



A Predictive Study of Use Impacts on the Denali Park Road



Bears and vehicle congestion on the Park road.

Fortunately the visitation is far below what outside parks are subjected to, hence we are able to strive for and maintain a high standard of quality in Denali. I would urge all planners to strive for quality in this Alaska wilderness. The people expect it.

- Adolph Murie

Adolph Murie's statement that visitation at Denali is far below that experienced by outside parks has not withstood the test of time as visitation climbed above 400,000 in 2004. However the need to maintain a quality wilderness experience for the greatest number of visitors possible while preserving park resources remains one of the primary challenges Park managers at Denali face. This document outlines a plan for biological and social research as well as a computer model which will provide a key tool in enabling managers to evaluate road use to best serve park needs.

History of Road Limits: Denali is now one of the most heavily visited subarctic national parks in the world. Almost all of this visitation is focused along the Park Road. Before 1972, Denali visitation was very low. Travelers arrived either by train or by an arduous overland route on the unimproved Denali Highway. In 1972 park visitation increased 100% in direct response to the opening of the George Parks highway. Anticipating the increase in visitation, park management implemented a mandatory public transportation system in 1972 to minimize disturbances to wildlife and scenery. In 1986 the general Management Plan (GMP) for Denali National Park and Preserve was developed with public hearings and other public input. The GMP authorized a motor vehicle use level of 10,512 vehicle round trips an-

nually. The 10,512 level was established by using 1984 use levels and allowing a maximum 20% increase. The public transportation system has enabled Denali to maintain vehicle use levels below this figure while providing most visitors the opportunity to travel the Park road. However, if increases in visitation continue and demand exceeds this capacity there will be increased pressure to reevaluate these limits and the scientific rationale behind them.

History of Road Research: In response to increased visitation, the NPS supported several observational studies of wildlife abundance and behavior along the park road. The existing data on movements and behavior of wildlife along the Park road have indicated that there may be effect on Dall sheep, grizzly bear, and moose. However, these studies have not been conclusive because of inadequate funding, intermittent effort, a focus on observational studies, a focus only on the road corridor, and a nonintegrated approach. In addition, little effort has been made to obtain data on what constitutes the primary factors that determine visitor satisfaction of the road experience. Logistical constraints such as train arrivals or weather dependent road travel time are also a clear driver of exactly how capacity levels are implemented and thus on any effects of road use. Park managers have had inadequate information to make informed decisions about managing



From top:
 Photographers and moose.
 Observations of Dall Sheep have indicated the potential for disturbance of movement patterns.
 Vehicle congestion frequently occurs at wildlife observations.
 Historic use of the park road. Skinner Collection, Alaska State Library.
 All other photos by Kennan Ward.

traffic levels on the road because of these data gaps and the complicated interplay of any results.

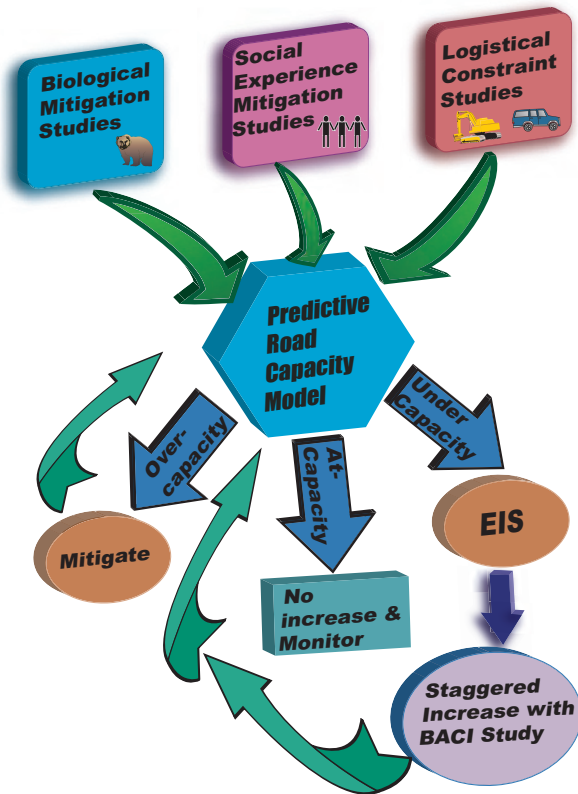
Creating a Road Capacity Computer Model:

The first step in the proposed methodology is developing a Geographic Information System based dynamic road capacity model, similar in concept to models used in evaluating urban transportation systems or managing efficient flow of commercial vehicles. This modeling approach will be based on quantifying the complicated interaction of desired future conditions of wildlife and other natural resources as well as retention of the visitor experience for which Denali is famous. The logistical constraints of the transportation system will also be integrated into the model. Studies will first be conducted to determine the relationship between road traffic and any effects on indicator wildlife namely Dall sheep, brown bears, and wolves. This will be combined with a literature review of the effects of road traffic on wildlife in order to establish “modeling rules”. For example, four or more vehicles in close proximity may result in unacceptable interference in Dall sheep migration. The studies will make efficient use of new Global Positioning System tags on wildlife and on vehicles. Concurrently there will be studies of the social factors associated with quality visitor experience as well as an examination of the logistical constraints of the entire transportation system to establish social and logistical modeling rules. For example, the arrival of trains is a limiting factor in the timing of tour buses.

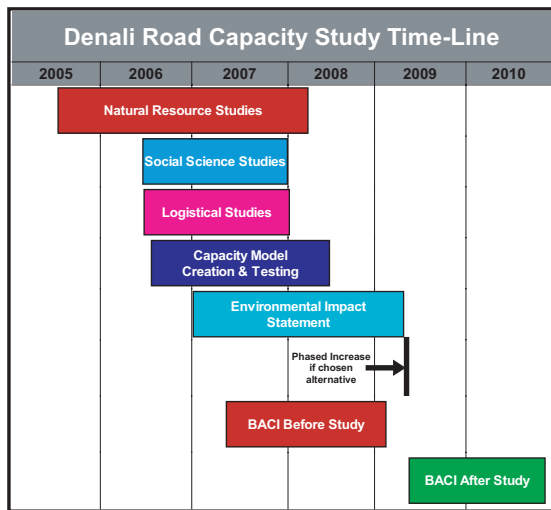
An Adaptive Management Experimental Approach:

The road capacity model will indicate the potential for increases or the potential need to mitigate overcapacity. However, the model will not by itself be able to determine that there are no negative effects of increased traffic. Before-After-Control-Impact (BACI) studies will be conducted to evaluate any increase after a environmental impact statement (EIS) is developed to establish suitable alternatives. An EIS will only be completed if under-capacity is indicated by the model. However, it will be started concurrently in order to ensure adequate time to prepare. Increases in traffic will be staggered over-multiple years and on alternative days to allow for an experimental and a adaptive management approach utilizing the powerful BACI method to evaluate any increases and adjust traffic levels to prevent damage to resource or visitor experience. Indicator wildlife species and visitor experience will be examined over a two year period before and after increases as well as between controls (alternative days) and impact (days with increases). “Before” studies will be conducted simultaneously with modeling studies to ensure that any potential increase in visitor numbers on the road are not needlessly delayed. This approach

will allow for a transparent scientific evaluation of what has been a problematic and highly politicized process.



Conceptual model for road capacity studies and adaptive management actions



Time-line for road capacity studies and adaptive management actions.

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