Siegrist, D., Clivaz, C., Hunziker, M. & Iten, S. (eds.) (2006). Exploring the Nature of Management.
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Environmental Impacts of Recreational Horse Riding in Protected Areas

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Introduction

The use of protected areas as destination areas for nature-based tourisms has increased remarkably during recent decades. Characteristics for this development have not only been the manifold numbers of visitors but also new types of recreational and tourism activities in protected areas. One greatly increased activity in protected areas is recreational horse-riding (e. g. Landsberg et al. 2001, Newsome et al. 2004). Furthermore, it seems that horse-riding will continue to be a significant recreational activity even with a considerable growing pressure. Conflicts between horse-riders and other recreational users arise because of direct impacts of horses and because of the greater erosion caused by horse-riding compared to other recreational activities. Environmental impacts of recreational horse riding are indeed both quantitatively and qualitatively greater than those caused by walkers. Horse-riding causes considerable damages to soils and vegetation by trampling and grazing, defoliation and nutrient enrichment by urination and defecation of horses (reviewed in Newsome et al. 2004). Even though recreational horse riding also poses a threat of spreading introduced species via horse manure (Campbell & Gibson 2001), the ecological impacts of horse-riding are poorly studied especially in northern areas.

Methods

We investigated the influence of horse-riding on vegetation and soil characteristics by experimental and monitoring research at Oulanka National Park, north-eastern Finland during 2001-2005. The main aim of the study was to assess and to quantify the general environmental impacts of horse-riding in protected areas in northern Finland. Furthermore, we specifically focused on the potential risks of horse-riding in spreading alien species to protected areas by conducting a field experiment. The study was full-factorial with three factors: (1) removal of humus layer, simulating trails trampled by horses, (2) addition of horse manure and (3) addition of seeds of dwarf shrubs (Vaccinium myrtillus, Vaccinium vitis-idaea and Empetrum nigrum).

Results

Our monitoring data from horse-riding trails and campsites show that even a low number of horse-back riders (about 80 – 100 per year) has caused considerable trail erosion and degradation. Erosion of trails was lowest in the driest forest type, Myrtillus-Calluna-Cladina (MC-ClT) compared to dry heath Empetrum-Myrtillus forests and moist Hyloconium-Myrtillus forests (figure 1a). Also topography and ele-

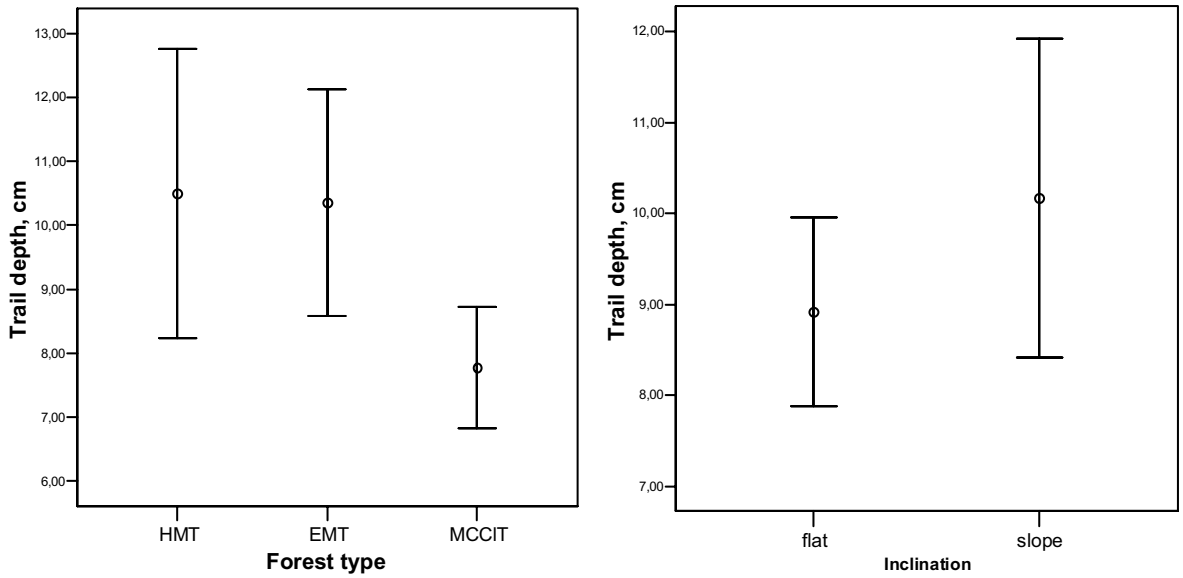

Figure 1: Mean (SE) trail depths (cm) of horse-riding trails in Oulanka National Park, Finland in (a) different boreal forest types (HMT = Hyloconium-Myrtillus; EMT = Empetrum-Myrtillus; MCCIT = Myrtillus-Calluna-Cladina) and (b) among trails in flat and slope terrain.

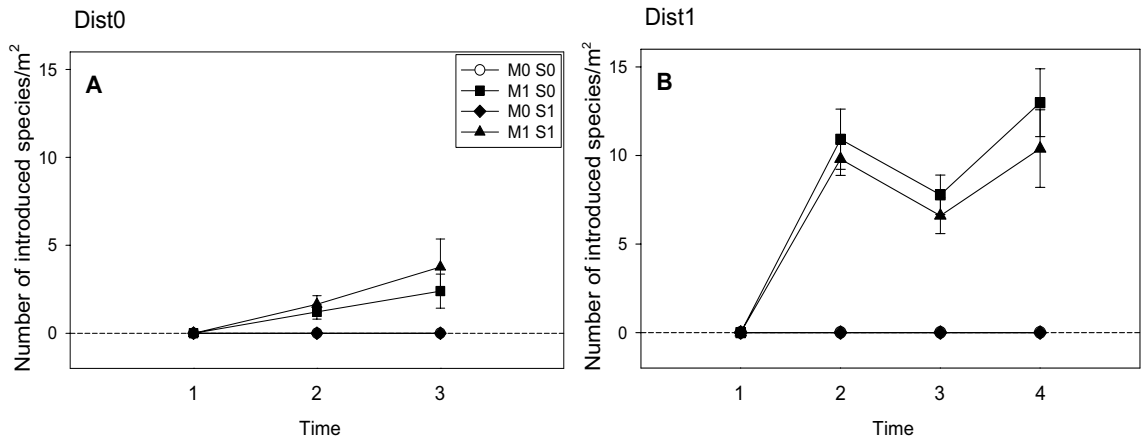

Figure 2: Change in the number of shoots of introduced species per m2 in (a) undisturbed (Dist0) plots and in (b) disturbed plots with removal of humus after treatments. Treatment abbreviations: no manure addition (M0), addition of manure (M1), no seed addition (S0) and addition of seeds (S1). The response was measure at the starting point (Time 1), one month (Time 2), one year (Time 3) and two years afterwards (Time 4).

lower that in slopes (figure 1b). Monitoring results on horse resting areas show that the cover of evergreen dwarf shrubs and herbaceous plants decreased due to trampling and grazing by horses. Original forest plant communities were replaced by secondary ones with many species introduced to the national park.

Our experimental study on the effects of horse-riding shows that via horse manure a number of introduced species was able to establish themselves in study plots (figure 2.). Moreover, there was an interaction between horse manure treatment and humus removal treatment indicating that among eroded study plots the establishment of introduced species was more quickly compared to control plots without humus removal (figure 2). This indicates that the potential risk of introducing alien species to protected areas via horse-riding is related to the level of human-induced disturbance. Alien species are more likely to establish themselves in protected areas when the vegetation and soils are prone to trampling disturbance either by horses, hikers or other users. Because of the diverse impacts to native species and to ecological processes, horse riding poses a serious risk for the biodiversity of conservation areas at least if not carefully planned and controlled.

References

Campbell, J.E. & Gibson, D.J. (2001). The effect of seeds of exotic species transported via horse dung on vegetation along trail corridors. In: Plant Ecology (157), p 23-35.

Landsberg, J., Logan, B. & Shorthouse, D. (2001). Horse riding in urban conservation areas: Reviewing scientific evidence to guide management. In: Ecological management & Restoration (2), p 36-46.

Newsome, D., Cole, D.N. & Marion, J.L. (2004). Environmental impacts associated with recreational horse-riding. In: Buckley, R. (ed.). Environmental Impacts of Ecotourism, p 61-82. Cambridge.