Bevanger, K., G. Bartzke, H. Brøseth, J.O. Gjershaug, F. Hanssen, K.-O. Jacobsen, P. Kvaløy, R. May, T. Nygård, H.C. Pedersen, O. Reitan, S. Refsnæs, S. Stokke, and R. Vang. 2009. Optimal design and routing of power lines; ecological, technical and economic perspectives" (OPTIPOL). Progress Report 2009. – NINA Report 504. 46 pp.

Abstract: From 2009 inclusive, NINA has received economic support for research on power lines and wildlife from the Norwegian Research Council (NFR) through the RENERGI Programme. The project is named "*Optimal design and routing of power lines; ecological, technical and eco-nomic perspectives*" (OPTIPOL). It is scheduled for 5 years (2009-1013) and is part of the activities within CEDREN, i.e. the *Centre for environmental design of renewable energy* (cf. http://www.cedren.no). With a grid close to 200 000 km overhead power-lines, the associated rights-of-way (ROW) affect huge land areas in Norway. The overall goal is to develop predicting tools for optimal routing of power lines from an environmental perspective and assess technical and economic solutions to minimize conflicts with wildlife and habitat conservation. Thus, the OPTIPOL rationale is based on the belief that the negative effects of electricity transmission and distribution can be reduced with respect to birds and mammals. OPTIPOL has several ambitious objectives, and is divided into sub-projects and specific tasks. From the first of November a PhD-student became part of the project, a position that will be held for 4 years. The main objective of the PhD-activities will be to assess how and why different wildlife species use deforested areas below power lines, evaluate possible positive and negative effects of power-line ROWs, and assess the possibilities for quality improvement. Another part of the project is dedicated the effects of linear structures on movement patterns and distribution in the landscape in native deer species. Here we will examine how different spatial scales influence the processes that guide movement patterns, and responses to linear structures. Another focus will be small game species, with mountain hare, capercaillie, black grouse and hazel grouse as model species. The main objective will be to assess the impact of transforming ROW habitats into attractive small-game foraging habitats. Moreover avoidance behaviour of gallinaceous birds towards power-line corridors will be studied, using capercaillie and hazel grouse as model species. Finally, mortality rates due to power-line collisions, relative to other human-related mortality factors (primarily hunting) among gallinaceous birds will be assessed, using capercaillie and black grouse as model species. Efforts to identify how topographic factors, including vegetation structure, affect bird-collision risk also are part of this work package. A wachtelhund, born in September 2009, is now being trained to locate dead birds in power-line corridors. The efforts to identify species- and site-specific factors regarding bird collisions with power lines is also the rationale behind a subproject where we are developing an online web application for registering dead bird data via Internet. We will target as many relevant users as possible and existing bird-collision data from various projects in NINA will also be imported into the database. A functional prototype of the web application is finished, and incorpo-rates topographical maps, and the possibility of overlaying power-line maps. The work with a Least Cost Path (LCP) toolbox for optimal routing of power lines has started. A pilot LCP-GIS-toolbox has been developed and will be further developed in 2010. Data from the national power-line database from NVE has been organised for internal use in a restricted/classified database at NINA. These data are used together with ecological background data to identify case-study areas. The first stage of the work on power-line colour camouflaging and mitigating measures regarding bird collisions and electrocution are made as reviews studies and will be finalized in 2010. Guidelines for technical solutions to mitigate bird collisions and electrocution hazard have started and will be an important part of the work in 2010. The eagle-owl is used as a model species in connection to the studies of electrocution mitigating measures. The study includes use of GPS-satellite telemetry to see how the eagle owls use the pylons during hunting activities. This will also give data on eagle-owl movements and electrocution rate. In 2009 3 adult and 4 juvenile eagle owls were equipped with GPS-radio transmitters.