



Protecting Wildlife and Visitor Experience along the Denali Park Road



The two most common visitor responses to the question “What did you enjoy most on the Denali Park Road on your bus trip?” are “seeing wildlife” and “seeing a grizzly bear.”

“Look, a bear on the road!” the man exclaims excitedly as the green shuttle bus climbs toward Polychrome. The passengers yell “Stop,” and the driver brings the bus to a halt. Within yards of the bus, the sow grizzly leaves the road, her head swinging as she gobbles blueberries. Her two cubs tussle and tumble behind her, and several magpies chatter overhead. Another bus pulls up behind—what has that first bus stopped to see?—and soon its passengers are viewing the bears, too. This scene is the magic of place that many visitors hope to experience in Denali National Park and Preserve while traveling the Denali Park Road in a bus.

Consider this wildlife viewing experience as a metaphor for the complicated intersection of many things that Denali managers grapple with—visitor expectations, wildlife viewing, wildlife populations in unaltered natural ecosystems, and the park’s oversight of vehicle traffic on the park road. The common denominator is the NPS mandate to ensure that traffic patterns and volume neither reduce the opportunity for exceptional visitor experiences nor adversely impact the ability of wildlife, such as the grizzly and her cubs, to forage and play and move near or across the park road. To guide how NPS manages the park road to carry out that mandate, there is a new (2012) Vehicle Management Plan.

Constructing the park road, keeping a balance

Beginning in 1923, rock was blasted and gravel moved to create the park road. This 92-mile ribbon of road—winding west from the park entrance to Kantishna—

was completed in 1938. From its inception, the park road has provided the primary access to the park—even though the road seems small and unobtrusive in the wide sweep of the park’s landscape.

Going west, the road character makes transitions from a paved two-lane road (Mile 0-15) to an unpaved two-lane road (Mile 15-31) to an unpaved one-lane road (Mile 31- 92). Sections of the one-lane road that hang precipitously above the valleys pose particular challenges for road crews and drivers to ensure safe travel.

In 1958, the National Park Service (NPS) proposed a road improvement project that would have drastically altered the road’s character. The intent was to widen and pave the entire road and add guard rails and striping. Conservationists, including Adolph and Olaus Murie, fought to protect the “wilderness atmosphere” of the road. Because of their efforts, westbound visitors who cross the Teklanika River are welcomed by the rustic character of road that has persisted for more than seventy years. The road improvement story is an example of the challenge faced by national parks—balancing the need to protect park resources while making these resources available for people to enjoy.

This challenge is amplified in Denali, where park managers must balance the growing demand for visitor opportunities to tour the road with the need to ensure that park resources are protected and visitors continue to have a safe, high-quality experience.

The park road transportation system facilitates wilderness recreational opportunities and supports freedom of discovery, a sense of adventure, and a connection to nature.



Since the park road was constructed, it has been an important part of visitor access and experience.



One of the goals of Denali's Vehicle Management Plan is to maintain the special character of the park road.

In 1972, park managers anticipated a substantial increase in motor vehicle access to the park resulting from the opening of the George Parks Highway. To protect park resources and visitor safety, they used a special park regulation to restrict *private* vehicle travel beyond the Savage River and instituted a public transportation system (buses).

In 1986, managers set an annual limit of 10,512 vehicle trips (from the Saturday before Memorial Day to the second Thursday after Labor Day or September 15, whichever comes first). Vehicles accessing the park road include concessioner-operated buses, government vehicles, and private vehicles operated by park partners, authorized researchers, Teklanika campers, Kantishna property owners, subsistence users, and other special permit holders. Each user group is allocated a portion of the 10,512 trips.

A comprehensive study of the park road

Between 1986 and 2006, visitation to the park and demands for bus travel on the park road increased steadily. In 2006, to defend the existing vehicle limit or consider changing it, park managers initiated a comprehensive study to identify how much traffic could be accommodated on the park road (*carrying capacity*) while protecting park resources and visitor experience.

An interdisciplinary team of NPS and academic scientists conducted the study from 2006 to 2012. The three primary study components were designed to (1) assess vehicle traffic and its impacts (if any) on wildlife movements and sightings from the road, (2) survey visitors to identify and quantify key indicators of a high-quality visitor experience on the park road, and (3) determine traffic patterns and driving behaviors of different types of road users.

Wildlife movements and sightings

In order to identify possible links between vehicle traffic and wildlife behavior, wildlife biologists collared 20 grizzly bears (2006) and 20 Dall's sheep (2007). Also, bus drivers were enlisted to document wildlife sightings from buses (how many wildlife were seen? where were they seen?) for the "big five" large mammals (grizzly bears, wolves, Dall's sheep, moose, and caribou).

Because wildlife had been encountering vehicle traffic for years, it was not expected that the analysis could discern a *statistically* significant impact of the amount and patterns of vehicle traffic on the distribution and movements of wildlife. However, there may be effects that are *biologically* important. This study and previous observations along the park road identified the following impacts from vehicle traffic on wildlife: (1) Dall's sheep were farther from the road at higher traffic volumes, (2) sheep were less likely to cross the road at high traffic levels, and (3) early morning wildlife sightings were reduced following nights with high-volume traffic (which often included large construction vehicles that created substantial noise and dust).

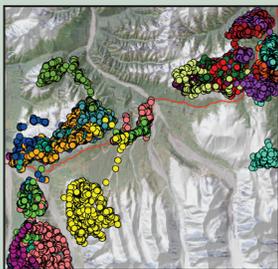
Visitor experience

Researchers conducted visitor surveys in 2006 to determine what aspects of a trip on the park road make it a quality experience. In 2007, the researchers conducted additional visitor surveys about some of the characteristics that were identified in 2006 to be important in providing positive visitor perceptions, such as the number of vehicles visible at iconic viewsheds (see panel of photos on next page).

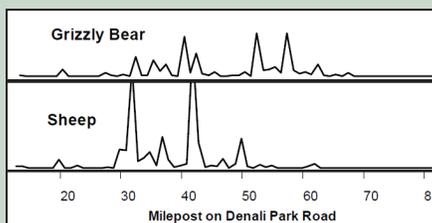
Survey participants were shown a series of photographs depicting crowding by vehicles at wildlife stops, rest stops, and iconic viewscapes.

Gallery of some of the research that provided information for developing the Vehicle Management Plan.

Wildlife movements and sightings



Locations for radio-collared sheep (each color a sheep) confirming where sheep cross the park road (red line).



Graphs summarize sightings of the "big five" mammals (two shown here) and indicate where visitors are more likely to see them along the park road.

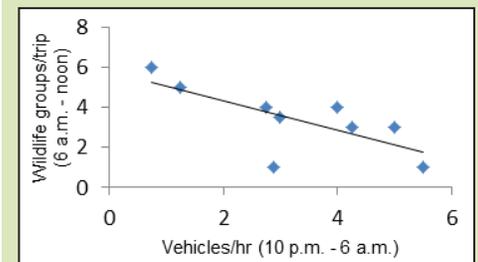
Visitor experience

Top 2 things enjoyed most during bus trip	Visitors %
wildlife	87%
scenery/mountains	83%
Top 2 things enjoyed least during bus trip	Visitors %
long ride/being on bus	28%
nothing	20%

Visitors surveyed indicated their likes and dislikes (e.g., table above) and their preferred park road traffic levels using photos that show 0 - 12 buses in the same viewshed (below).



Traffic patterns



Wildlife sightings (number of groups of wildlife seen during a bus trip) were more common on mornings following nights with fewer night construction vehicles traveling the park road from 10 p.m. to 6 a.m.



The photographs of these sites had been duplicated and modified to show a range of 0-12 buses (see visitor experience photo on previous page). The researchers asked visitors to describe their reactions to different vehicle crowding levels. On average, visitors preferred wildlife stops when there were fewer than 1.75 buses visible and viewscapes when there were fewer than 2.17 buses visible. These surveys provided park managers with guidance on establishing standards for vehicle numbers.

Traffic patterns

Road study ecologists used Global Positioning Systems (GPS) units on a subset of vehicles that traveled the park road to determine the speed and driving behavior (including the number and duration of stops) of different types of road users along different segments of the park road. For example, the Denali Natural History Tour traveled about 10 m.p.h. more slowly than other bus types.

Developing indicators and standards

Park managers and planners used the results of the road capacity study to select seven *indicators* of desired resource condition and visitor experience (see chart at right) and to develop quantitative *standards* for each of the indicators to ensure that the desired conditions are maintained.

Three of the indicators restrict the amount and timing of vehicle traffic to protect wildlife: (1) hourly 10-minute gaps in traffic at five sheep crossings (see photo below), (2) an hourly limit to night-time (10 p.m. to 6 a.m.) traffic, and (3) an hourly limit to large (>80,000 gross pounds) vehicle traffic. Three indicators that set limits on vehicle crowding were based on results of the visitor surveys (perceptions of visitors toward numbers of vehicles seen): (4) the number of vehicles stopped at the same location to view wildlife, (5) the number of vehicles parked at rest stops, and (6) the number of vehicles visible in four iconic viewscapes. The final indicator reflects the effectiveness of the transportation system in serving the needs of visitors: (7) hiker wait times to catch a bus that has room to take the hiker.

Meeting the standards for each indicator means success in managing the park road for its natural ecology and visitor experience.

To protect wildlife and ensure a quality visitor experience, NPS staff will use indicators to monitor desired conditions. For example, park staff will track whether there is sufficient spacing in traffic to allow Dall's sheep to cross the park road, e.g., near Toklat (left photo), how many buses are parked at rest stops, e.g., Toklat Rest Stop (middle), and how long hikers have to wait for a bus (right).



What is the indicator?	Where does it apply beyond the Savage Check Station?
Number of 10-minute gaps in traffic per hour to allow time for sheep to cross the park road	Hogan, Igloo, Toklat, Highway Pass, Grassy Pass
Number of vehicles per hour from 10 p.m. to 6 a.m.	Mile 15 to Mile 87.8 (old park boundary)
Number of large (>80,000 lbs gross weight) vehicles	Mile 15 to Mile 87.8 (old park boundary)
Number of vehicles stopped to view wildlife at one time	Any wildlife stop
Number of vehicles parked at one time	Teklanika and Toklat rest stops, Eielson Visitor Center
Number of vehicles visible in viewcape	Teklanika Flats (Mile 26), West of Toklat (Mile 55), Stony Overlook (Mile 62), Grassy Pass (Mile 68)
Amount of time a hiker waits for a bus	Mile 15 to Mile 87.8 (old park boundary)

Denali's Vehicle Management Plan establishes seven indicators for monitoring vehicle traffic.

Three wildlife viewing subzones were identified (see map on last page). These zones are subject to different standards (subzone 1 is expected to have the most vehicle traffic and subzone 3 the least traffic). For example, at least 75 percent of the wildlife stops will have 3 or fewer vehicles averaged over 5 years in subzone 1 (this is the standard). The standard is stricter in subzone 2 (2 or fewer vehicles) and in subzone 3 (1 or fewer vehicles).

A traffic simulation model was developed to assess the effects of changes in traffic (amount and scheduling) on the indicators (i.e., spacing of vehicles at sheep crossings and on the types of vehicle crowding that impact visitor experience).

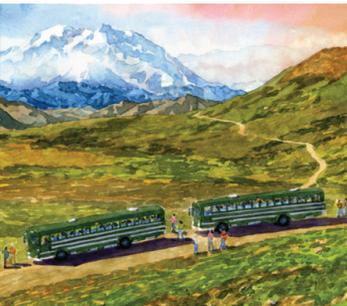


The four iconic viewsheds being monitored for number of vehicles visible at one time are:

- A. Teklanika Flats (Mile 26)
- B. W of Toklat (Mile 55)
- C. Stony Overlook (Mile 62)
- D. Grassy Pass (Mile 68)

For spatial distribution of these viewsheds along park road, see map on last page.

Photo credit: Ron Karpilo



Denali Park Road
Final Vehicle Management Plan and
Environmental Impact Statement

Denali's Vehicle Management Plan (VMP) is the outcome of years of scientific studies, planning efforts, and public input. The goal is to protect park resources, including wildlife, as well as visitor experience and the character of the park road.

This model integrated the traffic patterns (driving behaviors) with the results from the wildlife and visitor experience studies.

How will NPS manage the park road?

After more than six years of scientific study and four years of planning, analysis, and public input, the Denali Park Road Final Vehicle Management Plan and Environmental Impact Statement (VMP) was finalized and the Record of Decision signed by the Alaska NPS Regional Director in September 2012.

Implementation of the VMP is occurring in stages. Monitoring the indicators began in 2013. Full implementation will occur when a new concessions contract to operate the park's public transportation system is in place and the special park regulations—to change the vehicle limit from 10,512 per year to 160 per day—are updated in the U.S. Code of Federal Regulations.

Because there is some level of uncertainty and unpredictability in the outcomes of most management actions, park managers will use *adaptive management* in managing the park road. That is, as traffic volumes and schedules are adjusted to optimize the transportation system, and the results of management actions are monitored and better understood, managers will use the information to adjust further the volumes and schedules to make sure the goals of the VMP are being achieved.

The adaptive management strategy includes four aspects to assure visitor satisfaction and natural resource protection in the face of changes in the transportation system: (1) monitor the indicators

(see list in table) and standards of desired conditions (some standards ask for a five-year average), (2) detect any changes in wildlife sightings from the park road, (3) assess changes in wildlife populations using data from long-term monitoring programs, and (4) compare the data gathered *before* and *after* the traffic modifications are implemented to a *control* in order to determine the *impact* of the new traffic patterns and volumes (known as the Before-After-Control-Impact or BACI study).

During 2013-2015, park staff will develop the specific methods for implementing and for reporting using adaptive management as outlined in the VMP. Monitoring results will be reported to the public on an annual basis.

The VMP will guide management of vehicle traffic during the bus operating season for the next 15-20 years. Monitoring the indicators identified in the VMP will help ensure the protection of the special character of the park road—and the legacy of what the Murie brothers fought to keep decades ago.

What better symbol of the success of the VMP will there be than the wide smiles on awestruck visitors who travel the park road by bus and view and photograph the wild behaviors of a grizzly and her two cubs *right outside the window*?

For more information

Heather McKenny
Denali National Park and Preserve
Center for Resources, Science, and Learning
heather_mckenny@nps.gov
www.nps.gov/dena/parkmgmt

A map of the park road showing the location of several indicators and wildlife viewing subzones.

One of these indicators protects wildlife—vehicle spacing to afford 10-minute gaps in traffic each hour at five sheep crossings (green "hoof print" icon)—to allow Dall's sheep and other wildlife to cross the park road.

Two of these indicators—number of vehicles at rest stops (blue "rest stop" icon) and number of vehicles at viewscapes (brown "camera" icon)—help achieve visitor preferences for the number of vehicles seen while on a bus on the park road.

Standards for these indicators are different within wildlife viewing subzones (shades of magenta).

