Environmental effects on bison in Wood Buffalo National Park

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Management of bison herds in Wood Buffalo National Park has been a subject of much debate in recent years. The presence of disease in the population has lead federal researchers to suggest eradicating the existing herds and repopulating the Park with a disease-free herd. Studies to date have considered the effects of predation and disease on the bison, but only postulated on the impacts of habitat variation. The goal of our research is to characterize short-term variation in forage availability and to determine whether the recent fluctuation in bison numbers in the Park is correlated with annual habitat variation. We use a time-series of population data and empirically defined relationships between population growth and forage resources to predict forage-based carrying capacity at which the rate of increase is zero (i.e. equilibrium). We quantify relationships between NDVI values from AVHRR (Advanced Very High Resolution Radiometer) imagery from the Peace-Athabasca Delta during 1993-2002 and vegetation productivity, climatic, flooding regimes, and snow data and relate them to bison counts from annual aerial surveys flown each winter over the same period. We estimate the number of bison removed from the population by predation as a function of the numerical and functional response of wolves to bison following the approach of Joly and Messier (2001).