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IMPACTS OF HIGHWAYS ON DUTCH BREEDING BIRDS: AN ANALYSIS BY APPLYING NATIONAL BIRD CENSUSES

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Abstract Field studies under controlled circumstances have demonstrated adverse impacts of highways on breeding birds. These studies show that the presence and use of highways deteriorates habitat quality of a selected number of breeding birds from forests and wet meadow birds, resulting in lower population densities along roads. Studies showing effects on the national population level, however, are not available.

The project aimed to describe impacts of highways on the population level for a wide variety of breeding birds in the Netherlands. During the last twenty years, SOVON - being a non-governmental organization - has built up enormous data on the distribution and numbers of Dutch breeding birds. Also plots were monitored yearly on the presence of breeding birds during a considerable period of time. The availability of these data addressed the question whether the increase in the Dutch highway length and traffic intensity that took place from 1975 to 2000, has led to significant changes in the distribution of breeding birds. In contrast with other studies, the SOVON data allow us to address a large number of bird species in a broad range of habitat types.

Funding Source and Total Budget

The project was funded by the Dutch Ministry of Transport, Public Works and Water Management, The Netherlands. The research was carried for the amount of \$120,000 U.S. dollars.

Analyses and Results: Summary

Analyses were based on the assumption that changes in figures of species relate directly to the presence and changes in the highway's length and highway's traffic intensity. It was also assumed that the most predictive parameters for breeding bird presence and densities are addressed by the type of habitat and the geographic region. From other studies it was concluded that traffic noise appears to be a good predictor of the traffic's influence, and threshold values were derived for so-called "effect zones," depending on traffic and road characteristics. These effect zones along roads were used as an indicator for the areas along roads with an expected impact from traffic.

To assess how many breeding bird species were affected by road traffic, data were used from hundreds of survey plots counted yearly between 1984 and 2000; two national surveys on distribution, 1973-1977 (5x5km basis) and 1998-2000 (1x1 and 5x5 basis); and the national survey on rare breeding birds (1x1km basis). For 125 breeding bird species, analyses based on one or more of these data sets could be conducted. Negative impacts for traffic (e.g., effects on density and or presence/absence) could be shown for 25-50 percent of the species, depending on the type of analysis. An integration of these results shows that for more than 50 percent of the species the highway's impact is negative. These effects appear in all kinds of habitats, the largest proportion of affected species is found for those of heath land and marshland habitats, the lowest proportion for species of (sub)urban and rural habitats. The effects are spread over a wide variety of taxonomic groups. Species of special conservation concern (on the Dutch Red List or EU- Bird Directive) showed larger negative impacts than average. In 11 percent of the species a positive effect was found, mainly for species of (sub)urban and rural habitats. This probably is related to small habitat changes associated with road presence that could not be taken into account in the analyses and that work out positive for species of open habitats, e.g., presence of broad ditches along highways.

Implication for Further Research/Policy Development

The obtained results are in accordance with Dutch empirical research which was conducted in the mid 90's on a restricted number of plots of grasslands and woodland. The Directorate-General of Public Works and Water Management may use these results for emphasizing dose-impact responses on breeding birds into environmental impacts assessment (EIA) studies, and for considering a more reserved approach towards new development in vulnerable habitats, such as woodlands and marches.

The project results legitimize further research into the impacts of highway development in or near the vicinity of areas that are protected by the European Bird Directive and the National Ecological Network. Additionally, the results stress that we should know more in detail about the effectiveness of mitigation measures that reduce ecological impacts, such as noise screens and sound-suppressing concrete asphalt, in order to preserve the habitats that are important from the avian point of view.

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