industry through the attraction of out-of-state visitors.

The Department for Natural Resources and Environmental Protection was given responsibility for administering the Wild Rivers system and the program was initially handled by the Department's Division of Special Projects. In 1976 the Wild Rivers program was transferred to the Division of Water Resources. In 1978, the General Assembly appropriated funds for the preparation of a Statewide Management Plan for Kentucky's Wild Rivers system and detailed management plans for certain of the Wild River corridors. To assist in the planning effort, the Division of Water Resources engaged the services of Miller/Wihry/Lee, Landscape Architects, Engineers and Planners.

The Statewide Management Plan, published in June, 1979, outlined a series of management options and alternatives to assist policy makers in managing Kentucky's Wild River system. Assistance in the preparation of detailed Wild River corridor plans has come from the United States Army Corps of Engineers in its "Planning Assistance to States" program. Through this program, the Corps has prepared base maps at a scale of 1" = 400' with five foot contour intervals for each of the Wild River corridors, and has initiated a series of environmental inventories on Wild River corridors where detailed environmental data has not been gathered.

The Red River Management Plan has been prepared to assist policymakers and managers in the protection, use and management of the Wild River segment of the Red River.

The segment of the Red River that was designated for inclusion in the State Wild River System by the Kentucky Wild Rivers Act of 1972 (KRS 146.240) is the 9.1 mile long portion that begins at the Kentucky Highway 746 Bridge (Red River Mile 68.6) and extends downstream to the mouth of Swift Camp Creek (Mile 59.5). All but a 1.7 mile long strip of land on the north side of the river is in Wolfe County. This 1.7 mile long area is at the downstream terminus of the Wild River and is part of Menifee County. The portion of the Wild River segment from Mile 64.4 to 59.5 is within the existing Proclamation Boundary of the Daniel Boone National Forest.

The Wild River segment of the stream lies upstream of the area within the Red River Gorge that was to be impounded by the Corps of Engineers' Red River Dam, a project whose status is currently inactive. It overlaps with a portion of the Forest Service's 25,663-acre Red River Gorge Geological Area, which contains the largest concentration of natural arches in the eastern United States (Forest Service, 1974), and it intersects the Forest Service's Clifty Area. The Clifty Area is an 11,115-acre tract of land that recently underwent review and evaluation for inclusion in the National Wilderness System. It was recommended for Wilderness designation in January, 1979, by the Secretary of Agriculture. The Wild River segment, together with the segment downstream from the Wild River as far as the Kentucky Highway 77 Bridge, is being studied by the Forest Service for its eligibility for inclusion in the National Wild and Scenic River System.

This Management Plan describes existing conditions in the Red Wild River corridor and outlines carrying capacity guidelines, recreation use criteria and an estimate of the carrying capacity of the corridor for selected recreational uses. The report also includes a suggested plan for protection, use and development with accompanying management recommendations, implementation strategies and cost estimates. Additional management options available to policy makers and Wild River managers are detailed in the Statewide Wild Rivers Management Plan.

Managing Kentucky's Wild River resources in accordance with the directives of Kentucky's Wild Rivers legislation poses special challenges to those charged with policy and management responsibility, for on the one hand, private property rights must be preserved and protected, while on the other, opportunities to utilize and enjoy these natural resources must be provided the public.

Based on past trends, it is likely that, with or without the Wild Rivers program, there will be increasing visitor pressure on these resources as people seek out the Wild Rivers for recreation, investigation and aesthetic enjoyment. What these management plans seek to do is provide an organized program to monitor visitor activities; channel visitor use into areas which can best accommodate it; educate landowners and visitors as to the significance and importance of the Wild River resources; and, minimize disruptions to the rural lifestyles which characterize many of Kentucky's Wild River areas.

Effective protection and management of Kentucky's Wild Rivers will require multidimensional strategies involving coordination and cooperation among resource managers in Federal, State and local agencies. In addition, public-spirited citizens must play an active role in building a strong constituency for protecting these valuable natural resources. Many activities are currently underway designed to implement Kentucky's Wild Rivers legislation, and it is believed that with the implementation of strategies and recommendations outlined in the Wild Rivers plans, Kentucky will assume a national leadership role in the protection, use and management of its outstanding river resources.

Public Ownership

The Forest Service has included the entire Kentucky Wild River segment of the Red River in its Red River Composite, a 38,800 acre area administered by the Stanton Ranger District that includes, in addition to the Wild River, the Red River Gorge Geological Area, the Clifty Wilderness Area, and about 14 miles of the 220 mile long Sheltowee Trace. While the Forest Service assigns high priority to acquisition of land in the Red River Composite, only 69.5 percent of the total Composite is public land at present, and only 36.8 percent of the land in the Wild River corridor is currently publicly-owned.

Private Ownership

Private landowners hold title to 63.2 percent of the land in the Wild River corridor. Ownership of 14 privately-owned tracts that intercept the corridor has been determined from county property ownership records. These private holdings range in size from three acres to 365 acres, but typically are 80 to 100 acres in size. Collectively, they account for approximately 80 percent of the privately-owned lands in the corridor. Ownership of the remaining 20 percent of the private land has not been determined.

Complete information on land ownership within the corridor is not readily available due to the absence of property ownership maps in the county tax or property valuation offices. Without such maps, it is difficult to ascertain ownership within the corridor with a high degree of accuracy.

Land ownership within the Red Wild River corridor is depicted on Map 1. The numbers on the map are keyed to the information contained in Table 1, "Private Landowners in the Red River Wild River Corridor 1979." All property boundaries depicted on Map 1 are approximations.

Most of the private tracts of land along the river contain one or more cultivated fields or pastures. These are located back from the cliffline outside the lateral limits of the corridor, and are not visible from within the river corridor. They range in size from an acre to 43 acres, but most are less than 20 acres in size. Tobacco, corn, and occasionally soybeans are

grown on some of the cultivated parcels, with the remainder used for pasture or hay. There are no homes or other buildings within the boundaries of the Red Wild River, which is forested along its entire length.

Table 1: PRIVATE LANDOWNERS IN THE RED RIVER WILD RIVER CORRIDOR, 1979 (Keyed to Map 1)

Map Key	Landowner	Address
1	Dexter Campbell	Frenchburg, Kentucky
2	Ennis Chaney	Stanton, Kentucky
3	Earl Wells	Frenchburg, Kentucky
4	Adam Creech Lamech Creech	Valeria, Kentucky
5	Grace King	Rogers, Kentucky
6	William Campbell	Mt. Sterling, Kentucky
7	Elmer Lykens	Valeria, Kentucky
8	Ben Culbertson	Valeria, Kentucky
9	Bruce Smith	Maytown, Kentucky
10	Danny Brewer	Campton, Kentucky
11	Bill Jeff Brewer	No listing
12	Gerald Helton	Campton, Kentucky
13	Richard Pence	Campton, Kentucky

Table 1 (continued)

Map Key	Landowner	Address
14	Marvin Brewer	Campton, Kentucky
15	Raymond Osborne	Maytown, Kentucky
16	James R. Lacy	No listing

Designation of the Red River as a Kentucky Wild River does not confer upon the public any right of access on or across private property. It is incumbent upon visitors to the area to recognize this and seek the landowner's consent before engaging in any activity on private property in the Wild River corridor.

Roads and Parking Areas

The Wild River segment of the Red River is easily accessible only at its upstream and downstream termini. The upstream terminus is served by State Route 746, a two-lane, medium-duty asphalt road in fair condition. The Kentucky 746 bridge constitutes the upstream boundary of the Wild River segment. The road shoulder on the northwest side of the 746 bridge is 20 feet wide for a distance of approximately 100 feet and is gravel-surfaced. It provides a safe pull-off and parking for approximately five vehicles.

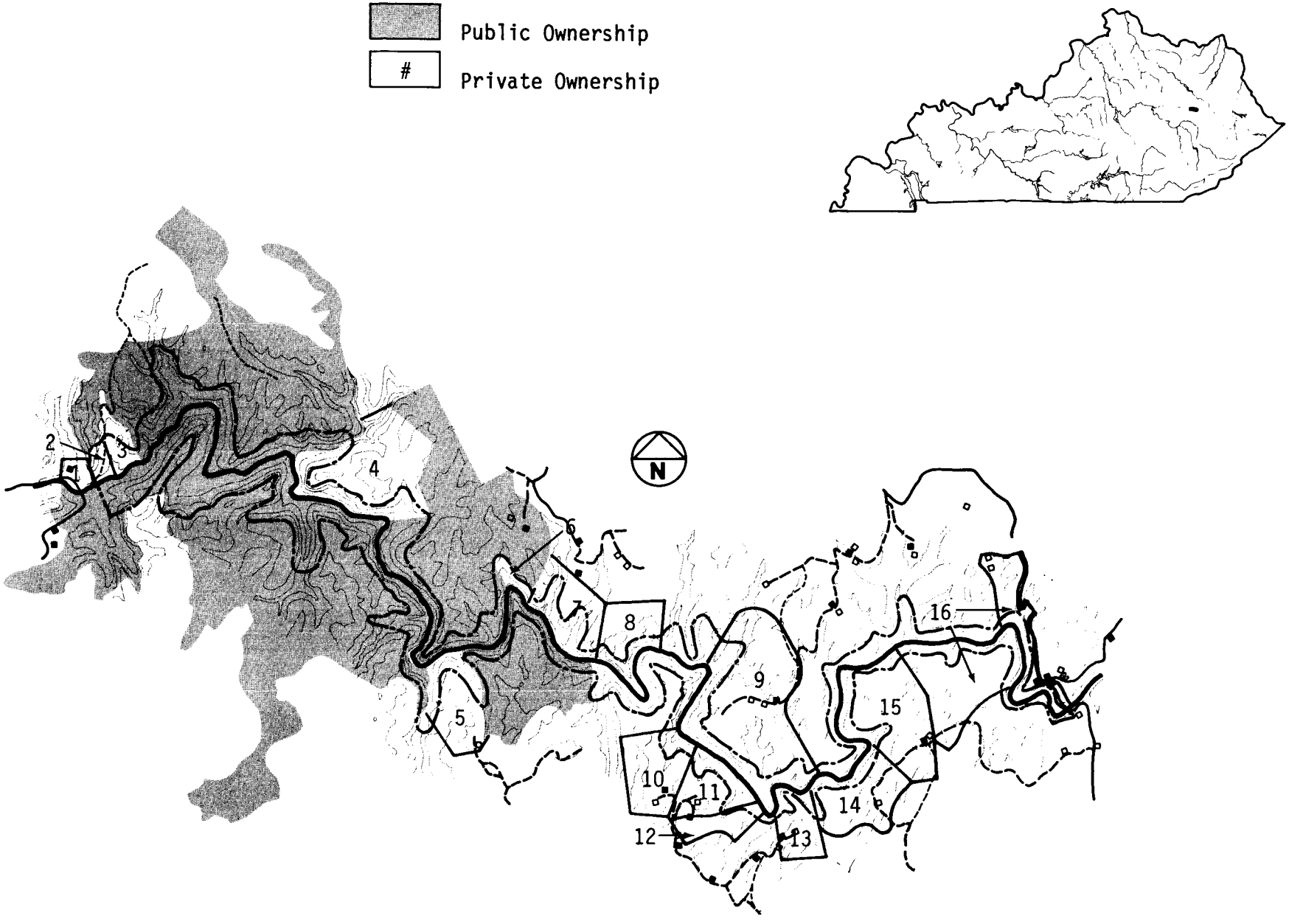
The downstream end of the corridor terminates approximately 600 feet upstream of the Kentucky 715 bridge. State Route 715 is also a two-lane, medium-duty asphalt road, and is in good condition. Gravel parking areas are available on both the northeast and southeast sides of the bridge. On the southeast side, the road shoulder has been widened to accommodate two or three vehicles. On the northeast side, there is a parking area where vehicles can pull completely off the road. This gravel lot is approximately 150 feet long by 60 to 80 feet wide at its widest point, and could accommodate perhaps 15 to 20 vehicles. While the area on the southeast side of the bridge is on Forest Service land, the parking area on the northeast side of the bridge is on private property.

Both State Route 715 and 746 connect with the Mountain Parkway a few miles south of the Wild River, and with U.S. 460 to the north.

Existing Trails

A dirt trail, 12 to 14 feet wide and approximately 150 feet long, curves downhill from the road shoulder on the northwest side of the Kentucky 746 bridge at the upstream end of the Wild River corridor. The trail, wide

Map 1: LAND OWNERSHIP IN THE RED WILD RIVER CORRIDOR



enough to accommodate motor vehicles, has a slope of about 15 percent and ends on a level to nearly-level floodplain area approximately 100 feet long by 36 feet wide. From this floodplain area, a footpath parallels the river 10 or 20 feet from the water's edge for a distance of approximately 200 feet and terminates at the base of a sheer cliff. Another footpath, on the the opposite (south) bank, parallels the river for a short distance. This path is reached only by wading across the river in the shallow riffle at the level floodplain area on the north bank. Neither path is heavily used, nor is either one marked in any way. Neither trail was produced by design, but rather is incidental to use of the area by canoeists, fishermen, and other recreationists.

At the downstream end of the Wild River Corridor, incidental trails abound, and have been much more heavily used. Wide pedestrian trails parallel both banks of the river; however, the trail on the south bank disappears after approximately a half mile, as severe slopes make hiking on that bank very difficult. The trail on the north bank continues for two miles or more, becoming narrower and showing fewer signs of heavy use. These trails are unplanned and therefore, are not designated hiking trails or marked in any way.

The trails on both banks at the upstream end of the corridor are on private property. Those on the north bank of the river at the downstream end, and within a quarter of a mile of the Kentucky 715 bridge, are on private property. The remainder are on Forest Service lands.

Existing Canoe Access

Access for canoes and kayaks at the upstream end of the corridor is on private property beside the Kentucky 746 bridge. From the road shoulder on the northwest side of the bridge, or from the unpaved road or trail leading downhill from the road shoulder, the canoeist has a short carry on an easy grade. The banks are sandy with a shallow entry, and the stream bottom consists of mud and rock-rubble of cobblestone-size and smaller.

At the downstream end of the corridor, access is from either the northeast or the southeast side of the Kentucky 715 bridge. Either side provides a short

carry on a clear trail, however, the slope of the bank on the southeast side is not as steep as the northeast side, and the southeast side is on Forest Service property while the other side is privately owned.

Hydrology and Drainage Relationships

The drainage area of the Wild River segment of Kentucky's Red River is 120 square miles in extent, and includes portions of Wolfe, Menifee, and Morgan counties (see Map 2). This drainage area or watershed is an important land area to consider in the management of the Wild River since any point or non-point source of pollution within the boundary of the watershed has the potential to affect water quality in the Wild River segment.

Point sources of pollution include municipal sewage outfall pipes or industrial waste treatment effluent pipes and pipes from a variety of sediment basins which empty into rivers or streams. Nonpoint sources of pollution do not have a defined drainage outlet and include agricultural lands, feedlots, surface mined lands, timber operations and construction sites.

No point source dischargers were identified in this segment of the river in the Kentucky 303(e) River Basin Water Quality Management Plan prepared in 1975. Campton, the largest community in the watershed (estimated 1975 population 419) was identified as the principal potential source of domestic or municipal discharges in the 145.36 square mile drainage area analyzed in the River Basin Plan, which included the Wild River segment, the headwaters, and the drainage area of Swift Camp Creek. Any municipal discharge from Campton, however, would have no effect on the Wild River segment since the discharge would be carried by Swift Camp Creek, and not the Wild River segment of Red River, which terminates at the mouth of Swift Camp Creek.

The River Basin Plan (1975) identified only one non-point source in the drainage area of the Wild River segment, a mine site on Laurel Fork, south of the Wild River Corridor. Studies of "orphaned lands" (abandoned mine lands) are currently being conducted by the Kentucky Department for Natural Resources and Environmental Protection, Divisions of Water Quality and Orphan Land Reclamation (personal communication) and, when completed, should assist Wild River Managers in determining if their stream segments have been impacted by runoff from orphaned lands.

An updated listing of point source discharges in the Red River watershed (Division of Water Quality, 1980) indicates that the Hazel Green Academy in Wolfe County (10,000 gallons per day design flow) is the only significant discharger in the Wild River drainage area. A "significant" discharge is defined as a discharge of 10,000 gallons per day (gpd) or more. Another discharger in the drainage area upstream of the Wild River is Red River Valley Elementary School, with a design flow of 6,000 gpd.

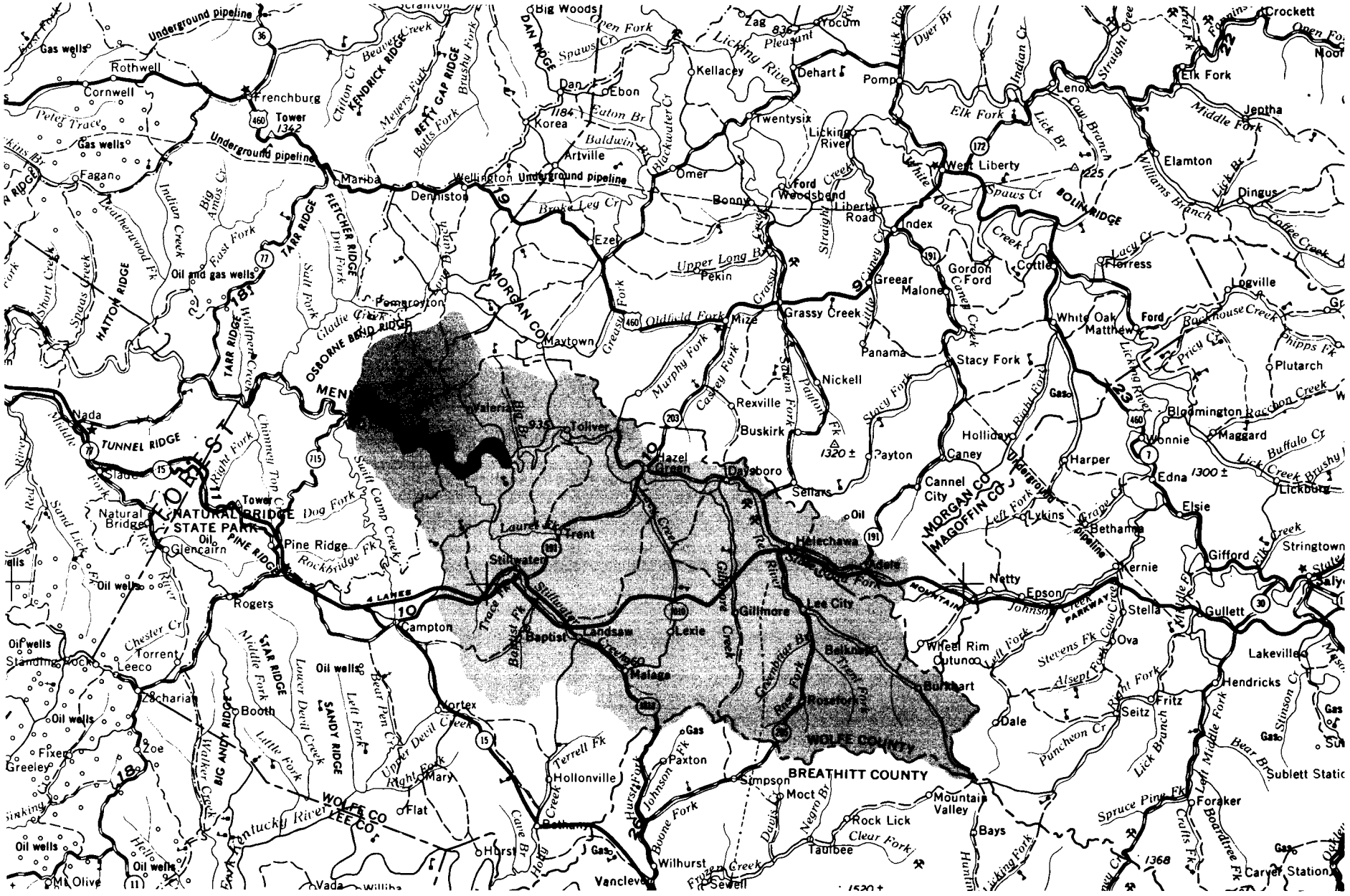
There are also oil wells in the upstream watershed and an oil spill occured in the upstream segment of the river in 1979; however, recent biological investigations indicated that this spill apparently had no serious or lasting effect on the fish, plankton and macroinvertebrate fauna (Division of Water Quality, personal communication).

The rural area of the 145.36 square mile drainage area analyzed in the River Basin Plan (1975) included an estimated 37.1 square miles of agricultural land and 107.2 square miles of forest and woodland. The remaining land area consisted of Campton and the other rural communities in the drainage area, some mining areas, and roadways. The population of the drainage area was estimated to be 3,709 in 1975.

Very limited water quality data was available for the river segment in 1975. The River Basin Plan concluded that water quality should be excellent in the stream segment since there were no significant point or non-point sources, but that additional monitoring was needed. The Plan recommended establishing a primary monitoring station at Red River Mile 73.32 which is upstream of the Wild River segment near the community of Hazel Green.

Water quality data for the segment is still limited; however, that data which does exist suggests water of high quality. The United States Geological Survey (USGS) maintains a gaging station on Red River at Mile 72.7 which has monitored discharge since 1954 and chemical data since 1976 (USGS, 1978). The chemical data monitored at this station consists of specific conductance and metals, including arsenic, cadmium, chromium, cobalt, copper, lead, mercury and zinc. Values reported for specific conductance range from 65 to 120 micromhos indicating low concentrations of dissolved solids and low productivity. Metals were present in trace amounts or sometimes were not detectable.

Map 2: RED RIVER DRAINAGE AREA (120 sq. mi.)



Other water quality data are contained in the Corps of Engineers' Final Environmental Impact Statement for the Red River Lake Project (1974). The Corps found the water soft, with a near neutral pH, low in dissolved materials and productivity, and containing very little contamination associated with human activity.

The most recent information available continues to indicate clean, unpolluted water. The Kentucky Department for Natural Resources and Environmental Protection, Division of Water Quality, reported to Congress in 1978 that water quality in Red River was superior in every parameter to the other sub-basins in the Kentucky River Basin. The Division cautioned, however, that "some mining is scheduled and it is doubtful that the integrity of the watershed can be maintained without rigorous supervision and prudent land use controls." The Division has had a water quality monitoring station on Red River at Hazel Green, a small community approximately 10 miles upstream of the Wild River segment, for three years. In addition to chemical and physical parameters, biological data including plankton, periphyton, fish and macroinvertebrate populations are now monitored at this station (Division of Water Quality, personal communication).

As recently as October 25, 1978, the Kentucky Nature Preserves Commission surveyed the aquatic biota and water quality of Red River at the upstream terminus of the Wild River segment, and their findings echoed those of the Division of Water Quality. The Commission found that mining had apparently not yet been initiated, although surface mining permits have been issued for areas in the watershed upstream of the Wild River segment. Their analyses of water quality in 1978 at Mile 68.6 did not indicate any obvious water quality impacts, and they concluded that the site appears to have some of the highest quality water observed in the Kentucky River drainage (Harker, et al., 1979).

Mean discharge of Red River at Mile 72.7, over a period of 23 years of record, is 87.4 cubic feet per second (cfs). The maximum discharge of record was 9,080 cfs on February 27, 1962 and the gage height reading was 22.12 feet (base datum of this gage is 870.11 feet above mean sea level). There have been times during the period of record when there was no flow (USGS, 1978). The minimum runnable water level for canoes is reported to correspond to a discharge of 175 cfs and the maximum is 350 cfs (Sehlinger, 1978).

The Wild River segment of Red River together with the other streams in the Wild Rivers System are classified as "outstanding resource waters" in the new State Water Quality Standards issued December 5th, 1979. The new standards have been approved by the Commonwealth, but have not yet received the approval of the United States Environmental Protection Agency. They are, however, expected to be approved according to personal communication with Kentucky Division of Water Quality personnel. 401 KAR 5:029, Section 2 of the new water quality regulations is a non-degradation section that provides for the protection of existing water quality in outstanding resource waters; that is, introduction of specific pollutants exceeding criteria established for outstanding resource waters or impairing the legitimate beneficial uses of these waters is forbidden. Existing water quality conditions must be maintained or enhanced. The new regulations are to be implemented and enforced through the system of permits regulating point source discharges in the waters of the Commonwealth. In addition, non-point sources also come under regulation where they will affect outstanding resource waters.

Criteria establishing "legitimate beneficial uses" of outstanding resource waters have yet to be developed. In the interim, criteria for aquatic life and recreational waters are applicable to Red River.

Geologic Features

The Wild River segment of Red River is located in an area of outstanding geological resources. The downstream half of the segment is within the Red River Gorge Geological Area which, as with the Wild River, is part of the Forest Service's 38,800 acre Red River Composite. The Composite has numerous interesting geologic features including rockhouses, Indian petroglyphs, and over 100 natural arches ranging in size from crawl-through to over 100 feet long and 31 feet high. Unusual rock formations abound throughout the entire Composite.

The Wild River corridor begins at the Kentucky 746 bridge, which is located at the head of a small, narrow, very scenic gorge. The right bank (to a person's right facing downstream) rises to a high bluff a short distance

downstream of the bridge, and the opposite bank, at the bridge, is a near-vertical cliff. The exposed rock on the bluff, and that forming the cliffs on the opposite bank, is a cross-bedded quartzose sandstone belonging to the Lee Formation (Cashion, 1963). The Lee Formation underlies the majority of the Wild River corridor forming many of the cliffs and steep slopes.

Near the downstream end of the corridor there are a few natural arches. Red Byrd Arch is located on the south side of the river just upstream of Silvermine Branch. Moonshiner's Arch, a small arch just high enough to walk beneath, is located on the north side of the river not far upstream of the mouth of Swift Camp Creek, and less than a quarter of a mile downstream of the Wild River Corridor is Sky Bridge. The Forest Service has an established Recreation Area at Sky Bridge.

Additional cliff- and ledge-forming rock formations found at the downstream end of the corridor are the Mississippian-aged Newman Limestone, and the Pennsylvanian-age lower tongue of the Breathitt Formation (Weir and Richards, 1974). The Newman Limestone forms very steep slopes, irregular cliffs, rounded ledges, and benches between elevations of 700 and 800 feet above mean sea level in the last two-mile stretch of the corridor. The lower tongue of the Breathitt formation is situated above the Newman Limestone and below the cliff-forming Corbin Sandstone Member of the Lee Formation that is so prevalent in the upstream portion of the corridor. The lower tongue of the Breathitt formation is composed of shale, siltstone and sandstone, and usually forms gentle slopes interrupted in places by sandstone ledges. It occupies middle elevations in the downstream end of the corridor.

Two small caves well-known to visitors occur on the north side of the river within a quarter of a mile of the Kentucky 715 bridge. One is located a short distance up the hillside from the trail paralleling the river, but well out of reach of high water, and the other is located very near the river and is submerged during spring flooding.

The geologic features in the Wild River corridor provide visitors with points of scenic and interpretive interest along the river, and some are of potential interest to archaeologists and other scientists.

Soils

Soils in the upstream half of the Wild River corridor are in the Latham-Shelocta-Gilpin association, and those downstream are in the Shelacta-Latham-Jefferson association (Leathers and Kash, 1972). A published soil survey containing detailed soils information and maps depicting the location and areal extent of individual soil series is available for Menifee County (Avers, et al., 1974), but not for Wolfe County, in which the majority of the Wild River corridor is located. Consequently, the soil associations are discussed in this section in a general sense as they relate to the land along the Wild River, but little site-specific discussion is included.

A soils association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soil or soils. The soils in one association may occur in another, but in a different pattern.

The landscape of the Latham-Shelocta-Gilpin association consists of long narrow ridgetops, steep side slopes, and narrow floodplains. The soils in this association are very strongly acid and are low in natural fertility. Latham soils formed in material weathered from shale and have a brown, dominantly silty clay subsoil mottled with gray in the lower part. These are moderately deep, sloping to steep soils on ridgetops, on noses of ridges, and on short, convex side slopes. Shelocta soils formed in colluvium from shale and siltstone and have a yellowish-brown and strong-brown dominantly silty clay loam subsoil. They are deep, strongly sloping to steep soils on plane to concave side slopes and toe slopes. Gilpin soils are on ridges and moderately steep upper slopes. They have a dark grayish brown silt loam surface, and a yellowish brown silt loam subsoil. Rock fragments comprise five to 40 percent of the soil.

The minor soils in the association include Rigley soils on steep side slopes, Hartsells soils on the ridges, and other soils on the small bottom lands and stream terraces.

The landscape of the Shelocta-Latham-Jefferson association consists of sloping ridges and moderately steep to steep mountain sides. The character-

istics of the Shelocta and Latham soil series have already been discussed. Jefferson soils developed in colluvium on slopes and benches mostly below sandstone escarpments and are well drained. They have a dark grayish-brown, gravelly loam surface and a yellowish brown, gravelly loam subsoil. Sandstone fragments comprise 20 to 40 percent of the soil.

The minor soils in this association include Cranston and Berks soils on steep lower side slopes; Donahue soils on steep middle side slopes; Steinsburg and Ramsey soils on ridgetops; and small acreages of other soils on floodplains and stream terraces. This association is mainly forested and the small portion which is farmed consists mostly of the sloping to moderately steep areas above the cliffs.

Table 2 summarizes the degree and kinds of limitations of some of the principal soils of the area for purposes of outdoor recreation planning for selected facilities. A review of the table reveals that most soils in the area have severe limitations for the uses contained in the table. A severe limitation means that costly soil reclamation, special design, intensive maintenance, or a combination of these is required in order to establish the intended facility. A moderate limitation can be overcome without undue cost or effort by careful planning, design, or special maintenance. Slope is the principal limiting factor in the corridor, followed by stoniness, and at lower elevations, the hazard of floods.

Flora

The flora of the Wild River section of Kentucky's Red River has not, as yet, been intensively investigated. The segment downstream of the Wild River reach, however, is the renowned Red River Gorge that was to have been impounded by a Corps of Engineers' dam. Practically all aspects of the environment of the Gorge were intensively studied during the controversy that surrounded the project. Higgins (1970) studied the vascular flora of the Gorge and concluded that its rich flora was unique and perhaps unsurpassed, as far as number of species of plants is concerned, by comparison with any other area of equal size in Kentucky. Higgins' report has numerous recent annotations regarding misidentification of plants (Kentucky Nature Preserves

Table 2: DEGREE AND KIND OF LIMITATIONS OF THE SOILS FOR OUTDOOR RECREATION PLANNING

Soil Series	Soil Description	Slope Range (%)	Camp Areas	Streets and Low-Cost Roads	Playgrounds	Picnic Areas	Paths and Trails
Berks	silt loam	40-70	Severe: slope	Severe; slope; bedrock at depth of 1½ to 3 feet	Severe: slope	Severe: slope	Severe: slope
Brookside	stony silt loam	30-60	Severe: slope, stony	Severe: slope	Severe: slope, stony	Severe: slope	Severe: slope
Cranston	gravelly silt loam	20-30	Severe: slope	Severe: slope	Severe: slope; coarse fragments	Severe: slope	Severe: slope
Donahue	rocky sandy loam	20-40	Severe: slope	Severe: slope; bedrock at depth of 2 to 3½ feet; moderate to high shrink-swell potential	Severe: slope; rockiness	Severe: slope	Severe: slope
Gilpin	silt loam	12-20	Severe: slope	Severe: slope; bedrock at depth of 2½ to 3½ feet	Severe: slope	Severe: slope	Moderate: slope
Hartsells	fine sandy loam	12-20	Severe: slope	Severe: slope; bedrock at depth of 2 to 3½ feet	Severe: slope	Severe: slope	Moderate: slope
Jefferson	gravelly loam	12-30	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope

Table 2: DEGREE AND KIND OF LIMITATIONS OF THE SOILS FOR OUTDOOR RECREATION PLANNING (continued)

Soil Series	Soil Description	Slope Range (%)	Camp Areas	Streets and Low-Cost Roads	Playgrounds	Picnic Areas	Paths and Trails
Latham	silt loam	12-20	Severe: slope	Severe: slope; poor traffic-supporting capacity; moderate to high shrink-swell potential	Severe: slope	Severe: slope	Moderate: slope
Latham-Shelocta	silt loam	30-50	Severe: slope	Severe: slope; poor traffic-supporting capacity; moderate to high skrink-swell potential	Severe: slope	Severe: slope	Moderate to Severe: slope
Rigley	stony fine sandy loam	30-60	Severe: slope; stoniness in some areas	Severe: slope	Severe: slope; coarse fragments; stoniness in some areas	Severe: slope	Severe: slope; stoniness in some areas
Skidmore	gravelly fine sandy loam	0- 2	Moderate: coarse fragments	Severe: flooding	Severe: flooding; coarse fragments	Moderate: coarse fragments	Moderate: coarse fragments
Steinsburg-Ramsey	rocky sandy loam	20-40	Severe: slope	Severe: slope; bedrock at depth of 1 to 1½ feet	Severe: slope; bedrock at depth of 1 to 1½ feet; rocky	Severe: slope	Moderate to severe: slope

Commission, personal communication). However, while the species composition of the flora of the Gorge, as reported by Higgins, is not entirely correct, his observation regarding the diversity of the flora is still valid.

The Gorge has a number of species within it which are relicts of past geological ages, and others which are reported from only a few other places in Kentucky. At least one endangered plant proposed by the Smithsonian Institution (Ayensu and DeFilipps, 1978) for inclusion on the Federal list of threatened and endangered species occurs in the Gorge. It is white-haired goldenrod (Solidago albopilosa), an endemic species known to occur nowhere else in the United States except in Menifee and Powell Counties, Kentucky. Three other plants which occur in the Gorge are considered threatened species in Kentucky and have also been proposed for inclusion on the Federal list as threatened species in the continental United States (Kentucky Nature Preserves Commission, 1979a). They are: goldenseal (Hydrastis canadensis), ginseng (Panax quinquefolium), and Synandra (Synandra hispidula).

The flora of the Red River area includes many other biologically interesting species, some of which are considered threatened with extirpation from the state, and whose status is being monitored by the Kentucky Nature Preserves Commission (1979). A few of the latter are: purple fringed orchid (Platanthera psycodes), monkshood (Aconitum uncinatum), hops (Humulus lupulus), sweet pinesap (Monotropsis odorata), Canada mayflower (Maianthemum canadense), red-berried elder (Sambucus pubens), and the Canadian yew (Taxus canadensis). The last two species in the list above, red-berried elder and Canadian yew, are known to be, or to have been present within the narrow limits of the Wild River corridor itself in years past, according to Kentucky Nature Preserves Commission botanists.

The general character of the forests of the entire region has been described by Braun (1950); an extensive listing of the vascular flora of the Gorge is contained in Higgins (1970); and, Branson and Batch (1974) briefly discuss the history of the Corps' now inactive Red River Dam project. To describe, in general, the plant communities that occur in the area, reference must be made to their relative positions in the topography. The distinctive com-

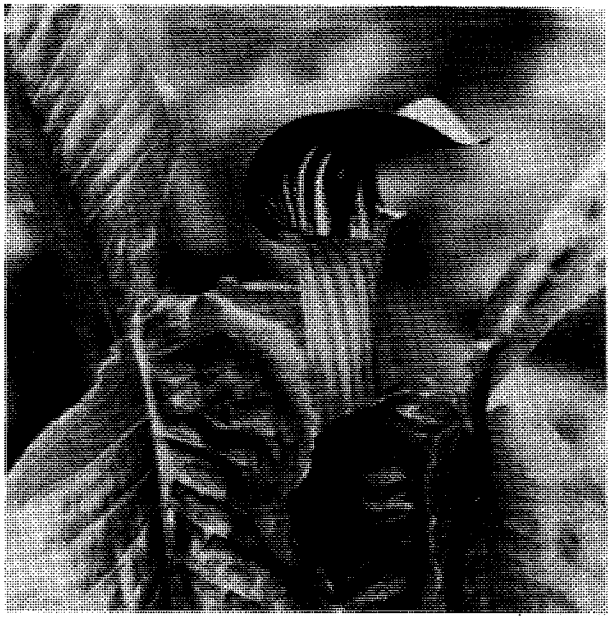


PHOTO: GLEN A. EARLY
JACK-IN-THE-PULPIT (ARISAEMA TRIPHYLLUM)

munities that are identified in this way are those associated with ridgetops, those associated with slopes, and those associated with stream banks.

Generally, ridgetops support an oak-pine community dominated by shortleaf (Pinus echinata), Virginia (P. virginiana), and pitch pine (P. rigida) on the driest sites, with an interspersion of oak including black (Quercus velutina), scarlet (Q. coccinea), white (Q. alba), post (Q. stellata), northern red (Q. rubra), and chestnut oak (Q. montana) on more favorable sites. The short slopes above the sandstone cliffs on the ridgetops support an oak-hickory association. The slopes below the cliffs support forests of a mixed mesophytic nature with a canopy layer consisting of American beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), American and white basswood (Tilia americana and T. heterophylla, respectively), sweet birch (Betula lenta), sugar and red maple (Acer saccharum and A. rubrum, respectively), eastern hemlock (Tsuga canadensis), white pine (Pinus strobus) and yellow buckeye (Aesculus octandra). The plant communities of the stream banks include species of the lower slopes and those found within broad stream valleys. The latter include American hornbeam (Carpinus caroliniana), river birch (Betula nigra), common alder (Alnus serrulata), black willow (Salix nigra), sycamore (Platanus occidentalis), American elm (Ulmus americana), and red elm (Ulmus rubra) (Corps of Engineers, 1974).

Fauna

The fauna of the Wild River corridor, because of its proximity and general similarity to Red River Gorge, should be similar to that of the Gorge area. The Final Environmental Impact Statement on the Red River Dam (Corps of Engineers, 1974) included a list of 261 vertebrate species believed to occur in the area. The list included 59 species of fish, 31 amphibians, 30 reptiles, 105 resident birds, and 36 mammals.

Game animals present include gray squirrel (Sciurus carolinensis), raccoon (Procyon lotor), rabbit (Sylvilagus floridanus), quail (Colinus virginianus), ruffed grouse (Bonasa umbellus), white-tailed deer (Odocoileus virginianus), and possibly wild turkey (Meleagris gallopavo). Turkeys were stocked in the

Red River Gorge area in 1957 and 1960, and subsequently increased until the area contained one of the highest per acre densities in the state (Corps of Engineers, 1974). However, the heavy public visitation of the area resulting from the publicity surrounding the Red River Dam controversy caused the turkey population to decline to the status of a remnant population by 1974.

Furbearers present in the area that are of interest to the trapper include mink (Mustela vison), muskrat (Ondatra zibethicus), fox (Vulpes vulpes and Urocyon cinereoargenteus), and opossum (Didelphis virginiana). Five species of uncommon mammals that are included on an "elements of natural diversity" list being prepared by the Kentucky Nature Preserves Commission (1979b) have been reported from or are suspected to occur in the Red River drainage (Kentucky Nature Preserves Commission, 1979). They are: Townsend's big-eared bat (Plecotus townsendii), Rafinesque's big-eared bat (P. rafinesquii), the silver-haired bat (Lasionycteris noctivagans), the evening bat (Nycticeius humeralis), and the woodland jumping mouse (Napeozapus insignis).

Among the reptiles that are thought to be present in the Gorge area are the coal skink (Eumeces anthracinus) and the corn snake (Elaphe guttata). The coal skink is one of the rarest reptiles in the state and little is known of its precise distribution (Kentucky Nature Preserves Commission, 1979). The corn snake is a slender-bodied, beautifully marked orange or red snake whose distribution in Kentucky is also little known. Its habitat preferences range from open woodlands to cultivated fields. It spends considerable time in burrows or beneath such shelters as stones, logs, and boards, and its diet consists chiefly of small mammals which it kills by constriction (Barbour, 1971).

An annotated list of the fishes of the Red River drainage is contained in Branson and Batch (1974). The principal sport fish present in the river include smallmouth bass (Micropterus dolomieui), spotted bass (M. punctulatus), rock bass (Ambloplites rupestris), Ohio muskellunge (Esox masquinongy ohioensis), catfish (Ictalurus punctatus), and longear sunfish (Lepomis megalotis). Swift Camp Creek, the tributary whose mouth marks the end of the Wild River segment of Red River, has been stocked with rainbow

trout (Salmo gairdneri) (Corps of Engineers, 1974). Among the fishes present in Red River are some of special interest because their continued existence in Kentucky is threatened by various human activities, but especially by the effects of surface mining on stream water quality. These rare, threatened and endangered fish include: the eastern sand darter (Ammocrypta pellucida), the river darter (Percina shumardi), the slenderhead darter (Percina phoxocephala), two undescribed species of darters, the least brook lamprey (Lampetra aepyptera), the American brook lamprey (Lampetra lamottei), the silver lamprey (Ichthyomyzon unicuspis), and the shorthead redhorse (Moxostoma macrolepidotum) (Harker, et al., 1979).

Biologists in the Kentucky Department for Natural Resources and Environmental Protection, Division of Water Quality conducted a survey of the mussel fauna of the Kentucky Wild River segment of the Red River beginning in fall of 1977 and ending in 1979. The survey is in press at this time (Haup, 1980; in press). Fifteen species of mussels were collected in the Wild River segment, with the elk toe (Alasmidonta marginata) being the most abundant species in the sample collections (Ron Haup, personal communication).

A detailed overview of the prehistory and history of the Red River area, and a synopsis of previous archaeological research in the area is included in Wyss and Wyss (1977). Their work in the vicinity of Gladie Creek, only two or three miles downstream from the Wild River segment, is the most recent in the vicinity of the Wild River. An archaeological reconnaissance in the Wild River corridor itself may eventually be conducted as part of an environmental inventory carried out by the Corps of Engineers under its Planning Assistance to States Program.

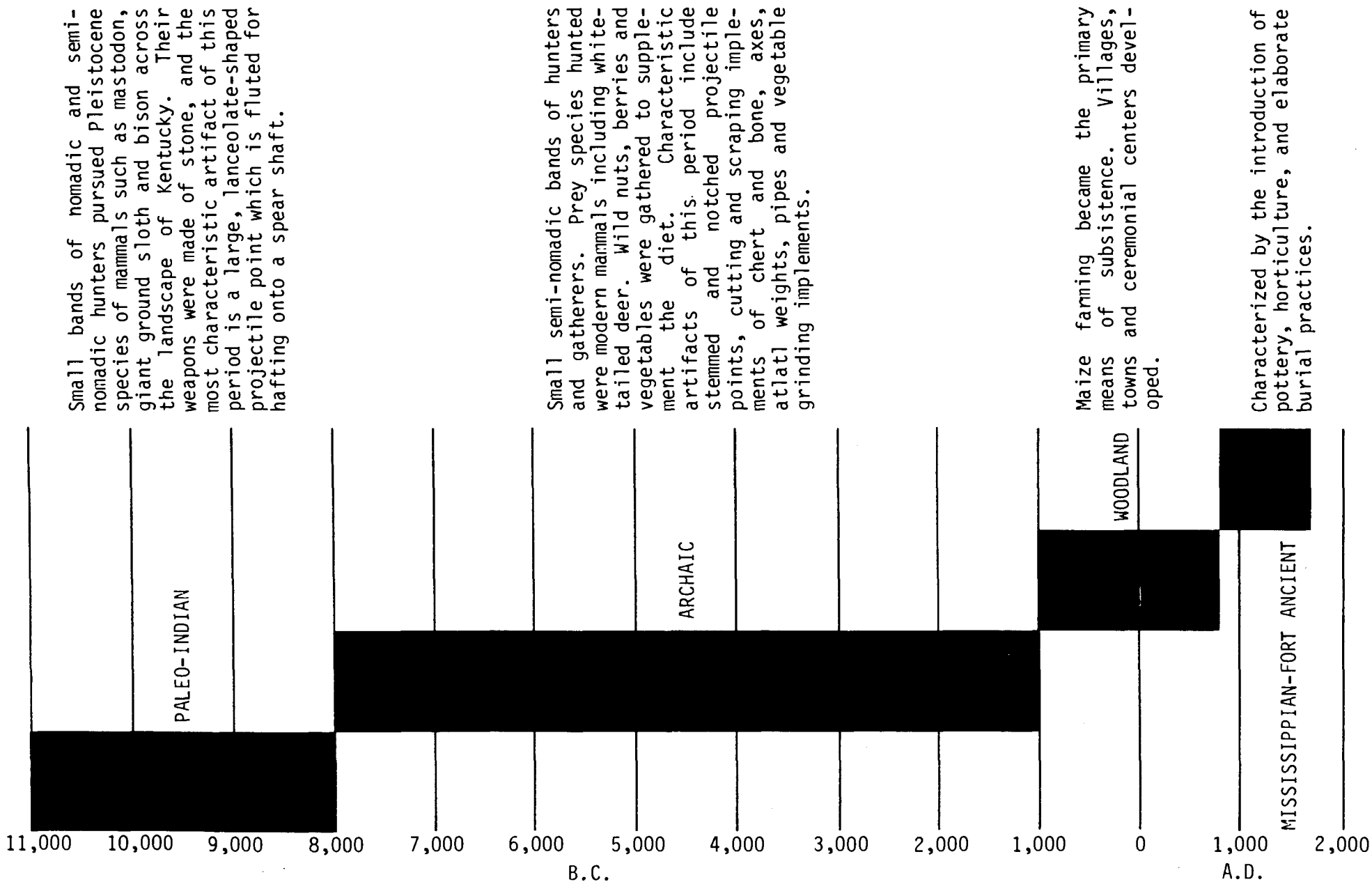
The richness of the area, in terms of archaeological material, was revealed by the results of Wyss and Wyss' investigation. In a 6,000 acre area northwest of Gladie Creek, they located 106 prehistoric sites and 24 historic sites. The prehistoric sites included the Archaic, Woodland, and Fort Ancient occupations. The historic sites included rockhouses, stables, splash dams, moonshine stills and possibly saltpeter workings. Considering the proximity of their survey area to the Wild River corridor, it seems likely that some amount of archaeological material must be present in the Wild River Corridor also.

Outline of the Prehistory and Prehistoric Resources of the Area

According to Wyss and Wyss (1977), the Red River Gorge area has been occupied and utilized by man for most of the past 10,000 years and possibly longer. The prehistory of the region is derived entirely from archaeological sites, and while a number of archaeological phases are known, there are numerous gaps in the record.

The prehistory of the region is outlined according to a traditional framework used by archaeologists in the eastern United States in which the cultural sequence is divided into four "traditions" or cultural configurations existing in a specific time and place (see Figure 1). The word tradition, as used in this report, means a specific pattern of subsistence practices, technology, and ecological adaptation. The four traditions are: Paleo-Indian, Archaic, Woodland, and Fort Ancient.

Figure 1: TEMPORAL DISTRIBUTION OF PREHISTORIC CULTURAL TRADITIONS IN EASTERN KENTUCKY



The Paleo-Indian Tradition is considered to have existed in the period from about 11,000 B.C. to 8,000 B.C., and was a subsistence type of culture focused on hunting of late Pleistocene megafauna, such as mastodon and species of extinct bison, by small nomadic or semi-nomadic bands of Indians. At present, there is no evidence to indicate Paleo-Indian occupation of the Red River Gorge area. However, the possibility of discovering Paleo-Indian sites in the area should not be discounted. Several amateur archaeologists have reported finding Paleo-Indian projectile points in rockshelters in the Red River Gorge Geological Area, but these reports have not been verified (Wyss and Wyss, 1977).

The Archaic Tradition occupied a time span of about 7,000 years between approximately 8,000 B.C. to 1,000 B.C., and may be thought of as a set of cultural adaptations to an essentially modern environment. Archaic peoples were apparently organized into small, semi-nomadic bands whose subsistence-type culture focused on hunting and gathering a wide variety of plant and animal species among which white-tailed deer and varied species of nuts figured prominently. According to Cowan (1976), the first substantial evidence of human occupation in the Gorge area consists of Archaic cultural remains dating to about 8,000 B.C. (Wyss and Wyss, 1977).

Archaic sites are generally identified by the presence of distinctive stemmed and notched projectile points and a variety of cutting, scraping and piercing implements made of chert and bone. According to Willey (1966), the appearance of axes, atlatl (spear-thrower) weights, pipes, and vegetable processing implements of ground stone marks the Middle and Late phases of the period (Wyss and Wyss, 1977). Both rockshelter and bottomland sites were utilized in the Red River Gorge during the Archaic Period. A rockshelter recorded by Fryman (1967) downstream of the Wild River area was reported by Cowan (1975) as containing possible Archaic components (Wyss and Wyss, 1977).

The Woodland Tradition appeared around 1,000 B.C. and persisted until approximately A.D. 900 in most areas of Kentucky. The Woodland Tradition is usually distinguished by the appearance of three very significant innovations; namely, the introduction of pottery, the elaboration of mortuary ceremonialism, and the introduction of horticulture. Although domestic

plants were used during this period, the subsistence base of the Woodland cultures was basically similar to that of the Archaic cultures. The diet remained largely dependent upon wild plants and animals, and cultivated plants served mainly as a supplement (Wyss and Wyss, 1977).

Numerous possible Woodland component sites have been recorded in the Red River region over the years by several different investigators beginning with Webb and Funkhouser in the 1930's. The majority of the sites have been rockshelter sites rather than bottomland sites.

The Fort Ancient Tradition is considered to be a continuation of the Woodland Tradition. It appeared around 900 A.D. and continued until the late seventeenth century and the beginning of European contact. The Fort Ancient Tradition consisted of a series of late prehistoric cultures centered in the central Ohio River Valley which came under acculturative pressure from the vigorous Mississippian Tradition situated to the south and west (Wyss and Wyss, 1977).

The patterns of subsistence of Fort Ancient cultures focused on deer hunting and cultivation of corn and squash, with the later addition of beans. Nineteen sites in the Red River Gorge with possible Fort Ancient components were located by investigators between 1967 and 1977, mainly in the area that was to have been inundated by the proposed Red River Lake. The sites were fairly evenly distributed between rockshelters and bottomlands (Wyss and Wyss, 1977).

The presence of prehistoric sites of occupation within the Wild River corridor is a virtual certainty, but the amount and condition of archaeological artifacts, and their cultural affinities remains, for the time being, unknown.

History and Historic Resources of the Area

The historic period began with European exploration and settlement of the region. Documentation of the historic period comes primarily from written records, but archaeological sites are also potentially important sources of information since written records are far from complete.

The Shawnee claimed and controlled the Red River Gorge in the early historic period, but there is no evidence that they resided there for any length of time (Wyss and Wyss, 1977). Griffin (1952) has suggested that the Shawnee were the likely ethnographic descendants of the Fort Ancient people.

The Shawnee, like most other Indian tribes in the eastern United States in contact with Europeans during the eighteenth century, were drawn into the struggle between the British and the French for control of the continent. The Shawnee apparently used the lower Red River as a refuge and as a base camp because they returned there several times after suffering defeat or in preparation for war. The base camp or Shawnee village site they returned to was called Eskippakithiki, and was located on a tributary of Red River near present-day Winchester, Kentucky (Wyss and Wyss, 1977).

The Cherokee and Chickasaw, supported by the English, forced the Shawnee to retreat to a location along Red River (probably Eskippakithiki) in 1715 from locations along the Cumberland River. In 1739, Eskippakithiki was being used as a base camp for attacks on the Chickasaw. The band of Shawnee occupying the village had moved there in 1739, probably at French instigation, from Pennsylvania. They were led by one Peter Chartier. Chartier's Shawnees were defeated and dispersed to the south and east among the Cherokee and Upper Creek. While among the Cherokee, the Shawnee managed to persuade the Cherokee to switch their alliance from the English to the French. In 1744, the Shawnee and their Cherokee allies returned to the village on the Red River and used it once again as a base camp; this time for attacks on the English-allied Catawbas. According to Cotterill (1954), the Shawnee apparently left Kentucky in 1747, returning to the the lands of the Creek and Cherokee where, by murdering Chickasaws who were allied with the Creeks, they provoked a Cherokee-Creek war (Wyss and Wyss, 1977).

Between 1747 and 1752, there were visits to the area by white explorers. Dr. Thomas Walker crossed the Red River in 1750, and Christopher Gist arrived at the north rim of the gorge in 1751 and proclaimed it the roughest country he had ever seen (Forest Service, 1974).

In 1752, John Finley attempted to establish a trading post near the confluence of the Red River and the Kentucky River. According to Rice (1975), he was taken captive by the Shawnee and was brought to Eskippakithiki. In 1759, Chartier's Shawnee returned. British diplomacy had forced their exit from the Creeks and they were defeated by the Chickasaw when they attempted to resettle their old village sites near Nashville, Tennessee (Cotterill, 1954).

John Finley returned to Eskippakithiki with Daniel Boone in 1769 and found that the Shawnee had abandoned the village, never to return. Boone and several companions were thought to have explored several eastern Kentucky counties including the Gorge area in 1769. A crude hut was discovered in an almost inaccessible overhanging bluff in the Gorge in 1959. It was constructed of rocks and red oak shakes, and on one of the shakes was carved the simple inscription, "D. Boon" (Forest Service, 1974). The Daniel Boone Hut has become a major recreational attraction in the Gorge Unit, and is thought to date to this early period of exploration by Boone and his companions (Wyss and Wyss, 1977).

As famous as he is, Daniel Boone is not the most famous early visitor to the Red River Gorge area. His name is far overshadowed by John Swift, an adventurer whose tales of lost silver spawned one of Kentucky's most persistent treasure legends.

Swift is variously described as a prospector, a pirate, a counterfeiter, or a deranged teller of tall tales. In a version of the legend that is popular in Menifee County, Swift was a pirate scouring the Spanish Main. In 1760, and periodically until 1769, he and his companions journeyed to the Red River Gorge with silver bullion which they smelted and cast into spurious English currency (Wyss and Wyss, 1977). In 1769, however, the party was overcome by Shawnee and Swift fled the Kentucky countryside leaving behind a veritable motherlode of silver. After leaving Kentucky, he went to England, where he landed in jail. When he was released 15 years later, he was blind (SCENE, 1978). Though he hired a guide and returned to Kentucky, he failed in his search for the silver and died a pauper. But he left behind a journal, which describes in the best detail Swift could muster, the landmarks leading to the treasure. One journal entry read as follows:

"On the 1st of September, 1769, we left between 22,000 and 30,000 in dollars and crowns on a large creek running a south course, and close to the spot we marked our names, Swift, Jefferson and Munday on a large beech tree..."

Other entries described stuffing thousands of coins in the cracks of a rockhouse and burying them in caves (SCENE, 1978). The names of Campton, Swift's Camp Creek, and Parched Corn Creek are intimately associated with the legend (Wyss and Wyss, 1977).

Still other entries in Swift's journal would lead readers to believe that the source of the silver was not from Spanish treasure ships, but from the Gorge itself. The journal speaks of two groups of mines, the "upper" and the "lower," that he and his party had supposedly mined for nine years, and gives directions for locating them (Scene, 1978).

Many people have searched in vain for Swift's treasure or his lost silver mines over the years, but the silver remains elusive. Around 1900, Rebecca Timmons and her husband spent their fortune and their lives searching for the silver. According to the Red River Recreation Guide (1976), they are buried near Rock Bridge and Forest Service trails have been constructed through an area known as "Timmons Diggins" (Wyss and Wyss, 1977).

In the 1930's, archaeologists Funkhouser and Webb were suspected by local residents of using archaeology as a convenient subterfuge while actually looking for Swift's treasure (Wyss and Wyss, 1977). Funkhouser and Webb were concerned over the destruction of prehistoric sites resulting from treasure hunting.

During the Revolutionary War, the Red River Gorge area was on the periphery of settlement efforts in the Bluegrass Region to the west, and because of continuing strife with the Indians, was a no-man's land. The Treaty of Greenville, signed in 1795 after the Battle of Fallen Timbers, extinguished the last Indian claim to the land (Wyss and Wyss, 1977).

After the signing of this treaty, settlement followed the old Indian traces. Boone had followed the Warrior's Path through the Cumberland Gap, but the

Wilderness Road branched to the west while the Path continued on to Eskippakithiki. Two other trails led to the mountains from a point near Eskippakithiki. According to Coleman (1971), the one following the Red River became the Old Kentucky State Road and finally the Mountain Parkway; the other is present-day U.S. 460 (Wyss and Wyss, 1977).

Settlement moved up the Red River first. There was little land suitable for agriculture, but iron ore and saltpeter were available. According to Coleman (1971), iron furnaces proliferated in Kentucky, and in 1840 the state was third in the nation in iron production (Wyss and Wyss, 1977). But production soon dropped. By 1869, Kentucky production was seventh in the country, and in the 1870's, the furnaces closed due to competition from the southern iron works centered around Birmingham, Alabama.

The iron furnaces, which were charcoal fired, required a large supply of hardwoods. According to McFarlan (1943), eight-tenths of an acre of forest (175 bushels of charcoal) was needed to produce one ton of iron. The Fitchburg Furnace (built in Estill County in 1869) in its best year produced nearly 10,000 tons of iron (Wyss and Wyss, 1977).

The production of nitrate for the manufacture of gunpowder was another early industry that probably affected the Red River Gorge area. It was probably during the Civil War that the nitrate (saltpeter) deposits in the Red River Gorge rockshelters were first extensively mined (Wyss and Wyss, 1977). The Confederacy worked numerous clandestine saltpeter mines in eastern Kentucky, but at the end of the war, saltpeter mining ceased.

Despite early industry, settlement of the Red River area was slow and scattered. Menifee County was not settled until the 1840's. Wolfe County achieved county status in 1860; Menifee County in 1869. There was a rapid population increase in Menifee County between 1870 and 1920, probably due to the second period of natural resource exploitation of the region (Wyss and Wyss, 1977). Logging began in the 1880's in Bath and Menifee counties.

The rugged terrain was a serious impediment to the harvest of the high quality timber resources in the Gorge area. In the early part of the logging

period, timber was floated downriver in rafts or loose flotillas that were caught in booms at the sawmills. To facilitate the process, and to extend the amount of land that could be logged, splash dams were built on the tributaries of the river. These dams created a sufficient reservoir of water to float the logs a considerable distance. Some of the logs ended up in Frankfort, Kentucky, but most went to Clay City to the sawmill of the Swann Day Lumber Company, one of the largest sawmills in the world until it burned in 1904 (Wyss and Wyss, 1977).

A physical feature was discovered in the Red River at Mile 60.3 in the course of a May 15th, 1979 site reconnaissance conducted in conjunction with this planning effort. This feature is believed to be a log dam, possibly constructed by the lumbering industry during the period described above, and is thought not to have been previously described in the archaeological literature for the area. It consists of three large logs spanning the river, their ends embedded in both banks. The logs are spaced a few feet apart, and a terrace arrangement has been created with a total drop of only two or three feet. Dams similar in description to this one were reported by Wyss and Wyss (1977) during their archaeological investigation of Gladie Creek and environs.

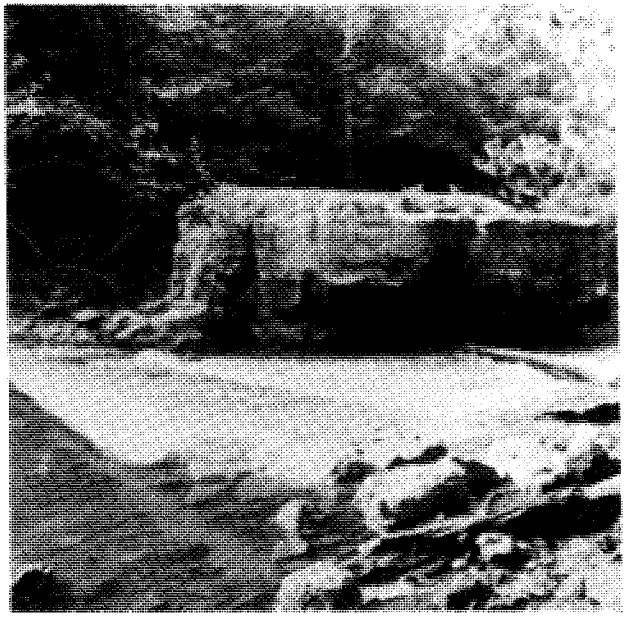


PHOTO: MILLER/WIHRY/LEE INC.
LOG DAM LOCATED IN RED RIVER AT MILE 60.3

Later in the historical period of lumbering activity, the railroads greatly increased the efficiency of the logging operations. Steam band sawmills were set up at central locations and rail spurs brought the timber from the forested tracts to the mill. One such sawmill was located at Nada, Kentucky, by the Dana Lumber Company (Nada is an anagram of Dana). Nada Tunnel was bored for the Big Woods, Red River and Lombard Railroad which ran from the timber tract on the North Fork of the Red River to the mill. Use of the railway was discontinued in 1919, the sawmill was closed in 1921, and the tracks were torn up in 1925. Today, Kentucky Highway 77 follows the old roadbed to the river (Wyss and Wyss, 1977).

The Ragland Oil Pool in Bath and Menifee counties was discovered in 1900, followed by discovery of the Campton Oil Field in 1903, and the Menifee Gas Field in 1904. The railroads served the oil and gas interest as they had the logging industry, and in a larger sense, opened the area to the twentieth

century. With the railroads, Lexington was just a few hours away and freight and passenger service was conducted on a daily basis. Also, Hazel Green, Campton, Stanton and Clay City became bustling communities during this period (Wyss and Wyss, 1977).

During the 1920's, the economic boom collapsed. First the timber and then the oil and gas were depleted. With the Depression, the area's fate was sealed. Development of what resources were left was halted, and the railroads succumbed to all-weather roads (Wyss and Wyss, 1977).

Between 1914 and 1929, the Forest Service examined the cut-over lands and in 1934 the purchase of tracts for the Cumberland National Forest, now the Daniel Boone National Forest, began (Forest Service, 1974).

One other "industry" was carried out in the Gorge area in the early twentieth century. The rockshelters of the Gorge area were isolated, had good sources of water and firewood, and consequently, were selected as places of operation for "moonshiners" (Wyss and Wyss, 1977).

In recent years, the Gorge was the center of a state and national controversy as a result of plans by the U.S. Army Corps of Engineers to construct a dam on Red River. In 1962, construction of a dam near Indian Creek was authorized, but the controversy delayed the project and in 1967 the dam site was moved downstream. Recognizing the unique geological, prehistoric and historic resources of the Gorge Unit, the Forest Service began a study in 1969 of the special management needs of the area. In 1974, this culminated in the creation of the Red River Gorge Geological Area. At the same time, opposition to the dam was increasing and Governor Julian Carroll ordered a reevaluation of the Red River Lake project. In 1976, on the basis of the findings, Governor Carroll withdrew his support and, in effect, cancelled the proposed construction (Forest Service 1974; Wyss and Wyss, 1977).

In the meantime, a 9.1 mile long portion of the river upstream of the dam site was designated a "Kentucky Wild River" by the Kentucky Wild Rivers Act of 1972 (KRS 146.200). Then, about the time the Governor withdrew his support of the proposed Red River Dam, the Forest Service initiated RARE II.

RARE stands for Roadless Area Review and Evaluation. The first Roadless Area Review and Evaluation was initiated in 1972. About 1976, RARE II was initiated and consisted of 2,686 areas nationwide containing slightly more than 62 million net acres (Forest Service, 1978a). The purpose of the review was to determine which of these areas should be allocated to wilderness uses and which should be allocated to non-wilderness uses. One RARE II area was located in the Red River Gorge Unit and overlapped with the Wild River area. It was called the Clifty Roadless Area. On January 4, 1979, Secretary of Agriculture Robert Bergland recommended that the 11,115-acre Clifty Area should be allocated to wilderness use.

Currently, another study is underway of the Wild River segment and the segment of the river downstream to the Kentucky Highway 77 bridge. This portion of Red River is being studied for eligibility for inclusion in the National Wild and Scenic Rivers System. The Forest Service is conducting the study and expects to complete it in early 1980.

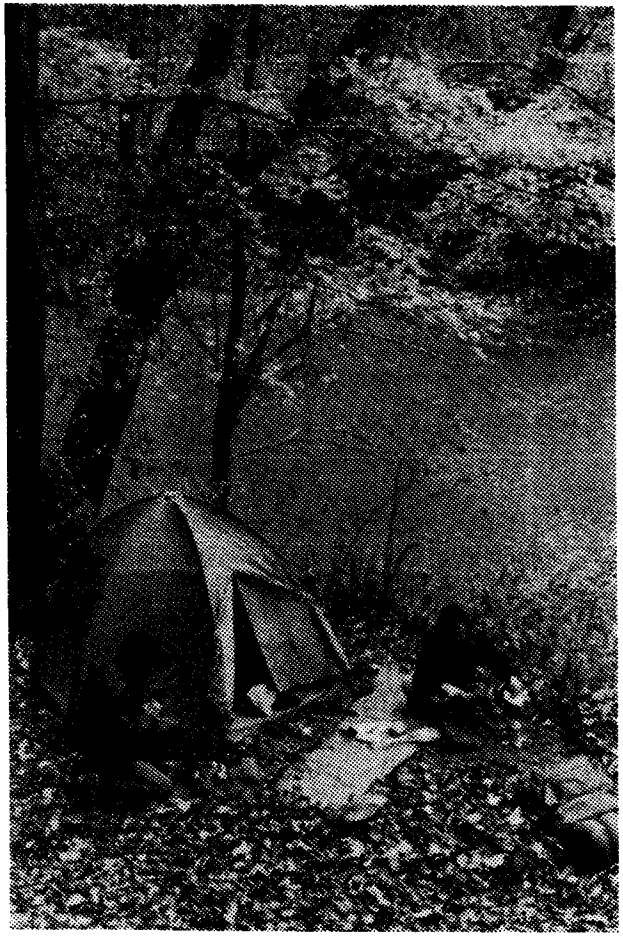


PHOTO: KENTUCKY DEPARTMENT OF PUBLIC INFORMATION
CAMPING ALONG THE RED RIVER

Canoeing

Canoeing is, for most people, the first recreation activity that comes to mind when the subject of a "Wild River" is brought up for discussion. Canoeing is uniquely associated with Wild Rivers and, in many cases, canoes and related craft (kayaks and inflatable craft) are essentially the only means to navigate the river. Often, they constitute the principal means of access to much of the land along the shores for other activities such as camping, hiking, fishing and hunting.

The Wild River portion of Red River is a whitewater river classified on the International Scale of River Difficulty (see Table 3) as Class III--suitable for intermediates, advanced paddlers, and experts (The first three miles are Class I; then conditions change to Class III, becoming Class II near the end of the segment). The average gradient of the stream segment is 13 feet per mile. There are a number of in-stream features (the Falls of the Red; the Narrows of the Red; the Dog-Drowning Hole) that make the Wild River reach an interesting and rather challenging length of stream for paddlers. When the water is high, it is a dangerous reach of the river. When it is low, several portages are necessary. The Wild River segment is runnable by canoe and kayak from late December to late May in years of average rainfall. The minimum runnable water level for canoes is 175 cubic feet per second (cfs) and the maximum is 350 cfs (Forest Service, 1974; Sehlinger, 1978).

A need for appropriately designed public launching and parking areas exists at both ends of the Wild River corridor. Both launching points are in private ownership and require permission from the property owner for their use. In addition, neither area has a proper combination of parking area, toilets, trash receptacles, and stabilized stream banks for ingress and egress from the stream (see Existing Access section for a description of existing roads, parking areas, trails, and canoe access points.)

Canoeing, as a national sport, is expected to grow at a rate of five to eight percent annually for the next 15 to 20 years. A reasonable estimate of the growth of Kentucky canoeing is an annual growth rate of two to four percent

Table 3: THE INTERNATIONAL SCALE OF RIVER DIFFICULTY

Class I- Moving water with few riffles and small waves, and few or no obstructions. An easily traveled stream suitable for beginning canoeists.

Class II- Easy rapids with waves up to three feet, and wide, clear channels that are obvious without scouting. Some maneuvering is required. This is a more difficult stream safely canoed only by persons with at least intermediate-level paddling skills.

Class III-Rapids with high, irregular waves often capable of swamping an open canoe, narrow passages that often require complex maneuvering and that may require scouting from shore. Should be attempted only by experienced paddlers.

Class IV- Long, difficult rapids with constricted passages that often require precise maneuvering in very turbulent waters. Scouting from shore is often necessary, and conditions make rescue difficult. Generally not possible for open canoes. Boaters in covered canoes and kayaks should be able to Eskimo roll. Should be attempted only by highly skilled paddlers.

Class V- Extremely difficult, long and very violent rapids with highly congested routes which nearly always must be scouted from shore. Rescue conditions are difficult and there is significant hazard to life in event of a mishap. Ability to Eskimo roll is essential for kayaks and canoes. Should be attempted only by expert paddlers.

Class VI- Difficulties of Class V carried to the extreme of navigability. Nearly impossible and very dangerous. For teams of experts only, after close study and with all precautions taken.

Source: American Whitewater Affiliation

two to four percent per year over the next 10 to 15 years. Upon analysis of available information, there does not appear to be any foreseeable threat of overly great numerical usage in the state. Canoeing in the Forest Service's Red River Composite amounted to 6,100 visitor-days in 1978. The percentage of this use that was specific to the Wild River segment is unknown.

A "visitor-day" is a recreation unit of measure obtained by multiplying the number of persons engaged in any activity by the number of days they are present in the study area. For example, two persons in a single canoe, paddling the length of the Wild River segment on any given day, represents two visitor-days of canoeing activity.

Fishing

The Wild River segment of Red River and some of its tributaries afford fair to good fishing for smallmouth bass and rock bass. In addition, Swift Camp Creek is periodically stocked with rainbow trout by the Kentucky Department of Fish and Wildlife Resources to provide fishermen an opportunity for cold-water fishing (Carter, 1970). Visitor-days for the purpose of fishing amounted to 3,600 in the Forest Service's Red River Composite in 1978. (The Composite includes the Wild River segment and also the portion of the river downstream as far as the State Route 77 bridge.) Cold-water fishing accounted for 1,500 of the 3,600 visitor days in 1978 (Forest Service, 1978c).

Hunting

The habitat within the Wild River corridor is most suitable for gray squirrel, but other game species that are present include white-tailed deer, cottontail rabbit, ruffed grouse, and possibly wild turkey. Hunting in the Red River Composite in 1978 amounted to 6,200 visitor-days (Forest Service, 1978c).

Species present in the corridor of interest to trappers include mink, muskrat, fox, and opossum.

Hiking

The Red River Composite contains approximately 45 miles of hiking trails. In addition, there are several miles of undeveloped trails, and about 14 miles of the Sheltowee Trace will pass through the Composite in the vicinity of Gladie Creek which is about three miles downstream from the Wild River corridor. The Sheltowee Trace is an all-purpose trail, now under construction by the Forest Service, that will traverse the entire length of the Daniel Boone National Forest from north to south. Its route will extend a distance of more than 220 miles and connect most of the major recreation attractions in the Forest. Beyond the Forest, in northern Tennessee, the Sheltowee Trace will link-up with Tennessee's John Muir Trail which will, in turn, connect with the Appalachian Trail in southern Tennessee. In Kentucky, north and east of the Red River Composite, the Sheltowee Trace will join Kentucky's Jenny Wiley Trail. The Jenny Wiley trail will in turn connect to the North Country Trail in Ohio (Forest Service, 1978c).

All of the trails in the Wild River corridor at present are undeveloped. Use of trails in the entire Red River Composite is heavy. Recorded use for 1978 amounted to 35,000 visitor-days.

Horseback Riding

Equestrian trails have not been provided by the Forest Service in the Red River Composite due to an apparent lack of user interest (Forest Service, 1978c). Natural Bridge State Park, which is adjacent to the southern boundary of the Composite, offers horseback riding on a seasonal basis. Horseback riding in the Composite in 1978 amounted to 2,000 visitor-days.

Camping

One family campground and three group camping areas are within the boundary of the Red River Composite. The family campground, which is located on Koomer Ridge approximately five miles southwest of the Wild River corridor, is the only developed camping area in the Composite. Eight primitive camping areas are designated for backpackers and groups, and the Forest Service is

considering establishing a new developed camping area on Whittleton Ridge which would contain about 140 camping units. The existing Koomer Ridge campground has 54 units and is used to 90% plus of capacity on weekends and has an average use of 78% of capacity for the season (Forest Service, 1978c). Camping in the Composite in 1978 amounted to 5,600 visitor-days.

Some camping, mainly in association with backpacking, occurs at undeveloped sites within the Wild River corridor at the present time.

Picnicking

There are three picnic grounds within the Composite at the present time, although none are within the Wild River corridor. They are receiving heavy use, with 14,900 visits recorded in 1977 (Forest Service, 1978c).

Other Uses

Other recreational uses of the area permitted by the Forest Service include viewing outstanding scenery, auto driving, bicycling, and swimming. The Forest Service recorded 62,400 visitor-days of these recreation activities in the Red River Composite in 1978.

Non-recreational uses of the Wild River corridor consist mainly of agriculture and farm residential land use. All of this land use is on ridgetops in the upstream half of the corridor, outside the Proclamation Boundary of the National Forest, and within only the extreme periphery of the lateral limits of the corridor so that the acreage involved is very small. There is no commercial or industrial development within the corridor, and no known mining or silvicultural activity. (Surface mining permits have been issued for upstream areas in the watershed, but mining had not been initiated as of late October of 1978.) A utility line, supported by wooden poles, crosses one small corner of the Wild River corridor at the Kentucky 746 bridge. Except for this line, there are no other utility rights-of-way in the corridor.

INTRODUCTION

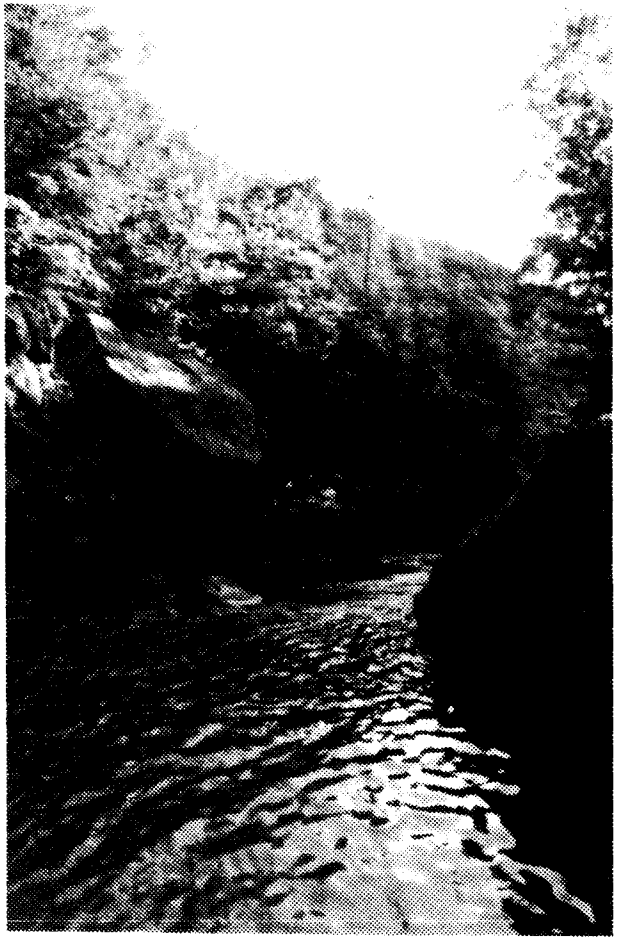


PHOTO: MILLER/WIHRY/LEE INC.
BOULDER-LINED RIFFLE

Recreation carrying capacity can be defined as the amount of recreational use an area can withstand while providing a sustained quality of recreation. The definition implies both an ecological or physical carrying capacity of a given site as well as a socio-psychological carrying capacity in terms of perceived needs or values which are to be derived from the experience (Jubenville, 1976). Ecological or physical carrying capacity is that level of recreational use which can be sustained without producing adverse long-term effects on the resource base such as soil erosion, water or air pollution, reduction or elimination of fish and wildlife populations, or replacement of desirable types of vegetation with undesirable types. Socio-psychological carrying capacity involves the effects of use on the "experiential" resource; that is, the factors which affect the quality of a visit to a natural resource or recreation area such as, for example, visitor density, crowding, and aesthetic appearance. The socio-psychological carrying capacity of a given site is the amount of recreational use which would maximize personal benefits for the user population for a given type of recreational experience (Jubenville, 1976). Therefore in determining carrying capacity, the interrelationships between management objectives, user attitudes and the environmental impacts of recreation use on natural resources must all be taken into account.

The concept of carrying capacity does not embody a discrete formula for determining the capacity of a given natural resource or recreation site. Rather, determining how much and what kind of use is acceptable for an area must be based on research, management judgement and experience. The determination of carrying capacity is a dynamic management activity which is based on existing knowledge of the resource base. It is a process whereby resource managers keep constant watch on the impacts of usage in an area and then react in a swift and decisive manner to solve problems when they arise. Because of the dynamic nature of the natural world, numbers and preferences of recreational users, and changing management policies, it is important that Wild River managers understand that determination of carrying capacity is an active, on-going process which must be responsive to the demands and needs of our dynamic natural and cultural environment.

General management objectives, including the types of recreation that are appropriate in Wild River corridors, were outlined for all eight Wild Rivers

in the Kentucky Statewide Wild Rivers Management Plan (Miller/Wihry/Lee, 1979). The Statewide Plan suggested that the Wild River segment of Red River should be managed for primitive level experiences (that is, Forest Service Level 1 and 2 development standards) including canoeing, fishing, hiking, backpacking, camping, hunting and sightseeing, as appropriate within environmental tolerances. Forest Service Level 1 and 2 refers to levels of development involving very little site modification in a near primitive forest environment, and non-motorized access. Any improvements to the site are mainly for protection of the site.

To initiate the process of determining recreational carrying capacity in the Wild River segment of Red River, it is necessary to begin with the management objectives established in the Statewide Plan and make certain assumptions and experienced judgements at the outset concerning the amount of use the Wild River corridor can sustain of each type of activity. Then the managers of the Wild River will monitor the effects of this use, and modify the assumptions, carrying capacity estimates, and management objectives as necessary to maintain the resource and provide a sustained quality visitor experience.

To assist in determining how much use constitutes a quality visitor experience, facility standards or public use space standards in use by state and federal planning agencies were examined, and certain of these were selected as criteria upon which to base calculations of recreation carrying capacity at Red River. Facility standards are estimations of the optimum number of persons that can use a given facility, site, or resource per day, or at one time. It is usually assumed that this level of facility usage, per day or at one time, will not exceed the design specifications of the facility, and therefore, the facility should withstand sustained use at this level and continue to provide a satisfying user experience. Implicit in these assumptions is also the idea that use in accordance with the standards will result in minimal impact on the natural environment. Differences in site characteristics such as soils, slope, microclimate, and other factors, however often results in variable response to the standards; hence, the need to monitor impacts closely and modify the standards to the extent necessary to produce the desired results at each unique site.

The hypothetical carrying capacity analysis outlined below assumes that the public has access to all areas within the Red Wild River corridor. However, since this is not in fact the case, as the public does not have access to private property except with the landowner's permission, for some activities such as hunting, the hypothetical carrying capacity available to the general public is, in essence, reduced by the percentage of land within the corridor which is in private ownership.

Canoeing

A carrying capacity criterion of two craft (canoes, kayaks or inflatable craft) per mile of stream was selected from published criteria that ranged from a suggested use of two craft per mile to 12 per mile. Several factors influenced the selection of a capacity criterion at the bottom of the range, including location of the recreation activity area; quality of site amenities; current speed and degree of difficulty; and width of the river. The season for canoeing the Wild River segment of Red River is typically from December to early May, or approximately 158 days annually (Sehlinger, 1978).

The carrying capacity for canoeing is calculated by multiplying the suggested daily public use space standard (two craft per mile) by the number of miles of stream (9.1). The resulting figure (18 craft) is the one-time-use or daily carrying capacity of the stream segment. Multiplying this by 158 canoeing days annually yields a total annual carrying capacity of 2,844 craft, or approximately 5,688 visitor-days per year. This is the hypothetical maximum amount of use the stream segment could sustain and still provide a high quality visitor experience. From a practical standpoint, however, this level of use would be difficult to achieve. There are several reasons for this. First, while canoeing literature states that, in a typical year, the Upper Red River is canoeable from December to early May, there will seldom be a year in which the stream will be canoeable all 158 days in that period. Sehlinger (1978) reports that the Upper Red, as the Wild River segment is called, is difficult to catch at an appropriate paddling level.

> "At very low water the run can turn into a hike. At very high water the Red is extremely dangerous, practically running in the trees."

Sehlinger (1978) also notes that the Upper Red has the potential to rise rapidly following a rain, and that the best time to run the Upper Red is in the morning, as the afternoon sun shines directly into your eyes after about 2 P.M.

An adjustment of the carrying capacity for adverse weather situations is made by subtracting from the 158-day season the average number of days in which precipitation equal to or greater than 0.5 inches falls on the region. Weather Bureau records for Frenchburg, Kentucky indicate that precipitation amounting to more than 0.5 inches of rainfall occurs between December 1st and May 15th on approximately 18 days in an average year (Weather Bureau, 1964). The adjusted carrying capacity of the stream segment is then derived by multiplying the daily capacity of 18 craft by 140 days (158-18). The result is an estimated annual carrying capacity of 2,520 craft or 5,040 visitor-days.

Fishing

Suggested criteria for computing the carrying capacity of a stream for fishing generally involve values expressed in terms of fishermen per mile of stream.

Published criteria vary widely and range from as low as 5.5 persons per mile for extremely remote, wilderness streams of low productivity to a high figure of 528 fishermen per mile. An extremely important factor that is often overlooked, however, is the physical capability of the stream's fish population to withstand the level of fishing pressure implied by the capacity criteria. If estimates of standing crop are available, formulae may be used to estimate the physical carrying capacity of a stream. In their absence, however, public use space standards must be employed. These reflect the socio-psychological carrying capacity and estimates of carrying capacity based on such standards generally tend to be higher than estimates based on standing crop of fish.

The Wild reach of Red River is considered as only a fair to good fishery resource (Carter, 1970). Its moderate rating is most likely a reflection of

the relative infertility of the soils of the region and consequent low fertility of the stream environment, meaning that the Wild River segment does not have a naturally abundant game fish population. This, in turn, lessens the recreation carrying capacity. The terrain and the narrow width and comparatively shallow depth of the stream influence the manner in which it is fished and predispose it to shoreline or bank fishing with live bait or lures, and to fly fishing while wading.

Generally, fishermen will accept and tolerate more fishermen per mile of shoreline if they are catching fish; therefore, streams that are either well-stocked or naturally abundant with fish can accommodate more fishermen per mile of shoreline (Bureau of Outdoor Recreation, 1977). Since the Wild River segment of Red River is not stocked and game fish are not naturally abundant, and as the stream is comparatively narrow and shallow, its carrying capacity for fishing must be assessed as somewhat low. For this reason, a public use standard of 5.5 persons per mile was selected from the range of suggested criteria. The recreation carrying capacity for fishing is then obtained by multiplying the public use standard by stream length. The result is an estimated one-time-use or daily capacity of 50 persons per day.

The Kentucky fishing season is the calendar year; however, most fishing occurs in the warm-season months of April to October, or a period of approximately 214 days annually. Using the daily capacity computed above, the estimated annual carrying capacity of the Wild River segment of Red River for fishing is 10,700 visitor-days.

Hunting

The estimate of hunting carrying capacity is computed by means of a formula that takes into account acres of habitat, wildlife population density (expressed in terms of animals per acre), population harvest ratio, and hunter success. The harvest ratio denotes the sustained number of animals which could be harvested annually by hunting. The ratio of total population to annual harvest that was used in the computations was as follows: big game, 4:1; small game, 3:1 and grouse, 3:1 (Willis, 1974). Hunter success refers to the number of hunter-days which would be provided by each unit of

game harvested. One deer or one turkey bagged was considered sufficient reward for 20 hunter-days expended. Two units of small game per hunter-day, and one grouse per hunter-day were the remaining measures of hunter success. (Willis, 1974). The formula used was as follows:

$$\frac{\text{Wildlife Density} \times \text{Hunter-days per animal harvested}}{\text{Harvest ratio}} = \text{Carrying Capacity}$$

The Forest Service, in the Unit Plan for Management of the Red River Gorge Unit (1974), states that management directions for National Forest land along the Wild River will be the same as those applicable to the Red River Gorge Geological Area. Elsewhere in the Unit Plan, it states that "future biological conditions in the Geological Area dictate that squirrel be the featured species." Therefore, squirrel will be the featured species on Forest Service land in the Wild River corridor also. The Forest Service, according to the Unit Plan, will cooperate with the Kentucky Department of Fish and Wildlife Resources to bring forest game populations in the Geological Area and the Wild River corridor to carrying capacity as follows:

Squirrel	two per acre
Deer	one per 150 acres
Turkey	one per 120 acres
Grouse	one per 30 acres

The 9.1-mile-long Wild River corridor contains approximately 864 acres within its lateral limits. Therefore, hypothetical game population densities to be used in calculating the carrying capacity are: 1,728 squirrel, six deer, seven turkey, and 29 grouse. The computations are as follows:

$$\frac{\text{Wildlife density} \times \text{Hunter-days per animal harvested}}{\text{Harvest Ratio}} = \text{Carrying Capacity}$$

$$\frac{6 \text{ white-tailed deer} \times 20 \text{ hunter-days/deer}}{4} = 30 \text{ hunter-days}$$

$\frac{7 \text{ turkey} \times 20 \text{ hunter-days/turkey}}{3}$	=	47 hunter-days
$\frac{29 \text{ ruffed grouse} \times 1.0 \text{ hunter-days/grouse}}{3}$	=	10 hunter-days
$\frac{1{,}728 \text{ gray squirrel} \times 0.5 \text{ hunter-days/squirrel}}{3}$	=	288 hunter-days
		375 hunter-days

Hiking

The Wild Rivers Act, and Forest Service policy with regard to Wild Rivers areas, both specify that Wild Rivers should be managed for "wilderness-type" or "primitive-level" experiences. The Bureau of Outdoor Recreation's (1977) suggested optimum carrying capacity range for primitive hiking is from one to seven groups of hikers per mile of trail with 3.5 groups per mile as an often-used base figure. A "group" is defined as a related hiking party consisting of one or more individuals. Typically, a hiking group would consist of one to five people.

It is estimated that there are three to five miles of undeveloped trails in the Wild River corridor. There are no developed trails at this time. Based on a maximum of five miles of trail and a public use capacity standard of 3.5 groups of hikers per mile per day, the existing trails have an estimated carrying capacity of 32 groups per day. A "group" would typically consist of one to five hikers or backpackers. Using 2.5 hikers as an average group, the daily capacity in terms of hikers is 80, and the total annual capacity, based upon a 365-day season, is 29,200 visitor-days.

Camping

Camping in the Wild River corridor should be "primitive camping," meaning no developed campsites. Instead, areas with suitable qualities (level; well-drained; adjacent to trails, and above the floodplain) should be desig-

nated as primitive camping sites. Such areas should generally be at least 2500 square feet (roughly 50 feet by 50 feet) in areal extent if possible, and should contain no unique or fragile natural features subject to adverse impact from camping use. Each unit this size, will accommodate one to five persons.

Primitive camping sites should have generous spacing between them (500 to 1,000 feet), and in keeping with Forest Service policy in the Geological area, there should be no camping within 300 feet of roads (in this case, Kentucky 715 and 746); no camping within sight of any developed Forest Service trail, and no camping within rockshelters or on top of, or underneath, natural arches. Fires should be permitted only in stoves or other devices designed to contain the flame.

The area on the north bank of the river in the downstream half of the corridor holds the highest potential for primitive camping due to the the relatively wide, level terraces along the river in this location, and the availability of parking adjacent to the 715 bridge. These terraces are generally well outside the limits of normal flooding following a heavy rain.

Assuming the availability of four primitive campsites in the vicinity of the downstream terminus of the corridor, then maximum daily capacity for primitive camping is 20 persons, and the annual capacity, based on a 365-day season, is 7,300 visitor-days.

Environmental Education

Fish and Wildlife Service (circa 1973) criteria for environmental education areas suggest that an optimum area should be within a quarter of a mile of an existing road, have a slope no greater than five percent, and be capable of supporting five people per acre without adverse environmental impact. The downstream end of the corridor is judged to be most suited to this activity on the basis of terrain and available parking. The area of the corridor within a quarter of a mile of the Kentucky 715 bridge is judged to have a carrying capacity, for environmental education, of 120 persons per day, and an annual capacity, based upon a 180-day season, of 21,600 visitor-days.

The tables on the following pages contain recreation use data for the Forest Service's Red River Gorge Geological Area, and for the Daniel Boone National Forest in Wolfe County for the period 1965 to 1978. The Wolf County data is the closest approximation of levels of use in the Wild River corridor that is available, although it represents use in the corridor, and in developed recreation areas south and west of the corridor (Sky Bridge, Rock Bridge and Koomer Ridge areas). The information in the tables is a compilation of data provided by the Forest Supervisor's Office in Winchester, Kentucky.

The figures contained in Tables 4 and 5 are indicative of relatively high levels of use, and this amount of use has led to the temporary closing of certain areas and facilities in the Geological Area in the past in order to allow these areas to recuperate from overuse. Signs of overuse are evident at the downstream terminus of the Wild River corridor in the form of litter, soil compaction and minor erosion on some trail surfaces, injured trees and smoke-blackened rockshelters.

Table 6 is a comparison of recent annual average visitation in the Wolfe County portion of the Daniel Boone National Forest for selected activities versus the estimated carrying capacity of the Wild River corridor for these same activities. The average visitation figures represent an average figure for the years 1974 through 1978. The activities presented in the table are those considered appropriate for the Red Wild River corridor. It is important to remember that direct comparison of the figures in the table is not appropriate since the columns represent slightly different areas.

The figures in the left-hand column are indicative of the demand for these activities and the levels of use that might be expected in the Wild River corridor. The figures indicate that, in the case of hunting and camping, demand may exceed the carrying capacity of the corridor. However, with regard to hunting, there appears to be no shortage of game in the Red River Gorge Geological Area, including the Wild River corridor, at the present time (Kentucky Department of Fish and Wildlife Resources, personal communication.)

Figure 2 outlines a series of actions which resource managers can take to lessen the impacts of overusage of facilities which exist or might be de-

Table 4: TRENDS IN RECREATION USE IN THE DANIEL BOONE NATIONAL FOREST
RED RIVER GORGE GEOLOGICAL AREA

Activity	Visitor-Days													
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974*	1975	1976	1977	1978**
Canoeing[1]	300	---	---	500	2,200	3,100	3,700	4,400	6,900	8,400	7,000	4,300	5,600	6,100
Fishing[2]	3,800	4,500	1,700	2,900	3,300	3,600	4,000	4,200	5,400	5,500	3,400	2,600	3,700	3,600
Hunting[3]	13,800	16,000	9,100	10,200	5,800	6,700	7,000	8,300	12,200	14,800	5,600	4,200	5,800	6,200
Hiking[4]	5,900	4,800	2,900	4,600	11,300	18,300	21,900	25,300	41,000	44,400	38,900	33,300	46,200	48,100
Horseback Riding	200	400	300	500	500	800	1,300	1,500	4,300	4,300	1,400	700	1,000	2,000
Camping[5]	5,300	10,500	12,500	47,000	48,000	63,900	66,600	86,500	87,400	107,500	99,300	46,300	52,800	5,600
Picnicking	12,800	4,700	4,300	6,100	9,800	14,300	16,700	18,900	23,800	22,900	15,200	11,200	16,400	14,900
E.E.[6]	1,400	1,400	1,200	2,400	2,100	3,400	4,700	7,200	11,800	16,000	10,700	3,700	12,500	12,400
Misc.[7]	31,200	40,000	27,100	23,500	25,100	33,800	38,500	64,200	71,600	28,100	57,100	40,400	64,700	62,400
TOTAL	74,700	82,300	59,100	97,700	108,100	147,900	164,400	220,500	264,400	251,900	238,600	146,700	208,700	161,300

* The Red River Gorge Geological Area was established in 1974. Figures for 1965 to 1973 represent recreation activity in the Stanton Ranger District.

** Figures in this column are for the fiscal year (FY). The columns for 1965-1977 are calendar year (CY) figures.

1 Canoeing includes canoeing per se, and other watercraft (rafts, kayaks, johnboats).
2 Fishing includes warmwater and coldwater fishing.
3 Hunting includes big game, small game and waterfowl hunting.
4 Hiking includes hiking, backpacking and unguided walking.
5 From the period 1965-1977, camping includes general camping, auto camping, trailer camping and tent camping. The 1978 column includes general camping and tent camping.
6 Environmental Education (EE) includes nature study, viewing interpretive exhibits, attending talks and programs, guided touring and guided walking.
7 Miscellaneous includes swimming, unguided touring, bicycling, and gathering forest products.

Table 5: TRENDS IN RECREATION USE IN THE DANIEL BOONE NATIONAL FOREST
WOLFE COUNTY, KENTUCKY

Activity	Visitor-Days													
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974*	1975	1976	1977	1978**
Canoeing[1]	100	---	---	200	1,000	1,200	1,600	1,800	4,700	3,700	3,700	2,300	3,200	3,500
Fishing[2]	3,100	2,000	1,200	1,900	2,000	2,200	2,500	2,500	3,400	3,200	2,200	1,070	2,600	2,500
Hunting[3]	2,500	5,200	3,100	3,700	2,300	2,500	2,600	2,700	4,900	4,900	4,300	2,800	3,100	3,000
Hiking[4]	4,200	14,100	2,200	2,300	5,600	6,300	7,700	9,900	8,700	17,800	19,300	15,900	21,900	22,800
Horseback Riding	---	200	---	---	---	---	---	---	2,400	1,000	800	300	400	500
Camping[5]	200	10,100	11,500	44,000	46,000	62,100	64,000	83,200	84,690	102,300	98,000	45,200	49,600	2,400
Picnicking	10,100	3,400	3,300	4,400	8,100	11,900	13,300	13,200	19,200	11,800	11,400	9,400	12,200	10,900
E.E.[6]	700	800	900	1,800	1,500	2,100	3,000	5,200	3,800	12,100	9,600	3,300	10,600	10,100
Misc.[7]	27,500	18,400	18,900	15,100	15,000	20,300	23,300	46,300	44,300	50,700	46,700	31,500	48,800	46,700
TOTAL	48,400	54,200	41,100	73,400	81,500	108,600	118,000	164,800	176,090	207,500	196,000	112,400	152,400	102,400

* The Red River Gorge Geological Area was established in 1974. Figures for 1965 to 1973 represent recreation activity in the Stanton Ranger District.

** Figures in this column are for the fiscal year (FY). The columns for 1965-1977 are calendar year (CY) figures.

1 Canoeing includes canoeing per se, and other watercraft (rafts, kayaks, johnboats).
2 Fishing includes warmwater and coldwater fishing.
3 Hunting includes big game, small game and waterfowl hunting.
4 Hiking includes hiking, backpacking and unguided walking.
5 From the period 1965-1977, camping includes general camping, auto camping, trailer camping and tent camping. The 1978 column includes general camping and tent camping.
6 Environmental Education (EE) includes nature study, viewing interpretive exhibits, attending talks and programs, guided touring and guided walking.
7 Miscellaneous includes swimming, unguided touring, bicycling, and gathering forest products.

Table 6: RECENT USE VERSUS ESTIMATED CARRYING CAPACITY
SELECTED RECREATION ACTIVITIES

Activity	Average Annual Use (Visitor-Days)[1]	Estimated Annual Carrying Capacity (Visitor-Days)[2]
Canoeing	3,280	5,040
Fishing	2,440	10,700
Hunting	3,620	375
Hiking	19,540	29,200
Camping	59,500	7,300
Environmental Education	9,140	21,600

[1]The figures in this column are the average of visitor-day figures for 1974 through 1978 for the Wolfe County portion of the Daniel Boone National Foest. Nearly all of the Wild River corridor is in Wolfe County. These figures, however, represent recreation activity in the Wild River corridor and recreation activity in developed recreation sites outside the corridor. Therefore, a direct comparison is not possible.

[2]These figures are the estimated carrying capacity of only the land within the Kentucky Wild River segment of Red River.

veloped in the Wild River corridor. Impact indicators such as crowding, soil erosion, loss of vegetation and litter are coupled with specific ameliorating actions for the range of recreational activity which appears to be appropriate for the Wild River.

Monitoring will be the key to determining when activities (canoeing, hiking, camping, etc.) are approaching carrying capacity. Wild River Rangers should watch for the appearance of impact indicators as presented in Figure 2. The appearance of these indicators should be the stimulus for implementation of one or more of the ameliorating actions suggested in Figure 2. Numbers of visitors, by activity, should be monitored also during the peak period of visitation to determine if daily or one-time-use capacity is being exceeded.

Figure 3 depicts the seasonal distribution of different activities in the Wild River corridor, showing that not all types of users will be present in the corridor at the same time. Overall, it is anticipated that approximately 70 percent of annual use will occur on weekends, and with the exception of hunting, the primary season for most all activities will be the period from April through October. Peak visitation is most likely to occur on weekends in spring and late summer or early fall.

There is minimal conflict among the activities suggested for primary management emphasis in the Wild River corridor, either in terms of space or time. Canoeists, for example, might occasionally interrupt fishermen in passing through the segment of the stream where the fishermen happen to be, but the interruption will be momentary. Essentially, canoeing, fishing, hiking, and camping are compatible activities. Conflict between these activities and environmental education is minimized by designating a specific area for environmental education, and limiting this activity to the designated area.

The potential for conflicting use is greatest in fall, during hunting season, when hunting activity may disturb late-season hikers, campers or fishermen. The most intense period of overlapping or conflicting use is from the middle of August to the end of October.

Figure 2: OVERUSE INDICATORS
WITH SELECTED AMELIORATING
ACTIONS BY FACILITY TYPE

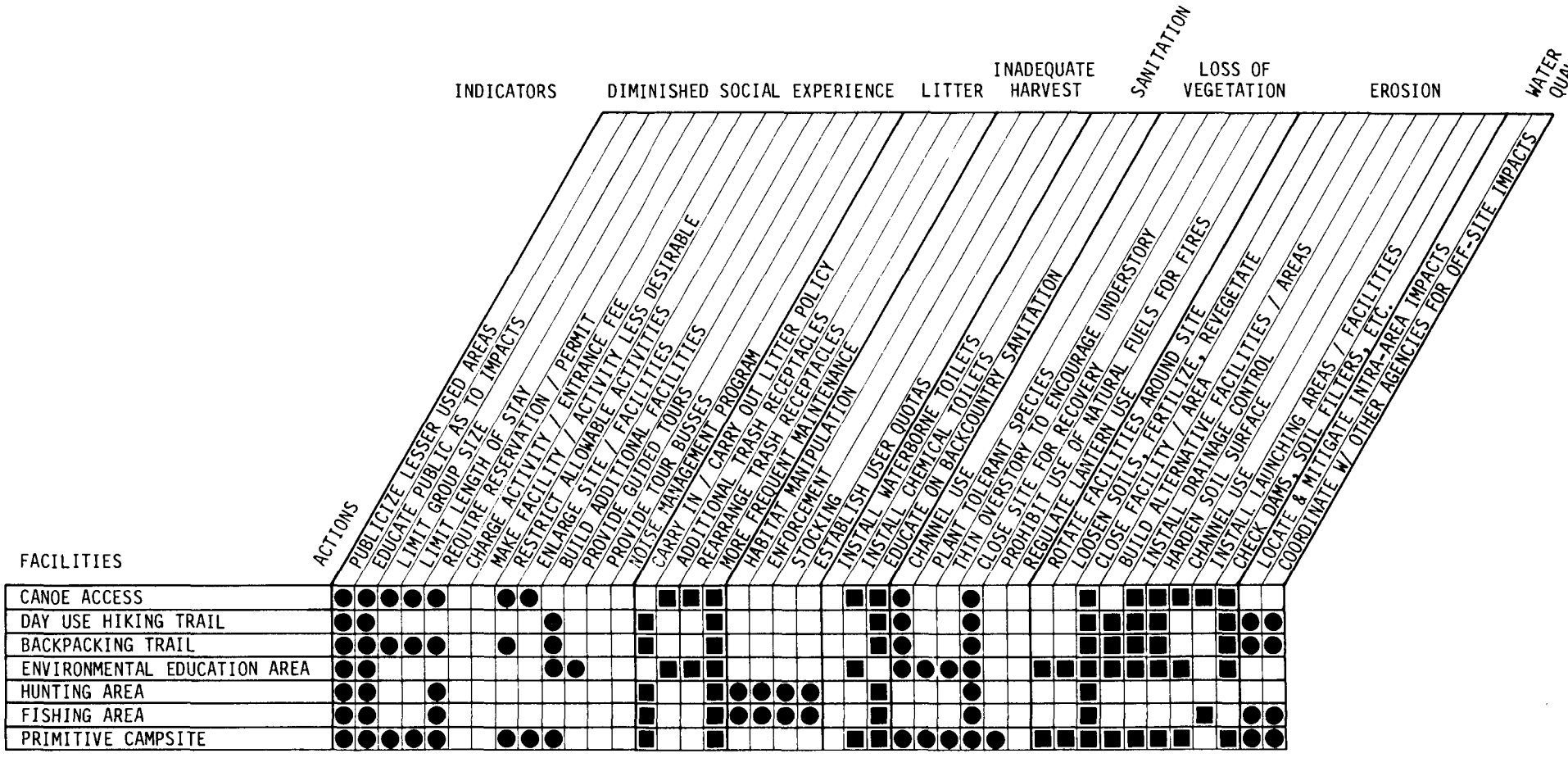


Figure 3: SEASONAL ACTIVITY CHART

1 - Hunting includes deer (gun and bow), squirrel, and grouse. Season represented on the graph is the 1979-80 hunting season for these species.

Visitor-day figures representing recreation use of an area can be deceiving unless it is realized that visitor-days are not the same as visitors, and that one visitor can engage in more than one activity. For example, a hiker or fisherman may also engage in camping while in the corridor. One visitor, therefore, could be responsible for two or more visitor-days of activity in a single 24-hour period.

The following sections of this report outline recommended management objectives for the Wild segment of Red River; identify the agencies who should share management responsibilities in the Wild River corridor; and, outline responsibilities of each agency. A suggested plan for development and use is presented along with estimates of the cost of implementation.

Management of the Wild River portion of Red River should, in general, be in accordance with the Forest Service's Direction Statement and Coordinating Guide for the Daniel Boone National Forest (1975); with the Unit Plan for Management of the River Gorge Unit (1974), and specifically, should be in accordance with the management directions set forth in the Memorandum of Understanding Between the Kentucky Department for Natural Resources and Environmental Protection and the United States Department of Agriculture, Forest Service, pertaining to Wild Rivers.

Management Objectives

(1) In recognition of the outstanding and unique scenic, recreational, geological, fish and wildlife, botanical, archaeological and other scientific, aesthetic, and cultural values possessed by the Wild River segment of Red River, the foremost objective should be to preserve the unique character of this stream segment, and to prevent future infringement upon it by impoundments or other manmade works. At the same time, the citizens of the Commonwealth and visitors from out-of-state should be afforded an opportunity to enjoy this natural stream so long as significant environmental degradation does not occur.

The aim and intent of this objective is entirely consistent with, or identical to, the intent expressed by the federal government in designating, or proposing designation of, portions of Red River and adjacent lands variously as National Natural Landmark, Red River Gorge Geological Area, Clifty Wilderness, and National Wild and Scenic River. The latter proposed designation encompasses the entire length of the Kentucky Wild River stream segment.

The Forest Service is currently preparing a report on its evaluation of the eligibility of the Red River for designation as a National Wild and Scenic River. According to the Forest Service, National Wild River designation would provide more protection for the river than would be afforded by any of the other current or proposed federal designations.

(2) Provide a meaningful recreation program to the public and take special care to protect the rights of private property owners.

(3) Maintain and protect the water quality of the drainage area of the Wild River segment of Red River for all uses including domestic use, maintenance and enhancement of aquatic life, and for recreation use including swimming, and for the aesthetic enjoyment derived from the purity and clarity of the water.

(4) Provide for protection and preservation of natural habitats in the Wild River corridor for all indigenous wildlife species and for rare, threatened or endangered species of plants or animals.

(5) Protect, conserve, and enhance the prevailing natural scenic values of the Wild River corridor, and maintain the setting of rural isolation and solitude. Areas around geological formations in particular, should be preserved as nearly as possible in undisturbed condition.

(6) Protect and preserve the archaeological and historical resources of the corridor.

Coordinate the disposition of all archaeological and historic sites on State lands in the Wild River corridor with the Heritage Commission, State Historic Preservation Office, and the Office of the State Archaeologist. The Forest Service is responsible for management and disposition of all cultural resources on federal lands and coordinates this responsibility with the State Historic Preservation Officer in accordance with 36 Code of Federal Regulations (CFR) 800.

Protection and preservation of archaeological and historical resources in Wild River corridors may involve some or all of the following strategies:

- Increased presence of authorities (Wild River Rangers, Forest Service or State personnel) in Wild River corridors including roads, trails and backcountry sites.

- Aerial observation.

- Cooperative agreements with County sheriffs for patrol of the area.

- Education -- including Environmental Education programs for students and teachers, and interpretive signs and exhibits directed toward visitors in general. Education programs should emphasize the preservation ethic, stabilization of archaeological sites and curation of artifacts, but should also communicate the legal penalties associated with willful injury or destruction of cultural sites or objects.

- Stabilization of vandalized rockshelter sites to discourage further vandalism. Stabilization may involve backfilling the floor of a rockshelter with dirt, or the use of other backfill or floor stabilization materials including gunnite. These Stabilizing or protective strategies are still experimental and should be monitored by Wild River managers to determine their efficacy.

- Complete excavation and recovery of all artifacts from archaeological sites threatened with certain destruction.

- Limiting access. This strategy may involve obliteration of trails that lead to or through rockshelters or other archaeologic sites; closure of an access point if feasible, or such strategies as fencing rockshelter sites or planting vegetation in front of them to discourage entry.

- Directing use through developed trails or by designation of campsites or open fire camp areas, and restricting such activity to only these areas.

(7) In cooperation with the Forest Service, recreation utilization in the Wild River corridor should be directed to primitive level experiences corresponding to Forest Service Level 1 (primitive) and Level 2 (secondary primitive) development. This means that the area should be managed for recreation use substantially in its natural condition. Activities to be permitted would be in the dispersed recreation category and would include canoeing, fishing, hiking and backpacking (on undeveloped trails), primitive camping, hunting, and sightseeing. Access points at the upper and lower boundaries of the Wild River corridor should be the only access for canoes and related craft to this portion of Red River. The corridor should be managed to ensure proper levels of use in relation to carrying capacity.

Physical improvements in the Wild River corridor should involve minimum site modification. Improvements should be primarily for the purpose of protecting the site, but rustic or rudimentary improvements may be provided for the comfort of the user. Use of synthetic materials such as plastic, styrofoam, fiberglas and so on, should be avoided.

(8) Provide for resource utilization at levels consistent with sound natural resource management practices on public and private land.

The principal natural resources of commercial value in the Wild River corridor and vicinity are timber, coal, oil, natural gas and limestone. It is the intent of this provision to recommend that only resource management activities that are consistent with other plan objectives be employed in Wild River areas. Resource management techniques should be tempered to meet the geologic, topographic, and climatic constraints inherent in this area.

(9) Begin an early program of monitoring recreational usage and impacts utilizing Wild River Rangers during peak recreation seasons. Explore

the feasibility of implementing this through a cooperative effort with the Forest Service and include Federal and State environmental specialists in assisting in monitoring impacts.

A suggested form of recording recreation use and recreation-related environmental impacts in Wild River corridors is included in this report as Appendix II. This form would provide information of use to managers, recreation planners and analysts. The information to be collected using the form is not technical in scope, and Wild River Rangers would need no special training nor sophisticated equipment. Equipment needs would consist of a clipboard, forms, pen or pencil, camera, thermometer, and a fisherman's scale with tape measure. With this equipment, and monitoring on at least a monthly basis, recreation use, trends in usage, and changes and impacts associated with varying levels and kinds of use could be evaluated by Wild River managers and appropriate management strategies implemented.

It is important to implement the monitoring program as soon as possible since implementation of certain aspects of Wild River Management Plans can be expected to result in an increased public awareness of Kentucky's Wild Rivers, and a subsequent increase in visitation. There are certain resources or sites in the Wild River corridor that have undergone previous visitor-related disturbance, and should be repaired or stabilized to discourage further damage or vandalism.

(10) Increase federal-, state-, and local-level coordination among agencies which have responsibility for and/or interest in resource management within the Wild River corridors and their drainage basins (i.e., the Kentucky Divisions of Forestry, Water Quality, Conservation, Fish and Wildlife, and Reclamation; the Kentucky Nature Preserves Commission; Kentucky Heritage Commission; the U.S. Geological Survey, and the USDA Forest and Soil Conservation Service).

It is imperative that administrators of Kentucky's Wild River program have a full understanding of other state and local agencies' activities in each of Kentucky's Wild River watersheds and that other agencies

recognize the significance of Kentucky's Wild River resources. Cooperative agreements should be developed among agencies which administer programs in Wild River watersheds and the resources of state agencies' field personnel should be maximized, to the extent possible, in monitoring change within each Wild River watershed. For example, Wild River administrators should play an active role with the Division of Water Quality in developing and implementing Kentucky's 208 Water Quality Plan and in implementing related programs for improvement of water quality in Wild River watersheds. Similarly, Wild River administrators should encourage the Division of Reclamation to give Wild River watersheds priority in the expenditure of funds for reclamation of abandoned and orphan mines. Keeping abreast of sister agency programs should be an on-going activity for Wild River administrators.

(11) Encourage implementation and administration of the Red Wild River Management Plan at the lowest possible governmental levels which will adequately protect local and statewide interests.

The intent of this provision is to ensure that plan objectives are carried out with efficiency and community involvement. Further, regulatory multiplicity should be avoided, and local interest and control over the management of private lands in the Wild River area are encouraged as long as statewide interests and objectives are met. An educational program directed to local administrators that will impress upon them the significance of the resources in the Wild River corridor and emphasize regulatory actions that are appropriate for Wild River areas would be useful in achieving this objective. Further, it is believed that there is currently vested in local units of government sufficient powers to protect environmentally sensitive areas and to ensure that land use practices employed in the area are those which respect the natural environment and natural processes. What is needed is responsible public action.

(12) Foster an appreciation of the unique natural, cultural, scenic, recreational and scientific resources of the Wild River corridor through a variety of educational and interpretive vehicles.

Kentucky's Wild Rivers administrators should mount an aggressive effort to build a strong constituency for the Wild Rivers program. This will likely be a time consuming effort; however, experience in other states indicates that this is an essential element in a successful Wild Rivers protection and management effort. To accomplish this, a slide presentation or movie, and information brochures and posters should be prepared to assist in the development of support for the program. Once the presentations and informational literature have been developed, their availability should be made known to potentially interested audiences. Candidate audiences for formal presentations would include:

- Canoe, kayak and rafting clubs
- Sport fishing clubs
- Hiking and backpacking organizations
- Chapters of the Audubon Society, Sierra Club, Wilderness Society
- Scientific Interests
- College, university, secondary and elementary school classes
- Conservation organizations
- League of Women Voters groups
- Boy and Girl Scout groups
- Rotary, Kiwanis, Lions Clubs
- Junior Naturalist Clubs

Areas at the upstream and downstream boundaries and midpoint of the Red River corridor were evaluated for their potential for development as managed access points into the river. Slope, vegetation, geological and archaeological resources, ease of access, and land ownership were the principal site factors that were evaluated. Mid-corridor access alternatives were eliminated from further consideration since, from a management standpoint, it appears that access at only the upstream and downstream termini is desirable (see Map 3).

Upstream Access Point

It is recommended that an area on the southeast side of the Kentucky Highway 746 Bridge (see Figure 4) be established as the upstream access point to the Red Wild River if the property can be acquired though an appropriate fee, lease or easement arrangement. Suggested site improvements include fresh gravel on the road shoulder pull-off and the jeep trail leading to the level terrace by the river; railroad-tie retainers to clearly define the parking area; appropriate signs along highway 746 identifying the access point; and, an informational/interpretive kiosk.

An estimate of the costs of implementing this alternative are presented in Table 7. This access site is not currently in public ownership and the cost of acquiring the property (fee or easement) would be in addition to the estimate presented in Table 7.

Downstream Access Point

Currently, visitors to the downstream terminus of the Wild River obtain access to the corridor from an existing gravel parking lot on private property. The site was formerly the parking area for a fee camping and fishing operation, and camping is still very popular along this segment of the river. There are some unsightly remnants of the former commercial operation at this location, including a dilapidated wooden building and large quantities of trash.

An alternative to this access point is a site on Forest Service property on the opposite side of the river (the southeast bank beside the Highway 715

Map 3: MANAGEMENT RECOMMENDATIONS

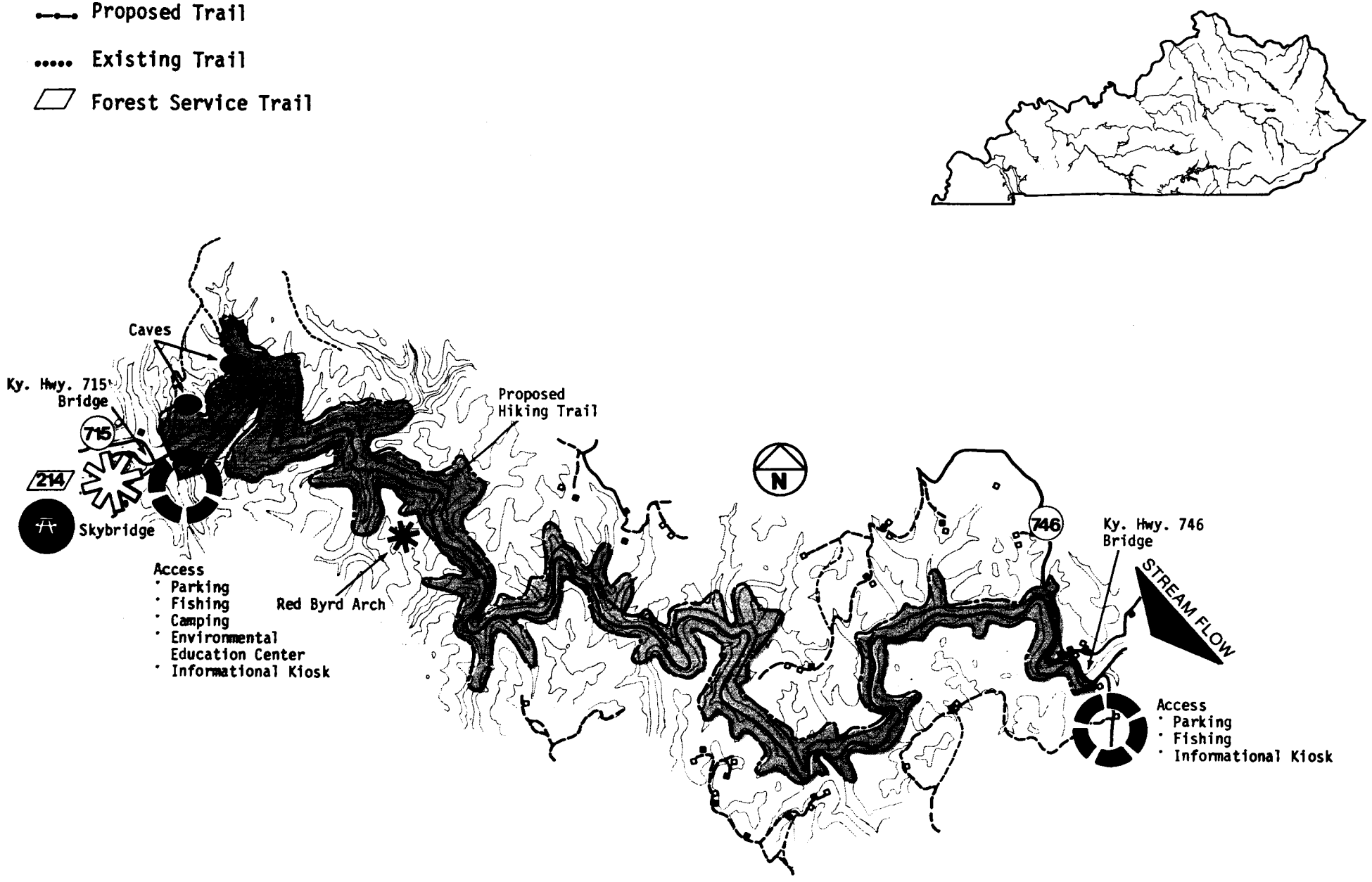


Figure 4: RED RIVER
UPSTREAM ACCESS
HIGHWAY 746

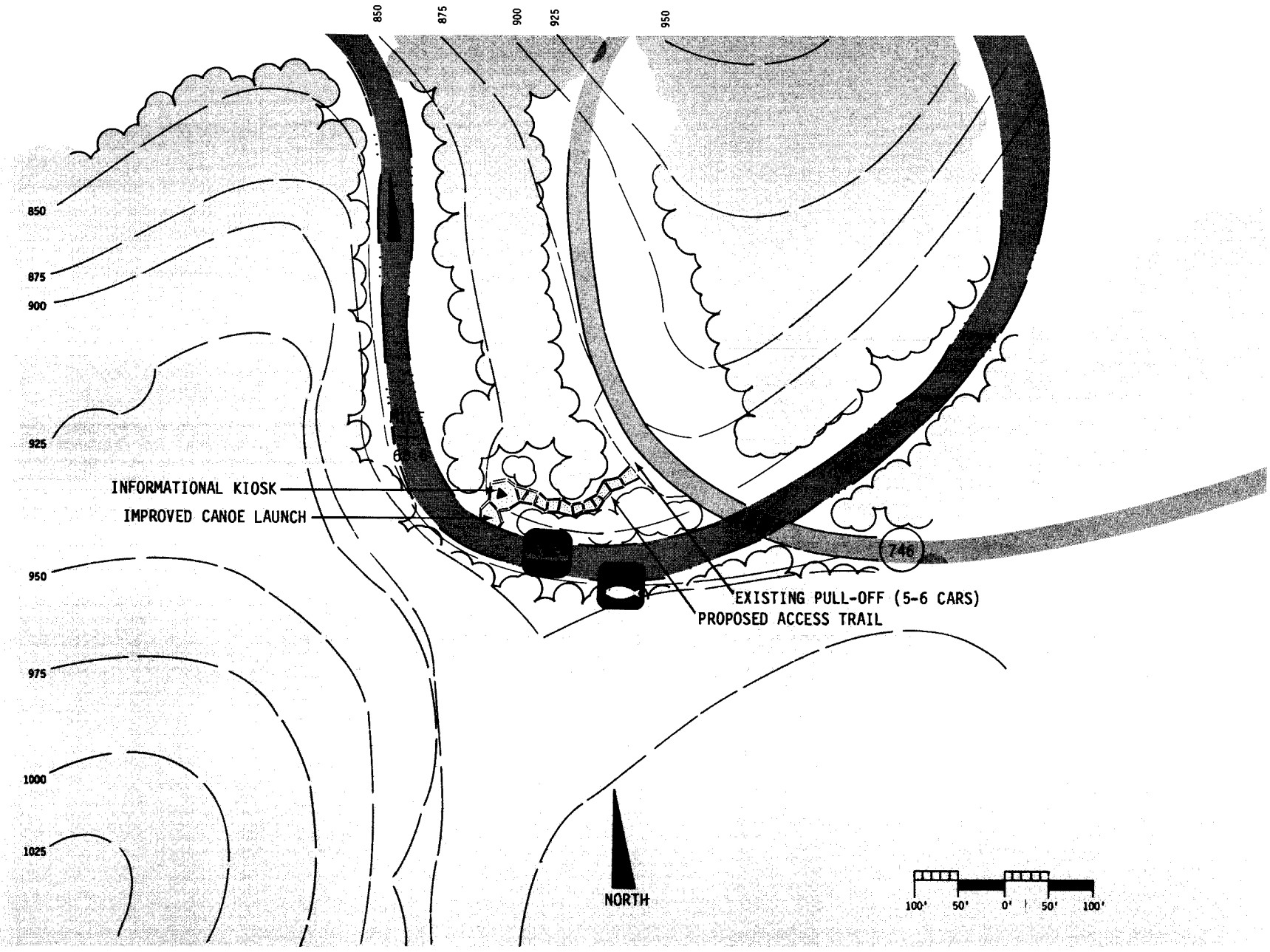


Table 7: UPSTREAM CANOE ACCESS ALTERNATE
HIGHWAY 746 PRELIMINARY COST ESTIMATE

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
Site Preparation						
Clearing & Grubbing (Walkway)	AC	.05	2,500	125	19	$ 144
Erosion Control (Walkway)	AC	.05	2,000	100	15	115
					Subtotal	$ 259
Walkway						
Earthwork	CY	47	5.00	235	35	270
4" Depth Dga Surface	SY	140	3.00	420	63	483
R/R Tie Retainers	LF	290	2.50	725	109	834
					Subtotal	$ 1,587

Table 7: UPSTREAM CANOE ACCESS ALTERNATE
HIGHWAY 746 PRELIMINARY COST ESTIMATE
(continued)

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
Directional Signs	LS					$ 150
Informational Kiosk	LS					3,396
Trash Receptacle	LS					200
					Subtotal	$ 3,746
					TOTAL	$ 5,592

These order of magnitude cost estimates have been calculated as being accomplished by private contractors, based on our experience in the Louisville market area. The quantities and price units applied are based on the accompanying conceptual design plans. This estimate of construction quantities and costs is made on the basis of our experience and represents our best judgment, but we cannot and do not guarantee that the construction quantities and costs will not vary from this quantity and cost estimate. This cost estimate does not include fees for construction design and engineering.

Bridge). This alternative could provide for five or six parking spaces for cars or buses located on the perimeter of a 50-foot radius cul-de-sac. The cul-de-sac provides the opportunity for pick up or drop off of equipment and people for either canoeing or for access to a proposed environmental education center amphitheater. The latter would be a small, circular, gravel and railroad-tie retainer facility for use as an outdoor classroom. An informational/interpretive kiosk is also suggested for this access point (see Figure 5).

The slope on the southeast bank of the river is not as steep as the opposite bank, and consequently, the southeast bank is favored for canoe access. The moderate slope and open woods environment is also favored over the northeast bank for the environmental education area. On the other hand, trails and primitive campsites are in abundance on the northeast bank, and these activities should continue to be accommodated primarily on the north side of the river so that they do not conflict with environmental education programs on the south bank. The existing parking lot on the northeast side of the 715 Bridge could serve as a managed parking area if the site could be acquired through an appropriate fee, lease or easement arrangement.

An estimate of the costs of implementing this access alternative are presented in Table 8.

River Gauge

It is recommended that a river gauge graphic (see example in Appendix I) be applied to the Highway 746 and 715 Bridges to inform canoeists of the suitability of river conditions for canoeing. This task should be coordinated with the Kentucky Department of Transportation, Bureau of Highways. The estimated cost of implementing this recommendation is $1,200 for each graphic.

Red River Interpretive Recommendations

The interpretive program for each of Kentucky's Wild Rivers should be directed toward educating the public as to the significance of Wild River

Table 8: DOWNSTREAM CANOE ACCESS ALTERNATE
HIGHWAY 715 PRELIMINARY COST ESTIMATE

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
Walkways						
Earthwork	CY	36	5.00	180	27	207
4" Depth dga Surface	SY	106	2.75	292	44	336
R/R Tie Retainers	LF	400	2.50	1,000	150	1,150
					Subtotal	$ 1,693
Environmental Education Area						
R/R Tie Retainers	LF	150	2.50	375	56	431
4" Depth dga	SY	178	2.75	490	74	564
Log Seating	LF	90	1.00	90	14	104
Miscellaneous Hardware	LS					200
					Subtotal	$ 1,299
Directional Signs	LS					150
Informational Kiosk	LS					3,396
Trash Receptacle	LS					200
					Subtotal	$ 3,746
					TOTAL	$11,958

Figure 5: RED RIVER
DOWNSTREAM ACCESS
HIGHWAY 715

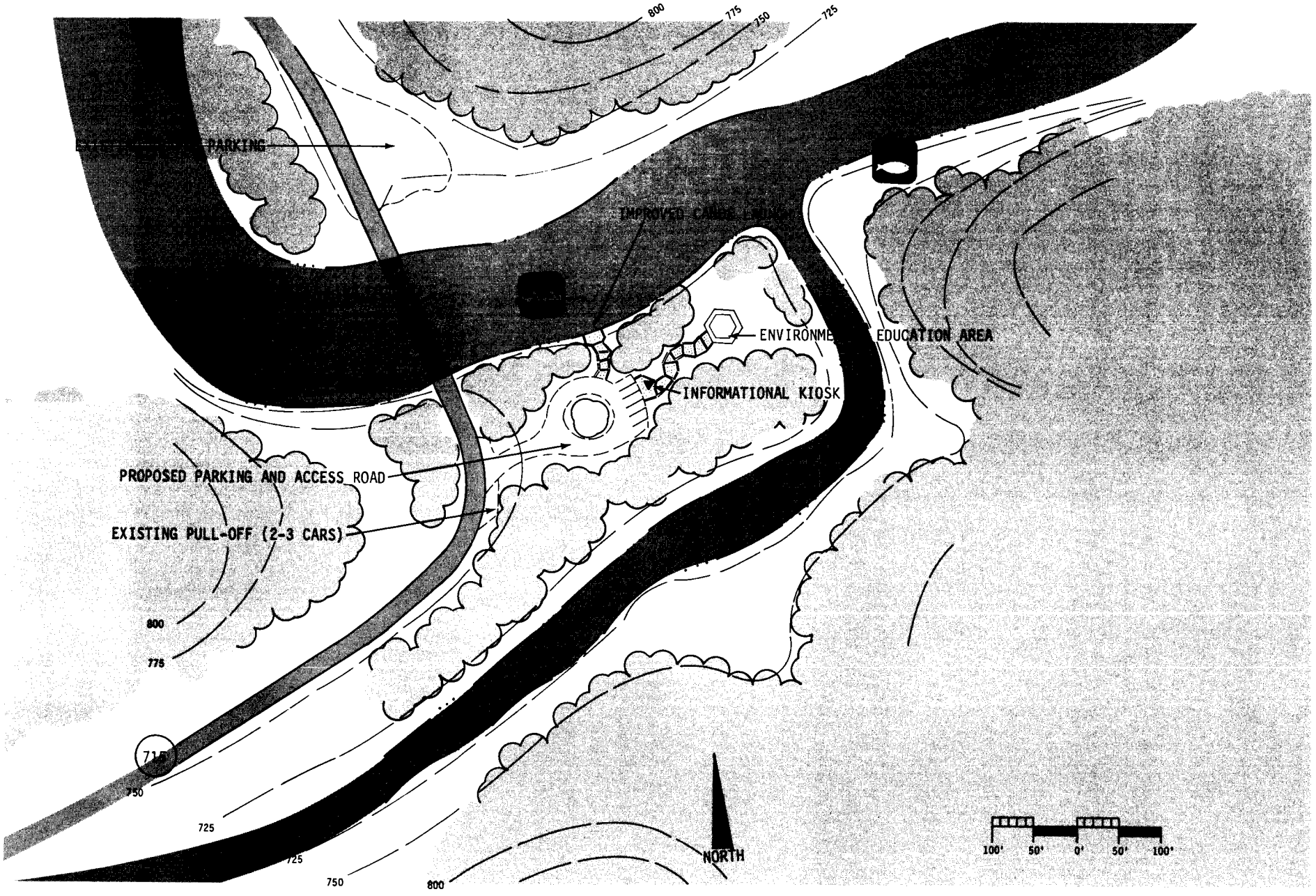


Table 8: DOWNSTREAM CANOE ACCESS ALTERNATE HIGHWAY 715 PRELIMINARY COST ESTIMATE (continued)

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
Site Preparation						
Clearing & Grubbing (Parking Area, Walkway, Access Road & Env. Ed. Area)	AC	.3	2,500	750	113	$ 863
Earthwork & Drainage (Parking Area, Access Road and Env. Ed. Area)	CY	284	2.50	710	107	817
Erosion Control	AC	.3	2,000	600	90	690
					Subtotal	$ 2,370
Road & Parking Construction						
Roadway						
6" depth large gravel	SY	280	3.00	840	126	966
6" depth dga	SY	280	3.00	840	126	966
(50¢/sq. yd. in. x depth = cost/sq. yd.)						
Parking Area	SY	133	6.00	798	120	918
					Subtotal	$ 2,850

These order of magnitude cost estimates have been calculated as being accomplished by private contractors, based on our experience in the Louisville market area. The quantities and price units applied are based on the accompanying conceptual design plans. This estimate of construction quantities and costs is made on the basis of our experience and represents our best judgment, but we cannot and do not guarantee that the construction quantities and costs will not vary from this quantity and cost estimate. This cost estimate does not include fees for construction design and engineering.

resources and should deliver to the public, in a subtle manner, actions expected of visitors in maintaining and improving the integrity of the resources. Similarly, the interpretive message presented in each river corridor, although different in each, should be placed within the context of the larger Wild Rivers program.

The interpretive information conveyed at each Wild River should be tailored to meet the unique interest of users of that river. The anticipated visitor interest and visitation levels, be they fisherman, canoeists, hikers or sightseers, should determine the information presented.

The interpretive kiosks recommended for access points are three-sided structures, with each side designed to display interpretive information. Visitor orientation, interpretation and safety information would each occupy a panel (see example in Appendix I).

Visitor interests and levels of visitation are not evenly divided between the two access points to the Wild River corridor. The upstream access is used primarily by canoeists and fishermen, and levels of use at this access are rather low. Heaviest use occurs at the downstream terminus, where the principal users include canoeists, hikers and backpackers, campers, fishermen and sightseers. The interpretive approach, therefore, should be geared to canoeists and fishermen at the upstream access, and to a wider user audience at the downstream terminus.

The following paragraphs are representative of the kinds of visitor orientation, interpretive, and safety information that might be included on the interpretive/informational kiosks at the access points to the Red Wild River.

Information

This reach of the Red River is located on the Cumberland Plateau, an area characterized by a rugged topography developed in conglomerate sandstones. The designated Wild River segment extends 9.1 miles from the Kentucky Highway 746 Bridge to the mouth of Swift Camp Creek near an access point at Kentucky Highway 715.

This segment of the river has an average gradient of approximately 13 feet per mile with an average width of 25-45 feet. The Red River is rated an International Class III stream suitable for intermediate to advanced paddlers, and is runnable at average water levels typically from December to May. There are five major rapids which require advance scouting. At high water levels, the difficulties and dangers of this stream segment increase significantly. Canoeists in open boats should not attempt this segment when the discharge of the stream is above 350 cubic feet per second.

Sport fish present in the Red River include smallmouth bass, spotted bass, rock bass, muskellunge, catfish, and longear sunfish. Catfish and rock bass are the most frequently caught species in the Wild River segment.

Trails are established in the area on the north side of the river at the downstream end of the Wild River segment. Public primitive camping areas are defined along the riverbank. In order to protect the Wild River resource, visitors should stay on the established trails or camping areas.

Interpretive Theme

The Red River, and the deep gorge through which it flows, possesses certain unusual and outstanding characteristics which have been of interest to mankind for centuries. The abundance of rockshelters and arches, and the richness and diversity of the vegetation and wildlife of the gorge attracted prehistoric Indians, who lived in some of the rockshelters along the gorge and painted petroglyphs on the walls of some.

Indians in historic times, such as the Shawnee, recognized that the rugged gorge was a natural fortress and a secure hiding place, and established a permanent camp along the river to which warriors returned after raids.

Local legends tell of John Swift, for whom Swift Camp Creek is named; a pioneer adventurer who claimed to have stashed a fortune in silver somewhere in eastern Kentucky. Many who believed that Swift's silver was stashed in Red River Gorge have searched in vain for the treasure.

While Swift's treasure is probably mythical, there are actual mineral resources in the gorge which were exploited in times past. During the Revolutionary War, and probably during the Civil War also, saltpeter (nitrate), useful in the manufacture of gunpowder, was mined at various locations in eastern Kentucky, including the Red River Gorge.

The ruggedness of the gorge discouraged white settlement. The most significant human activity to disturb the environment of the gorge to date has been logging activity, which reached its peak in the last century. Since then, the forest has largely been allowed to recover, and today, supports an unusually diverse flora and fauna. This, coupled with the large assemblage of rockshelters, arches, chimneys and other interesting geologic features, makes the Red River Gorge an outstanding natural resource.

Safety Information

The Red River offers the visitor many outstanding recreation experiences, but only with care can it be enjoyed safely.

To ensure a safe canoe trip on the Red River the trip should be carefully planned to allow time to scout rapids before an attempted run. Beware of fallen trees which may block the river's course or rapids which may be too difficult to navigate. Portage when necessary. The Red River continues to flood for several days after hard rains, usually in the spring and fall. Never attempt a canoe trip when the river is at flood stage. Canoes should be equipped with the following:

- 50 to 100 feet of throwline
- Life preservers
- Bow and stern lines on each canoe
- Extra paddles

- Knife
- Waterproof matches
- First aid kit

To protect the Red Wild River resource, recreationists should pack out all litter and garbage and thoroughly drown out all campfires and spread the ashes. In no instance should fires of any kind be built on private property.

A few tips for hikers:

- Never hike alone
- Don't hike after dark
- Help maintain trails by removing brush and small trees that have fallen across them.
- Don't shortcut switchbacks. Stay on the trail as your shortcut footpath eventually leads to erosion and gullying.
- Carry a topographic map and compass if you're planning a long, cross-country hike.
- If you encounter a snake, it's best to leave it alone. Most snakes you are likely to encounter are non-venomous and will get out of your way if given the chance. They are beneficial to the environment and some are colorful and attractively patterned. Enjoy the sight and the thrill of the encounter, but leave well enough alone.
- If you should be bitten by a venomous snake (the rattlesnake and the copperhead occur locally), and have a snakebite kit in your possession, use it at your discretion. If you decide to use it, carefully follow the directions enclosed with it. If you do not have a snakebite kit, take comfort in the knowledge that the vast

majority of untreated snakebite cases involving the rattlesnake or the copperhead are non-fatal. Don't waste time trying to kill the snake or you could be bitten again. Instead, stay calm and get medical treatment as soon as possible.

- Carry insect repellent. Mosquitoes, ticks and chiggers can transmit disease and can ruin a hike.

- Poison Ivy is locally plentiful. Avoid contact with the leaves of this plant.

Several governmental agencies have land use authority and direct management responsibilities for the public and private lands in the Wild River corridor. The United States Forest Service has land use planning and management responsibilities on National Forest lands. Land use planning for lands in private ownership is the responsibility of Wolfe County, which is within the Kentucky River Area Development District, and Menifee County, in the Gateway Area Development District.

Other agencies have authority and responsibilities related to specific activities that do or may occur within the Red Wild River corridor and its watershed. These include the Kentucky Department of Fish and Wildlife Resources; the Kentucky Department for Natural Resources and Environmental Protection, Divisions of Water Resources, Water Quality, Reclamation, Forestry, Conservation; the Kentucky Nature Preserves Commission; the Kentucky Heritage Commission; the U.S. Geologic Survey and the Soil Conservation Service.

This section of the Plan outlines authorities and recommended activities of agencies as they affect management of the Red Wild River corridor.

U.S. Department of Agriculture, Forest Service

The Forest Service is the Federal agency created by Congress to administer the National Forest system, which includes the Daniel Boone National Forest, and is responsible for the management of the Forest system's resources. Certain responsibilities in this regard are nondelegable. Nonetheless, it is the mutual desire of the Kentucky Department for Natural Resources and Environmental Protection, which administers the Commonwealth's Wild Rivers Program, and the Forest Service to work in harmony for the common purpose of developing, maintaining and managing State Wild Rivers that lie within the Daniel Boone National Forest for the best interest of the people of Kentucky and the United States. It is for this reason that the Forest Service has entered into a cooperative agreement with the Kentucky Department for Natural Resources and Environmental Protection to establish and record jointly agreed-upon policies and procedures designed to promote and administer the use and enjoyment of the Rockcastle, Red, Cumberland and Big South Fork Cumberland Wild Rivers.

Under the terms of the Memorandum of Understanding between the two agencies, the Forest Service will make every effort to comply with the intent of the 1972 Kentucky Wild Rivers Act in management of National Forest land along Kentucky Wild Rivers. The cooperation between the two agencies includes coordination of Forest Service land management plans that affect Wild Rivers with the Department and cooperation with the Department in enforcing Kentucky laws in State Wild River areas. The Forest Service, under this agreement, is the primary agency responsible for land acquisition and determination of the proper use of National Forest land in Wild River areas. Forest Service administration of the Red Wild River corridor falls within the jurisdiction of the Stanton Ranger District.

U.S. Department of Agriculture, Soil Conservation Service

The Soil Conservation Service (SCS) has a field office located in every county seat in the Commonwealth. The SCS can offer landowners valuable assistance in the most productive use of the soils on their property and recommendations for preventing loss of soils through erosion. Through acceptance and implementation of the recommendations of the SCS, very significant benefits accrue to the landowner and protection of the watershed is simultaneously enhanced. The latter benefit is of particular significance to the Wild Rivers system.

The SCS can also advise landowners in regards to establishment and maintenance of ponds on their property for livestock watering, fishing, and other purposes, and the SCS initiates and implements local drainage and flood control projects. The latter may involve stream modifications, including channelization or the installation of weirs or dams.

Kentucky Department for Natural Resources and Environmental Protection

The Department for Natural Resources and Environmental Protection was created under the laws of Kentucky. Among its legislative responsibilities are to study, survey, plan and promote the development of the State Wild Rivers system as set forth in the 1972 Kentucky Wild Rivers Act. Under the terms of the Memorandum of Understanding between the Department and the Forest Service, the Department recognizes the Forest Service as the primary agency

Service as the primary agency responsible for land acquisition and for determining the proper use of National Forest Land along Wild Rivers, and the Department has agreed to cooperate with the Forest Service in the enforcement of Federal laws and regulations in Wild River areas. In order to comply with Public Law (PL) 91-190, the National Environmental Policy Act (NEPA) of 1969, both agencies have agreed to direct their programming activities under the Memorandum of Understanding toward managing and enhancing the environment for the widest range of beneficial uses without its degredaton or risk to health or safety or other undesirable consequences. The Department is also bound by the terms of this agreement to assist the Forest Service in the preparation of environmental statements as required by Section 102 (2) C of PL 91-190 for all major actions taken under the agreement which might significantly affect the quality of the human environment or be controversial.

Kentucky law (KRS 146.270) authorizes the Department to develop a Management Plan for a designated Wild River and publicize and hold public hearings and record the views expressed on each plan developed. However, under the Memorandum of Understanding, the Department also agrees that, where a fully coordinated Forest Service land management plan covers a Wild River, that management plan will be adopted by both agencies. The Unit Plan for the Red River Gorge Unit covers the downstream terminus of the Wild River at this time.

The Department for Natural Resources and Environmental Protection, Division of Water Quality has significant responsibilities related to the protection of Kentucky's Wild Rivers. The Division is one of the agencies responsible for implementing specific provisions of the Federal Water Pollution Control Law, PL 95-217, directed to the control of point and non-point sources of pollution. Point sources include municipal and industrial waste dischargers. Non-point sources include soil erosion, pesticides and animal wastes, which contribute to the degredation of water quality in Kentucky's rivers and streams.

The Kentucky Department for Natural Resources and Environmental Protection, Division of Conservation provides Kentucky's conservation districts with assistance in developing and implementing their conservation programs;

(2) Coordinate and cooperate with the Forest Service in supervising the use of the environmental education area at the downstream terminus of the river to promote an understanding and appreciation of the Wild River environment.

(3) Coordinate and cooperate with the Forest Service in establishing informational/interpretive displays at major access points in the Red Wild River corridor which present recreation safety guidelines, information on the significance of the Wild River resource and resource management requirements.

(4) Actively promote the protection of the Red Wild River through a variety of informational techniques and interpretive programs.

Wild River interpretive/informational kiosks, proposed for installation at major access points, are only one of many potential interpretive vehicles for promoting the significance of Wild Rivers and the need for their protection. Printed maps and brochures distributed at kiosks, at state parks and interstate highway rest areas are other informational vehicles which would provide a means for reaching a larger audience. Wild River slide presentations, movies, and talks and guided tours delivered to schools and to interested citizen groups such as the Sierra Club and Audubon Society are other vehicles which can be utilized to build a strong constituency for Kentucky's Wild Rivers.

Interpretive and educational programs should stress the cultural and scientific value of natural and cultural resources which exist in the Rockcastle Wild River area and should be presented in a manner which will evoke public appreciation and protection of them. Further, interpretive programs should make it clear that certain portions of the Rockcastle Wild River corridor are in private ownership and that trespassing on private property is clearly prohibited without the express permission of the landowner.

Kentucky Nature Preserves Commission

The Nature Preserves Commission was created by Kentucky statute to establish and maintain a system of nature preserves within the Commonwealth. A nature preserve is an area possessing outstanding natural significance that, once secured by the Nature Preserves Commission, is protected against alteration by human activity and is held in trust for the benefit of the general public. Nature preserves are used for scientific research; for teaching; as habitat for plants and animals; as reservoirs of natural materials; and, as places of natural interest and beauty for observation, enjoyment and appreciation by the public.

A broader, more general function of the Nature Preserves Commission is to act as a central clearinghouse for environmental and conservation information and to promote educational programs pertaining to natural areas and nature preserves. In addition, the Commission is directed to promote, study, investigate, recommend, encourage, advise, and assist in the preservation, protection, and management of natural areas. In this capacity, the Nature Preserves Commission has contributed valuable information, advice and assistance in the development of Kentucky's Wild Rivers management plans and should be counted on as an important partner in their implementation.

The Nature Preserves Commission is currently monitoring the status of plants and animals throughout Kentucky that are threatened with extirpation from the State. This Commission activity holds special significance for the Wild Rivers system, since the Red River is inhabited by one or more of the species being monitored by the Commission.

Kentucky Heritage Commission

The Kentucky Heritage Commission was created by State statute to preserve and protect "all meaningful vestiges" of Kentucky's heritage for future generations. The Commission is concerned with matters related to the conservation and continuing recognition of buildings, structures, sites, and other landmarks associated with the archaeological, cultural, economic, military, natural, political, or social aspect of Kentucky's history. The

Commission maintains an inventory of these resources in Kentucky and maintains an official roll of landmarks which are of statewide or national significance. The Commission can propose nomination of districts, sites, buildings, or objects to the National Register of Historic Places.

Potentially, at least, sites of prehistoric occupation as well as historical sites of local significance may occur within the Red Wild River corridor. It is essential to cultivate in private landowners in the Wild River corridor a sense of appreciation of prehistoric and historic resources and to engender an atmosphere of cooperation in reporting the discovery of cultural materials on private lands.

The Heritage Commission has provided the Forest Service and the Kentucky Department for Natural Resources and Environmental Protection with suggestions and advice regarding management of Wild River corridors for the protection and preservation of cultural materials. Continued interagency cooperation in this important area of resource management is recommended to promote the long-term protection of cultural resources within the Red Wild River corridor.

Office of State Archaeology

The Office of State Archaeology is within the Department of Anthropology at the University of Kentucky. Kentucky statutes (KRS 164.730) requires any person who discovers an archaeological site or object of antiquity in the course of construction work or otherwise to report such discoveries to the Department. The law also forbids willful injury, destruction or defacement of any archaeological site or object of antiquity situated on lands owned or leased by the Commonwealth or any state agency or any political subdivision or municipal corporation of the Commonwealth. A permit issued by the Department of Anthropology is required in order to explore, excavate, appropriate or remove archaeological sites or objects of antiquity from such lands.

Kentucky Department of Transportation, Bureau of Highways

Matters of access, highway construction and maintenance and on State highways are the responsibility of the Bureau of Highways. The Forest Service and the Department for Natural Resources and Environmental Protection should coordinate matters pertaining to access onto State Routes 715 and 746 within the Wild River corridor with the Bureau of Highways.

Activities related to new highway construction and/or improvements within the Red River watershed should be carefully mitigated to ensure that adverse impacts such as erosion and disturbance of significant environmental and cultural resources are avoided.

County Governments

Wolfe and Menifee counties can, through adoption of land use and zoning ordinances, control development and use of private lands in, adjacent to, and upstream from the Red Wild River corridor. Ordinances which recognize environmentally sensitive areas and make provision for their protection can play a substantial role in resource conservation, in maintenance of water quality, and in reducing future governmental costs from environmental degradation, not merely in the Wild River corridors, but throughout the two-county region.

Established county Planning and Zoning Commissions should actively and aggressively pursue the development and implementation of county ordinances which utilize a combination of performance standards and zoning for the protection of environmentally sensitive areas. A zoning ordinance defines uses to which land in a given mapped zone in the county may be committed. It has the effect of directing future use of county land to the areas most suited to that use. It requires a Planning and Zoning Commission with expertise in land use planning, environmental and conservation principles, or a willingness to draw upon the expertise of other governmental agencies, such as the local Soil Conservation Service or upon consultants, for assistance in analyzing and mapping zones within the county for their optimum use and protection. Traditional zoning categories include: agricultural, single and

multi-family residential, light and heavy industrial, and commercial. To this list, a number of cities and counties are now adding various environmental protection categories such as stream corridor, floodplain and wetlands zones, aquifer recharge zones, and woodlands protection zones.

An approach to environmental protection which may be utilized in conjunction with zoning is performance standards for each zoning category. While a zoning category defines what use may occur in a given area of the county, a performance standard describes the way a given type of use is expected to perform in order to prevent or minimize air pollution, contaminated ground or surface water, erosion and sedimentation or other adverse environmental effects. The goal of environmentally oriented land-use regulations such as these is to maintain and preserve natural processes as land undergoes change for man's use.

If a Planning and Zoning Commission does not exist in a county, it is recommended that one be established. The local Area Development District can assist in organizing the Planning Commission and in drafting appropriate ordinances and regulations for comprehensive planning. The importance of guiding future growth within the region and the effects new growth will have on the natural resources of the county should be recognized by both public officials and private citizens and measures implemented to ensure that significant natural and cultural resources will be preserved.

Effective protection and management of Kentucky's Wild River resources will require a great deal of coordination among agencies at the Federal, State and local level, and while many activities related to interagency coordination are currently being carried out and are providing an effective means of managing certain aspects of Kentucky's Wild River resources, it is recommended that additional activities be programmed for early implementation.

Outlined below are a series of recommendations which, if effectively implemented, will contribute to the further protection of Kentucky's valuable river resources. Certain of the recommendations may prove appropriate for inclusion in a series of Administrative Regulations which should be drafted by a qualified attorney.

A. Forest Service

(1) Cooperate with the Kentucky Department for Natural Resources and Environmental Protection in the creation of safe, well designed and appropriate canoe access points at the upstream and downstream ends of the Red Wild River corridor.

(2) Designate the downstream terminus of the Wild River as a primitive camping area and allow continued camping at this location, without campfires, to protect the trees from further harm and to promote recovery of the site from overuse.

(3) Cooperate with the Department for Natural Resources and Environmental Protection in establishing an Environmental Education Area at the downstream terminus of the Wild River.

(4) Promote silvicultural practices on National Forest land in and immediately adjacent to the Wild River corridor which reflect the special mutual concern of the Forest Service and the Department for Natural Resources and Environmental Protection for this special natural area.

Timber cutting practices such as clearcutting should be discouraged in and adjacent to the Wild River corridor because of the adverse impact on the scenic values of the Wild River as well as the potential for creating erosion and sedimentation.

Logging roads should be constructed and maintained in a manner which will avoid adverse impacts within the Red River watershed. Improper logging road construction may cause surface soil erosion, mass soil movement, and sedimentation in streams. Other related impacts can include increases in stream temperature and reduced dissolved oxygen concentration.

It is important that a thorough analysis be performed in route planning for new logging roads to assure the construction of the most economical minimum mileage road network. Field reconnaissance should consider potential water quality impacts, expected road stability, road size/load capacity limitations, and any needed modifications for the proposed harvest methods, as well as the economics of each alternative route under consideration. Areas exhibiting evidence of old landslides, and slopes greater than 55 to 60 percent should be excluded from consideration as routes for logging roads.

In order to minimize erosion and transport of sediment to streams in the construction and operation of logging roads, it is essential that adequate temporary and permanent drainage measures be employed. Culverts and related drainage features should be installed as road work progresses to ensure protection of the natural environment throughout the life of the project. In addition, soils disturbed by road construction should be quickly revegetated through grading, seeding and mulching, as a further means of minimizing erosion and sediment production.

Regular maintenance will help extend the life of logging roads and minimize adverse impacts on water quality. Maintenance should include keeping road surfaces well crowned to assure good drainage, cleaning of surface crossdrains, and maintaining ditches, culverts and catch basins free of clogging debris.

B. Department of Agriculture, Agricultural Stabilization and Conservation Service and Soil Conservation Service

(1) Actively promote soil conservation and watershed protection practices on farmlands in the Red River drainage area. The ASCS and SCS should encourage private property owners in the Rockcastle River watershed to participate in SCS and ASCS programs. Specifically, the local staffs should encourage riparian landowners to establish natural buffers along the Red River and to use field buffer strips, grassed to reduce levels of sediment entering the stream from cultivated fields.

(2) Seek alternatives to stream channel or bank modification or the use of dams and weirs in controlling flooding in the Red River drainage area, as these flood control structures and practices may have adverse and undesirable effects on the Wild River. Alternatives to consider include clearing and snagging, and encouraging of floodplain zoning and related building regulations.

C. U.S. Army Corps of Engineers

(1) Continue to implement existing Corps policies and procedures which recognize the Red Wild River corridor as a special natural area.

(2) Through its "Planning Assistance to States" program, conduct an environmental inventory of the Red Wild River corridor.

D. Department for Natural Resources and Environmental Protection, Division of Water Resources

(1) Cooperate with and assist the Forest Service in establishing safe and appropriate upstream and downstream canoe access points.

(2) Coordinate and cooperate with the Forest Service in supervising the use of the environmental education area at the downstream terminus of the river to promote an understanding and appreciation of the Wild River environment.

(3) Coordinate and cooperate with the Forest Service in establishing informational/interpretive displays at major access points in the Red Wild River corridor which present recreation safety guidelines, information on the significance of the Wild River resource and resource management requirements.

(4) Actively promote the protection of the Red Wild River through a variety of informational techniques and interpretive programs.

Wild River interpretive/informational kiosks, proposed for installation at major access points, are only one of many potential interpretive vehicles for promoting the significance of Wild Rivers and the need for their protection. Printed maps and brochures distributed at kiosks, at state parks and interstate highway rest areas are other informational vehicles which would provide a means for reaching a larger audience. Wild River slide presentations, movies, and talks and guided tours delivered to schools and to interested citizen groups such as the Sierra Club and Audubon Society are other vehicles which can be utilized to build a strong constituency for Kentucky's Wild Rivers.

Interpretive and educational programs should stress the cultural and scientific value of natural and cultural resources which exist in the Rockcastle Wild River area and should be presented in a manner which will evoke public appreciation and protection of them. Further, interpretive programs should make it clear that certain portions of the Rockcastle Wild River corridor are in private ownership and that trespassing on private property is clearly prohibited without the express permission of the landowner.

The Department for Natural Resources and Environmental Protection, Division of Water Resources should explore the feasibility of producing a Wild Rivers movie in conjunction with the Kentucky Department of Public Information and the Kentucky Department of Tourism.

(5) In cooperation with the Forest Service and other state agencies, implement a monitoring system as a means of providing baseline data on recreation usage and related environmental impacts within the Wild River corridor. A recommended form for recording impacts is outlined in Appendix II. Information gathered on this form would provide information of use to managers, recreation planners and analysts. The information to be collected using the form is not technical in scope, and those gathering the information would need little special training or sophisticated equipment. Equipment needs would include a clipboard, forms, pen or pencil, camera, thermometer, and a fisherman's scale with tape measure. With this equipment, and monitoring on at least a monthly basis, recreation use, trends, and changes and impacts associated with varying levels and kinds of use could be evaluated by Wild River managers.

It is important to initiate the monitoring program as soon as possible since implementation of certain aspects of Wild River Management Plans can be expected to result in an increased public awareness of Kentucky's Wild Rivers and a subsequent increase in visitation. There are certain resources and sites in the Red Wild River corridor that have undergone previous visitor-related disturbance which should be repaired or stabilized to discourage further damage or vandalism. For example, vandalized rockshelter sites should have their damaged floors backfilled with six inches of dirt to hide traces of previous digging and to discourage further artifact hunting.

Representatives of the Forest Service and State agencies, including the Department of Fish and Wildlife Resources and the Kentucky Nature Preserves Commission, have indicated a willingness to par-

ticipate in this monitoring program. Participating agencies would include those that already have, or are likely to have field personnel in Wild River areas. Incidental to their primary field responsibilities, these field personnel would periodically take a few minutes while on-site to fill out a monitoring form provided by the Division of Water Resources. The information to be gathered is not of a technical nature and requires only a few minutes to complete. It is recommended that the Division of Water Resources be responsible for reproducing and distributing blank monitoring forms, collecting completed forms, and tabulating and analyzing the data obtained.

(6) Explore with the Forest Service, the most effective means of managing litter, trash and other solid waste at Wild River access points.

Options for managing litter, trash and other solid waste include encouraging users to "pack it in and pack it back out," as opposed to some form of regular collection and maintenance. A pack it in - pack it out strategy, if effective, would be the least costly alternative and therefore, the most desirable. If, however, this strategy should prove ineffective, then other arrangements should be made.

Other options include contractual agreements with local people to police access points daily or several times per week during periods of heavy use; environmental cleanup events sponsored by Wild River managing agencies utilizing conservation groups, scout troops, and other similar organizations; contract agreements for garbage pickup by local sanitation departments, county works departments, or the local highway department.

(7) In cooperation with the Forest Service, establish search and rescue responsibilities in Wild River corridors. Where necessary or expedient, it is recommended that arrangements be made with local units of government for assistance from local search and rescue

units, law enforcement agencies, emergency medical service (EMS) units, and fire departments.

(8) Clearly mark the boundaries of public access and recreation areas to prevent trespassing on private lands.

(9) Establish a Red River Advisory Committee.

Following the lead of states which have been most successful in establishing Wild River management programs, it is recommended that a Red River Advisory Committee be established to provide local input and assistance in the implementation of the Red Wild River management plan. The composition of the Wild River Advisory Committee should include several landowners with property adjacent to the Wild River corridor, several representatives of local government, and several representatives from the local Soil Conservation Service office and local conservation and environmental organizations. The Office for Local Government and the Gateway and Kentucky River Area Development Districts should be able to provide assistance in identifying individuals who would be willing to serve on the Red River Advisory Committee and who would prove to be effective committee members. Advisory Committee meetings should be open to the public to provide the broadest possible participation in carrying out specific management strategies for the Red Wild River corridor.

E. Department for Natural Resources and Environmental Protection, Division of Water Quality

(1) Implement a comprehensive program of water quality monitoring in the Red River to include an analysis of physical, chemical and biological parameters. Initially, it is recommended that water quality sampling be on at least a monthly basis for a period of no less than one year to obtain a baseline record of water quality conditions. After this has been accomplished, the sampling schedule could be modified to include only quarterly, semi-annual, or annual sampling for certain parameters.

Monthly sampling should measure the following parameters: dissolved oxygen, temperature, pH, electrical conductivity, sediment, turbidity, discharge and stream velocity.

Quarterly, or at least annual water quality monitoring should include an analysis of the following chemical parameters:

- calcium
- magnesium
- sodium
- potassium
- sulfate
- chloride
- barium
- chromium
- copper
- lead
- manganese
- selenium
- zinc
- suspended solids
- total hardness
- chlorinated hydrocarbon pesticides
- phosphorus
- bicarbonate
- alkalinity as $CaCO_3$
- nitrate
- boron
- arsenic
- cadmium
- cobalt
- iron
- mercury
- silver
- organic phosphorus

Biological monitoring is also recommended, on a quarterly basis, and should include a fecal coliform count, and analyses of the algal flora, macroinvertebrate fauna, and fish fauna. Fish sampling should be limited to non-consumptive methods.

Sediment is a particularly important gauge of water quality within Wild Rivers. Analysis of sediments provides a means of detecting sedimentation loads resulting from land disturbing activities in the watershed, including surface mining activity and construction. After the first year monthly sampling program, sediment analysis should continue on a semi-annual or annual basis.

If funding is not available for a comprehensive monitoring program, a minimally acceptable program should be implemented and should

include annual sampling of at least the following parameters: temperature (air and water), discharge, velocity, alkalinity, suspended solids, conductivity, chloride, dissolved oxygen, pH, iron, sulfate, magnesium, calcium, nitrogen, phosphorus, and bicarbonate. A quarterly analysis of the algal flora and macro-invertebrate fauna is also recommended.

It is estimated that the annual cost of implementing the recommended comprehensive water quality monitoring program would be in the $15,000 - $18,000 range. An alternative to explore is a joint program with the United States Geological Survey (USGS). The USGS has a matching fund program for participation with State and local governments. If the State or local government will pay half the cost, USGS will install continuous monitoring equipment for discharge measurements and measure other parameters at monthly, quarterly, or annual intervals. A fairly comprehensive joint effort might reduce the cost to the State to $10,000 or $11,000 annually. If the USGS is approached by letter from the Division of Water Quality, outlining the State's water quality monitoring goals and objectives, the USGS may aid in designing the monitoring program and in developing a detailed cost estimate and funding arrangement.

(2) Move expeditiously to implement 201 and 208 plans in the Red River watershed as a means of improving water quality in the Wild River corridor.

F. Department for Natural Resources and Environmental Protection, Division of Conservation

(1) Assist the Division of Water Quality in implementing Section 208 plans for control of agricultural and construction non-point pollution sources affecting Wild Rivers and their upstream watersheds for the enhancement, preservation and protection of water quality in Wild River areas.

G. Department for Natural Resources and Environmental Protection, Division of Forestry

(1) Assist the Division of Water Quality in implementing Section 208 Plans for control of silvicultural non-point pollution sources affecting Wild Rivers and their upstream watersheds for the enhancement, preservation and protection of water quality in Wild River areas.

H. Department for Natural Resources and Environmental Protection, Bureau of Surface Mining Reclamation and Enforcement

(1) Evaluate applications for surface mining permits in the Red River drainage area with special attention to the potential impacts proposed mines could have on the aesthetics and water quality of the Red Wild River segment.

(2) Give priority to Wild River watersheds in the expenditure of funds for reclamation of abandoned and orphan mines.

I. Kentucky Department of Fish and Wildlife Resources

(1) Coordinate and cooperate with the Department for Natural Resources and Environmental Protection and the Forest Service in implementing fish and wildlife enhancement measures, including management of the Red River corridor for white-tailed deer, gray squirrel, wild turkey, ruffed grouse and other game and non-game species, and in devising strategies for the protection of endangered species in the corridor.

(2) Consider, in cooperation with the Forest Service, the feasibility of implementing additional wildlife enhancement and/or restoration projects on Forest Service lands in and adjacent to the Wild River corridor. Consider, for example, habitat manipulations including creation of small clearings, or manipulation of existing clearings for game and non-game species by selective encouragement of natural

food and cover plant species, or by establishing wildlife food plots in these clearings planted to cultivated crops favored by wildlife.

(3) Evaluate the status of fish populations in the Red Wild River segment through creel census and other appropriate fishery investigation techniques such as fish sampling. Determine standing crop so that Wild River managers can refine estimated fishing carrying capacity and assess levels of fishing activity in relation to carrying capacity.

(4) Evaluate periodically the status of game populations in the Wild River area to provide Wild River managers with a means of refining estimates of the hunting carrying capacity of the area.

(5) Consider the desirability and feasibility of enacting regulations limiting hunting on public land in Wild River corridors to primitive or pioneer weapons; i.e., crossbows, longbows and certain muzzleloading firearms.

J. Kentucky Nature Preserves Commission

(1) Continue coordination efforts with the Department for Natural Resources and Environmental Protection and the Forest Service for preservation, protection and sound management of outstanding natural areas in the Red Wild River corridor and for the protection of plant and animal elements of natural diversity threatened with extirpation.

K. Kentucky Heritage Commission

(1) Continue to advise with the Department for Natural Resources and Environmental Protection and the Forest Service in the safeguarding and interpretation of cultural resources in the Red Wild River corridor.

L. Office of State Archaeology

(1) Coordinate reports of discoveries of archaeological sites or objects of antiquity in the Red Wild River with the Department for Natural Resources and Environmental Protection and the Forest Service.

(2) Promote the enforcement of state laws related to willful injury, destruction or defacement of archaeological sites or objects of antiquity, and in issuance of permits on state-owned lands for exploration, excavation, appropriation or removal of sites or objects.

(3) Continue to provide advice and guidance to the Department for Natural Resources and Environmental Protection and the Forest Service in the management of archaeological sites in Wild River areas.

M. Kentucky Department of Transportation, Bureau of Highways

(1) Cooperate with the Department for Natural Resources and Environmental Protection and the Forest Service in establishing access to the Wild River from Highways 715 and 746; in establishing Wild River directional and informational signs along State highways; and, in establishing a river gauge at the existing Highway 746 and 715 bridges.

(2) Take special precaution to control soil erosion and to mitigate adverse impacts on significant cultural and environmental resources in the construction of new and improvement of existing highway facilities in the Red River watershed.

N. County Governments

(1) Establish and maintain active Planning and Zoning Commissions.

(2) Adopt land use and zoning ordinances that recognize environmentally sensitive areas and make provision for their protection and conservation.

Wild Rivers administrators should encourage Planning and Zoning Commissions to develop and implement land-use regulations and zoning ordinances to protect and preserve water quality in the Wild Rivers through the prudent use of land along, and upstream, from Wild Rivers. Subdivision regulations could include provisions for ensuring that construction activities for housing subdivisions and other facilities are planned and constructed in a manner to control surface water runoff, reduce erosion and sediment loss, and minimize off-site sedimentation damage and stream pollution. Where planning and zoning commissions do not exist or are inactive, they should be established or reactivated.

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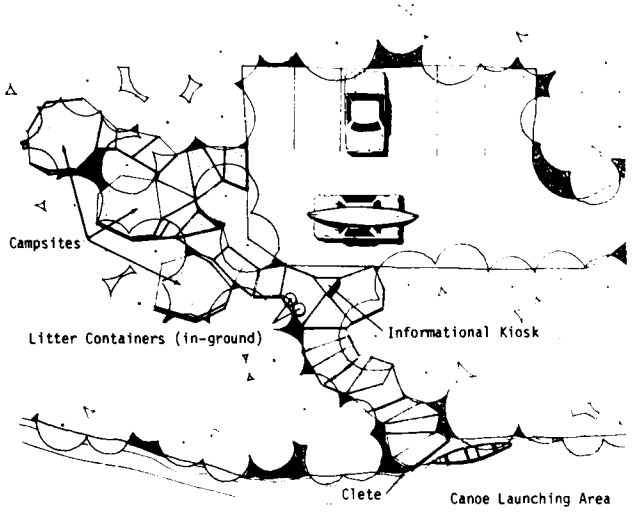


PROTOTYPICAL CANOE LAUNCHING FACILITY

Canoe Launching Facilities

Well designed and constructed and easily traversable access trails should connect canoe launching facilities with parking areas. Access trails should be a minimum of four (4) feet wide to provide an easy means of carrying water craft to the river and to facilitate loading and unloading of cargo. A stable, non-erodable boat landing area should connect the access trail with the river. The landing area should be outfitted with cleats for tying water craft and should project slightly into the river to provide a harbor effect along its downstream edge.

The canoe launching facility should be designed to facilitate visitor movement to the river with minimal environmental impact. To accomplish this, the access trail should be designed to discourage the development of shortcut footpaths. As with all recreation facilities associated with the Wild Rivers system, the canoe access point should have the capability to withstand seasonal inundation. Pea gravel surfacing with railroad tie retainers can provide these qualities as well as an efficient, non-erodable construction system for traversing slopes.

Access points should be designed to make reverse cuts across the river bank to allow natural vegetation to screen parking areas, roadways and related development from the river.

Hiking Trails

Management strategies for trail development in Wild River corridors should emphasize use of existing trails and old logging roads, with minimal development of new trails.

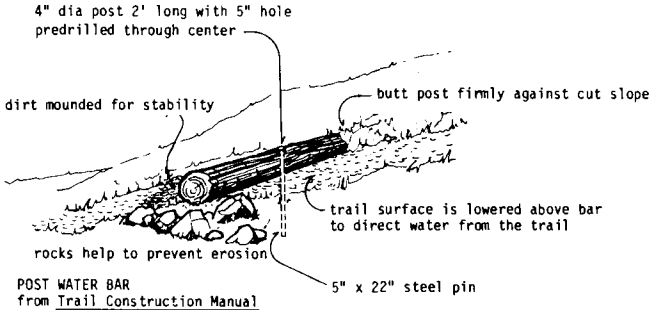
Whenever possible, demand for trails and campsites should be satisfied by utilization of secondary terraces in the alluvial woods environment. This area holds the greatest potential for use by recreationists, and its natural vegetation is least sensitive to destruction from visitor use. Trails and camping on rocky river banks, boulder fields, talus slopes, slope forests, cliffs, and bluff and ridge forests in the corridor should be discouraged for

reasons of visitor safety as well as for the protection of these impact-sensitive environments.

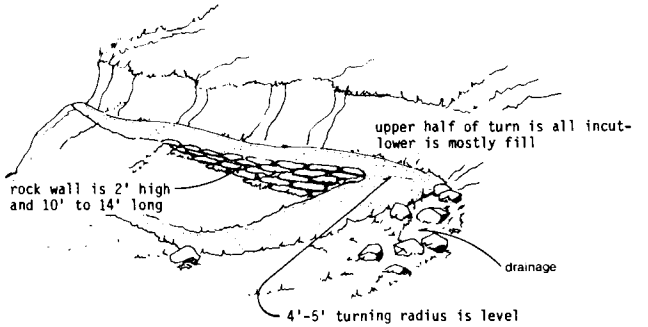
Where existing trails are located on unfavorable slopes and are promoting erosion, or where a trail leads visitors into a dangerous area (as for example, onto a high, thin rock ledge above boulders or jagged rocks), continued use should be discouraged. The trail entry might be covered with brush barriers to discourage use and signs or markers installed to encourage visitors to use an alternate route, which may be a new trail.

New trails which are developed should be routed to take advantage of topography, scenery, vegetation, and interesting geologic features, and should be designed to minimize conflict of trail use with other uses. A tread width of two or three feet, which permits single file use, should be sufficient and appropriate for a Wild River area.

In establishing a trail in a sidehill location, providing proper drainage is crucial. To ensure proper drainage, outsloping of the tread should not exceed a maximum of .5 inch per foot of tread. Grade dips and water bars should be employed at frequent intervals to intercept runoff on tread surfaces to prevent water from building up erosive force. Desirable grade maximums which should be observed in establishing trails are 15 percent for a sustained grade, or a maximum of 20 percent for a short pitch (100 feet or less). Surfacing material such as gravel and bark, and steps or perrons may be required on steeper slopes. The most desirable grade range is 0-10 percent and switchbacks should be utilized only when absolutely necessary.



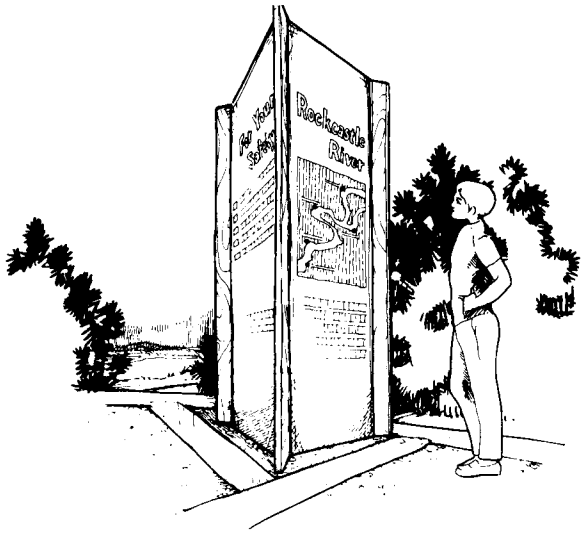
POST WATER BAR
from Trail Construction Manual
Tennessee Department of Conservation



SWITCHBACK CONSTRUCTION
from Trail Construction Manual
Tennessee Department of Conservation

Camping Facilities

Camping areas should be level to nearly level, well drained sites, and should contain no unique or fragile features subject to adverse impacts from visitor use (e.g., archaeological sites or threatened or endangered species of plants or animals). Further, campsites should be located away from hazards such as floodplains and precipices.



INTERPRETIVE KIOSK

Primitive campsites should be at least 2,500 square feet in area (approximately 50 by 50 feet), and should be spaced 500 to 1,000 feet apart. They may be located adjacent to undeveloped trails. Each site should be cleared of ground cover vegetation, shrubs, vines, seedling and sapling trees, and low hanging branches of larger trees (prune branches at trunk or main limb). Facilities such as tables and grills should not be provided, although a fire circle composed of rocks six to 12 inches in diameter or thickness is appropriate.

Signs and Interpretive Kiosks

Signs are recommended to direct recreationists to river access points, trails and camping areas and as directional markers on state highways. Signs should be designed to be easily read and inexpensively duplicated. Silkscreen techniques should be used which allow efficient duplication by relatively inexperienced labor.

A modular system of displaying informational elements would minimize the problems inherent with composing each sign individually. Each module should contain a symbol as well as a brief word communication. It is recommended that the name of the river be in the uppermost position. The middle module would identify the facilities provided and the lower module would contain information related to restrictions, operating seasons, etc. In each instance, the message should be phrased succinctly.

The recommended informational kiosk should be constructed of highly durable, natural materials which are capable of withstanding a range of adverse elements. The recommended kiosk is triangular in shape, approximately three feet on each side and seven feet tall. One side of the kiosk would include information on river safety and respect for the natural environment. In addition, maps providing river information would be vended on this side.

The second side of the kiosk would include a graphic representation of the Wild River segment and a narrative description of the resource and visitor experience. The third side of the kiosk would present a synopsis of Kentucky's Wild Rivers enabling legislation and information on the management program. The table on the following page details the approximate cost of constructing the proposed kiosk.

Table 9: KENTUCKY WILD RIVERS
CANOE ACCESS INTERPRETIVE KIOSK - PRELIMINARY COST ESTIMATE

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
4 x 8 Plywood 3/8" (exterior grade)	LS	3	30.00	90	14	104
Glass cover (3 sides/unit).	SF	72	1.50	108	16	124
2 x 6 treated wood framework (ext. grade)	LF	24	2.00	48	7	55
2 x 4 treated wood framework (ext. grade)	LF	65	.50	32	5	37
Misc. hardward including coping	LS			25	4	29
Base and/or footings	LS			75	11	86
RR tie border	LF	12	2.50	30	5	35
Gravel base (4" depth)	SY	3	2.75	8	1	9
Roofing material: Hand split cedar shakes on roof felt, w/drip edging	SF	13.5	14.00	189	28	217
					Subtotal	$ 696
Labor Cost (100% of material cost)	LS					700
					Total	$ 1,396
Design & Graphics	LS					2,000
Total						$ 3,396

These order of magnitude cost estimates have been calculated as being accomplished by private contractors, based on our experience in the Louisville market area. The quantities and price units applied are based on the accompanying conceptual design plans. This estimate of construction quantities and costs is made on the basis of our experience and represents our best judgment, but we cannot and do not guarantee that the construction quantities and costs will not vary from this quantity and cost estimate.

Trash Containers

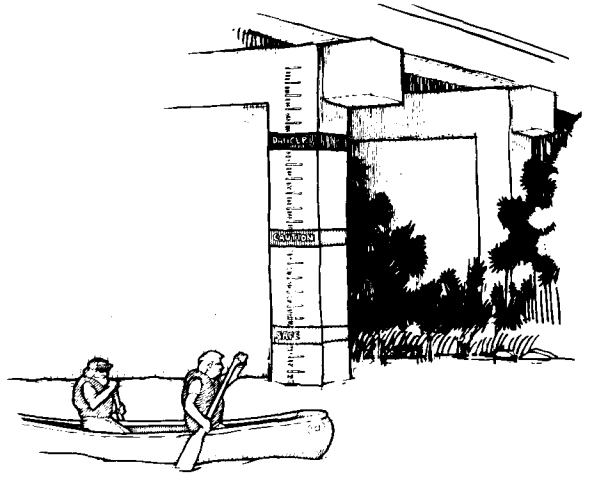
It may be necessary to provide trash containers at access points to preserve the character of the Wild River. At least one 50 gallon container is recommended for any access point at which litter is a chronic problem and at which a pack it in/pack it out policy has proven ineffective.

River Gauges

Utilizing bridge supports, when possible, and metal poles, it is recommended that a gauge system be developed to aid recreationists in determining safe boating conditions (see Figure 10). Water elevations could be calibrated in feet, with bright, bold red markings to indicate water elevations which necessitate caution or are dangerous. Approximate costs associated with implementing this proposal are included in the following table:

Table 10: KENTUCKY WILD RIVERS
CANOE ACCESS RIVER GAUGE - ORDER OF MAGNITUDE COST ESTIMATE

Item	Unit	Number of Units	Unit Price	Extension	15% Contingency	Estimated Cost
Paint & Materials	LS					100
Design & Graphic Fee	LS					500
Labor (Man-Hours)	MH	40	15.00	256	38	600
					TOTAL	$ 1,200



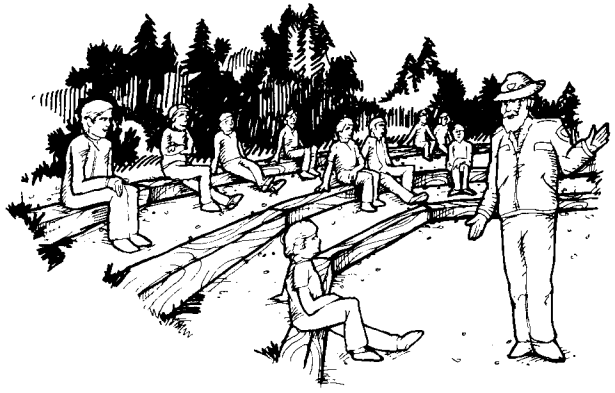
PROTOTYPICAL RIVER GAUGE

Environmental Education Areas

Environmental education is an educational method involving real experiences. It is a planned, structured educational experience in which an outdoor environment, in this case a Wild River corridor, provides a place for students to actively study and learn about ecology and environmental relationships. The course of study or curriculum offered in a formal environmental education program at an elementary or secondary school, a school district or college or university is enriched by visits to such outdoor learning laboratories. An environmental education program presented in the Wild River corridor could be presented by the students' school teaching staff while Wild River Rangers, and others might serve as coordinators, consultants, and resource persons. Examples of environmental studies which could be conducted in Kentucky's Wild River areas include:

- woodland plants
- biology of streams
- water quality analysis
- geology
- woodland wildlife
- archaeology

In general, environmental education areas should be located within one-quarter of a mile of an existing road for ease of access. The site should have well drained, permeable soils not susceptible to compaction, and be capable of supporting five people per acre with negligible adverse environmental impacts (United States Fish and Wildlife Service, circa 1973). Space for parking that will accommodate one or more school buses is an implied prerequisite for an environmental education area, and a comfort station with one or more washbasins, toilets and exterior faucets is also a recommended component.



PROTOTYPICAL ENVIRONMENTAL EDUCATION AREA

Appendix II: KENTUCKY WILD RIVERS RIVER CORRIDOR MONITORING PROGRAM DATA SHEET

River Corridor:_____ Date:_____ Day: M T W T F S S

Location:_____ Time of Day:_____

Additional Comments/Observations:_____

Type of Facility (Circle)	OBSERVATIONS (Circle)		Visitors (#)
A. Canoe Access Point	Weather	Wind	____ Canoeing
B. Other Access Point	Clear	N S E W	____ Hunting
C. Campsite	Ptly Cloudy	0- 5	____ Fishing
D. Picnic Area	Overcast	5-15	____ Hiking
E. Hiking Trail	Fog	greater	____ Swimming
F. Equestrian Trail	Drizzle	than 15	____ Picnicking
G. Envtl. Education Center	Rain		____ Camping
H. Rockshelter	Snow		____ Other
I. Other:_____	Air Temp. (°F)____		Vehicles (#) __

VISITOR OBSERVATIONS:

	Male	Female
Caucasian		
Black		
Other		

Hunter Game Observations:

Species	# taken

Fishermen Creel Observations:

Species	Length	Weight	Number

Vehicle Observations:

KY Co.	Out-of-State

FACILITY OBSERVATIONS: (Photographic Record: Yes____ No____)

a. Litter, Garbage, Trash:

_____

b. Vandalism:

_____

c. Normal Wear:

_____

d. Soil Compaction, Vegetation Loss, Erosion:

_____

e. Additional Comments/Observations:

_____

_____

_____

_____

_____

OBSERVER: _____

STREAM OBSERVATIONS (Circle):

Surface	Bottom (%)
Clean	Bedrock
Oil	Rock Rubble
Garbage, Trash	Gravel
Gas Bubbles	Sand
Dead Fish	Mud or Clay
Floating Solids	Coal Fines
Other:_____	Garbage and Trash
_____	Leaf Litter

Water

Color:_____

Detectable Odor:

Yes_____ No_____

Temperature (°F): _____

WILD RIVERS SYSTEM

146.200. Title. — KRS 146.200 to 146.350 may be cited as the "Kentucky Wild Rivers Act." (Enact. Acts 1972, ch. 117, § 1.)

Cited: Cumberland Falls Chair Lift, Inc. v. Commonwealth, 536 S.W.2d 316 (Ky. 1976); Commonwealth ex rel. Department for Natural Resources & Environmental Protection v. Williams, 536 S.W.2d 474 (Ky. 1976).

NOTES TO DECISIONS

ANALYSIS

1. Constitutionality.
2. Condemnation of property.

1. **Constitutionality.**
The Kentucky Wild Rivers Act is constitutional. Commonwealth ex rel. Department for Natural Resources & Environmental Protection v. Stephens, 539 S.W.2d 303 (Ky. 1976).

2. **Condemnation of Property.**
The Kentucky Wild Rivers Act is enabling legislation and, as such, the Commonwealth is required by Const., § 13 to pay for what it takes before the taking. Commonwealth ex rel. Department for Natural Resources & Environmental Protection v. Stephens, 539 S.W.2d 303 (Ky. 1976).

146.210. Definitions used in KRS 146.210 to 146.360. — As used in KRS 146.210 to 146.360, the words listed herein shall have the following respective meanings, unless another or different meaning or intent shall be clearly indicated by the context:

(1) "Stream or watercourse" shall mean a flowing body of water or a section or portion thereof, including rivers, streams, and creeks.

(2) "Free flowing" shall mean existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any stream is proposed for inclusion in the wild rivers system shall not automatically bar its consideration for such inclusion; provided, that this shall not be construed to authorize or be intended to encourage future construction of such structures within components of the wild rivers system.

(3) "Road" shall mean a highway, a hard-surfaced road, or an improved or unimproved dirt road. The existence, however, of unimproved roads at the time any stream is proposed for inclusion in the wild rivers system shall not automatically bar its consideration for such inclusion; provided, that this shall not be construed to authorize or be intended to encourage future construction of such roads where this would be contrary to the provisions of KRS 146.200 to 146.360.

(4) "Wilderness type recreation" shall mean activities such as fishing, hunting, canoeing, camping, hiking, horseback riding, exploring, archaeological and scientific investigation, and scenic and aesthetic enjoyment, which utilizes and protects to the highest degree the primitive and natural values of the area.

(5) "Visual horizon" shall mean the normal distance to which land and vegetative features can be unobstructedly viewed from the center of the stream.

(6) "Access point" shall mean an area along the stream under public ownership, or under easement acquired by agreement with a private landowner. This area would be available for public recreational use including, but not limited to, the launching of boats, picnicking and camping.

(7) "Secretary" shall mean the secretary for natural resources and environmental protection or the successor to that office. (Enact. Acts 1972, ch. 117, § 2; 1974, ch. 74, Art. III, § 13(9); 1976, ch. 197, § 1.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

146.220. Legislative intent. — The general assembly hereby recognizes that certain streams of Kentucky possess outstanding and unique scenic, recreational, geological, fish and wildlife, botanical, historical, archaeological and other scientific, aesthetic, and cultural values. It is the policy of the general assembly to complement dam construction and development projects on Kentucky watercourses with other equally important and beneficial uses of our water resources. Therefore, it is hereby declared that in order to afford the citizens of the Commonwealth an opportunity to enjoy natural streams, to attract out-of-state visitors, to assure the well-being of our tourist industry, to preserve for future generations the beauty of certain areas untrammeled by man, it is in the interest of the Commonwealth to preserve some streams or portions thereof in their free-flowing condition because their natural, scenic, scientific, and aesthetic values outweigh their value for water development and control purposes now and in the future. For aesthetic, as well as ecological reasons, the foremost priority shall be to preserve the unique primitive character of those streams in Kentucky which still retain a large portion of their natural and scenic beauty, and to prevent future infringement on that beauty by impoundments or other man-made works. Since the stream areas are to be maintained in a natural state, they will also serve as areas for the perpetuation of Kentucky's wild fauna and flora. Few such streams remain in the eastern portion of the United States, and the general assembly feels a strong obligation to the people of Kentucky to preserve these remnants of their proud heritage. It is the purpose of KRS 146.200 to 146.360 to establish a wild rivers system by designating certain streams for immediate inclusion in the system and by prescribing the procedures and criteria for protecting and administering the system. It is not the intent of KRS 146.200 to 146.360 to require or to authorize acquisition of all lands or interests in lands within the boundaries of the stream areas but to assure preservation of the scenic, ecological and other values and to provide proper management of the recreational, wildlife, water and other resources. It is the intent of KRS 146.200 to 146.360 to impose reasonable regulations as to the use of private and public land within the authorized boundaries of wild rivers for the general welfare of the people of the Commonwealth, and where necessary, to enable the department to acquire easements or lesser interests in or fee title to lands within the authorized boundaries of the wild rivers, so that the public trust in these unique natural rivers might be kept. (Enact. Acts 1972, ch. 117, § 3; 1976, ch. 197, § 2.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

Opinions of Attorney General. In order to conform with the purpose and legislative intent of the Wild Rivers Act, the protection embodied in said act must be extended immediately to all streams designated, for the moment the act went into effect the use of land became applicable so that once the legislature designates a stream, or portion thereof, as part of the wild rivers system, all development not in accordance with KRS 146.290 is prohibited. OAG 73-797.

146.230. Criteria for streams in wild rivers system. — Streams which substantially meet the following criteria are eligible for inclusion in the wild rivers system:

Streams or sections of streams that are essentially free flowing, with shorelines and scenic vistas essentially primitive and unchanged, free from evidence of the works of man, and pleasing to the eye. The waters shall not be polluted beyond feasible correction and shall be kept unpolluted once corrected according to standards established by the department of natural resources and environmental protection. The area may provide a high quality fish and wildlife habitat, containing one or more unique or rare species for sport or observation. It may provide opportunities for scientific study or appreciation of essentially undisturbed ecological, geologic, or archaeologic conditions. It shall provide wilderness type recreation such as canoeing and hiking, or specialized uses without disturbing the primitive character of the area. (Enact. Acts 1972, ch. 117, § 4; 1976, ch. 197, § 3.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

146.240. Designation of streams in wild rivers system. [Repealed.]

Compiler's Notes. This section (Acts 1972, ch. 117, § 5; 1974, ch. 206, § 1) was repealed by Acts 1976, ch. 197, § 11.

146.241. Designation of streams in wild rivers system. — The streams or segments of streams to be included in this system, being classified by the above stated criteria, are as follows:

(1) The Cumberland River from Summer Shoals to the backwater of Lake Cumberland.

(2) The Red River from the Ky. 746 bridge to the mouth of Swift Camp Creek. Nothing in KRS 146.200 to 146.360 shall be construed to prohibit that portion of the Red River between Peck's Branch and Swift Camp Creek from being used to temporarily contain flood waters that may be impounded above the normal sustained pool level of any lake which may be created in the event a dam is constructed on the Red River near Bowen, Kentucky.

(3) The Rockcastle River from the Ky. 80 bridge to the backwater of Lake Cumberland. Nothing in KRS 146.200 to 146.360 shall be construed to prohibit or interfere with the relocating of Ky. 80, including the construction of a bridge at a point approximately 2.35 miles downstream from the existing Ky. 80 bridge.

(4) The Green River from the eastern boundary of Mammoth Cave National Park extending downstream and including only that portion of the river within the Mammoth Cave National Park.

(5) The Big South Fork of the Cumberland River from the Tennessee border to Blue Herron.

(6) Martins Fork, Cumberland River from Ky. Highway 987 bridge to the eastern boundary of Cumberland Gap National Park.

(7) Rock Creek from the White Oak Junction bridge to the Kentucky-Tennessee border.

(8) Little South Fork, Cumberland River from the backwater of Lake Cumberland (mile 4.1) to the Kentucky Highway 92 bridge (mile 14.5) in Wayne and McCreary Counties. (Enact. Acts 1976, ch. 197, § 4.)

146.250. Boundaries of stream areas. — The secretary for natural resources and environmental protection shall, by June 16, 1974, determine generally the boundaries of the stream area associated with the stream or stream segment initially included in the wild rivers system by KRS 146.200 to 146.360. Establishment of these boundaries shall be accomplished in such a way that it includes at least the visual horizon from the stream, but not more than two thousand (2,000) feet from the center of the stream. The boundary shall further include access points, at the upstream and downstream boundary of the area. (Enact. Acts 1972, ch. 117, § 6; 1974, ch. 74, Art. III, § 13(9); 1976, ch. 197, § 5.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

Opinions of Attorney General. In order to conform with the purpose and legislative intent of the Wild Rivers Act, the protection embodied in said act must be extended immediately to all streams designated, for the moment the act went into effect the use of land became applicable so that once the legislature designates a stream, or portion thereof, as part of the wild rivers system, all development not in accordance with KRS 146.290 is prohibited. OAG 73-797.

NOTES TO DECISIONS

1. **Designation of Boundaries.**
In action concerning rights to property within the wild rivers area of the Cumberland River to enjoin landowners from cutting timber and otherwise disturbing the area, landowners' motion to dismiss should have been *granted since no designation of* boundaries had been made under this section, for until such designation is made there can be no violation. Commonwealth ex rel. Department for Natural Resources & Environmental Protection v. Stephens, 539 S.W.2d 303 (Ky. 1976).

The provision for the designation of boundaries in this section is mandatory but the date for making the designation is *directory. Commonwealth ex rel. Department* for Natural Resources & Environmental Protection v. Stephens, 539 S.W.2d 303 (Ky. 1976).

146.260. Recommendation of additional stream areas by secretary for natural resources and environmental protection — Content. — (1) The secretary for natural resources and environmental protection shall study and from time to time submit to the governor and to the general assembly proposals for additions to the wild rivers system of streams and sections of streams which, in his judgment, would qualify for inclusion therein. Each proposal shall be accompanied by:

(a) A detailed map showing the boundaries of the stream or sections of streams and those adjacent lands needed to protect and administer the needed controls.

(b) The category of the proposed additions in accordance with KRS 146.230.

(c) A detailed report on the factors which make the area a worthy addition to the system.

(2) The intention of this requirement is to insure that such studies will be made; it is not intended to preclude or discourage, but rather encourage *similar studies and proposals by other agencies or by citizen groups working* independently. Authority for additions to the wild rivers system shall remain exclusively with the Kentucky general assembly. (Enact. Acts 1972, ch. 117, § 7; 1974, ch. 74, Art. III, § 13(9).)

146.270. Administration of system by department for natural resources and environmental protection. — The wild rivers system shall be administered by the department for natural resources and environmental protection according to the policies and criteria set forth in KRS 146.200 to 146.360. The secretary for natural resources and environmental protection shall adopt such rules or regulations necessary for the preservation and enhancement of the stream areas as set forth in KRS 146.250, and for control of recreational, educational, scientific and other uses of these areas in a manner that shall not impair them. In such administration primary emphasis shall be given to protecting aesthetic, scenic, historic, archaeologic, and scientific features of the area. The secretary shall develop a management plan for a designated stream area and shall publicize and hold public hearings and record the views expressed on each plan developed. Management plans for a given stream area may establish varying degrees of intensity for its protection, based on special attributes of each area, but shall follow the concepts embodied in KRS 146.230. No public use of lands within the boundaries of a designated wild river area in which the state has acquired an interest shall be permitted prior to the development of a management plan. Any such management plan shall be developed jointly with the department of fish and wildlife resources with respect to those aspects of such plan as relate to the jurisdiction of that department over fish and wildlife resources. (Enact. Acts 1972, ch. 117, § 8; 1974, ch. 74, Art. III, § 13(1), (9); 1976, ch. 197, § 7.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

146.280. Acquisition of stream areas by secretary for natural resources and environmental protection. — (1) Within the boundaries of a designated stream area, as established and authorized by the Kentucky general assembly, the secretary for natural resources and environmental protection is authorized and empowered to acquire by purchase, exercise of the rights of eminent domain, grant, gift, devise or otherwise, the fee simple to, an easement, or any acceptable lesser interest in any lands, and by lease or conveyance, contract for the right to use and occupy any lands. Where property within such boundaries is owned by the federal government, the secretary can enter into agreements with the landowning agency concerning use of the property consistent with the objectives of KRS 146.200 to 146.360. Nothing in KRS 146.200 to 146.360 shall be construed to deprive a landowner of the fee simple title to or lesser interest in his property without just compensation.

(2) The secretary for natural resources and environmental protection may not exercise authority to acquire lands or interests in lands located within any incorporated city, village, or county when such entities have in force a duly adopted, valid ordinance or plan for the management, zoning and protection of such lands in accordance with the provisions of KRS 146.200 to 146.360. (Enact. Acts 1972, ch. 117, § 9; 1974, ch. 74, Art. III, § 13(9); 1976, ch. 197, § 8.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

146.290. Land uses permitted in stream area. — (1) The provisions of this section shall not apply to those uses existing at such time as a stream is included in the system.

(2) Land uses to be allowed within the boundaries of a designated stream area shall be as follows:

New roads, structures or buildings may be constructed only where necessary to effect a use permitted under the other provisions of KRS 146.200 to 146.360. Utility lines or pipelines may be constructed as approved by the secretary in writing and under provision that the affected land be restored as nearly as possible to its former state. This provision, however, shall in no way affect the rights between a landowner and a utility company or pipeline company. There shall be no strip mining as defined in KRS 350.010, and select cutting of timber or other resource removal and agricultural use, may be allowed pursuant to regulations promulgated by the secretary upon the granting of a permit under the other provisions of KRS 146.200 to 146.360. All instream disturbances such as dredging, shall be prohibited. Except for the management agency and any existing uses which do not conform to the purposes and intent of KRS 146.200 to 146.360, travel upon a wild river or any public lands within the designated boundaries thereof, shall be by foot, horseback, canoe, boat or other nonmechanical modes of transportation. If there are existing agricultural areas within the boundaries of the area, such areas may continue to be used for agricultural purposes.

(3) Any landowner within the boundaries of the area may apply to the secretary for a change of use to permit the select cutting of timber, a resource removal or an agricultural use upon his property located within the area and the secretary shall hold a public hearing after public notice on the application within sixty (60) days. The landowner or any interested person shall be allowed to present evidence as to whether the proposed use by the applying landowner is in accordance with the management plan developed pursuant to KRS 146.270, the purpose and intent of the Wild Rivers Act as expressed in KRS 146.220, and other applicable law.

(4) The secretary shall, within sixty (60) days after said hearing, either:

(a) Issue an order, with accompanying opinion, denying the permit; or

(b) Issue an order, with accompanying opinion, granting the permit with such restrictions, terms and conditions as are appropriate to protect to the fullest extent possible the wild rivers area and the public trust therein within the intent of KRS 146.220; or

(c) Recommend an alternate use to which the land may be put under KRS 146.200 to 146.360 which is more consistent with the purposes and intent of KRS 146.200 to 146.360 than the use for which application was made.

(d) Institute condemnation proceedings in the circuit court of the county in which the land is located or else negotiate a purchase of the land affected, or any interest therein.

(5) On or before thirty (30) days from the date of the secretary's ruling, the landowner may file with the department a written objection to the ruling. If, within the next sixty (60) days the landowner and the secretary are unable to reach an agreement with respect to a modification of his ruling, the secretary must either permit the use applied for, condemn the property, or petition the Franklin Circuit Court for an order restraining the proposed use. The order shall be entered immediately upon the filing of the petition and the execution of a bond without surety by the Commonwealth in an amount satisfactory to the court to indemnify the landowner against loss of profits from any wrongful restraint of the use of his property during the period from the filing of the petition until such time as the matter is concluded by the courts. The court shall review the decision as to both law and fact; but no factual finding shall be reversed unless clearly erroneous or else arbitrary, capricious, or an abuse of discretion. (Enact. Acts 1972, ch. 117, § 10; 1974, ch. 74, Art. III, § 13(9); 1976, ch. 197, § 9.)

Kentucky Law Journal. Comment, Commonwealth v. Stephens: The Taking Doctrine at Work in Environmental Land Use Planning, 65 Ky. L.J. 729 (1976-77).

Opinions of Attorney General. In order to conform with the purpose and legislative intent of the Wild Rivers Act, the protection embodied in said act must be extended immediately to all streams designated, for the moment the act went into effect the use of land became applicable so that once the legislature designates a stream, or portion thereof, as part of the wild rivers system, all development not in accordance with this section is prohibited. OAG 73-797.

NOTES TO DECISIONS

1. **Condemnation of Property.**
The Kentucky Wild Rivers Act is enabling *legislation and, as such, the Commonwealth is* required by Const., § 13 to pay for what it takes before the taking. Commonwealth ex rel. Department for Natural Resources & *Environmental Protection v. Stephens*, 539 S.W.2d 303 (Ky. 1976).

146.300. Determination of applicable law in conflict. — Any component of the wild rivers system that is or shall become a part of any state park, wildlife refuge, or similar state-administered area shall be subject to the provisions of KRS 146.200 to 146.360 and the laws under which the other areas may be administered, and in the case of conflict between the provisions of these laws the more restrictive provisions shall apply. (Enact. Acts 1972, ch. 117, § 11.)

146.310. State agencies to notify secretary for natural resources and environmental protection of activities affecting stream areas. — All state agencies shall, promptly upon June 16, 1972, inform the secretary for natural resources and environmental protection of any proceedings, studies, or other activities within their jurisdictions, and regardless of by whom requested, which are now in progress and which affect or may affect any of the streams specified in KRS 146.240. They shall likewise inform him of any such proceedings, studies or other activities which are hereafter commenced or resumed before they are commenced or resumed. (Enact. Acts 1972, ch. 117, § 12; 1974, ch. 74, Art. III, § 13(9).)

146.320. Component of wild rivers system may be included in federal system. — Nothing in KRS 146.200 to 146.360 shall preclude a component of the wild rivers system from becoming a part of the national wild and scenic rivers system. The secretary for natural resources and environmental protection is directed to encourage and assist any federal studies for inclusion of Kentucky streams in the national wild and scenic rivers system. The secretary for natural resources and environmental protection may enter into written cooperative agreements for joint federal-state or interstate administration of a Kentucky component of the national wild and scenic rivers system, provided such agreements for the administration of water and land uses are not less restrictive than those set forth in KRS 146.200 to 146.360. (Enact. Acts 1972, ch. 117, § 13; 1974, ch. 74, Art. III, § 13(9).)

146.330. Employment of assistants. — The secretary for natural resources and environmental protection may employ such technical, clerical, stenographic and other employes and assistants as are required to effectively carry out his duties and responsibilities as provided in KRS 146.200 to 146.360. (Enact. Acts 1972, ch. 117, § 14; 1974, ch. 74, Art. III, § 13(9).)

146.340. Wild rivers system fund created. — A fund for the purpose of carrying out the provisions of KRS 146.200 to 146.350 is hereby created to be designated as a "wild rivers system fund" to consist of all revenues derived from privileges, concessions, contracts, or otherwise, all moneys received by gifts, contributions, donations and grants from public or private sources. Such "wild rivers system fund" shall be disbursed by the department for natural resources and environmental protection after appropriations are made by law for administration and other expenses and for other purposes provided by KRS 146.200 to 146.360. (Enact. Acts 1972, ch. 117, § 15; 1974, ch. 74, Art. III, § 13(1).)

146.350. Enforcement. — It shall be the duty of the department's office of general counsel, or upon the secretary's request, of the attorney general, to bring an action for the recovery of the penalties provided for in KRS 146.990 and to bring an action for a restraining order, temporary or permanent injunction, for the prevention or correction of a condition constituting or threatening to constitute a violation of KRS 146.200 to 146.360. All actions for injunctive relief for violation of KRS 146.200 to 146.360 shall be brought in the name of the Commonwealth of Kentucky department's office of general counsel, or upon the secretary's request, by the attorney general in the Franklin Circuit Court. If such action seeks recovery of penalties in addition to injunctive relief, it shall be brought to one (1) of the counties through which the designated portion of the river runs. (Enact. Acts 1972, ch. 117, § 16; 1974, ch. 74, Art. III, § 13(9); 1976, ch. 289, § 4.)

146.360. Trespass. — Nothing in KRS 146.210 to 146.360 shall be construed to confer upon any member of the public any right to the use of or access to private lands within the boundary of a designated wild river. (Enact. Acts 1976, ch. 197, § 6 (1st sentence).)

Memorandum of Understanding
Between
the Kentucky Department for Natural Resources and Environmental Protection
and
the United States Department of Agriculture Forest Service

Pertaining to the Following State Wild Rivers: Rockcastle, Red, Cumberland and the South Fork of the Cumberland

This Memorandum of Understanding made and entered into by and between the State of Kentucky with the Department for Natural Resources and Environmental Protection as its agent, hereinafter referred to as the Department, and the Forest Service, U.S. Department of Agriculture, hereinafter referred to as the Forest Service, for the purpose of establishing and recording agreed-upon policies and procedures designed to promote and administer the use and enjoyment of the above State Wild Rivers.

WITNESSETH:

WHEREAS, the development and operation of the above State Wild Rivers, within the boundary of the Daniel Boone National Forest, are desirable to provide recreation opportunities for the public, and

WHEREAS, both parties desire to cooperate in the development and operation of these State Wild Rivers to insure consistent management policies and practices, and

WHEREAS, the Department has been created under the laws of the State of Kentucky and charged to study, survey, plan and promote the development of the State scenic, historic and recreational attractions and the State Wild Rivers as set forth in 1972 Kentucky Wild Rivers Act, and

WHEREAS, the Forest Service is the Federal agency created by Congress to administer the National Forest System, which includes the Daniel Boone National Forest, and is responsible for the management of their resources, of which certain responsibilities are nondelegable, and

WHEREAS, it is the mutual desire of the Department and the Forest Service to work in harmony for the common purpose of developing, maintaining and managing the above State Wild Rivers for the best interest of the people of Kentucky and the United States;

NOW, THEREFORE, the parties hereto agree as follows:

A. The Department shall:

1. Within the boundary of the Daniel Boone National Forest, recognize the Forest Service as the primary agency responsible for land acquisition and determining the proper use of National Forest land.

2. Cooperate with the Forest Service in the enforcement of Federal laws and regulations.

3. Erect no signs, perform no construction, or post no National Forest landlines, except as agreed upon in plans approved by the Forest Service and the Department.

4. In the performance of work, the Department agrees to comply with the provisions shown in Exhibit A which is attached and made a part of this agreement. In the exhibit, "contractor" means "cooperator"; "contracting officer" and "contracting agency" means "Forest Service".

5. When studying additional rivers within the Daniel Boone National Forest for inclusion in the State Wild Rivers System, coordinate all study activities with the Forest Service.

B. The Forest Service shall:

1. Make every effort to comply with the intent of 1972 Kentucky Wild Rivers Act in management of National Forest land on State Wild Rivers.

2. Provide the Department with review drafts of land management unit plans, when such planning is adjacent to these rivers.

3. Along designated State Wild Rivers, place high priority on acquisition of lands needed for development, trails and protection of scenic beauty within the National Forest Proclamation Boundary.

4. Cooperate with the Department in the enforcement of Kentucky laws.

5. Provide orientation on National Forest objectives and policies for Department personnel as needed.

6. Furnish the Department with current ownership maps of the Daniel Boone National Forest and other pertinent information necessary to the execution of this agreement.

7. If designated by the Secretary of Agriculture, the Forest Service shall initiate a study in consultation with the Department to determine the suitability of a subject State Wild River for inclusion in the National Wild and Scenic Rivers System.

C. The Department and Forest Service mutually agree that:

1. Where a fully coordinated Forest Service unit plan covers a Wild River, that management plan will be adopted by both agencies.

2. Cooperative agreements will be entered into for specific management activities, as needed.

3. Amendments to the Memorandum of Understanding may be proposed by either party and shall become effective upon approval by both parties.

4. Each and every provision of Understanding is subject to the laws of the State of Kentucky and the laws of the United States Government.

5. Criteria and coordinating requirements contained in Appalachian Management Standards for Travel and Water Influence Zones as they pertain to the Daniel Boone National Forest will apply to those State Wild Rivers within the Daniel Boone National Forest unless superseded by a joint management plan.

6. Both agencies will jointly analyze mining proposals that would directly affect these Wild Rivers.

7. Each agency will meet jointly with other interested agencies at least annually for discussion of matters relating to the management of these State Wild Rivers and to provide for other meetings, including meetings with private organizations and individuals, at various administrative levels for discussions of such matters as may be relevant to the Rivers.

8. Handout literature and material will be prepared for distribution. Material will refer to the coopertive management of these Rivers and will be subject to mutual review before publication.

9. Copies of significant correspondence directly related to this memorandum will be given by each agency to the other.

10. Signs to adequately and distinctly identify the Rivers and both agencies will be developed. Signs will show the cooperation of the Kentucky Department for Natural Resources and Environmental Protection and the Forest Service, U.S. Department of Agriculture. The cost of certain signs may be shared. Signs, within the National Forest Proclamation Boundary, will have cooperative signing, and mutual identification will be present on all signs.

11. Each agency will orient their field personnel annually to the provisions of this Memorandum of Understanding.

12. Fire control activities will be in accordance with the Cooperative Fire Control Agreement between the Ky. Division of Forestry and Forest Service, U.S. Department of Agriculture.

13. Nothing herein shall be construed as obligating the Forest Service or the Department to expend, or as involving the United States or the State of Kentucky in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for this work.

14. Nothing herein contained shall be construed as limiting or affecting, in any way, the authority of the Forest Supervisor in connection with the proper administration and protection of the National Forest, in accordance with the purpose for which the lands contained therein were acquired and reserved.

15. To comply with Public Law 91-190, the National Environmental Policy Act of 1969, the State and the Forest Service agree to direct their program activities covered by this agreement toward managing and enhancing the environment for the widest range of beneficial uses without its degradation or risk to health or safety or other undesirable consequences. The State further agrees to assist the Forest Service in the preparation of environmental statements as required by Section 102(2) (C) of Public Law 91-190 for all major actions taken under this agreement which might significantly affect the quality of the human environment or be controversial.

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

17. Either party may terminate this Memorandum of Understanding by providing 60 days written notice, following agreed-upon disposition of all improvements constructed under the terms of this memorandum. Unless terminated by written notice, this agreement will remain in force indefinitely.

IN WITNESS WHEREOF, the parties have executed this Memorandum of Understanding, as of the last date written below.

Thomas O. Harris

THOMAS O. HARRIS, Commissioner
Ky. Dept for Natural Resources &
Environmental Protection

12/27/73
Date

John E. Alcock

JOHN E. ALCOCK, Forest Supervisor
Daniel Boone National Forest
Forest Service, U.S. Dept. of Agriculture

12/27/73
Date