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Out of sight of wind turbines—Reindeer response to wind farms in operation

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Abstract

Reindeer herding is a traditional land use based on wild ungulate herbivory. Large-scale infrastructure development and other anthropogenic disturbances are increasing in the Scandinavian mountains. Wind power development is one such disturbance, and there is a lack of knowledge about how the herbivore herding ecosystem is affected by wind farms. We studied reindeer herding and other ungulates in a 1000 km² area in the Swedish mountains before, during and after construction of a wind farm. We used GPS collared reindeer and aerial surveys to study the spatial and temporal distribution of reindeer, and found a significant decrease in habitat selection of wintering reindeer herds within the wind farm. Reindeer herds showed a significant decrease in habitat selection of areas within 2 km of the wind farm, and a significant increase in habitat selection of areas more than 2 km away from the wind farm. We estimate the reindeer shift in home range distance as 1.5 km on average. The wind farm affected the reindeer shift in home range distance on average by 1.5 km. We discuss the reindeer shift in home range distance as a measure of the reindeer herding ecosystem's resilience to wind farm development. We also discuss how the reindeer herding ecosystem could be managed to minimize the adverse impact on reindeer habitat selection than the construction phase. Wind farm development in reindeer herding areas is a complex issue, and we suggest that adaptive management should be the reindeer herding and the wind farm industry.

Keywords: Rangifer tarandus tarandus, wind farm, reindeer herding, habitat selection, Swedish mountain, scoping, wind, construction, disturbance

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...Introduction (e.g. European red deer Kuehn, Haensel, Schroeder, Jeltsch, 2011; Norwegian reindeer Skarin et al., 2015; Sami reindeer Skarin et al., 2015) were affected by WPP construction and operation, while one study detected no effects on the behaviour of Sika deer (Cervus nippon) (Ikuta, Matsuzaki, Morimoto, 2013).

Studies in Scandinavia addressed movement behaviour and habitat selection of reindeer herds and found reindeer avoidance of WPP areas (Skarin et al., 2015; Reinhardt et al., 2012; Wahlgren, Karlsson, Danell and Olofsson, 2007; Wahlgren, Danell, Karlsson, Pettersson et al., 2011). Reindeer herders reported that reindeer avoided areas with WPP and that reindeer herding was impacted by WPP construction and operation and that reindeer herding operations had to be adapted to the new situation (Skarin et al., 2015).

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