

The Ecology and Management of Aquatic-Terrestrial Ecotones (Man and the Biosphere Series)



Article

Impacts of Changing Forest Management Areas on Forest Landscapes and Habitat Patterns in Northeastern China

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Abstract: The management of multi-use forests often drives forest fragmentation, which leads to decreased habitat areas and quality. We explored suitable habitat distributions of cervids to evaluate the conflict between small-scale human management and large-scale habitat conservation in human-disturbed forest landscapes. We estimated the potential habitat of roe deer (*Capreolus pygargus*) and determined the contribution of multiple environmental factors to habitat distribution using the presence of roe deer (N = 106) in a maximum entropy (MaxEnt) model. We simulated changes in the suitable habitat and characteristics of landscape patterns based on three forest management area scenarios. The results showed that the potential suitable habitat for roe deer was located mainly in the east. The variables affecting habitat suitability were similar in different scenarios, and included distance to farmland, settlements, rivers and management areas, and elevation. Distance to the management area was found to affect habitat suitability with a contribution probability from 4% to 6%. With an increase in the management area, the suitable habitat decreased. Landscape indexes showed that habitat quality decreased with management area expansion, but patch fragmentation was not aggravated. The expansion of the management area increased the range of human disturbance and had a negative impact on habitat area and quality, which adversely affected the environmental suitability for roe deer.

Keywords: national forest; forest management; suitable habitat; species distribution models; roe deer

1. Introduction

Forest management activities often have a negative impact on the habitat and living conditions of wild animals [1]. For example, Leclerc et al. (2012) mentioned that in the context of the declining global population of caribou (*Rangifer tarandus*), reducing forestry activities will help protect caribou habitat and increase their population [2]. The pattern, intensity and scope of forestry activities can affect the habitat of wild animals. These forestry activities are largely determined by the forest ownership system, which means that changes to the system guide these forestry activities. In recent years, forest rights in many areas have become more dispersed. There are a variety of management measures for the understorey layer, plus increased frequency and scope of management, which affect indicators such as the distribution, abundance and coverage of vegetation, and which also result in the spatial fragmentation of the forest landscape and habitat degradation for wild animals [3,4]. The trend towards decentralized management guides human activities, directly affecting the habitat of most wild animals [5–7]. Since 2012, commercial logging has been banned in the Lesser Xing'an Mountains.

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