Journal of Transport Geography 17 (2009) 491–499

Contents lists available at ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo

Transportation and recreation: a case study of visitors driving for pleasure at Acadia National Park

Jeffrey C. Hallo [a,*], Robert E. Manning [b]

[a] Department of Parks, Recreation and Tourism Management, Clemson University, 280B Lehotsky Hall, Clemson, SC 29634, USA
[b] Rubenstein School of Environment and Natural Resources, University of Vermont, Aiken Center, Burlington, VT 05405, USA

ARTICLE INFO

Keywords:
Recreation
Indicators
Motorized recreation
Scenic driving
Transportation quality
Acadia National Park

ABSTRACT

Automobiles and roads are as much of a way of experiencing national parks as they are a means of conveyance. This study examines experiential aspects of transportation on Acadia National Park's primary scenic road – Ocean Drive. Interviews with vehicle-based road users were conducted to identify indicators to measure and manage experiential quality on Ocean Drive. Also, a survey was conducted to make comparisons with important variables identified on "transportation-only" urban roads. Results suggest that (1) Ocean Drive is important to park visitors' experience; (2) experiential indicators for Ocean Drive include vehicle crowding, scenery, and travel freedom/convenience; and (3) experiential aspects of transportation on scenic roads in parks may differ substantially from urban roads. Study findings suggest a need to deliberately and thoughtfully plan and manage for quality recreational experiences on roads in national parks and related areas.

1. Introduction

The social movement to create a system of national parks in the US began before emergence of the automobile, and visitors to the first national parks arrived predominantly by train (Runte, 1997). However, as the national park movement gained momentum in the early 1900's, automobiles began to be used by many national park visitors. This growth in automobile use in parks and elsewhere led to a substantially increased mobility of people in the US and worldwide. Today ownership and use of automobiles are an established norm of modern society (Flamm and Kaufmann, 2006), long-distance trips to parks are commonplace, and automobiles are now the primary way that most visitors experience national parks (National Park Service (NPS), 1999). Approximately 273 million visits were accommodated in the US national parks in 2006 (NPS, 2007), and the vast majority of visitors arrived in personal vehicles and traveled through parks on roads designed for cars.

Automobiles are both a form of transportation and a mechanism for experiencing national parks. Park visitors use automobiles to access attraction sites or to travel to a location to participate in an activity. However, studies have consistently suggested that large numbers of people in the US also enjoy driving for recreational purposes (Manning, 1999). Recently, "driving for pleasure" was ranked as one of the most popular recreational activities in the US (National Survey on Recreation and the Environment (NSRE), 2000–2002). Some NPS units (e.g., national parkways) were even explicitly established and designed to provide recreational driving experiences within scenic natural landscapes of the US (Havlick, 2002).

The study described in this paper examines the recreational driving experience at Acadia National Park, Maine. Objectives of the study were to (1) determine the importance of Ocean Drive to the "park experience"; (2) gather data to help identify indicators of quality for the recreational driving experience; and (3) explore differences between the concept of quality for recreational driving and "transportation-only" driving.

2. Literature review

2.1. Transportation experiences in parks

The concept of mobilities examines "movements of people, objects, capital and information across the world, as well as the more local processes of daily transportation, movement through public space and the travel of material things within everyday life" (Hannam et al., 2006). Many studies of visitors' use of transportation in parks fits within the context of micro-scale research on mobilities by examining the spatial and temporal characteristics of visitors' movement on public lands. However, some

* Corresponding author. Tel.: +1 864 656 3237; fax: +1 864 656 2226.
E-mail addresses: jhallo@clemson.edu (J.C. Hallo), robert.manning@uvm.edu (R.E. Manning).

0966-6923/$ - see front matter © 2008 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jtrangeo.2008.10.001

research on transportation in parks has gone beyond the critical issue of visitor mobilities to examine visitors' experience during movements throughout a park.

Transportation and the experience of visiting a national park are inextricably linked, with scenic park roads, scenic vistas, and related facilities serving as primary areas for visitation (NPS, 1999; Turnbull, 2003). In fact, establishment of Olympic, Mount Rainier, and North Cascades National Parks were greatly influenced by roads and visitors who wanted to use roads to experience these natural areas in their cars (Louter, 2006). Other NPS sites like the Blue Ridge Parkway were designed to appeal almost exclusively to scenic drivers (Jolley, 1969). Also, transportation is sometimes a form of recreation that people pursue in parks. For example, Davenport and Borrie (2005) stated in a study at Yellowstone National Park that snowmobiling provided "highly meaningful recreational experiences, grounded in appreciating the park's unique natural features and attributes." However, snowmobiling was not perceived by users as the experience itself. Instead, snowmobiles gave users freedom, access, and a close and intimate connection with the park that would not have been possible otherwise.

Transportation-related problems have now emerged in many NPS areas. The NPS transportation planning guidebook (1999) states that use of park roads has resulted in congestion, air and noise pollution, physical deterioration of roads, and degradation of natural and cultural resources. All of these impacts directly relate to visitors' ability to enjoy national parks. Intensive roadway use at Yosemite, Grand Canyon, Denali, Zion, Bryce Canyon, Hot Springs, and Rocky Mountain National Parks (and several other NPS sites) has caused managers to implement public transit systems to alleviate transportation problems (Dunning, 2005; NPS, 1999; Turnbull, 2003). These transit systems are intended to decrease congestion, improve visitor safety, and reduce environmental impacts (Dunning, 2005). The 2001–2005 NPS Strategic Plan lists both transportation planning and alternative transportation systems (ATS) as strategies for protecting park resources and providing for the enjoyment of visitors (NPS, 2000).

Most studies of vehicles and roadway use in national parks have focused on environmental impacts. For example, the effects of vehicle traffic on wildlife have been studied in Denali National Park (Burson et al., 2000) and at several national seashores (Melvin et al., 1994). (For a review of ecological impacts of roads see Forman et al., 2003). Less emphasis has been placed on empirical studies of the recreational driving experience. However, some research has begun to examine experiential aspects of vehicle use in parks, for visitors using either personal vehicles or ATS (e.g., buses) to see national parks.

Two studies examined the effects of the number of private vehicles on visitor experiences. A survey of Blue Ridge Parkway motorists showed that roadway congestion degraded the visitor experiences. This study went on to determine that an average of 56 cars per mile was the maximum acceptable level of use for respondents (Park Studies Laboratory, 2002). Another study of vehicle crowding at the Schoodic Peninsula portion of Acadia National Park found that on average 40 cars per mile was considered the maximum acceptable level of use by survey respondents (Manning et al., 2002). These respondents also indicated that if use levels exceeded 70 cars per mile, it would (on average) displace them from this area. These studies suggest that experiential aspects of transportation (e.g., too many vehicles on park roadways) may substantially reduce the quality of the visitor experience.

Other studies have examined experiential aspects of visitors who use ATS or Intelligent Transportation Systems (ITS) in national parks. In one study, qualitative interviews were conducted with visitors to Yosemite National Park who used the park-sponsored ATS (i.e., shuttle bus) (White, 2007). Analysis of interview text showed that factors that may influence ATS users' behavior or perspectives include perceived freedom of travel, access, flexibility of travel, and crowding. However, results from interviews with park visitors at several NPS sites suggested use of ATS itself may influence the visitor experience (particularly where road access is available to visitors) by reducing pleasure driving opportunities, convenience, and the ability to carry recreational equipment and related belongings (Dilworth, 2003).

Another study used a quantitative survey to examine the effects of ITS on vehicle-based visitors to Acadia National Park (Daigle and Zimmerman, 2004a, 2004b; Zimmerman et al., 2003). Respondents to this survey indicated that they were most concerned about unsafe conditions caused by vehicles parked along the road, the number of automobiles, and automobile-related impacts on air quality. Survey results also indicated that ITS at Acadia (e.g., electronic signs displaying real-time parking and ATS schedule information) has made it easier for visitors to travel around the park and to avoid parking and traffic congestion. This suggests that ITS may be useful for protecting visitor experiences by preserving natural resources (e.g., keeping vehicles from parking in unauthorized areas or keeping visitors at areas intended for use) and reducing congestion.

Some studies have examined factors influencing recreational driving, but not necessarily in park settings. For example, attributes involved in driving a travel route such as directness, safety, congestion, and distance traveled, were found to be of most concern to drivers on scenic byways (Eby and Molnar, 2002). Also, transportation options like scenic byways that provide an entertaining or pleasant experience affected tourists' choice of travel routes. Similarly, a study of physical, aesthetic, and amenity preference of tourists on roads in the state of Minnesota suggested that roads have a unique character that is recognized by drivers (Gartner and Erkkila, 2004). Attributes of roads related to scenic or environmental qualities were highly valued by respondents in this study. A survey in the state of Connecticut, confirms the importance of natural features (which rated highest), but also indicated the importance of cultural aspects to scenic route users (Kent, 1993).

2.2. Concepts of quality

The Highway Capacity Manual (HCM) is a widely used reference for roadway planning that defines transportation quality according to six "levels of service" (LOS), labeled A through F (Transportation Research Board (TRB), 2000). The concept of quality in the field of transportation is predominantly determined by measures associated with travel efficiency. For example, LOS A is characterized by completely unimpeded traffic flows, and LOS F is described by conditions where traffic ceases to flow (i.e., gridlock). This is measured on a two-lane scenic or recreational road by determining the percent of time a vehicle spends following another vehicle. For example, LOS A is characterized by less than 40% of time spent following another vehicle, and LOS E occurs when a vehicle spends greater than 85% of time following another vehicle. LOS F occurs when traffic flows are greater than a road's capacity and vehicle travel ceases.

The HCM and its LOS framework provide an intuitive and useful approach for addressing the concept of quality in transportation. However, is the HCM's LOS framework appropriate for roads planned and managed for recreational driving? Is quality on recreational roads best represented by efficiency-oriented variables like percent of time spent following another vehicle?

Answers to these questions might be informed by the concept of quality as considered in contemporary park and recreation planning frameworks. These frameworks include Limits of Acceptable Change (LAC) (Stankey et al., 1985), Visitor Impact Management (VIM) (Graefe et al., 1990), and Visitor Experience and Resource