Yosemite car ban stalled for good

Parking: Traffic jams mar recreation areas

JUL 3 1990

'89 NPS Statistical Abstract Points Up Shifts, Changes in Visitations

Popularity of parks threatens to pave them over

Travelers Increasingly Favor Weekend Trips, Survey Finds

TRAFFIC MANAGEMENT

Crowd Figures Rile Readers

Off-road vehicles jam beaches

Dollar figures route for travelers this year

Americans pummel parks with conflicting goals

VOICES/Do you like the way the national parks are run?

Nature lovers, off-road vehicle users collide

United States Department of the Interior

NATIONAL PARK SERVICE
P.O. BOX 37127
WASHINGTON, D.C. 20013-7127

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

June 26, 1990

Memorandum

To: Park Superintendents

From: Assistant to the Director for Science and Technology

Subject: TRAFFIC MANAGEMENT

Questions relating to traffic management long have plagued NPS managers ..... congestion, safety, roadside parking, too many vehicles, efficient movement of visitors, the need for some form of public conveyance, local commercial and commuter traffic, optimization of the visitor experience, etc.

Dr. Robert Manning, a social scientist at the University of Vermont, conducted a combination traffic flow experiment and survey for Acadia National Park to assess visitor and local resident reactions to introduction of a one-way loop road within the Park, as a possible replacement for conventional two-way traffic flow. I think you may find the results of Dr. Mannings' study interesting in that it deals with a broad range of traffic issues and suggests a technique for providing information for Superintendents about those matters. Most of the changes recommended in the Acadia study have been implemented successfully by the Park.

A summary of Dr. Mannings findings is attached. Those who wish to review a copy of the full study report may contact the author at (802) 656-2684.

Richard H. Briceland

NO TWO WAYS ABOUT IT: AN EXPERIMENT IN PARK TRAFFIC PATTERNS

Robert E. Manning
Recreation Management Program
School of Natural Resources
University of Vermont

How many times have you heard it said that there aren't too many people in the parks, but too many cars? Traffic congestion has become a perennial problem in the parks. There are a number of potential solutions to the problem, including use limits, automobile entrance or parking fees, and mass transit systems.

Among the simplest of solutions is creation of one-way traffic patterns. Redesignation of two-way streets to one-way has been a standard practice of traffic engineers in urban areas for decades. It is well accepted that one-way roads can accommodate heavier traffic flows. But park management is more than engineering. How do one-way roads affect visitors and "the park experience"? For example, do one-way traffic patterns inconvenience visitors to an unacceptable degree? Or, do one-way roads ease congestion enough to allow more attention to be devoted to park enjoyment? We decided to conduct an experiment to find out the answers to these and other questions.

The experiment was conducted at Acadia National Park in Maine. Acadia is one of the most heavily used national parks in the nation. But Acadia's popularity, combined with its relatively small size, often results in congestion. This is especially the case along the "loop road," a twenty mile roughly oval roadway designed by the National Park Service to connect many of the prime scenic attractions in the park. Over a decade ago the Park Service designated about half of the loop road as one-way to ease congestion and improve traffic safety conditions. Recently the Park Service proposed changing the remainder of the loop road from two-way to one-way travel.* However, this proposal was met with some concern and an environmental assessment was conducted. Part of this assessment involved exploring the effects of this

*An approximately one half mile section of the loop road connecting to the spur road on Cadillac Mountain would remain two-way under this proposal.

proposal on park visitors and the quality of their experience.

The experiment involved a test implementation of the proposed road changes. During one week in August the proposed road changes were put into effect. During the following week the road system was returned to its normal traffic pattern. During both weeks visitors along the loop road were sampled and interviewed about their reaction to the loop road system. Variables addressed in the interview included visitor perceptions of traffic congestion and safety, enjoyment and appreciation of the park, and attitudes about the proposed traffic changes. Sampling was conducted each day over the two-week period from 7:00 am to 7:00 pm. Interviews were conducted with 858 motorists and 184 bicyclists.

Major findings from the study are shown in Table 1. The vast majority of both motorists and bikers were visitors to the park, not residents of Mt. Desert Island. Moreover, the percent of residents using the loop road did not decline to a statistically significant degree when the traffic pattern was changed to one-way. This is important because some of the concern over the proposed loop road changes involved residents of Mt. Desert Island. Acadia National Park is located on Mt. Desert Island and comprises about half the Island. The other half of the Island is comprised of four communities. Residents of these communities sometimes use portions of the loop road for business or other travel around the Island. Some residents felt the proposed loop road changes would inconvenience them to the extent that it would no longer be feasible to use the loop road for such travel. Results from the experiment indicate that this may be true only to a very limited extent. The percent of Island residents using the loop road under one-way conditions declined approximately five percent, but this was not a statistically significant change. Some residents who use the loop road for purely business or other non-recreational purposes may have shifted to other non-park roads due to the experimental one-way traffic pattern. But many residents use the loop road for recreational purposes and this use is apparently unaffected by the proposed loop road changes.

The remaining items in Table 1 are evaluative measures of loop road conditions. Respondents were stopped and interviewed at the point at which

they had just finished travelling the section of loop road affected by the proposed one-way change. Respondents were asked to consider the questions as they applied to the section of road they had just travelled. It is clear from the results that the one-way traffic pattern substantially enhances the quality of the park experience for visitors. Motorists, for example, evaluated traffic congestion and safety conditions as better, to a statistically significant degree, under the one-way traffic pattern as opposed to the normal two-way pattern. They also felt their ability to stop, park and view the scenery was enhanced with the one-way traffic flow. And, in fact, motorists did report stopping more often to enjoy the park under one-way road conditions.

The same relationship held with other evaluation variables including ability to relax and enjoy the park, problems in getting "caught" or "stuck" behind very slow moving vehicles, sharing the road with bicyclists, pleasantness of trip, and attractiveness of the affected section of loop road. Motorists also felt that the proposed change in the loop road inconvenienced them less as they actually experienced this change than when it was explained to them in a hypothetical way. They also favored the proposed changes more strongly as they actually experienced the conditions created. The only two variables which were not rated more favorably by motorists in the one-way experiment were problems in sharing the road with hikers or people walking and the attractiveness of the loop road overall. However, responses to these two variables were so uniformly high for the sample as a whole that statistically significant differences between subsamples would be difficult to detect.

Bicyclists' evaluations of loop road conditions were similar to those of motorists. Bicyclists who travelled the loop road under one-way conditions rated their experience as significantly better on five of the evaluation items than did those who travelled the loop road under the two-way traffic pattern. The five evaluation items were traffic congestion; safety conditions; ability to stop, park and view the scenery; ability to relax and enjoy the park; and problems in sharing the road with automobiles.

Several conclusions can be drawn from this study. First, one-way traffic patterns can substantially enhance the quality of the visitor experience. Under the one-way traffic pattern, visitors to Acadia felt less congested and

perceived traffic conditions as safer. Visitors were less likely to experience the frustration of getting "stuck" behind very slow moving vehicles and there were fewer conflicts between motorists and bicyclists. And visitors were able to stop and enjoy the park more often and more intensely. In other words, the one-way traffic pattern reduced the distraction of automobile traffic and allowed visitors to place more attention on enjoying the park.

Second, visitor impressions of one-way traffic patterns seem to improve markedly as they actually experience these conditions. Although most visitors favored the one-way traffic pattern as it was described to them, their favorability rating increased substantially as they drove the loop road in its proposed one-way pattern. Visitors also found the one-way traffic pattern to be less inconvenient than they had originally thought. Experiments of the type described in this article may give more accurate readings of visitor feelings toward proposed park changes.

Finally, one-way traffic patterns may cause some inconvenience to local residents. Residents of Mt. Desert Island viewed the proposed road changes less favorably than did park visitors. However, use of the loop road by residents did not decrease significantly during the one-way experiment. Moreover, resident use of the loop road constitutes a small minority of all traffic carried by the loop road. Some inconvenience caused to local residents seems a small price to pay for a substantial enhancement in the quality of the visitor experience. This is especially so considering the underlying purpose of parks.

Based on this study, it is recommended that one-way traffic patterns be given serious consideration in parks where such patterns are feasible. One-way traffic patterns can not only reduce traffic congestion from an engineering standpoint, but can also substantially enhance the park experience. Relatively simple experiments of the type described in this article can help determine the effects of such changes.

Table 1. Type of visitor and evaluation of loop road conditions.

Variable	Motorists		Bicyclists	
	Two-way traffic	One-way traffic	Two-way traffic	One-way traffic
	(Percent)			
Type of visitor				
Local resident	14.1	9.8	16.7	21.3
Park visitor	85.9	90.2	83.3	78.7
Traffic congestion*				
Very good	45.6	71.3	32.9	51.6
Good	48.7	27.0	52.6	41.1
Bad	4.7	1.5	12.9	5.3
Very bad	0.9	0.2	1.2	2.1
Safety conditions*				
Very good	32.0	55.9	15.3	43.2
Good	59.8	40.9	37.6	48.4
Bad	7.8	2.7	44.7	7.4
Very bad	0.5	0.5	2.4	1.1
Ability to stop, park and view the scenery*				
Very good	22.8	62.2	38.1	64.2
Good	57.9	35.1	52.4	31.6
Bad	17.9	2.5	9.5	4.2
Very bad	1.4	0.2	0.0	0.0
Ability to relax and enjoy the park				
Very good	33.9	62.3	25.9	56.8
Good	56.5	34.1	58.8	40.0
Bad	8.9	3.2	15.3	3.2
Very bad	0.7	0.5	0.0	0.0
Problem in getting "caught" or "stuck" behind very slow moving vehicles**				
Big problem	8.0	1.5	3.6	1.1
Small problem	34.4	13.6	13.1	12.6
No problem	57.6	84.9	83.3	86.3
Problem in sharing the road with bicyclists (automobiles)*				
Big problem	6.6	2.7	18.8	3.2
Small problem	31.8	12.8	55.3	32.6
No problem	61.6	84.4	25.9	64.2

(continued)

Table 1. (continued)

Variable	Motorists		Bicyclists	
	Two-way traffic	One-way traffic	Two-way traffic	One-way traffic
	(Percent)			
Problem in sharing the road with hikers or people walking				
Big problem	1.2	1.0	0.0	1.1
Small problem	8.2	4.7	4.8	2.1
No problem	90.6	94.3	95.2	96.8
Pleasantness of trip				
Very pleasant	50.2	72.4	55.3	69.5
Pleasant	49.1	24.9	43.5	27.4
Unpleasant	0.7	1.0	0.0	0.0
Very unpleasant	0.0	1.7	1.2	3.2
Frequency of pulling over and stopping to enjoy the park**				
Often	21.9	41.1	24.7	36.8
Occasionally	42.4	33.3	43.5	35.8
Never	35.8	25.6	31.8	27.4
Attractiveness of this section of the loop road**				
1 = Ugly	0.0	0.0	0.0	0.0
2	0.5	0.2	1.2	0.0
3	7.6	6.2	6.0	4.2
4	33.4	25.6	27.4	31.6
5 = Beautiful	58.5	67.9	65.5	64.2
Attractiveness of loop road overall				
1 = Ugly	0.0	0.5	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	1.3	0.0	1.1
4	9.6	7.7	7.1	7.6
5 = Beautiful	90.4	90.5	92.9	91.3
Inconvenience caused by loop road changes**				
Big inconvenience	12.4	5.2	9.4	5.3
Small inconvenience	24.0	14.9	12.9	7.4
No inconvenience	63.7	79.9	77.6	87.4

(continued)

Table 1. (continued)

Variable	Motorists		Bicyclists	
	Two-way traffic	One-way traffic	Two-way traffic	One-way traffic
	(Percent)			
Attitude toward loop road changes**				
Very good idea	33.8	54.0	49.4	66.3
Good idea	43.2	36.3	35.3	25.3
Bad idea	16.2	6.2	11.8	5.3
Very bad idea	6.8	3.5	3.5	3.2

* Statistically significant differences ($p \leq .05$) for both motorists and bicyclists between two-way and one-way conditions as determined by chi square.

** Statistically significant differences ($p \leq .05$) for motorists between two-way and one-way conditions as determined by chi square.