

Railroad construction and farmland breeding birds - a study of the Bothnia Line

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The construction of a new 190 km railroad track gave a rare opportunity to study its effect on numbers of farmland breeding birds in a Before-After Census (BAC) study. The Bothnia Line was built 2001-2009 through the boreal forest landscape west of the Gulf of Bothnia in northern Sweden. Farmland is scarce in the region, mainly found on sediment soils in valleys of rivers and streams. Farming is dominated by dairy production with ley and barley for fodder as the main crops. The farmland breeding bird community is rich in comparison to landscapes dominated by arable land, but several species have started to decline in numbers, like they have been doing for decades in rationalized agricultural landscapes across Europe. The breeding populations of 17 bird species were monitored by territory mapping (4 visits/year) in 2002-2009. All thirteen patches of farmland (> 10 ha) that became affected by the railroad (total area 1016 ha), as well as six reference sites (807 ha) were included in this study. The total number of breeding territories in the analysis was 3886. Model selection among 10 mixed effects models was performed for each species. Combinations of None, Treatment (before, under and after) and Year were used as fixed effects. Site and Year were used as random effects. For fourteen species no effect of railroad construction (Treatment) was included in the most adequate models (best fit + 3 AIC). The preferred model for *Numenius arquata* included Year (negative trend), but not Treatment as fixed effect variables. For *Sturnus vulgaris*, *Charadrius dubius* and *Motacilla flava*, Treatment was included in the preferred model. The population of *Sturnus vulgaris* declined during railroad construction, but the populations of the other two species increased. In all three cases, the effect is thought to be indirect.