Summer 2007- Road dust monitoring

Fig. 1. Fugitive dust can be a real problem on some areas of the Denali Park Road.

The Denali National Park road study is composed of 3 distinct parts. The first part of the study, the road capacity study, entails determining the capacity for vehicle traffic on the Denali Park road by examining the movements of wildlife in relation to traffic patterns; modeling possible constraints to traffic flow given driver behavior, number of vehicles, and physical characteristics of the park road; and conducting interviews to discover important components of a quality visitor experience. The results of this first study will help managers decide whether the current limit of 10,512 vehicles annually on the park road puts the road at-, under-, or over-capacity. If it's found that the park road could accommodate greater traffic without negatively affecting targeted wildlife species, traffic flow, or visitor experience, then the park will create an Environmental Impact Statement (EIS) outlining possible alternatives for increased road use. Because the initial road capacity study may not predict all possible negative effects of a traffic increase, a Before-After-Control-Impact (BACI) study would be implemented to evaluate a suite of potential effects. Traffic would be experimentally increased in alternate time periods to allow for data to be collected under control and impact scenarios. Significant changes in variables selected to be examined during the BACI study would be reason for rejecting an increase in traffic.

Fig. 2. What are those green buckets for? Dust collection bin along the Denali Park Road.

Dust can be severe on the 90-mile gravel road during summer dry periods, and possible negative impacts such as decreased visibility, loss of surface material, detrimental health affects, and alteration of plants and soils adjacent to the road are of concern to park managers (Fig. 1). Past studies of dust in the park road corridor found that a 1 meter wide section of road could generate 0.5 lbs of dust mass accumulation in areas adjacent to the road each day. Presumably quantities of dust generated on any one day varies with a number of environmental and anthropogenic factors, including precipitation, wind, dust palliative (calcium chloride, CaCl) application, and numbers and types of vehicles traveling the road. If a BACI study is initiated and traffic levels on the park road are experimentally increased, potential changes in fugitive dust will be monitored. Accumulated dust adjacent to the park road will be measured using sampling protocols developed in previous Denali Park dust monitoring studies (Karle 1997, 1999). The primary objective of the study would be to determine whether an increase in vehicle traffic on the park road causes a significant increase in dust accumulation adjacent to the road. To tease apart confounding factors, we will determine how dust accumulation varies with precipitation, wind, vehicle numbers and dust palliative application. Monitoring dust adjacent to the

park road during summer 2007 will be a pilot effort that will be expanded and refined once it is determined that a BACI study will be initiated.

Methods

Dust collection methods will follow protocols outlined by Karle (1997, 1999). Dust will be collected in open buckets containing water and mounted 1 meter above ground level (Fig. 1). Two pans spaced 20 meters apart will be placed on both sides of the road at 5 and 50 meters from the road edge. Sampling locations include a control site along the paved section of road at mile 9, a previously sampled site at mile 29, an east end dust palliative control site (no previous or future CaCl application) at mile 23.5, a west end dust palliative control site at mile 51, and a site at mile 55.5 (Fig. 2).

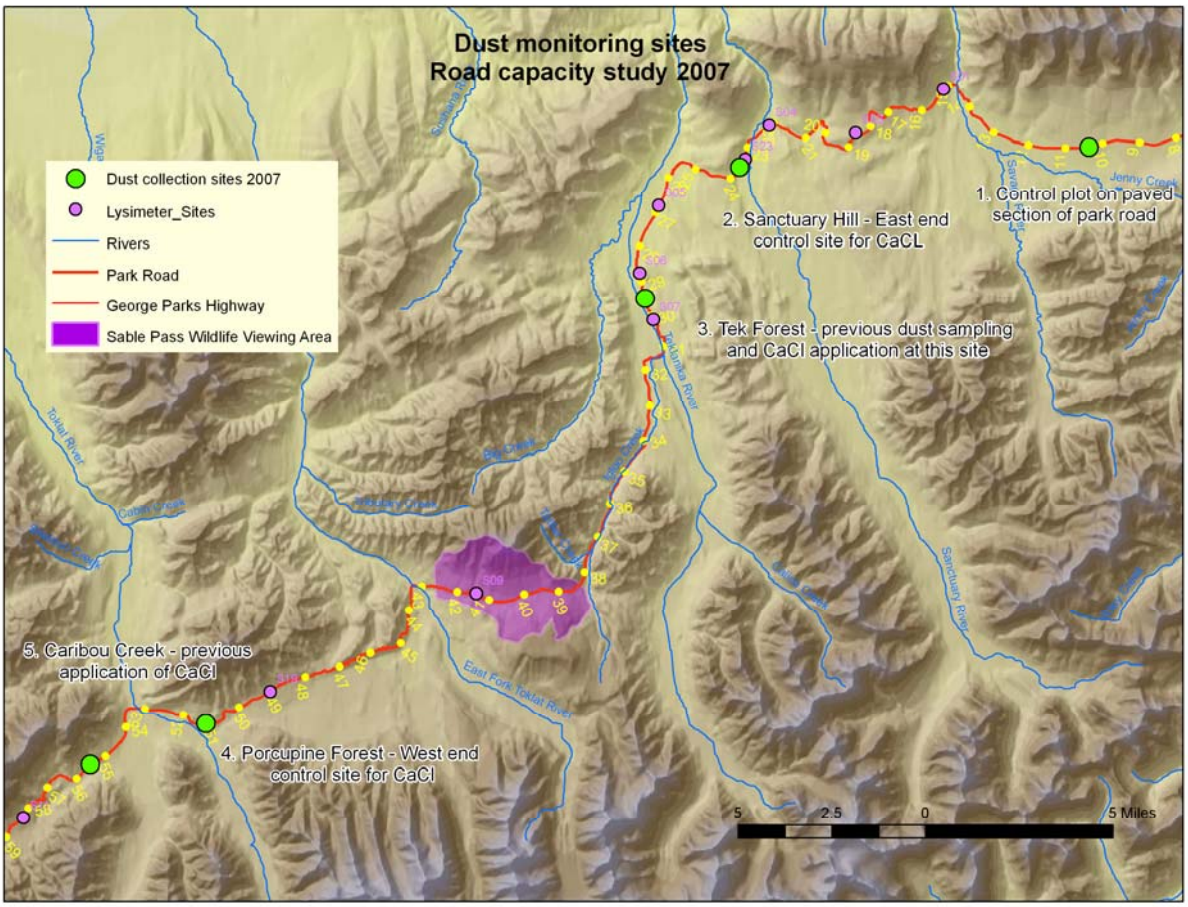

Fig. 3. Locations of dust monitoring bins (green dots) along the Denali Park Road, Summer 2007. The lysimeter sites (pink dots) are locations where ground water is collectedas part of an ongoing study of the potential effects of dust palliative application on areas adjacent to the road.

Current events

Current road study work in the park includes: written quantitative visitor surveys conducted by University of Vermont staff (survey available on road study website); Dall sheep behavioral observations; dust collection and monitoring; vehicle GPS download and maintenance; hand-held GPS distribution at Savage check station; Sunday "Quiet" night; traffic counter data collection; and 2006 bear habitat use data analysis.

Contact Laura Phillips at laura_phillips@nps.gov or 683-5761 with comments or suggestions. For more information on the road capacity study, visit the website at: http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm.