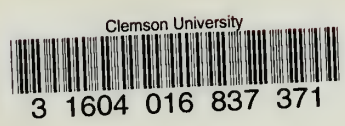


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road system evaluation



BUFFALO



NATIONAL RIVER / ARKANSAS





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ROAD SYSTEM EVALUATION

Buffalo National River
Arkansas

Recommended:
Alec Gould
Superintendent, Buffalo National River

December 6, 1985

Approved:
Robert Kerr
Regional Director, Southwest Region

February 19, 1986

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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.This road system evaluation has been prepared in response to the Surface Transportation Assistance Act of 1982 (Public Law 97-424), which addresses the nationwide need for rehabilitation and upgrading of the deteriorating roads in the National Park System. The funding authorized by this Act has enabled the National Park Service to implement a multi-year program--the Federal Lands Highway Program--for phased improvement of individual park road systems. To fulfill the purpose of the Act, the Park Service is conducting servicewide transportation planning.

CONTENTS

INTRODUCTION	1
Existing Development Plans	1
Issues	2
The Purpose of Park Roads	3
 PARK SETTING	 7
Access and Circulation	7
Natural Resources	7
Cultural Resources	8
Visitor Use and Development	9
 ROAD INVENTORY AND RECOMMENDATIONS	 11
Functional Classification	13
Design/Maintenance Guidelines	15
General Design Guidelines	20
Compliance Considerations	21
Special Studies	21
 STUDY TEAM	 Back Cover

INTRODUCTION

In 1972 Congress established Buffalo National River for the following purposes:

...conserving and interpreting an area containing unique scenic and scientific features, and preserving as a free-flowing stream an important segment of the Buffalo River in Arkansas for the benefit and enjoyment of present and future generations (Public Law 92-237).

The National River includes over 94,000 acres of land along 132 miles of the Buffalo River in northwest Arkansas. Because the land was originally privately owned and occupied, the area includes hundreds of old farming, logging, hunting, and fishing roads. Most roads in the park are primitive gravel roads or dirt paths.

EXISTING DEVELOPMENT PLANS

The 1975 Master Plan for Buffalo River does not specify which roads in the park will be improved or maintained. It does however include the following general policy statements on roads:

River access at selected points will be provided for floaters. This access will usually be a minor road to a simple graded or asphalt parking area at the riverbank. (p.32)

Roads - Certain existing roads will be improved to meet immediate circulation needs. New roads within the boundary will be minimal, limited to those needed to serve developed areas and main scenic points. Some primitive roads will be kept to retain the cultural flavor of the region; others will be used administratively as fire roads and for maintenance of riverside campgrounds; still others will be closed to enhance the primitive character of certain areas. (p. 35)

In 1978 Congress designated three wilderness units within Buffalo National River totalling about 36,000 acres (Public Law 95-625). In compliance with the Wilderness Act of 1964, no roads will be maintained within these areas once all valid, existing rights-of-way are acquired.

Development concept plans have been completed for Buffalo Point (1981), Tyler Bend (1981), Pruitt (1981), and Steel Creek-Lost Valley (1983). A Land Use Plan/Cultural Landscape Report has recently been completed for Boxley Valley (1985). A development plan/cultural landscape report is currently underway for the Erbie area. A development plan is also nearly completed for the Rush area. These plans provide more specific guidance on the function of the roads and major upgrading needs. They have been used in formulating this study.

The 1983 River Use Management Plan for Buffalo River includes the following policy statement on roads:

In order to maintain the rural character of the Buffalo River, roads going to the river access sites (Buffalo Point and Tyler Bend excepted) will not be paved. They will be well maintained, all weather, gravel roads.

Some of the low use access sites provide appropriate opportunities for a variety of recreational pursuits. Others, however, are not necessarily serving the needs of the public. Although they may be used by only a few individuals for brief periods during the year, this use often results in or has the potential to result in damage to the resource and/or conflict with other visitors and adjacent land owners. Some areas are particularly vulnerable to damage from off-road vehicle use. Furthermore, other sites providing identical or similar recreational opportunities may be within a short distance. The following criteria will be used in assessing the appropriateness and need of low use river access sites.

Adequacy for the intended use

Potential for environmental damage (erosion, litter/dumping, and disturbance of wildlife or of cultural and natural sites)

Potential for conflict with other users and/or adjacent landowners

Potential for adverse impacts on the character of a specific river segment

Law enforcement considerations, including emergency needs such as fire and rescue purposes

Maintenance cost

Sites determined to be inappropriate will be closed (pp. 31-32).

ISSUES

The purpose of this document is to present a road system evaluation for Buffalo National River. As mentioned above there are hundreds of old roads in the area. The Park Service cannot maintain all of these due to cost constraints; many are resulting in resource damage, and others provide little or no functional use. The study identifies which roads in the park will be open, maintained, and in some cases improved. Other former roads in the park will be closed to visitor use. A functional classification is assigned to the maintained roads to identify the primary purpose of each road segment. Included in this analysis is the visitor experience or function the Park Service is attempting to provide for each park road.

Lacking specific road standards, upgrading and maintenance occurs on a case-by-case basis, which can result in a road that is overbuilt or underbuilt. This study provides guidelines to direct future design, construction, and maintenance activities to be followed subject to funding availability and park priorities. Guidelines are provided for speed, vehicle type, surface type, roadway width, and stream crossing types.

THE PURPOSE OF PARK ROADS

The roads cited in this document are intended to be classified, designed and maintained so as not to degrade natural and cultural resources and to enhance the objective of providing high quality visitor experiences at Buffalo River.

The general purpose of park roads is expressed in the National Park Service Park Road Standards (NPS, 1984).

Among all public resources, those of the National Park System are distinguished by their unique natural, historical, cultural and recreational qualities--values dedicated and set aside by law to be preserved for the benefit and enjoyment of people in such a manner as will leave them unimpaired for future generations.

Ideally, perhaps no road would be permitted to violate or despoil the sanctity of park resources. Pragmatically, the protection, use and enjoyment of these values in a world of modern technology has necessitated the encroachment of a system of public park roads. Today's visitors are no longer required, as early motorists to Yellowstone once were, to chain their cars to logs and turn over the keys to the superintendent. In most parks today, the basic means of providing for visitor access is the park road system. It is both a means and an end. It enables one visitor to reach his goal; for another, it is the goal.

The marked increase of park visitors in the latter half of the 20th century represents both a profound threat to park values and an extraordinary opportunity for those values to become more tangibly significant in each individual's recognition of our natural and cultural heritage.

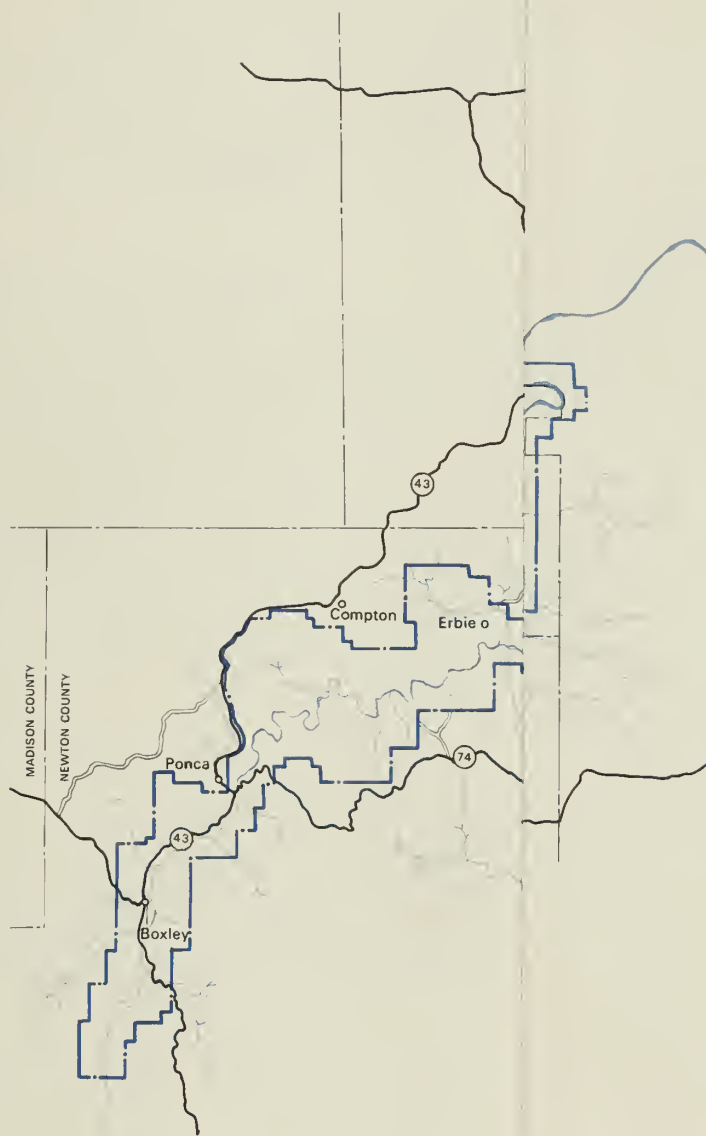
The fundamental purpose of national parks--bringing humankind and the environment into closer harmony--dictates that the quality of the park experience must be our primary concern. Full enjoyment of a national park visit depends on its being a safe and leisurely experience. The distinctive character of park roads plays a basic role in setting this essential unhurried pace. Consequently, park roads are designed with extreme care and sensitivity with respect to the terrain and environment through which they pass--they are laid lightly onto the land.

Each segment of every park road should relate to the resource it traverses in a meaningful way and should constitute an enjoyable and informative experience in itself while providing the visitor the utmost in visual quality. Long tangents that encourage high speeds--and only fleeting views of "kinetic scenery"--should be avoided. The horizontal and vertical alignment and cross-section should respect the terrain, blending into the environs. A park road should be fundamentally designed to maintain an overall continuing sense of intimacy with the countryside or area through which it passes.

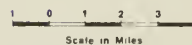
The purpose of park roads remains in sharp contrast to that of the Federal and State highway systems. Park roads are not intended to provide fast and convenient transportation; they are intended to enhance visitor experience while providing safe and efficient accommodation of park visitors and to serve essential management access needs. They are not, therefore, intended nor designed as continuations of the State and Federal-aid network. Nor should they be designed or designated to serve as connecting links to those systems. And within parks, no road or other circulation system should be planned or designed merely as a device to link points of interest.

As stated on a brochure that was once given to visitors when they entered National Parks:

Park roads are for leisurely driving only.
If you are in a hurry, you might do well to
take another route now, and come back when
you have more time.



VICINITY
BUFFALO
NATIONAL
RIVER
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United States
 Department of the Interior
 National Park Service

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PARK SETTING

Buffalo National River lies in north-central Arkansas within an area bounded by the Missouri, Mississippi, and Arkansas Rivers on the north, east and south, and the prairie to the west. The Buffalo River drains an elongate basin, 22 by 70 miles, and covers 1,338 square miles. Flowing from the Boston Mountains on the west to the White River on the east, it follows a 148-mile winding course. Surrounding the Buffalo River is a basin replete with streams, caves, natural arches, springs, and waterfalls. The Buffalo National River is a narrow, linear strip of land along the river that comprises only 11 percent of the basin's land area. The first 16 miles of the River lie within the Ozark National Forest. The remaining 132 miles to the White River flow within the national river boundary.

ACCESS AND CIRCULATION

Access to the Ozarks is almost entirely by private automobile. There is commuter airline service into the region through the Harrison Airport. Except for seven miles in Boxley Valley, no major road parallels the Buffalo River. Several cross it and provide approaches to all major river sections. These include Arkansas 21-74, providing access to Boxley, Ponca, and Lost Valley; Arkansas 7, providing access to Pruitt; Arkansas 123, providing access to Carver; U.S. 65, providing access to Tyler Bend; and Arkansas 14, providing access to Buffalo Point. In addition, unmarked gravel or dirt roads over rough, hilly country approach the river at various points, often on steep erosion-prone grades. Some of these cross the river on low-water bridges or fords.

NATURAL RESOURCES

The major resource and central attraction of the Buffalo National River is the river itself. Its national significance stems from its undeveloped, free-flowing nature. The river offers an excellent canoeing opportunity with some whitewater that is not of great difficulty. The Buffalo remains relatively unpolluted. The water is a transparent green color except after rain storms when it turns a typical muddy brown.

Riverflow varies according to both seasonal, and annual storm trends. Floods occur on an average of every two years, most frequently in the spring but potentially any month. These floods flow over various floodplain areas within the valley. Because runoff from the basin is swift, river levels rise and fall relatively fast during and after storms.

With help from these storms, over time the Buffalo River has cut deeply into bedrock layers of sandstone, shale, dolomite, and limestone. The results are tall, vertical bluffs in some areas that attain heights up to 500 feet.

In addition to outstanding geologic features, Buffalo National River contains interesting wildlife and plants. Due to its Ozark Mountains location, the river has stayed somewhat ecologically isolated from surrounding regions. Within the Buffalo River area; however, are a variety of habitats--mountain balds, forests, meadows, hollows, dry and moist bluffs, springs, creeks, rivers, and gravel bars.

The variety of habitats allows richness and diversity in the park vegetation. Over 1,500 species of plants can be found within the area. Most fall into either of the two major forest associations: upland oak/hickory--comprised of six species of oak and three of hickory, with smaller numbers of winged elm, red maple, sassafras, persimmon, walnut, hackberry, blackgum, shortleaf pine, and red cedar; and river floodplain--sweetgum, sycamore, willow, elm, river birch, and boxelder. Additionally, a great variety of microenvironments provide for a number of plants which are under study for possible listing as endangered species.

Animal life of the Arkansas Ozarks is representative of the deciduous forest biome and its rivers. Buffalo River is nationally outstanding for its many species of fish. The principal game fish is the small-mouth bass, but also present are largemouth bass, spotted bass, Ozark bass, suckers, catfish, bluegill, and green and longear sunfish. Since the river is an isolated ecological unit, it is protected from the invasion of warm-water rough fish. Several caves within the park serve as critical habitat for endangered bat species. Bald eagles winter in the area; nesting is suspected, but none has been recorded in the park.

CULTURAL RESOURCES

Buffalo National River's rugged topography has culturally isolated the inhabitants as well as ecologically isolating the plant and wildlife. The area along the Buffalo has been occupied for at least 9,000 years. The earliest native people, the Bluff Dwellers, were hunters and gatherers. Later, they built small semi-permanent villages in the bottomlands.

The first European settlers arrived in the early 1800's. By this time the Buffalo Valley was largely an uninhabited seasonal hunting ground of the plains-dwelling Osage Indians. Early settlers cleared bottomlands and farmed, the work of which is still reflected in the pastoral scenes of Richland and Boxley valleys. After the European settlement--Civil War skirmishes, lead and zinc mining, and the timber and cattle industry all added to the story of life in the Ozark Hills.

The history of the Buffalo River Valley has left it with a variety of cultural resources. An archeological site at Calf Creek, the CCC-built structures at Buffalo Point, and the Boxley Mill are all listed on the National Register of Historic Places. Boxley Valley has been classified as a significant cultural landscape and it is currently being nominated to the Register. Current studies are investigating the cultural resources of Erbie and Rush. Research indicates that more structures and sites, both prehistoric and historic may be eligible for inclusion.

VISITOR USE AND DEVELOPMENT

Traditionally the Buffalo has been a place for local people to float, fish, and swim. Since its designation as a National River, use of the Buffalo has expanded. The National River now provides a spectrum of visitor experiences and recreational uses compatible with the area's natural and cultural resources. Visitors experience the Buffalo in three basic settings:

- (1) wilderness environments with no roads, few people and many opportunities for solitude,
- (2) semi-primitive areas with gravel roads, few facilities, low to moderate visitation and a mix of peaceful times and social interaction with friends or other visitors.
- (3) developed park settings with paved roads, convenient facilities, moderate to high visitation, fun, sociability and participation in park interpretive programs.

Visitor activities include floating and river camping, swimming, hiking, backpacking, picnicking, hunting, fishing, horseback riding, johnboating, historic site visiting, caving, and more. Floating depends on access to put-in and take-out locations. These access points are generally located within an easy day's float from each other and at points accessible by existing roads.

As shown below, annual visitation to the National River more than tripled between 1974 and 1978. From 1978 to 1984, visitation stayed in the 500,000 to 600,000 range. In 1985 it rose to over 761,000. As park development occurs over the next 10 years, visitation should increase.

Annual Visits to Buffalo National River

1974	205,900
1975	224,000
1976	315,700
1977	331,500
1978	645,300
1979	675,800
1980	576,400
1981	580,100
1982	606,900
1983	655,800
1984	510,000
1985	761,100

Buffalo National River draws a mix of visitors from the local area, the six state surrounding region, and an increasing number of national and international groups. More than 10 million people live within 250 air miles of the Buffalo River.

Presently, both quantity and character of use vary by season. Leisure time determinants, such as school schedules, vacation times, weekends, and holidays, plus response to weather and natural conditions effect the fluctuation of visitor use. Floating on the upper stretches of the river is determined by the amount of rainfall. The upper river is usually floatable from March to early June. The middle river from Tyler Bend downstream is floatable most of the year. Canoes and johnboats use the lower Buffalo year-round.

Average daily traffic (ADT) volumes have been determined for the park's roads. Because actual traffic counts are not available for most roads at Buffalo National River, ADT volumes are, in most cases, "guesstimates" provided by field personnel. They should be used as a general guide on the level of use that a given road receives. The ADT volumes have been seasonally adjusted to reflect daily traffic during the months when most visitor use occurs. However, they are not adjusted to reflect weekend versus weekday volumes. Because use is heavily oriented toward the weekends at Buffalo River, traffic on busy Saturdays and Sundays will typically be considerably higher than the reported ADT. As traffic counts are completed, more accurate ADT volumes will be available. Following is a list of roads (with route numbers) where traffic counters are currently in place:

- Lost Valley (244)
- Steel Creek (143)
- Kyles (144)
- South Erbie (145)
- Ozark Campground (248)
- Upper Pruitt (942)
- Lower Pruitt (142)
- Hasty (943)
- Carver (140)
- Highway 65 River Access (231)
- Gilbert (930)
- Tyler Bend (130)
- Woolum (131.1)
- Maumee North (228)
- Maumee South (229)
- Highway 14 River Access (923)
- Buffalo Point (21)
- Rush (121.1)

ROAD INVENTORY AND RECOMMENDATIONS

This section includes an inventory of park roads, which total about 107 miles. It also provides recommended design and maintenance standards for each road segment. Table 1 depicts the six functional classifications that apply to Buffalo National River, and it summarizes five standard type roads that were specifically developed for this evaluation. Normally, specific park road standards would be assigned to each road segment. Because Buffalo National River has over 130 road segments, many of which serve similar areas and levels of use, roads were grouped into standard types. The design guidelines are consistent with Park Road Standards (1984).

Table 2 at the end of this section displays existing conditions, special considerations, and the assigned classification and "standard type" for each road segment. Exceptions to the standard guidelines and special recommendations are shown in the comments column. To complete the table it was necessary to determine the purpose, function, estimated traffic volume, and intended visitor experience for each road. Resource concerns and physical factors were also considered and are noted in the table to assist users of the evaluation. Maps showing the location of each road segment are integrated with Table 2.

Table 2 and the accompanying maps identify which roads will be maintained by the National Park Service. The maps also display state and county roads in the park. In addition to these routes, there are private access roads in the park not shown on the maps because they are not maintained by the Park Service nor subject to visitor use. Four roads identified in the table and maps provide access to "use and occupancy" lands. Maintenance of these roads will become the responsibility of the Park Service when the use and occupancy terms expire.

Over half of the routes identified in Table 2 are primitive roads for access to low use areas and/or hayfields. Because the park's policy on such areas is still evolving, the recommendations contained in Table 2 will be reviewed periodically and updated to reflect changing conditions or unanticipated management needs.

At this writing, many park roads do not meet the recommended design/maintenance standards specified in the tables. The Park Service will attempt to bring the roads up to the proposed standards over time as funding permits.

TABLE 1

Functional Classification and Design Guidelines Summary

FUNCTIONAL CLASSIFICATIONPublic Use Roads

- I. Principal Park Road
- II. Connector Park Road
- III. Special Purpose Park Road
- IV. Primitive Park Road

Administrative Roads

- V. Administrative Access Road
- VI. Restricted Road

DESIGN/MAINTENANCE GUIDELINES

<u>Buffalo River Standard Type</u>	<u>Volume (ADT)</u>	<u>Speed</u>	<u>Vehicle</u>	<u>Surface</u>	<u>Roadway Width*</u>	<u>Stream Crossings</u>
A. High	Greater than 200	25	Bus/RV/ car	Paved	24'	All-weather
B. Medium	50-200	20	Bus/car	Gravel	20'	All-weather or low-velocity
C. Low	Less than 50	15	Passenger car	Gravel or dirt	10'-14' (one-lane)	Low-velocity or fords
D. Very Low	Less than 20	Very low	High clearance**	Dirt	8'	Fords
E. One-way	Varies	Low	Bus/RV/ car	Paved or gravel	10'-12' (one-way)	N/A

* Type "A" roads include 20 feet of pavement and 2 foot shoulders; all other roads include 1 foot shoulders. Major type "A" roads with heavy RV traffic may have 22 feet of pavement with one foot shoulders where appropriate and designated as such in the comments column of Table 2. Type "C" roads should have turnouts where needed; they may be two-lane (18 feet wide) where appropriate and designated as such in the comments column of Table 2.

** Type "D" roads may be maintained for passenger cars where appropriate and designated as such in the comments column of Table 2.

FUNCTIONAL CLASSIFICATION

This section is extracted directly from the Park Road Standards (NPS, 1984) as it applies to Buffalo National River. The assignment of a functional classification to a park road is based on its intended use or function, not traffic volumes or design speed. For purposes of functional classification, the routes which make up the park road system are grouped, based on use, into two categories: public use park roads and administrative park roads.

Public Use Park Roads

All park roads that are intended principally for the use of visitors for access into and within a park are placed in this category. This includes all roads that provide access to boat launches, points of scenic or historic interest, campgrounds, picnic areas, etc. County, State, and U.S. Numbered highways maintained by the Service are included in this category. Public use park roads are subdivided into the following four classes:

Class I: Principal Park Road. Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors.

Class II: Connector Park Road. Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc.

Class III: Special Purpose Park Road. Roads which provide circulation within public use areas, such as campgrounds, picnic areas, visitor center complexes, concessioner facilities, etc. These roads generally serve low-speed traffic and are often designed for one-way circulation.

Class IV: Primitive Park Road. Roads which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles.

Administrative Park Roads

The Administrative Park Road category consists of all public and non-public roads intended to be used principally for administrative purposes. It includes roads servicing employee residential areas, maintenance areas and other administrative developments, as well as restricted patrol roads, truck trails, and similar service roads. Administrative park roads are subdivided into two classes:

Class V: Administrative Access Road. All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas.

Class VI: Restricted Road. All roads normally closed to the public, including service roads, hayfield accesses, and other similar roads.

Figure 1 illustrates the application of these functional classifications to a hypothetical park road system.

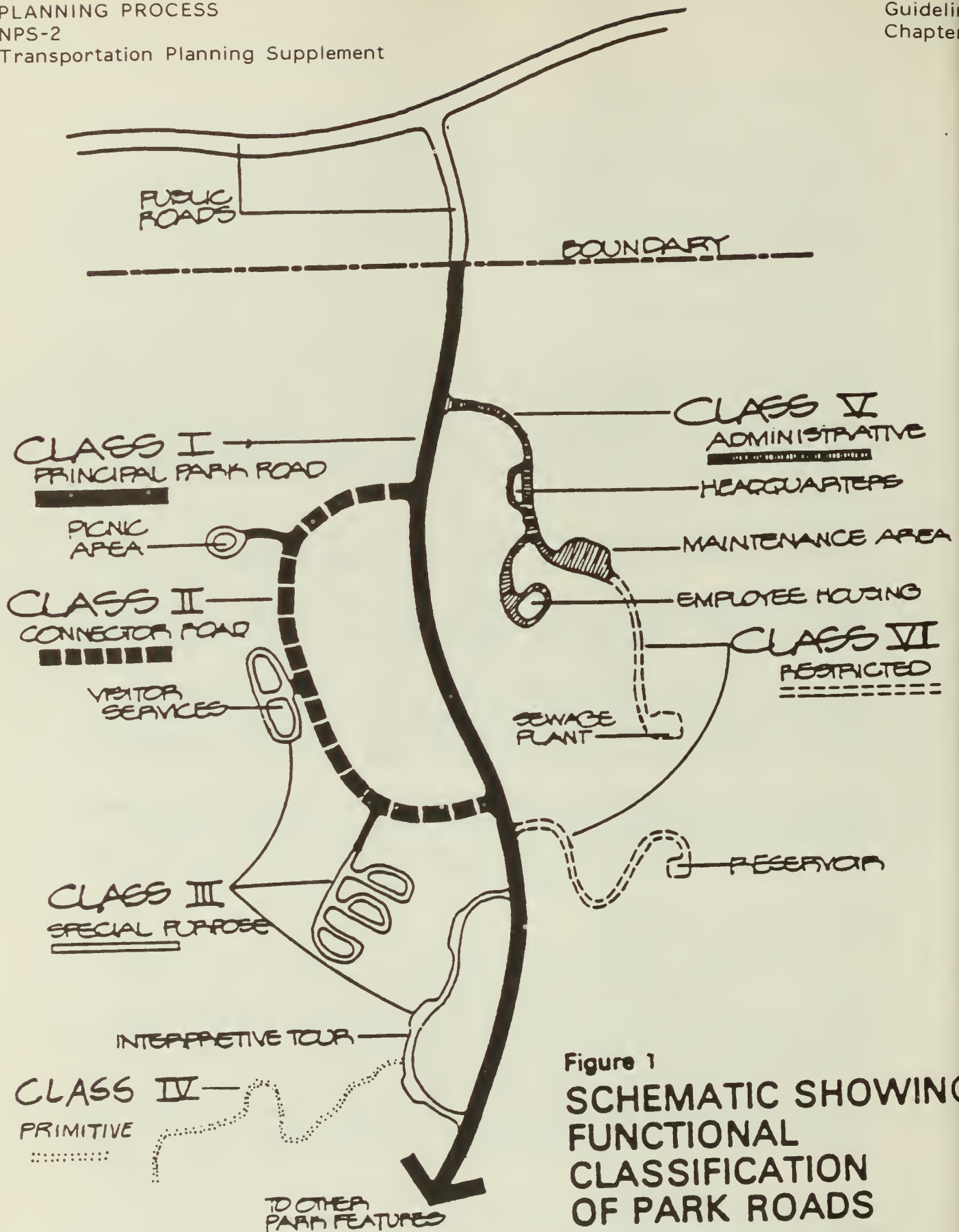


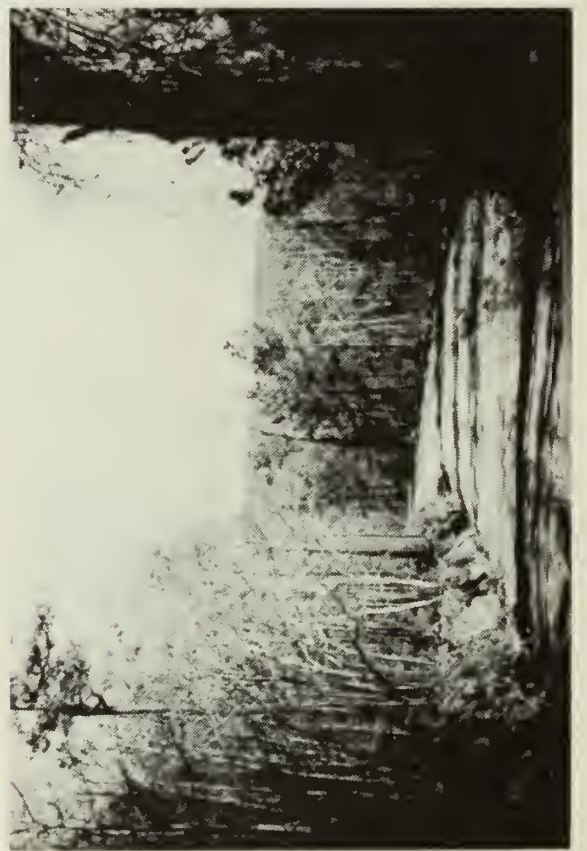
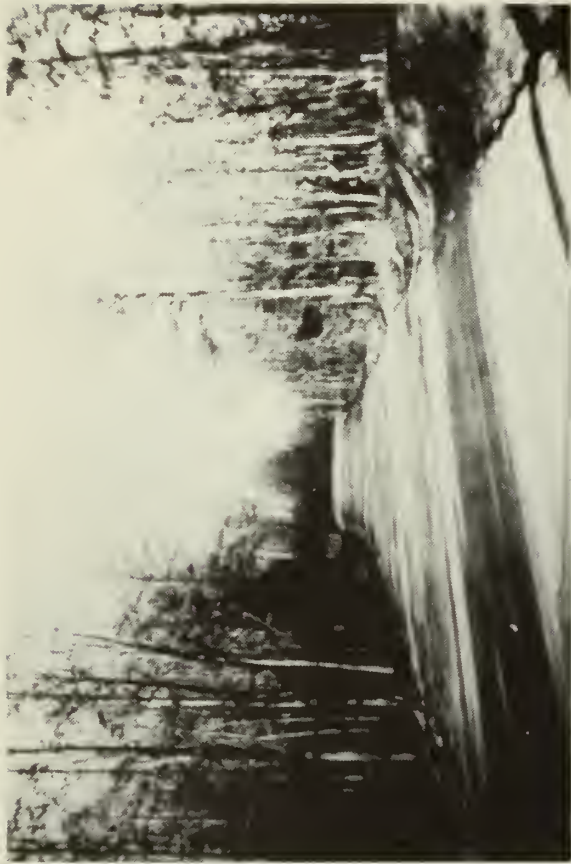
Figure 1
SCHEMATIC SHOWING
FUNCTIONAL
CLASSIFICATION
OF PARK ROADS
NATIONAL PARK SERVICE

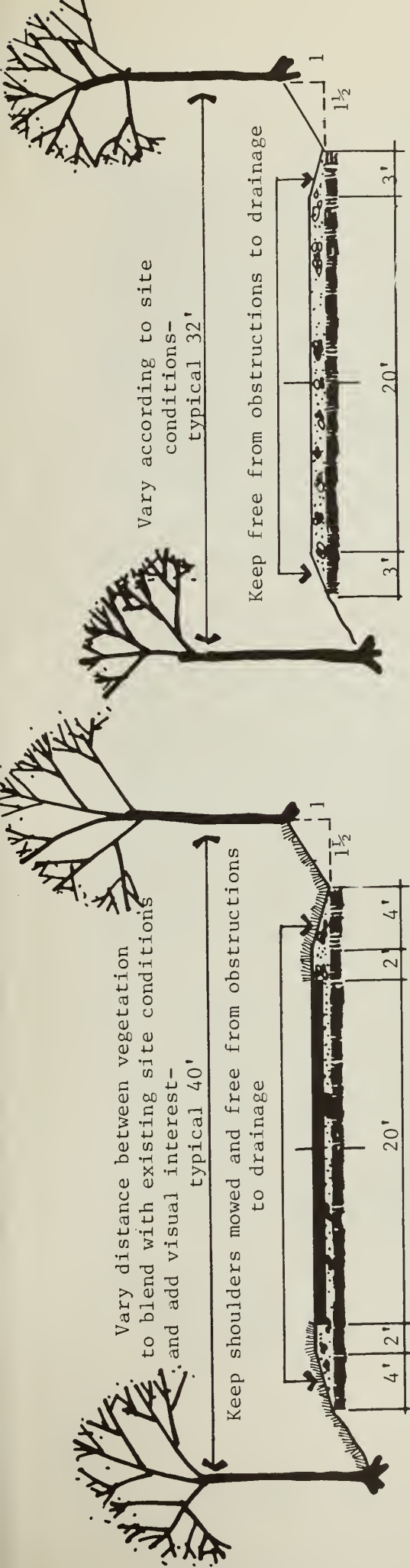
DESIGN/MAINTENANCE GUIDELINES

As mentioned above, standard road types were developed for this evaluation using the 1984 Park Road Standards as they apply to Buffalo National River. This is justified given the situation at Buffalo where there are over 130 roads, many of which are similar. Many of these are river corridor access roads which receive minimal use and maintenance; about 20 routes are more heavily used by the public and receive more frequent maintenance by the Park Service. It should be noted that, given the topography of the land, short lengths involved, high costs of improvements, the type of experience desired, and the traditional road standards in the Ozarks, design guidelines are on the lower end of the Park Service scale. With a few exceptions, roads at Buffalo River will remain unpaved, low-speed roads. High-speed, paved routes outside the park provide access between developed areas. The standard road types are summarized in Table 1. While a functional Class I, principal park road, is more likely to be a standard type A road, and a Class IV, primitive park road is more likely to be a type D road, there is no direct relationship between classification and standard. Following are more detailed descriptions of the design/maintenance guidelines for each type of road. The road type designation for each route is displayed in Table 2 in the Appendix. The designation and related standards have been assigned to each road based on currently available information. They may be revised following subsequent engineering studies. Such studies provide more detailed technical information and advice on the design and maintenance of specific roads. The recommendations may or may not be concurred with due to other considerations such as the desired visitor experience, environmental affects, and costs.

High Standard Road (A)

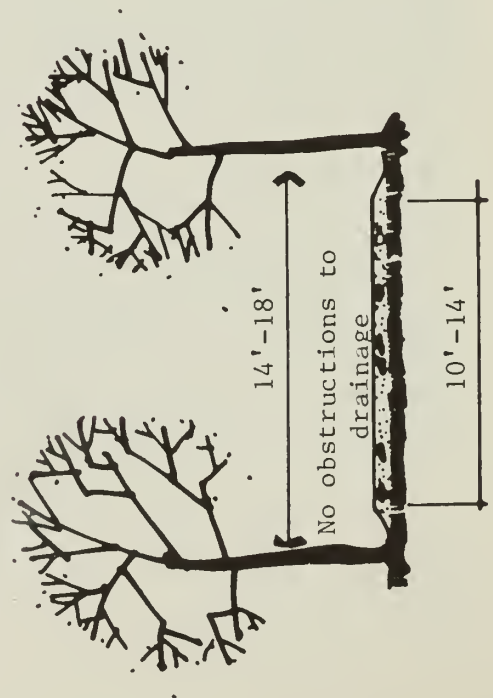
Type A is the most highly developed park road at Buffalo National River. The visitor experience is intended to be a developed, relatively fast-paced experience with many other visitors using the road. It serves as the main access route to high use areas. Traffic volumes generally average greater than 200 vehicles per day during the season of use. The operating speed may be up to 25 mph, although in cases of extensive resource constraints or cost considerations it should be lower. High standard roads are intended to serve all types of vehicles that are seen at Buffalo River, including buses, RV's, and passenger cars. The traveled way of these roads is paved; shoulders are stabilized turf. The roadway width is 24 feet, including 10 foot lanes and 2 foot shoulders. Where needed on major type A roads with heavy RV use, the pavement width may be increased to 22 feet (1 foot shoulders). These roads are maintained to the highest levels of any at Buffalo River. Drainage ditches are improved and stream crossings are of an all-weather design. The main road at Buffalo Point (route 21) to the boat access area is an example of a type A road. The proposed road into Tyler Bend (route 130) will also be a high standard road when improved.



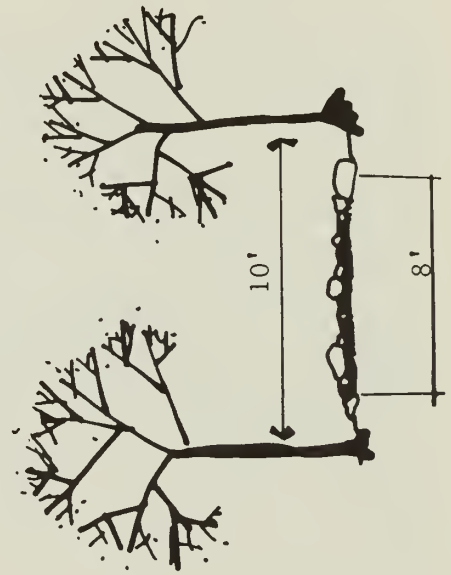


TYPICAL TYPE A
CROSS-SECTION

TYPICAL TYPE B
CROSS-SECTION



TYPICAL TYPE C
CROSS-SECTION



TYPICAL TYPE D
CROSS-SECTION

Medium Standard Road (B)

The medium standard road at Buffalo National River provides access to secondary use areas with average volumes ranging from 50-200 vehicles per day during the season of use. The visitor experience is intended to be travel at a moderate pace on a designed road of medium development standards where other visitors are frequently seen. Speeds may be up to 20 mph serving primarily shuttle buses and passenger vehicles. These roads are gravel surfaced with a consistent roadway width of 20 feet (including shoulders). These are designed roads that are well-maintained and are graded at least annually. Excess gravel should be removed from the roadside following grading activities. Existing roads would be widened to meet minimum widths plus drainage ditches. Stream crossings may be all-weather or low-water types. Examples of medium standard roads include the Steel Creek road (route 143) and the Ozark Campground road (route 248). Others that are proposed to be improved to this standard include the Lost Valley road, a portion of the Erbie road on the south side, most of the Woolum road, the proposed Highway 14 Bridge developed area road, and the Rush road.

Low Standard Road (C)

These roads provide access to or circulation within areas that receive relatively low levels of use. The visitor experience should be a slow-paced, undeveloped experience on a road characteristic of many of the traditional Ozark region roads. Other vehicles are seen but the feeling should be relatively uncrowded. Volumes generally average less than 50 vehicles per day during the season of use. Speeds are slow, generally on the order of 15 mph. These roads are maintained for use by passenger cars. They are usually gravel surfaced (dirt in some cases). In most cases these roads are "one-lane, two-way" roads with turnouts. The width will generally be 10-14 feet. Turnouts are provided as needed by sight distance as determined in the field. In most cases these are not designed roads but are simply existing roads that are to be maintained to the standards herein described. Improvements are made only at certain locations to solve specific problems, such as a culvert to solve a drainage problem, or a turnout to solve a traffic safety problem. These roads are not widened except where they are below the 10 foot minimum width. Stream crossings are fords or low-water bridges (not all-weather bridges) in most cases. In exceptional cases these roads may be improved and maintained to 18-foot wide, two-lane gravel roads. Maintenance of low standard roads will generally occur every two to three years, or more frequently if needed to maintain them for passenger vehicles. When graded, excess gravel material should be removed from the roadside. An example of the typical low standard road is the Erbie road on the north side of the river (route 247).

The Kyles road (route 144) is a special case in that it receives peak use that might suggest a higher standard. However, this study proposes upgrading the road no higher than the low standard level (Type C) for the following reasons: The county road leading to the park boundary

is a very low standard road, only 8-10 feet wide, with no turnouts, grades up to 20 percent, and a dirt surface which becomes almost impassable when wet. The segment in the park is extremely steep, with grades up to 25 percent. Erosion problems and maintenance needs are substantial. Reducing the grade to a more acceptable level would require a major realignment causing significant environmental damage and costing upwards of \$1 million to accomplish. An alternative river access exists only four miles downstream at Erbie. Five of the Upper Buffalo concessioners can be expected to shift most of their business to Erbie once the Erbie road, camping, and launch improvements are in place. The other two Upper Buffalo concessioners based in Ponca would probably continue to use Kyles, but overall visitation at Kyles should be reduced. Another reason for keeping the Kyles Road at a low standard is the management objective of providing a more primitive area experience at Kyles than Erbie. (See Erbie Development Plan). The Kyles road would remain open to public use, but large vehicles such as RV's and buses would be prohibited from using this road.

Very Low Standard Road (D)

Very low standard roads serve low use areas. The visitor experience is intended to be a very slow-paced, primitive, remote, and uncrowded experience. Volumes will generally average less than 20 vehicles per day during the season of use. Speeds are very low, on the order of 10 mph or less. These roads accommodate high clearance vehicles, pickups, and sport wagons and, in some exceptional cases, passenger cars. These are dirt roads with a width of about eight feet. Turnouts are generally unnecessary because of the extremely low levels of use. These are not designed roads, but rather existing routes that are being kept open for continued use. Stream crossings are fords, not low-water or all-weather bridges. Maintenance is minimal, not on any schedule, occurring only when necessary to keep the road passable by the specified vehicle. Most of the administrative roads fall into this category. An example of a visitor use road in this group is the Pruitt to Erbie north river road (route 242).

One-Way Road (E)

One-way roads provide circulation within developed areas where travel in two directions is not necessary nor desirable. These are generally short loop roads in campgrounds or at boat landings. Traffic volumes vary from low to high. Speed is dependent on the specific application but is generally very low. All types of visitor vehicles are accommodated including buses, RVs and cars. The surface is gravel in most cases, but may be paved where needed in areas of mostly paved roads such as Buffalo Point. These roads are usually 10-12 feet wide. Maintenance is at a level consistent with other roads in the developed area. A specific example of a one-way road is the cabin roads at Buffalo Point (route 220).

GENERAL DESIGN GUIDELINES

In addition to the specific design criteria presented above, a number of other factors should be considered during the design and reconstruction of Buffalo River's road system. To ensure an aesthetically pleasing road, it should lie lightly upon the land utilizing natural support wherever possible. Heavy cuts and fills should be avoided. In attempt to avoid extensive cuts and fills, grades may be steeper than typically found on developed roads outside the park. Retaining walls can also reduce the height and extent of cut-and-fill slopes. They should be constructed using native stone to present a natural appearance. The roadway should be of the highest design quality in terms of blending the traveled surface, shoulders, and ditches into the surrounding environment. Wherever appropriate, the color of materials used in road construction should be chosen to harmonize with the general character of the landscape. Gravel from the St. Joe member of the Boone Limestone formation should be used when available, and pavement should be a brown tone if feasible, to blend with the park environment. Material used for periodic road repair should be the same color as that used during construction. Cut-and-fill slopes should be rounded and warped at the ends for transition, and properly seeded, fertilized, and mulched for early recovery and to control erosion. Shoulders on paved roads should be stabilized turf (50% aggregate and 50% topsoil). Backslopes should be constructed for roads (type A and B) to minimize erosion, slope failure and ditch blockage. A minimum maintainable backslope in other than bedrock is one and a half to one (run to rise). On type A roads, backslopes may be designed for mowing, in which case the minimum should be three to one.

Whenever a road is relocated, materials of the old roadbed may be utilized, providing it is obliterated and revegetated to restore a natural appearance. Whenever a road is reconstructed, turnouts should be considered at locations having potential for scenic overlooks.

In order to phase out the continuation of backcountry utility line maintenance/access and associated scars, the burial of utilities within the road corridors should be encouraged.

Guiderails or guardwalls should only be installed at points of unusual danger. The criteria for high-speed, high-volume highways do not apply to the low-speed, relatively low-volume traffic conditions of Buffalo River. Guiderails, guardwalls, or guideposts should be used sparingly. Such structures should be constructed with native materials and blend with the architectural theme of the park.

Roadside signing, whether regulatory, informational, or interpretive should enhance, not detract, from the visitor experience. Information conveyed should be clear and unambiguous. Signs should be placed in locations conducive to visitor comprehension and decision making, and must conform to the National Park Service Sign System Plan. Graphic symbols should be sized and designed for visual comprehension from moving vehicles but not any larger than necessary.

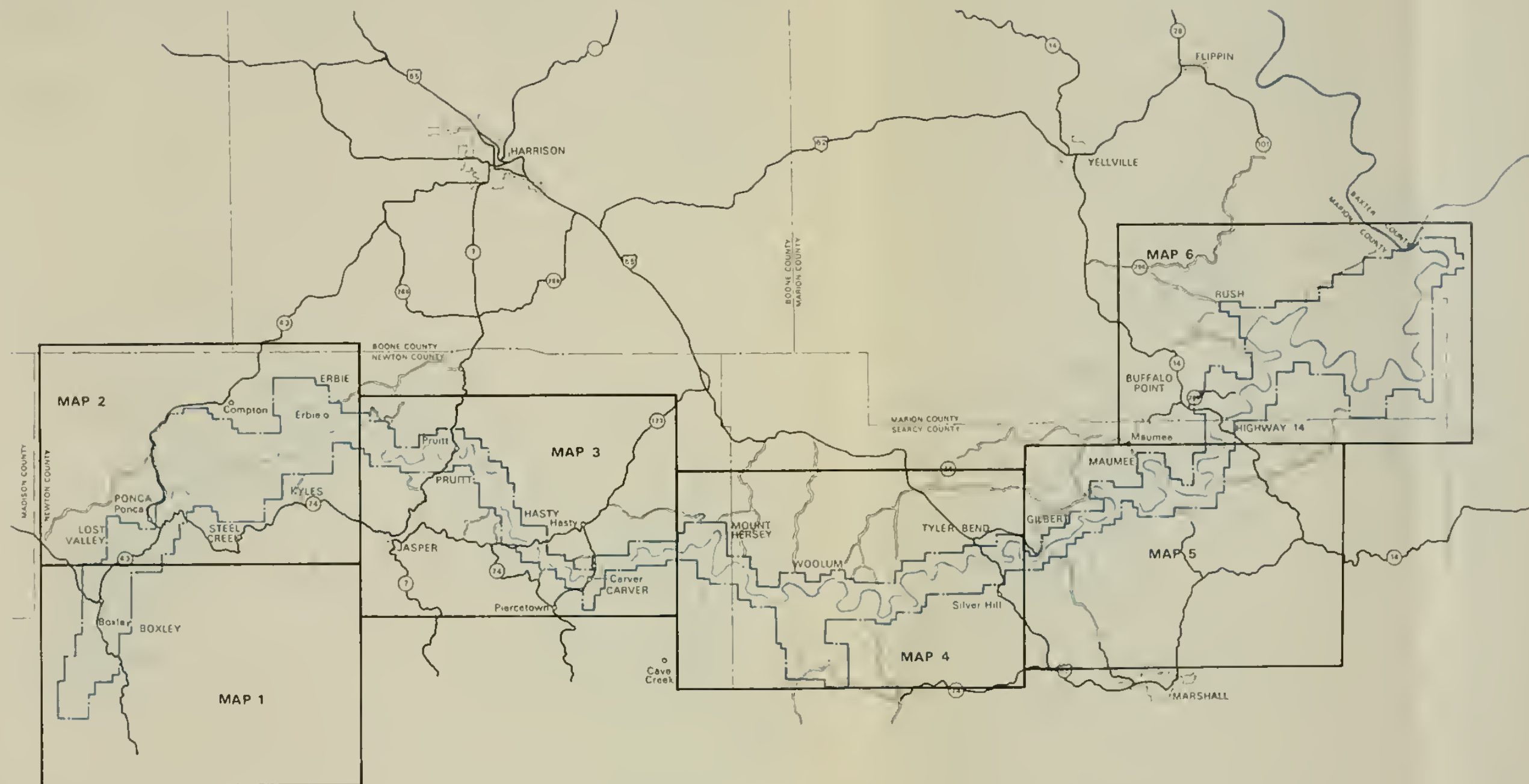
COMPLIANCE CONSIDERATIONS

The Environmental Statement on the 1975 Master Plan addressed the impacts of roads at Buffalo in a general way. Roads that are proposed for upgrading in the development concept plans cited in the Introduction section were covered in associated environmental assessments. The roads at Rush and Erbie are being addressed in environmental assessments accompanying development plans currently being prepared. Considerations for environmental compliance on other roads will await more specific design documents. Most of the roads contained in this study are not scheduled for upgrading but rather continued maintenance at the specified standard. Road maintenance is exempt from further environmental compliance as long as it fits within the categorical exclusion contained in the Departmental Manual (516 DM 6, Appendix 7.4C.) "(9) Repair, resurfacing, striping, installation of traffic control devices, repair/ replacement of guardrails, etc., on existing roads."

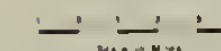
Each improvement project will require archeological and endangered species clearances prior to construction. Compliance with Section 106 of the National Historic Preservation Act either has been, or will soon be completed on the various development plans for Buffalo River. Any additional 106 compliance needed will occur in the design phase.

SPECIAL STUDIES

An engineering study will be undertaken to provide more detailed technical input on design for certain roads scheduled for upgrading in the near future, such as the Kyles and Woolum roads. Based on the results of the engineering study, a more extensive alternatives analysis may be undertaken for the possible relocation of a portion of route 131 near Woolum. A section of the road about 1500 feet long is cut into a steep bank along the Buffalo River. The existing road is narrow and subject to sloughing off at certain locations. Widening the road to a consistent 20 foot traveled-way could be expensive and result in adverse visual impacts on visitors floating on the river and hiking the far side. The interim solution proposed in this road system evaluation is to maintain a one-lane, two-way road along this section with minimal improvements, such as additional turnouts, where needed. The proposed special study would consider alternative long-range solutions including relocating the road up over the bluff near the 1500-foot section of road.



MAP INDEX BUFFALO NATIONAL RIVER arkansas



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National Park Service

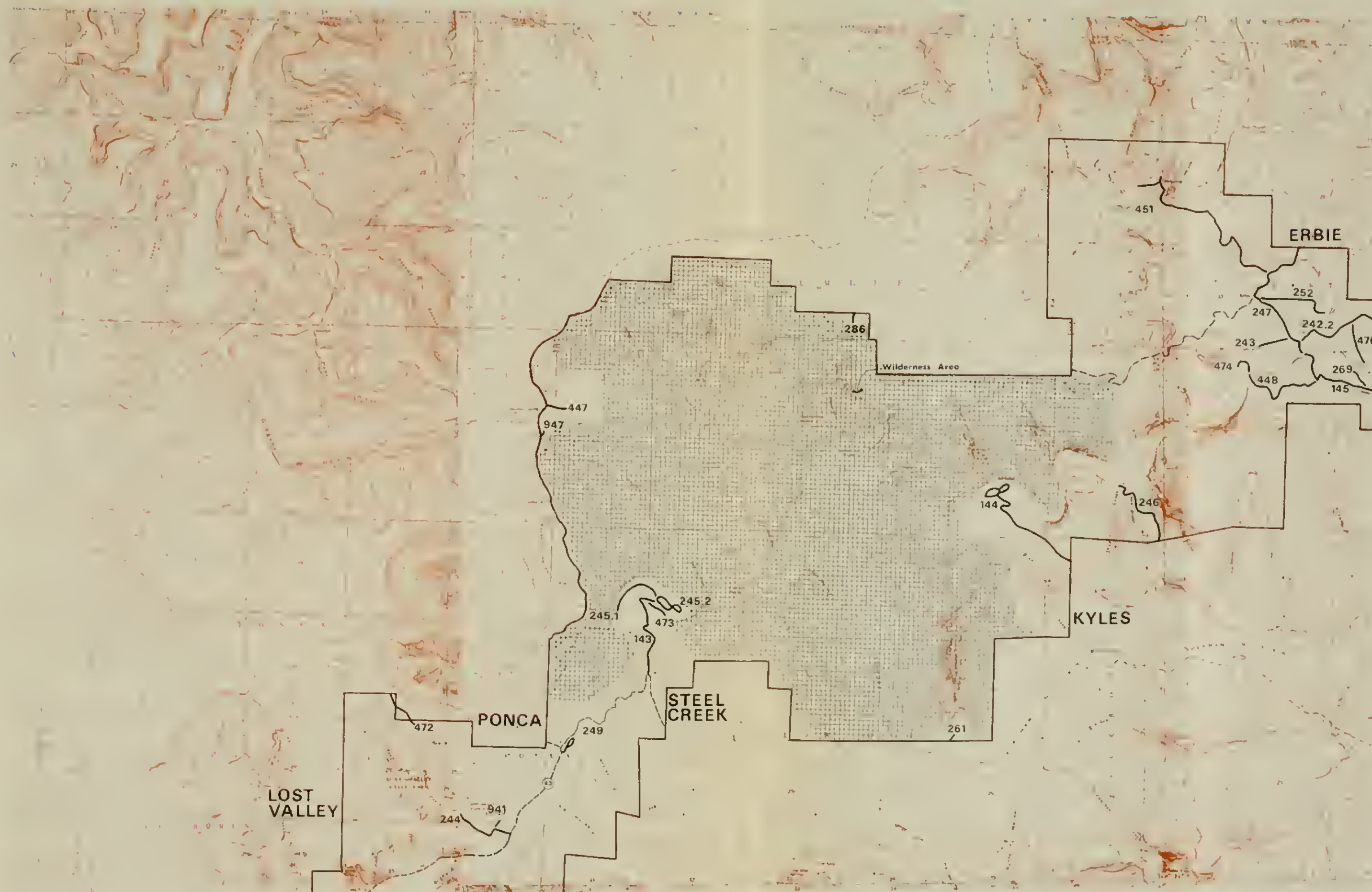
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TABLE 2:

BUFFALO RIVER ROAD SYSTEM EVALUATION

ROUTE NUMBER	ROUTE NAME	MAP NO.	LENGTH	FUNCTION	ADT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
445	Whiteley School	1	0.7	Wilderness Access	5		Dirt		IV	D	Passenger Cars
944	LuAllen	1	1.0	Hayfield/ Low Use Area		Historic District	Dirt		IV	D	
945	Boxley Bridge	1	0.1	River Access	5	Currently in Private Use; Flooding	Dirt		III	C	Two-lane; Future Development Site

TABLE BUFFALO RIVER ROAD SYSTEM EVALUATION											
ROUTE NUMBER	ROUTE NAME	MAP NO.	LENGTH	FUNCTION	ADT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
143	Steel Creek	2	1.3	Campground/Boat Access/High Use	50	DCP	Gravel	22	II	B	Recently Upgraded, Gravel
144	Kyles	2	1.4	Campground/Boat Access	20	Grades to 25%, Erosion	Dirt	9-12	IV	D	Narrow Road/Steep Slope
145	South Erbie	2/3	5.8	Campground/Boat Access	20	Historic Zone/DCP	Dirt	10-15	II	B	Type C West of Proposed Boat Access
242.2	East Erbie	2/3	1.4	Low Use Area	20	Historic Zone	Dirt	9-13	IV	D	Passenger Cars
243	Jasper in June	2	0.3	Service		Historic Zone	Dirt	9-12	VI	D	Administrative/Private Use
244	Lost Valley	2	0.6	Campground Access/ Trailhead	30	DCP	Dirt	11-15	II	B	To Be Realigned
245.1	Steel Creek Campground	2	0.7	Campground/Parking Access/High Use	50	Flooding	Gravel	14-20	III	C	Two-lane
245.2	Steel Creek Boat Ramp	2	0.7	Boat Access/High Use	50	Flooding	Gravel	14-20	III	B	Type E in One-way Loop
246	Camp Orr Spur	2	0.7	Access to Camp Orr	20		Dirt	8-11	V	C	
247	North Erbie	2	1.7	Caver Access/Low Use Area	20	Historic Zone	Dirt	12	II	C	
249	Ponca Bridge	2	0.3	Boat Access	75	Historic District/ Low Water Bridge	Gravel	12-18	II	B	
252	Fuller	2	0.7	Low Use Area	10		Dirt		IV	D	
261	Indian Creek (Mayes)	2	0.1	Hunter/Hiker/ Wilderness Access	10		Dirt		IV	D	Passenger Cars
269	Erbie Campground	2	0.8	Future Campground/ Boat Access	--	Historic District/DCP	--		III	C	Two-lane to be Const. in 1986
286	N. Ponca Trailhead	2	0.1	Hiking Access	5	Wilderness Exclusion	Dirt		IV	D	
447	Compton Radio	2	0.2	Radio Tower Access	5		Dirt		VI	D	
448	Cherry Grove Cemetery	2	1.1	Cemetery/Low Use Access	10	Historic District	Dirt		IV	D	Passenger Cars To Cemetery
451	Fitton Cave	2	2.2	Administrative Access	5	Caver Research Facility	Dirt		VI	D	
472	Villines	2	0.5	Agriculture		Partially Across Severance Tract	Dirt		VI	D	Lease
473	Steel Creek Residence	2	0.3	Park Residence/ Research Center			Gravel		VI	D	Area Needs to be Redesigned
474	Cherry Grove- Farmer	2	0.2	Agricultural		Requires Fording River	Dirt		VI	D	
476	Lindsey Field	2	0.5	Agriculture		Currently Blocked	Dirt		VI	D	
941	Beechwood	2	0.2	Community Center/ Cemetery Access		Historic District	Gravel		II	C	
947	Centerpoint Trailhead	2	0.1	Trailhead Access	5		Dirt		II	C	Two-lane



LEGEND

- PARK ROAD
- - - STATE OR COUNTY ROAD
- USE AND OCCUPANCY ROAD

ROUTE NUMBERS

BUFFALO NATIONAL RIVER
arkansas



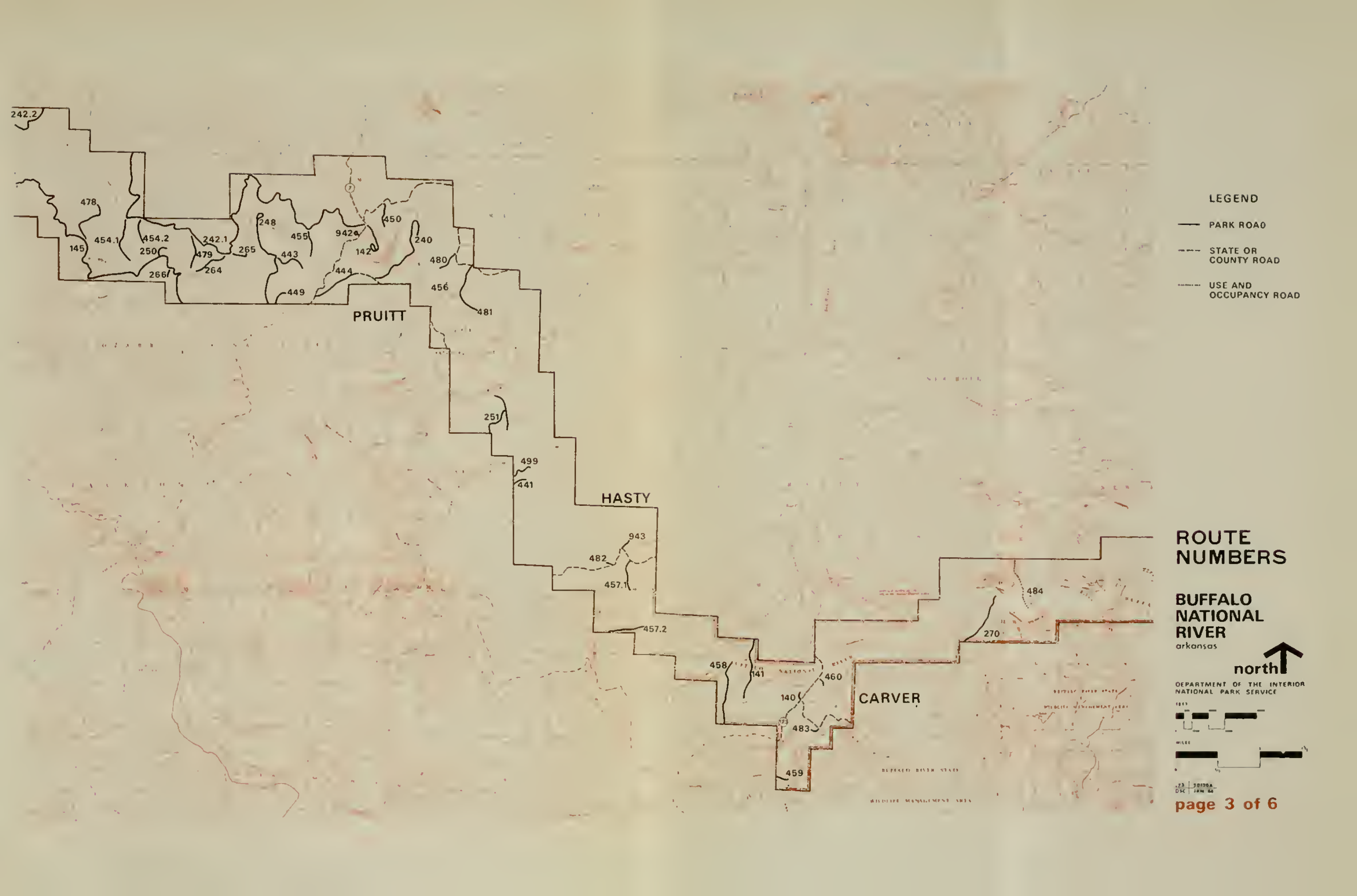
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TABLE 2: BUFFALO RIVER ROAD SYSTEM EVALUATION

ROUTE NAME	MAP NO.	LENGTH	FUNCTION	ADT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
Carver	3	D.1	Agriculture/ River Access	20		Gravel	8-12	VI	D	River Access to be Relocated to Rt. 460
Blue Hole	3	D.7	Low Use Area	10		Dirt	17	IV	D	Passenger Cars
North Pruitt	3	D.6	Boat Access/Future District H.Q.	10	DCP	Dirt	17	II	B	
South Erbie	2/3	5.8	Campground/Boat Access	20	Historic Zone/DCP	Dirt	10-15	II	B	Type C West of Proposed Boat Access
Hamilton Place	3	1.1	Low Use Area/Future Campground	10	DCP	Dirt	9	II	C	Two Lane when Campground Developed
North River	3	5.5	Low Use Area	20	Scenic Overlooks	Dirt	9-13	IV	D	
East Erbie	2/3	1.4	Low Use Area	20		Dirt	9-13	IV	D	Passenger Cars
Dzark Campground	3	1.8	Campground/Boat Access	20		Gravel	18	II	B	
Lepoldt	3	D.3	Low Use Area	5		Dirt		IV	D	
Hellie	3	0.4	Low Use Area	5		Dirt		IV	D	
Hiner West	3	0.4	Low Use Area	5		Dirt		IV	D	
Hiner East	3	D.2	Low Use Area	5		Dirt		IV	D	
Lepolt Pond	3	0.1	Fishing/Camping	5	Between 2 Ponds	Dirt		IV	D	
Walter	3	0.2	Hunter Access/Low Use Area	5	Bordered by AG & FC Land	Dirt		IV	D	
Hasty Residence	3	1.2	Private Residence Access	10		Dirt	15-20	V	D	Passenger Cars
Ozark Residence	3	0.4	Park Residence Access	5		Dirt	9	V	C	
Pruitt Park Residence	3	0.3	Park Residence Access	5		Dirt		V	C	
Shaddox Cemetery	3	0.3	Cemetery Access/Hayfield			Dirt		IV	D	
Angle West	3	D.4	Hayfield/Low Use Area	5		Dirt		IV	D	
Angle East	3	0.2	Hayfield			Dirt		VI	D	
Shaddox	3	0.3	Hayfield			Dirt		VI	D	
Vioel West	3	0.4	Hayfield			Dirt		VI	D	
Sheldon Branch	3	0.8	Hayfield			Dirt		VI	D	
Wilson	3	0.7	Hayfield/Low Use Area	5		Dirt		IV	D	
Bolin	3	0.2	Hayfield			Dirt		VI	D	
North Carver	3	D.2	River Access/Campground	5		Dirt		II	B	Proposed River Access
Taylor	3	0.6	Hayfield			Dirt		VI	D	
McFadden	3	0.5	Hayfield			Dirt		VI	D	
Wallace	3	0.3	Hayfield			Dirt		VI	D	
Hess	3	0.7	Hayfield		Currently Blocked	Dirt		VI	D	
Collins Cemetery	3	D.1	Hayfield/Cemetery Access			Dirt		VI	D	Passenger Cars
Holt	3	0.1	Hayfield			Dirt		VI	D	
Wallin	3	D.8	Hayfield			Dirt		VI	D	Use & Occupancy/Maintain Road when expired
Carroll	3	0.3	Hayfield			Dirt		VI	D	
Pruitt	3	0.1	Picnic Area/Trailhead			Gravel		II	B	
Hasty	3	D.1	Boat Access/Campground			Gravel		IV	C	Two-lane



LEGEND

- PARK ROAD
- - - STATE OR COUNTY ROAD
- ... USE AND OCCUPANCY ROAD

ROUTE NUMBERS

BUFFALO
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TABLE 2: BUFFALO RIVER ROAD SYSTEM EVALUATION

ROUTE NUMBER	ROUTE NAME	MAP NO.	LENGTH	FUNCTION	ADT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
130	Tyler Bend	4	2.7	Future Campground/ Boat Access	40	DCP	Dirt	8-13	I	A	Future Major Developed Area
131.1	Woolum - St. Joe Entrance	4	2.6	Campground/Boat Access	50	Flooding/Steep Bank/ Erosion by River	Dirt	14-18	II	B	Type C in Eroded Area by River
131.2	Woolum - N. Entrance	4	0.5	Campground/Boat Access	50	Flooding	Dirt	14-20	II	C	Two Lane
132	Mount Hersey	4	1.2	Campground/Boat Access/Low Use	50	Flooding	Dirt	15-17	II	C	
231	Grinders Ferry	4	1.2	Boat Access	50	Flooding	Dirt	16	II	B	To be Improved When Hwy 65 Bridge is Replaced
232	Baker Ford	4	0.4	Low Use Area	10		Dirt		IV	C	
233	White Bluff	4	1.7	Low Use Area	10		Dirt		IV	D	
234	Cane Branch	4	0.7	Low Use Area	10		Dirt		IV	D	Passenger Cars
273	Mt. Hersey, South	4	2.0	Low Use Area/ Ford	10		Dirt		IV	D	
276	Woolum Campground	4	0.3	Campground Access	20		Dirt		III	C	Two-lane
277	Bend Ford	4	0.3	Hunting/Fishing	5		Dirt		IV	D	
278	Love Hensley	4	0.9	Low Use Area/Hunting/ Fishing/Camping/Hay	10		Dirt		IV	D	Passenger Cars
279	Rye Bottom	4	0.8	Agriculture	10		Dirt		VI	D	Use and Occupancy; Maint. Road When Expired
430.1	Calf Creek Scenic Drive	4	4.5	Low Use Area/ Scenic Drive	10		Dirt	12-17	II	C	
430.2	Calf Creek Spur	4	0.3	Low Use Area	5		Dirt		IV	D	
431	Point Peter	4	0.6	Radio Tower	5		Dirt		VI	D	
432.1	Richland Valley	4	7.6	Trail, Hiking Access/Hayfield	10	Pastoral Scene	Dirt		IV	D	
432.2	Flatrock Spur	4	0.1	Access to Richland Valley	5		Dirt		VI	D	
433	Brewer	4	1.2	Hayfield			Dirt		VI	D	
435	Goggin	4	0.9	Hayfield			Dirt		VI	D	
436	Shine Eye	4	0.6	Low Use Area	10		Dirt		IV	D	
461.1	Mt. Hersey Campground	4	0.2	River Access/ Campground	5		Dirt		II	C	
461.2	Davis Creek	4	1.0	Hayfield			Dirt		VI	D	
485	Sharp North	4	0.3	Hayfield			Dirt		VI	D	
486	Sharp Middle	4	0.8	Hayfield			Dirt		VI	D	
487	Sharp South	4	0.7	Hayfield			Dirt		VI	D	
488	Cash Field	4	0.2	Hayfield			Dirt		VI	D	
489	Arnold Bend	4	0.4	Hayfield/Hunter Access	5		Dirt		IV	D	
491	Lane Bend	4	1.3	Hayfield			Dirt		VI	D	Use and Occupancy;Main- tain Road When Expired.
492	Long Bottom	4	1.0	Exotic Species Control			Dirt		VI	D	Delete When Control is Completed.

MOUNT
HERSEY

TYLER BEND

WOOLUM

LEGEND

- PARK ROAD
- - - STATE OR COUNTY ROAD
- USE AND OCCUPANCY ROAD

ROUTE
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BUFFALO
NATIONAL
RIVER
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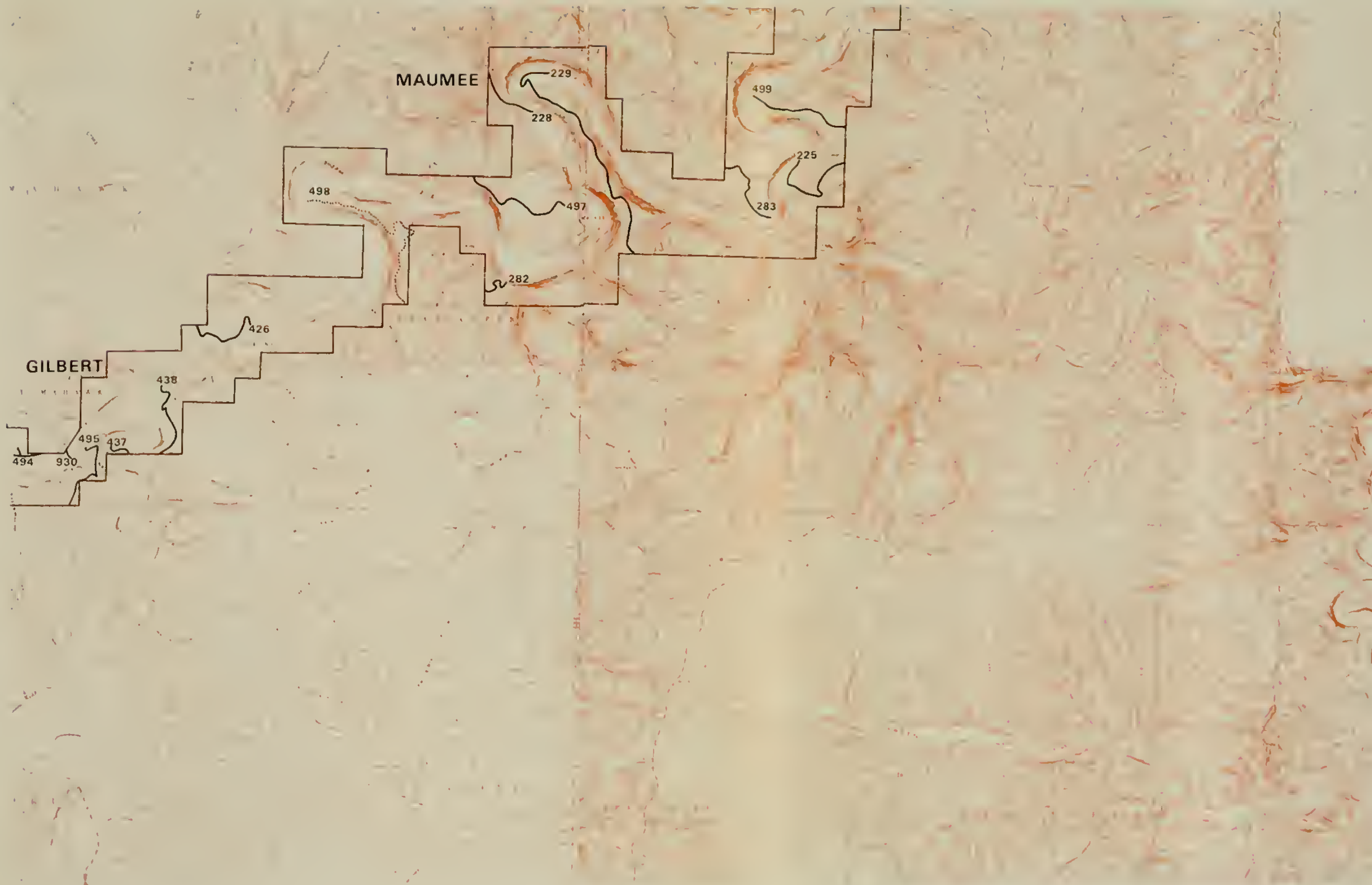
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TABLE 2: BUFFALO RIVER ROAD SYSTEM EVALUATION

ROUTE NUMBER	ROUTE NAME	MAP NO.	LENGTH	FUNCTION	ADT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
225	Spring Creek	5	1.2	Low Use Area	10		Dirt	13	IV	D	Passenger Cars
228	North Maumee	5	0.4	Boat Access	50		Gravel	14-18	II	C	
229	South Maumee	5	2.5	Boat Access	50		Dirt	12-14	II	C	
282	Little Rocky	5	0.5	Low Use Area/Boat Acc.	10		Dirt		IV	D	
283	Shawnee	5	1.0	Low Use Area	5		Dirt		IV	D	
426	Plum Field	5	0.5	Low Use Area	10		Dirt		IV	D	
437	Crane Bottom	5	0.2	Hayfield			Dirt		VI	D	
438	Bear Creek	5	0.8	Low Use Area	5		Dirt		IV	D	
494	Gilbert Field	5	0.3	Hayfield			Dirt		VI	D	
495	Blair	5	1.0	Hayfield			Dirt		VI	D	
497	Sanders North	5	1.0	Fire Management			Dirt		VI	D	Minimum Maintenance for Fire Management.
498	Potter	5	2.0	Agriculture			Dirt		V	D	Use and Occupancy; Main tain Road When Expired.
499	Jackpot	5	1.3	Low Use Area	5		Dirt		IV	D	
930	Gilbert	5	0.1	Boat Access/Trailhead	10		Gravel		II	C	Two-lane



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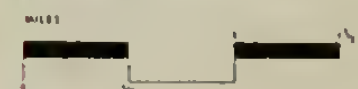
- PARK ROAD
- - - STATE OR COUNTY ROAD
- USE AND OCCUPANCY ROAD

ROUTE NUMBERS

**BUFFALO
NATIONAL
RIVER**
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TABLE 2: BUFFALO RIVER ROAD SYSTEM EVALUATION

ROUTE NUMBER	ROUTE NAME	MAP NO.	LENGTH	FUNCTION	AOT	SPECIAL CONSIDERATIONS	EXIST. SURFACE	EXIST. WIDTH	FUNC. CLASS	DESIGN TYPE	COMMENTS
21	Buffalo Point Main Access	6	1.4	Campground/Boat Access/High Use	330	Flooding	Paved	22	I	A	22' Pavement
120	Buffalo Point Camp. Access	6	0.5	Campground Access	100	Flooding	Paved	14-18	II	A	
121.1	Rush Main Access	6	2.0	Campground/Boat Access/High Use	50	Hist. Dis./Archeol. Sites/Flooding/DCP	Gravel	18-22	II	B	Type A From Park Boundary to Ghost Town
121.2	Clabber Creek	6	0.2	Picnic Area Access/Low Use	50	Hist. Dis./Archeol. Sites/Flooding/DCP	Gravel	14-22	II	C	
220.1	Buffalo Point Cabins	6	0.3	Lodge/Concession Access	30		Paved	12-14	III	E	Paved
220.2	Buffalo Point Cabins	6	0.2	Lodge/Concession Access	30		Paved	12-14	III	E	Paved
222	Buffalo Point Picnic Area	6	0.3	Group Campground/Picnic Area	50		Paved		II	B	Paved
223	Buffalo Point Campground	6	0.8	Campground Circulation	100		Paved	14	III	E	Paved
224	Big Creek	6	0.5	Wilderness Access	10	Wilderness Exclusion	Dirt	8-22	IV	O	
226	Rush Campground	6	0.3	Campground Access	10	Historic District Archeological Sites	Dirt	9	II	C	Two-lane
227	Cedar Creek	6	0.3	Low Use Area	10		Dirt	9	IV	D	
284	Highway 14 Overlook	6	1.0	Scenic Vista	5		Dirt		IV	D	
421	Buffalo Point Maintenance	6	0.3	Maintenance Area Access	60		Gravel	20	V	B	
424	Buffalo Point Residence	6	0.8	Park Residence Access	20	Adjacent to Wilderness Area	Dirt	15	V	C	
427	Hathaway Mountain	6	0.4	Radio Tower/Wilderness Access	5	Wilderness Exclusion	Dirt		IV	D	
428	Dillard's Ferry	6	1.0	Hayfield/Future Campground Access	5	Flooding/DCP	Dirt		II	B	Future Campground Access Road
429	Shipman	6	1.1	Low Use Area/Hayfield	5		Dirt		IV	O	
430	Horse Pasture	6	0.5	Park Horse Pasture			Dirt		VI	D	
500	Salt Peter Cave	6	0.5	Cave Access	5		Dirt		IV	D	
921	Buffalo Point Maintenance	6	0.3	Maintenance, Materials Storage			Gravel		V	C	
922	Buffalo Point Residence Rd.	6	0.1	Park Residence			Gravel		V	C	
923	Oillard's Ferry Access	6	0.1	Boat Access			Gravel		II	B	To Be Phased Out With New Development
924	Buffalo Point Cabin Access	6	0.1	Cabin Access			Paved		III	C	Paved
925	Buffalo Point Sewage Plant	6	0.1	Sewer Treatment Plant			Paved		V	C	
926	Buffalo Point Water Tank	6	0.2	Park Residence/Water Tank			Dirt		V	C	
927	Buffalo Point Monitor Stat.	6	0.2	Air Quality Monitoring Station			Dirt		V	D	

LEGEND

— PARK ROAD
- - - STATE OR
COUNTY ROAD
..... USE AND
OCCUPANCY ROAD

ROUTE NUMBERS

BUFFALO NATIONAL RIVER

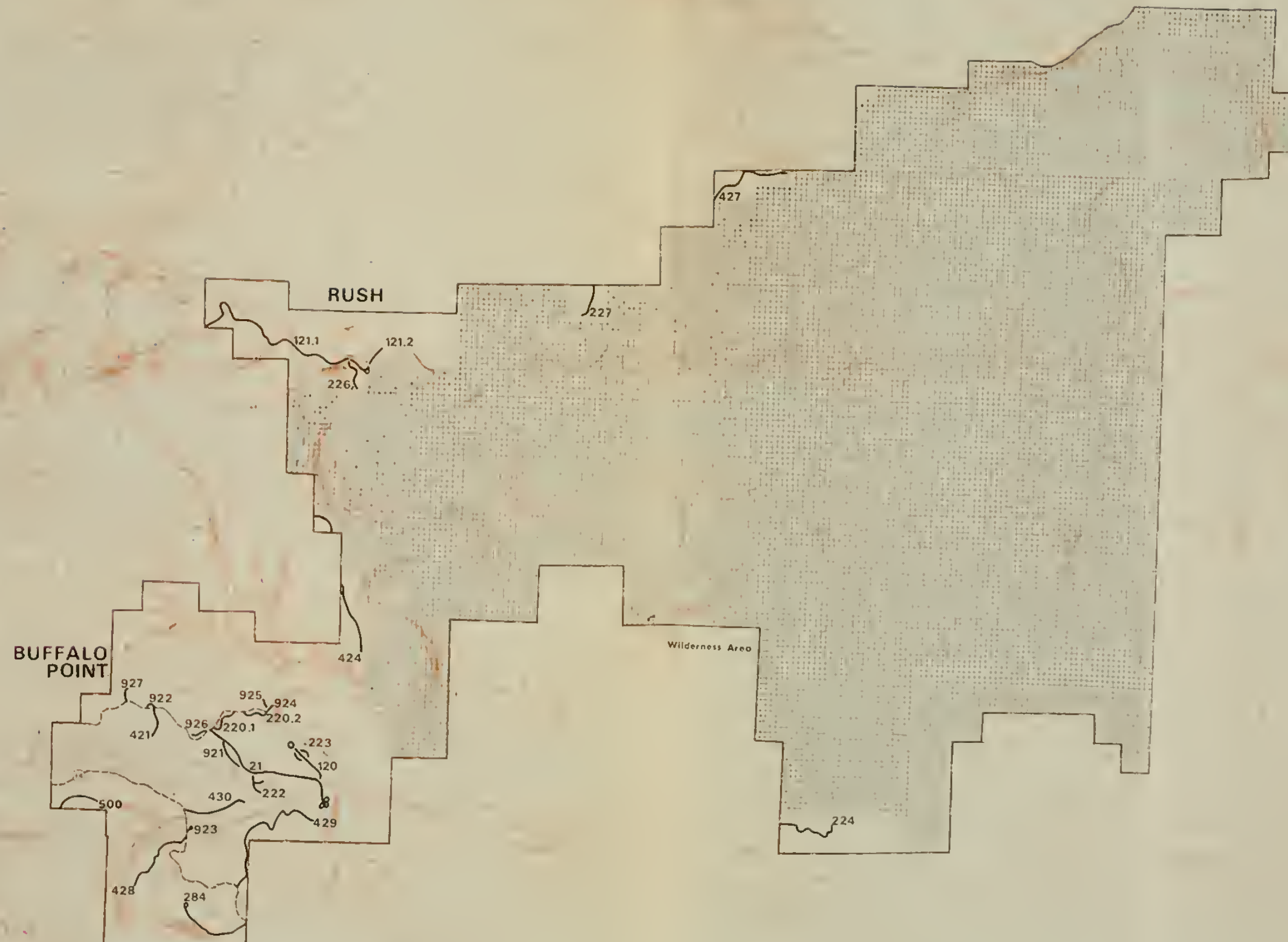
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north 

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The top graph, labeled "FEET", shows a step function with three steps. The first step has a height of 300, the second step has a height of 3000, and the third step has a height of 3000. The x-axis is marked with 0, 1000, and 3000. The bottom graph, labeled "MILES", shows the same step function in miles. The first step has a height of 1/2, the second step has a height of 1, and the third step has a height of 1 1/2. The x-axis is marked with 0, 1/2, and 1.

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LEGEND

- PARK ROAD
- - - STATE OR COUNTY ROAD
- USE AND OCCUPANCY ROAD

ROUTE NUMBERS

BUFFALO NATIONAL RIVER
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Paul Zenisek, Project Manager, DSC
Bob Schreffler, Landscape Architect, DSC
Mike Spratt, Transportation Planner, DSC
Jim Liles, Assistant Superintendent, BUFF
John Parks, Chief of Maintenance, SWRO
Jim Straughan, Chief, Transportation Branch, DSC
Mike Bureman, Cultural Resource Compliance Specialist, DSC
Mark Moseley, Upper Buffalo District Ranger, BUFF
John Scott, Middle Buffalo District Ranger, BUFF
Carl Hinrichs, Chief Ranger, BUFF
Steve Chaney, Resource Management Specialist, BUFF
Sammy Lail, Acting Lower Buffalo District Ranger, BUFF

As the nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

