Denali Park Road Visitor Survey 2010
--Final Report--

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Introduction

National parks contain natural, cultural, and recreational resources of great importance to the nation and, in many cases, to the international community. Given the significance of this resource base, public demand to see and experience these areas is not surprising. Data on visitation to the national park system dramatically support this premise. Visits to the national park system now total nearly 300 million per year.

The popularity of the national park system presents substantial management challenges. Too many visitors may cause unacceptable impacts to fragile natural and cultural resources, and may also cause crowding and other social impacts which degrade the quality of the visitor experience. How many visitors can ultimately be accommodated in a park or related area? How much resource and social impact should be allowed? These and related questions are commonly referred to as carrying capacity (Manning 2010; Stankey and Manning 1986; Shelby and Heberlein 1986; Graefe et al. 1990; Manning 2007).

The Denali Park Road is a good example of the issue of carrying capacity. This road is the primary way that most visitors experience the park. Visitors travel most of the road by bus, on either a park-sponsored Visitor Transportation System (VTS) bus or a commercial tour bus. Denali's 1986 General Management Plan established a use limit of 10,512 vehicle trips annually on the road to protect the natural environment and the quality of the visitor experience. However, the demand for vehicle trips is now approaching this limit, and this has created a need to reexamine this issue.

The National Park Service (NPS) has developed a carrying capacity framework titled Visitor Experience and Resource Protection (VERP) (National Park Service 1997; Manning 2001). As the name suggests, this planning framework is aimed at maintaining the quality of the visitor experience and protecting natural and cultural resources in the face of increasing visitor use. VERP is built upon the same basic principles and concepts that drive other contemporary carrying capacity and related planning/management frameworks, including Limits of Acceptable Change (Stankey et al. 1985), and Visitor Impact Management (Graefe et al. 1990).

Application of VERP can be supported by a program of research. For example, information on visitor use and associated impacts can help inform the planning process. Research can also guide formulation of indicators and standards of quality for natural/cultural resources and the visitor experience. Indicators of quality are measurable, manageable variables that help define the quality of natural/cultural resources and the visitor experience. Standards of quality define the minimum acceptable condition of indicator variables. Research suggests that visitors often have norms or standards about the resource and social conditions acceptable in a park or related area, and that such norms can be useful as a means of formulating indicators and standards of quality (Shelby and Heberlein 1986; Shelby et al. 1992; Manning et al. 1996a; Manning et al. 1996b; Manning 2007; Manning 2011).

VERP was initially applied to Arches National Park as a test case and a model for other units of the national park system (Hof et al. 1994; Manning et al. 1996b; Manning et al. 1993; Lime et al. 1994; Manning et al. 1995). This application resulted in a carrying capacity management plan that has now been implemented at that park (National Park Service 1995). Additional applications of VERP have been conducted and are now proceeding at selected units of the national park system (Manning 2007).

The purpose of this study was to gather information that will help support application of VERP to the Denali Park Road. In particular, the objectives of this study were to help identify indicators and standards of the quality for the visitor experience on the Denali Park Road. Specifically, previous research identified a series of potential indicators and standards of quality for the visitor experience on the Denali Park Road. Indicators were identified in a series of interviews conducted with several types of Denali Park Road users. Resulting indicators include 1) the number of buses per viewscape along the road, 2) the number of buses at wildlife stops, 3) the number of buses at rest stops, and 4) the chance of seeing wildlife, particularly grizzly bears. Standards of quality for these indicators were measured in a follow-up survey in which respondents reported the minimum acceptable condition for these indicator variables using several evaluative dimensions.

A remaining issue concerns the relative importance of indicator variables and how this affects attitudes and preferences for management alternatives that might be applied to the Denali Park Road. The purpose of this study is to address this issue through application of stated-choice analysis. Additional information about management of the Denali Park Road experience, and visitor and trip characteristics was also collected to help inform park management.

Research on recreation has identified three dimensions of the recreation experience: resource, experiential and managerial. Examples of the resource dimension include root exposure on a trail caused by recreational use, and the amount of impact to vegetation caused by visitors walking off the trail. An example of the experiential dimension includes the number of other people within sight of visitors on or off the trail. Examples of the managerial dimension include bog bridging used to prevent or minimize visitor impacts on the trail, and methods used to keep visitors on the designated trail like trail signs or trail borders.

Normative research methods have been used to address a range of recreation management issues. These include crowding in numerous forms, ecological impact, and management practices (Manning 2007). The normative approach in recreation research involves the formulation of management objectives, selection of indicators of quality, and formulation of standards of quality for selected indicator variables. Management objectives are broad, narrative statements defining the type and quality of recreation conditions to be maintained. Indicators of quality are more specific, measureable, manageable variables reflecting the essence or meaning of management objectives. Standards of quality define the minimum acceptable condition of indicator variables (Manning et al. 1995; Manning 1997; National Park Service 1997; Manning 1999; Manning 2007; Manning 2009; Manning 2011).

Traditionally, studies designed to assist park managers in selecting or prioritizing indicators of quality have asked respondents to rate the desirability of a series of setting attributes that are thought to be related to the quality of the recreation experience. This approach provides useful information about the importance of each individual attribute. However, it does not provide information about how these attributes interact with each other when being evaluated. For example, respondents could simply rate all of the attributes as highly and equally important (Manning, 1999b). Recent studies in outdoor recreation have suggested that normative research should more explicitly consider the tradeoffs inherent recreation management decision-making (Manning et al. 1999). Stated-choice analysis has attempted to fill this need (Newman et al. 2005; Lawson & Manning 2003, 2002).

While previous stated-choice research has been successful in helping park managers better understand how attributes (indicators) of the recreation setting interact when being evaluated by visitors, characteristics of the visitors themselves have not entered into the models. Previous work in this area has included only attribute specific variables in the model. It is possible that some characteristics of the visitors (e.g. type of bus they travel on) might influence choices with regard to preferred setting attributes. Research suggests that user characteristics can influence attitudes about the recreation experience (Manning 2011). Specifically, attitudes about management, crowding and ultimately satisfaction may be influenced by user characteristics.

The current study expands on previous work by including visitor characteristics to the types of models previously developed in stated choice research. This is done by comparing two segmented models which analyze choice data from visitors who experienced the Denali Park Road on the park's Visitor Transportation System buses, and visitors who traveled into the park on commercial tour buses.

Methods

Surveys were conducted with two Denali Park Road user groups – Visitor Transportation System (VTS) bus users and commercial bus users. A systematic sampling protocol was used to select survey respondents and each respondent was asked a screening question to prevent multiple responses from the same visitor. The sampling period was designed to include the park's peak use period. Sampling was conducted on 30 randomly selected days during July and August of 2010. During the sampling periods, visitors were approached by trained survey administrators and asked to complete the questionnaire. At the onset of the survey, the administrator gave instructions about how to complete the questionnaire, made sure that the respondent understood the instructions, and provided assistance with the posters that presented the choice scenarios. Response rates of 91.3% and 55.8% were achieved for VTS bus riders, and commercial tour bus riders respectively. This yielded 392 completed VTS questionnaires and 398 commercial tour bus questionnaires. A total of 3528 stated choice comparisons were made by survey respondents who rode on VTS buses in the park and 3573 stated choice comparisons were made by survey respondents who rode on commercial tour buses in the park.

Stated-Choice Study Design, Data Collection and Analysis Approach

The present study builds on recent research (Newman et al. 2005 and Lawson & Manning 2003, 2002) in which three levels of six attributes of the recreation experience were presented to visitors to recreation sites. An orthogonal fractional factorial design was used to create 36 paired comparisons that were blocked into four versions of the questionnaire that was presented to visitors who were asked to evaluate nine paired comparisons (Newman et al. 2005; Lawson & Manning 2003, 2002). The present study used a similar study design. Like the previous studies, the utility of each level of each variable when presented together was modeled using multinomial logistic regression (MNL). Combinations of photographs and written descriptions of the setting attributes and levels were used.

Selection of Attributes and Levels

Managers at Denali National Park could adopt many management strategies in their management of the Denali Park Road. The attributes or indicator variables chosen for study include the number of vehicles seen along the road at one time, the number of vehicles seen at informal wildlife stops, the number of vehicles seen at rest stops, the percentage chance of seeing a grizzly bear, accessibility of buses, and trip length (Table 1). The choice of attributes to represent conditions on the Denali Park Road was based on consultation with park staff, as well as research conducted previously. The attribute for accessibility of buses was represented differently for each of the study groups. This was done to better represent a realistic scenario for each group.

Data Analysis

Effects coding was used to represent the recreation setting attributes in the statistical model. Effects coding requires that one level of each attribute be used as the baseline level. The first level of each attribute was used as the baseline level in the current study. As a result, each setting attribute was represented in the model by two coefficients, one associated with the intermediate level of the attribute and one associated with the third level of the attribute. To code for the first level of an attribute, both indicator variables were assigned values of -1. To code for the second or intermediate level of the attribute, the indicator variable for the intermediate level of the attribute was coded 1 and the indicator variable for the third level was coded 0. To code for the third level of the attribute, the indicator variable for the intermediate level of the attribute was coded 0 and the indicator variable for the third level was coded 1 (Boxall et al. 1996).

These codes are useful for a number of reasons (Adamowicz et al. 1994; Louviere 1988), but were primarily used here because they allow for assessment of each level of the attributes specified directly in the indirect utility function. The result of effects coding is that the coefficient for each variable represents the utility (or disutility if the coefficient is negative) associated with the corresponding level of the attribute. The utility (or disutility) of the first level of the attribute is equal to the negative sum of the coefficients on the indicator variables corresponding to the attribute (Lawson 2002; Boxall et al. 1996).

Data analysis was conducted in three phases. First, a multinomial logit (MNL) model was constructed using Biogeme version 1.8 with data from the respondents who rode on the Visitor Transportation System. The second phase of data analysis consisted of constructing a similar MNL model with data from the respondents who rode a commercial tour bus into the park. The third phase of data analysis consisted of determining the relative importance of each of the setting attributes by using a Log-likelihood Ratio (LLR) test. The LLR chi square values were used to rank the setting attributes, assuming that the coefficients with larger chi square values had a greater influence on the overall fit of the model (Holmes & Adamowicz 2003).

Table 1. Stated Choice Matrix: Indicators (Attributes) and Standards (Levels) for the Stated Choice Questions

Indicators (Attributes)	VTS Bus Standards (Levels)	Tour Bus Standards (Levels)
1. Number of vehicles seen along the road at one time	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses
2. Number of vehicles seen at informal wildlife stops	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses
3. Number of vehicles seen at rest stops	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses	1. Photo with 0 buses 2. Photo with 2 buses 3. Photo with 6 buses
4. Percent chance of seeing a grizzly bear	1. 25% 2. 50% 3. 75%	1. 25% 2. 50% 3. 75%
5. Accessibility of buses	1. Most visitors would be able to get on a bus on the day and time they prefer. 2. Many visitors would have to get on a bus earlier or later in the day than they prefer. 3. Many visitors would have to wait a day to get on a bus.	1. You would need to make a reservation for a bus trip about a month in advance. 2. You would need to make a reservation for a bus trip about 6 months in advance. 3. You would need to make a reservation for a bus trip about a year in advance.
6. Trip length	1. Bus trips would average about 4 hours (reach the Teklanika area). 2. Bus trips would average about 6 hours (reach the Toklat area). 3. Bus trips would average 8 hours or more (travel most or all of the road, including the Eielson, Wonder Lake/Kantishna areas).	1. Bus trips would average about 4 hours (reach the Teklanika area). 2. Bus trips would average about 6 hours (reach the Toklat area). 3. Bus trips would average 8 hours or more (travel most or all of the road, including the Eielson, Wonder Lake/Kantishna areas).

Bus Trip Characteristics and Visitor Attitudes

The study questionnaire also included questions that addressed bus trip characteristics and visitor attitudes toward a number of issues pertaining to management of the Denali Park Road. Trip characteristics included length of bus trip, prior visits to the park, sources of information about bus tours, and hiking activity. Questions on visitor attitudes addressed bus trip characteristics (e.g., length, timing, and types of bus trips), provision of information/education on bus tours, and number and complexity of bus tours.

Results

Stated-Choice Results

The results from phase 1 and 2 of data analysis are presented in Table 2 and Figure 1. In general, respondents preferred seeing fewer vehicles along the park road, at wildlife stops and at rest areas, having a greater chance to see grizzly bears, having the highest level of access to the buses they wish to be on, and longer trip lengths. The intermediate level of the number of vehicles seen on the road had the highest utility of any of the three levels. Previous research would predict that the lowest level of this attribute would have the highest utility. However, some studies have found that park visitors do prefer to see some use in remote areas. This finding is consistent with the latter studies.

Results from the commercial tour bus model were generally similar to the results from the VTS model. Respondents preferred seeing fewer vehicles along the park road, at wildlife stops, and at rest areas, having a greater chance to see grizzly bears, and having the highest level of access to the buses they wish to be on. The primary difference between commercial tour and VTS respondents is that commercial tour respondents prefer an intermediate length trip. Like their VTS counterparts, commercial tour respondents indicated the intermediate level of the number of vehicles seen on the road had the highest utility of any of the three levels.

The results from the third phase of the analysis are presented in Table 3 for the VTS bus and Tour bus models. This phase of analysis sought to determine the relative importance of each of the setting attributes. This was accomplished by constructing the MNL models, excluding one attribute in turn for each iteration of the model. The resulting models were compared using the LLR test. The resulting chi square values were used to rank the importance of each study attribute. The order of ranked importance for each of the study attributes for both the VTS and commercial tour models were very similar; however, one difference did exist. The percent chance of seeing a grizzly bear was by far the most important setting attribute, with the number of visitors seen at rest stops being the second most important. Bus accessibility and the number of buses seen at wildlife stops were the third and fourth most important attributes, respectively. For VTS respondents, trip length was the fifth most important attribute while the number of buses seen on the road was the least important attribute. The order of importance for these two variables was reversed for commercial tour respondents.

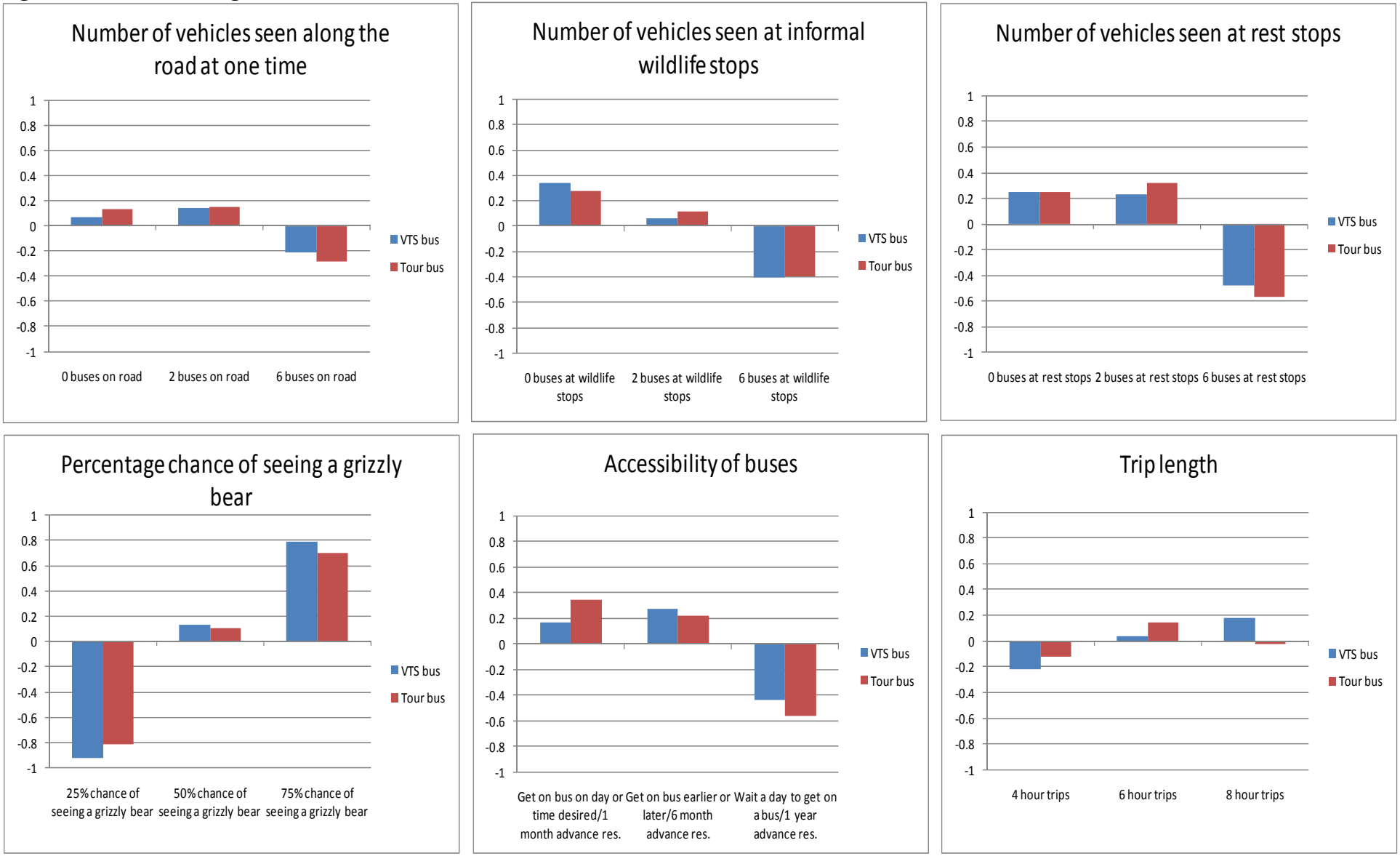
Table 2. Multinomial logit model results

	VTS Buses		**Tour Buses**	
Constants	Coefficient	t-stat	Coefficient	t-stat
Choice 1	0		0	
Choice 2	-0.092	-2.35	-0.140	-3.53
2 buses on road	0.145	3.49	0.148	3.62
6 buses on road	-0.211	-5.23	-0.281	-6.78
2 buses at wildlife stops	0.065	1.62	0.120	3.07
6 buses at wildlife stops	-0.408	-8.85	-0.396	-8.91
2 buses at rest stops	0.233	5.85	0.317	8.03
6 buses at rest stops	-0.480	-12.04	-0.570	-14.44
50% chance of seeing a grizzly bear	0.134	3.43	0.106	2.79
75% chance of seeing a grizzly bear	0.790	18.31	0.704	16.87
Get on bus earlier or later/6 month advance res.	0.271	6.02	0.218	5.21
Wait a day to get on a bus/1 year advance res.	-0.441	-10.75	-0.561	-13.53
6 hour trips	0.040	0.98	0.145	3.68
8 hour trips	0.181	4.05	-0.023	-0.54
Log-liklihood at Zero	-2445.423		-2476.615	
Log-liklihood at Constant	-2445.010		-2474.952	
Log Liklihood at convergence	-1982.864		-1976.775	
Adjusted Rho-squared	0.184		0.197	
Sample Size	3528		3573	

Table 3. Relative importance of each setting attribute.

	Unrestricted LL	Restricted LL	Chi-square	Rank
VTS Buses				
Buses seen on the road	-1982.864	-1996.938	28.148	6
Buses seen at wildlife stops	-1982.864	-2034.132	102.536	4
Buses seen at rest stops	-1982.864	-2061.355	156.982	2
Percent chance of seeing grizzly	-1982.864	-2277.844	589.96	1
Wait to get on bus	-1982.864	-2044.414	123.1	3
Length of trip	-1982.864	-1999.111	32.494	5
Tour Buses				
Buses seen on the road	-1976.775	-2000.205	46.86	5
Buses seen at wildlife stops	-1976.775	-2021.510	89.47	4
Buses seen at rest stops	-1976.775	-2091.112	228.674	2
Percent chance of seeing grizzly	-1976.775	-2218.961	484.372	1
Advance reservation	-1976.775	-2078.982	204.414	3
Length of trip	-1976.775	-1985.107	16.664	6

Figure 1. Multinomial logit model results.



Descriptive Results

On average, visitors who rode the VTS buses spent 8.7 hours traveling on the Denali Park Road, while visitors on commercial tour buses spent an average of just over 6 hours. Table 4 shows that over half of tour bus visitors spent less than 6 hours traveling on the road, while three quarters of VTS bus riders spend between 8 and 12 hours.

Table 4. Question 1. How long did you spend traveling along the Denali Park Road?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Less than 6 hours	13	3.25	211	51.46
6 to less than 8 hours	60	15.0	37	9.02
8 to less than 12 hours	302	75.5	158	38.54
12 or more hours	25	6.25	4	0.98

VTS Mean = 8.68 hours
VTS Median = 8.00 hours
Tour Mean = 6.15 hours
Tour Median = 5.00 hours

Table 5 show the extent of visitors trips. Two-thirds of VTS bus riders (66.6%) traveled as far as Eielson, while only about one-third of commercial tour bus visitors (34.6%) traveled that far. About one quarter of tour bus visitors (28.9%) traveled as far as Sanctuary River.

Table 5. Question 2. How far out on the Denali Park Road did you go on this trip?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Sanctuary River	1	0.2	118	28.9
Teklanika	8	2.0	3	.7
Polychrome Pass	5	1.2	5	1.2
Toklat River	37	9.2	12	2.9
Eielson	267	66.6	15	3.7
Wonder Lake	68	17.0	141	34.6
Kantishna	8	2.0	3	.7
Other	6	1.5	5	1.2
Don't Know	1	0.2	88	21.6

A majority of both VTS bus riders (71.2%) and commercial tour bus riders (92.0%) have not traveled on the Denali park road on previous trips (Table 6). For a majority of tour bus riders (55.6%) and a plurality of VTS bus riders (43.3%), the bus they were on when contacted for this survey was their first trip on the Denali Park Road (Table 7). On average, VTS bus riders have traveled on the Denali park road 3.5 times, while commercial tour bus riders have traveled on the road an average of 2.1 times.

Table 6. Question 3a. Have you been on the Denali Park Road on previous trips?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Yes	115	28.8	33	8.0
No	284	71.2	378	92.0

Table 7. Question 3b. How many times have you been on the Denali Park Road?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
1	55	43.3	20	55.6
2	33	26.0	10	27.8
3	11	8.7	1	2.8
4	8	6.3	0	0.0
5	7	5.5	2	5.6
6	0	0.0	1	2.8
7	1	0.8	1	2.8
8	1	0.8	0	0.0
10	7	5.5	0	0.0
11	0	0.0	1	2.8
20	1	0.8	0	0.0
30	2	1.6	0	0.0
54	1	0.8	0	0.0

VTS Mean = 3.46
VTS Median = 2.00
Tour Mean = 2.14
Tour Median = 1.00

Table 8 shows the year that visitors first traveled on the Denali Park Road. For both VTS bus riders and tour bus riders, approximately half of the visitors' first travelled on the Denali Park Road in the year 2000 or later.

A series of questions asked visitors to rate how good or bad they thought selected bus trip characteristics were (Table 9). On average, VTS bus users thought all of the characteristics but one were good ideas. VTS bus riders indicated that "some buses would provide "express" service to specific locations along the road without stopping to view wildlife" was a bad idea, however, the average rating for this characteristic (-0.06) fell only slightly on the "bad idea" side of the scale. All other characteristics were rated on average as positive by VTS bus riders. The three most highly rated characteristics for VTS bus riders were "some buses would be scheduled to allow short hikes that are guided by park rangers" (1.18), "most buses would facilitate hiking by stopping on demand to drop off and pick up hikers" (1.11), and "some buses would provide "specialty" tours (e.g., birding, geology, "family oriented")" (1.09).

Table 8. Question 3c. In what year did you first travel on the Denali Park Road?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
1954	1	1.2	0	0.0
1962	1	1.2	0	0.0
1963	1	1.2	0	0.0
1964	1	1.2	0	0.0
1965	1	1.2	0	0.0
1966	0	0.0	1	3.2
1972	2	2.4	0	0.0
1973	0	0.0	2	6.5
1975	2	2.4	0	0.0
1976	2	2.4	0	0.0
1977	1	1.2	0	0.0
1978	1	1.2	0	0.0
1981	0	0.0	1	3.2
1982	1	1.2	0	0.0
1984	2	2.4	0	0.0
1985	2	2.4	0	0.0
1986	3	3.6	0	0.0
1987	1	1.2	0	0.0
1989	1	1.2	1	3.2
1990	4	4.8	2	6.5
1994	2	2.4	1	3.2
1995	4	4.8	1	3.2
1996	2	2.4	1	3.2
1997	1	1.2	2	6.5
1998	1	1.2	2	6.5
1999	5	6.0	0	0.0
2000	1	1.2	2	6.5
2001	4	4.8	1	3.2
2002	6	7.1	2	6.5
2003	6	7.1	1	3.2
2004	2	2.4	3	9.7
2005	3	3.6	2	6.5
2006	3	3.6	3	9.7
2007	6	7.1	2	6.5
2008	6	7.1	1	3.2
2009	5	6.0	0	0.0

In general, commercial tour bus riders rated the characteristics presented less favorably than VTS bus riders. For example, the "most buses would facilitate hiking by stopping on demand to drop off and pick up hikers" characteristic, which received the second highest rating from VTS riders, received a -0.32 average rating from commercial tour bus riders. Additionally, three other characteristics received a negative average rating from commercial tour bus riders. Those characteristics included "some buses would leave as early as 4:00 am" (-0.57), "some buses would provide "express" service to specific locations along the road without stopping to view wildlife" (-0.39), and "most bus trips would start and end in the park (e.g., at the Park Visitor Center)" (-0.01). The characteristics that received the highest positive ratings by commercial tour bus riders included "some buses would provide "specialty" tours (e.g., birding, geology, "family oriented")" (1.13), "some buses would be scheduled to allow short hikes that are guided by park rangers" (0.99), and "most bus trips would include a stop at the Park Visitor Center (to view park film, exhibits, etc.)" (0.92).

Approximately three quarters of visitors (73.9% of VTS bus riders and 73.8% of commercial tour bus riders) chose not to get off the bus to take a hike (Table 10). Of those visitors who chose to get off their bus and take a hike, VTS bus riders spent an average of nearly three hours hiking with an average hike duration of 176.3 minutes, while commercial tour bus riders who chose to hike spent an average of about one half hour hiking with an average hike duration of 32.1 minutes (Table 11). Of the VTS bus riders who chose to hike, nearly half (45.3%) left the designated trail, while only 3.8% of commercial tour bus riders who chose to hike left the designated trail (Table 12). Only about one in ten (10.4%) VTS bus riders who chose to hike hiked with a ranger or guide, while 75.7% of commercial tour bus riders who hiked, hiked with a ranger or guide (Table 13).

Visitors who did not hike during their Denali Park Road trip were asked if they would have liked to go for a hike (Table 14). Over half of the VTS bus riders (59%) and nearly half of the commercial tour bus riders (43.7%) indicated that they would have liked to have gone for a hike on the day they were contacted. When asked why they did not go for a hike, a majority of tour bus riders (53.3%) indicated that their tour did not provide an opportunity for hiking. Nearly a quarter of VTS bus riders indicated that inclement weather (23.1%), that some members of their group did not wish to hike (21.4%), or some other reason (20.5%) prevented them from hiking (Table 15). Over two-thirds of VTS bus riders (68.7%) and nine out of 10 commercial tour bus riders (90.2%) indicated that they would prefer to hike on a designated trail on a future trip on the Denali Park Road (Table 16). Over half of VTS bus riders (56.0%) indicated that they would prefer a hike without a guide or ranger on a future trip on the Denali Park Road, while 86.2% of commercial tour bus riders indicated that they would prefer hiking with a ranger or guide on a future trip (Table 17).

Table 9. Question 5. Please indicate the extent to which you think the following bus trip characteristics are a good or bad idea.

	VTS Bus						Tour Bus					
Bus Trip Characteristics	Very Bad Idea (-2)	Bad Idea (-1)	No Opinion (0)	Good Idea (1)	Very Good Idea (2)	Mean	Very Bad Idea (-2)	Bad Idea (-1)	No Opinion (0)	Good Idea (1)	Very Good Idea (2)	Mean
a. Some buses would leave as early as 4:00 am	8.4	20.0	30.4	32.9	8.4	0.13	29.1	29.4	15.6	20.9	5.0	-0.57
b. Some buses would leave as late as 6:00 pm	3.3	13.1	24.2	45.7	13.6	0.53	9.3	20.3	20.0	38.0	12.5	0.24
c. Most buses would facilitate hiking by stopping on demand to drop off and pick up hikers	1.0	7.6	9.4	43.7	38.3	1.11	18.7	33.4	19.7	18.0	10.2	-0.32
d. Some buses would be scheduled to allow short hikes that are guided by park rangers	0.8	5.3	8.4	46.3	39.2	1.18	3.0	7.5	8.3	49.4	31.8	0.99
e. Some buses would provide “express” service to specific locations along the road without stopping to view wildlife	18.2	27.8	12.4	25.1	16.5	-0.06	25.8	28.8	14.3	20.6	10.5	-0.39
f. Some buses would provide “specialty” tours (e.g., birding, geology, “family oriented”)	1.0	5.1	13.5	44.7	35.8	1.09	1.3	2.3	14.8	45.4	36.3	1.13
g. Buses would be designed to provide more passenger comfort than existing buses	5.3	16.0	38.6	26.1	14.0	0.27	2.3	10.1	30.7	28.4	28.6	0.71
h. Most bus trips would start and end in the park (e.g., at the Park Visitor Center)	2.3	4.1	27.1	42.5	24.1	0.82	12.1	27.9	22.6	23.9	13.6	-0.01
i. A local shuttle bus system would provide access to the park (including the departure area for bus trips on the Denali Park Road) from surrounding hotels	5.8	7.3	28.4	35.7	22.8	0.62	5.3	10.8	19.1	38.7	26.1	0.70
j. Most bus trips would include a stop at the Park Visitor Center (to view park film, exhibits, etc.)	7.1	20.3	24.4	33.8	14.5	0.28	2.3	6.8	17.0	44.1	29.8	0.92

Table 10. Question 6a. Did you get off the bus today to take a hike?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Yes	104	26.1	102	26.2
No	294	73.9	288	73.8

Table 11. Question 6b. Approximately how long was your hike?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Less than 15 minutes	5	4.81	25	24.75
15 to 29 minutes	12	11.54	36	35.64
30 to 59 minutes	30	28.85	21	20.79
60 to 119 minutes	13	12.50	13	12.87
120 minutes or more	44	42.31	6	5.94

VTS Mean = 176.3 minutes; median = 60.0 minutes
Commercial Tour Mean = 32.1 minutes; median = 20.0 minutes

Table 12. Question 6c. Did you hike on or off-trail?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
On a trail	58	54.7	103	96.2
Off-trail	27	25.5	2	1.9
Both	21	19.8	2	1.9

Table 13. Question 6d. Did you hike with a guide/ranger?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
With a guide/ranger	11	10.4	81	75.7
Without a guide/ranger	95	89.6	26	24.3

Table 14. Question 6e. If you did not get off the bus today to hike, would you have liked to?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Yes	171	59.0	129	43.7
No	119	41.0	166	56.3

Table 15. Question 6f. Why didn't you get off the bus today to hike?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Bus tour did not provide an opportunity	14	4.6	138	53.3
Inclement weather	71	23.1	14	5.4
Some members of my party were not interested	66	21.4	22	8.5
Some members of my party were not able	26	8.4	20	7.7
Concerned for my safety	9	2.9	10	3.9
Worried about catching another bus	48	15.6	15	5.8
Few/no marked trails	11	3.6	6	2.3
Other	63	20.5	34	13.1

Table 16. Question 6g. On a future visit, would you prefer to hike on a trail or off-trail?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
On a trail	202	68.7	222	90.2
Off-trial	92	31.3	24	9.8

Table 17. Question 6h. On a future visit, would you prefer to hike with or without a guide/ranger?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
With a guide/ranger	129	44.0	212	86.2
Without a guide/ranger	164	56.0	34	13.8

Respondents were asked about the desirability of several methods that information and education could be provided on buses that operate in the park (Table 18). VTS bus riders and commercial tour bus riders were quite similar, on average, in their responses to these questions. Only the "bus passengers would be provided a recorded narrative about traveling the road (e.g., podcast)" method of information delivery was considered undesirable by a majority of both types of park visitors. Over two thirds of VTS bus riders (69.7%) and 60.2% of commercial tour bus riders considered this method "undesirable" or "very undesirable". All other methods of information and education delivery were considered "desirable" or "very desirable" by a majority of respondents. The most desirable method of information deliver was to have bus drivers provide commentary during the trip. Nearly all respondents (98.2%), both VTS and commercial tour bus riders, considered this method "desirable" or "very desirable".

Table 18. Question 7. Information and education about the park could be provided to bus passengers in several ways. Please rate the desirability of each of the following forms of information/education on the Denali Park Road.

	VTS Bus					Tour Bus				
	Very Desirable (1)	Desirable (2)	Undesirable (3)	Very Undesirable (4)	Mean	Very Desirable (1)	Desirable (2)	Undesirable (3)	Very Undesirable (4)	Mean
a. Bus drivers would provide commentary during the trip.	65.5	32.7	1.3	0.5	1.37	75.7	22.5	1.3	0.5	1.27
b. Park rangers would ride the bus and provide commentary/answer questions.	28.4	56.7	12.7	2.3	1.89	35.9	49.5	12.2	2.3	1.81
c. Park rangers would ride the bus for part of the trip and provide commentary/ answer questions.	31.0	55.5	10.9	2.5	1.85	31.2	55.6	11.2	2.1	1.84
d. Park rangers would be stationed at selected stops along the road.	21.8	57.7	16.9	3.6	2.02	25.8	53.7	17.3	3.1	1.98
e. Bus passengers would be provided a written guide to traveling the road.	21.7	42.9	28.1	7.4	2.21	22.2	45.7	25.6	6.5	2.16
f. Bus passengers would be provided a recorded narrative about traveling the road (e.g., podcast).	8.5	21.9	51.4	18.3	2.79	9.1	30.7	49.5	10.7	2.62
g. Interpretive signs would be posted at selected stops along the road.	15.5	50.1	24.4	9.9	2.29	15.4	44.4	30.0	10.3	2.35

Respondents were asked how they thought bus trips on the Denali Park Road should be designed. Bus trips on the Denali Park Road could be designed to provide many types of trips (lengths, destinations, themes, etc.). This would offer many choices, but might be confusing to visitors. Trips could also be designed to offer only a few types of trips. This would offer fewer choices, but might be less confusing to visitors. Both VTS bus riders and commercial tour bus riders indicated that a compromise between the two extremes was preferred (Table 19). Approximately one quarter of VTS bus riders (27.3%) and just over one third of commercial tour bus riders (33.9%) chose the midpoint of the 5-point scale, Approximately three quarters of both types of visitors choose a point on the scale other than the extreme ends of the scale.

Table 19. Question 8. Please indicate how you think bus trips on the Denali Park Road should be designed.

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
1 – Many types of trips, but possibly confusing	71	17.9	60	15.7
2	104	26.3	73	19.1
3	108	27.3	130	33.9
4	77	19.4	74	19.3
5 – Fewer choices in types of trips, but possibly less confusing	36	9.1	46	12.0

Respondents were asked how they obtained information about bus trips in Denali National Park (Table 20). Over one third of VTS bus riders (36.2%) obtained information from sources on the internet, while 43.6% of commercial tour bus riders obtained information through a travel agent. Other popular sources of information were brochures and other sources not listed in the question. Other sources included, word of mouth, previous experience, information from cruise lines and guidebooks (Table 21).

Table 20. Question 9. How did you and your group obtain information about bus trips in the park?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Travel agent	17	2.8	257	43.6
Brochures	111	18.3	75	12.7
Park newspaper	44	7.2	9	1.5
Internet	220	36.2	86	14.6
Denali Park Trans. Reservation Agent	45	7.4	12	2.0
Park ranger	23	3.8	8	1.4
Railroad staff	1	0.2	9	1.5
Hotel staff	21	3.5	46	7.8
Other	126	20.7	88	14.9

Table 21. Other sources of travel about bus trips in Denali National Park

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
Word of mouth/family/friends/other travelers	62	51.2	15	16.3
Previous experience	13	10.7	2	2.2
Guidebooks	29	24.0	2	2.2
Cruise/tour company	2	1.7	62	67.4
Miscellaneous	15	12.4	11	12.0

Finally, respondents were asked how easy or difficult it was to obtain information on bus trips in Denali National Park (Table 22). A majority of both types of visitors indicated that getting information was relatively easy, with 81.6% of VTS bus riders and 78.4% of commercial tour bus riders rating the ease of finding information as a 1 or 2 on the five point scale.

Table 22. Question 10. How easy or difficult did you find getting information on bus trips in the park?

	VTS Bus		Tour Bus	
	Frequency	Percent	Frequency	Percent
1 - Very Easy	197	49.6	201	53.6
2	127	32.0	93	24.8
3	49	12.3	63	16.8
4	24	6.0	12	3.2
5 – Very Difficult	0	0.0	6	1.6

Discussion and Conclusions

Findings from this study should help park planners/managers focus the current Denali Park Road planning process on indicators of quality that are most important in meeting the needs of park visitors. Preliminary results indicate that percent chance of seeing a grizzly bear is the most important indicator of quality for the visitor experience on the Denali Park Road for both VTS and tour bus users. The length of trip is the least important indicator. Waiting time to get on a VTS bus/advance time needed to make a tour bus reservation and number of buses seen at rest stops are of moderate importance. Two other "crowding" attributes (number of buses seen along the road and number of buses at wildlife stops) are of relatively low importance.

Segmentation analysis demonstrates that there are some minor differences between visitors who visit the park on the VTS bus and visitors who travel into the park on commercial tour buses. Most notably, visitors who ride the VTS buses found trip length to be a more important indicator of quality than the number of buses they see on the road. Specifically, for this group of visitors, a longer trip had the highest utility for this attribute. For visitors who ride commercial tour buses, the number of buses seen was a more important indicator of quality than trip length, and for this group, a trip of moderate length had the highest utility for this attribute.

Other differences between the two groups of visitors were also present. Visitors who rode the VTS buses were more flexible when it came to accessibility of buses. The intermediate level of the accessibility variable had the highest utility for VTS riders, while the first level of this variable had the highest utility for commercial tour bus riders. This may be due to differences in the way this attribute was measured for each group.

Direct statistical comparisons of the two models was not possible since slightly different levels of the accessibility attribute were used. The difference between the two models indicate that VTS and tour bus visitors are two distinctive subgroups of visitors. This may require managers to use slightly different management techniques when managing conditions for each subgroup. However, the differences found between the two visitor groups were found in the two attributes that were rated as least important to the visitors' overall utility.

Study findings also offer detailed information on a number of characteristics of visitors and their use patterns, including length of bus trip, prior visits to Denali, sources of information about bus trips, and hiking activity and preferences. Moreover, information on visitor attitudes toward a number of issues pertaining to bus trips on the Denali Park Road was gathered, including bus trip characteristics, provision of information to visitors and the number and complexity of bus tours.

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