

footpaths & bike routes

This article was prepared by the Oregon State Highway Division in January 1972. It is intended to provide general considerations and methods for bicycle trail and footpath planning, design and construction. The standards and guidelines will vary according to local conditions and special situations.

In the 1971 Regular Session of the Oregon Legislative Assembly, House Bill 1700, commonly known as the Bicycle Bill, was passed which became Chapter 376 of Oregon Laws of 1971. This law provides that not less than 1% of the funds received by the Commission or by any city or county from the State Highway Fund shall be expended as necessary for the establishment of footpaths and bicycle trails.

Such footpaths and bicycle trails provide opportunities to complement present modes of transportation by linking communities, schools, parks and places of work while reducing congestion in areas and conflicts between various forms of travel occurring on some streets and highways. Bicycle and pedestrian pathway establishment creates additional commuting and recreation opportunities within urban, suburban, and rural areas.

(Continued on page 11)

guideline

NATIONAL CONFERENCE ON STATE PARKS

Ben Bolen, President
Barry Tindall, Executive Secretary

NATIONAL RECREATION AND PARK ASSOCIATION

Willard Brown, Chairman,
Board of Trustees
Dwight F. Rettie, Executive Director
James E. Yeo, Circulation Manager

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

Rogers C. B. Morton, Secretary
George B. Hartzog, Jr., Director
Patricia Conner, Acting Chief, Div. of State
and Private Assistance

Ron Greenberg and Susan Dietch,
Editors

Glenn Snyder, Art Editor

CONTENTS

FOOTPATHS & BIKE ROUTES	9
BIKES IN THE BOONDOCKS	17

The opinions expressed in GUIDELINE are those of the authors and not necessarily those of this publication, the Park Practice Program, its sponsoring and cooperating organizations, agencies or the officers thereof. Contributions to GUIDELINE are invited. Illustrative materials and a brief biographical sketch of the author should accompany text intended for publication. Send all material to: Editor, GUIDELINE, Division of State and Private Assistance, National Park Service, Washington, D.C. 20240.

Establishing a plan

I. DETERMINING CYCLING NEEDS, INTERESTS, PROBLEMS

A. Evaluate cycling activity in the community

1. Consult with law enforcement agencies for auto-bike conflicts and problems
2. Interview school officials and school safety committees for determining cycling patterns in the community
3. Consult with local planning commissions and personnel
4. Request opinions from civic organizations and service clubs
5. Request input from cycling clubs in the community
6. Consult authorities in other communities and states
7. Review state and local outdoor recreation plans

B. The survey should determine

1. Individual and group interests in cycling
2. Number and ages of cyclists in neighborhoods
3. Cycling patterns - existing
4. Traffic problems with cyclists using streets
5. Existing laws and ordinances affecting cyclists
6. Community-wide distribution
7. Traffic counts
8. Plans for future developments that may include cycling facilities

C. Available facilities and how used for bicycling

1. Inventory park and recreation areas
 - a. Roads
 - b. Walks
 - c. Hiking trails
 - d. Paved multiple-use areas
 - e. Parking lots
2. Community facilities not under park and recreation department that have potential for cycling
 - a. Side streets
 - b. Secondary and little-used roads
 - c. School grounds
 - d. School and college tracks
 - e. Fairgrounds
 - f. Parking lots
 - g. Utility rights of way
3. Facilities that can be converted, expanded, or improved for bicycling
 - a. Dry canals
 - b. Dry riverbeds
 - c. Abandoned railroad beds
 - d. Existing little-used pedestrian or riding paths and trails

D. Evaluate

1. In terms of facilities
2. In terms of facilities for bicycling

II. EXISTING FACILITIES

- A. Evaluate planned bicycle programs in light of community survey to determine need for expansion
- B. Experiment with marking roads and streets as bike routes
- C. Experiment using walks, hiking trails, etc., signed and marked as bike routes.
- D. Try multiple uses of facilities
- E. Evaluate use to determine additional need

III. CONSTRUCTION OF NEW BIKE ROUTE FACILITIES

A. Check for suitability

1. Topography
2. Scenic qualities
3. Points of interest
4. Passing other activity points
5. Proximity to service facilities
6. Consider using perimeter areas
7. Consider following canal, creek or riverbanks
8. Consider paralleling roads
9. Compatibility with overall plan or ultimate goal

B. Plan layout

1. Sketch approximate route
2. Possible additional engineering necessary (topography, etc.) for detailed layout
3. Design variety into trail to insure repeat use
4. Determine length of trail - avoid a short facility
5. Determine width of trail
6. Consider maintenance
7. Consider lighting
8. Consider street crossings and alternatives
9. Plan markings and signs

IV. EXPLORE POSSIBILITIES OF FEDERAL HELP

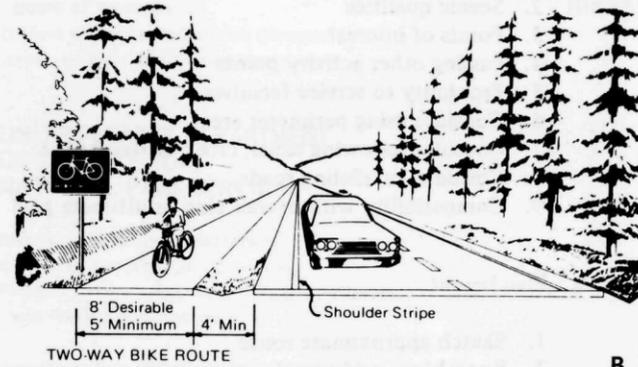
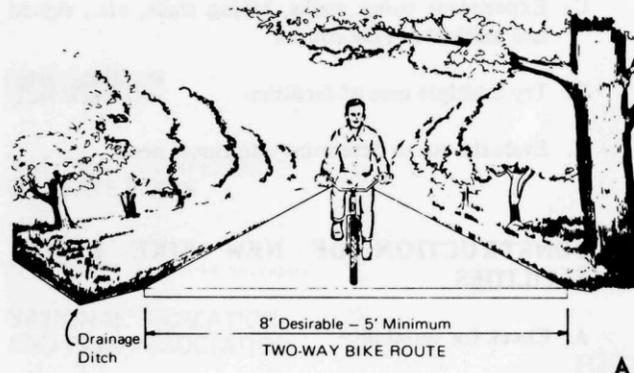
- A. Land and Water Conservation Fund Act
- B. Economic Opportunity Act
- C. Open Space Program
- D. Urban Renewal
- E. Federal Highway Act

Planning and design

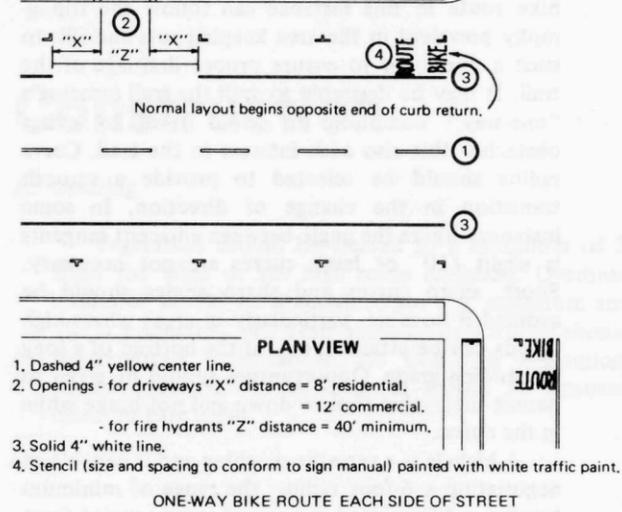
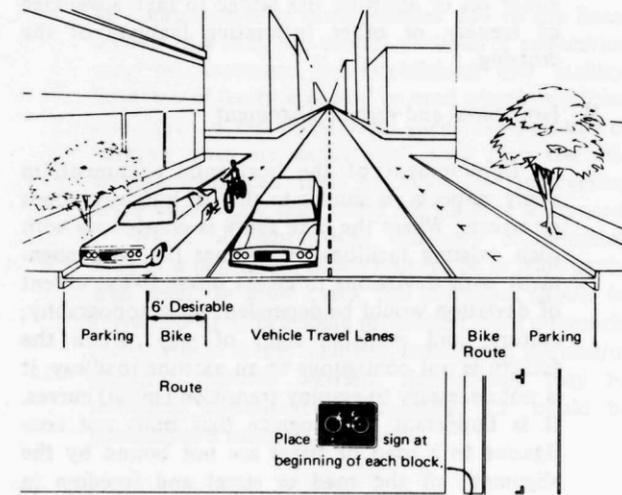
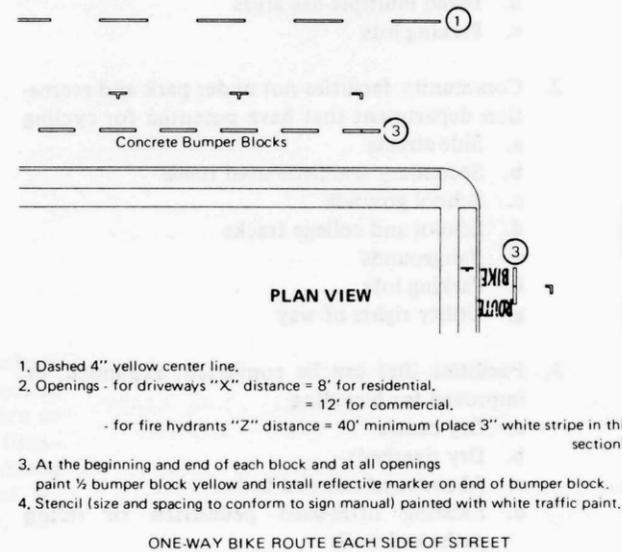
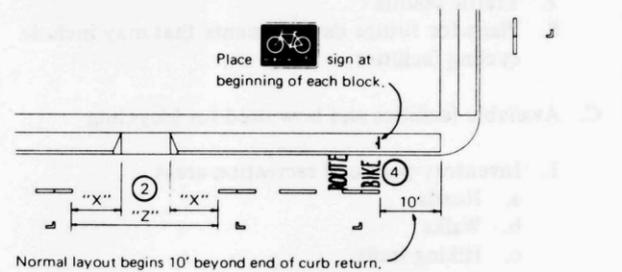
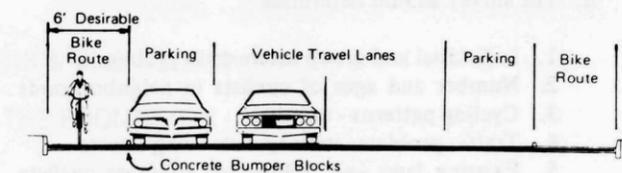
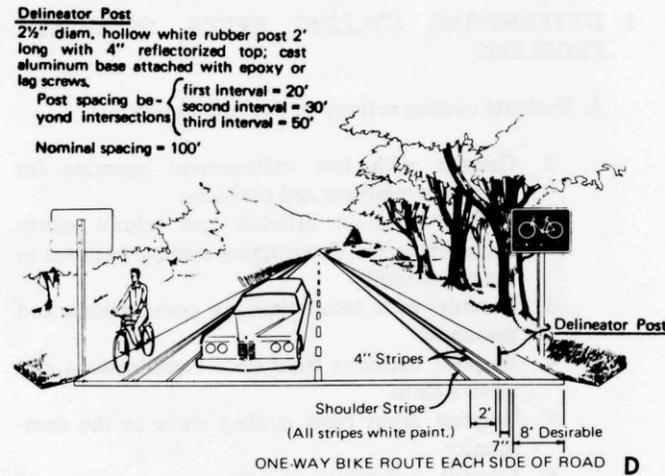
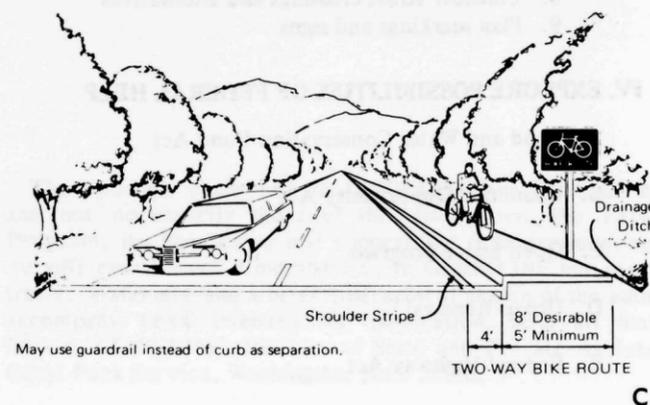
I. GENERAL CONSIDERATIONS FOR DESIGN AND CONSTRUCTION OF FOOTPATHS AND BIKE ROUTES

A. Four types of bike routes for varying conditions.

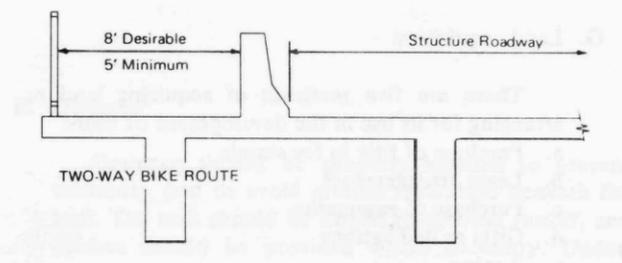
1. An independent trail for exclusive bicycle/pedestrian use that may be entirely independent of other facilities (A) or utilize highway right-of-way (B)



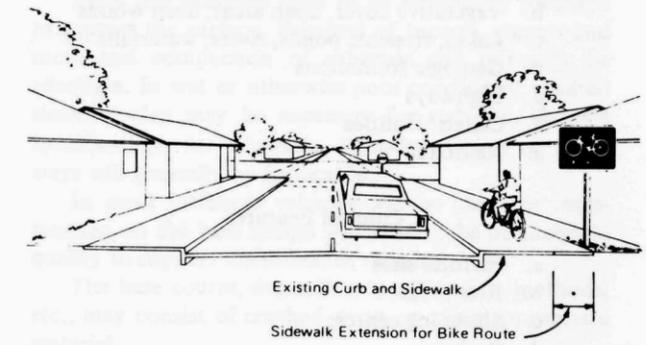
2. A bike route that utilizes city streets, secondary roads and other existing facilities and is so designated by signs, striped lanes, and/or physical barriers such as guard rail, special fencing, curbed sections, etc. (C, D, E, F)



3. A bike route utilizing same as above, but is signed only. No provisions are made for separation.
4. A bike route to be constructed as part of a new structure, signed and separated from the travel way by a physical barrier (G)

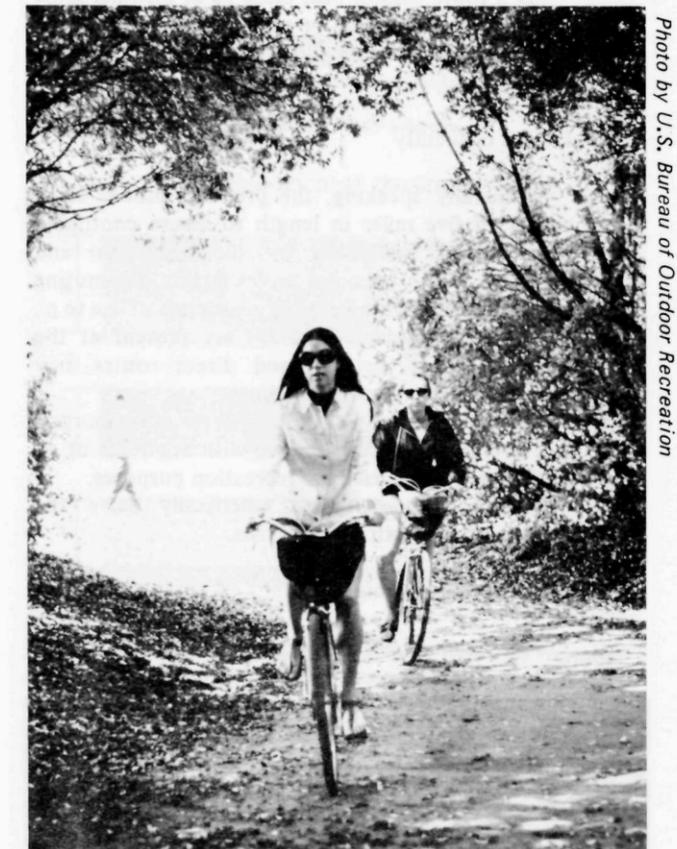


5. Extra width on sidewalks, usually 2' to 3' with markings or signing to allow bicycle traffic (H)



*2' to 3' (4' to 5' where poles or mailboxes are located in sidewalk).

ONE-WAY BIKE ROUTE EACH SIDE OF STREET



Cyclists ride along tree-lined trails in Golden Gate Park, San Francisco, California.

B. Features of interest

A footpath and bike route, while providing a means for reaching one point from another, should provide stops and access to and near parks, viewpoints, or items of cultural interest. It should allow riding through a diverse and dynamic landscape. The following lists some of the items to be considered in route selection:

Physical Features

- Terrain
- Vegetative cover, open areas, deep woods
- Lakes, streams, ponds, rivers, waterfalls
- Geologic formations
- Highways
- Canals, Utilities
- Railroads

Cultural Features

- Historic sites
- Rest areas
- Shopping centers
- Bridges
- Parks
- Civic centers
- School campuses

If a route cannot pass close to or through some items of interest, spurs or connecting loops may be considered as additions to the main trail to create diversity and stimulate interest.

C. Length of facility

Generally speaking, the proposal should be in excess of five miles in length to assure continued interest and utilization by the pedestrian and bicyclist. If the proposal serves largely commuting traffic, and if large sources or generators of use (e.g., college campus, large factory) are present at the termini, short distance and direct routes may become a primary consideration.

Ideally, a bike route should serve a commuting and overall transportation use with segments or all of that trail being used for recreation purposes.

Other proposals may specifically serve the racing and competition bicyclists.

D. Width considerations

The recommended width for bike routes is eight feet, but heavily used, urban bike routes can exceed this width. For a two-way bike facility, the minimum width is five feet. Where conditions warrant one-way trails, sections with widths of three to four feet would be considered adequate, but minimal.

If the bike route is to be established in conjunction with sidewalks, it is desirable to add extra width to accommodate bicycles—a minimum of two feet to four feet is recommended, generally extending the total width of the sidewalk to seven to nine feet.

E. Bridges

Bridges will need to be wider than the bike routes they connect, particularly if two-way traffic is to be accommodated. A survey shows that an average width of bicycle bridges is 7.5 feet, therefore a basic minimum of 8 feet is desirable.

Consideration should be given to pull-off areas either on or abutting the bridge to take advantage of scenery or other interesting features of the crossing.

F. Horizontal and vertical alignment

Development of the horizontal alignment, in many respects, is similar to that of highway, roads or streets. Where the bike route is contiguous with such existing facilities, it assumes the same alignment with deviations to create interest—the extent of deviation would be dependent upon topography, culture, and available right of way. When the facility is not contiguous to an existing roadway, it is not necessary to employ transition (spiral) curves. It is important to recognize that trails not contiguous to a road or street are not bound by the alignment of the road or street and freedom in alignment is allowed under these conditions. The bike route in this instance can follow the topography prevalent in the area keeping cuts and fills to such a minimum to ensure proper drainage of the trail. It may be desirable to split the trail creating a "one-way" condition to avoid trees or other obstacles—this also adds interest to the trail. Curve radius should be selected to provide a smooth transition in the change of direction. In some instances where the angle between adjacent tangents is slight (10° or less), curves are not necessary. Short, sharp curves and sharp angles should be avoided if possible, particularly in areas where high speeds can be attained, e.g., at the bottom of a long descending grade. Opportunities should be given to permit the cyclist to slow down and not brake while in the curve.

A bicycle is a versatile machine and is capable of negotiating a 6-foot radius; the range of minimum turning radii reported in a recent survey varied from 6 to 50 feet with an average minimum radius of 17.4 feet. On this basis, the minimum turning radius should be 20 feet.

Grades should vary on a bike route, particularly one serving recreation cyclists. The main condition to avoid is long, steep uphill grades. A 15% uphill grade for short distances may be considered a working maximum, while 10% grade is a desirable maximum. The grade and its length must be judged together. The long climb, even though gradual, should be avoided.

G. Land acquisition

There are five methods of acquiring land or arranging for its use in the development of trails:

- Purchase of title in fee simple
- Lease arrangements
- Purchase of easements
- Gifts or dedications
- Zoning

Fee simple acquisition is generally the most expensive method, but it guarantees the fullest use of property.

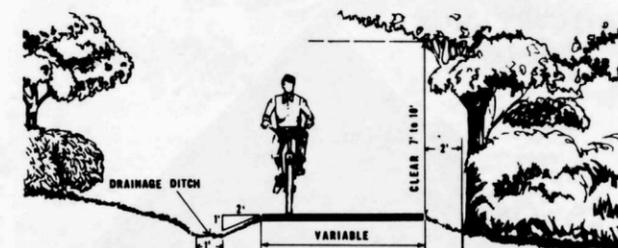
Acquiring lands or rights for bike route use may be complicated by many factors due to the linear aspects of a trail, and several methods of acquisition may be necessary for establishing one facility. Purchase of fee title should be used where major use areas such as rest stops, mini parks, campground or parking areas are anticipated. Less than fee title arrangements can then be made for intervening areas where only bike route use itself is warranted.

Width of right-of-way will vary considerably and, as a minimum, needs only to be as wide as the trail itself. In most cases, this minimum should be surpassed to afford some protection from encroachment. Where scenic qualities, anticipated use and/or physical features warrant, right-of-way may be extended considerably. Generally, 15' could be considered a working minimum.

Construction

A. Clearing

Vegetation should be cleared to a minimum of 2' from the edge of the bike route surfacing. Overhead clearance should be maintained for a 7' minimum and 10' is preferable. All dead branches and trunks should be removed from above the trail. All vegetation, including roots, on the subgrade should be removed down to bare earth.



TYPICAL SECTION SHOWING CLEARING & DRAINAGE

B. Drainage

Drainage should be properly handled to prevent washouts, and to avoid ground saturation beneath the trail. The trail should be sloped to provide runoff, and ditches should be provided where necessary. Underdrains may be necessary in very wet places to prevent frost action with resultant heaving.

In special instances, catch basins and drains may be needed.

C. Bases

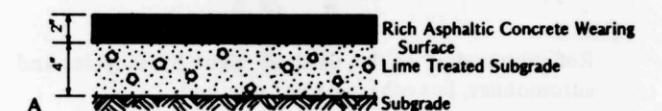
Bases and subbases need to be adequately prepared to protect the surface. Removal of topsoil, stumps and roots and compaction of subgrade will normally be adequate. In wet or otherwise poor conditions, crushed stone or slag may be necessary for stability. General specifications for sidewalks, light-duty roads or driveways will generally be applicable.

In most instances vehicles will be used for maintenance, so the base design will need to be of adequate quality to support maintenance vehicles.

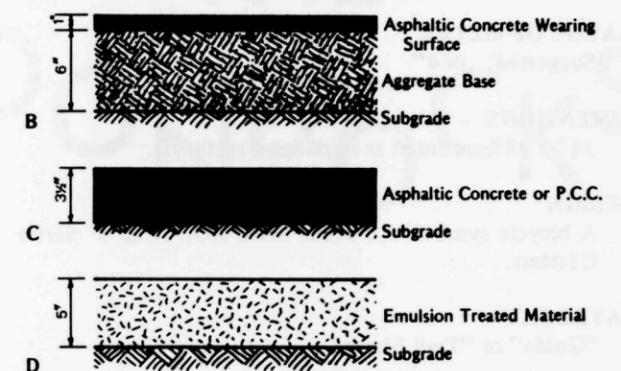
The base course, depending upon locality, methods, etc., may consist of crushed stone, or other appropriate material.

TYPICAL SECTIONS - BASE DESIGN

CONSIDERED AS NORMAL



ALTERNATES TO BE CONSIDERED



Bicycle path near Provincetown, Mass., Cape Cod National Seashore.



Photo by C. W. Stoughton

Appendix

Standard Signing

All signs and markings must conform to the *MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES*, 1971 edition.

BIKE ROUTE

USE

A nationally-approved sign for marking an officially designated bicycle trail, appropriate both where a trail is separate from a street or highway and where a trail may be routed on selected roads or streets.

MATERIAL

Alloy aluminum or any other suitable metal, plastic or high-density plywood.

FINISH

Reflectorized if to be used at night by bicycles and automobiles, but otherwise not required.

COLORS

Standard Interstate Green, White.

GAUGE OF METAL

Suggested: .064"

DIMENSIONS

24" x 18" mounted as horizontal rectangle.

DESIGN

A bicycle symbol; the words BIKE ROUTE in 3" Series C letters.

CATEGORY

"Guide" or "Trail Blazer".

XING

USE

A nationally approved sign for placement on a street or highway just in advance of a point where an officially designated bicycle trail crosses the roadway.

MATERIAL

Alloy aluminum or any other suitable metal, plastic or high-density plywood.

FINISH

Reflectorized material as in warning signs if it must be effective at night.

COLORS

Standard Hi-way Warning Yellow, Black.

GAUGE OF METAL

Suggested: .080"

DIMENSIONS

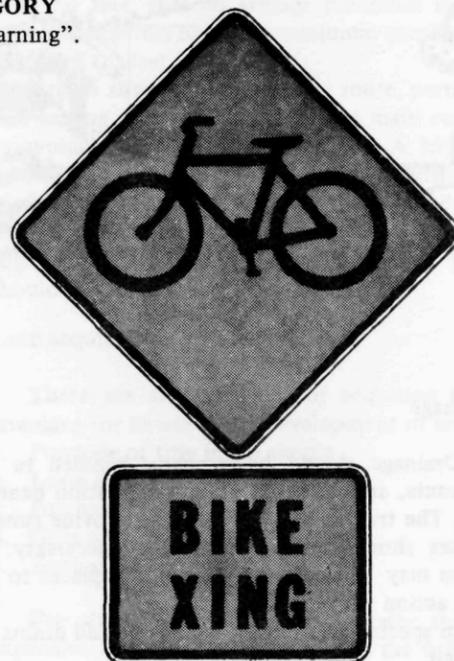
30" x 30" mounted as a diamond.

DESIGN

A bicycle symbol; the term XING in 6" Series D letters. "X" substitutes for "cross", shortening the word "crossing".

CATEGORY

"Warning".



BIKES IN THE BOONDOCKS

Reprinted by permission from *TEXAS PARKS AND WILDLIFE*, June 1971.

By Howard Barnett

The exploding popularity of trail- and mini-motor bikes has created a dilemma for those in charge of planning and managing our state parks. On one hand, more than a million off-the-road bikes were sold during the 1960's, and sales are still going strong. That's a lot of riders looking for a place to go. On the other hand, park superintendents must live with complaints about mini-bikes racing through campsites and destroying the tranquility of nature trails.



Photo by Bill Reaves

So the Texas Parks and Wildlife Department was faced with three options in dealing with this apparent contradiction in park use:

1. Ignore the problem.
2. Come down with a heavy hand and strictly forbid bikes in the parks.
3. Recognize trail- and mini-bikes for what they are—a solid and rapidly growing recreation trend which is fun, challenging and healthful, and for which provisions must be made before utter chaos reigns.

The department took the third option by setting aside areas for motorbike riding in 20 state parks including Lake Brownwood, Lake Colorado City, Cleburne, Inks Lake, Kerrville, Lake Arrowhead, Lake Whitney, Possum Kingdom, Atlanta, Eisenhower, Fort Parker, Martin Dies, Jr., Tyler, Bastrop, Huntsville, Lake Sommersville, Stephen F. Austin, Falcon, Goliad and Lake Corpus Christi state parks.

To satisfy the objections of other park users, the bike areas are isolated from other recreational areas. Also, the bike areas are of minor ecological importance so a minimum of environmental damage will be done.

In formulating policies, rules and regulations for the trail- and mini-bike areas, the department consulted other states to see what they were doing. Most states had not

come to grips with the problem, but California had some useful data on noise levels of different types of mufflers, and the department did get enough information to develop a policy that should be fair to both rider and camper.

Bikers are informed right away that these areas may be only temporary. Signs designating the "Trail and Mini-Bike Area" say, "This area is being provided on a trial basis for your use and enjoyment. Failure to comply with regulations may result in banning of this activity."

Several of the areas are being monitored to see how the arrangement is working.

Rules and procedures were kept simple so there could be no misunderstanding about what is expected of those who use the areas:

Motor bikes are defined as two- or three-wheeled motorized vehicles.

All motorbikes must be equipped with an unmodified street-legal muffler and a spark arrester/exhaust system approved by the U.S. Forest Service.

Motorbike and mini-bike operators must keep their vehicles under control at all times and ride with reasonable care and with due regard to the safety and convenience of other park users and other vehicles:

Only street-legal motorbikes with licensed operators will be permitted to ride on roads designated Park Roads. All Texas laws apply, including the use of approved safety helmets.



Photo by U.S. Bureau of Outdoor Recreation

Motorbikes are *not* to be operated on state park roads between 10 p.m. and 8 a.m. except in emergencies. This applies to all state parks, not just those with mini-bike areas.

Operators of street-legal motorbikes in state park camping areas shall limit travel to ingress and egress from their campsites only. Indiscriminate riding back and forth within the park and the creating of excessive noise by a motorbike is prohibited.

Photo by Bill Reaves





Photos by Bill Reaves

Trail- and mini-bikes not legal on city streets may be operated only in designated areas and must be transported to and from the trail. Protective headgear is recommended.

The use of trail- and mini-bike areas will not be permitted after sundown or before 8 a.m. by either street-legal or non-street-legal trail- or mini-bikes.

The use of trail- and mini-bike areas by pedestrians, bicycles, horses or any racing bike is prohibited.

Chasing or otherwise harassing any form of wild animal in a state park is prohibited by state law and punishable by fine. Tracking and harrassing domestic animals is prohibited.

These rules and maps of trail- and mini-bike areas are available in the state parks where such areas are designated.

The bike areas in the 20 state parks offer enough variety to satisfy a novice or an experienced rider who has progressed to trying the more challenging feats on his machine. One word of caution: Those who travel to the areas would be wise to make sure their bikes are in good repair. In case of breakdown, it might be a long push to the trail head.

Experienced trailriders know how physically demanding their sport can be. They also know that protective clothing can prevent a severe case of "road rash." Long pants, a long-sleeved shirt, boots and protective headgear are recommended. Where there are trees and overhanging branches, goggles are also a good idea.

The important thing to remember, though, is to abide by the rules and remember that other persons are using the park, too.

