

Development of Conservation and Management Technique for Large Mammals in Shiretoko World Natural Heritage Site.

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[Abstract]

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Objectives were to: 1) develop a new population estimation method for brown bears; 2) clarify the relationship between annual changes in bear diet and prey species; and 3) clarify the mechanism of maintaining high densities of sika deer population. From 2019 to 2020, we collected approximately 20,000 hair samples and 900 feces samples of bears for DNA analysis and individual identification. As a result, 499 brown bears were identified over the two-year period. We also established a new population estimation method that integrates the spatially explicit mark-recapture and tag recovery methods with individual identification. As a result, we estimated that there are 472 individuals (95%CI: 393-550) in 2019 and 399 individuals (342-457) in 2020. We found that the frequency of photographing bears could be used for monitoring population trends. We also investigated the reproductive status of female brown bears and identified the litter size, reproductive rate, breeding interval, age at first calving, and survival rates of sub-adult bears. The mass appearance and mortality of bears occurred in 2012 and 2015. We divided the Shiretoko Peninsula into six districts and examined geographical and annual variations of their food habits. Fecal contents analysis and the stable isotope ratio analysis of hairs revealed that the use of salmonids was higher at the tip area of peninsula. The years of mass appearance coincided with the years when the start of the pink salmon run was delayed or the number of salmon decreased, and when there was a bad harvest of *Quercus crispula* and *Pinus pumila* acorns. It was suggested that the possibility of predicting mass appearance of brown bears in advance. The survival rate of adult female for sika deer was estimated to be 87% in the Rusha, where no control-kill was conducted, and 82% in the Horobetsu/Iwaobetsu district, where control-kill was conducted. Natural mortality including predation by bears was less than 13% in both districts. Sensitivity analysis suggested that a population growth rate of less than 1.0 would result in a decrease in the population when the adult female survival rate was less than 71%. Pregnancy rates were more than 81% in both districts. Recruitment rates showed large annual fluctuations. Predation by brown bears and weather factors during winter were thought to have affected recruitment rates. Thus, high survival and pregnancy rates of adult females were found to support the population's high-density maintenance mechanism.

[References]

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