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学位論文題目

Habitat selection by Asiatic black bears inhabiting

on the periphery of human-dominated lands

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The frequent occurrence in recent decades of Asiatic black bears (*Ursus thibetanus*) on the periphery of human-dominated lands in Japan is an instance of a worldwide increase in the observation of carnivores within or around anthropogenic landscape. While advanced studies have already investigated the effect on both people and animals of this phenomenon, the causal mechanisms have rarely been explored.

Given the high probability that the prevalent recourse to lethal control will result in serious impacts on the populations of these low reproductive animals, a long-term management scheme to reduce human-bear interactions is essential not only for the prevention of damage to property but also for the persistence of viable bear populations. Despite the fact that our knowledge of bear habitats offers considerable potential for identifying the causes underlying the frequent use of anthropogenic lands by bears, to date few studies of habitat selection have been conducted in Japan.

This study aims primarily to initiate the compilation of baseline knowledge relating to habitat selection by Asiatic black bears. On the assumption that land use changes by humans has a profound impact on the habitat of bears, I have focused on searching for the linkages between current habitat selection by bears and land use patterns by humans that might be the ultimate cause of increased human-bear interactions. Evaluations of the quality and quantity of habitat in the mountain-valley region that was the focus of this study were undertaken on the basis of predictive models for habitat distribution. The eventual goal of the study was to address large-scale and long-term issues of human responsibility in managing lands in order to reduce the frequency of human-bear conflicts.

Accurate locations of 15 females and 13 males acquired by global positioning systems (GPS) were the foundation used to estimate habitat selection by Asiatic black bears in two seasons, summer and autumn. On the basis of biologically relevant covariates generated by the geographical information system (GIS), the relative probability of habitat selection was predicted using resource selection functions (RSF) to identify season specific habitat in relation to human land use. Interaction terms in logistic regression were employed to

investigate how effects of distance from linear landscape features on bear response vary among season and landscape types, and human-bear boundaries where interaction between humans and bears was most likely to occur were delineated.

The habitat selection models clearly suggested that there was specific landscape components selected by bears during summer, the season of prevalent human-bear conflict. Asiatic black bears positively selected red pine forests, open regenerating lands, and areas nearby forest edges, forest roads and rivers in this season. The study also revealed a remarkable consistency of selection for deciduous broad-leaved forests and avoidance for coniferous plantations among seasons. Areas of high probability in the selection estimated by the RSF models showed that the distribution of summer habitat for bears was significantly skewed toward lower lands intensively used by humans, and strongly affected by linear landscape features that resulted in the secure habitat remaining for bears being noticeably confined.

The characteristics of the landscapes positively selected by bears imply that available summer food is severely restricted in marginal lands consisting of unmanaged forests near human-dominated lands and riparian forests. This indicates that human land use changes are the underlying cause of the frequent use by bears of the peripheries of human-dominated lands, and thus ultimately the cause of the increase in human-bear conflicts.

Given what is now known about the effects of human land use on bear habitat use, it is possible to propose several management strategies that might reduce human-bear interactions by restoring heterogeneous forests in remote mountains, prioritizing areas to create buffers and disseminating information about pre-avoidance measures among local communities and tourists. In view of our still limited knowledge of the habitat of Asiatic black bears, further exploration of habitat selection is crucial if we are to identify the specific human disturbances affecting the habitat of bears or other wildlife in Japan. This research has confirmed that knowledge of the causal mechanism underlying the frequent use of marginal habitat near human-dominated lands has the potential to enable the creation of more effective mitigation measures for the long-term conservation of the elusive large carnivore struggling to survive in this populous country.