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In Focus: Denali Park Road

Modeling traffic patterns in Denali National Park and Preserve to evaluate effects on visitor experience and wildlife

By Ted Morris, John Hourdos, Max Donath, and Laura Phillips

Abstract: Historically, traffic on the Denali Park Road has been limited in order to protect wildlife and improve visitor experience. The Denali Park Road is one example of a park roadway facing increasing visitation and pressure to change or defend the current limits on traffic. To respond to such pressures, park and protected area managers need a greater understanding of the impacts of traffic volume and traffic patterns on the physical, biological, and social environment. This study developed a traffic simulation model of the Denali Park Road that predicts visitor experience and impacts on Dall's sheep for hypothesized road usage scenarios. The model incorporated crowding indicators at prescribed scenic areas and at wildlife stops along the road, as well as traffic levels at critical wildlife crossing locations. Violations of set standards for each of the indicators were then assessed for several scenarios that encompassed road usage beginning from a below-average condition to a condition well above the current mandated daily vehicle trip limit. Results from the model indicated that adherence to standards representing a higher-quality visitor experience may be difficult to maintain on the park road if more visitors--in more vehicles--are allowed on the park road.

Key Words: Dall's sheep, Denali National Park and Preserve, scenic road, traffic microsimulation, visitor experience

Introduction

Faced with increasing visitation and public use in the road-accessible, remote areas of Denali National Park, land managers needed to develop a greater understanding of the impacts of traffic volume and patterns on the physical, biological, and social environment of the lands that the Denali Park Road traverses. Studies have explored the reactions of wildlife to increased vehicle volumes; however, these studies were mainly directed at understanding the impact of high-volume highway traffic (Langevelde and van Jaarsma 2004). Current research indicates that increased public visitation in remote public spaces creates unique traffic patterns and challenges, such as maintaining visitor satisfaction and safety and protecting wildlife and other natural resources. Denali National Park and Preserve (Denali) in Alaska exemplifies the challenges of managing a public space with high visitation and sensitive wildlife.

Most visitors experience the park by traveling the historical Denali Park Road, a restricted-access, mostly gravel road extending 90 miles (145 km) from the park entrance to the old mining district of Kantishna (see fig. 1, Phillips, Hooge, and Meier). The road provides an almost wilderness experience and unparalleled wildlife viewing, and is the only road facility providing access to the interior of the park. The current mandatory transportation system consists of park-sponsored, regularly scheduled shuttles and ticket-reserved bus tours, both of which travel to several turnaround destinations within the restricted 75-mile portion of the park road.

The traffic simulation model incorporated seven separate destinations. Five of the seven turnaround destinations are provided by the shuttle service beyond the Savage Creek checkpoint at mile 15 where the restricted portion begins (refer to the map). Specifically, they are Polychrome Overlook rest area (mile 47), Toklat River rest area (mile 53), Fish Creek (mile 63), Wonder Lake (mile 85), and Kantishna (mile 89). The remaining two destinations are turnaround points for the bus tours: the shorter interpretive Denali Natural History Tour turns around at Primrose Rest Stop, located at mile 17, and the Tundra Wilderness Tour travels to Stony Hill Overlook located just before mile 62. In addition to shuttle bus and tour bus operations, scheduled one-way and round-trip bus service is provided for visitors staying at any of the three lodges located on the west end of the park road near Kantishna. The service is privately operated by the lodges themselves. Unlike either the tour or the lodge bus operations, the scheduled visitor shuttle service stops to pick up day hikers and campers at designated stops near campgrounds, or anywhere along the road. The general management plan (GMP) implemented by the National Park Service (NPS) in 1986 (NPS 1986) mandates a daily limit of 88 bus trips: 30 Tundra Wilderness Tours, 36 shuttle trips, and 22 Denali Natural History Tours. The lodge bus service is not included in these daily limits (though they do count toward the annual trip limit). The lodge buses provide about 12 trips per day throughout the summer (mid-June through the beginning of September). These trips are included in all the simulation scenarios.

The buses that encounter wildlife in view of the road stop frequently for several minutes to allow passengers to observe and photograph the animals. The buses also stop for extended periods (10 to 30 minutes) at several scenic rest stops, for example, Teklanika River at mile 29, Polychrome Pass, and Stony Hill Overlook (particularly when Mount McKinley is in view; see cover photo and fig. 3). The round-trip travel time to Primrose Ridge (the shortest bus trip) averages three hours, while the average travel time to Kantishna and back is more than 11 hours. Two very popular routes, the shuttle service to Fish Creek (15 bus trips were scheduled daily during peak season in 2007) and the bus tour to Stony Hill Overlook (about 30 trips during peak season), have average round-trip travel times of 7.7 and 7.4 hours, respectively. Further details of the park road and the transportation system are described in the introductory article by [Phillips, Hooge, and Meier].

Recently, because of concerns that the mandatory transportation system was not meeting the needs of visitors, Denali park managers began an integrated study to examine the interactions among road use, quality of the visitor experience, and wildlife behavior. A traffic simulation model was needed to integrate logistical constraints and interactions among traffic, wildlife, and the visitor experience. Computer simulation modeling has been shown to serve as a valuable tool for managing visitor recreation use in a variety of public and protected area settings (Lawson et al. 2003; Cole 2005). Modeling informs park managers about the possible effects of future management options for the park road.

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Traffic on the park road primarily comprises large buses that stop frequently for passengers to view wildlife. This driving behavior imposes modeling constraints that traditional traffic planning models cannot handle. The objective of this study was to develop an integrated simulation model capable of analyzing the effects of vehicle-specific driving behaviors, vehicle schedules, and wildlife sighting probabilities on visitor experience and resource protection. Park managers could then use the model proactively to evaluate the impacts of several alternative transportation management strategies on the ability to achieve visitor experience and wildlife resource standards.

Building the model

The model was implemented using traffic microsimulation software. Similar to other protected area capacity simulation approaches (Gimblett e-t al. 2001; Lawson et al. 2003; Cole 2005; Itami 2005; Morris et al. 2005), traffic microsimulation is a dynamic, stochastic (i.e., random), and discrete event-based simulation. Such an approach typically has been used to understand complex traffic systems and facilities in urban settings (Barcelo et al. 2005). Traffic microsimulation is an evolutionary departure from other simulation approaches since it requires that vehicle behaviors such as following, passing, merging, route choice, and other complex interactions be inherent characteristics of the simulation. Also, it provides an open architecture to modify and add other behaviors to individual vehicles. We used this methodology to define such complex interactions and behaviors on the park road.

Traffic microsimulation is an evolutionary departure from other simulation approaches since it requires that vehicle behaviors such as following, passing, merging, route choice, and other complex interactions be inherent characteristics of the simulation.

First we constructed the geometry of the park road in the simulation model by referencing a Geographic Information System (GIS) layer of road information created by the National Park Service from U.S. Geological Survey transportation files. The road narrows to 1.5 lanes beyond the Teklanika River rest area at mile 29 (see map), so we coded passing provision rules into the simulation software. This is especially important when buses are ascending or descending mountain passes, where adequate room must be given to vehicles in the outside lane as a traffic safety measure. A limited number of road permits are issued to private vehicles, and because of the passing provisions, the travel behavior of the buses is affected by private vehicle traffic as well. Therefore, in order to consider the effect of private vehicles, approximately 50 private vehicle trip departures were randomly generated throughout the simulation period. The distribution and number of trip destinations for these vehicles were derived from the daily log entries from the Savage Check Station at mile 15 (see map).

We used records from approximately 4,000 trips made by 87 buses equipped with Global Positioning System (GPS) Automatic Vehicle Locators (AVLs) to examine driving rules, speed behavior, rest stop and designated stop (e.g., stops at scenic vistas and campgrounds) dwell times, and wildlife encounter stop dwell times of vehicles on the park road. We recorded a GPS location every 400 feet (112 m) and uploaded the data wirelessly to a central server during the time buses were parked in service lots. We aggregated GPS speed data for the different vehicle operators (tours, shuttle service, lodge buses, and private vehicles) into one-mile segments in order to estimate a mean speed profile of the road and a statistical distribution of the speed of each different vehicle operator type over the round-trip length of their route. This captures general speed behavior for specific operators. For example, we found that the Denali Natural History Tour drivers travel about 10 miles per hour (mph) slower, on average, than the other bus operators. We then estimated maximum attainable speed along different road sections by computing one standard deviation above the mean speed profile. [1] When the simulation model computes a desired vehicle speed that is greater than the maximum attainable speed at a given location along the road, the vehicle is set to travel at the maximum attainable speed (which was typically 0 to 10 mph less than the 35 mph speed limit enforced by the park). Computation of the desired vehicle speed when it encounters other traffic in its lane is based on the vehicle-following model by Gipps (1981). Note that the profile speed reflects a driving speed pattern that results from a myriad of factors beyond the enforced speed limit (35 mph) of the park road, such as road geometry, scenic viewing opportunities, and road and traffic conditions.

1 The simulator requires a maximum attainable speed be assigned for a given road section. A standard deviation above the mean population of bus drivers is a logical representation of this parameter as it includes a large majority of the drivers. Drivers going faster than this are considered outliers.

A key component in building the model was understanding driver stop behavior, especially with respect to wildlife sightings along the road. We developed a data acquisition system to allow bus drivers to geo-reference stop information using touch-screen panels that interfaced with the AVL units. Data recorded on the panels provided information about type and location of wildlife sightings, hiker pick-up and drop-off locations, and dwell times at rest areas. Twenty buses were equipped with the touch-screen panels, which provided information for 5,697 stops made by drivers during the summer season.

We built stops for wildlife viewing into the model by creating "incidents" simulated at 79 prescribed locations and time frames that impeded vehicles as they traveled along the road. The incidents were derived by observing where vehicles stopped in clusters in time and space using the AVL data. We determined stop duration behavior using data from 2,771 logged wildlife stops. The trends indicated that the time a bus spent at a wildlife stop varied by order of arrival at the sighting location and by the species being observed. In particular, buses spent more time for grizzly bear encounters than for other species of large mammals, and buses that stopped at a wildlife sighting after the first bus had arrived spent more time at that location. We computed rest stop and other designated stop durations for the different bus operators and routes from 1,059 stops extracted from the AVL data during July (mid-peak season). We validated the model by creating a simulation experiment that duplicated the actual schedule departures for 61 buses, and then comparing their arrival times at the wildlife, campground, and rest stops. The results indicated a travel time difference of 4 to 20.2 minutes ($p < 0.01$, T = -205.5, N = 158,719) between the model and actual travel times. Bus trip times averaged 6.5 hours, with the shortest trips taking 3.1 hours, and the longest lasting more than 11 hours.

To integrate the model with important indicators of visitor experience and resource protection, we incorporated standards established by concurrent interdisciplinary studies. A GPS study of Dall's sheep movements (see article by Phillips, Mace, and Meier) and previous studies of sheep behavior in the park (Putera and Keay 1998; Dalle-Molle and Van Horn 1991) indicated that sheep may be sensitive to traffic volume when crossing the park road during seasonal migration. To ensure protection of crossing opportunities for sheep, park managers determined that a gap between vehicles that is longer than 10 minutes each hour should be maintained as a standard at three traditional migration corridors along the road. The simulation model incorporated three sheep crossing locations at miles 21.6, 37.6 (near Sable Pass), and 52.8 (Toklat River).

Another study (see article by Manning and Hallo) was designed to evaluate indicators of quality for the visitor experience on the Denali Park Road. The investigators used visitor surveys to formulate standards for three crowding indicators: (1) number of buses in a viewscape, (2) number of buses at a rest area, and (3) number of buses at a wildlife stop. Park managers chose to analyze three levels of crowding, as indicated by the number of buses for a specified level of road use at a particular location. These crowding levels correspond to the traffic volume visitors would prefer (low), typically saw (medium), and found minimally acceptable (high) on the road (table 1). The set standards were computed using a weighted average based on the number surveyed of each visitor type during the season in order to balance differences among park users in a single set standard value (see article by Manning and Hallo). We built tools to summarize and evaluate the ability of different transportation scenarios to meet road use levels within the traffic simulation model.

Evaluating transportation options

To evaluate potential impacts on the visitor experience and wildlife if traffic volume were to increase, park managers developed scheduling scenarios that amplified the park road usage patterns throughout the day by proportionally adding different bus routes and operators controlled by the daily limit specified in the general management plan (fig. 1). Park managers needed to understand how the indicators and set standards were affected by the logistical constraints of the current transportation system. The number of buses in base condition, a condition well below average traffic levels during the peak summer tourist season, was 29 fewer than the GMP limit of 88 shuttle and tour bus trips per day. The first three scenarios starting at the base condition represent a lower to more typical level of bus service below the GMP daily limit. Service at or near the GMP limit is represented by the 30% scenario. Note that it is not uncommon during the peak summer season for bus service to meet the daily GMP limit. Twelve scheduled lodge bus routes remained the same for all scenarios, since the National Park Service does not control day-to-day scheduling for these buses. For each condition, we executed 30 simulation experiments to benefit from the stochastic nature of the model. We then extracted performance measures from the simulation that project impacts on visitor experience and resource indicators by evaluating the degree of departure from set standards indicated in table 1. By examining change in violation rates for the three crowding standards of quality for viewscapes, wildlife, and rest stop crowding, we can assess the sensitivity of the standards to different levels of crowding modeled by the simulation experiments. This can indicate how the carrying capacity of the road is affected as use levels and standards of quality change from low to high (Lawson et al. 2003). The carrying capacity of the park road is defined by each of the four crowding indicator set standards (table 1) in addition to the sheep crossing gap time described previously.

We calculated maximum number of buses observed within a one-minute interval at rest areas to estimate the crowding levels and violation rates for the three standards. The low-crowding standard proved to be the most sensitive to increases in road use and was violated more frequently than the other standards. The low-crowding standard experienced an increase in frequency of violations from 18% at the low (i.e., base) road use level to 34% at the 60% increase scenario. In contrast the observed frequency of violations for the medium- (from 5% to 16%) and high-crowding standards (from fig. 2).

We evaluated crowding within two viewscapes on the road: Viewscape A, which represents an iconic view of the road just beyond mile 62 and Mount McKinley, and Viewscape B, which represents a generic scenic view of the road at mile 57 (see map), 3 miles beyond the Toklat rest area (fig. 3). As with the rest stop model outcomes, the low-crowding standard was the most sensitive (i.e., produced the greatest change in violations) to increased usage scenarios within viewscapes (a change in violation from 10% to 15% for Viewscape A and from 15% to 23% for Viewscape B). Fluctuations of this indicator over time can be examined and used by park managers to create bus schedules that reduce crowding during specific periods of the day. On average, the greatest simulated crowding impacts occur during two morning and evening peaks for Viewscape B and a more singular midday peak for Viewscape A. While the viewscapes are approximately 5 miles (8 km) apart, peak crowding occurs more than two hours apart, a pattern that could not be predicted without the simulation model (fig. 4).

For wildlife stops, the medium-crowding standard was most sensitive to the traffic increase scenarios relative to the base condition (i.e., increase in violation rate from 64% to 78%, 18% to 41%, and 3% to 12% for the low-, medium-, and high-crowding standard levels, respectively) (fig. 5). More than 80% of all wildlife stops occur within the first 50 miles (80 km) of the park road (about 600 stops). The variation of violation rates for the three set standard levels changes considerably with respect to time and location along the park road (fig. 6). This implies that management actions to respond to crowding at wildlife stops may need to be based on different standards that are specific to certain portions of the park road, or even to particular times of the day.

In order to assess potential impacts on wildlife, as represented by Dall's sheep, we examined temporal characteristics of road crossing opportunities of greater than 10 minutes without vehicle traffic and extracted them from the model for three locations along the road. Denali park managers ultimately wish to provide consistent crossing opportunities to sheep populations during the period when vehicles are traveling the park road. For example, at least one ample gap time is desired to accommodate sheep crossings for every hour of the day. Therefore, we studied the temporal variability of vehicle spacing and crossing opportunities by examining the amount of time during each hour of the day that was made up of gaps in traffic longer than 10 minutes. Gap times between vehicles that were greater than 10 minutes and that cross over a division between one hour and the next were divided between the hours. The model predicted that crossing opportunities would diminish specifically during morning hours, particularly at mile 37.6, the second crossing location encountered on the road. A similar circumstance occurs between noon and 2 p.m. for the farthest sheep crossing location. All sheep crossing locations lose crossing opportunities during various periods of the day for the 40%, 50%, and 60% increase cases—all greater than the daily GMP limits (fig. 7).

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The temporal variations between the Dall's sheep crossing standard (fig. 7) and wildlife crowding standards (fig. 6) are similar, particularly between the first 30 miles of road and the first sheep crossing location, and between mile 54 (Toklat) and mile 66 (Eielson) and the last sheep crossing location (this can be visualized by turning the corresponding graphs in fig. 6 or fig. 7 upside down). Intuitively, such a correlation between the two standards might be expected since both an increase in wildlife stop crowding and a reduction of the gap times between vehicles at the crossing locations result when the volume of traffic passing through these areas of the park road increases. Park management may wish to explore this relationship further since the implication is that if large variations in wildlife crowding standard violations can be reduced (e.g., "smoothing out" the peaks shown in fig. 6), a more even distribution of sheep crossing opportunities in these two areas of the park road would also ensue during the period of the day when buses are operating.

Management application

We evaluated sensitivity of crowding indicators on the Denali Park Road by comparing the violation rates of three standards when traffic levels were increased incrementally starting from a low-use level in seven scheduling scenarios within a traffic simulation model. The resulting sensitivities for the three set standards for the four different Denali Park Road crowding indicators are nonlinear and differ significantly from each other. The violation rates of set standards varied significantly in time and space—especially for the high and medium standards. For example, the violation rate for the middle standard for wildlife stops was much more sensitive to increased traffic levels than the low and high standards. This is exemplified within a 24-mile (39 km) road section between Teklanika and Toklat. Therefore, the model results suggest that adherence to the more restrictive visitor experience standards may be difficult to maintain on the park road if more access were to be provided.

This study was a first step in evaluating traffic scenarios on the Denali Park Road. Managers are using the results to assist in creation of a range of alternatives for transportation systems on the road. An example being considered by park managers is a "loop" shuttle system that would allow visitors to leapfrog to destinations farther along the park road, instead of using a single route to similar destinations, as done in the current system. Yet another alternative would be to consolidate the different operators into a single, unified shuttle service, providing more route options to intermediate locations on the park road, such as Teklanika. Offering "express service," that is, not stopping for wildlife, is also being considered to provide visitors a more efficient means to reach destinations on the park road.

The simulation model will be used to explore the ability of the proposed alternatives to provide more opportunities for access to the road without compromising the visitor experience or behavior of Dall's sheep. We will alter the travel behavior of buses and other vehicles within the model to consider potential alternatives to assess the ability of new systems to meet crowding and wildlife protection standards. One example of such an alteration is to control the turnaround rest stop dwell times of the buses as a schedule adherence strategy for loop service. We will also explore effects of changing the route departure times for a desired level of service in order to reduce the violations of set standards for the current system as well as for the alternative transportation systems provided by the park. By examining temporal and spatial crowding trends, park managers will be able to forecast when and where the largest crowding impacts will occur and experimentally manipulate schedules within the model to mitigate the simulated impacts.

Additional data obtained from actual and simulated travel and stop behaviors of vehicles could provide valuable information for proactive management of park road access. For example, we could determine which vehicle behaviors may affect crowding and wildlife standards most often and recommend changes in operator behavior to address the problems. We will be building visualization tools to summarize this complex and multidimensional system to provide park managers with an enhanced ability to make inferences about the causes and effects of modeled changes to indicators of visitor experience and wildlife resources on the park road.

Acknowledgments and references

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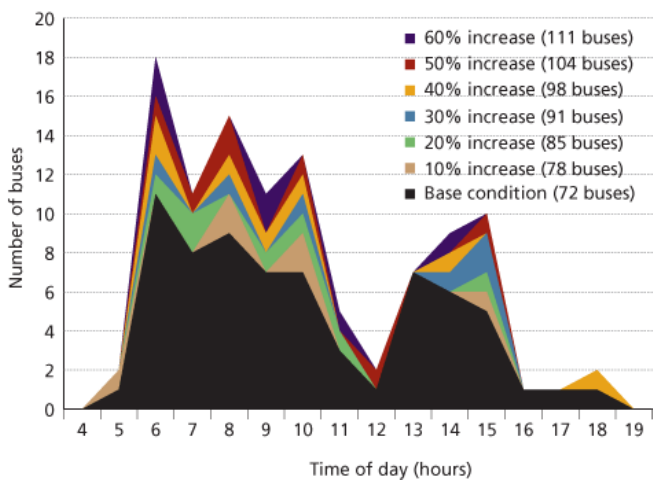


Figure 1. Bus schedules: We used seven traffic scenarios that represented a range of increases in road use in a microsimulation model of the Denali Park Road to identify possible impacts on important social norms and biological resources. In each scenario we increased the number of buses used in the model in proportion to a base schedule that is below the current traffic levels. Traffic on the park road is limited by the present GMP limit of 88 buses per day. Park managers are not considering a reduction in traffic volume as they revisit the traffic limits.

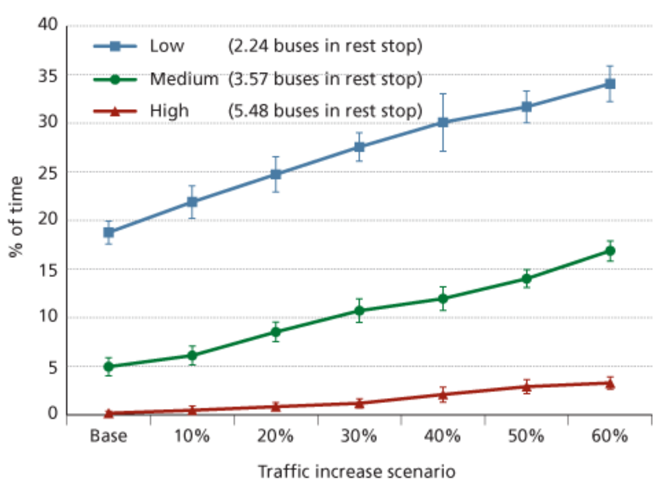


Figure 2. Rest stop crowding: The model forecasts (a) which crowding standards (low, medium, and high) at a rest area on the Denali Park Road would be exceeded more frequently from mid-morning (10 a.m.) until midafternoon (2 p.m.), and (b) a secondary sharp peak in the early evening (6–7 p.m.), as the number of vehicles on the road increased. For example, a traffic increase of 30% would result in the medium-crowding standard (i.e., normally experienced today) being violated around 11% of the time.

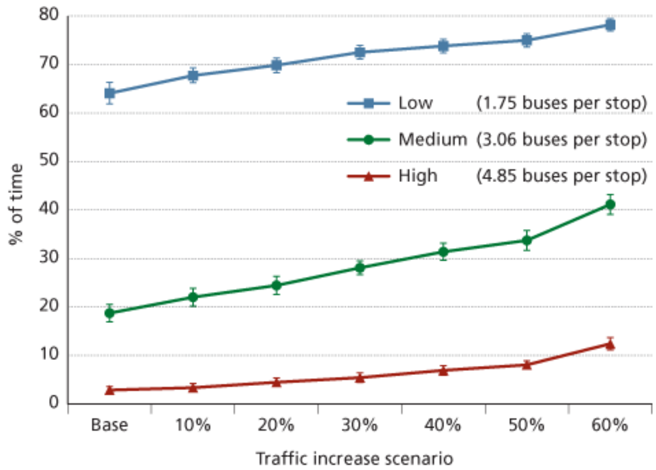


Figure 5. Crowding at wildlife stops: The medium-crowding ("typically saw") standard violation rate proved to be the most sensitive to the simulation traffic increase scenarios. For these scenarios, the largest increase in crowding occurred between mile 30 (1 mile west of the Teklanika River rest area) and mile 45 (2 miles east of the Polychrome rest area), where 24 of 79 wildlife "incidents" occurred in the simulation model. For example, even at the base condition, the high-crowding standard is violated nearly 3% of the time for number of buses at wildlife stops.

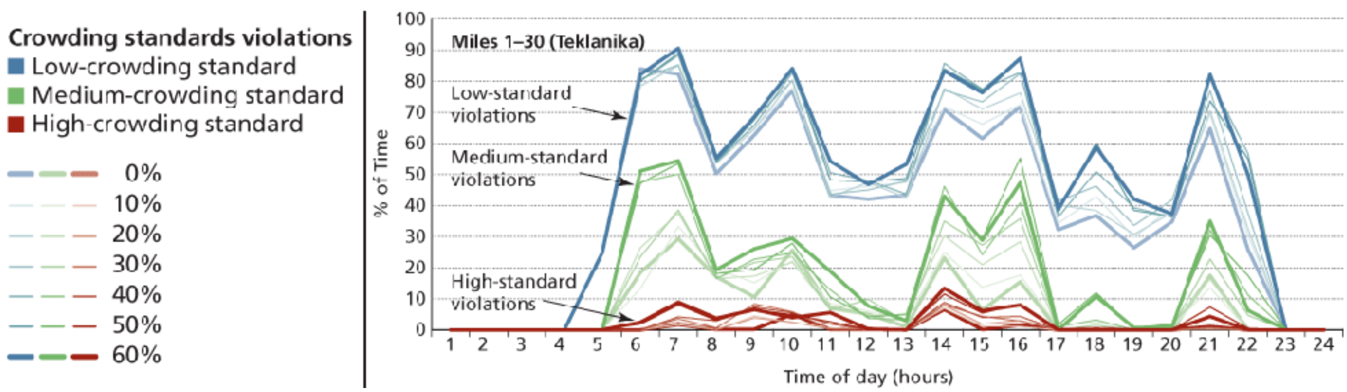


Figure 6. Temporal and spatial variation of crowding at wildlife stops along the park road: A crowding "shockwave" is observable by following the violation peaks in time starting from the beginning of the road in the morning hours (miles 1–30, Teklanika, shown here), proceeding farther into the park, as more vehicles enter the park road. The family of curves in each of the three graphs represents the complete range of modeled traffic conditions.

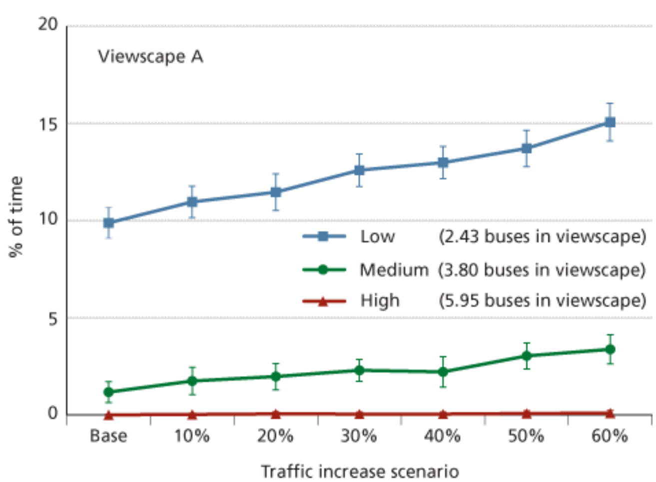


Figure 3. Viewscape crowding: The simulations produced violation levels for the medium- and high-crowding standards for Viewscape A (shown here), the iconic viewscape located at mile 62, just beyond the Stony Hill Overlook scenic rest stop and turnaround, that were less sensitive to increasing road use than those for Viewscape B, the "generic" viewscape located at mile 57, in part because more bus trips pass through Viewscape B than through Viewscape A.

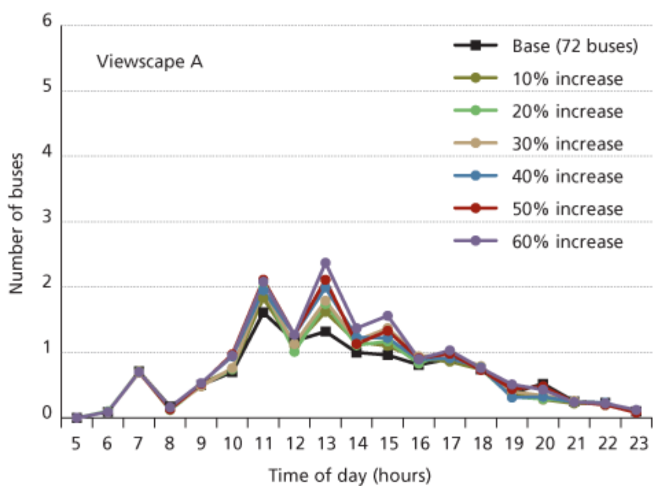


Figure 4. Viewscape crowding: Comparison of temporal trends between the iconic Viewscape A (shown here) and Viewscape B indicates significantly different peaks in crowding that occurred several hours apart, even though the two viewscapes are only 5 miles (8 km) from each other on the park road.

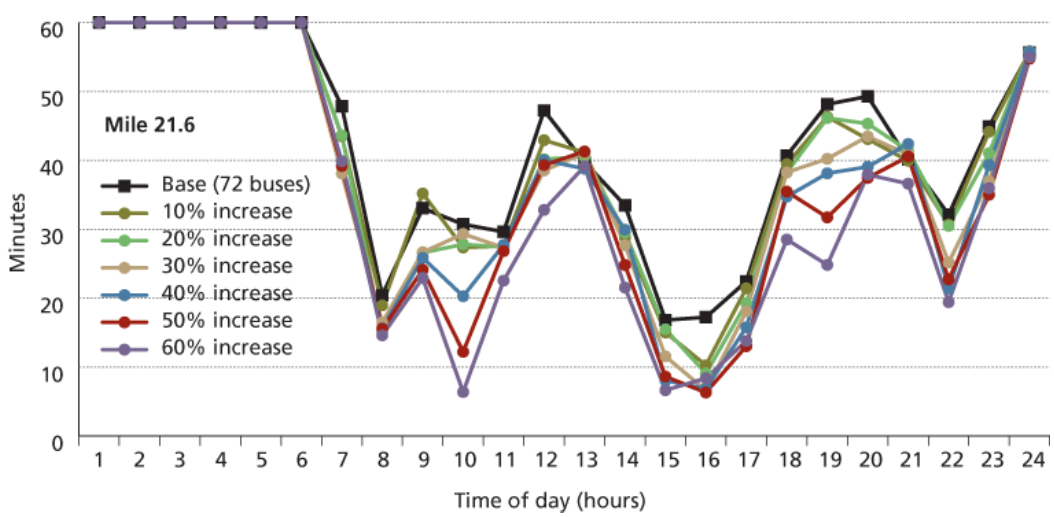
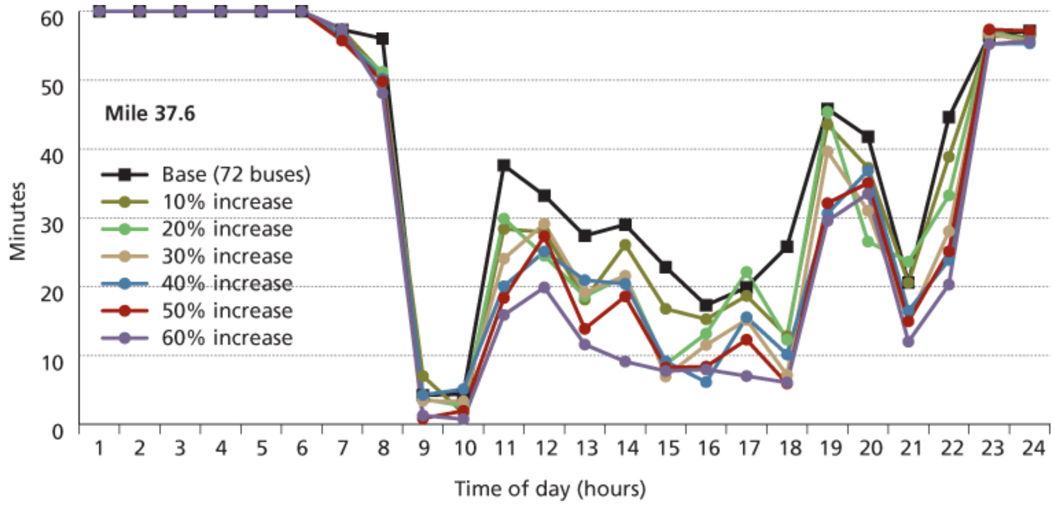


Figure 7. Road crossing opportunities for Dall's sheep: We estimated road crossing opportunities at different traffic levels by calculating the sum of >10-minute traffic gaps per hour at three historical migration corridors: (a) mile 21.6 (shown here), (b) mile 37.6, and (c) mile 52.8. The 60% increase scenario showed a marked decrease in >10-minute gaps (hence sheep crossing opportunities) particularly in the afternoon and early evening hours at mile 37.6.



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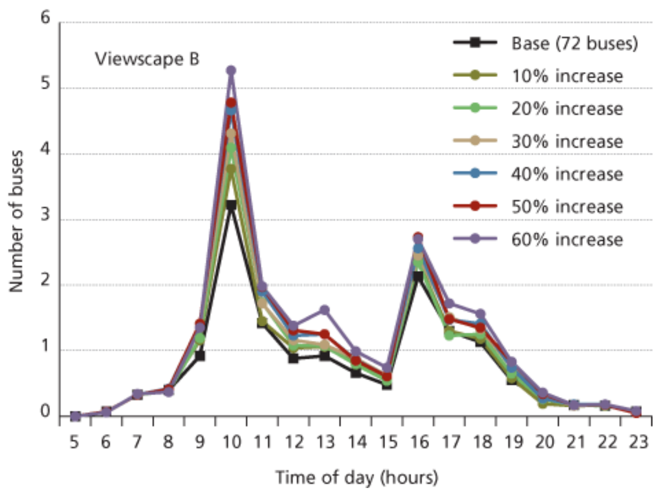

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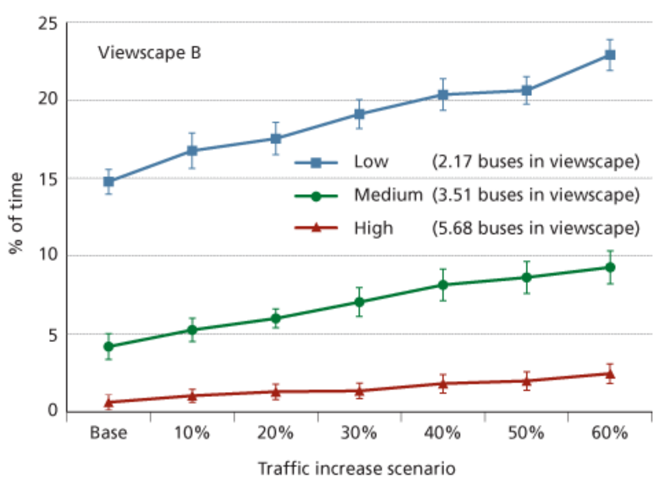

Figure 3. Viewscape crowding: The simulations produced violation levels for the medium- and high-crowding standards for Viewscape A

(shown here), the iconic viewscape located at mile 62, just beyond the Stony Hill Overlook scenic rest stop and turnaround, that were less sensitive to increasing road use than those for Viewscape B (shown here), the “generic” viewscape located at mile 57, in part because more bus trips pass through Viewscape B than through Viewscape A.

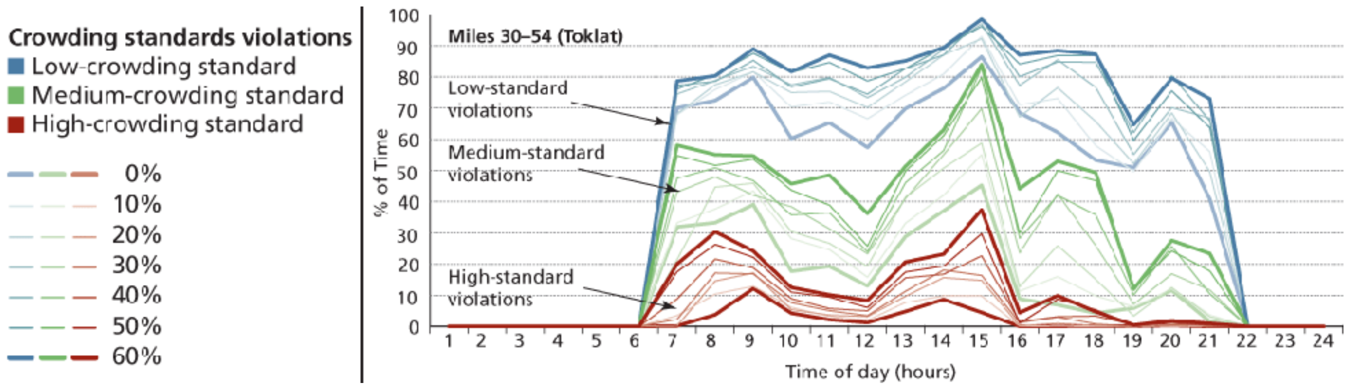

Figure 6. Temporal and spatial variation of crowding at wildlife stops along the park road: A crowding “shockwave” is observable by following the violation peaks in time starting from the beginning of the road in the morning hours (first graph), proceeding farther into the park (miles 30–54, Toklat, shown here), as more vehicles enter the park road. The family of curves in each of the three graphs represents the complete range of modeled traffic conditions.

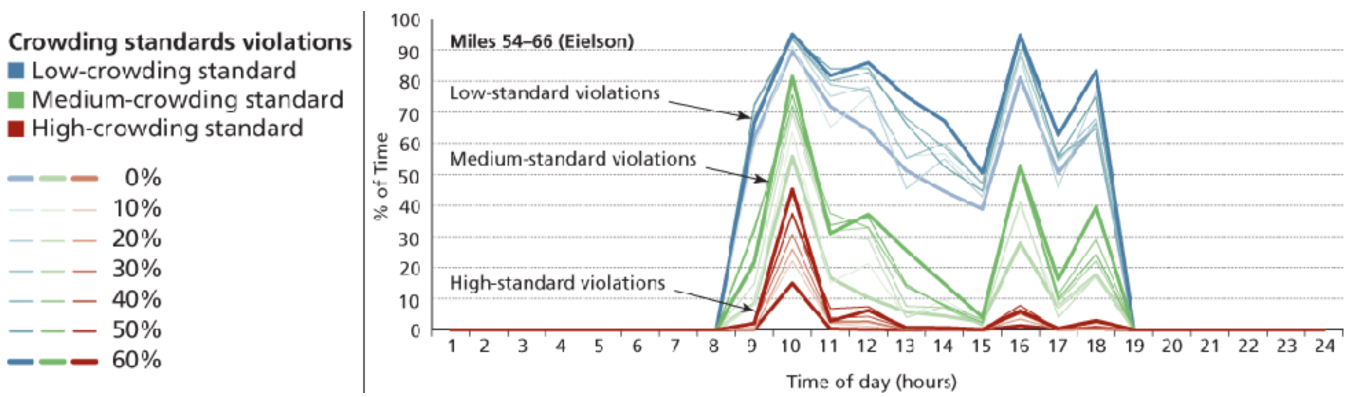

Figure 6. Temporal and spatial variation of crowding at wildlife stops along the park road: A crowding “shockwave” is observable by following the violation peaks in time starting from the beginning of the road in the morning hours (first graph), proceeding farther into the park (miles 54–66, Eielson, shown here), as more vehicles enter the park road. The family of curves in each of the three graphs represents the complete range of modeled traffic conditions.

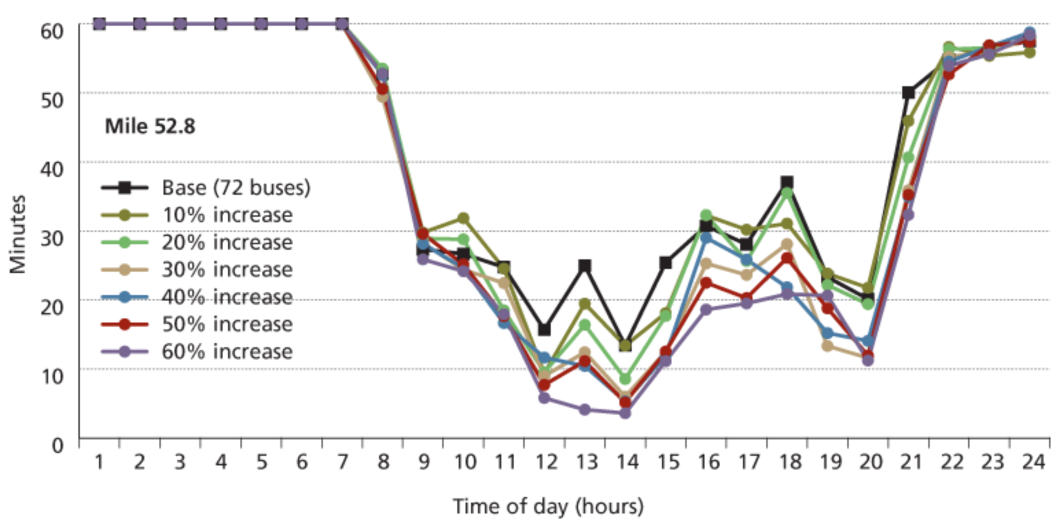

Figure 7. Road crossing opportunities for Dall's sheep: We estimated road crossing opportunities at different traffic levels by calculating the sum of >10-minute traffic gaps per hour at three historical migration corridors: (a) mile 21.6, (b) mile 37.6 (shown here), and (c) mile 52.8 (shown here). The 60% increase scenario showed a marked decrease in >10-minute gaps (hence sheep crossing opportunities) particularly in the afternoon and early evening hours at mile 37.6.

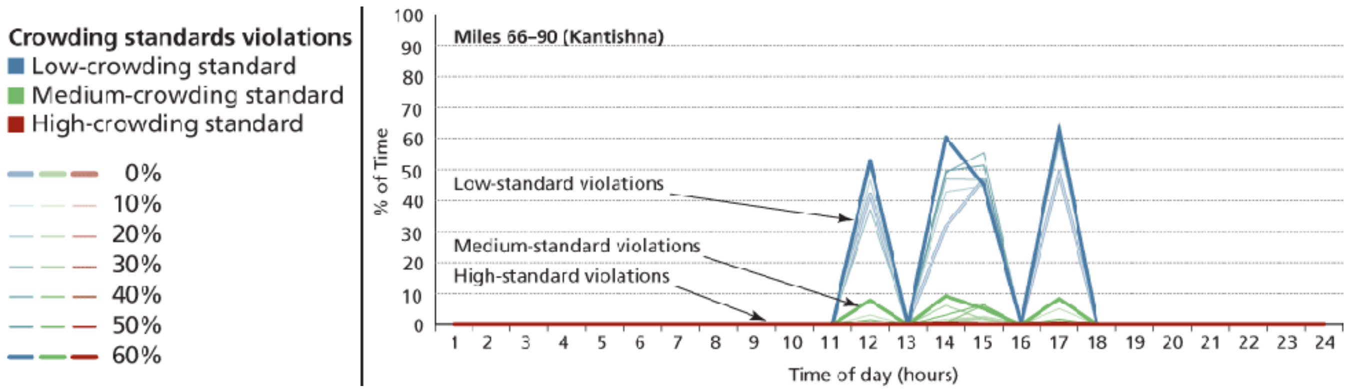

Figure 6. Temporal and spatial variation of crowding at wildlife stops along the park road: A crowding "shockwave" is observable by following the violation peaks in time starting from the beginning of the road in the morning hours (first graph), proceeding farther into the park (miles 66–90, Kantishna, shown here), as more vehicles enter the park road. The family of curves in each of the three graphs represents the complete range of modeled traffic conditions.

Table 1. Standards for the number of buses present at one time and one location on the Denali Park Road for all crowding indicators

	Type of Stop			
Indicator	**Iconic Viewscape (A)**	**Alternative Viewscape (B)**	**Wildlife Stops**	**Polychrome Overlook Rest Stop**
Low-crowding (preference)	2.43	2.17	1.75	2.24
Medium-crowding (typically seen)	3.80	3.51	3.06	3.57
High-crowding (acceptable)	5.95	5.68	4.85	5.48

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