

TRAIL RESOURCES, USERS AND OPPORTUNITIES  
IN THE UNITED STATES

By

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Introduction

Trails represent perhaps an important and varied class of recreational resource. Trails include marked, designated or blazed paths, and many unimproved roads, on land and water. Trail types vary from urban areas with highly developed and paved jogging, bicycle and fitness trails, to botanical gardens, nature centers, and some federal and state recreation areas with short interpretive or nature study loop trails, to wilderness trails. Trails designed for persons with disabilities exist in many areas of the country. Rivers, lakes and forested slopes contain canoe routes, horse trails, and maintained and unmaintained footpaths sometimes extend several hundred miles.

Trail resources are used as a primary resource for a wide range of activities including hiking, horseback riding, bicycling, canoeing, cross country skiing, and off-road driving. In addition, trails serve as primary travel routes for many other dispersed forest activities, including primitive camping, berry picking, hunting, nature study and wildlife photography.

The importance of trails in outdoor recreation is evident in the number of trips away from home taken by Americans over age 12 for trail related activities. In 1987, those people took over 267 million trips for pleasure walking, 115 million biking trips, 91 million trips to go day hiking, 45 million to observe wildlife, 70 million backpacking trips, 63 million horseback riding trips, 71 million nature study trips, 80 million off-road driving trips, 40 million canoeing/kayaking trips, and 18 million snowmobiling trips. It is estimated that for all trail related activities, Americans took over 920 million trips in 1987. For people involved with some of these activities, enormous

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amounts of time are allocated, indicating their importance. For example, day hiking involved over 320 million person days and pleasure walking over 1.5 billion person days in 1987.

### Trail Use and Users

Trail use depends on both resource-related factors and people-related factors. The length and characteristics of the trail, the types of activities accommodated, availability of and access to trail resources, trail quality, and information concerning these trail resources are important resource-related factors. People-related factors include age, physical condition, income, education, access to transportation, and preferences.

In addition to management uses of many trails, such as fire suppression, trails support recreational uses including backpacking, hiking, bicycling, pleasure walking, horseback riding, off-road vehicle driving, jogging, bicycling, canoeing and cross-country skiing. In addition, trails serve as primary travel routes for several dispersed forest land activities such as primitive camping, berry picking, hunting, nature study and wildlife photography.

Characteristics of Trail Recreation.--The 1985-87 Public Area Recreation Visitor Study (PARVS) provided information about trail use on public recreation lands. One important part of this information is a measure of "popularity". Popularity of a recreational activity is most commonly measured by the percent of the population who participate in the activity at least once per year (Figure 1). By this measure, walking for pleasure is the most popular activity in the United States which typically involves trails. Other popular activities which solely occur on trails or unimproved forest roads are day hiking, interpretive uses, and horseback riding. Also important is how often individuals participate. Measured this way, walking for pleasure is again the most popular trail-associated activity, followed by walking for pleasure, off-road driving, and hunting (Figure 2).

Another important measure of participation is how far someone will travel and how long they will stay to participate in an activity. Figure 3 shows that people are willing to travel much further and stay much longer to participate in backpacking trips than for other types of trail use. These other trail uses were mostly day trips. Over half of backpacking trips lasted over two days.

There were regional differences in trail recreation as well. In all regions, walking for pleasure was the most popular trail use. Cross-country skiing, obviously, was less popular among southern residents, than among residents of other regions. Additionally, Southerners participated less in running, jogging or day hiking than did residents of other regions. Running and jogging were more popular in the North than in the other regions. Walking for pleasure and day hiking were most popular in the Pacific Coast region. For residents of the Rocky Mountain region day hiking, backpacking, horseback riding, off-road vehicle use, and cross-country skiing were popular trail activities.

Characteristics of Recreational Trail Users.--Generally, recreational patterns of older persons emphasize less strenuous activities. This pattern is especially true for trail use. A greater percentage of older persons walk for pleasure, while for most other trail users the percentage is highest among younger people. But an important point is that people of all ages use trails, especially for pleasure walking and casual strolls.

Income is typically an important determinant of the amount of recreation participation, but this does not seem true for trail use. Figure 4 shows slightly higher participation percentages in walking for pleasure and day hiking among people with higher incomes. Backpacking and cross-country skiing show slightly higher participation levels among both the lower and the upper ends of income groups, perhaps indicating higher participation by students and professionals. Participation in other trail activities showed little relationship to income differences. Overall, trail use is spread across all income levels reflecting the low cost of most forms of participation.

An overall pattern of increased trail use with increased education levels is evident, except for off-road vehicle use. In percentages, this pattern is most dramatic for backpacking, cross-country skiing, and day hiking. There are also gender differences in recreational activities, including trail use. Those activities which are more popular among men include off-road vehicle use, cross-country skiing, and backpacking. Activities which are more popular with women include walking for pleasure, horseback riding and day hiking.

Certain trail activities seem to be more closely associated with family recreating groups than with other group types. Walking for pleasure and day hiking are strongly family-related trail uses (Figure 5). Friendship groups more commonly participate in cross-country skiing, backpacking, running or jogging, and driving off-road vehicles. Backpacking is more popular among organized groups or clubs. Solo recreationists often cross-country ski, backpack, or run or jog.

#### Trail Resources

Trail providers include both private and public landowners and managers. Individual landowners and nonprofit conservation organizations often have trails or unimproved roads on their rural lands. Some nonprofit organizations own camps which have trails on them. Local governments and colleges often have fitness or jogging trails around their golf courses and athletic fields. Woodland trails can be found near municipal nature centers. State parks typically contain short, easily accessible trails; state forests and fish and game lands often have longer and more rustic trails. Seven federal agencies provide trails of varying types.

#### LAND BASE

Trails provide important and often the only access to vast tracts of public lands, including wilderness. Both Federal and state agencies manage extensive, remote roadless lands that lie more than 3 miles from roads. There are about 194 million acres of Federal and state

designated wilderness and other extensive remote areas that can only be accessed by trails. In addition, there are an estimated 91 million acres of public and about 31 million acres of private lands open for recreation that lie between 1/2 and 3 miles from roads. This middle category of trail settings will be called non-motor backcountry.

In all, this represents about 315 million acres of remote Federal, state and private lands that can be accessed only via trail. Over one third of these remote lands are on the west coast (129 million in Alaska). Much of the rest is in the Rocky Mountain region. Of the remote lands in the East, about 12 million acres are state owned, and about 11 million acres are federal lands. Few private lands that are this remote are available for recreation.

Most public and private lands available for recreation are not remote. Most lie within 1/2 mile or less of roaded access. Nationally, about 390 million Federal, 40 million state and 250 million private acres are available for recreation in this road-accessible setting.

## RECENT TRENDS

The amounts of land in each of these categories has been changing over the last few years, and these trends are expected to continue. The total acres of federal and state lands that have been accorded wilderness protection has increased. However, road building activity, especially by Federal agencies has reduced the amounts of nonwilderness remote lands much faster. Road building and other development will continue to convert public lands toward settings closer to road access and thus will present less opportunities in remote areas.

The amount of private lands available for public recreation has dropped from the acreage available 10 years ago, for two reasons. First, conversion of private rural lands to more developed uses, especially for residential and industrial uses, has reduced the total undeveloped private land base by about 1 million acres per year. Second, the proportion of the remaining undeveloped private rural land on which owners allow public access has dropped

from about 30 percent in 1977 to about 23 percent in 1986. Not only is the size of the pie getting smaller, but the size of the slice available for public use is also smaller.

## TRAIL MILES

Over 2 million miles of the primitive roads and trails which exist on private, nonindustrial lands can be used by the public (Figure 6). Relative to public lands, private rural lands have a much greater density of roads and trails, about 1 mile of trail or unimproved road per 125 acres of land. While many of these miles are not blazed or signed, they serve as a trail resource to private land users. The magnitude of private road and trail miles highlights the importance of private lands as a potential trail resource.

It is important to note that about half of the total miles of private, unimproved roads and trails are in the Northeast--an area of relatively few public lands and very high population density. Another 1/3 of the private miles are in the South. The concentration of these resources on private lands in the East increases their importance as a means to meet the demands of a large portion of the U.S. population. Local governments also provide a wide array of trails across the country. The President's Commission on Americans Outdoors (PCAO) reported that local and regional governments manage almost 22,000 miles of trails across the country. Since only 33 states reported these data, the above figure should be considered a conservative estimate. A later study (McDonald and Cordell 1988) estimated that local governments provide a national total of over 32,000 miles of trails. Local trails are provided by a wide variety of local entities, including school districts, park departments, and nature centers. Local trails receive the most use, because they are close to home and readily available.

Local governments tend to provide more developed trail resources that federal or state agencies, including paved trails for jogging and bicycling, fitness trails, and short nature or interpretive trails. These trails mostly are located on parks, school properties, around golf courses, at local nature centers, on old railroad or utility rights-of-way, or along roads or rivers.

Regionally, local government trail resources are concentrated in the East--in about the same proportion as private land trail resources. About 55 percent are located in the Northeast, and just over 26 percent are in the South. This reflects a responsiveness of local government to local population pressures.

Trail data for state agencies are available from PCAO efforts and for state park systems from the National Association of State Park Directors (NASPD) Annual Information Exchange. Estimates of total miles vary widely. The 38 states that responded to PCAO reported managing 36,000 miles of trails. The states that reported trail miles to NASPD reported about 70,000 miles of trails. Estimates used here were derived from both sources, and extrapolated to all states based on acreage of state lands available for recreation, including state forests and state fish and game lands.

State trail miles for all 50 states are estimated at about 102,000 miles. Over half of those miles are in states in the Northeastern portion of the country, and over one half are in the Southeast. Fewer than 10,000 miles of trails are found on state lands in the Western half of the country. Overall, over 90 percent of state trails are located in the Eastern half of the country.

Federal agencies manage about three times the trail miles managed by state and local governments combined--about 160,000 miles of trails. The majority of these trails are fairly rudimentary and are located away from developed sites. However, a number of short, developed trails, such as interpretive trails are provided, primarily on National Park Service lands.

About 100,000 of all Federal trail miles are located on Forest Service lands, and another 42,000 are on BLM lands (Figure 7). These trail miles are located predominantly in the West, as is the majority of the land managed by these federal agencies. The National Park Service provides

about 13,000 miles of trails, distributed fairly evenly across the country. Federal agencies provide over 23,000 miles of trails in the Eastern half of the country.

The miles of trail resources on private rural lands are by far the largest portion of trail miles in each region. In the East, miles on private lands outnumber trail miles on all public lands by more than 10 to 1, an indication of possible future importance of these trail opportunities in the regions most heavily populated. Federal trail miles make up only about 20 percent of the total miles on public lands in the Eastern regions, but make up over 80 percent of the public total in the West.

During the past several years there are indications that public land trail opportunities have been expanding. Figure 8 provides recent trends in public agency trail miles among the 3 levels of government. While the data for these two time periods may not be exactly comparable, they do represent the best available sources (USDA Forest Service 1979 and 1989). Also, these trends, while encouraging for trail advocates, do not reflect possible changes of quality or degree of accessibility to the public. Trail opportunities on private lands are less now than in 1978--by about--20 percent. Across all trail providers, public and private, the trend in trail resources available for public use is down from previous years.

#### Effective Trail Opportunity

Totalling the trail miles in each region does not address how accessible these resources are to populations, i.e., how effectively these trail opportunities serve the public. Most people who are out for a day of hiking, walking, or nature study will travel fewer than 80 miles from home. Trail resources beyond that distance are too far away to be used for these purposes by most, and so are not as important for trail use. Conversely, trails that are located closer to home take on additional importance because they can more easily be used for outings for which only a few hours are available.

The total set of trail opportunities available to any population is comprised of all of the individual trail resources, as well as the number of service providers, including guides, outfitters, bike and canoe rental businesses, and other similar businesses.

A composite index of the availability of all these inputs making up trail recreational opportunities was developed and termed the Effective Trail Recreation Opportunity (ETRO) index. This index is useful for comparing one area or region with another, and allows determination of which area or region is relatively better off in terms of the trail resources relative to the number and distribution of the populations.

Figure 9 shows the average ETRO index values for 4 regions and the overall national average. In general, the Western regions rank highest for land and winter trail opportunities. Not surprisingly, there are few winter trail recreation opportunities in the South. Water trail recreation opportunities show the least variation across regions.

Even though total trail miles in the eastern regions is greater, the western regions have more effective opportunity for three reasons. First, the greater population in the east spreads the resources more thinly. Second, there are more public trail miles in the west; these resources are more important than are trails on private lands because of their greater accessibility and better information about them. Third, more access services are provided in the western portions of the country, especially guide and outfitter services.

A frequent question about trail resources is whether persons living in urban areas have better or less access to trails than persons living in rural areas. ETRO index values for land, water and winter trail opportunities for locations with high (over 75 percent), medium (50 to 75 percent), and low (under 50 percent) proportions of population living in urban areas indicate no great differences, except that urban residents have much fewer opportunities for water trail opportunities. The evenness of land and winter trail opportunities seems mostly due to the many short, easily accessed local trails in and near urban areas, and the more extensive but

less accessible private and federal trails in predominantly rural areas. Since water trail opportunities are primarily made up of designated and protected river segments, it is not surprising that few of these exist in areas of high urban populations.

#### Indices of Future Supply and Demand

If recent past trends in the rate of change of trail resource availability continues, the amount of trail resources would decline in the future. Remote trail opportunities would decline as a result of road building activity, especially on public lands. Additions to wilderness and other protected areas will not be sufficient to counterbalance the reductions from continued road building. Road building activity would increase near-road trail opportunities on public lands, but these gains would be more than offset by losses of access to private lands from development and posting.

With the above resource availability constraints, it is expected that the public's consumption of trail recreation opportunities would increase by about 70 percent over the next 50 years, depending on the type of trail environment, remote to roaded. Trail trips would rise slightly faster in non-motorized backcountry settings than in either wilderness or near-road settings. The predicted percentage growth in trail trips to 2040 represents an increase of almost 600 million per year above 1987 levels.

The growth in trips, coupled with the expected overall decreases of trail resource availabilities would have implications for trail use and users. First, trail recreationists would expect to encounter more people on their trips, regardless of the trail setting. Second, higher use densities would put increasing pressure on the resources, and managers would have to become more adept at spatially and temporally distributing use.

If demand for trail recreation were not constrained by recently experienced reductions in trail resources, future consumption would be expected to rise faster than if constrained. The trail setting that has the highest expected rate of unconstrained growth would be the non-motor

backcountry setting, projected to grow over 100 percent above present levels by 2040. Unconstrained demand for wilderness trips by 2040 would be expected to grow 99 percent above present levels, and for near-road settings, where motorized recreation is prevalent, growth would be over 80 percent above present levels. For all trail settings combined, preferred demand is expected to be about 94 percent above present levels, which is about 30 percent greater than consumption growth would be if recent past supply trends were to be continued.

The above data show that if past resource trends continue, significant gaps between the number of trail trips users wish to consume and the number they would be able to consume. For both non-motorized backcountry and near-road settings, those gaps will be about 100 million trips per year by 2040. The gap in wilderness trail use will be at about 36 million trips per year (Figure 10).

For some activities and settings there will be large gaps; for other activities in the same setting, or for the same activity in another setting there will be no gap. The implication of a no gap situation is that past trends projected into the future will increase recreational resources and facilities sufficiently to allow Americans to take as many recreational trips as they desire at the 1987 levels of trip costs.

The activity and setting combinations that will experience the greatest gaps include wilderness day hiking (16.5 million trip gap), nonmotor backcountry wildlife observation (30.5 million trip gap), nonmotor backcountry day hiking (53.8 million trip gap), and near-road sightseeing (27.8 million trip gap). The magnitude of these gaps indicates that in the future trail settings for these activities may need additional attention from managers and resource planners.

## A Case Study -- Wood County, WV

A county in West Virginia was chosen to provide an example of the trail opportunities that serve a specific population. Wood County is located in the northwestern part of the state along the Ohio border. Wood County has a population of about 93,000 and contains the city of Parkersburg.

**Land Trail Resources.**--People are generally willing to travel about 80 miles, one way, for a trail-based recreational trip. Within this distance from the center of Wood County there are 45 other counties that contain a wide variety of trail resources.

Public sector trail resources include more than 20 local recreation departments serving over 25,000 residents each. These departments manage over 3,500 natural area acres which contain over 35 miles of trails. More than 200,000 acres of state-owned recreation lands are in this area, including over 50,000 acres of state park lands. These state acres contain over 500 miles of trails. Over 1/4 million acres of Forest Service land comprises the Federal component of trail opportunities. These lands contain over 200 miles of trails. In addition, Corps of Engineers recreation sites contain 40 different trails. Private sector trail-related resources in this area include half a dozen resorts, 40 organization camps, 50 golf courses open to the public, and 6 nature centers. In addition, there are over 34,000 miles of trails and primitive roads on private rural lands which are open to the public.

**Water Trail Resources.**--Within the 60-mile market area for water opportunities are about 143 miles of designated and protected river segments, including a 10-mile segment of the National Wild and Scenic River System. These are served by several canoe livery and outfitter businesses.

**Winter Trail Resources.**--The market area for winter trail recreation is about 120 miles one way. Within this distance from the center of Wood County are 5 commercial cross-country ski touring

operations that manage over 150 miles of trails, 35 resorts, 150 camps, and almost 200 golf courses. In addition, Federal, state and local recreation areas provide over 2,300 miles of trails in areas that receive at least 16 inches of snowfall. Several National Recreation Trails in the area are also designated for snowmobile or cross-country ski use. In addition, over 70,000 miles of roads and trails on private lands are available for public use.

**Users and Number of Trips.**--About 1.7 million people over age 12 live within the 80-mile market area around Wood County. These people annually take over 75 million trips to trail accessed recreation lands, including over 5 million trips to go day hiking, 7 million trips for bicycling, 4.7 million trips for wildlife observation, 2.5 million for nature study, and about 3/4 million each for horseback riding and backpacking.

Within the 28-county market area for water resources, there are about 670,000 people over the age of 12 who take 1.4 million trips to go canoeing or kayaking each year. Similarly, the 6.2 million people living within the 120-mile market area for winter recreation resources take about 4.9 million trail-related trips in winter, including over 800,000 for cross-country skiing.

**ETRO Index Values.**--The ETRO index values for Wood County are somewhat below the average values for the Northeastern portion of the U.S. (Figure 11). These lower figures for Wood County indicate slightly fewer trail recreation opportunities per capita and a disproportionate distribution of trail opportunities and population relative to that in the Northeast in general. Reasons include locally higher amounts of private lands not open to public recreation, including industrial forest lands and agricultural lands, and the presence of relatively few large local recreation and parks departments.

## Conclusions

**Evenness of Distribution.**--There do not seem to be large differences in the amount of trail resources available to urban versus rural residents. However, despite the fact that the Eastern

regions have more total trail miles than do the Western regions, the trail miles that effectively serve residents are greater in the West than in the East. The reasons for this are twofold. First, most of the trail miles in the East are on private rural lands and are neither well marked nor well publicized. On the other hand, more trails in the West are on public lands, and better information is available about these trails. Second, more of the metropolitan areas in the West are closer to large tracts of public lands, and hence are closer to more trail resources. This proximity makes public trail miles in the West more effective in serving the regional population.

**Future Shortages.**--In general, future growth in trail resources is not expected to be sufficient to satisfy all the trips the American public wants to take for trail recreation. Shortages of opportunities are expected to be especially acute for nonmotorized backcountry and near-road settings, particularly for wildlife observation, day hiking, sightseeing and photography trips in these settings. Resource changes that may influence these shortages include conversion of private rural lands to more developed uses, especially near urban areas, and closures of remaining private rural lands to public use. Road building activity in presently roadless tracts of public lands will negatively affect the supply of trail opportunities in nonmotorized backcountry settings.

**Adequacy of Information.**--The most important information about national estimates of trail resources is that there is too little information. Most of the information presented here is based on estimates of trail resources. Accurate information about the amounts of trail resources for many of the major providers, including state park systems, state forest lands, several Federal agencies, and nearly all private sector providers is virtually nonexistent. Frequently, the best information available is at the state level, and so gives little indication of how well these trail miles serve the state's population. Optimally, national assessment data would include number of trails, trailheads and miles of trails by county, as well as number of access services, such as guides, livery services and outfitters.

Hundreds and perhaps thousands of published maps, trail guidebooks and sourcebooks exist across the country, covering individual trails or specific geographic areas. The information contained in these sources represent perhaps the most accurate set of data on the total spectrum of trail resources available to the public, and possibly the only source for locally relevant trail data. Combining them into a national inventory of trails would be a useful, albeit Herculean task. Something approaching this effort may be needed to enable development of a definitive picture of the nation's trail resources.

LITERATURE CITED

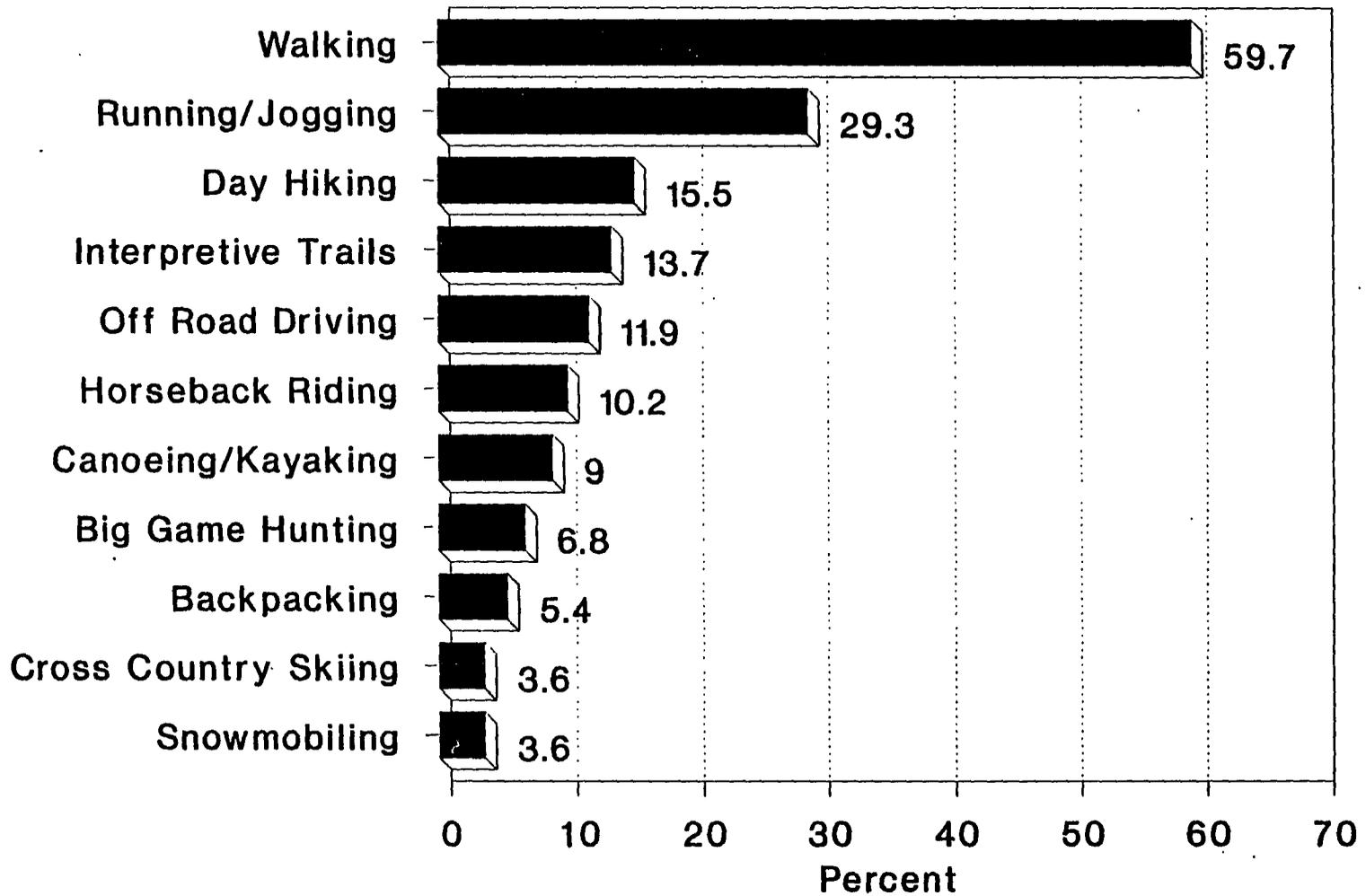
McDonald, B.L. and H. Ken Cordell. 1988. Local Opportunities for Americans: Final Report of the Municipal and County Park and Recreation Study. National Recreation and Park Assn., Washington, D.C.

USDA Forest Service. 1979. An Assessment of the Forest and Range Land Situation in the United States. USGPO, Washington, D.C.

USDA Forest Service. 1988. An Analysis of the Outdoor Recreation and Wilderness Situation in the United States: 1989 - 2040 (Draft) USGPO, Washington, D.C.

FIGURE 1

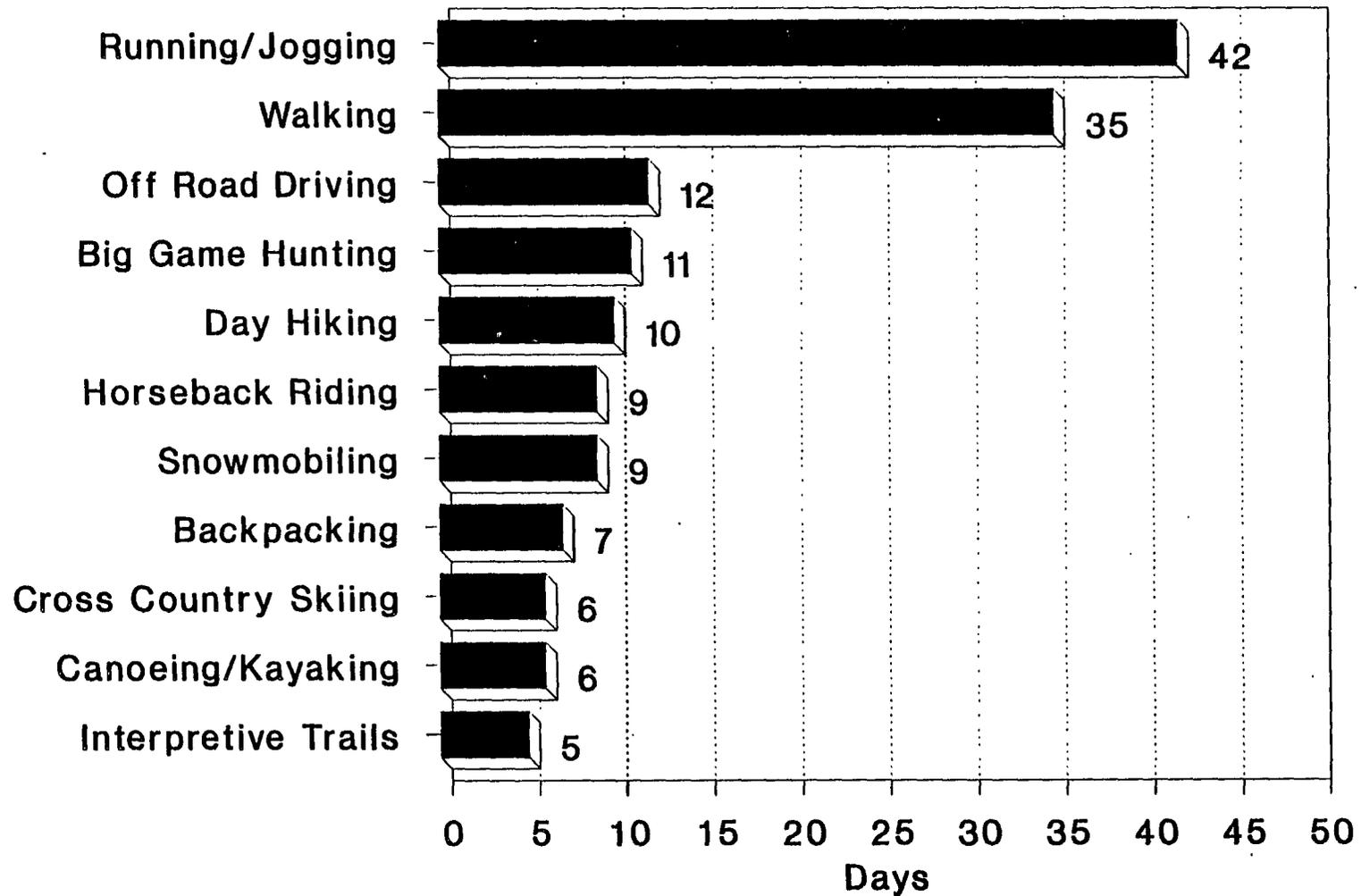
### Percent of Population Participating in Trail Use at Least Once Annually



SOURCE: 1985-87 PARVS

FIGURE 2

### Median Days of Annual Participation in Trail Use Activities

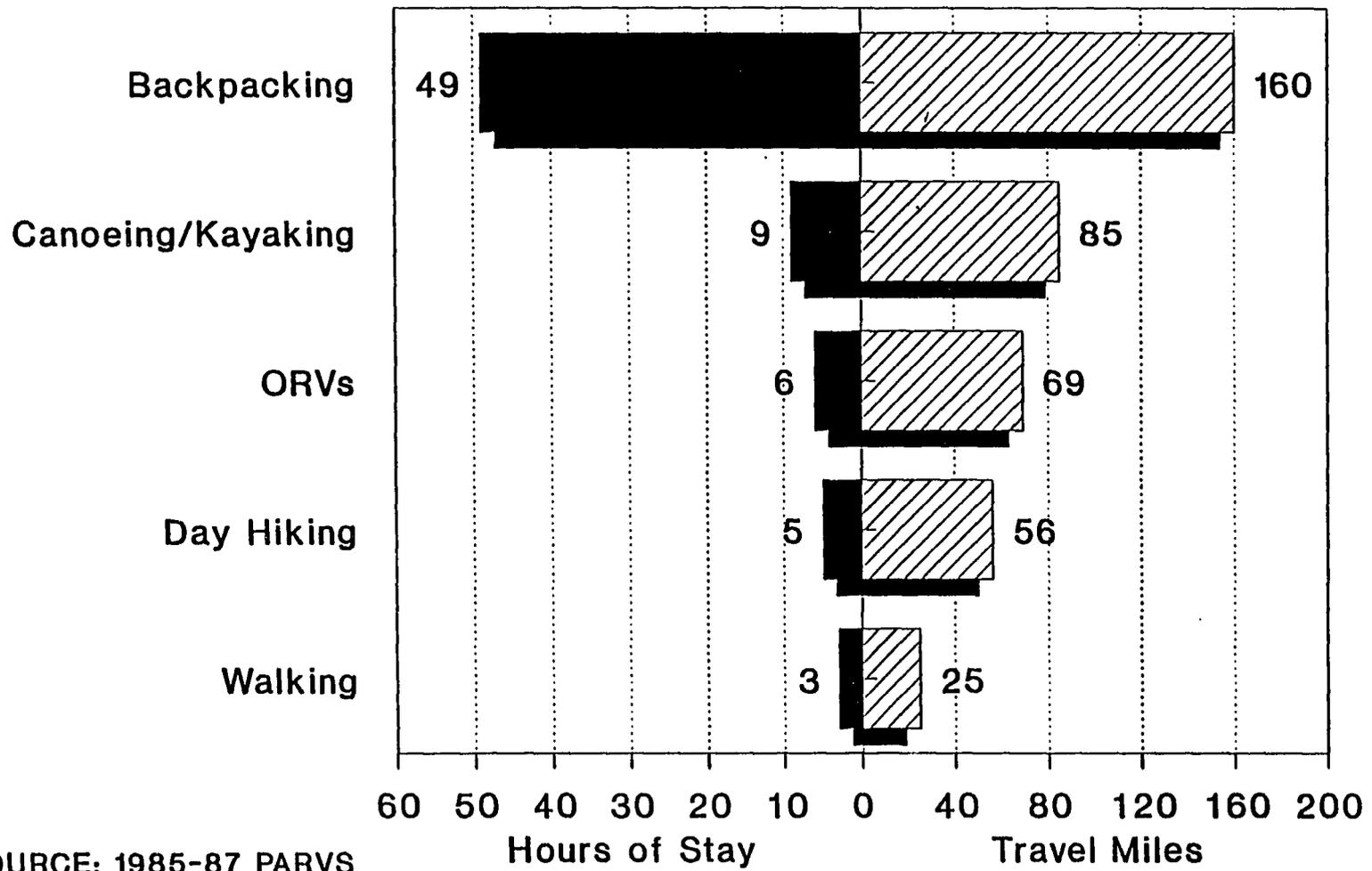


SOURCE: 1985-87 PARVS

SPES-66

FIGURE 3

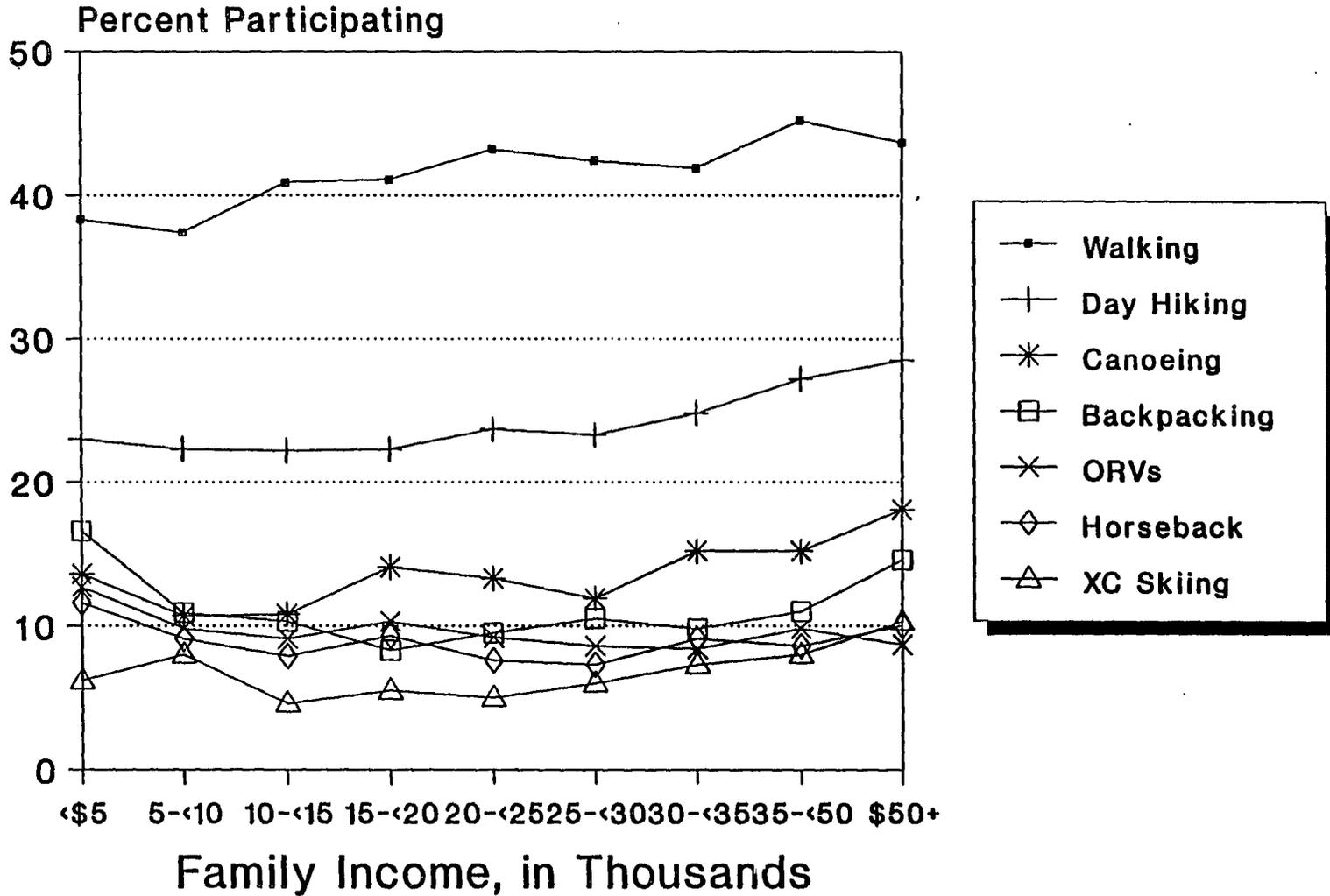
### Median Length of Stay and One-Way Travel Miles, for "Main" Activities, Single Destination Trips



SOURCE: 1985-87 PARVS

FIGURE 4

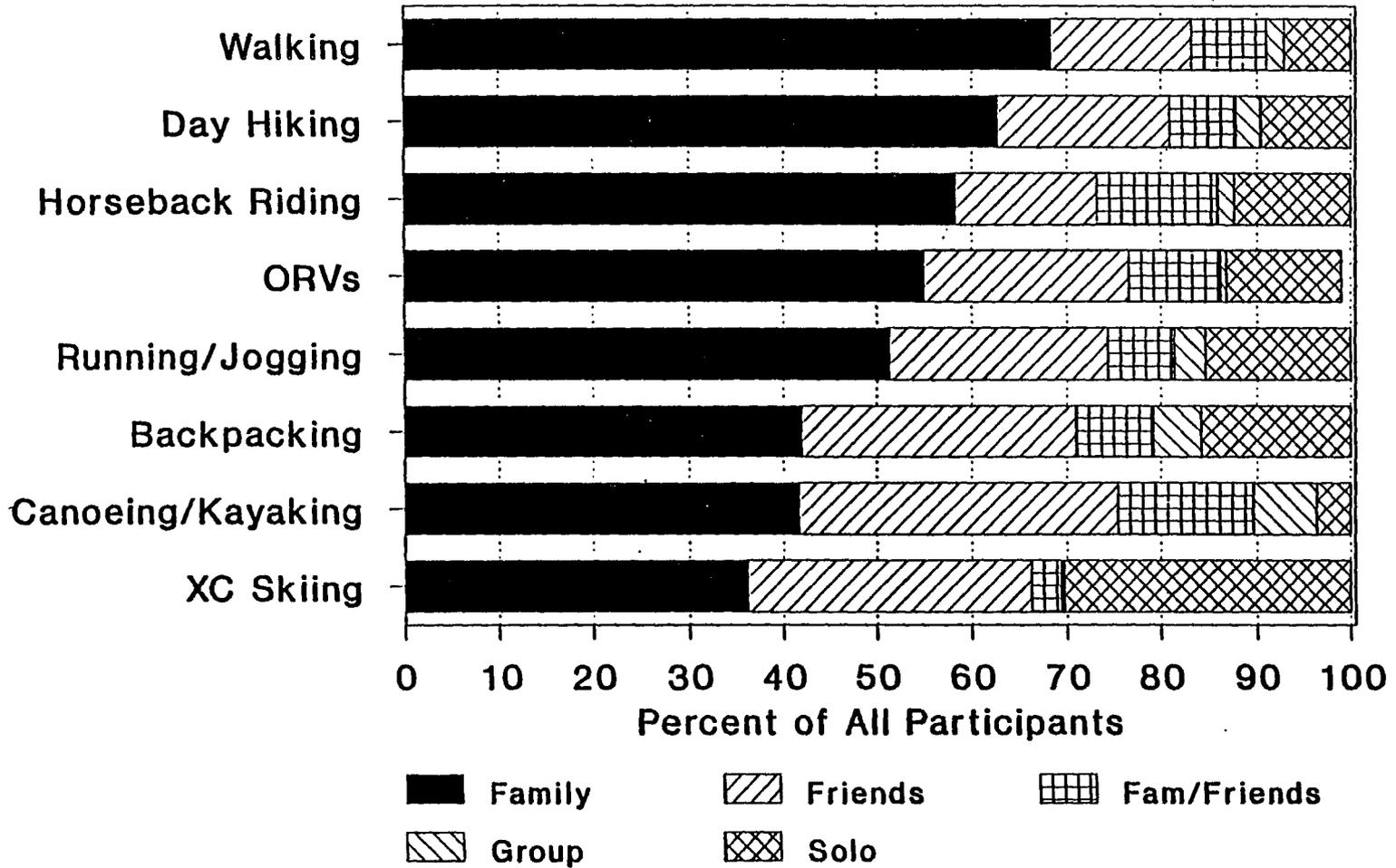
### Percent Participating in Trail Use at Least Once Annually, by Income



SOURCE: 1985-87 PARVS

FIGURE 5

### Group Differences in Trail Use

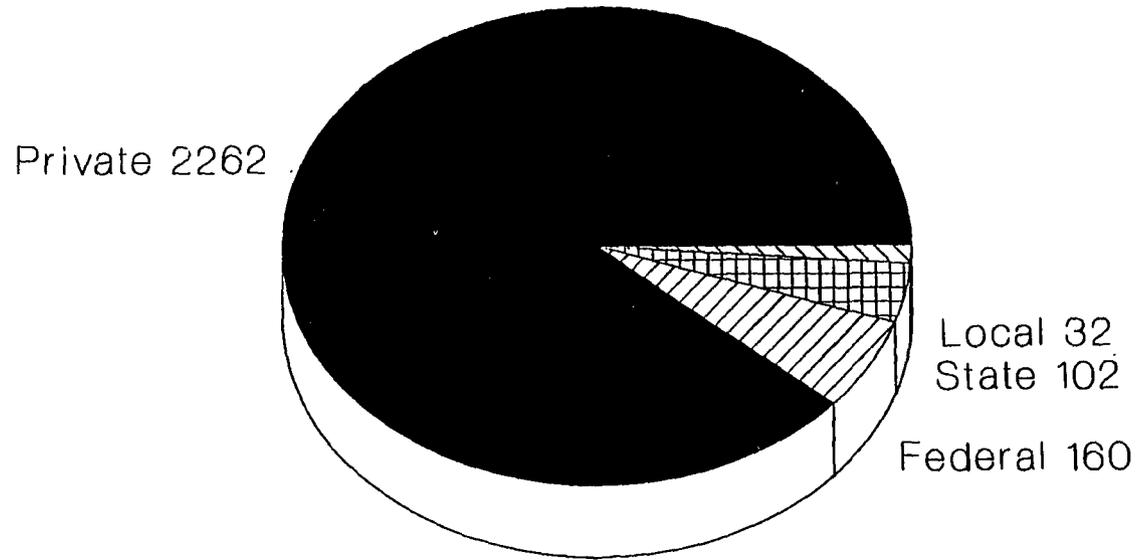


SFES-69

SOURCE: 1985-87 PARVS

FIGURE 6

# Miles of Trails by Provider, United States, 1987

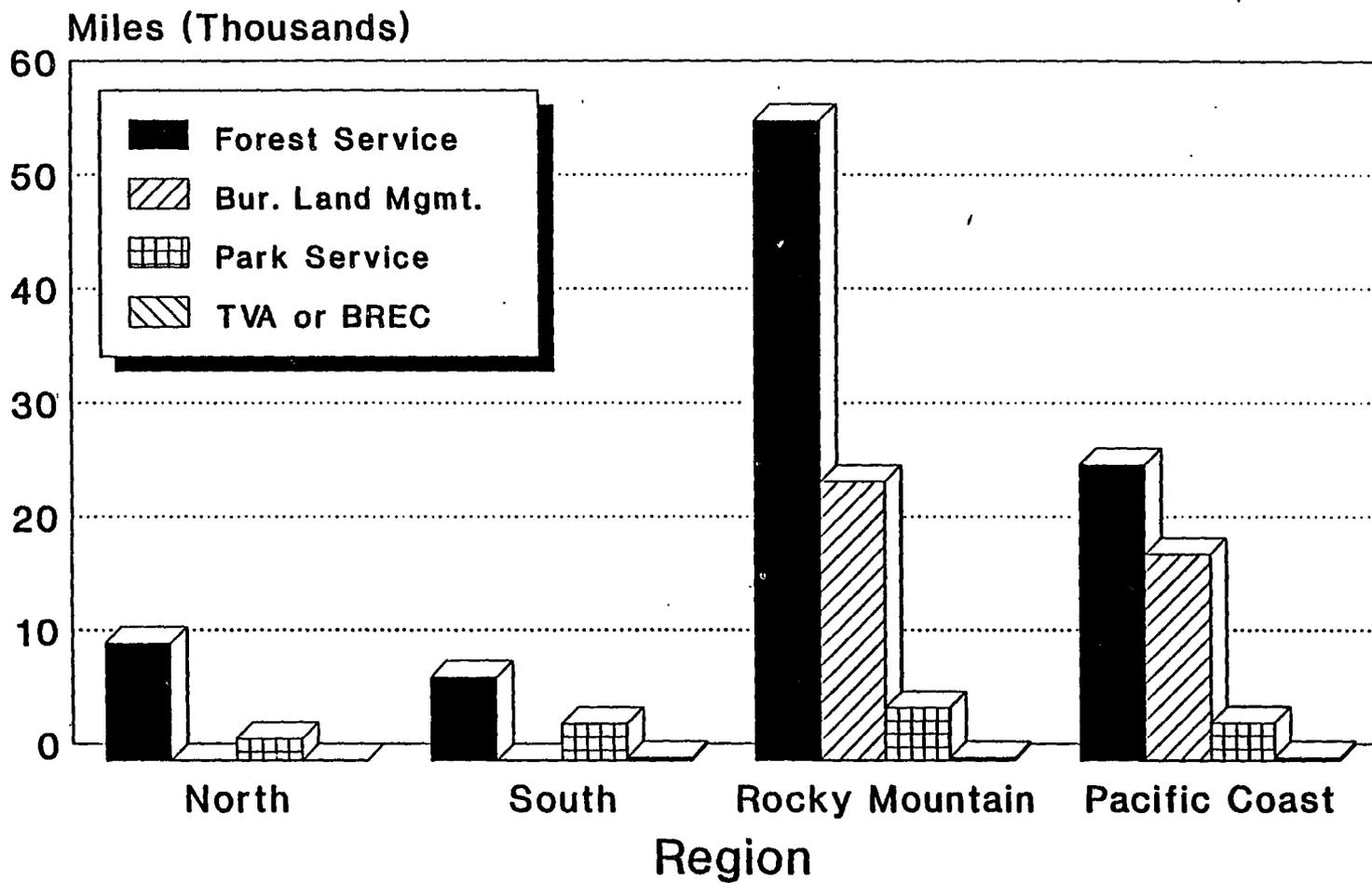


(Thousands)

TOTAL = 2,556

FIGURE 7

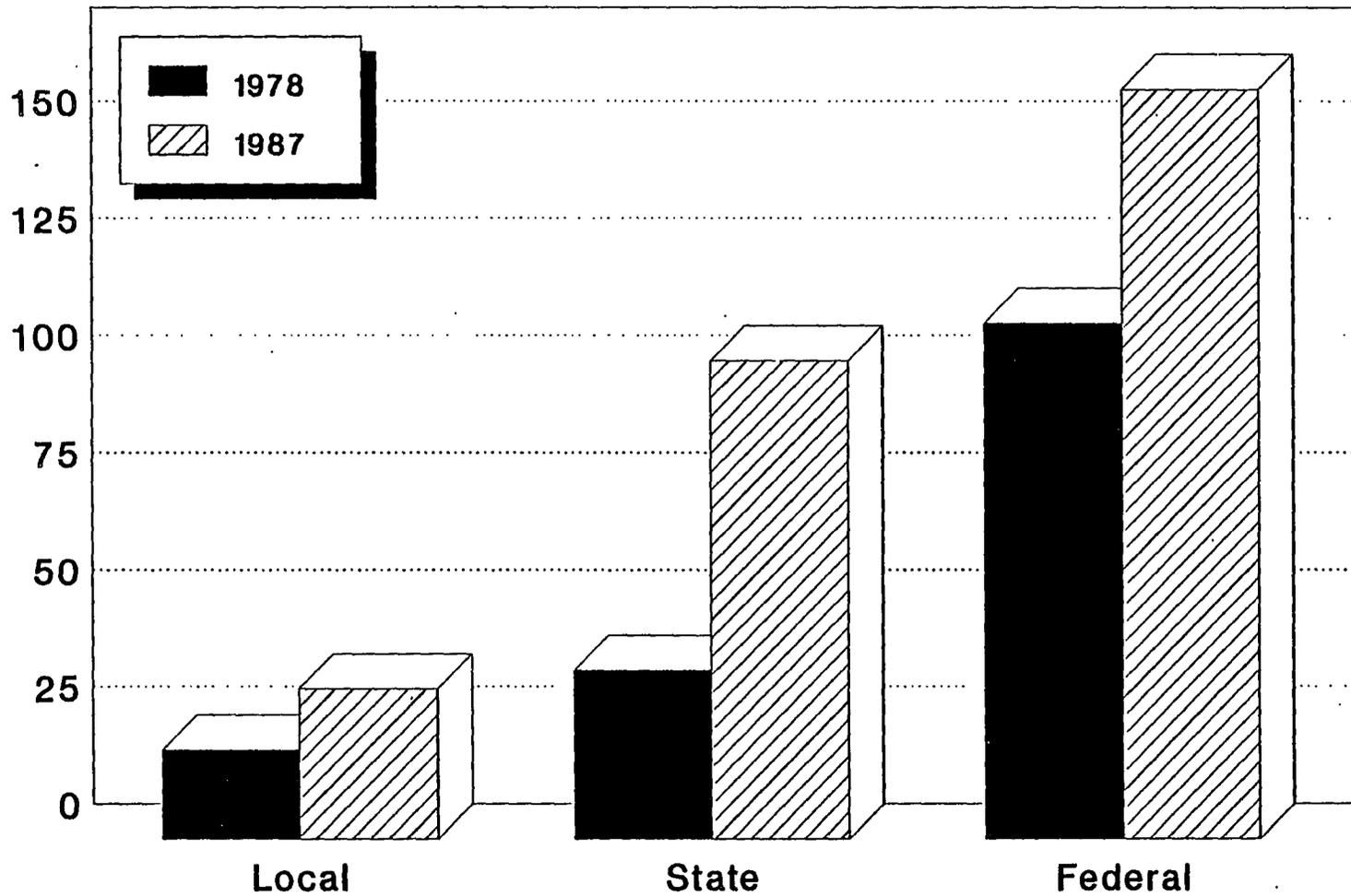
### Trail Miles on Federal Recreation Lands, by Region and Managing Agency, 1986



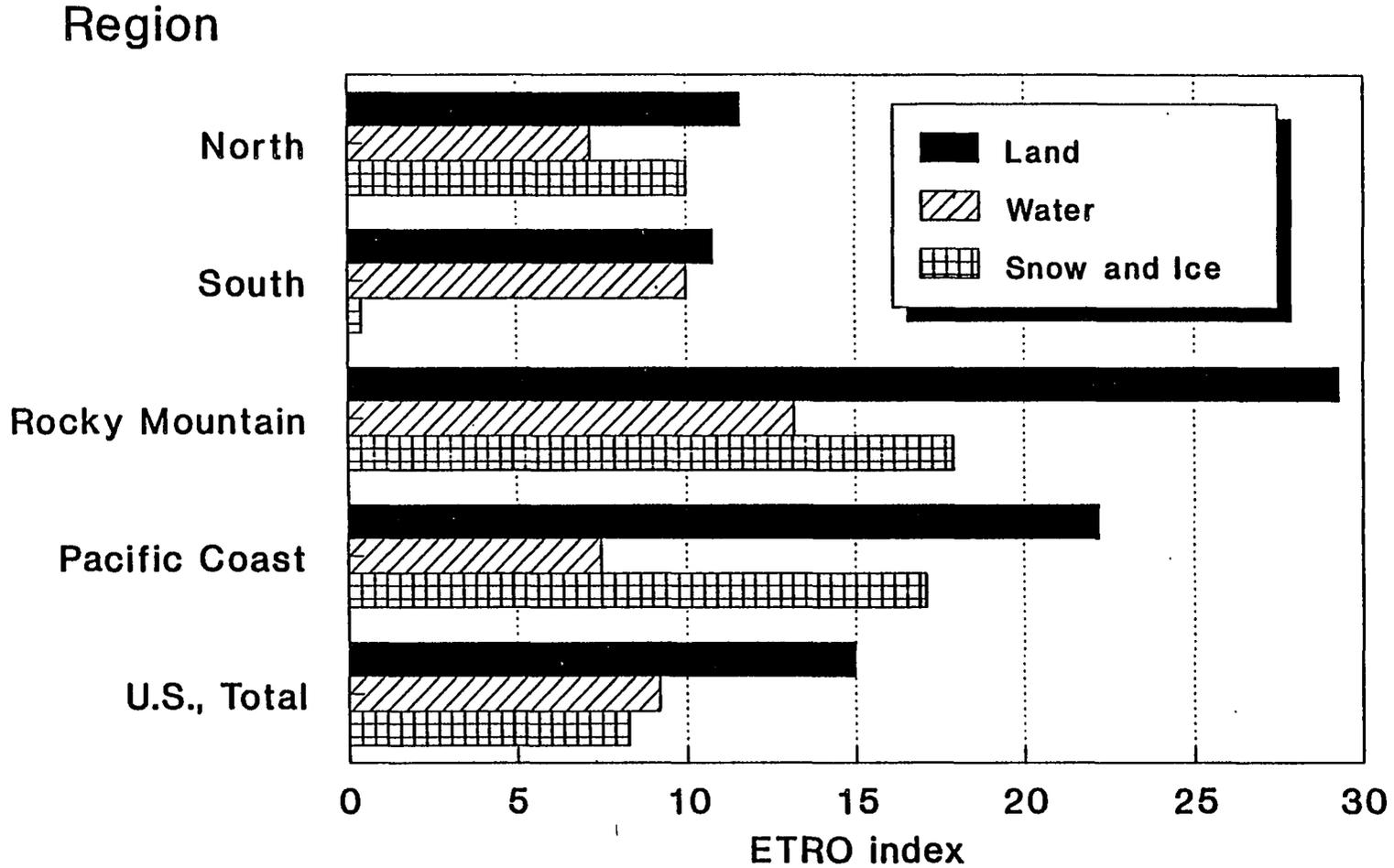
SOURCE: National Outdoor Recreation  
Supply Information System (NORSIS),  
USDA-Forest Service, Athens, GA, 1986.

FIGURE 8

## TRENDS IN REPORTED TRAIL MILES (THOUSANDS)



## Regional Comparisons of Effective Trail Recreation Opportunity Index Values



SOURCE: National Outdoor Recreation  
Supply Information System (NORSIS),  
USDA-Forest Service, Athens, GA, 1988.

FIGURE 10

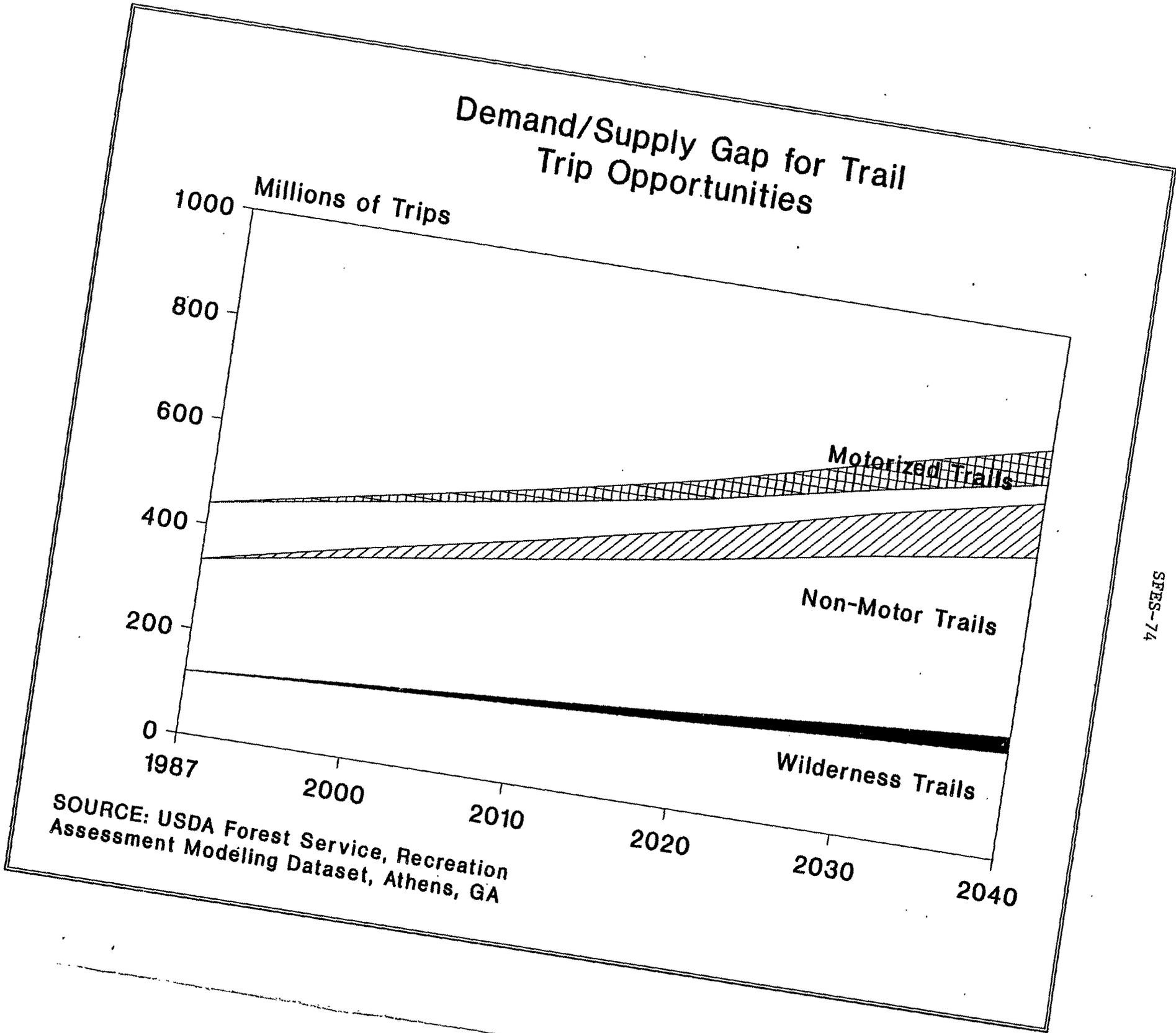
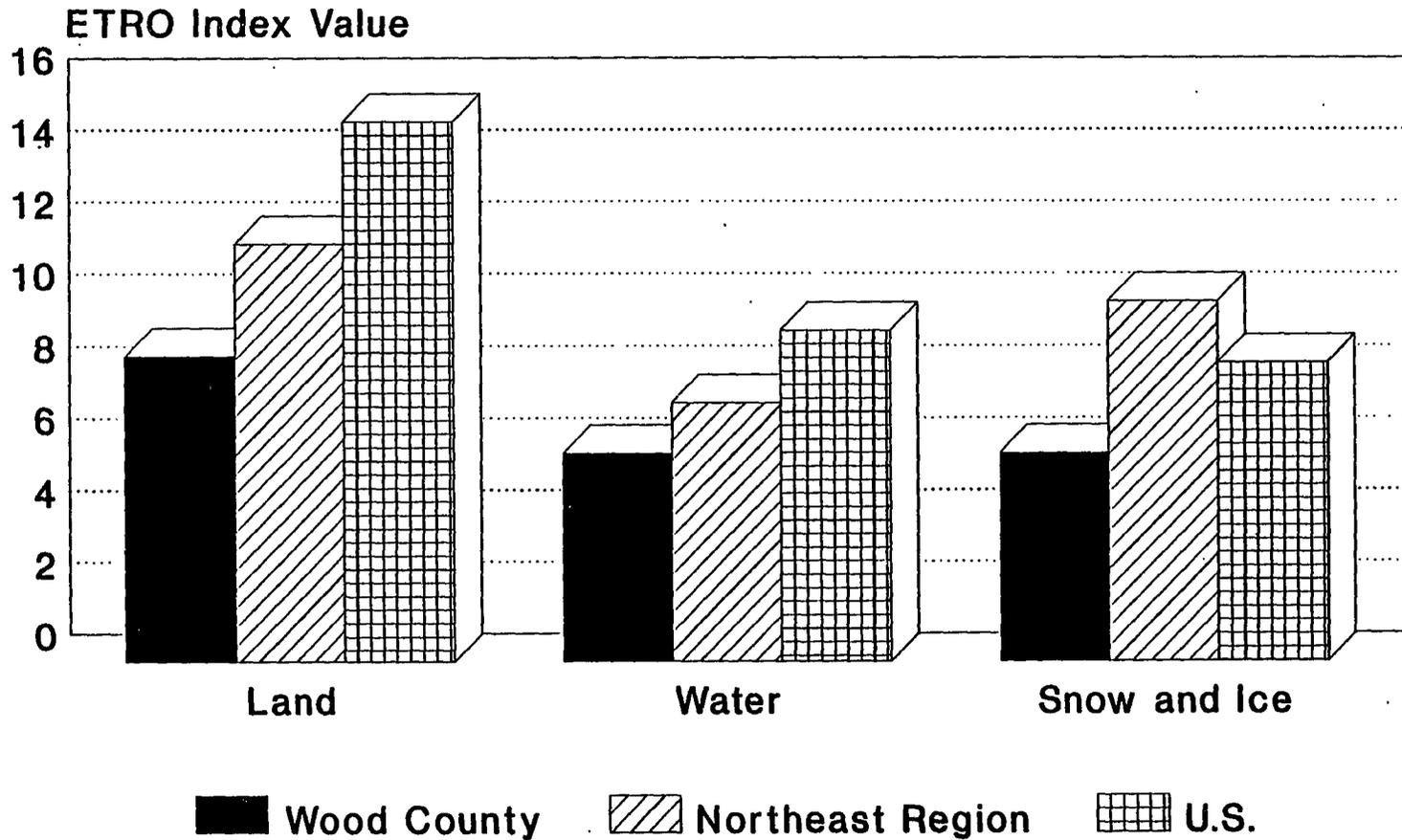


FIGURE 11

### Effective Trail Recreation Opportunity Index Values, for Northeast Region and for Wood County, West Virginia



SOURCE: USDA Forest Service, Recreation Assessment Modeling Data et, Athens, GA