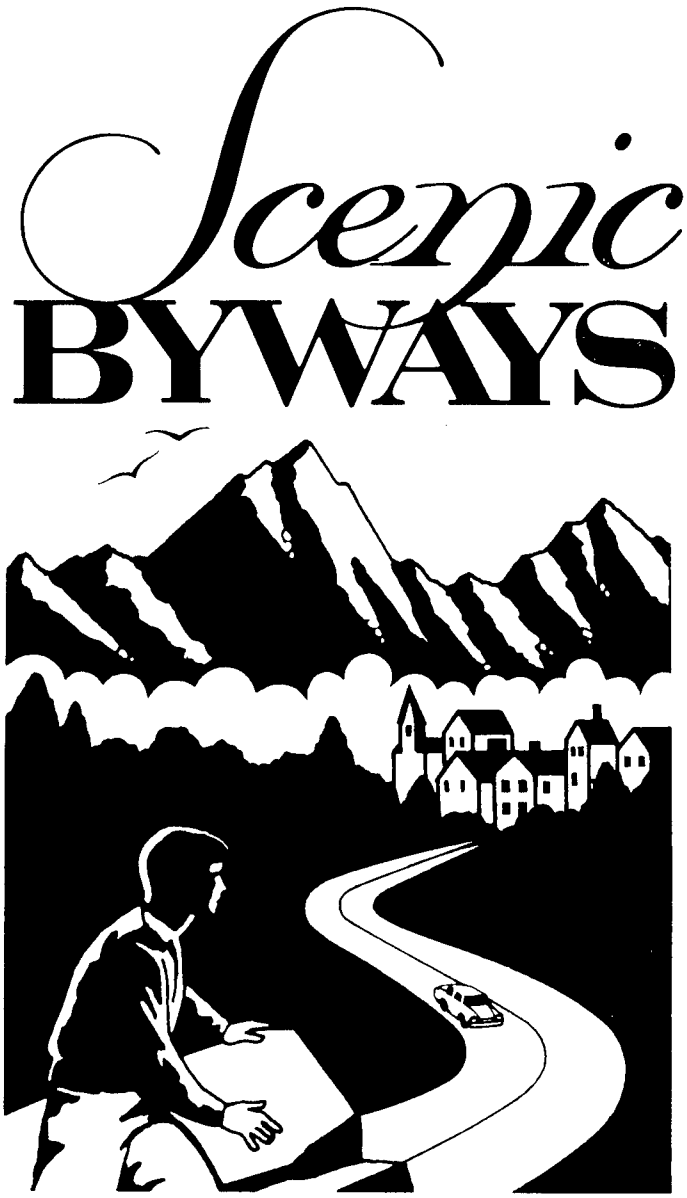
U.S. Department
of Transportation

Federal Highway Administration

Final Case Study for the National Scenic Byways Study

Safety, Traffic and Cost Considerations on Scenic Byways



September 1990

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Final Case Study

for the

National Scenic Byways Study

SAFETY, TRAFFIC AND COST CONSIDERATIONS on SCENIC BYWAYS

SEPTEMBER 1990

Prepared for

The Federal Highway Administration

Submitted by

Greenhorne & O'Mara, Inc.

9001 Edmonston Road
Greenbelt, Maryland 20770
301-982-2877

INTRODUCTION

The 1990 Scenic Byways Study was a response to a Congressional initiative to identify program options for a national scenic byways program. As part of that initiative, Congress asked that case studies be conducted to illustrate the existing policies and programs and the impact of three issues on existing future programs. The three issues were the environment, traffic safety, and economic (tourist) development. This report is concerned with the elements of the last two issues and adds another important element - cost.

Greenhorne & O'Mara, Inc. was asked by the Federal Highway Administration to conduct three case studies as follows:

1. Saftey Issues in Scenic Byways

2. Highway Costs for Scenic Byways

3. The Impact of Scenic Byways on Travel

All studies involved a survey of selected state highway organizations after review of the results from the 1990 Scenic Byways Inventory. Data were obtained from state submissions and from telephone interviews. For the "cost" study, data were obtained from other sources and blended with state data.

It is believed that each case study provides a useful guide to analysts considering the designation of existing highways as scenic byways. The studies present recommendations and caveats. Perhaps the most useful guide is the "cost" report. Cost data, with ranges, are presented for all elements of a scenic byway that are unique to such highways. An analyst can make various assumptions on complementary services to be provided and arrive at a first <u>very</u> preliminary estimate of the cost of designating a road as a scenic byway.

The reports are provided in the order presented in this introduction: safety, cost and travel.

CASE STUDY IN HIGHWAY COSTS FOR SCENIC BYWAYS

BY
Thomas J. Wilkins, P.E.
Greenhorne & O'Mara, Inc

Objective

The objective of this case study was to develop and document existing Scenic Byway cost data information that could be used as a quick reference guide in analyzing the feasibility of designating a highway as a Scenic Byway.

Study Approach

Personnel responsible for the Scenic Byways in selected State and Federal agencies described below were contacted to develop a list of candidate highways to study. Personnel responsible for cost analysis in those areas were contacted to determine if suitable cost analysis information was available. In addition, where possible, personnel were interviewed to determine their perspectives on determining costs associated with designating a highway as a Scenic Byway.

Data Collected

The New York Department of Transportation provided insight into the features actually found along a Scenic Byway.

The Arizona Department of Transportation provided costs of various improvement for specific sites.

The Maryland Department of Transportation supplied cost data for various parking layouts in the Maryland area.

The U. S. Forest Service provided construction information for the San Juan Skyway. This information also helped to identify features to be found along a Scenic Byway.

The National Park Service provided cost information that was useful in determining specific item costs.

For items not determined by interviews, the 1990 National Construction Estimator, 1989 Cost Data for Landscape Construction, 1987 Dodge Square Foot Cost Data, 1990 Means Square Foot Costs were used for cost analysis.

Findings

At the beginning of the study an attempt was made to estimate a cost per mile of designating a Scenic Byway. Upon review of the data, it was found to be impossible to develop a meaningful, generalized cost per mile. Improvement type differences appeared to account for substantial variation in the data. Therefore, it was decided to breakdown costs by improvement type, and features within each improvement type, and to show them in matrix form. The matrix is attached.

Types of improvement identified were as follows:

Scenic Overlooks	Camera Stops
Campsites	Roadside Rest Area
Boat Launching Areas	Historic & Cultural Sites
Hiking Trails	Bicycle Trails
Information Centers	Visitor Centers
Picnic Sites	Existing Road Improvement Add 12' Lane

Improvements were further broken down into individual components or features as follows:

Operation Costs	Parking Per Space
Landscaping	Buildings
Rest Rooms	Climbing Lanes
Picnic Tables	Barbecues
Trails	Roads-Site Specific
Right-of-way	Maintenance
Trash Pickup	Signing

The features, commonly associated with each improvement are represented by an 'X' in the matrix. Costs are categorized by low, medium, and high.

Application of Findings

An example of how to use the table is shown on the matrix. It estimates the "medium cost" for a Camera Stop.

A WORD OF CAUTION - There remains substantial variation in each of the cost figures provided. Furthermore, these costs are representative of the period 1987 - 1989. Their use should be restricted to estimating likely program costs or in making a first attempt at a project cost. For engineering, more refined cost information is required.

MATRIX OF COST FOR IMPROVEMENTS TO A SCENIC BYWAY

TYPICAL IMPROVEMENTS ASSOCIATED WITH SCENIC BYWAYS	Operation Cost High $67,500.00	Operation Cost Medium $36,300.00	Operation Cost Low $26,300.00	Parking Per Space High $2,700.00	Parking Per Space Medium $2,300.00	Parking Per Space Low $1,600.00	Landscaping High $30,000.00	Landscaping Medium $20,000.00	Landscaping Low $10,000.00	Buildings High $84.70	Buildings Medium $45.50	Buildings Low $31.60	Rest Rooms High $7,000.00	Rest Rooms Medium $5,000.00	Rest Rooms Low $2,000.00	Climbing Lanes High $477,700.00	Climbing Lanes Medium $419,000.00	Climbing Lanes Low $225,000.00	Picnic Tables High $1,300.00	Picnic Tables Medium $600.00	Picnic Tables Low $350.00	Bar-B-Q's High $250.00	Bar-B-Q's Medium $200.00	Bar-B-Q's Low $60.00	Trails High $100,000.00	Trails Medium $83,400.00	Trails Low $31,500.00	Roads - Site Specific High $477,700.00	Roads - Site Specific Medium $419,000.00	Roads - Site Specific Low $255,000.00	R/W High $1,500.00	R/W Medium $1,000.00	R/W Low $800.00	Maintenance High $1,400.00	Maintenance Medium $1,150.00	Maintenance Low $950.00	Trash Pickup High $3,850.00	Trash Pickup Medium $2,400.00	Trash Pickup Low $1,350.00	Signing High $700.00	Signing Medium $450.00	Signing Low $250.00	Low Typical Cost $1000	Medium Typical Cost $1000	High Typical Cost $1000	Options
Cost Bases	Per Year			EA			AC			SF			EA			Per Mile			EA			EA			Per Mile			Per Mile			AC			Per Year			Per Year			Per Mile						
Scenic Overlooks				X												X															X			X			X			X			277.0	450.9	514.0	A,G
Camera Stops				X																											X			X			X			X			11.5	17.9	21.4	H
Campsites				X									X						X			X			X			X			X			X			X			X			360.9	621.4	730.6	B,D,I
Roadside Rest Areas				X			X						X						X			X									X			X			X			X			32.3	51.1	61.4	G
Boat Launching Sites				X																								X			X			X			X			X			324.0	524.3	609.8	B,I
Historic & Cultural Sites				X			X																					X			X			X			X			X			343.5	556.3	634.0	B,I
Hiking Trails				X																					X			X			X			X			X			X			43.6	61.5	64.9	B,C,H
Bicycle Trails				X																					X			X			X			X						X			43.6	101.4	121.2	B,D,H
Information Centers	X			X			X			X									X									X			X			X			X			X			231.2	380.5	631.0	E,J
Visitor Centers	X			X			X			X									X									X			X			X			X			X			231.2	380.5	631.0	E,J,K
Picnic Sites				X			X												X			X			X			X			X			X			X			X			135.5	247.2	346.3	F,J
Existing Road Improvement Add 12' Lane							X									X															X			X						X			268.5	443.9	514.1	A

A. 1 Mile Climbing Lane

B. 1 Mile Access Road

C. 1 Mile Hiking Trail

D. 1 Mile Bicycle Trail

E. 1/8 Mile Access Road

F. 1/4 Mile Access Road

G. Based Upon 24,500 Sq.Ft. Area (10 parking spaces)

H. Based Upon 12,250 Sq.Ft. Area (5 parking spaces)

I. Based Upon 122,500 Sq. Ft. Area (50 parking spaces)

J. Based Upon 40,000 Sq.Ft. Area (15 parking spaces)

K. Based Upon 5000 Sq.Ft. Information Or Visitor Center

USING THE MATRIX AS A COST ESTIMATING TOOL

THE FOLLOWING EXAMPLE INDICATES HOW TO USE THE MATRIX TO ESTIMATE THE COST TO CONSTRUCT AND MAINTAIN A CAMERA STOP.

THE COST INDICATED IN THE MATRIX FOR A TYPICAL MEDIUM COST CAMERA STOP WERE OBTAINED FROM THE ARIZONA DEPARTMENT OF TRANSPORTATION. THE CAMERA STOP USED, WAS ALONG THE CORONADO TRAIL SCENIC BYWAY. THIS CAMERA STOP CONSISTED OF APPROXIMATELY 12,250 SQUARE FEET OF PAVING, WHICH INCLUDED A DRIVE THROUGH LANE AND FIVE PARKING SPACES. THE COST FOR THE PAVING FROM THE MATRIX WOULD BE FIVE SPACES TIMES $2,300.00 EACH FOR A TOTAL OF $11,500.00.

FROM THE MATRIX THE MEDIUM COST FOR ONE ACRE OF LAND REQUIRED FOR THE CAMERA STOP IS $1,000.00.

THE MEDIUM COST FOR ANNUAL MAINTENANCE FOR THE CAMERA STOP IS $1,500.00. THE MEDIUM COST FOR ANNUAL TRASH PICKUP FOR THE CAMERA STOP IS $2,400.00.

THE MEDIUM COST FOR ONE MILE OF SIGNING IN EACH DIRECTION TO THE CAMERA STOP IS TWO TIMES THE COST OF $450.00 FOR ONE MILE, WHICH IS $900.00.

IN SUMMARY THE MEDIUM COST TO CONSTRUCT AND MAINTAIN A CAMERA STOP IS $17,300.00.

IT SHOULD BE NOTED THAT THE MATRIX DOES NOT TAKE INTO ACCOUNT AREA MULTIPLIERS AND OTHER SITE SPECIFIC INFORMATION, WHICH COULD EFFECT TOTAL COST.

FEDERAL AND STATE EXPERIENCE WITH SAFETY ISSUES ON SCENIC BYWAYS[1]

By
John C. Klimovitch, P.E.
Greenhorne & O'Mara, Inc.

Purpose

The purpose of the project has been to develop and document case studies of Federal and State experience with safety issues on scenic byways, including a comparison of State accident statistics.

Procedure

The procedure used to accomplish this task was as follows.

Personnel responsible for scenic highways in selected State and Federal agencies were contacted to develop a list of candidate highways to study. Personnel responsible for accident statistics in those jurisdictions were then contacted to determine if suitable accident data was available. If it was available, the information was requested. In addition, the personnel were interviewed to obtain their experience with general safety issues on scenic byways.

Accident data was requested for scenic highways before and after its designation as a scenic road. If that information was not available, then recent accident data was requested for these highways and for similar highways not designated scenic.

The accident data was analyzed to determine if the accident rates changed as a result of their being designated scenic, and to determine if the designated scenic highways have different accident rates than non-designated highways.

Data Collected

States which were contacted were Arizona, California, Michigan, New York, Oregon, Tennessee, Virginia, Washington, and Wisconsin. In addition, the National Park Service was contacted to obtain information on Federal roads.

The Arizona Department of Transportation provided accident summary reports and average daily traffic volumes for five selected scenic highways in the State. This information is presented in the section titled Case Studies.

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[1] Greenhorne & O'Mara, Inc. Task Order No. 9. Task C, Case Study 1a., May 2, 1990.

Accident data was not readily available for rural scenic highways in California. Many of the roads which seemed to be likely candidates for study were multi-lane highways or carried considerable commuter traffic. A CALTRANS staff member familiar with these roads indicated that they probably would not be typical of scenic highways in other states.

Michigan's Heritage Routes program is currently under development and may be implemented next year. Currently there are no State highways signed as scenic routes. Therefore, information was not obtained from this state.

The New York State Department of Environmental Conservation was contacted for information. We were informed that the State's scenic roads are under the control of the local government jurisdictions which they traverse. Accident data would be difficult to obtain. However, Ms. Theresa Mitchell, Executive Director of the New York State Seaway Trail, was contacted to determine the accident experience on that scenic road. Ms. Mitchell stated that no unusual safety problems have been brought to her attention. However, she said that requests have been received for wider shoulders in order to improve safety for bicyclists.

The Oregon State Highway Division supplied accident data on six highways before and after the roads were signed as scenic routes. The information is presented in the section titled Case Studies.

Tennessee was able to supply information on two scenic highways; US 70 and US 79. US 70 between Smithville and Sparta was designated scenic in 1982. Two years prior to that, it had an average accident rate of 1.62 accidents per million vehicle-miles. Two years after, its average rate was 1.81. US 79 between Dover and Clarksville also was designated scenic in 1982. A section of this road is in the urban area of Clarksville. Its average accident rate two years prior to that was 2.18, and 2.88 for the two years after. Currently the State-wide average rate on two lane rural roads is 1.85, and on two lane urban roads 3.79.

Virginia was not able to supply accident rate information on their scenic roads due to the lack of traffic data on these rural highways.

Washington supplied accident rates for eight scenic highways along with the State-wide average for similar roads. This information is discussed in the section titled Case Studies.

Mr. Steven Coons of Wisconsin's Rustic Roads Board was contacted about the State's accident experience on these roads. Mr. Coons stated that he believes there have been no significant safety consequences or changes in accident rates directly related to the designation of Rustic Roads in Wisconsin. Since these are lightly traveled, local roads, accident data was not available from the State.

Accident information on selected National Parks was obtained from Mr. Tim Neuman of CH2M Hill, Inc. This information is presented in the section titled Case Studies.

Case Studies

The following are case studies of scenic highway accident data provided by the Arizona Department of Transportation, the Oregon State Highway Division, and the Washington State Department of Transportation. Also included is data obtained on two Federal parkways and one national park.

Arizona

The Arizona Department of Transportation provided for each of five selected scenic highways traffic accident summaries from 1982 to 1989, and average daily traffic volumes for those years, except for 1989. The volume for that year was estimated. The following is an analysis of the data for each highway.

US 89A (Prescott-Flagstaff Highway) from Milepost 375.50 to 390.00

This section of US 89A was designated the Sedona-Oak Creek Canyon Scenic Road on 8/24/84. It is located south of Flagstaff and follows the Oak Creek Canyon.

The following table lists, for each year from 1982 to 1989, the number of accidents, the average daily traffic volume, and the accident rate (number of accidents per million vehicle-miles) on this section of highway.

Year	# of Accidents	ADT	Accident Rate
1982	58	4190	2.61
1983	47	4130	2.15
1984+	72	4547	2.99
1985	85	4500	3.57
1986	73	5000	2.76
1987	92	4900	3.54
1988	67	4400	2.88
1989	81	4900*	3.12*

+Year designated scenic
*Estimated

The trend in number of accidents and rate can be seen graphically in Figure 1. In the study period the accident rate peaked in 1985 and 1987. The highway was designated scenic in 1984. A review of the accident summary reports for 1985 and 1987 shows relatively high numbers of accidents which occurred on snowy or icy pavement. Therefore adverse weather conditions may partly explain the increase in accident rates for these years.

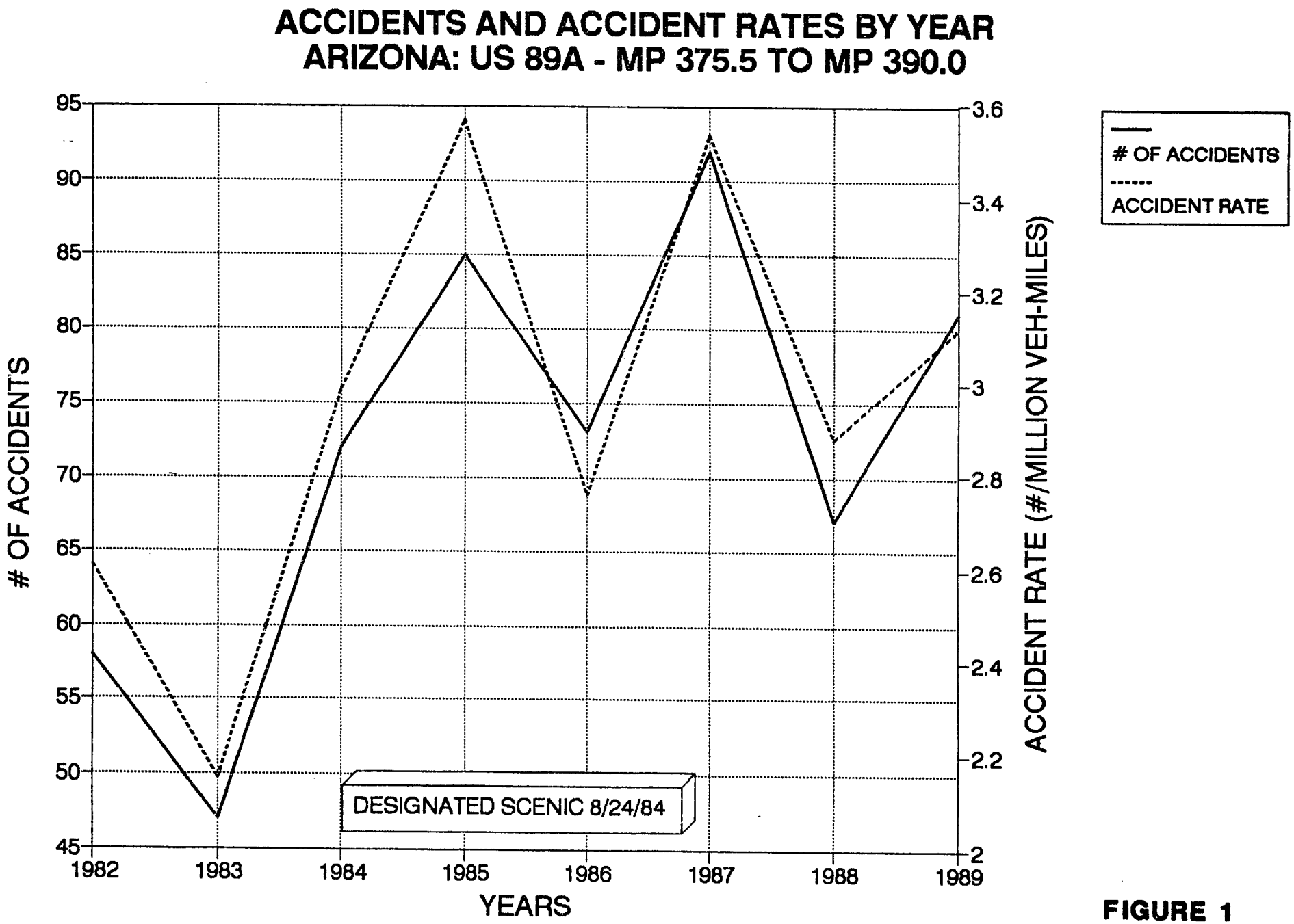
ACCIDENTS AND ACCIDENT RATES BY YEAR
ARIZONA: US 89A - MP 375.5 TO MP 390.0
OF ACCIDENTS
ACCIDENT RATE (#/MILLION VEH-MILES)
YEARS
95
90
85
80
75
70
65
60
55
50
45
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1982
1983
1984
1985
1986
1987
1988
1989
DESIGNATED SCENIC 8/24/84
OF ACCIDENTS
ACCIDENT RATE

FIGURE 1

Arizona (Continued)

State Route 179 (Rimrock-Sedona Highway) from Milepost 302.50 to 310.00

This section of SR 179 was designated the Redrock Scenic Road on 2/20/87. It is located in the same vicinity as the Sedona-Oak Creek Canyon Scenic Road, which is south of Flagstaff.

The following table lists, for each year from 1982 to 1989, the number of accidents, the average daily traffic volume, and the accident rate (number of accidents per million vehicle-miles) on this section of highway.

Year	# of Accidents	ADT	Accident Rate
1982	15	4080	1.34
1983	9	3645	0.90
1984	25	4000	2.28
1985	29	3600	2.94
1986	25	3800	2.40
1987+	31	4000	2.83
1988	27	4700	2.10
1989	29	4553*	2.33*

+Year designated scenic
*Estimated

The average accident rate from 1982 through 1986 was 1.97. This period was prior to the highway being designated scenic. The average rate for the years after the road was designated scenic (from 1987 through 1989) was 2.42. The accidents and accident rate trends can be seen graphically in Figure 2. The graph shows an increase in accident numbers and rate in 1984 and 1985, and then no appreciable change for the remaining years. It appears that designating this highway as a scenic route had little impact on the number and rate of accidents.

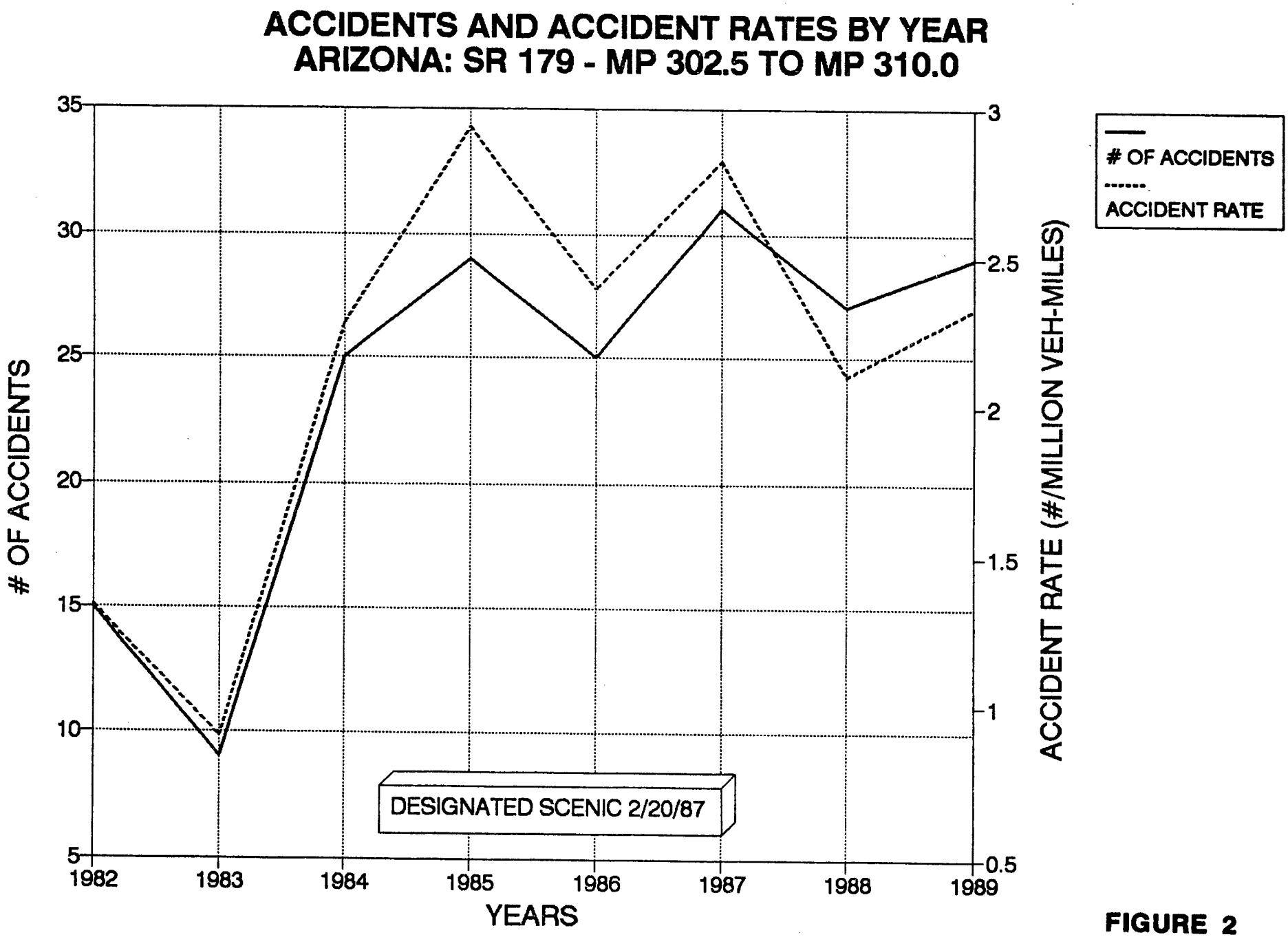
ACCIDENTS AND ACCIDENT RATES BY YEAR
ARIZONA: SR 179 - MP 302.5 TO MP 310.0
OF ACCIDENTS
ACCIDENT RATE (#/MILLION VEH-MILES)
YEARS
35
30
25
20
15
10
5
3
2.5
2
1.5
1
0.5
1982
1983
1984
1985
1986
1987
1988
1989
DESIGNATED SCENIC 2/20/87
OF ACCIDENTS
ACCIDENT RATE

FIGURE 2

Arizona (Continued)

US 60 (Phoenix-Globe Highway) from Milepost 214.50 to 240.50

This section of US 60 was designated the Gila - Pinal Scenic Road on 5/20/86. It is located east of Phoenix.

The following table lists, for each year from 1982 to 1989, the number of accidents, the average daily traffic, and the accident rate (number of accidents per million vehicle-miles) on this section of highway.

Year	# of Accidents	ADT	Accident Rate
1982	92	6752	1.44
1983	71	6922	1.08
1984	84	6742	1.31
1985	113	6234	1.91
1986+	123	5871	2.21
1987	97	6467	1.58
1988	101	6900	1.54
1989	84	7000*	1.26*

+Year designated scenic
*Estimated

This information can be seen graphically in Figure 3. The number and rate of accidents increased in 1985 and 1986, and then dropped to levels comparable to those prior to that period. The highway was designated scenic in 1986, which was the year with the highest accident rate and numbers. A review of the accident summaries reveals that 1986 had the highest number of accidents where snowy or icy conditions may have been contributing factors. These 18 accidents represent 15% of the total accidents for that year. Of the other years studied, snowy or icy pavement conditions are factors in an average of 9% of all accidents on this roadway. Therefore the increase in accidents in 1986 may be partly attributable to adverse winter weather conditions.

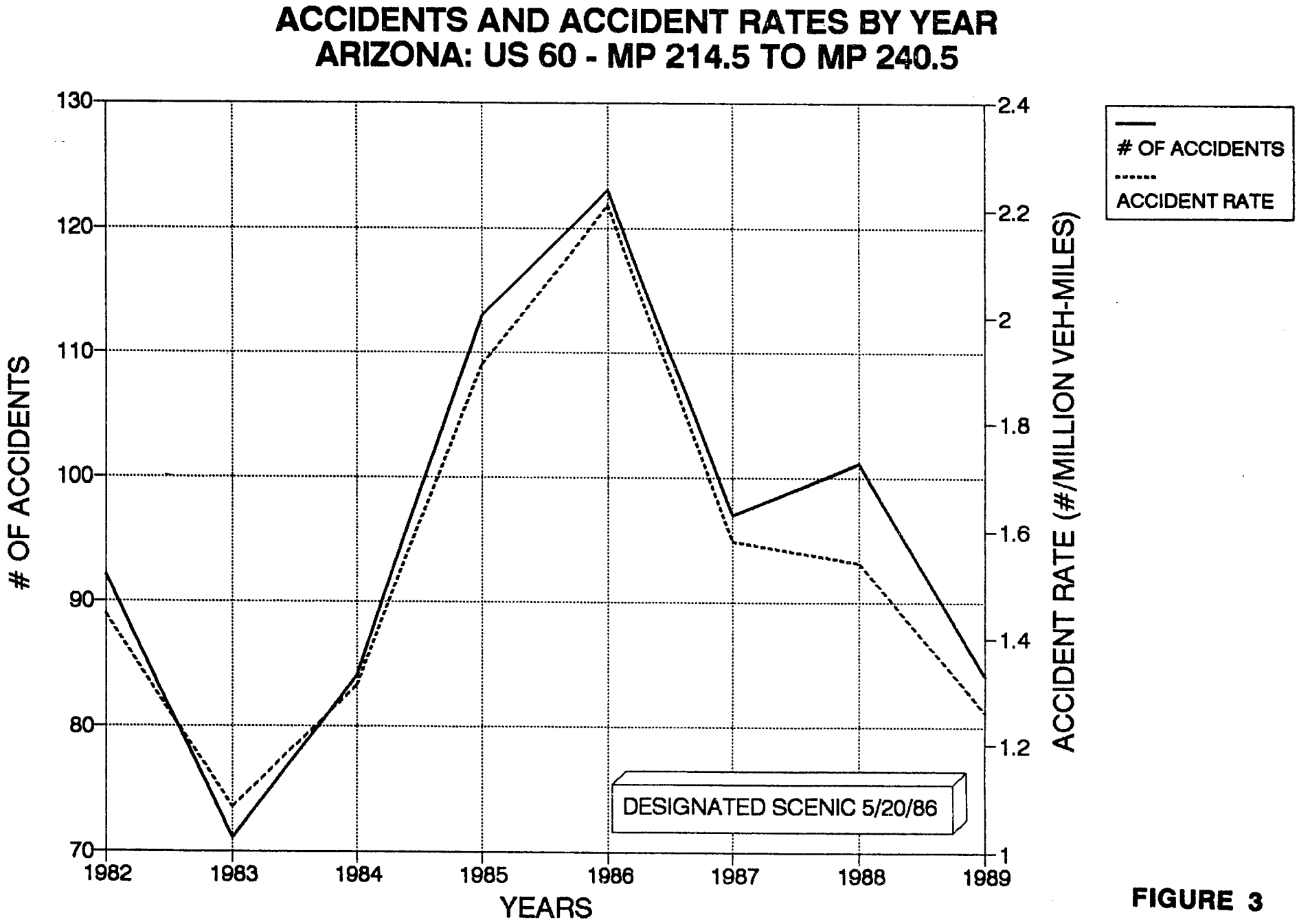
ACCIDENTS AND ACCIDENT RATES BY YEAR
ARIZONA: US 60 - MP 214.5 TO MP 240.5
OF ACCIDENTS
ACCIDENT RATE (#/MILLION VEH-MILES)
YEARS
130
120
110
100
90
80
70
2.4
2.2
2
1.8
1.6
1.4
1.2
1
1982
1983
1984
1985
1986
1987
1988
1989
DESIGNATED SCENIC 5/20/86
OF ACCIDENTS
ACCIDENT RATE

FIGURE 3

Arizona (Continued)

State Route 83 (Parker Canyon Lake-Mountain View Highway) from Milepost 33.00 to 58.00

This section of SR 83 was designated as part of the Patagonia-Sonoita Scenic Road on 9/20/85. It is located southeast of Tucson.

The following table lists, for each year from 1982 to 1989, the number of accidents, the average daily traffic volumes, and the accident rate (number of accidents per million vehicle-miles) on this section of highway.

Year	# of Accidents	ADT	Accident Rate
1982	11	869	1.39
1983	19	879	2.37
1984	14	850	1.80
1985+	31	940	3.61
1986	20	1093	2.01
1987	23	1300	1.94
1988	19	1300	1.60
1989	28	1300*	2.36*

+Year designated scenic
*Estimated

This information can be seen graphically in Figure 4. The number and rate of accidents increased in 1985, the year the highway was designated scenic. After that, the yearly accident rates dropped to pre-1985 levels, although the number of accidents remained higher. The accident summaries for 1985 show that most of the accidents occurred on dry pavement during the day, and were single vehicle run off the road accidents involving cars or pickup trucks. A contributing factor in the majority of accidents was speed too fast for conditions.

Discussions with the Arizona Department of Transportation district maintenance engineer and traffic engineering personnel revealed no unusual circumstances to explain the increase in accidents in 1985. It was their opinion that the accident peak could not be attributable to designating the highway scenic that year.

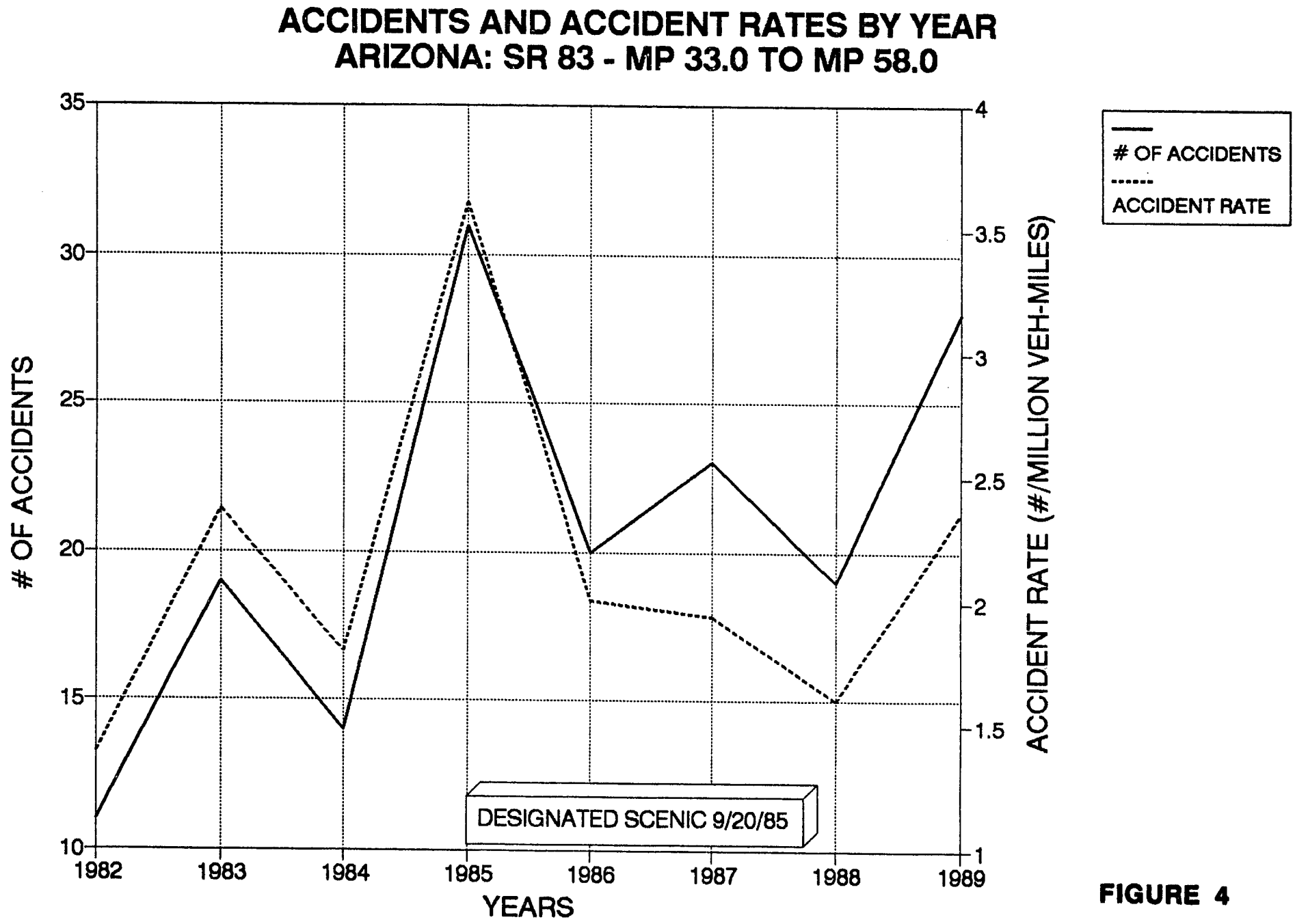
ACCIDENTS AND ACCIDENT RATES BY YEAR
ARIZONA: SR 83 - MP 33.0 TO MP 58.0
OF ACCIDENTS
ACCIDENT RATE (#/MILLION VEH-MILES)
YEARS
35
30
25
20
15
10
4
3.5
3
2.5
2
1.5
1
1982
1983
1984
1985
1986
1987
1988
1989
DESIGNATED SCENIC 9/20/85
OF ACCIDENTS
ACCIDENT RATE

FIGURE 4

Arizona (Continued)

State Route 82 (Nogales-Tombstone Highway) from Milepost 4.50 to 32.00

This section of SR 82 was designated as part of the Patagonia-Sonoita Scenic Road (along with SR 83) on 9/20/85. It is located south of Tucson.

The following table lists, for each year from 1982 to 1989, the number of accidents, the average daily traffic volumes, and the accident rate (number of accidents per million vehicle-miles) on this section of highway.

Year	# of Accidents	ADT	Accident Rate
1982	25	1245	2.00
1983	18	1158	1.55
1984	27	1367	1.97
1985+	34	1333	2.54
1986	31	1379	2.24
1987	22	1500	1.46
1988	30	1700	1.76
1989	24	1650*	1.45*

+Year designated scenic
*Estimated

This information can be seen graphically in Figure 5. The number and rate of accidents peaked in 1985, the year the highway was designated scenic. Later, the accident rate dropped to previous levels. Most of the accidents in 1985 were run off the road accidents involving passenger cars or pickup trucks on dry pavement. That year, a large percentage of the accidents occurred during May and June. In other years, the accidents occurred somewhat evenly throughout the year. Typical contributing factors to the 1985 accidents were speed to fast for conditions, sleepy or fatigued drivers, and hitting game.

Discussions with the Arizona Department of Transportation district maintenance engineer and traffic engineering personnel revealed no unusual circumstances to explain the increase in accidents in 1985. It was their opinion that the accident peak could not be attributable to designating the highway scenic that year.

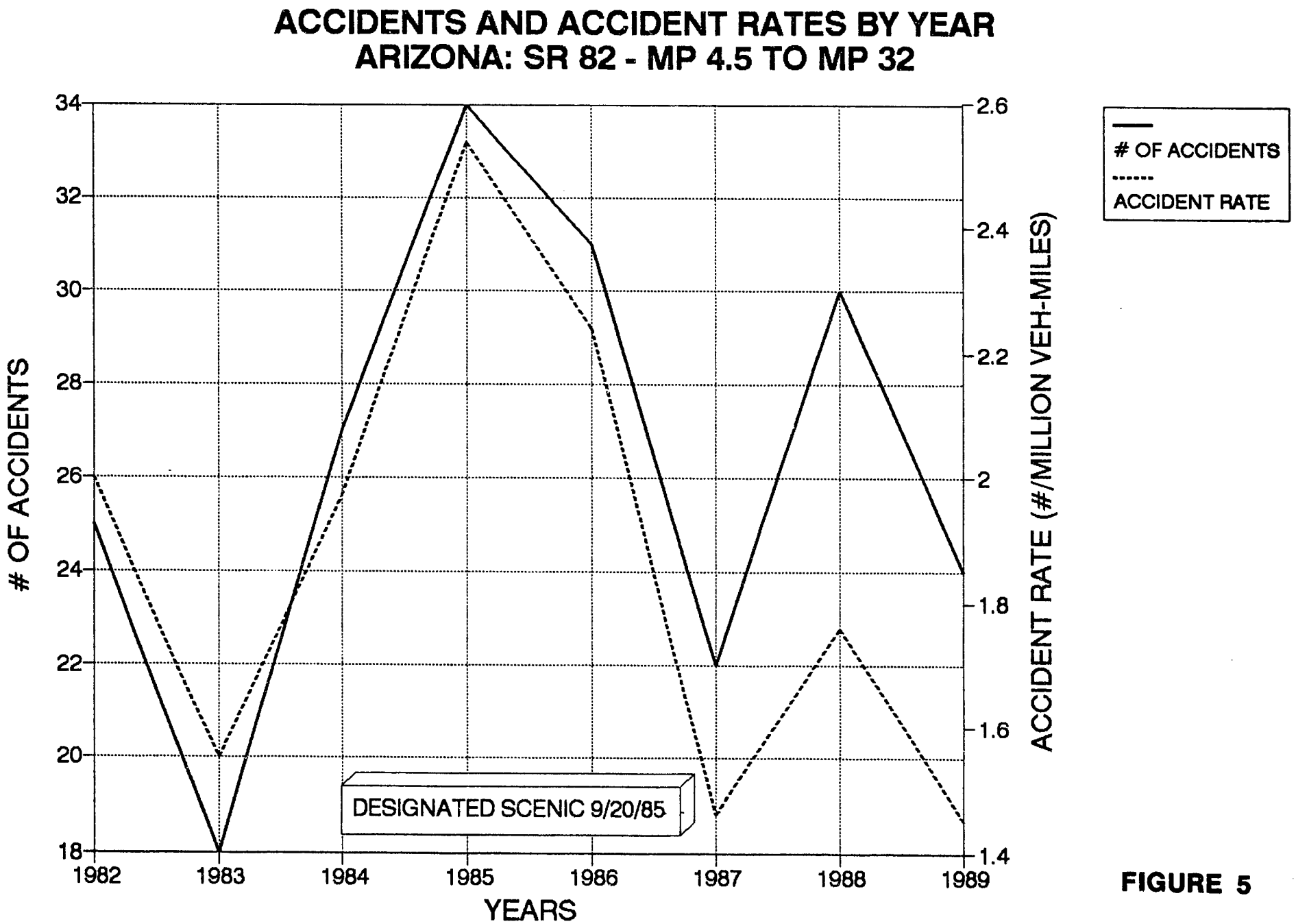
ACCIDENTS AND ACCIDENT RATES BY YEAR
ARIZONA: SR 82 - MP 4.5 TO MP 32
OF ACCIDENTS
ACCIDENT RATE (#/MILLION VEH-MILES)
YEARS
34
32
30
28
26
24
22
20
18
2.6
2.4
2.2
2
1.8
1.6
1.4
1982
1983
1984
1985
1986
1987
1988
1989
DESIGNATED SCENIC 9/20/85
OF ACCIDENTS
ACCIDENT RATE

FIGURE 5

Oregon

The Oregon State Highway Division, Planning Section, provided the following accident data on seven sections of scenic highways. The accident rates for the years 1984 through 1986 are prior to the routes being designated scenic, and the rates for the years 1987 through 1989 are after the routes were designated scenic. The accident rates for injury and total accidents are the number of accidents per million vehicle miles.

Route	Average Accident Rate			
	Injury Accidents		Total Accidents	
	'84-'86	'87-'89	'84-'86	'87-'89
Columbia Gorge Highway				
(Hwy. No. 125 MP 1.85 - 23.44)	1.25	1.33	2.57	2.45
(Hwy. No. 292 MP 0.37 - 14.99)	1.86	1.29	2.52	2.15
Crooked River Highway (Palisades)				
(Hwy. No. 14 MP 6.00 - 20.00)	0.92	0.48	2.31	1.90
Green Springs Highway				
(Hwy. No. 21 MP 8.45 - 49.66)	0.83	1.01	1.70	1.70
La Grande - Baker Highway				
(Hwy. No. 66 MP 44.67 - 48.00	0.45	1.21	0.76	1.21
McKenzie Highway				
(Hwy. No. 15 MP 61.80 - 83.81	1.27	2.29	2.55	4.36
Oregon Caves Highway				
(Hwy. No. 38 MP 8.01 - 19.51)	0.55	0.57	0.69	1.14

Four of the seven routes experienced nearly unchanged or decreased accident rates after being designated scenic. The remaining three routes experienced rate increases. The rate increases were due to both increases in the number of accidents and decreases in traffic volumes. Mr. Dennis J. Mitchell of the Oregon State Highway Division, Planning Section stated that it was unlikely that the increase in accident rates on these roads was related to their designation as scenic since these roads are not actively promoted. He said the increases could have been due to a normal fluctuation in numbers of accidents over a period of time.

Washington State

The Washington State Department of Transportation provided the accident rates for eight scenic highways for 1985 through 1989, along with the state-wide average accident rate on similar rural two lane highways with no access control. The data is summarized in Table 1. A description of each highway, taken from the report titled National Scenic Byways Study, State of Washington, 1990 by the Washington State Department of Transportation, follows.

State Route 14 (Columbia River Gorge Scenic Byway) from Washougal to I-82

This scenic highway follows the Columbia River for its entire length of 164 miles. Recreation is a key draw for this byway, with windsurfing, boating, fishing and camping activities occurring in the corridor.

This highway was designated a scenic byway in the 1960's. The average accident rate on this road from 1985 to 1989 was 1.5 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

State Route 20 (North Cascades Scenic Byway) from Hanson Creek to State Route 153

This section of the North Cascades Scenic Byway follows the Skagit River in sections. The river provides recreational activities such as fishing and white water boating.

This highway was designated a scenic byway in the 1960's. The average accident rate from 1985 to 1989 was 1.5 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

State Route 101 (Olympic Loop Scenic Byway) from Sequim State Park to Black Lake Boulevard

This section of the Olympic Loop Scenic Byway parallels Hood Canal, a major 40 mile long arm of Puget Sound. There are many public accesses to the Sound for camping and other recreational activities.

The average accident rate on this section of scenic byway (which was designated scenic in the 1960's) from 1985 to 1989 was 1.48 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

TABLE 1

Accident Rates for Selected Scenic Byways in Washington State

	Accident Rate by Year (Accidents/million veh.-miles)					Average Rate
Route	1985	1986	1987	1988	1989	'85-'89
Average*	1.9	1.9	1.9	1.9	1.9	1.9
SR 14	1.7	1.6	1.2	1.5	1.5	1.5
SR 20	1.6	1.4	1.2	1.4	1.4	1.4
SR 101	1.7	1.4	1.5	1.4	1.4	1.5
SR 2	2.9	3.0	2.6	2.9	2.7	2.8
SR 21	2.2	1.8	1.6	1.4	1.5	1.7
SR 155	1.3	1.5	1.1	1.3	1.4	1.3
SR 504	2.9	1.8	1.9	1.7	1.5	2.0
SR 821	2.1	2.4	1.7	1.5	1.7	1.9

*Average accident rate for rural two lane highways with no access control in Washington State

Washington State (Continued)

State Route 2 (Stevens Pass Scenic Byway) Woods Creek to State Route 97

The western section of this route parallels the Skykomish River, the State's only designated scenic river. River activities and hiking are the primary recreation in the lower western part of this byway, and winter skiing and summer hiking are recreational activities at Stevens Pass.

The average accident rate from 1985 to 1989 for this highway was 2.82 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

State Route 21 (Sanpoil Scenic Byway) from Keller Ferry Landing to SR 20

The southern section of this scenic byway provides panoramic views of the Columbia River and Roosevelt Lake (the impoundment behind Grand Coulee Dam). North of the Columbia River, the highway parallels the Sanpoil River, and provides views across the river valley.

The average accident rate from 1985 to 1989 for this highway was 1.7 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

State Route 155 (Grand Coulee Scenic Byway) from State Route 2 to Omak Creek

The southern section of this Byway parallels the Banks Lake Reservoir and provides views of the adjacent bluffs of layered basalt flows. Further north, Grand Coulee Dam can be seen from the Byway.

The average accident rate from 1985 to 1989 for this highway was 1.32 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

Washington State (Continued)

State Route 504 (Spirit Lake Memorial Scenic Byway) from State Route 5 to Mt. St. Helen's Viewpoint

The focal point of this scenic byway is Mt. St. Helens and the effects of its 1980 volcanic eruption. Interpretative exhibits of the volcano and its effects have been established. A major new interpretive center will be a primary focus in the future, and a new replacement scenic byway is scheduled to be completed in 1992.

The average accident rate from 1985 to 1989 for this highway was 1.96 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

State Route 821 (Yakima Canyon Scenic Byway) from State Route 82 to Thrall Road Interchange

This byway passes through an uplifted mountain range that is bisected by the Yakima River. Floating, fishing, swimming, camping, picnicking, and bicycling are the favorite recreational activities.

The average accident rate from 1985 to 1989 for this highway was 1.88 accidents per million vehicle miles. The state-wide average accident rate on rural two lane roads with no access control was 1.9 during this same period.

Of the eight scenic byways studied, only one (State Route 2) had a significantly greater accident rate than the state-wide average for rural two lane highways with no access control.

National Parks and Parkways

Mr. Tim Neuman of CH2M Hill, Inc. supplied accident rate information on selected parkways and national parks. The following summarizes the information on two parkways and one national park.

Blue Ridge Parkway

The Blue Ridge Parkway traverses sections of Virginia and North Carolina for 470 miles. It is a two lane rural highway, generally access controlled. The following table lists the accident rate (number of accidents per million vehicle-miles) by year for this road.

Year	Total Accidents	Veh-miles of Travel	Accident Rate
1982	285	261,577,644	1.09
1983	318	248,263,413	1.28
1984	337	234,949,181	1.43
1985	330	221,634,950	1.49
1986	395	208,320,718	1.90
1987	437	195,006,487	2.24
1988	382	181,692,255	2.10

Natchez Trace Parkway

The Natchez Trace Parkway is a two lane controlled access rural highway in Tennessee, Alabama, and Mississippi. Its length is 446 miles. The accident rate by year follows.

Year	Total Accidents	Veh-miles of Travel	Accident Rate
1982	187	177,790,279	1.05
1983	199	174,570,635	1.14
1984	206	171,350,991	1.20
1985	218	168,131,347	1.30
1986	207	164,911,703	1.26
1987	151	161,692,059	0.93
1988	301	158,472,415	1.90

National Parks and Parkways (Continued)

Yellowstone National Park

This park is located primarily in Wyoming and partly in Montana and Idaho. The accident rates by year follow.

Year	Total Accidents	Veh-miles of Travel	Accident Rate
1982	459	105,947,779	4.33
1983	465	116,581,148	3.99
1984	447	127,214,518	3.51
1985	380	137,847,887	2.76
1986	398	148,481,256	2.68
1987	438	159,114,626	2.75
1988	498	169,747,995	2.93

The accident rates on the Blue Ridge Parkway and on the Natchez Trace Parkway are relatively low. This might be partially due to these roadways being generally controlled access.

The roadways in Yellowstone Park show higher accident rates than the Parkways. Information was obtained from the Wyoming State Highway Department on the 1988 fatal accident rate in the State. That rate is 2.75 fatal accidents per million vehicle miles. Yellowstone Park's fatal accident rate for that year was 2.36.

Summary and Conclusions

The accident data obtained from the Arizona Department of Transportation showed the change in accident rates before and after five roadways were designated scenic highways. The data showed no definite relationship between change in accident rate and the designation of the roads as scenic highways. While the accident rates generally increased the year they were designated scenic, the rates either dropped or leveled off the following years. The increase on two roadways may have been caused by unusually adverse winter weather conditions. Increases on the other roads may have been due to normal fluctuations in the number of accidents. Arizona Department of Transportation officials familiar with these roads were of the opinion that the increase in accidents could not be attributable to the highways being designated scenic.

Accident rate information on seven scenic highways provided by the Oregon State Highway Division shows that four of the routes experienced essentially no change or a decrease in accident rates after they were designated scenic. Three of the routes experienced an increase in accident rates. However, the increases may have been due in part to the normal fluctuation in the number of accidents over a period of time.

The accident data from the Washington State Department of Transportation revealed that, of the eight scenic byways studied, only one had a significantly greater average accident rate than the state average for similar roads.

The Tennessee Department of Transportation provided accident data before and after two highways were designated scenic. One highway experienced a slight increase in accident rate, and the other experienced a moderate increase. However, the rates are typical of similar type highways in the state.

Accident data on the Blue Ridge Parkway and the Natchez Trace Parkway showed relatively low accident rates. However, this might be due in part to access control along these roads. Accident data for roads in Yellowstone National Park, located primarily in the northwest corner of Wyoming, showed accident rates higher than that of the parkways. However, for 1988 the fatal accident rate in the park was lower than the Wyoming state average.

The results of this study of 24 scenic byways indicate that accident rates on designated scenic highways are generally similar to other comparable roads, and that, when roads are designated scenic, they usually do not experience an increase in accident rates as a result of their scenic designation.

CASE STUDY IN THE IMPACT OF SCENIC BYWAYS ON TRAVEL

BY
Barbara Barnow
R. Ian Kingham, P.E.
Greenhorne & O'Mara, Inc.

The 1990 Scenic Byways Study includes over 20 case studies of scenic byways to explore specific issues. Among the issues of most interest to Congress in planning a scenic byways program are the environment, safety, and economic development. Of importance in evaluating the impact of these issues on a program is travel demand resulting from designating a highway as a scenic byway. This report presents the results of a survey conducted among key state highway organizations to determine differences that might be expected in traffic volumes by designating a scenic byway. Specifically, the objective of the survey was to document traffic volume changes before and after scenic byway designation for at least 10 cases.

APPROACH

The methodology used to identify appropriate agencies to survey was to review Part B of the 1990 National Scenic Byways Inventory to determine first, if the highways and corridors identified by a particular agency were "designated", and then to determine if there was legislation in-place to support the designation of a scenic byway or corridor. For purposes of this survey, it was not essential that a particular agency maintain a separate unit for its scenic byway program. The second screening of the Part B Inventory form involved a preliminary review of the form to determine if statistics were available on route and corridor features of designated roadways.

Eleven agencies then were contacted by telephone to collect data on the "before" and "after" effects of designation on ADT's, mix of vehicle types, seasonal variations, and driver age. A copy of the questionnaire which was used as a reference for discussion is provided on the following page. Responses from five of these agencies were reviewed to determine patterns which may be associated with the administrative procedures for designation. The remaining six agencies were not able to provide any data.

It is important to mention that agencies identified a variety of techniques for data collection, emphasizing different types of data and using different methodologies. These variations will be noted in the discussion of data for each state.

Scenic Byways - Travel Case Study
Questionnaire

STATE:

CONTACT:

SCENIC BYWAY:

1. What was the date of designating this roadway/corridor as scenic?

2. Is ADT information available to compare before-designation and after-designation traffic volumes?

	ADT	%Tourism	Peak Season ADT	%Tourism
Before Designation Year _____				
After Designation Year _____				

3. (a) Is there a change in the mix of vehicle types (RV's vs motorcycles vs automobiles) before and after designation?

Before Designation
Year _____

After Designation
Year _____

(b) What is the trend, based on data collected or observation?

4. What is the average regional growth (not attributed to tourism)?

5. What is the principal attractor of the byway?

6. What is the distance from the nearest urban area?

7. Are there any changes in the average driver age, before and after designation? If so, what are the impacts?

COMMENTS:

FINDINGS

Arkansas

Information on the scenic byway program in the state of Arkansas was provided by the Chief of Planning with the Arkansas Highway and Transportation Department (AHTD). In preparing their response to the survey, the AHTD noted that scenic highway designation in Arkansas involves 1) the posting of scenic byways signs located below existing route markers, and 2) the provision of a unique symbol noted on these highways on state maps.

It was further reported that the actual signing of a scenic byway in Arkansas occurs a year after the designation of the highway. Three locations were identified for this survey.

One final comment from the AHTD was that their ADT figures represent weighted traffic counts.

SH 10 - This route was designated in 1981 and has as its principal attractions the Ouachita and Ozark National Forest, Fort Chaffee Military Base and Blue Mountain Lake.

The ADT's (weighted) before and after this route was designated are:

	Yearly	Peak Season
1981	2,010	n/a
1990	2,300	n/a

The percentage of ADT's attributed to tourism on this route is estimated at 10% for 1981; comparable data were not provided for the year 1990. The average regional growth is given as 2%. SH 10 is located 21 miles from Fort Smith, the nearest urban area.

Data were not available on the mix of vehicle types using this facility or the average driver age to determine if designation has had any effect on either of these variables. No particular trend in vehicle mix was noted.

SH 12 - This roadway was designated as a scenic byway in 1989. Its principal attractions include Beaver Lake, Hobbs Management Area, War Eagle Creek and Mill, and the War Eagle Craft Fair. SH 12 is located in the city of Rogers, which is an urban area.

A comparison of the ADT's (weighted) before and after designation is:

	Yearly	Peak Season
1989	1,650	n/a
1990	2,280	n/a

An estimated 40% of the ADT's is given for travel associated with tourism in 1989; data were not available for 1990 to provide for comparisons. Average growth in the region of this facility is 2%.

Because the percentage increases in ADT's were very significant on SH 12, additional contact was made with the state agency to further evaluate the effects of designation. The Arkansas Highway and Transportation Department reported that this facility is located in the fastest growing area in the state, with tourism also on the increase. However, it could not be determined what percentage of the increase in tourism could be considered a direct effect of designating this highway.

It is not possible to evaluate other changes in vehicle or driver characteristics since data have not been collected on the mix of vehicle types or the average driver age. Again, AHTD has not observed any trend in the mix of vehicle types.

SH 22 - This route was designated in 1985 because of its proximity to Lake Dardanelle and the Subiaco Monastery.

The ADT's (weighted) before and after this route was designated are:

	Yearly	Peak Season
1985	2,040	n/a
1990	2,840	n/a

The State attributes 10% of these ADT's to tourism travel in 1985; similar data were not available for 1990. The average growth rate in the region is reported at 2%. SH 22 is located approximately 4 miles from the nearest urban area.

There were no statistics available on either the mix of vehicle types or the average driver age on this road.

Maine

The Bureau of Planning within the Maine Department of Transportation reported on one scenic byway for consideration. Data maintained by this bureau include only ADT statistics. Information concerning tourism travel has never been collected.

SR 4 - This highway was designated in 1982 and spans for nearly 20 miles. SR 4 provides access to numerous recreational and aesthetic attractions, including the Appalachian Trail, Cascades, Rangeley Lake, Rangeley Lake State Park, and mountain views.

The ADT's for this facility were collected before and after its designation at five locations along the 20 mile stretch. The statistics are:

	Yearly
1982	1,071
1985	1,500
1982	1,589
1985	1,715
1982	795
1985	1,125
1989	1,610

City Cove is a small urban area located along SR 4. The nearest urban area from City Cove is 43 miles away.

The general perception at the Bureau of Planning is that the formal designation of scenic byways has not changed travel behavior. The program in the state of Maine involves the posting of signs and minimal promotion activities.

Oregon

Data on the scenic byways in Oregon were provided by the Oregon Department of Transportation, Highway Division. Two designated scenic byways were reported, both having been designated in 1989

Crown Point Highway - The principal attraction of this facility is Multnomah Falls.

The before and after ADT's for this route are:

	Yearly	Peak Season
1985	517	981
1988	448	760

The Oregon Department of Transportation maintains good records on vehicle classifications on many of their highways; and this data was used to produce a conservative estimate of the percentage of ADT's associated with tourism travel. The categories used to identify tourism travel were limited to out-of-state passenger cars and campers/light trucks. Statistics also were available on the percentage of Oregon state passenger cars; however, it was difficult to determine the percentage of these vehicles that were on the road for tourism travel.

Based on this methodology of identifying vehicles associated with tourist travel, it was estimated that in 1985 at least 17% of the ADT's were tourist-related, and in 1988 at least 21%. An estimate for the percentage of ADT's associated with tourism during the peak season was not available.

Regarding the mix of vehicle types on this roadway, a staff member of the Oregon Department of Transportation has observed a slight increase in out-of-state vehicles.

The Oregon DOT reports that there is no growth in this area, and possibly negative growth. The nearest urban area is located two miles from Crown Point Highway. Statistics on average driver age are not available.

U.S. 30 (LaGrande-Baker Highway) - The principal attraction of this scenic byway is its vegetation.

The ADT's before and after this route was designated are:

	Yearly	Peak Season
1985	734	948
1988	779	901

Based on the methodology previous described, it was estimated that at least 6.5% of the ADT's are associated with tourism travel in 1985. No data were available for the year 1988. Although peak season ADT data were provided, an estimate for the percentages attributable during peak seasons was not available.

Based on a review of the data, there was no significant change in the mix of vehicle types on U.S. 30 before and after its designation as a scenic byway. The average annual regional growth in the vicinity of this byway has been approximately 1.5% in recent years, and 3.5% over the past 10 years. No data were available on the average driver age on this facility.

U.S. 30 is located about one mile from Baker, the nearest urban area.

South Carolina

The South Carolina Highway Department provided data on two designated scenic routes: Andrew Pickens Scenic Parkway and US 278. These corridors were selected from among a total of 18 scenic byways because of the availability of data for these two locations. The highway department noted that there were no provisions for full-time counters at any locations.

Andrew Pickens Scenic Byway (SC 11) - This route was designated in 1971, and its main attractions are the view of the Smokey Mountains and roadside vegetation.

The ADT's for this route before and after official designation are:

	Yearly	Peak Season
1969	325	n/a
1971	506	666

As reported by the South Carolina Highway Department, the explanation of the significant increases in ADT's on SC 11 is that this facility was newly-constructed around the time of its designation. Therefore, the

increases in ADT's most probably represented traffic diverted from other roads for purposes of general travel. Also, although the percentage increase on this road was nearly 28% a year immediately following its designation, it should be noted that volumes remained very low, with an ADT of 506 after designation.

The State attributes 20% of the ADT to tourism travel throughout the year and during peak seasons. It is estimated that the average growth in the region is 5% per year, where growth refers to an increase in through traffic. The peak season at this location varies. The facility is located approximately 7 miles from Seneca, a small urban area, and 26 miles from Anderson, a larger urban center.

The State does not maintain data on vehicle types and driver age.

US 278 - This route was designated as a scenic byway in 1978. It is the entranceway to Hilton Head resort/conference center and a beach area.

The "before" and "after" ADT's for this route are:

	Yearly	Peak Season
1976	5,281	5,786
1978	8,010	9,279

It was reported that the significant increase in ADT's on U.S. 278 was probably due to new land development in the Hilton Head area.

The South Carolina Highway Department estimates that 20% of the ADT's is attributed to tourism. The average regional growth rate is reported at 5%, although the statistics on current ADT's on US 278 indicate that the rate of growth for this roadway is higher. US 278 is located about 17 miles from the nearest urban area.

No data is available on the mix of vehicle types on this highway, or any trends in average driver age.

Washington

In the state of Washington, all scenic roads, with only one exception, were designated in the year 1967. There is very minimal promotion of scenic byways, according to the Washington State Department of Transportation. For this study, they have provided information on three scenic byways, all designated in 1967.

Stevens Pass - The principal attractions of this scenic byway are its mountain scenery, Tumwater Canyon, and Stevens Pass, as well as its access to winter skiing.

The ADT's before and after this route was designated are:

	Yearly	Peak Season
1966	3,600	4,300
1967	3,850	4,700

It was estimated that in 1966 twenty-five percent (25%) of the ADT's were attributed to tourism travel; the following year, the estimate increased by one percent. During the peak season of 1966, it was estimated that 29% of the ADT's were associated with tourism, while in 1967 the figure increases to 40%.

The average growth rate in this region is given as 6% over the past ten years. The nearest urban area is located 50 miles from Stevens Pass.

Since designation occurred 23 years ago, any changes in the mix of vehicle types cannot be attributed to designating a facility as a scenic byway. No data were available on the average driver age on Stevens Pass, however, it has been noted that the number of younger drivers participating in ski activities is increasing in the winter months. Also, the Washington State DOT has observed that during the spring and fall more seniors tend to be using the highway. These changes are not related to designation status, according to this department.

Olympic Loop Highway (U.S. 101) - This route serves as access to several entrances of the Olympic National Park and is proximate to Hood Canal. The Olympic Loop Highway is located 30 miles from the nearest urban area.

A comparison of the ADT's before and after designation is:

	Yearly	Peak Season
1966	2,000	3,500
1967	2,100	3,700

An estimated 30% of the ADT's were attributed to tourism in 1966; the following year, after designation, the percentage increased to 31%. During peak season in 1966, the percentage attributed to tourism travel was 30%, while the following year, estimates were at 31%. The present estimate of the percentage of ADT's during peak season has been restored to 40%.

The average regional growth rate is reported at approximately 3% over the past ten years. No data are available on the mix of vehicle types using this facility. There also are no data on the average driver age in this area. However, it has been observed by Washington DOT personnel that there is an increase in the driver age and an increase in tourists. These changes are not assumed to be related to the act of designating this roadway as a scenic byway, but rather to changes in travel patterns over a 23 year period.

Sanpoil Scenic Byway (SR 21) - The Sanpoil Scenic Byway has as its major attraction the Sanpoil River Valley, and this route provides panoramic views of the area. This facility is located 80 miles from

Spokane, the nearest urban area.

The before and after ADT's for this route are:

	Yearly	Peak Season
1966	400	500
1967	400	550

In 1966, it was estimated that 35% of the ADT's were associated with tourism travel; during the peak season of that same year it was estimated that 44% of the ADT's were associated with tourism. The average growth rate in the region is given as 2%.

The Washington DOT does not maintain data on the mix of vehicle types or the average driver age. However, their field observations are that there is less logging activity, and an increase in the numbers of recreation vehicles and trailers. The overall perception is that there is an increase in the number of senior drivers during the spring and the fall.

SUMMARY AND CONCLUSIONS

Table 1 summarizes the "before and after" traffic volume data for the 11 scenic byways. For each byway, the percent increases over the measurement time period and corresponding yearly averages are provided. The average yearly increase then may be compared to the average growth rate for other similar roads in the area not designated as scenic byways (last column).

Of the ten byways for which there is growth rate information, eight showed an increase that could be associated with byway designation. Of the eight showing an increase, the increases ranged from .7% to 38% annually. Seven of the eight byways had annual increases in excess of the average annual growth rate. The average percentage increase over the average growth rate for the six byways was 12.6%. The range was from .4% to 36.2%.

The average percentage increase could be useful as a planning tool <u>if</u> there are reasons to suspect increases due to land development or to traffic diverted to a new road. In the absence of land development or a new road, increases due to tourist related travel are questionable. (Approximately thirty-five percent of the byways did not experience growth greater than the average for the area.) Consequently, no increases above average growth rates should be assumed.

This conclusion has been the judgment of all persons interviewed. Unanimously, respondents felt that other factors associated with activity centers rather than formal designation are responsible for any increases in travel.

Table 1.
COMPARATIVE STATISTICS ON TRAVEL FOR DESIGNATED SCENIC BYWAYS

STATE Scenic Byway	Year	ADT	Peak ADT	Change/ Percent	%/Year	Growth Rate
ARKANSAS						
SH 10	1981	2,010		290/		
	1990	2,300		6.4	0.7	2
SH 12	1989	1,650		630/		
	1990	2,280		38.2	38.2	2
SH 22	1985	2,040		800/		
	1990	2,840		39.2	7.8	2
MAINE*						
SR 4	1982	1,152		295/		
	1985	1,447		25.6	8.5	
OREGON						
Crown Point	1985	517	981	(decrease)	(decrease)	
	1988	447	760	-	-	0
U.S. 30	1985	734	948	45/		
	1988	779	901	6.1	2.0	1.5
SOUTH CAROLINA						
SC 11	1969	325		181/		
	1971	506	666	55.7	27.8	5
U.S. 278	1976	5,281	5,786	2,729/		
	1978	8,010	4,279	51.7	25.8	5
WASHINGTON						
Stevens Pass	1966	3,600	4,300	250/		
	1967	3,850	4,700	6.9	6.4	6
U.S. 101	1966	2,000	3,500	100/		
	1967	2,100	3,700	5.0	5.0	3
S.R. 21	1966	400	500	0/		
	1967	400	550	0	0.0	2

* Traffic counts were taken at three locations along this facility, and these figures represent the average of these ADT's.

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