

Analysis of the Relationship Between Seasonal and Locational Features of Sika Deer-Vehicle Collisions in Hokkaido, Japan and Deer Ecology Towards Collision Reduction

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ABSTRACT

Collisions between vehicles and wildlife are a serious problem in many countries around the world. Ungulate-vehicle collisions are the most problematic, because the damage from such collisions, including injuries and fatalities of humans and animals, tends to be serious. The number of sika deer on Hokkaido, the northernmost island of Japan, is steadily increasing, as are deer-vehicle collisions (DVCs) there. To achieve greater traffic safety and harmony between wildlife and humans by developing measures to prevent such collisions, this study investigated the details of DVCs on the national highways in the Kushiro area, one of the most DVC-prone areas in Hokkaido, using a database that includes the number of DVCs for the 12 years from 1995, each DVC location, the route name and the pickup date. First, the relationship between DVC frequency and deer seasonal behavior was investigated. Next, a Poisson regression model was used to understand the effect of explanatory variables on the number of DVCs. These explanatory variables included DVC site topography features such as avg. annual max. snow depth, avg. elevation, vegetation type, land-use classification, distance from the nearest river, distance from the nearest woods, distance from the nearest wildlife sanctuary and average day traffic volume (ADT). A topographic dataset including the spatial distribution of avg. elevation and of avg. annual max. snow depth, and roadside landscape features within the 1,000-m wide zone on both sides of each sample road by 1 km long section was created by using GIS software. On the basis of the results of the data analysis, effective DVC prevention measures by features of DVC prone sites were considered.