BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Secretaries Of The Interior, Defense, And Agriculture

Impact Of Gasoline Constraints Should Be Considered In Managing Federal Recreation Facilities

In 1979 and 1980--when gasoline was in short supply or costly--visitors to the Nation's recreation areas stayed closer to home. Visitation dropped at remote sites while facilities near cities were more heavily used.

Federal recreation agencies have not fully responded to the public need or desire to use less gasoline for recreation. Also, they have not developed techniques to predict changes in patterns of recreation use. Consequently, current policies and practices do little to ensure that facilities are constructed and maintained to meet changing use patterns or to encourage minimum use of gasoline.

Although several agencies have adopted measures to help conserve gasoline, these efforts have been incidental to other objectives such as environmental protection. GAO makes recommendations to assist Federal recreation agencies to improve and use forecasting and encourage gasoline conservation.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

COMMUNITY AND ECONOMIC
DEVELOPMENT DIVISION

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The Honorable James G. Watt
The Secretary of the Interior

The Honorable Caspar W. Weinberger
The Secretary of Defense

The Honorable John R. Block
The Secretary of Agriculture

This report discusses gasoline constraints on recreation and Federal agencies' responses to the public's needs or desires to use less gasoline for recreation. The report also discusses the need for agencies to develop techniques to predict changes in patterns of recreation use and to construct and maintain facilities at locations where changing patterns reflect they are most needed.

We discussed this report with agency officials and their comments were incorporated where appropriate.

This report contains recommendations to you on page 45. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Chairmen, House and Senate Committees on Appropriations, House Committee on Government Operations, and Senate Committee on Governmental Affairs; the Director, Office of Management and Budget; and other interested parties.

Henry Eschwege

Henry Eschwege
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE SECRETARIES
OF THE INTERIOR, DEFENSE,
AND AGRICULTURE

IMPACT OF GASOLINE CONSTRAINTS SHOULD BE CONSIDERED IN MANAGING FEDERAL RECREATION FACILITIES

D I G E S T

During 1979 and 1980, when gasoline was in short supply and prices rose, the public's use of outdoor recreation facilities was significantly affected; people tended to use facilities closer to home. Recreation officials observed longer stays at campgrounds; less vehicular movement within and between recreation areas; increased use of tents; and use of smaller cars, trucks, and recreational vehicles. Gasoline constraints were probably a major cause, but other factors such as general economic conditions, weather, and site closures also influence visitation. (See pp. 5 to 11.)

VISITATION PATTERNS CHANGED

The National Park Service experienced heavy declines in visitation at distant facilities. During 1979 visits to rural sites fell 15 percent and visits to outlying sites fell 9 percent. In 1980 visitation was still under 1978 levels by 13 percent at rural sites and 8 percent at outlying sites. (See p. 6.)

At the same time, the use of facilities in and near cities increased. Although visitation statistics showed declines for Corps of Engineers facilities, which are generally located near cities, officials discounted the statistics' reliability and instead told GAO that usage had increased at their facilities too. (See pp. 7 to 10 and 12.)

Although there were some exceptions, the general pattern in the Forest Service, Water and Power Resources Service, and State parks was toward decreased use of distant facilities in 1979, with increases at some facilities in 1980. (See pp. 7 to 9 and 13.)

OPPORTUNITIES FOR CONSERVATION

Most Federal agencies have not done enough to respond to indications that people are pursuing

recreation closer to home and might want to use less gasoline while doing so. (See pp. 15 to 20.)

Forest Service policies include encouraging energy efficient transportation systems and locating new facilities near them. In addition, the National Park Service has developed a policy to promote public and nonmotorized transportation. However, neither agency has done much to carry out these policies. The Corps of Engineers and the Water and Power Resources Service have not taken any steps to develop recreation policies which take public gasoline conservation into consideration. (See pp. 15 to 20.)

Many measures undertaken for environmental protection or public service motives have had incidental gasoline conservation effects. For example, shuttle systems in parks not only reduce congestion but also use fuel more efficiently to transport visitors than do numerous private cars. Campground reservation systems, a convenience for some people, help conserve gas by enabling visitors to drive directly to their camping spaces instead of searching. (See pp. 23, 51, and 55.)

Recreation managers could make greater use of the National Park Service's exchange program by sharing information on gasoline conservation measures. As of December 1980, few such ideas had been included in the program. (See p. 20.)

NEED FOR BETTER VISITOR FORECASTS

Since long-term and sizable financial commitments are involved, recreation managers need better forecasts of visitation trends so they can consider applying their limited resources to facilities where more people are expected to go.

The Secretary of the Interior has proposed legislation which would allow funds from the Land and Water Conservation Fund to be used for restoring and improving national parks, forests, refuges, and certain other Federal land units and areas. About $105 million would be used in the national parks alone. In October 1980, GAO estimated that it would cost about $1.6 billion to correct health and safety

deficiencies in the national parks. Projected demand for the facilities would help recreation managers establish priorities for spending available funds.

Better forecasts will be needed to identify what factors affect recreation patterns and to forecast visitation levels. Forecasting research has been uncoordinated and has focused on determining recreation use at a point in time rather than establishing recreation trends. Also, visitor surveys have limited reliability and are not coordinated and visitation statistics for many locations are not reliable. (See pp. 13, 28, and 30.)

Statistical forecasting models could help improve recreation planning and management. Further research could result in developing models which Federal and State recreation agencies could use to project visitation trends. (See pp. 32 to 42.)

RECOMMENDATIONS

GAO recommends that the Secretary of the Interior coordinate and monitor research performed by various agencies on the long- and short-term effects that fuel shortages and high fuel costs have on the use of recreation facilities. This effort should encourage

--using statistical forecasting models,

--developing ways in which visitor data reliability might be improved, and

--developing standards for collecting visitor survey data.

Information developed from the research should be made available to Federal recreation agencies and to the States for adaptation to their recreation facility programs.

The Secretaries of the Interior and Defense should require the Corps of Engineers and Water and Power Resources Service to adopt gasoline conservation policies. (See pp. 18 and 19.)

The Secretaries of the Interior, Agriculture, and Defense should

--require their agencies to consider the results of improved forecasts in allocating financial resources to recreation facilities and

--encourage recreation facilities managers to participate in the National Park Service information exchange program to contribute and extract information on conservation measures and to consider applying at their facilities those conservation measures successful elsewhere.

Officials from Federal recreation agencies covered by GAO's review commented informally on the draft report. They agreed with the report in general but disagreed with certain aspects of GAO's recommendations and certain technical information. Many thought that the Corps of Engineers and Forest Service should be included in research. Some thought that GAO should be more explicit in recommending adoption of gasoline conservation policies or measures. GAO restated its recommendations and made other suggested changes as appropriate in view of their comments. (See p. 46.)

Contents

		Page
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Recreation, which is socially important, is often dependent on gasoline	1
	Federal involvement in recreation	2
	Objectives, scope, and methodology	2
2	RECREATION PATTERNS CHANGED AS GASOLINE SUPPLIES TIGHTENED AND PRICES INCREASED	5
	Visitors used near-city rather than distant facilities	5
	National Park Service	5
	Forest Service	7
	Water and Power Resources Service	8
	Colorado State parks	9
	Pennsylvania State parks	9
	New Jersey State parks	9
	City parks	10
	Other observations of shifts in visitation patterns	10
	Visitors went to fewer locations, stayed longer, switched to tents, and used smaller recreational vehicles	11
	Visitation to some areas did not follow the patterns	11
	A word of caution	13
3	FEDERAL AGENCIES COULD DO MORE TO RESPOND TO CHANGES IN RECREATION USE	15
	Policies and practices vary	15
	National Park Service	15
	Forest Service	16
	Corps of Engineers	18
	Water and Power Resources Service	18
	Heritage Conservation and Recreation Service	19
	Officials had mixed views on conservation opportunities	20
	Agencies have sponsored some measures that help conserve gasoline	22
4	APPROACHES TO FORECASTING VISITATION SHOULD BE IMPROVED	26
	Better forecasting is needed	27
	More research needed to improve forecasting	28

CHAPTER		Page
	Officials have mixed opinions on the need for better forecasting	31
	Results of GAO's experimental longitudinal forecasting models	32
	Observations	40
5	CONCLUSIONS AND RECOMMENDATIONS	43
	Conclusions	43
	Recommendations to the Secretaries of the Interior, Agriculture, and Defense	45
APPENDIX		
I	Key recreation legislation	47
II	Unadjusted recreation visitation data reported by selected Federal agencies	49
III	Fiscal year 1981 recreation costs estimated by selected Federal agencies	50
IV	Examples of measures that help to conserve gasoline	51
V	Modeling park visits	58

ABBREVIATIONS

HCRS	Heritage Conservation and Recreation Service
WPRS	Water and Power Resources Service

CHAPTER 1

INTRODUCTION

The public is highly dependent on private vehicles to use recreation facilities; however, gasoline costs have risen sharply, and foreign oil supplies, upon which the United States relies heavily, are undependable. Since the Federal Government spends large amounts on outdoor recreation--$1.5 billion annually--we considered it important to analyze how agencies are anticipating and dealing with the effects of gasoline constraints on the public's use of recreation facilities.

RECREATION, WHICH IS SOCIALLY IMPORTANT, IS OFTEN DEPENDENT ON GASOLINE

The executive report of the Third Nationwide Outdoor Recreation Plan, prepared in 1979 by the Department of the Interior, outlined the importance of recreation. It stated,

> "Today we appreciate more than ever the benefits of recreation such as:
>
> --Providing a link with our natural and cultural environment;
>
> --Contributing to our physical and mental health in ways we are only beginning to understand;
>
> --Generating economic growth through an estimated $180 billion of personal expenditures annually; and
>
> --Providing an important public service on which Federal, State, and local public agencies expend over $5 billion each year."

Availability and prices of gasoline needed for this recreation is now of continuing concern. The National Recreation Assess Study, prepared in 1975 for the Secretary of Transportation, included estimates that 90 percent or more of the trips by individuals to major recreational areas are made in private autos or recreation vehicles.

During the 1970's, gasoline prices increased greatly while reduced supplies resulted in shortages during the Arab oil embargo in 1973-74 and the cut off in exports from Iran in the winter of 1978-79. From 1970 through 1979 the price of regular-grade gasoline, adjusted to exclude inflation, increased by 31 percent. In previous decades, comparably adjusted prices decreased--10 percent in the 1960's and 6 percent in the 1950's. Though imports of oil have been declining recently, the United States remains vulnerable to import disruptions since more than 40 percent of its supplies were still imported in 1980.

FEDERAL INVOLVEMENT IN RECREATION

All levels of government--Federal, State, and local--plus private, nonprofit, and commercial organizations provide recreation facilities and services. Federal costs to acquire or operate recreation resources and to help States and cities to develop or rehabilitate them were projected at $1.5 billion in both the 1980 and 1981 Federal budgets. Most of these funds were for Department of the Interior agencies, but other agencies in the Departments of Agriculture and Defense also received funds.

In addition, recreation facilities at some Federal water projects are maintained and operated by State or local governments or other sponsors. They pay half the cost of constructing new facilities as well as operation, maintenance, and replacement costs.

A description of key legislation dealing with recreation, recreation planning, agencies' responsibilities for providing recreation, and funding recreational activities is included in appendix I.

OBJECTIVES, SCOPE, AND METHODOLOGY

There is little national legislation on gasoline constraints on recreation and trends are not definite. Our work, therefore, was designed to examine the need and potential for strategies to encourage and accommodate public desires to use less gasoline for recreation.

We concentrated most of our work on five agencies. These included the Heritage Conservation and Recreation Service (HCRS), the National Park Service and the Water and Power Resources Service (WPRS), all in the Department of the Interior; the Forest Service in the Department of Agriculture; and the Corps of Engineers. We also visited the headquarters of the Departments of Transportation and Energy for related information.

We selected agencies and locations for numerous reasons. HCRS had a national recreation planning role. The Corps, Park Service, Forest Service, and WPRS serve the largest number of visitors among Federal agencies. (See app. II for their visitation statistics.) These five agencies also spend most of the Federal recreation funds. (See app. III for their 1981 cost projections.) We judgmentally selected the geographic areas to provide wide national coverage, to include both near-city and distant recreation facilities, and to cover areas with major population concentrations. Our work centered on facilities in and around California, Colorado, Pennsylvania, and New Jersey.

In addition to visiting Federal agencies, we visited State and local governments. (See the list at the end of this chapter for the locations visited.) We also visited sponsors of gasoline-conserving recreation projects in Washington, D.C.; Nags Head,

North Carolina; Winter Park, Colorado; and Salt Lake City, Utah, to study examples of such projects.

Before we completed our work, HCRS was consolidated with the Park Service by Secretary of the Interior Order No. 3060 dated February 19, 1981. Among other things, HCRS administered and funded recreation grants and provided recreation technical assistance to State, territorial, and local governments. Budget authority for the grants has been proposed for partial recission in fiscal year 1981, followed by elimination in fiscal year 1982. Technical assistance is to be continued by the Park Service. We have noted the effects of the reorganization where relevant and reported other information as it existed in the agency during our visits. Also, WPRS was renamed the Bureau of Reclamation by Secretary of the Interior Order No. 3064 dated May 18, 1981. In this report we refer to the agency as WPRS.

At each Federal, State, or city agency we tried to collect recreation visitor statistics for fiscal or calendar years 1978 thru 1980. This proved to be an obstacle as data was not available in some places or was of limited reliability or comparability in others. More discussion on data limitations is included on page 14. We used the available data with caution and discussed major changes in visitation patterns with agency officials. We decided to use this approach because opinions on the effects of gasoline on recreation patterns were consistent.

After reviewing visitation changes, we studied how agencies had reacted or might react to visitation changes. We discussed and collected relevant documents such as policy statements and developed examples of actions taken or planned by the agencies to reduce gasoline consumption by the public. We also discussed how the agencies forecast recreation demand and experimented with computer models to do so. Pages 32 to 42 and 58 to 67 contain detailed information on our models.

In addition, we contacted other officials for background information and obtained related published reports. We called officials or researchers in the Water Resources Council, the Corps' Waterways Experiment Station, the Corps' Los Angeles and Fort Worth district offices, the Corps Southwest division office, the Forest Service's northeastern and southeastern forest experiment stations, the Rocky Mountain forest and range experiment station, the University of Idaho, and Colorado State University.

Organizations Visited

Federal agencies	Location
HCRS	Philadelphia, Pa. Lakewood, Colo. San Francisco, Calif.
National Park Service	Philadelphia, Pa. Lakewood, Colo. San Francisco, Calif.

Organizations Visited

Federal agencies	Location
WPRS	Lakewood, Colo. Salt Lake City, Utah Sacramento, Calif.
Forest Service	Lakewood, Colo. San Francisco, Calif.
Corps of Engineers	Philadelphia, Pa. Pittsburgh, Pa. Omaha, Neb. Sacramento, Calif.
State park or recreation organizations	Harrisburg, Pa. Trenton, N.J. Denver, Colo. Sacramento, Calif.
Local park or recreation organizations	Trenton, N.J. Philadelphia, Pa. Harrisburg, Pa. Denver, Colo. Salt Lake City, Utah Sacramento, Calif.

CHAPTER 2

RECREATION PATTERNS CHANGED AS GASOLINE SUPPLIES TIGHTENED AND PRICES INCREASED

Numerous factors such as general economic conditions, weather, site closures, etc., influence the use of outdoor recreation facilities. Uncertain gasoline supplies in 1979, however, also appear to have reduced the number of visitations at many of the Nation's outdoor recreation areas. We noticed drops in visitation at many distant areas and shifts in visits that indicated people pursued recreation closer to home. We were also told that gasoline supplies altered how long people stayed in a location and determined the vehicles they used to get there. In 1980--a year when more gasoline was available but at greatly increased prices--recreation facility use increased in some places, but many of the patterns evident in 1979 remained. Visits to national parks appear to have been most heavily affected: they were significantly under 1978 levels at outlying and rural parks in both 1979 and 1980.

There were some notable exceptions to the overall changed visitation patterns, and WPRS and California Corps officials were unsure of any or saw little relationship between gasoline constraints and visitation patterns.

VISITORS USED NEAR-CITY RATHER THAN DISTANT FACILITIES

A common change reported by recreation managers in both 1979 and 1980 was that more people were pursuing recreation closer to home. Recreation planners at the HCRS mid-continent region observed that the largest increases in recreation demand in 1979 and 1980 were at "metro parks"--those located within 20 to 30 miles of a large city.

National Park Service

Park Service areas were heavily affected by uncertain gasoline availability and higher prices. As shown in the following table, recreation visits to Park Service facilities were under 1978 levels by 9.1 percent in 1979 and 8.5 percent in 1980. Visits to outlying and rural park facilities dropped substantially more than visits to others.

Changes in Park Service Visitation
From 1978 Base Year

Adjusted recreation visits (note a)

Category	1978	Percent change 1979	1980
	(millions)		
Near-city (note b)			
Urban	35.6	-2.6	-2.8
Suburban	18.8	+1.9	-1.4
Distant (note b)			
Outlying	38.7	-8.6	-7.8
Rural	77.9	-15.0	-13.2
Remote	0.9	-6.7	+7.9
Total	171.9	-9.1	-8.5

a/See appendix II for a definition of recreation visits. Also, figures do not include visits to Golden Gate National Recreation Area (see p. 14), national parkways for which the Park Service considers statistics relatively inaccurate, and locations where statistics were not comparable among the years 1978, 1979, and 1980.

b/Park Service urban and suburban parks are located within standard metropolitan statistical areas. Outlying parks are also located in these areas but they are less populated and visitors generally must use cars to get to them. Rural parks are located beyond these areas. Remote parks are difficult to reach and receive relatively few visitors. For these reasons we consider the last three Park Service classifications to be distant. More than two thirds of Park Service parks are in the distant category.

The Rocky Mountain region, with mostly outlying and rural parks, experienced visitation declines in excess of the Park Service average in both 1979 and 1980. Regional recreation visitation was down 22 percent in 1979 and 20 percent in 1980 from 1978, after adjustment for two parks whose statistics were not comparable. A 20-percent reduction means 5 million less visits in this region. Twenty-seven of the region's 37 parks experienced decreases in 1979 and did not fully recover in 1980.

Even Rocky Mountain National Park, the region's most popular park, experienced 456,000 less visits in 1979 and only marginal recovery in 1980. Furthermore, preliminary 1980 figures from the Park Service showed a major shift to more Colorado visitors.

Through July 1980, 71 percent of the park visitors were from Colorado, whereas in 1979 only 32 percent were Coloradans. One reason for this could be the park's proximity to Denver, only 60 miles away.

Forest Service

The Nation's 154 national forests experienced increased visitor days as defined in appendix II, in both 1979 and 1980 over 1978 by about 1 and 7 percent, respectively. However, there were shifts in visitation among forests according to location. Near-city forests in both the Pacific Southwest and Rocky Mountain regions were more heavily visited while visitations at distant forests dropped. Visitation increased in distant Pacific Southwest forests in 1980, but Rocky Mountain region distant forests recovered minimally. The following table illustrates shifts in visitation among forests.

Changes in Forest Service Visitor Days From 1978

Region/forest location	1978	Percent change 1979	1980
	(millions)		
Pacific Southwest			
Near-city	35.0	+2.2	+6.2
Distant	18.2	-5.1	+5.5
Rocky Mountain			
Near-city	16.9	a/+4.1	+5.3
Distant	10.4	-6.2	-5.9

a/Adjusted to exclude Arapaho National Recreation Area figures, which were not included in 1978 figures.

The near-city and distant forest classifications are to accomodate regional differences. Those forests within 100 miles from a standard metropolitan statistical area are near-city in the Pacific Southwest region, which covers California. In the Rocky Mountain region, with its rougher topography and lesser population, forests near Denver, Colorado Springs, and Fort Collins, Colorado, and those easily accessible on Interstate Highway 70 from Denver or Grand Junction, Colorado, are included in the near-city classification.

Three national forests near major metropolitan areas experienced significant visitation increases in both 1979 and 1980. Visitation to the Angeles National Forest, close to the Los Angeles area, increased by 19 percent in 1979 and 50 percent in 1980 over 1978 levels. The result was almost 2 million more visitor days in 1980 over the 3.7 million visitor days in 1978.

Likewise, visitation at the Arapaho and Roosevelt National Forests--the nearest forests to Denver--grew 15 percent in 1979 and 28 percent in 1980 over 1978. This meant 1.2 million more visitor days in 1980 than the 4.1 million visitor days in 1978. The Rocky Mountain region's recreation staff attributed these increases to people staying closer to home.

Water and Power Resources Service

WPRS experienced a 4.3 percent decrease in visitor days, as defined in appendix II, during 1979 and a 4.8 percent decrease in 1980 from 1978. Despite even larger declines in two of the three regions visited, WPRS land management and recreation branch officials were unsure whether the declines were related to uncertain gasoline availability and higher prices. They said that not enough evidence exists to determine significant trends attributable to the 1979 gasoline shortage.

However, we did notice shifts in where people pursued recreation in both the upper Colorado and lower Missouri regions. We identified no significant changes in total visitation nor shifts in visitation among the mid-Pacific region's reservoirs in California and neither did the regions outdoor recreation planner. The following table shows that near-city visitation increased or remained relatively stable while visitation at distant facilities was down in both years in both of the other regions.

Changes in WPRS Visitor Days

From 1978

		Percent change	
	1978	1979	1980
	(millions)		
Region/location			
Upper Colorado			
Near-city	2.3	+ 3.1	- .7
Distant	5.6	-10.3	- 9.3
Lower Missouri			
Near-city	1.3	+ 6.7	+ 5.9
Distant	5.4	-10.1	-14.5

These regions cover parts of South Dakota, Nebraska, Kansas, Colorado, New Mexico, Nevada, Arizona, Utah, and Idaho; all are

characterized by sparse population and great distances from large metropolitan areas to the facilities. The classifications for near city or distant are based on the facilities' proximity to and accessibility from major towns or cities for the area.

Colorado State parks

Visits to Colorado's State parks decreased 6.2 percent from July 1978 through June 1979. Also, visits in 1980 were still 5.5 percent less than in 1978.

Near-city parks experienced increased use in each period, especially during the summer months. From July to September near-city park visitation, as a percentage of overall State park visitation, grew from 61 percent in fiscal year 1978, to 67 percent in 1979, to 70 percent in 1980.

The classification of near-city facilities is based on their proximity to and accessibility from major towns or cities for the area. The director of the Colorado division of parks and outdoor recreation attributed the shift toward near-city facilities in part to changing gasoline availability and prices.

Pennsylvania State parks

Pennsylvania's chief of the bureau of State parks stated that the 1979 gasoline shortage and weather caused park use to decrease by about 15 percent from the previous year. However, he told us that 1980 figures would probably reflect an increase above 1978 levels.

Pennsylvania's parks are divided among six geographic regions, one in each corner of the State and two in about the central third of the State. Attendance at those in the south-central and northeast regions were the most heavily affected by the uncertain gasoline supplies of 1979, according to the parks bureau chief. He explained that neither of these regions includes a major metropolitan area but that they often draw people from such areas outside the region. While the Three Mile Island incident was an important factor in a 25-percent drop in the south-central region, that reduction was closely followed by a 23-percent drop in the northeast region, where the primary factors would have been poor weather and uncertain gasoline supplies, according to the chief.

New Jersey State parks

The State chief of the bureau of parks management stated that New Jersey residents stayed closer to home because of the gasoline shortage. Visits to State parks increased 4.7 percent in 1979 while visits to State forests rose more than 8 percent.

Visitation statistics for State parks also reflect increases in 1980 of nearly 27 percent above 1978 levels. Part of the increase was attributed to good weather and other factors, as well as fuel costs. Also, these increases may not be surprising considering that, relative to the West, most recreation areas in New Jersey are close to large cities.

City parks

Parks department personnel we visited reported increases in city park usage in 1979 and 1980. However, none collected visitation statistics. All of the changes reported were based on observations and estimates of parks department personnel.

Sacramento officials told us that gasoline constraints were not a factor, but officials in other cities attributed the changes to gasoline constraints, as well as factors such as increased population. For example, both Denver and Salt Lake City have noticed increases in city park usage in the last 3 years. Denver's superintendent of parks estimated in April 1981 that usage in 1980 had increased 20 to 30 percent over 1978. He also noticed that usage of city parks in 1980 was higher than in any previous year. On the other hand, Denver's city mountain parks, which are outside the urban area, experienced decreased use in 1980. He attributed a major part of these changes to gasoline constraints.

Picnic reservations are an indicator of increased usage, according to Salt Lake City's assistant parks and recreation director. In 1980 Salt Lake City issued more picnic reservations that ever before, 250,000 versus 200,000 in 1978, or a 25 percent increase. Along with increased population, the city's assistant parks director attributed the increases to more people pursuing recreation closer to home as a result of gasoline constraints.

Other observations of shifts in visitation patterns

Speakers at the 1980 National Outdoor Recreation Trends Symposium in April and the 1980 National Recreation and Parks Association Congress Meeting in October noted that people continued to pursue recreation in 1979 and 1980 but they stayed closer to home. One speaker cited a 1979 New York study reporting that visitation to New York City metropolitan area resorts showed increases or no change whereas visitation to other faraway area resorts decreased.

VISITORS WENT TO FEWER LOCATIONS, STAYED LONGER, SWITCHED TO TENTS, AND USED SMALLER RECREATIONAL VEHICLES

Many Federal, State, and local agency officials reported that in the last 2 years people have been going to fewer locations, staying longer at each location, using smaller recreational vehicles, and switching to tents. Some of the more specific observations are:

--An October 1980 Corps research report entitled "Impact of the Energy Crisis on Corps of Engineers Recreation Program" concluded that noticeable trends in 1979 included increased use of Corps lakes as vacation destination sites, increased lengths of stay, fewer visitors making a large number of trips of short duration, and more use by local residents who can make a round trip on one tank of gas or less.

--The Park Service western region noticed that in the last 2 years people visiting the national parks have been staying longer. This trend was also noticed in many other locations we visited. Before 1979 visitors tended to stay a few days in one park and then move on to visit another one.

--A Corps Missouri River division report in September 1980 stated that a noticeable increase in tent camping had occured at Corps lakes. Tent campers arrived in small, economy cars and pickups, and some were pulling soft-top, pop-up campers.

--The Park and Forest Services Rocky Mountain regions also noted substantial increases in the number of people camping with tents. This correlated with substantial decreases in the number of large recreation vehicles.

VISITATION TO SOME AREAS DID NOT FOLLOW THE PATTERNS

More than 80 percent of Corps facilities are located within 50 miles of a standard metropolitan statistical area. Even so, Corps recreation areas in many parts of the country experienced visitation decreases in 1979, according to Corps statistics. In 1980 visitations increased in many places. The Corps research report noted earlier contains statistics showing, after adjustment for data inconsistencies, overall Corps recreation days, as defined in appendix II, had dropped 4.3 percent, or by 18 million visits in 1979. The report suggested two possible interrelated interpretations for the decline: first, the reductions were caused by gasoline prices and second, they were caused by other factors such as weather.

A Corps Missouri River division public use report and the Pittsburgh district recreation and resource management branch chief attributed part of the 1979 decrease to the uncertain availability and rising costs of gasoline. The Philadelphia districts' outdoor recreation planner told us that gasoline constraints had reduced visitation in 1979 but statistics were too inaccurate to show it. Sacramento district recreation managers, however, detected no visitation changes related to gasoline constraints there and neither did we. On the other hand, headquarters officials discounted the statistics because they considered many to be unreliable. They told us that they thought visits to their facilities had increased.

Some distant areas experienced increases in both 1979 and 1980. Agency officials attributed these increases to people choosing closer, but still distant, recreation areas over even more distant locations; people choosing less crowded, distant forests over near-city forests; and people returning to distant forests once gasoline availability was no longer a problem. For example:

--Curecanti National Recreation Area, in western Colorado, has experienced increased visitation during both 1979 and 1980 despite its distant location from large cities. The Park Service Rocky Mountain associate regional director attributed the increases to western Coloradans substituting the closer Curecanti for the more distant Glen Canyon National Recreation Area in southern Utah.

--Routt National Forest, in western Colorado, experienced a large visitation increase in 1980, especially during the summer. The increase was associated with the heavy use of the Arapaho and Roosevelt Forests and people looking for less crowded conditions.

--Rio Grande National Forest, in southern Colorado, experienced increased visitation in 1980. According to the Rocky Mountain regional director for recreation and lands, much of the increase resulted from Texans returning to Colorado after staying home during 1979.

Visits reported at 257 State parks in California declined about 4 percent to 56 million in 1979 but increased in 1980 to an estimated 58.5 million--about 1 percent below 1978 visitations. Recreation planners in the California State department of parks and recreation analyzed park visitations for 1979 and 1980 in an attempt to identify recreation trends. The results of their analysis were inconclusive. A more clear-cut shift to recreation locations within a 1-hour drive from metropolitan areas in both 1979 and 1980 was anticipated but not found. We

also noted an unexpected pattern. While visits near Los Angeles were up in the two periods by 24 and 4 percent, respectively, they were down at other near-city locations. As expected, however, visits to distant facilities beyond 100 miles of standard metropolitan statistical areas were down by 6.7 and 3.4 percent, respectively, for the same periods.

A WORD OF CAUTION

In this chapter we used the best available visitation statistics. These statistics have varying degrees of reliability and must be used with caution. Also, they are not comparable across agencies. (See app. II.)

Several officials cautioned us that other factors besides gasoline constraints influenced visitation at their recreation areas. Some of these factors are: weather conditions, quality of hunting or fishing, temporary closures, site rehabilitation or improvement, attractiveness of new and competing facilities, and forest fires.

In one instance, the recreation manager for the WPRS mid-Pacific region stated that reported visitor days are only estimated totals, they could vary by as much as 30 percent from the actual total. In another case, the Corps Missouri River division statistics showed recreation days increased from 29 million in 1978 to 56 million in 1979. The division doubled the number of recreation days to their facilities in 1979 to account for people visiting more than one recreational area of the same project. For these reasons, we did not include either of these sets of figures in this report.

The Park Service explained the problem of collecting reliable visitation data in its 1979 statistical abstract, as follows:

> "This information results from a variety of methods ranging from visual counts to electromagnetic traffic counters. In each unit of the park system, the method of learning about public use is selected to preserve a balance between cost effectiveness and concern for the best accuracy possible. Many problems complicate the counting effort such as 'open' parks which have multiple, random access points. Irregular park boundaries and boundaries which include residencies or even small population centers make it difficult to actually count visits. In such cases, local estimates are designed to adjust for the circumstances. Estimates of other types are also reported here. The reports of 'recreational' use and visitor hours are derived from a variety of estimates. Visitor surveys are periodically conducted to establish the basis of estimating as well as to change the estimates as the patterns of travel and public use are changing."

We did not use approximately 25 percent of Park Service statistics because they lacked comparability with those from other years or because facilities lacked comparability with each other. For example, we excluded Golden Gate National Recreation Area in San Francisco from our Park Service calculations because of the continuing expansion of the park's size and its programs, which resulted in large increases in visitors--26 percent in 1979 and 106 percent in 1980 over 1978. Also, we did not use traffic counts in such places as the George Washington Parkway because the Park Service reported difficulty in obtaining reliable statistics. To the extent that we found other organization's figures lacked comparability or were erroneous, we made appropriate adjustments, which were relatively minor.

CHAPTER 3

FEDERAL AGENCIES COULD DO MORE TO RESPOND TO CHANGES IN RECREATION USE

Most Federal agencies could do more to respond to the signals suggested by visitation statistics, namely that people may want to pursue recreations nearer their homes as a result of uncertain availability and rising costs of gasoline and some people may want to consume less gasoline while they pursue recreation.

The public's heavy reliance on gasoline-dependent private vehicles for recreational travel makes both facility location and gasoline consumption particularly important. While some agencies have developed policies that emphasize locating outdoor recreation facilities nearer users and helping them conserve gasoline, the agencies have not yet implemented them.

On the other hand, some measures they have initiated for other motives have incidental conservation effects and could reduce the heavy reliance on private vehicles for recreation and help assure continued accessibility to recreation facilities.

POLICIES AND PRACTICES VARY

The Park Service and HCRS, which were recently consolidated, have issued energy-focused policies, and the Forest Service included such direction in its 1980 Recommended Renewable Resources Program. The Corps and WPRS, however, developed possible responses to the impact of gasoline supply and price changes upon recreation use, but did not finalize policies. Although little progress has been made on implementing their policies, all agencies have implemented measures that help the public reduce gasoline consumption. Most measures were not motivated by energy concerns but to achieve public service and environmental protection objectives.

National Park Service

The Park Service's energy policy, established in 1978, provides that the national park systems will operate in an energy-efficient manner, employing, where appropriate, public and nonmotorized transportation for both park personnel and visitor use.

The Park Service Denver Service Center amplified the 1978 policy in its September 1980 Draft Energy Conscious Planning Guidelines. Its section on conservation strategies for transportation systems provides the following suggestions for planners:

--Exploration and implementation of various modes of visitor travel to and within the parks.

--Provision of incentives to visitors to use transit systems.

--Expansion of trail networks--including use of road rights of way--to include bicycle paths.

The Park Service is currently supporting the Vehicle Access Transportation System--a 3-year pilot test that was intended by the Congress to improve public transportation access to national parks. The Park Service programed funds for fiscal years 1979 through 1981 to implement the system. The Park Service's first-year evaluation of an initial 21 projects reinforced its decision to support the program. Most projects involved extending existing transit routes to parks or into parks. In addition to broadening access, Park Service evaluators said that the system has potential for significant energy savings.

Beyond these projects, however, the Park Service has yet to implement its policies in the three regions we visited. The western region operations and planning staff stated that gasoline-induced decreases in visitations would need to be much greater to affect park operations. The mid-Atlantic region also has not reacted to gasoline constraints. The Rocky Mountain regional energy coordinator stated that the region's current efforts are aimed at conserving energy in Park Service buildings, facilities, or vehicles. Helping the public conserve gasoline is seen as the next step in the process.

Forest Service

Forest Service officials have included energy conservation or improved site accessibility statements in national program recommendations and implementation guides. Regional personnel are now taking preliminary steps to manage facilities with goals for both reduced gasoline consumption and increased accessibility by urban residents.

The Forest Service's statement on gasoline conservation and near-city recreation is included in "A Recommended Renewable Resources Program--1980 Update," dated September 1980 and submitted to the Congress, in which improved access to recreation is stressed. The document states that new emphasis will be placed on energy efficiency in recreation use and development, including making recreation on national forest system lands more accessible, usable, and enjoyable for urban residents. This would be done through the following actions:

--First, new recreation facilities would be located to use energy-efficient transportation systems, where possible, to encourage use by urban residents.

--Second, energy-efficient transportation systems serving national forest system areas would be encouraged and supported by coordinating facilities and programs with the private sector and local Chambers of Commerce and public utility districts.

--Third, visitor information programs would be used to promote energy efficiency and to inform urban residents of recreational opportunities within the national forest system.

A policy implementation memo dated September 24, 1980, from Forest Service headquarters to the regions provides that recreation facilities will be maintained, improved, and developed in a way that encourages energy conservation by providing greater recreation opportunities to areas closest to urban areas. In addition, draft regional and forest plans emphasize nonmotorized recreation activities.

The Rocky Mountain region's progress in the conservation area is shown in the following management activities.

--The Arapaho and Roosevelt National Forests' draft forest plan contains evaluation criteria for selecting management alternatives. Among these criteria is a factor for considering the energy efficiency of both production and consumption aspects of recreation under each management alternative. Each alternative was evaluated by determining the estimated amount of energy required to provide recreation and the estimated amount of energy required by the users.

--The region emphasized developing near-city facilities by proposing fiscal year 1981 special capital investment funds for projects near the heavily populated Colorado Front Range of the Rocky Mountains. However, most of the proposal was not funded.

The Pacific Southwest region's progress is shown in the following regional activities:

--In its planning, the region developed a group of program alternatives that emphasize both conservation and recreation. Various near-city recreation programs are to be evaluated.

--Current Pacific Southwest regional planning for new facility construction is concentrated in forests near metropolitan areas. However, funding delays have hampered the development of three priority sites near Los Angeles: two projects have experienced funding delays and the other has not yet received initial funding.

Corps of Engineers

In August 1978 the Corp developed a draft of guidance on energy conservation in recreation resource management. Possibilities identified in the draft--which was not issued in final form--included emphasizing nonenergy-consumptive forms of recreation in the planning, designing, and managing of Corps recreation areas. The draft went on to say that the design of parks should encourage travel by foot or bicycle rather than by motorized vehicle.

Division and district officials told us that no emphasis had been placed upon managing their recreation areas with gasoline conservation in mind because they had not received guidance to do so. They also said that gasoline was not a serious problem for their recreation areas and responsibilities for conservation lie chiefly with State and local agencies that manage Corp-built recreation areas.

The chief of the recreation resources branch in Washington, D.C., told us that the Corps had not encouraged public energy conservation because the size of the issue did not warrant its attention and there was not much it could do. Later, the headquarters' energy conservation officer told us that the corps was reconsidering a gasoline conservation policy.

Water and Power Resources Service

In January 1974 the Commissioner of the Bureau of Reclamation (later WPRS) responded to a request from the Director of the Bureau of Outdoor Recreation (later HCRS) requesting contingency plans for adjusting WPRS recreation programs to save energy. The response suggested a variety of measures that could be taken to help bring facilities and visitors together and to reduce energy consumption by recreation area users. These measures did not constitute a contingency plan but suggested identifiable fuel-saving components inherent in the Bureau of Reclamation recreation program. The ideas in the response included

--shifting development funds from remote to urban areas;

--opening canal, pipeline, and transmission line rights of way to hiking, biking, and equestrian use;

--emphasizing nonmotorized recreation;

--developing mass transit and shuttle transportation systems;

--working with State fish and game departments to enhance near-urban fishing; and

--emphasizing day use at urban recreation areas, with corresponding deemphasis and possible closure of remote areas.

In February 1974 the Commissioner sent the response to the agency's regional offices to indicate his views on recreation and the energy crisis. A WPRS headquarters land resources manager and the upper Colorado region land management and recreation branch chief reported that the memo had not been implemented.

The WPRS senior staff assistant for land resources management in Washington, D.C., told us that regional officials have no evidence that the public has reacted to gasoline availability and price problems by changing its use of WPRS facilities. However, we noted that the visitor day statistics showed declines at distant WPRS facilities in two regions in each of the last 2 years.

The WPRS official in Washington also said that the agency is limited in the steps it can take to deal with the energy crisis because the agency manages only 48 of its projects while other sponsors administer the other 230. We agree that indirect control does impose limitations, but as also mentioned in the Commissioner's earlier memo, the agency can encourage the administering agency to emphasize low energy-consuming activities and deemphasize high energy-consuming ones.

Heritage Conservation and Recreation Service

In September 1980, HCRS policy was "to encourage the best in energy conservation practices and innovation in its grants-in-aid programs." The policy provided that the Land and Water Conservation Fund grant program emphasize projects that served close-to-home recreation needs and upon recreation activities that conserved energy. The policy also stressed recreation area and access improvement in densely populated central cities through the Urban Park and Recreation Recovery Grant Program. An October 1980 implementing directive, applicable in fiscal year 1982, stated:

--All projects shall be designed, constructed, operated, and maintained in an energy-efficient manner.

--State project selection systems shall include a rating element that gives priority to the most cost-effective energy-efficient projects including among others those that are located close to populated areas and are accessable by foot, bicycle, or public transportation.

Undoubtedly, the Federal influence over State and local operations will be less if these two grant programs are phased out later, as planned. If not eliminated, however, such guidance

could lead to more policies and practices similar to those we observed in California. While developed without HCRS guidance, the 1980 California State Park System Plan recognizes the impact that gasoline availability and price have had on the public's ability to participate in outdoor recreation. The plan stresses acquiring and developing park units located near metropolitan population centers and the importance of potential public transportation access. The State's plan for 1980 to 1986 shows that 36 of 41 proposed development projects are located near Los Angeles, San Diego, San Francisco, and San Jose. On the other hand, New Jersey, Pennsylvania, and Colorado park officials reported that their agencies had not developed written policies to promote reduced gasoline consumption by the public.

HCRS progress on sharing conservation information could be carried on through its technical assistance programs which will be continued by the Park Service. The Information Exchange, a technical assistance program, is the foundation of the information dissemination system. Information on ideas, skills, techniques, and approaches dealing with problems and opportunities in recreation, conservation, and preservation are transferred to managers, planners, and users through a publication called "Notifications." In May 1981 about 11,500 members were in the program, which involves individuals and organizations from Federal, State, and local governments and private and nonprofit organizations.

To supplement the Information Exchange, HCRS started a computer-based system called "SHARE" that was to contain innovative solutions to problems such as energy conservation. SHARE data is in the form of case studies submitted by users. However, as of December 1980, the system contained only a few examples of projects relating to energy conservation and transportation.

OFFICIALS HAD MIXED VIEWS ON CONSERVATION OPPORTUNITIES

Some officials reported that numerous obstacles must be overcome before many ideas could be implemented to save gasoline. Foremost is people's reluctance to leave their cars. Other points included:

--Federal recreation area development sponsors, willing to co-share project development and bear subsequent costs as required by the Federal Water Projects Recreation Act, are difficult to find regardless of the project location. Though easier to find sponsors near cities, finding them is still difficult.

--Helping the public conserve energy penalizes park operations. Park Service facilities have energy-conservation goals, and shuttles would increase the Park Service's gasoline consumption even though consumption for the public might decreased.

--Public transit companies have equipment and personnel constraints, along with a reluctance to go into new territory. Colorado's division of parks and outdoor recreation heard these arguments during the division's fruitless negotiations with Denver's regional transportation district for service to two Denver facilities. The division director suggested that authorities be pressed into providing public transit to recreation areas by establishing requirements in Federal grants programs. Along the same line, a Park Service headquarters transportation analyst commented that responsibilities for people's transportation, except under the Vehicle Access Transportation System, stops at the park boundary. He said the local funding should be made available for providing transportation to urban parks.

--The Colorado division of parks and outdoor recreation sees potential for a statewide campsite reservation system but has encountered disinterest or negativism from State legislators for such a program. The director attributed the lack of enthusiasm for the system to people's aversion to long-range planning for recreation. An HCRS headquarters outdoor recreation planner pointed out, however, that campground reservations systems may favor those who are aware of the system and may discriminate against those people who do not use reservation systems.

--While some officials see fuel-saving advantages to long-term recreational vehicle, boat, and trailer storage near federally built reservoirs, they express ambivalence and reluctance to advocate such efforts; there has been an outgrowth of unsightly storage areas near some reservoirs. The Corps Sacramento district chief of the recreation/resources management unit and the WPRS mid-Pacific outdoor recreation planner both told us that such facilities also would not be acceptable because they might compete with private enterprises. A WPRS headquarters official stated that this type of activity could be accomodated on private land.

--Measures that might be applicable in some places would not be applicable at others. Shuttle buses would not work if there were not sufficient visitors, and people would still go to facilities even if a

reservation system showed they were full, according to the Corps Sacramento district chief of recreation resources management. Furthermore, Corps policy is to serve the public on a first-come-first-serve basis.

--An outdoor recreation planner at Corps headquarters considered the procedures so encumbering in the HCRS SHARE system that it would not receive much use.

As their attention became focused upon public gasoline consumption during our review, some agency officials expressed increasing awareness of the issue and decided to take action.

--The Corps Missouri River division, rather than States or other sponsors, managed nearly 57 percent of its own facilities to provide 67 percent of the visitor recreation in the region during 1979. The recreation and resources branch chief indicated that he and his staff will begin placing emphasis upon gasoline-saving approaches to managing these facilities, as well as providing guidance to administering agencies for the remaining 43 percent.

--In WPRS' lower Missouri region, land management and recreation branch personnel indicated that our review will serve as a catalyst to evaluate and plan more effectively, with emphasis on methods of helping the public to conserve gasoline.

--The director of Colorado's division of parks and outdoor recreation sees potential for initiatives in his organization toward fostering conservation by the public, despite his optimism that such measures will not be essential to sustain park visitation.

AGENCIES HAVE SPONSORED SOME MEASURES THAT HELP TO CONSERVE GASOLINE

While many officials have pessimistic views toward influencing public gasoline conservation, they have implemented numerous gasoline-saving projects for other reasons. They had differing degrees of involvement in the measures. For example, for some measures, they funded or provided the actual service. Among others, they allowed or encouraged concessioners to provide them.

Following is a list of gasoline-saving activities that are or will soon be sponsored by agencies we visited. Most measures were motivated to reach objectives such as public service and environmental protection. Although individual circumstances differ, the measures appear to have potentially wide applicability. The list describes gasoline-saving measures that were

implemented; sponsoring agencies, States, or localities; and the benefit toward gasoline conservation in recreation.

Gasoline-Saving Measures and Their Benefits

Measure	Agencies, States, or localities involved	Gasoline-saving benefits
Public transit to parks, forests, and ski areas (note a)	Park Service, Forest Service, California, Pennsylvania	Reduces number of vehicles; reduces per capita consumption
Shuttle systems within or to ski areas, parks, beaches, historic sites, forests, etc. (note a)	Park Service; Forest Service; New Jersey; Pennsylvania; Nags Head, North Carolina; Washington, D.C.	Reduces number of vehicles; reduces per capita consumption
Off-duty school buses or rented buses to recreational or cultural sites	Pennsylvania, New Jersey	Reduces number of vehicles; reduces per capita consumption
Discounted ski lift tickets or waived parking fees to carpoolers (note a)	Forest Service, New Jersey	Reduces number of vehicles; reduces per capita consumption
Biking and hiking trails cross-country and within parks (note a)	Corps, WPRS, California, Colorado	May substitute for motorized activity
Levee rights of way for biking and hiking trails	Corps	May substitute for motorized activity
Campsite reservation systems (note a)	Park Service, Forest Service, California	Reduces excess driving to search for campsites.

a/Detailed descriptions of these measures are in appendix IV.

Measure	Agencies, States, or localities involved	Gasoline-saving benefits
Provision of reservoir and fishing information in local newspapers	Corps	Allows for driving directly to favorable sites
Broadcasting of campsite availability on local radio stations	Corps, Colorado	Reduces excess driving to search for campsites
Directing visitors to alternate available campgrounds	Corps, Pennsylvania	Reduces excess driving to search for campsites
Easing length of stay limitations at campgrounds	Forest Service, Corps	Reduces traveling among several locations
Closure of little-used distant recreation areas	Corps	Reduces long-distance driving
Overflow camping areas	Forest Service	Reduces traveling to find available campsites
Fenced long-term boat or recreational vehicle storage areas (note a)	Corps, WPRS	Reduces repeated hauling of boats or recreational vehicles; allows commuting to recreation area with smaller vehicles

a/Detailed descriptions of these measures are in appendix IV.

Measure	Agencies, States, or localities involved	Gasoline-saving benefits
Use of computer terminals to provide current campsite availability information	Forest Service	Reduces excess driving to search for campsites

CHAPTER 4

APPROACHES TO FORECASTING VISITATION SHOULD BE IMPROVED

Federal agencies do not have good techniques for forecasting how many people will visit recreational facilities. Also, forecasts often have not considered the influence of gasoline price increases and shortages on visitations.

We believe there could be numerous benefits from improved forecasts. Effective forecasting could become particularly important for both the Park and Forest Services. An Interior proposal called for an additional $105 million in fiscal year 1982 to restore and improve national park areas. Since we estimated in October 1980 that correcting safety and health deficiencies for national parks alone would cost about $1.6 billion, projected demand for facilities should be an important factor in determining where to spend the additional money. 1/ Later, on April 2, 1981, legislation was proposed by the Secretary of the Interior to amend the Land and Water Conservation Fund Act of 1965 to allow funds to be used for restoring and improving both the national park and forest systems and certain other Federal recreation facilities.

Such forecasts also should help recreation managers to justify budget requests, estimate future revenues from admission fees, negotiate with concessioners, plan strategies for accommodating or restricting projected excess demand, plan parking and traffic patterning, plan strategies for moth balling selected operations during projected periods of slack visits, plan energy conservation strategies; evaluate requests for grants, and provide technical assistance to State and local agencies.

Recent actions by various agencies could lead to forecasting improvements. Interior is currently preparing a research agenda that consolidates the views of 500 recreation and recreation-related professionals. The first research priority is to study fuel constraints on the use of recreation resources. Another research priority item is to develop better visitor survey techniques. The Water Resources Council recently began encouraging better methods of forecasting recreation demand, sometimes requiring computers, but only for building new or expanding existing water projects. Furthermore, the Office of Management and Budget recently directed Interior to develop standard measurements for recreation data collected by all Federal agencies. To encourage refinement of forecasting, we experimented with statistical models to project visits at several locations.

1/"Facilities in Many National Parks Do Not Meet Health and Safety Standards," CED-80-115, dated Oct. 10, 1980.

BETTER FORECASTING IS NEEDED

The executive report of Interior's Third Nationwide Outdoor Recreation Plan, prepared in 1979, identified weaknesses in recreation forecasting. The report stated:

> "Projection of future recreation participation rates should be interpreted cautiously, as evidenced by the gross underestimates of current outdoor recreation trends made 17 years ago by the Outdoor Recreation Resources Review Commission. Substantial improvements must be made in the data base used for analysis, and in the technical specifications used to develop computer models for recreation participation. Acceptable national projections depend entirely on these changes."

Federal agencies now use techniques such as extensions of historic trends to project visits; sometimes they do not project visits at all; in other cases they subjectively modify historic data. The following examples illustrate the wide range of approaches to forecasting used by Federal and State recreation agencies.

Forest Service forecasting seems to be done inconsistently. The Forest Service Rocky Mountain region used a demand model in preparing its Arapaho and Roosevelt National Forests plan, which considered the impact of various energy scenarios on recreation demand for the forests. The Pacific Southwest region, without considering the availability or price of gasoline, projected historic growth in visitations adjusted for anticipated increases under various alternatives in its operations planning. Recent projections through 2030 done at the national level were based on statistical analysis including socioeconomic factors. However, the analysis did not include rising energy costs because necessary information to do so was considered unavailable.

The National Park Service's mid-Atlantic region forecasts future demand by reviewing historical use trends to anticipate current-year use. In this way, the region estimates its operating resource needs. The western region develops no recreation visitation forecasts. Instead, it relies on information provided by the Park Service's Denver statistical office, which maintains past-use statistics. The office prepares forecasts based on averages of visitations during recent years. Although some parks had visitor projections for longer periods, such major ones as Glacier, Yosemite, and Grand Canyon have none.

The Corps and WPRS prepare demand forecasts during periodic updating of facility master plans or when new projects are being planned. The forecasts, however, are often straight projections of historic data with data or methodology sometimes modified on the basis of subjective judgment. For example, the Corps Philadelphia district's outdoor recreation planner and the Pittsburgh district's recreation and resource branch chief told us that they

project visitation at sites based on historical use and surrounding population characteristics. The Corps' Missouri River division recreation resources and environmental resources branch chiefs told us that, along with projection of past trends, they use subjective estimates of project conditions and national economic conditions. The Corps' Sacramento district environmental planning section chief told us that the district's evaluation of data would include a relatively minor consideration of gasoline price and availability unless those impacts changed dramatically. More important factors included long-term growth in demand, cost of living, and water levels.

State agencies, like their Federal counterparts, also have varying forecasting techniques or capabilities. Some are making projections based on historic use. Others are applying recreation participation rates to surrounding populations which then may be adjusted subjectively for other factors.

Both Pennsylvania and New Jersey rely heavily on historic data to project needs but do so only for the ensuing year. Neither State does long-range forecasting.

Colorado's division of parks and outdoor recreation director reported that the division's recreation demand forecasts included historic patterns adjusted for shifts in population, projected population increases, and added roads. The division's planner told us that new HCRS planning guidelines allow flexibility in developing both statistical and subjective demand data, which are then governed by public review.

California, on the other hand, forecasts recreation demand using a computer system. The system estimates the total potential demand for each recreation activity by county, allocates the potential demand for each activity among zones surrounding each metropolitan area, determines the peak-period demands within each zone, and estimates the quantity of facilities required to satisfy these peak-period demands. The result is a listing of recreation needs in various zones around heavily populated areas.

MORE RESEARCH NEEDED TO IMPROVE FORECASTING

The top priority among 117 research tasks, according to a research agenda now being prepared by Interior in response to needs identified by 500 recreation and recreation-related professionals, is to:

> "Analyze and evaluate the long and short-term effects of fuel shortages and high costs of fuel on leisure travel and use of recreation resources. Identify opportunities for social intervention in this adjustment process to mitigate hardships and increase the production of recreation benefits per unit of fuel consumed."

The tenth priority is to:

> "Develop guidelines for the application of survey research techniques (e.g. questionnaires, interviews) in the aquisition of recreation planning and management information."

Increased interest in improved forecasting techniques may also grow from December 1979 Water Resources Council rules and regulations suggesting that one way to measure the value of recreational benefits at water projects is to calculate the willingness of people to pay. The calculation requires determining the number of people living various distances from the proposed facility; forecasting the likelihood of these population groups visiting the facility; and estimating the travel costs from the various population zones to to the facility.

The accuracy of the projected per capita visitation rate is, of course, critical to the benefit measure. The rate is usually based on the number of visits made in the past to recreational facilities with characteristics similar to the proposed one. More sophisticated studies also consider the characteristics of the potential users in such terms as age, income, and education. The cost of getting to the park usually includes the direct cost of operating an automobile, a personal cost for travel time, and the cost of any entrance fees.

Studies leading to the Water Resources Council proposal were done in the late 1960's and early 1970's when gasoline prices and supplies were relatively stable. Several adjustments were made in the cost of operating an automobile from time to time for purposes of measuring willingness to pay. However, the impact increasing gasoline prices and shortages have on visitation is not considered.

Furthermore, at least four factors limit improved forecasting methods. First, most of the studies have been what researchers call cross sectional studies--that is, they look at conditions at one point in time. The studies have concentrated on how park characteristics and populations at a given time were related to visitation. For example, a recent study analyzed 1976 visitation at 30 New York State parks. It compared visitation with such factors as the area of park, water frontage, miles of trails, and some socioeconomic factors, etc. Because such conditions remained stable from year to year, researchers or research managers apparently felt it was not necessary to conduct longitudinal studies--those that evaluated the impact of changing conditions over time. One significant longitudinal study that we found concentrated on the impact of population growths and changes in per capita income. These factors were undoubtedly important but did not include other factors such as gasoline prices and shortages.

Another limitation on current forecasting is that research on forecasting visitation has been done sporadically. Some researchers complained that they had started recreation studies but were unable to finish them. However, numerous articles have been published, such as those presented at the Forest Service's 1980 National Outdoor Recreation Symposium. There seems to be no long-term commitment to research in forecasting demand, as the studies have been done in numerous places with numerous sponsors. For example, the Forest Service's principal recreation scientist commented that the agency had done research on forecasting recreation trends until 1976. He considered their current Forest Service efforts on the periphery of the subject although he was trying to get more research started on the effects of energy constraints on recreation.

Current visitor statistics also have varying degrees of reliability or comparability. Data limitations are discussed on page 13. The implication for forecasting visits is that results of statistical models cannot be accurate if their data base is inadequate.

Finally, the three methods used to collect other data that may be needed for forecasting visitation have been inconsistent, costly, perhaps burdensome to the public, and of limited reliability. The methods include

--surveying visitors,

--surveying the general public or residents in the surrounding communities, and

--using published statistics.

Visitor questionnaires have solicited information including origin of the trip, per capita income, ethnic background, and type of recreation sought by the visitor. The previously mentioned New York study, for example, involved interviewing 7,000 visitors to study recreation at water-related recreation areas.

A 1975 National Survey of Hunting, Fishing and Wildlife is an example of a general survey in which more than 100,000 people were telephoned. Respondents were asked about their socioeconomic characteristics (age, income, etc.) and their recreation participation. In another general survey, Arizona mailed out almost 15,000 questionnaires in 1970 asking people about distances traveled for recreation, the types of recreation they sought, and their socioeconomic characteristics.

Along with the problem of gathering consistent data, the number of people actually responding to the surveys was often too small, which limited the survey's reliability. Identifying trends from such surveys is difficult and they are usually expensive.

In December 1980 the Office of Management and Budget suspended the surveys of visitors to facilities managed by Federal agencies for 1 year, except to collect minimum information for visitor safety. Before doing more surveys, Interior is expected to develop standard measurements for r eation data compiled by Federal agencies.

OFFICIALS HAVE MIXED OPINIONS ON THE NEED FOR BETTER FORECASTING

Officials both within and among agencies had mixed opinions on the need or benefits from improved visitor forecasting.

Some Forest Service officials saw a need for forecasting improvements. The Rocky Mountain regional director for recreation and lands said that long-range forecasts, if done by the State or the Park Service, would be helpful for Forest Service planning to meet recreation demand. A need for better forecasting through demand modeling also was seen in the Pacific Southwest region. A regional draft plan states that, "Demand models are needed for dispersed and developed forest recreation activities." However, according to the research representative from the Berkeley range and experiment station who worked on the plan, developing recreation demand models is presently only a suggestion in the conceptual stage. Nothing specific has been done to demonstrate the need for recreation demand modeling in the Forest Service.

The WPRS Lower Missouri region's landscape architect commented that data in a model he was testing to meet Water Resources Council requirements is old (1966-69) and needs to be updated. WPRS headquarters officials told us, however, that recreation forecasting is not a high priority research item within the agency.

The chief statistician at the Park Service's Denver statistical office indicated that a definite need exists for better forecasting. He told us, however, that the Park Service spends nothing on studying social and economic factors needed for developing a workable model. He said that better modeling could be used for site selection and determining the need for facilities. Fuel conservation could be included in a model, as could other important parameters.

Another Park Service official, however, saw less need for forecasting. According to the western region's chief of park planning, visitation forecasts and projections are generally not a significant consideration in developing plans for existing parks; the primary emphasis is assessing the capacity of each park to handle visitations in an environmentally sound manner. He considered environmental impacts a far more important and controlling factor in developing park plans.

Corps officials also had mixed opinions. A Philadelphia district outdoor recreation planner stated that since there are so few recreation facilities, the projections can be performed manually; given recent budget cutbacks and no further site development, no need exists for computer modeling in the Philadelphia district. Missouri River division personnel stated that the burden of projecting recreation demand in the short term rests with the sponsoring agency. They said that computer modeling is not worth the cost of initiating and employing such a system. On the other hand, a Pittsburgh district recreation resources management branch chief stated that if a computer model existed and if the Corp established a data base, it could be helpful.

Officials involved with State recreation programs also had mixed opinions. The chief for technical assistance and State planning of HCRS' mid-continent regional office said that the method used by most States to prepare their State recreation plans provides a good general indication of recreation needs. This method involves multiplying an estimated rate by an estimated population. He added that more specificity would be good, but he doubted that the cost of methods to achieve this would be justified in view of the benefits derived. On the other hand, Colorado's recreation planner stated that problems exist with current recreation demand forecasting and that modifications in methodology should be considered.

RESULTS OF GAO's EXPERIMENTAL LONGITUDINAL FORECASTING MODELS

Since agency and academic studies have not resolved the forecasting issue yet, we developed experimental models for forecasting the annual number of visits at six large national parks and four smaller recreational facilities built by the Corps. We used a statistical technique called regression analysis and almost 40 years of data to develop these models, to find the factors--especially energy-related factors--that influence visitation, and to measure their impacts.

We used our visitation models and data from a model of the national economy to forecast attendance at each of the six selected national parks as well as the total visits for all six parks through 1990. The six national parks we studied were: Glacier, Grand Canyon, Rocky Mountain, Great Smoky Mountain, Yellowstone, and Yosemite. We tried to use large parks in different parts of the country and with different proximities to population centers. Another criterion we used in selecting the parks was the availability of relatively reliable historic visitation data. We also studied local or regional facilities. These were: Lake Sidney Lanier, near Atlanta, Georgia; Lewisville Dam, near Dallas, Texas; Denison Dam in central Oklahoma; and Oahe Dam, in central South Dakota.

We first tried to identify the major variables that influence park visitation. Variables described in the research literature included, but are not necessarily restricted to

--weather,

--travel costs,

--urbanization,

--leisure time,

--population size,

--population characteristics,

--cost of alternative recreation,

--park admission fees,

--accommodations and other park facilities,

--promotion campaigns, and

--per capita income.

Chain reactions can occur among variables. For example, in theory, increases in per capita income increases the number of autos per capita, which in turn increases gasoline and other taxes for improving the highway system. The additional automobiles and better highways make parks more accessible to more people and should increase visitation. The Government has no control over most of these factors, like weather and population, but does for others like admission fees, promotion campaigns, and number of accommodations.

Some variables also are more sensitive to change over time than others. For example, per capita income, population, and in recent years, gasoline prices, have been changing over time. On the other hand, the size and basic characteristics of most parks remain fairly stable over time.

To capture the impact of changing gasoline prices and supplies, we used longitudinal analysis, i.e., we analyzed the relationship among variables over time. Our theory was that visitation is influenced by the size of the population, the relative cost of driving, or other measures of accessibility to recreation areas, and availability of gasoline. For the six national parks, we assumed visitation is primarily influenced by national as opposed to local populations, so we used national statistics.

We experimented using several factors, which are discussed in appendix V, but the ones that we found to be consistently and strongly associated with visitation in the six national parks were as follows:

--Number of households or changes in the number of households in the United States,

--Existence or absence of a serious fuel shortage during the year.

--Average gasoline prices per gallon during the year.

--Average miles per gallon for the existing stock of automobiles operating in the United States.

--Average per capita income.

For Grand Canyon, we found that adding changes in sales of motorhomes to dealers seemed to improve the predictability of the equations.

We tried the same approach with four of the Corp's regional reservoirs but had less success. We started with the same variables as listed above. Since these facilities probably draw people primarily from the local region, we needed regional data, which was not readily available. To overcome this problem, we used national data for gasoline price and average miles per gallon of autos operating in the United States. We used population and per capita income in the State or nearest large metropolitan area. In some cases we found we achieved the best result by excluding the household variable.

Another apparent problem with reservoirs is that visitation is very sensitive to local weather. Visits will drop if the season is either exceptionally dry or wet. Also, when seeking regional recreation, the public usually has many alternatives to choose from, which complicates estimating visitation.

Because of the numerous problems with data, the formulas were not as satisfactory as for the six national parks. Therefore, we did not try to make any projections of future attendance at the reservoirs. More details on the regression formulas for the four reservoirs are given in appendix V.

Our formulas of key variables for the six national parks appear to accurately estimate visitation on a retroactive basis. Figure 1 compares the number of actual visitors at Grand Canyon from 1941 through 1979 with visits as estimated by our formulas. Figure 2 is a similar comparison for total visits at all six parks.

FIGURE 1

ACTUAL AND ESTIMATED VISITS TO GRAND CANYON

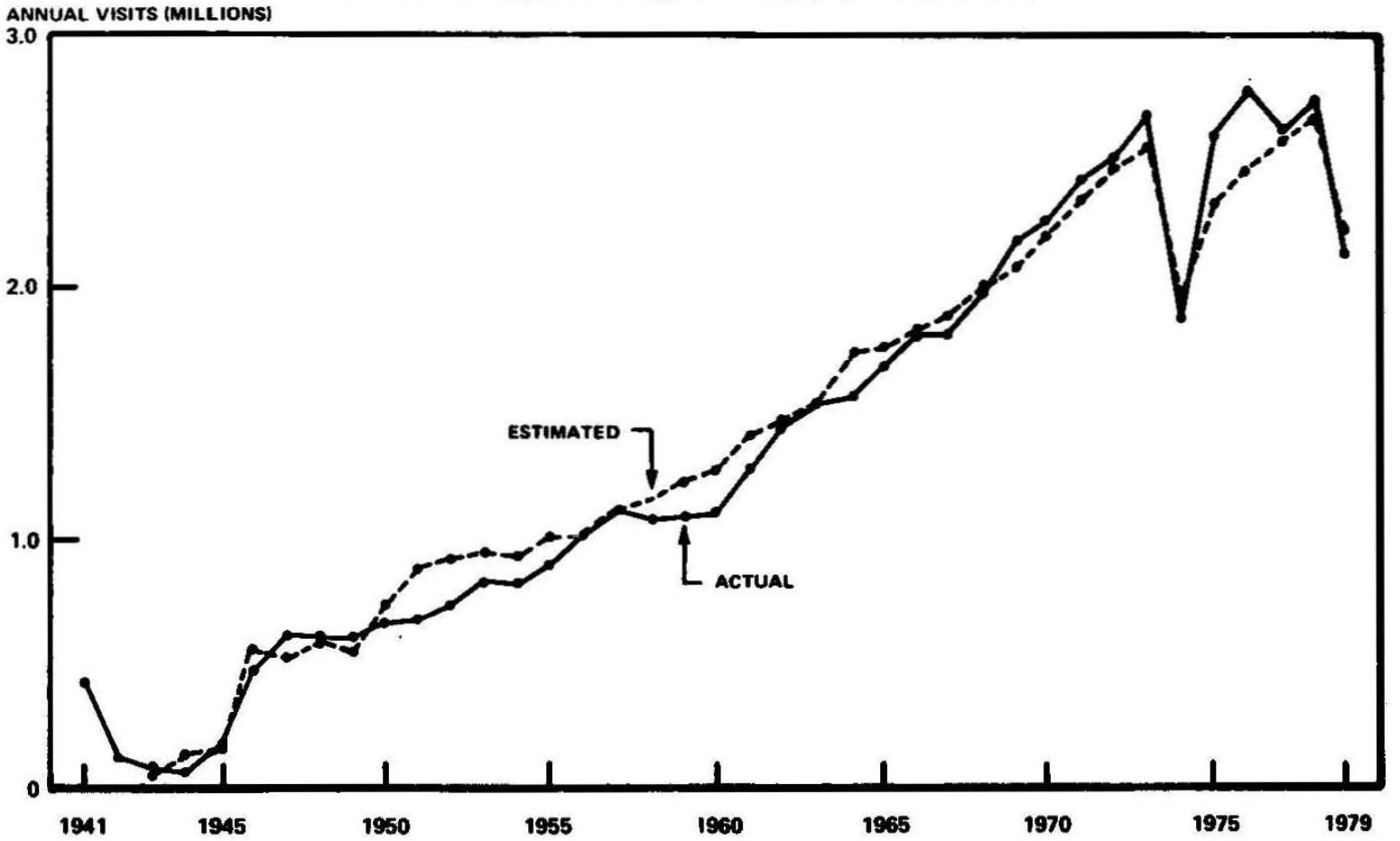
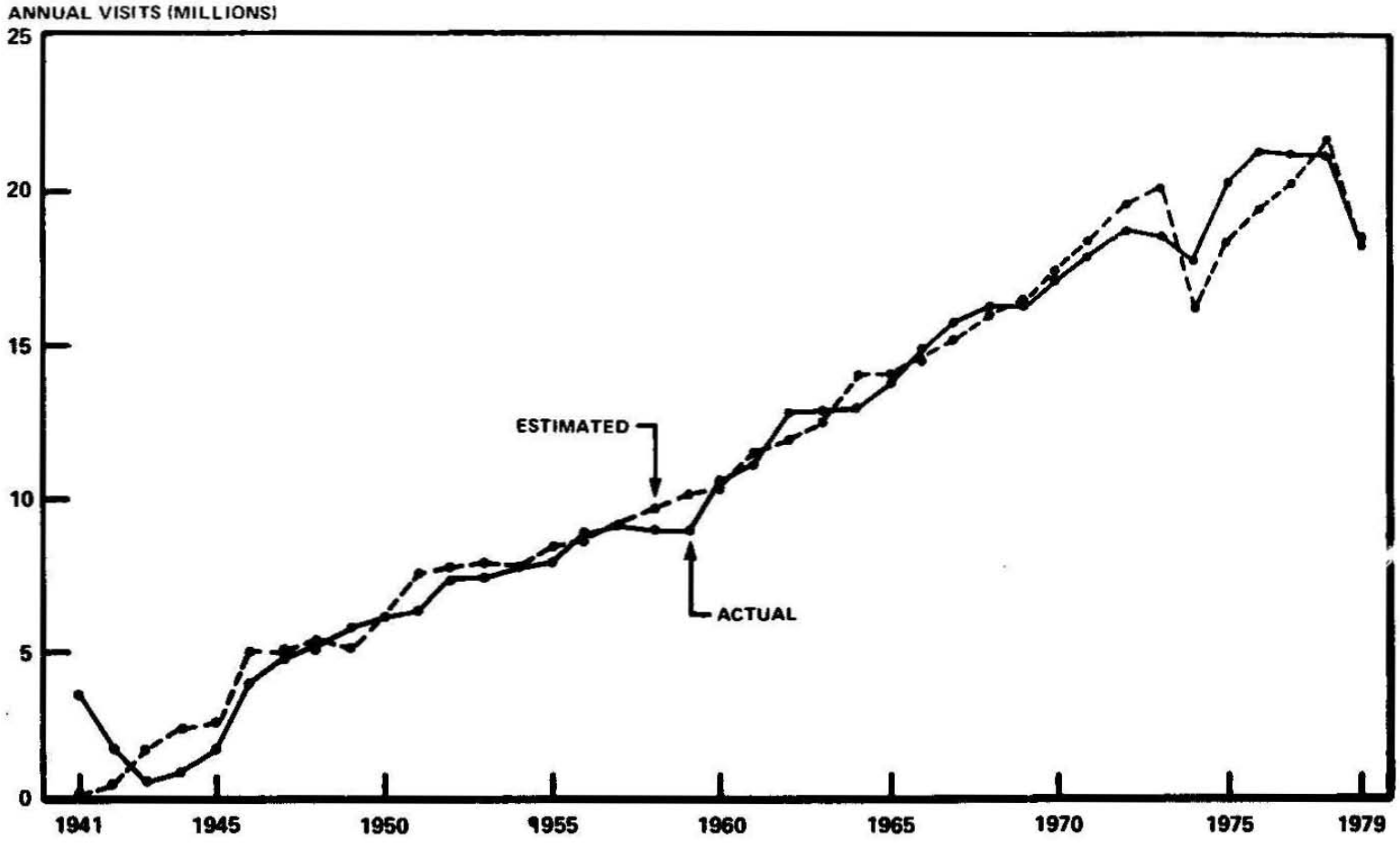


FIGURE 2

ACTUAL AND ESTIMATED VISITS TO SIX NATIONAL PARKS



We then used our formulas for forecasting visits, which was done by inserting forecasted values of the key variables into our formulas. This is different from a simple trend analysis, which would plot future recreation visits based only on the number that occurred in the past. We used forecasts of the impact variables given in the table below to make our base projections.

Impact variables used for base forecast (note a)

Year	Number of households (millions)	Per capita disposable income (thousands)	Gasoline price per gallon (dollars)	Miles per gallon of U.S. fleet of autos
1980	79.320	8.057	1.248	15.234
1981	81.030	8.856	1.535	15.910
1982	82.728	9.941	1.760	16.738
1983	84.394	11.072	1.943	17.624
1984	86.025	12.353	2.145	18.504
1985	87.588	13.772	2.372	19.400
1986	89.060	15.181	2.644	20.293
1987	90.472	16.652	2.947	21.172
1988	91.818	18.220	3.283	21.989
1989	93.142	19.879	3.662	22.741
1990	94.452	21.518	4.085	23.428

a/Values from Data Resources Inc. national econometric model

Our experimental forecasts indicate that, with no severe gasoline shortage but with increasing gasoline prices, annual visits will start to climb after 1981 as the stock of fuel-efficient cars, per capita income, and number of households increase. By 1990 there will be substantially more visits than today. However, during any period of severe shortage, sharp drops in attendance will occur.

We then projected visits with varying assumptions of gasoline prices, ranging from 30 percent lower to 30 percent higher than those used for the base projection. Figures 3 and 4 on pages 38 and 39 show projected visits for Grand Canyon, and all six parks through 1990 under the three sets of assumptions about future gasoline prices. As the figures show, for the base projection, visits drop through 1981, then in 1982 they start to climb. The figures also show that the level of visits increases if gasoline prices drop and the level decreases if prices increase. Although the results possibly exaggerate the sensitivity of visits to gasoline prices, particularly in the near future, this is because of limitations to the formulas and certain simplifying assumptions we used. However, the graphs do provide a rough estimate of the effects of gasoline prices. Projected visits for the other five parks follow the same general patterns.

FIGURE 3

PROJECTED VISITS TO GRAND CANYON
UNDER THREE GASOLINE PRICE ASSUMPTIONS

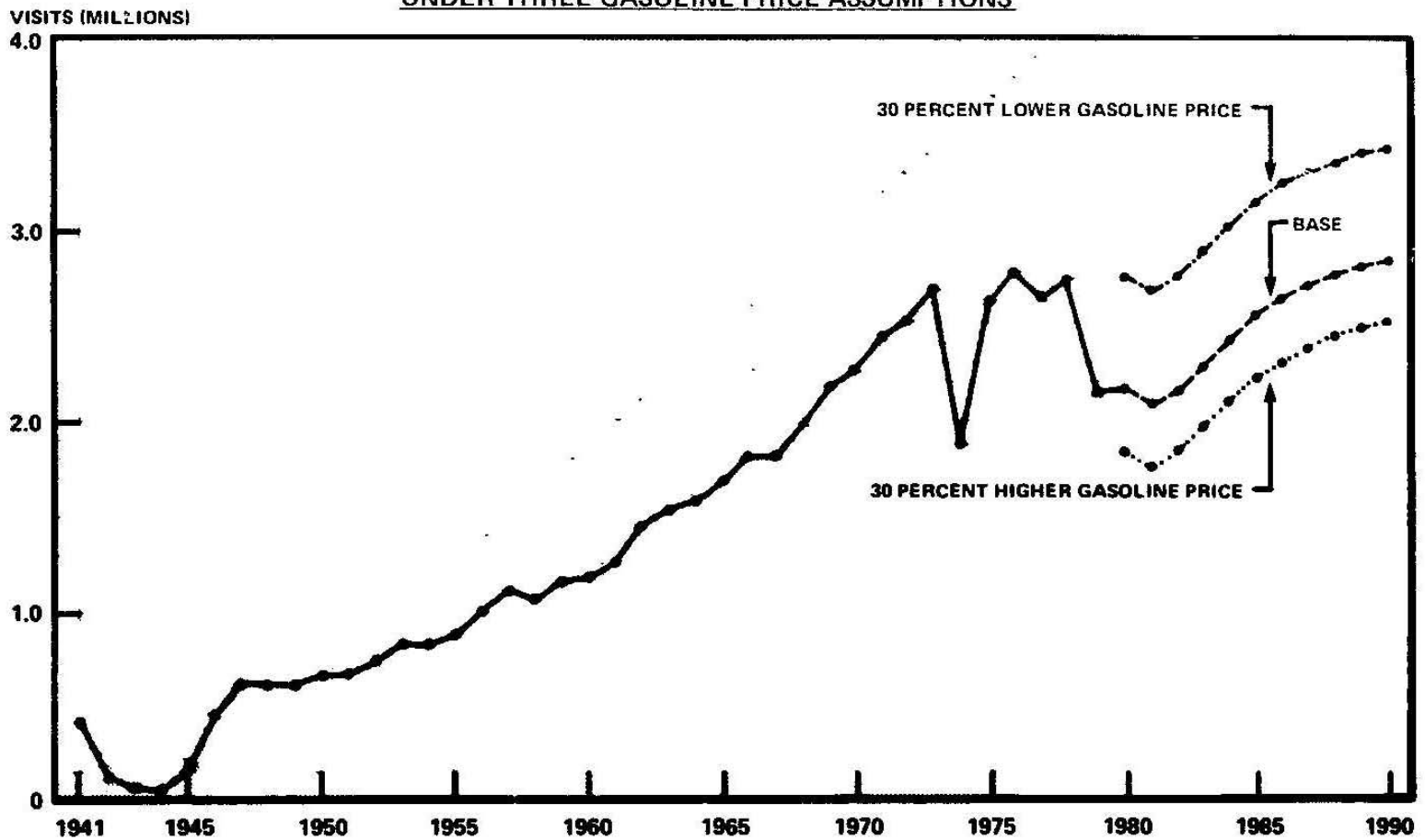
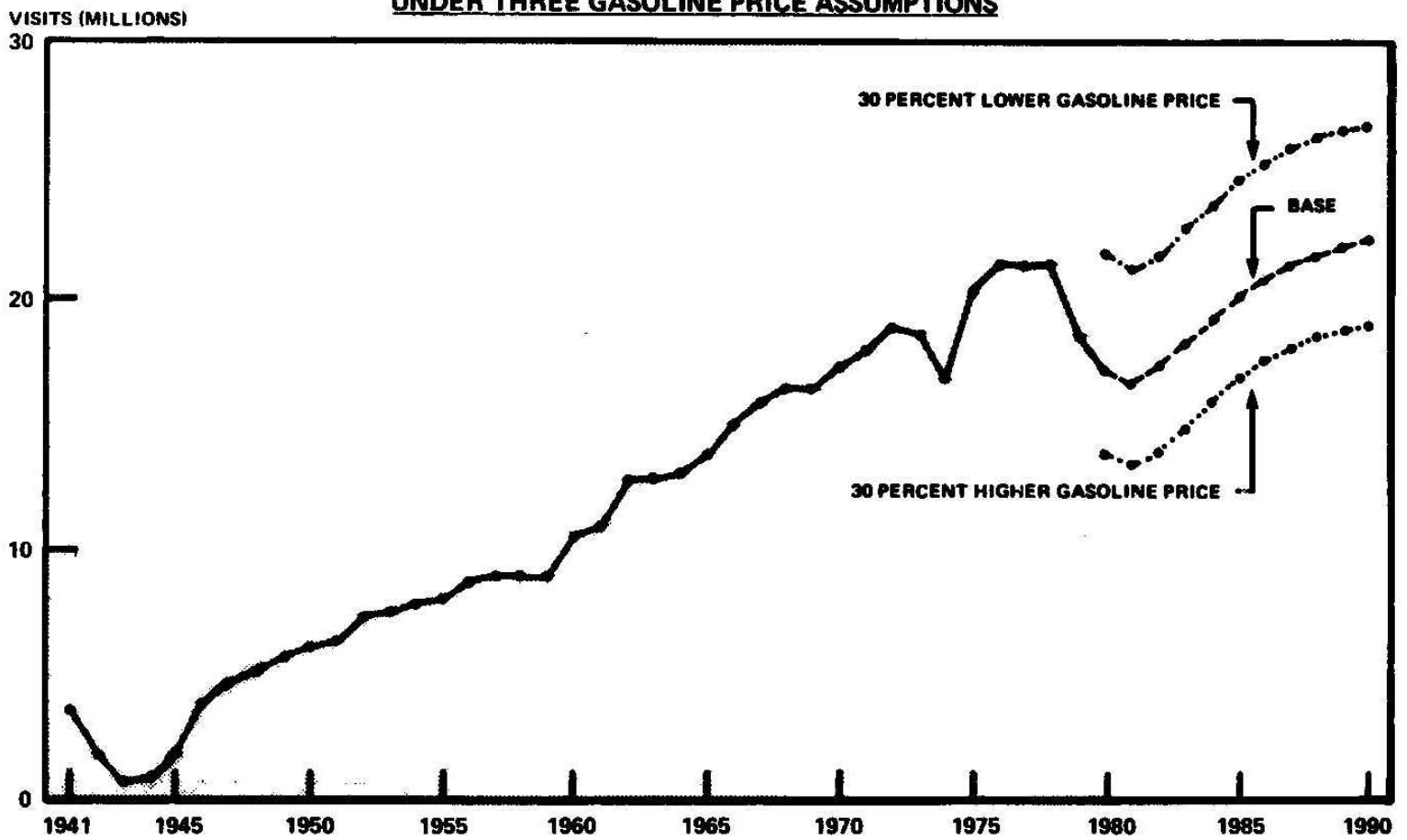


FIGURE 4

PROJECTED VISITS TO SIX NATIONAL PARKS UNDER THREE GASOLINE PRICE ASSUMPTIONS



We also projected visits under two other sets of assumptions: optimistic conditions for visits and pessimistic conditions for visits. The assumptions for the two conditions detailed below show how we changed the variables in the base projection.

Pessimistic and Optimistic
Variables as a Percentage Change
from Those in the Base Projection

	Pessimistic	Optimistic
Number of households	2% less	2% more
Per capita Income	10% less	10% more
Gasoline prices	30% more	30% less
Miles per gallon of autos	10% less	10% more

Projected visits under these two conditions and the base projections are shown in figures 5 and 6 on pages 41 and 42 for Grand Canyon and all six parks together. Visits for the other five parks follow the same general pattern.

OBSERVATIONS

Our main purpose was not to prepare forecasts. Rather, we sought to encourage the use of improved statistical methodologies for forecasting. Such models are intended to aid rather than replace judgment. While trend analysis or other simple regressions may also give good estimates of visits, we believe our model has the advantage of making better projections under changing economic and energy-related conditions. Even though we do not claim our model as the final answer, we believe that even in its present form it is a useful forecasting tool.

It must also be recognized that, to a large extent, the models are based on past relationships of visits with factors influencing the visits. Major changes in these relationships, or a major world crisis could drastically modify the forecasts. Our projections assume no gasoline shortages since they have been sporadic; we currently have no way of forecasting if or when they would occur. But if there were any serious gasoline shortages in the future, there would be severe drops in visits similar to those shown in 1974 and 1979. To be useful, the actual versus forecasted visits should be monitored and compared each year and the forecasts updated and modified from time to time as necessary.

FIGURE 5

PROJECTED VISITS TO GRAND CANYON UNDER THREE SOCIOECONOMIC ASSUMPTIONS

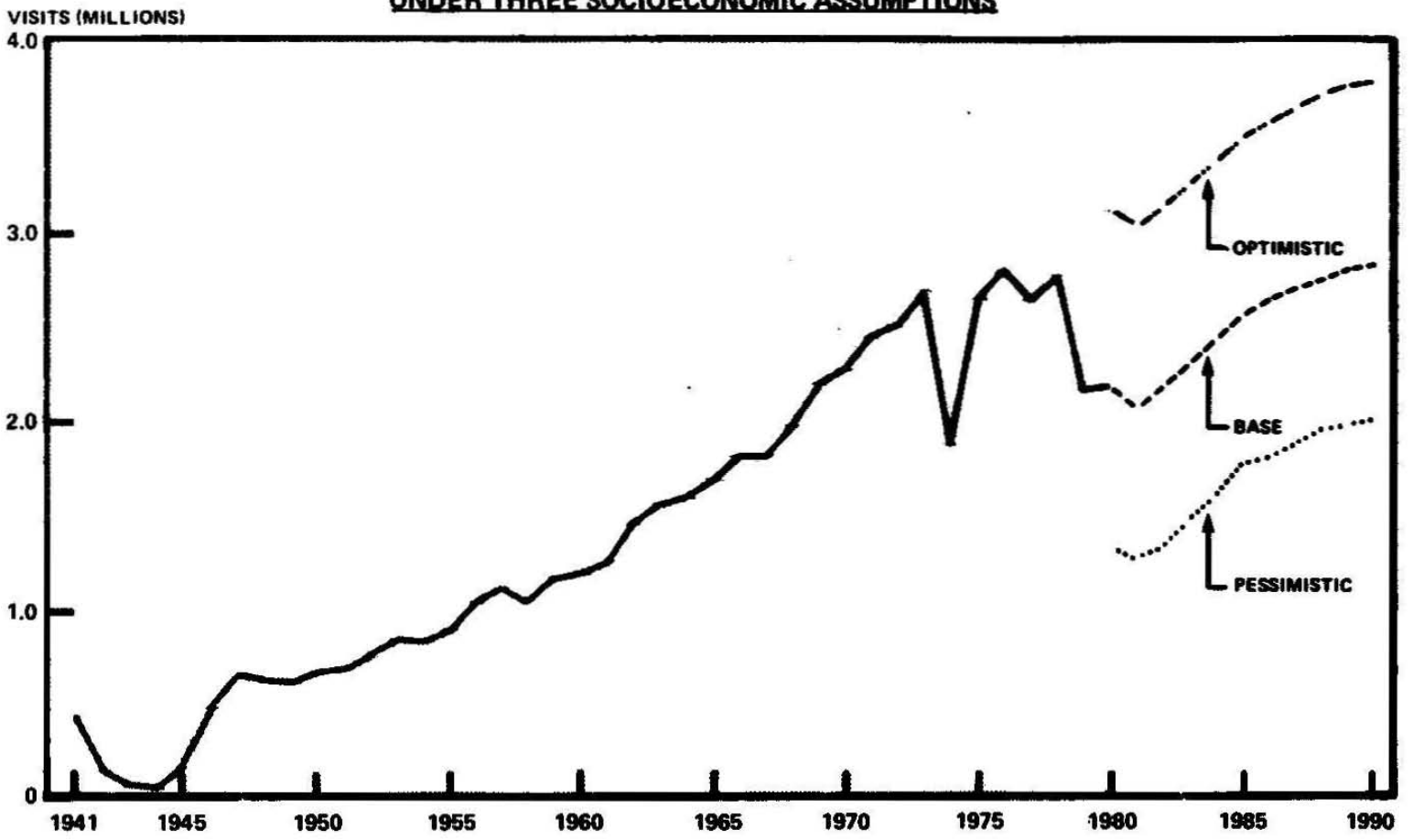
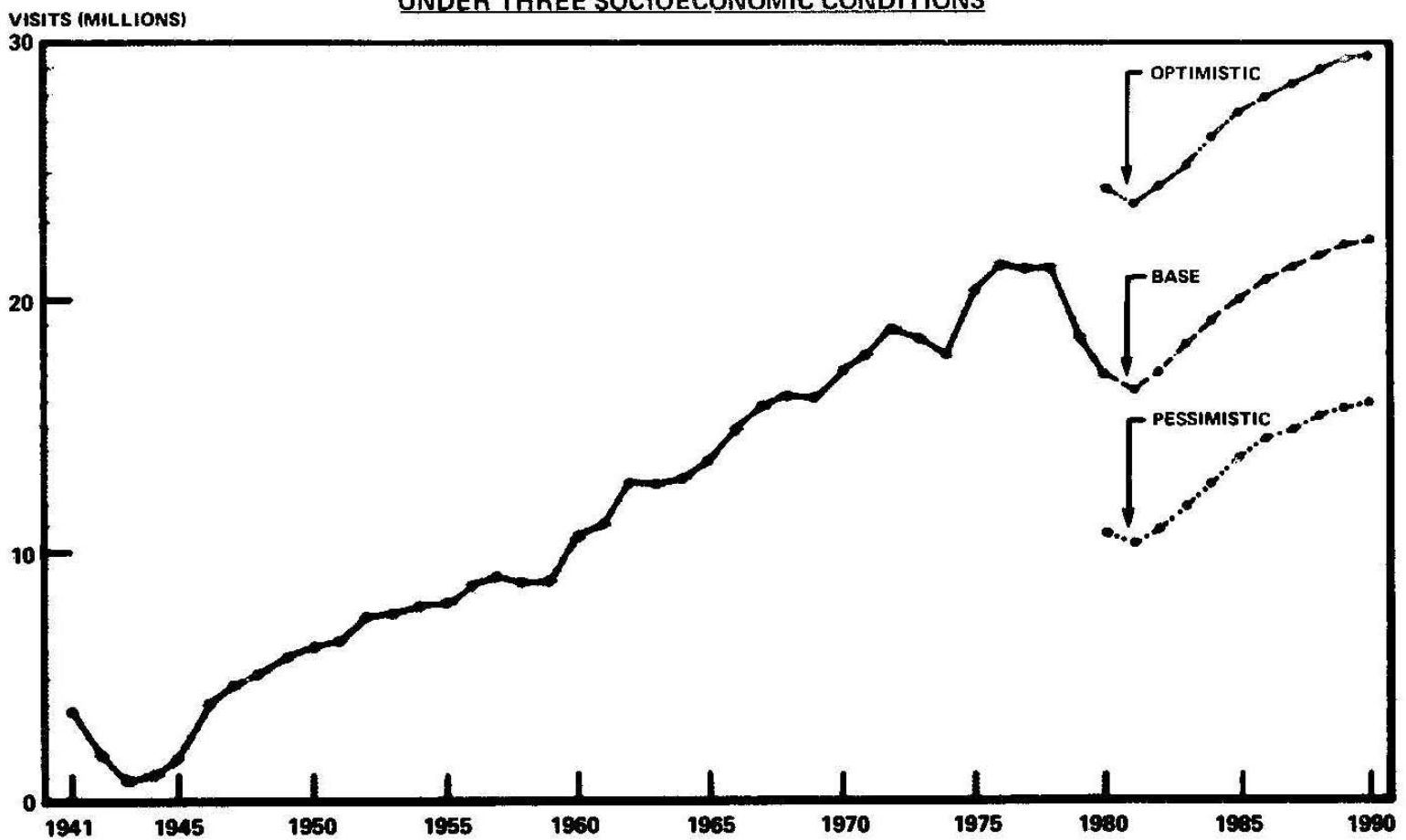


FIGURE 6

PROJECTED VISITS TO SIX NATIONAL PARKS
UNDER THREE SOCIOECONOMIC CONDITIONS



CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Even though the visitation data may not be entirely accurate and factors other than gasoline availability and price may also influence visits to recreation facilities, the statistics on the whole indicate to us that recreation visitation patterns shifted when gasoline availability became a problem in 1979. High gasoline prices also seem to be an important factor for many facilities, particularly those of the Park Service, because visits to its distant facilities were still down in 1980. These shifting patterns could continue into the future, especially if gasoline prices continue to escalate or if gasoline supplies decrease and shortages occur.

Recreation agencies are now inconsistent in their responses to gasoline constraints. Forest Service policies include encouraging energy efficient transportation systems and locating new facilities near them. WPRS and the Corps have no policies. The Park Service's policy is to encourage public and nonmotorized transportation. HCRS, which has now been consolidated with the Park Service, established a policy that emphasized projects that serve close-to-home recreation needs and recreation activities that conserve nonrenewable energy sources.

Even among agencies that have policies, little or no progress has been made toward actually reacting to gasoline constraints. Initiatives for near-city forest facilities have not been funded, and HCRS funding for grant programs that would include State and local facilities located near cities has been proposed for elimination. The Park Service programed funds for several shuttles, but most other Federal efforts with gasoline-saving benefits were incidental to and motivated by other objectives such as environmental protection.

We believe agencies could achieve more results in gasoline conservation by communicating the merits of such projects among facility managers. Continuing the HCRS technical assistance program in the Park Service will make it possible for agencies and managers to share such conservation ideas through the Information Exchange and the SHARE program. Sharing conservation information could be enhanced by including more than the few conservation examples we found in the system in December 1980.

Changes in visitation patterns during a 2-year period do not necessarily indicate a trend. In fact, our model shows visits rebounding in 1982; however, such forecasts need to be revised periodically. The need for developing and implementing policies to deal with long-range trends is highly important and should not be overlooked.

Unfortunately, agencies' forecasting capabilities are not as good as they could be. Research to improve them has gone on sporadically and has not emphasized important factors of today such as gasoline constraints. Necessary visitation data has not been collected in a reliable or uniform enough manner to enhance improvements.

Actions are now underway in several agencies that could lead to forecasting improvements. These actions include Interior's research agenda, which identifies as top priority studies of short- and long-term effects of fuel constraints. Likewise, its agenda gives another high priority to developing visitor survey techniques. Also, better measurement standards for recreation data are to be developed by Interior.

Our work with computer models, using energy and time-sensitive variables, helps demonstrate the usefulness of this approach to forecasting recreation demand. The agencies' interests in setting proper priorities among resource needs should be aided by incorporating this approach into their planning processes.

While better forecasting methods would be useful in most places, the lack of these methods does not mean every agency should develop a research program to improve them. Some agencies spend very little money on their recreation facilities or they rely on nonfederally funded sponsors to operate them. Other agencies have also felt less of the effect of changing visitation patterns. The Park Service is the place to focus on improving forecasting techniques. It

--has considerable internally generated visitation data and is aware of its limits;

--spends the most money directly on facilities;

--has a substantial backlog of unfunded safety and health deficiencies; and

--has experienced a decrease in visitors at its distant facilities in both 1979 and 1980.

Even so, other agencies such as the Forest Service or the Corps should not be discouraged from helping improve forecasting techniques. They have done or are doing related research and they have somewhat unique problems caused by different facility characteristics. Subsequently, the Park Service's national forecasting techniques could be made available to help develop regional techniques that consider demand among the competing facilities of Federal, State, and local agencies. This would reduce the learning requirement and avoid duplicate learning by the numerous other Federal, State, and local agencies sponsoring recreation.

Since facility restoration and improvement needs are so much greater than available resources, use trends disclosed by forecasting could help pinpoint where to spend the additional funds recently proposed for these needs. Shifts in recreation patterns could carry potentially serious implications for facilities. Should these patterns become trends, the need for distant recreation facilities would diminish and the need for near-city facilities would increase. Even without funding increases, much of the $1.5 billion spent on recreation by the agencies might need to be spent differently, depending on the expected trend.

RECOMMENDATIONS TO THE SECRETARIES OF THE INTERIOR, AGRICULTURE, AND DEFENSE

The Secretary of the Interior should coordinate and monitor research performed by various agencies on the long- and short-term effects that fuel shortages and high fuel costs have on the use of recreation facilities. Interior should encourage

--using statistical forecasting models such as those discussed in this report,

--developing ways in which visitor data reliability might be improved, and

--developing standards for collecting visitor survey data.

Information developed from the research should be made available to Federal recreation agencies and to the States for adaptation to their recreation facility programs.

The Secretaries of the Interior and Defense should require WPRS and the Corps of Engineers to adopt gasoline conservation policies.

The Secretaries of the Interior, Agriculture, and Defense should

--require their agencies to consider the results of improved forecasts in allocating financial resources to recreational facilities and

--encourage their recreation facilities managers to participate in the Park Service's information exchange program to contribute and extract information on conservation measures, such as those described in this report, and to consider applying at their facilities those conservation measures successful elsewhere.

Program officials from Federal recreation agencies covered by our review commented informally on our draft report. They agreed with the report in general but disagreed with certain aspects of our draft recommendations and certain technical information. We restated our recommendations and made other suggested changes as appropriate in view of these comments.

Program officials from each agency told us that the Forest Service's and the Corps' research organizations should not be excluded from our recommendation that research be conducted to determine the effects of fuel constraints on recreation. They explained that both had done forecasting research and their participation would be useful. We expanded our recommendation to include them even though the greatest need seems to be in the Park Service.

A WPRS official suggested that we be more explicit in recommending that it adopt a gasoline conservation policy. Also, a Forest Service official suggested that we be more explicit in recommending that the Forest Service implement gasoline conservation measures. We revised both recommendations in response to their comments. The principal technical changes involved revising our description of the Forest Service's gasoline conservation policy and explaining the lack of comparability of the recreation visitation statistics reported by the various recreation agencies and shown in appendix II.

KEY RECREATION LEGISLATION

Legislation dealing with recreation, recreation planning, agencies' responsibilities for providing recreation, and funding recreational activities includes:

--The Land and Water Conservation Fund Act (Public Law 88-578), which became effective January 1, 1965, provides grants for State outdoor recreation planning and State and local land acquisition and development on a 50/50 matching basis. Funds are also provided for acquiring land for federally administered parks, recreation areas, and wildlife refuges. 1/

--The Urban Park and Recreation Recovery Act of 1978 (Public Law 95-625, title X), dated November 10, 1978, authorized a 5-year Urban Park and Recreation Recovery Program to provide Federal grants to economically hard-pressed communities for rehabilitating recreation areas and developing recreation programs. 1/

--Public Law 88-29, dated May 28, 1963, requires the Secretary of the Interior to prepare a nationwide outdoor recreation plan every 5 years, taking into consideration plans of the various Federal, State, and local agencies.

--The Chattahoochee River National Recreation Area Act (Public Law 95-344), dated August 15, 1978, authorizes the Secretary of the Interior to formulate transportation plans and implement transportation projects where feasible to make the national park system more accessible through transportation modes other than personal vehicles. Appropriations were authorized for fiscal years 1979 through 1981 but funds were not appropriated.

--The Forest and Rangeland Renewable Resources Planning Act of 1974 (Public Law 93-378), as amended by the National Forest Management Act of 1976 (Public Law

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1/Budget authority for these programs for State and local assistance has been proposed for partial recission in fiscal year 1981 followed by elimination in fiscal year 1982. The Federal share of the Land and Water Conservation Fund has been proposed for reduction, with $105 million refocused on restoring or improving existing national park areas. Authorizing legislation has been proposed to cover the latter action, including construction and rehabilitation, and to allow the fund also to be used for these purposes on forests, refuges, and authorized Bureau of Land Management facilities and areas.

94-588), provides congressional emphasis and direction to assure that while the national forests continue to provide sustainable timber supplies to meet national demands, other forest resources are adequately considered in all Forest Service land management decisions. The 1974 act requires the Secretary of Agriculture to prepare and periodically update a renewable resource program. The latest update was published in September 1980 and involves resource planning, including recreation for 1981 through 2030.

--The Federal Water Projects Recreation Act (Public Law 89-72), dated July 9, 1965, requires the Corps of Engineers and the Water and Power Resources Service (WPRS) to encourage non-Federal public bodies to provide recreation at Federal water projects, unless they are located on certain Federal lands. Minimum facilities for health and safety still may be provided even without non-Federal assistance. Funds are to be matched on a 50/50 basis for developing the recreational facilities with the non-Federal agency bearing the operations, maintenance, and replacement costs.

--The Powerplant and Industrial Fuel Use Act of 1978 (Public Law 95-620), dated November 9, 1978, authorized, among other things, an Executive order directed at energy conservation. In accordance with the order, HCRS required greater State or local consideration of new recreation projects that would encourage less energy consumption for people to reach them. This requirement is to become a condition in fiscal year 1982 for receiving Land and Water Conservation Fund grants if the budget authority for them is not eliminated as discussed on page 47.

UNADJUSTED RECREATION VISITATION DATA REPORTED BY SELECTED FEDERAL AGENCIES

	Visitation data (note a) (millions)		
	1978	1979	1980
Corps of Engineers recreation days (note b)	439.0	449.0	457.2
Forest Service visitors days (note c)	218.5	220.2	233.5
National Park Service recreation visits (note d)	222.2	205.4	219.1
Water and Power Resources Service visitor days (note e)	69.9	66.9	66.5

a/Figures represent measurement units commonly used by agency management. They are not comparable across agencies (see footnotes below). Also, Forest Service figures are on a fiscal year basis; the others are on a calendar year basis.

b/A recreation day is a visit by one individual to a recreation development or area for recreation purposes during any reasonable portion or all of a 24-hour period.

c/A visitor day may entail recreational use by 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

d/A recreation visit represents the entry of a person onto Park Service lands or waters for recreation purposes. A visitor may enter several parks during a trip and generate a "visit" for each entry. A visitor may enter a single park several times during a reporting period and generate a visit for each entry.

e/A visitor day is a significant amount of time spent by one individual in a particular recreation activity during a 24-hour period.

FISCAL YEAR 1981 RECREATION COSTS

ESTIMATED BY SELECTED FEDERAL AGENCIES

Agency	Estimated costs	
	Operation and maintenance	Construction
National Park Service (note a)	$427.7	$71.4
Forest Service	109.1	6.0
Corps of Engineers	104.0	13.6
WPRS	2.7	22.5
Total	$643.5	$113.5

a/HCRS was consolidated into the Park Service by Secretary of the Interior Order No. 3060 on February 19, 1981. Formerly, it administered funds and numerous programs focused on natural, cultural, and recreation resources. It financed recreation facilities indirectly through grants to State, territorial, or other governments. Budget authority for making the grants, has been proposed for partial recision in fiscal year 1981 followed by elimination in fiscal year 1982. In addition to the Park Service estimated costs, the HCRS previously estimated budget authority was $477.1 million in fiscal year 1981.

EXAMPLES OF MEASURES THAT HELP TO CONSERVE GASOLINE

NATIONAL PARK SHUTTLE SYSTEMS

During 1980 there were 30 visitor transporation systems (shuttles) operating in 19 national parks. Although energy conservation was not a concern when the Park Service conceived of the idea of using shuttles, it has been recognized as one of the system's benefits. The following schedule reflects the gallons of gasoline saved in several national parks where shuttles are in operation, assuming they are 50 percent full.

Facility	Type of equipment being used	Miles per vehicle per year	Estimated (note a) gallons saved assuming 50-percent ridership
Colonial National Historical Park	3 buses (25 pass.)	4,233	1,413
Devils Postpile National Monument	2 school buses (39 pass.)	5,000	2,666
Mesa Verde National Park	2 buses (50 pass.)	18,800	14,614
Mt. McKinley National Park	36 school buses (44 pass.)	10,661	123,581
Rocky Mountain National Park	4 school buses (45 pass.)	2,725	3,633

a/Assumes each bus is half full, each three bus riders would require a car going the same distance, that buses get 6 miles per gallon, and cars get 15 miles per gallon.

The Park Service began the program in 1971 because of problems involving public use and protection of resources. The capacity of the roads that were originally built for access, maintenance, and protection were being exceeded and visits at some parks exceeded capacity. The Park Service believed that the costs to build roads and parking to accommodate more automobiles was prohibitive, and, in addition, such construction would cause extensive damage to the resources and ultimately destroy the quality of the visitors' experience. Although original plans were to increase the program by three or four systems each year, the Park Service currently has no definite plan for initiating any new systems.

PUBLIC TRANSIT TO SKI AREAS NEAR SALT LAKE CITY

In 1976 the Utah Transit Authority initiated regularly scheduled year-round bus service from Salt Lake City to the Big and Little Cottonwood Canyon ski areas of Snowbird, Alta, Solitude, and Brighton to ease parking congestion in and near those locations. It is estimated that the service yields an annual net gasoline savings of about 490,000 gallons, assuming 1.4 people per privately owned vehicle at 15 miles per gallon and various numbers of people per bus at 4 miles per gallon.

A 1979 analysis of ski area use in the Little Cottonwood Canyon revealed that traffic volume had increased only 6 percent during the prior 3-year period in which use had risen 30 percent. The Wasatch and Cache National Forests supervisor attributed the relatively low traffic increase to bus ridership.

The transit authority funds the canyon service as part of its regular system: 65 percent of funds are derived from a local 1/4 percent sales tax, 20 percent from fare box collections, and 15 percent from Federal grants. Fares are 50 cents from the mouths of the canyons; $1 from downtown Salt Lake City, and $2 from the airport.

The ski areas and transit authority publicize the bus service via newspapers and radio, and schedules are posted throughout the city. These efforts were reflected in a ridership of 365,000 during 1979 and 286,000 during 1980.

TOURMOBILE, WASHINGTON, D.C.

In 1969 Landmark Services, Inc., a Park Service concessioner, began operating the Tourmobile shuttle bus in and between major Washington, D.C., attractions. The objectives for the shuttles were to reduce traffic congestion and energy use, improve the environment, and make transportation to the monuments easier. It now serves 18 sites and offers unlimited travel on its vehicles for $5.50 per day. No studies have been made of gasoline conservation, but it could be considerable, since ridership is approximately 1.1 million a year.

Assuming that many Tourmobile riders would use autos if the service were not available, our following calculations indicate gasoline savings:

--The typical Tourmobile vehicle carries 88 passengers. Each Tourmobile replaces 20 autos assuming that ridership is at 70 percent capacity and each car carries an average of 3 people.

--In Arlington Cemetery, the concessioner uses a 125 passenger supertram, which averages 3 miles per gallon, versus an assumed 15 miles per gallon for private autos. At 67 percent capacity and based on 3 people per car, the tram would carry as many people as 28 autos. Since the cemetery tour is 2 miles long, those 28 autos would use a total of 3.7 gallons of gasoline, compared with 2/3 of a gallon by the tram.

NAGS HEAD SHUTTLE BUS

Nags Head, North Carolina, faced with problems of increased vehicular traffic, successfully sought a Department of Transportation demonstration grant to initiate a shore-road shuttle bus service in the 1980 summer season.

Tourism is central to the economy of Nags Head so its government moved to combat the high number of vehicular accidents, increased traffic congestion, and fuel consumption. With 90-percent grant funding, it leased a bus and hired two operators for the summer 1980 tourist season.

Nearly 14,000 people rode the shuttle during its first season, and although gasoline savings have not been quantified, they were judged by the project manager to be an effect of the service. Nags Head is trying to obtain funds to expand both the system's geographical coverage and its frequency of service.

CARPOOLING DISCOUNTS AT WINTER PARK, COLORADO, SKI AREA

In 1977 Winter Park Ski Area in Colorado's Arapaho National Forest began offering discounted ski lift tickets to adults arriving by auto in groups of four or more. Although the program was initiated to ease parking congestion, it is now being emphasized for its gasoline conservation benefits.

The Forest Service and Winter Park Recreation Association have cooperated in planning and executing the program. Eight personnel are required on the "energy coupon crew," and administrative costs to the association are approximately $30,000 per year.

Coupons are issued to eligible skiers by parking lot attendants and are redeemable for "energy ski lift tickets" at $1 below regularly priced tickets. Coupons are offered only during the high-use season, from December 9 to April 19.

During the 1979-80 ski season, 93,200 coupons were redeemed out of total skier attendance of 886,000. In addition, the average number of people arriving per car increased from 2.6 in prior years to 3.3 during the 1979-80 season. The association president said that many skiers come to Winter Park because of the energy discount.

The association president, the Forest Service Rocky Mountain regional director for recreation and lands, and the Arapaho and Roosevelt Forests supervisor deemed the program a success and recommended its application to other ski areas.

NEW JERSEY'S STATE PARK CARPOOLING POLICY

On June 30, 1979, the New Jersey Division of Parks and Forestry initiated a carpooling policy to permit free parking and free entry for day-use visitors arriving in passenger vehicles carrying five or more occupants. The division's deputy director reported that the program was conceived wholly as a device to combat the energy problems of visitor transportation to State parks and forests.

The policy was implemented from June 30 to September 3, 1979, and from May 24 through September 1, 1980. Response to the program was strong:

--During the 1979 effective period, more than 450,000 people gained free admission.

--Free admissions rose to more than 800,000 in 1980 as the program became more widely known.

--Total State park visitation increased 19 percent in 1980 over 1979, attributed in large degree to the carpooling program.

The deputy director reported that there were no serious ill effects to facilities, such as overcrowding or excessive litter. However, the loss of revenues was considered significant: $190,020 in 1979 and $350,170 in 1980. Unless alternative funding sources are found for 1981, the division may discontinue the program.

BICYCLE TRAILS IN CALIFORNIA

In California, Federal, State, and local governments have developed and are continuing to develop bicycle trails that

reduce gasoline consumption to the degree that the trails replace motorized recreation. Examples follow.

California coast hostel plan

In 1978 the California State Department of Parks and recreation published a plan for a series of 38 hostels (places providing overnight stays to touring cyclists), to be linked by a bicycle trail along the California coast.

The plan proposed a $1.9 million pilot plan to establish two initial chains: a four-unit section to serve the San Francisco area and a five-unit hostel chain to serve the Los Angeles, San Diego, and Orange County areas.

Development of the San Francisco section is underway with $975,000 funded by the State Legislature: one hostel is in service and another is to open in the spring of 1981. American Youth Hostels, Inc., will operate both facilities. It is estimated that 10,000 people will use the trail each year when the San Francisco chain is complete.

Los Angeles area bicycle trails

The Corps, in conjunction with local governments, is developing 5 bicycle trails along approximately 60 miles of its Los Angeles area flood control channels. In some sections the Corps provides only land, in others, it also supplies funds.

Approximately $8.5 million has been spent on the trails, which serve an area with more than 10 million population.

CAMPSITE RESERVATION SYSTEMS IN CALIFORNIA

Federal and State agencies in California have established campsite reservations systems at many larger and more popular parks. Although initiated to protect park environments from overuse and to better serve the public, the systems are also judged to foster conservation by reducing

--driving to parks where campsites are full,

--driving within campgrounds while searching for unoccupied campsites, and

--driving to alternate locations when campsites at the original destination are full.

Several examples of reservations systems follow.

Forest Service

The Forest Service Pacific Southwest region has 42 campgrounds under the privately operated Ticketron system. Campers may make reservations either in person, at Ticketron sales terminals, or by mail to the Ticketron reservation office.

The 42 campgrounds represent 4 percent of the region's 946 campgrounds and 20 percent of the 184 that have at least 150 campsites. The region's reservations program manager said that the program can be successfully applied to any campground larger than 150 sites.

Park Service

Three of the Park Service western region's 21 parks with camping facilities are under a reservation system. Although also affiliated with Ticketron, the Park Service uses the additional feature of daily reservation reporting through computer terminals at the parks. Operations staff stated that the possibility for expanding the system within the western region is limited by personnel and funding constraints.

California State Department of Parks and Recreation

Sixty-eight of California's larger State parks are under the reservations system. Although now also a subscriber to Ticketron, the State is considering handling reservations totally in-house in the future to enable campers to use a more convenient telephone-based system.

LONG-TERM STORAGE FACILITIES AT WEIGAND RECREATION AREA

The vehicle-storage concession at Weigand Recreation Area, Lewis and Clark Lake, Nebraska, contributes to gasoline conservation by providing long-term storage for camping trailers, boats, and boat trailers. The public can avoid repeated gas-consumptive hauling of heavy vehicles, and, during the storage period, can drive more fuel-efficient vehicles, such as smaller cars, trucks, and motorcycles.

The 15-year old Weigand concession, offered as a public service, is a 1/2-acre area located on Corps project land, approximately 500 feet from the lake's edge. The fenced, locked area has a 40-50 vehicle capacity. Although the concessioner provides a measure of security by living at the site during the summer, owners of stored vehicles bear liability for theft or damage. Little vandalism and theft has occurred, however, with only about $500 worth during the summer of 1980 and even less in prior years.

Most of the concession's users come from either a nearby town or cities 60 to 70 miles away. They pay storage fees of

about $50 per vehicle, per season, plus $2.50 each time the concessioner provides boat launching or retrieval service.

The facility has been used nearly to capacity. The concessioner stated that he has found no disadvantages to the venture, and he sees merit in wider application nationwide of this type of long-term storage at recreation areas.

MODELING PARK VISITS

This appendix provides details for the technical reader on the models used in this report. Most of the discussion refers to models for the six selected national parks. The last section briefly covers the regional facilities.

Variables affecting visits

Research literature suggests that numerous variables influence attendance at a specific recreational park or facility in a given year. These include but are not necessarily limited to: (1) the park's characteristics as measured by such variables as area, length of water frontage, miles of trails, and presence of wildlife, (2) weather factors such as temperature, precipitation, and snow fall, (3) socioeconomic characteristics of the population, and (4) the cost of getting to the park, which includes automobile-operating or other transportation costs, food and lodging, park fees, and the cost of income foregone for the time the person is traveling to the park. (See fig. 7.) Besides these four main groups of variables, many miscellaneous factors may influence visitation, such as park promotion campaigns, alternative recreation facilities, special holidays like the bicentennial, etc.

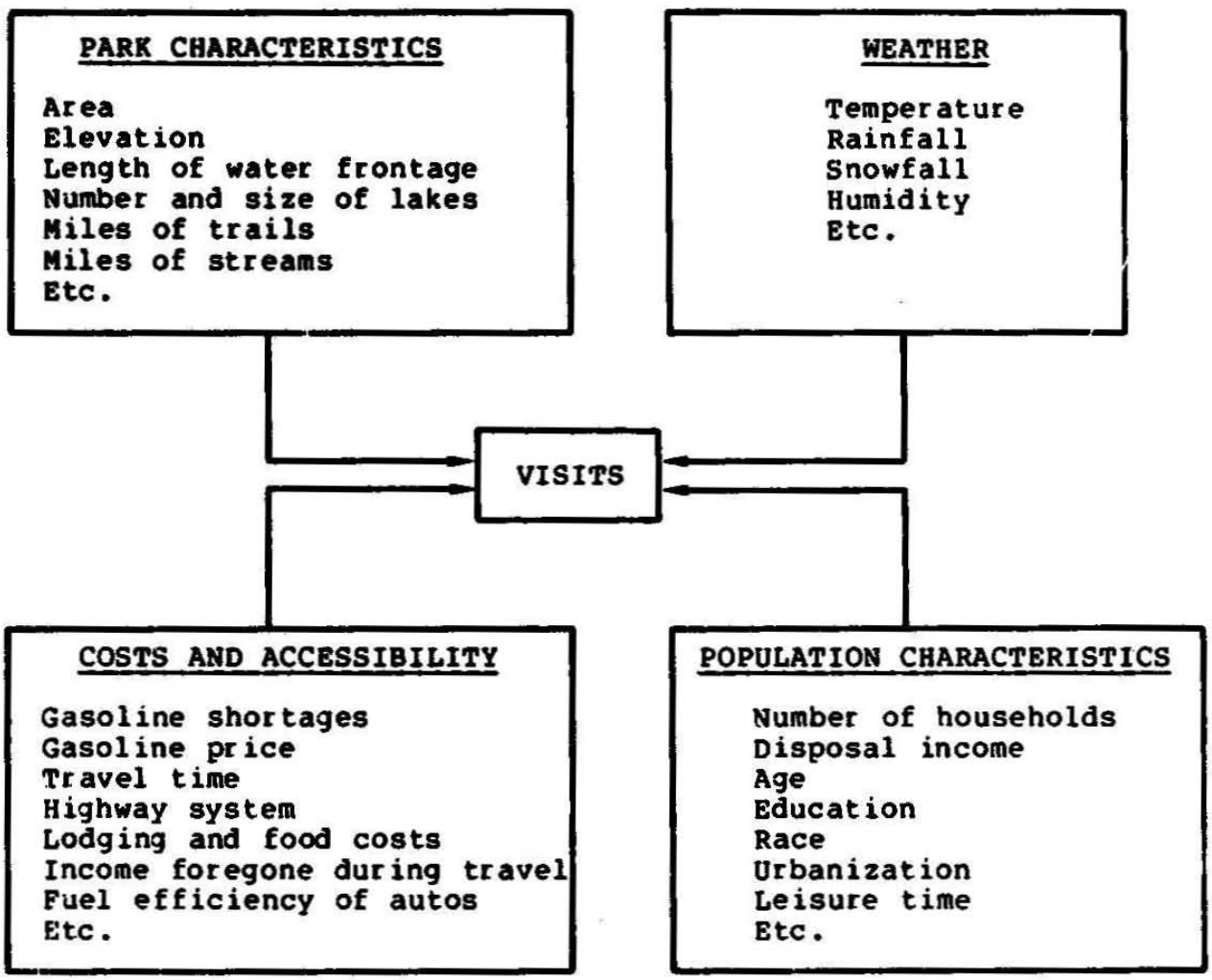
Many of these variables shown in figure 7 interrelate with each other as well as other variables shown in the figure. For example, per capita disposable income is probably a driving force behind many other variables. It affects the number of automobiles purchased, revenues available for taxes for highway construction, and the value of income foregone while traveling. Increases in per capita disposable income cause increases in demand for goods and services, which in turn increases industrialization resulting in urban crowding and more leisure time. This crowding, combined with more leisure time, induces people to visit recreational facilities.

Gasoline price increases and gasoline shortages inhibit long-distance travel. But increasing fuel efficiency of the the entire fleet of automobiles might be counteracting this negative impact on visits. Recently, some people have also been substituting other transportation modes such as airplanes, buses, and trains for the private automobile.

Increasing numbers of foreign visitors to the United States may generate visits to internationally known parks such as Grand Canyon or Yellowstone.

Figure 7

Four Main Groups of Variables
Affecting Visits to Parks



Some of these variables, such as those pertaining to park characteristics, are not particularly sensitive to time and are more appropriate for inclusion in cross sectional analyses; other variables, such as travel cost, change over time and are more appropriate for longitudinal studies.

Selection of variables for a model

To capture the effects of energy-related variables we found it necessary to use longitudinal analyses, that is, estimating visits at one facility or total visits at several facilities over a period of several years. Consequently, we started by looking at only the time-sensitive variables. Also, to keep the model simple, we further tried to reduce the number of variables to the ones we felt were the most pertinent. It was also important to use variables for which we could readily get good data. This meant dropping some variables and using surrogates for some. We first tried the following variables.

1. Population or number of households
2. Proportion of younger (5-15 years) and older (50-70 years) people to total population
3. Deflated per capita disposable income
4. Deflated gasoline prices
5. Average miles per gallon of the fleet of automobiles
6. Whether or not there was a serious gasoline shortage
7. Number of automobiles per thousand population
8. Unemployment rate
9. Motor homes shipped to dealers
10. Deflated air fare per mile
11. Total surfaced miles of primary State highway
12. Foreign visitors to the United States for pleasure
13. Number of employed people taking vacations in June and July
14. A measure for improved public transportation to the individual parks
15. Weather conditions
16. Whether it was the bicentennial year or not

17. National average speed limit

18. Average number of vacation days

Variables 13 through 18 were dropped for a variety of reasons. For example, good data was unavailable or we felt that the factor was already adequately measured by other variables. However, we obtained about 40 years of data on all the other 12 variables. In all cases, we used national statistics. We then experimented with various combinations of these variables to test their relationship to annual park visits. We also experimented with various equation forms: linear, logarithmic, and serial correlation adjustment. We tried absolute values, as well as yearly changes in values, for several variables.

One major problem was that several influencing variables were found to be highly correlated with each other, that is each followed very similar trends over the years. For example, number of automobiles per thousand population and per capita income are strongly correlated. This multicollinearity problem leads to contamination of the coefficients of the highly interrelated variable, to wrong signs for the coefficients of the variables, or to other problems.

For these reasons, where several variables are highly correlated only one should be used or other adjustments made. Where we found it necessary to drop one of two variables, we gave preference to keeping energy-related ones, for example, gasoline price.

The variables finally selected that consistently gave the best estimates of visits for the six parks were: (1) number of households, (2) real per capita disposable income, (3) real gasoline prices, (4) average fuel efficiency of the U.S. fleet of automobiles, and (5) the presence or not of a physical gasoline shortage. But even the first four variables were highly correlated with each other. To avoid this problem, these four variables were combined into a single indicator of the economic capacity of the public to travel by automobile; it represents the total miles the American people can drive on their per capita disposable income. We refer to this variable as "M." This index is constructed as follows:

$$M = \frac{NH \times PI \times MPG}{GP}$$

Where M = Economic traveling capacity
NH = Total number of households
PI = Per capita disposable income in dollars
MPG = Fuel efficiency in miles per gallon
GP = Gasoline prices in dollars per gallon.

Conceptually, this index assumes that each household has one car and one person's disposable income per family available for

automobile travel and the index is therefore expressed in miles. We experimented with both a linear and log form, but we applied the log form for two reasons: first, it gave better fit and second, it generates increasing visits at a decreasing rate as (M), traveling capacity in miles, increases. Otherwise, visits will "explode" if future traveling capacity increases much.

The final regression formula

The number of visits to a park is therefore given by the following formula: $V = B_0 + B_1 \log M + B_2 S$

where V = total number of visits in any given park in any given year

M = index of total U.S. economic traveling capacity for that year

S = presence or not of a gas shortage during the given year (a binary variable)

Since we are evaluating national parks and used national data, M and S will have the same values for all six parks. The B's are regression coefficients and have different values for each park.

The formula has what might be considered as two limitations. First, if economic traveling capacity (M) is increased or decreased by a given percentage, the increase or decrease in visits is the same irrespective of the level of economic traveling capacity. For example, a 10-percent increase in gasoline price from either $1.00 or $5.00 per gallon gives the same decrease in visits. (See fig. 4 in the text; the upper and lower levels are always parallel to the base case.) This may not, however, be too unrealistic. People may react to changes in prices in this way, that is, they become accustomed to prices at a certain level and will react the same if prices increase say 50 percent no matter what level the 50 percent is applied to.

Another problem is that the effect of gasoline shortages is not measured in terms of the degree of shortage. It is only measured in terms of whether or not there was one, that is, were there gas lines or not? Also, the decrease in visits caused by a shortage is the same irrespective of the level of the park visits in the previous year.

Perhaps more sophisticated models might be developed to accomodate some of these problems. Although further improvements are possible in our model, we believe even in its present simple form it is a useful forecasting tool.

Regression results

Table 1 shows the regression coefficients for the formula for the national parks. These numbers show the magnitude and

direction of the relations between the variables and visits. In all cases, a positive relationship exists between travel capacity and visits and a negative relationship between a gasoline shortage and visits, that is, when there is a shortage, visits drop.

TABLE 1

REGRESSION EQUATION RESULTS-SELECTED NATIONAL PARKS

Independent Variable or Statistical Measure	Name of Park						
	Grand Canyon	Rocky Mountain	Yosemite	Yellowstone	Glacier	Great Smoky Mountain	Total of Six Parks
B_0 Constant	-12933.5 (-29.22)	-10984.7 (-19.82)	-11630.1 (-20.52)	-9052.25 (-19.91)	-7282.29 (-17.42)	-45273.0 (-25.41)	-97156.0 (-30.59)
B_1 Log of relative Travel capacity	3876.00 (32.62)	3429.52 (23.05)	3535.42 (23.24)	2891.23 (23.69)	2188.29 (19.50)	13431.5 (28.09)	29351.9 (34.43)
B_2 Gasoline shortage	-316.916 (-4.745)	-372.452 (-4.454)	-219.623 (-2.569)	-660.127 (-9.623)	-109.940 (-1.743)	-173.579* (-0.6457)	-1852.64 (-3.866)
$\bar{R}^2$	0.9691	0.9416	0.9395	0.9530	0.9152	0.9560	0.9716
Durbin-Watson 1/ Statistic	0.8136	0.8705	0.9644	1.5711	0.7284	0.8359	0.9788
Number of observations	39	39	39	39	39	39	39

* Numbers in parenthesis are t values not significant at the 90% level

1/ In general the nearer the Durbin-Watson Statistics is to 2.0 the better. While these values are not as high as desirable, we feel they are adequate. They can be improved by adjusting for serial correlation of the first order or second order if necessary.

The numbers in parenthesis are "T" values. These are indicators of the statistical significance of the coefficients being different from zero. The larger the absolute number, the more confident we are in the significance of the coefficients. Only in one case (gasoline shortage applied to Great Smoky Mountain) is the coefficiant not significant at the generally accepted standard of 90-percent confidence level.

The numbers below the line on the tables are other indicators of how accurately the regression equation, as a whole, expresses the relationship among variables. The R expresses the predictive power of the equation in terms of the percentage of the variation in visits that is explained by the influencing variables. The closer R is to 1.0 the better the predictive power of the equation.

The Durbin-Watson statistic is a criterion for measuring the relationship between the year-to-year error terms. In general, the nearer this number is to 2.0 the better. Finally, the number of observations of years of data used in the regression is shown. Overall, we believe the regression equations express the relationship among variables rather well.

Projections of future visits

We projected park visits for the period 1980-90 using the estimated regression equations and projected input data (from a macroeconometric model) provided by Data Resources Inc. The values for the input data are given on page 37 in the text and are referred to as the base case. We performed sensitivity analysis to assess the effects of lowering or raising gasoline prices. We also performed two additional analyses: first, an overall pessimistic case where traveling capacity was reduced by lowering income by 10 percent, lowering number of households by 2 percent, lowering fuel efficiency by 10 percent, and raising gasoline prices by 30 percent; and secondly, an overall optimistic case where the economic travel capacity was similarily increased.

Regional parks

The same general approach was used for developing the formula for the regional parks. The final formula is: $V = B_0 \times B_1^{M} \times B_2^{P} \times B_3^{S} \times B_4^{D}$

V = Total number of visits in any a given year to a given park

where M = Index of individual automobile traveling capacity for the given year using regional per capita income

P = Regional or local population

S = Presence or not of a gas shortage during the given year (a binary)

D = Presence or not of a shift in the data series (a binary variable used only for Oahe Dam)

It differs from the previous national park equation as follows:

1. Traveling capacity M is linear not log and represents individual not national capacity.

2. Regional or local population is used rather than total national households and is separated from the index of traveling capacity.

3. It includes a binary variable for Oahe Dam, which had an unusual upward shift in visits from the year 1965.

Table 2 shows the regression coefficients and statistical indicators of how well the formula measures visits. These results in general are not as good as the results shown in table 1 for the national parks. Travel capacity for Lewisville Lake and regional population for Oahe Dam were eliminated because they gave a negative sign, which seems inconsistent.

The coefficient of the gasoline shortage variable has a positive sign in three of the four local parks and a negative sign for Lewisville Lake. The positive sign for the gasoline shortage variable indicates that visits to these local parks increase if a gasoline shortage exists. This result seems logical because people may reduce long distance travel and increase short distance travel for recreation when the gasoline shortage exists. However, the coefficient of the gasoline shortage variable is not significant.

Table 3 compares actual with estimated visits for Grand Canyon, the total for six national parks and Denison Dam. In general, the formula for Denison Dam is not as adequate as visits estimated by any of the national park formulas.

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APPENDIX V

TABLE 2

REGRESSION EQUATION RESULTS-SELECTED REGIONAL PARKS

	Independent Variable or statistical Measure	Name of the Park			
		Lewisville Lake close to Dallas in Texas	Denison Dam in Oklahoma State	Oahe Dam in South Dakota State	Lake Sidney Lanier close to Atlanta in Georgia
B_o	Constant	-10481.8 (-3.768)	-7999.93 (-2.653)	-111.583 * (-0.5032)*	-21325.1 (-6.405)
B_1	Travel capacity		38.9082 (3.207)	4.71609 (1.943)	81.8101 (3.548)
B_2	Regional population	5839.12 (5.009)	4915.81 (2.935)		12553.4 (4.653)
B_3	Gasoline shortage	-66.0117 (-0.0807)*	268.526 (0.6285)*	118.371 (0.9758)*	945.291 (0.9430)*
B_4	Variable for substantial shift in the data series			1438.47 (12.26)	
	$\bar{R}^2$	0.6597	0.9329	0.9640	0.8891
	Durbin-Watson statistic	0.4210	1.0882	2.0608	2.0464
	Number of observations	15	21	21	15

Numbers in parenthesis are t values

* Not significant at the 90% confidence level

TABLE 3

A COMPARISON OF ACTUAL VISITS WITH VISITS ESTIMATED BY REGRESSION FORMULAS FOR THREE PARKS
(in million visits)

Year	Grand Canyon		Total of Six Selected National Parks		Denison Dam 1/ in Oklahoma	
	Actual	Estimated	Actual	Estimated	Actual	Estimated
1941	0.437	-	3.785	0.200		
1942	0.133	-	1.813	0.542		
1943	0.072	0.055	0.782	1.752		
1944	0.065	0.141	1.054	2.404		
1945	0.170	0.168	1.825	2.602		
1946	0.487	0.569	4.098	5.093		
1947	0.622	0.537	4.792	4.852		
1948	0.618	0.591	5.160	5.259		
1949	0.601	0.558	5.710	5.015		
1950	0.665	0.725	6.198	6.275		
1951	0.682	0.891	6.313	7.535		
1952	0.737	0.916	7.398	7.726		
1953	0.837	0.935	7.438	7.866		
1954	0.814	0.920	7.712	7.751		
1955	0.892	1.006	7.954	8.401		
1956	1.033	1.040	8.798	8.662		
1957	1.102	1.101	9.048	9.121		
1958	1.064	1.164	8.999	9.603		
1959	1.169	1.238	8.983	10.161	6.736	6.534
1960	1.187	1.272	10.566	10.420	6.624	6.786
1961	1.252	1.405	11.044	11.426	6.448	7.113
1962	1.447	1.467	12.827	11.898	6.743	7.439
1963	1.539	1.534	12.809	12.402	7.333	7.607
1964	1.576	1.746	12.901	14.011	8.197	8.062
1965	1.689	1.757	13.809	14.090	8.905	8.037
1966	1.806	1.838	14.993	14.708	8.287	8.244
1967	1.805	1.895	15.763	15.137	8.790	8.567
1968	1.986	2.010	16.316	16.004	8.793	8.844
1969	2.193	2.086	16.277	16.579	9.073	9.135
1970	2.258	2.215	17.211	17.562	9.715	9.563
1971	2.426	2.331	17.908	18.441	10.299	9.887
1972	2.501	2.493	18.868	19.668	10.293	10.540
1973	2.698	2.560	18.506	20.172	10.432	10.746
1974	1.875	1.957	17.781	16.152	10.693	10.270
1975	2.625	2.338	20.356	18.488	10.906	10.201
1976	2.792	2.480	21.374	19.570	11.046	10.773
1977	2.627	2.599	21.212	20.468	11.322	11.364
1978	2.749	2.774	21.239	21.795	11.615	12.117
1979	2.132	2.229	18.410	18.212	11.455	11.878

1/ Figures are in recreation days.

*U.S. GOVERNMENT PRINTING OFFICE: 1981-0-341-843/702

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