



Analysis of red kite flight behaviour under different weather and land-use conditions with special consideration of existing wind turbines in the Vogelsberg SPA

Final report

As of 23.09.2019



Contracting authority: Hessian Ministry of Economics, Energy, Transport and Housing (HMWEVW)

Contracting authority:

Hessian Ministry of Economics, Energy, Transport and Housing (HMWEVW)
Kaiser-Friedrich-Ring 75
D-65185 Wiesbaden, Germany

Contractors:

NABU Landesverband Hessen (Conservation NGO)
Friedenstraße 26
D-35578 Wetzlar, Germany
Maik.Sommerhage@NABU-Hessen.de

Bioplan Marburg GbR (Consultancy)
Deutschhausstrasse 36
D-35037 Marburg, Germany
c.heuck@bioplan-marburg.de

Büro für faunistische Fachfragen (Consultancy)
Rehweide 13
D-35440 Linden, Germany
info@bff-linden.de

Researchers:

Capture and fitting of transmitters:	Christian Gelpke, Steffen Koschkar (BFF Linden)
Data collection:	Kristin Geisler, Maik Sommerhage (NABU Landesverband Hessen)
Data analysis:	Christian Heuck, Pablo Stelbrink, Christian Höfs (Bioplan Marburg GbR)

Translation: Christopher Hay, Übersetzungsbüro für Umweltwissenschaften

Quality assurance: Dr. Marc Reichenbach (ARSU GmbH), Martin Sprötge (planungsgruppe grün GmbH)

External expert: Ubbo Mammen (Ökotox GbR)

Project advisory council:

Iris Otto (HMWEVW – Hessian Ministry of Economics, Energy, Transport and Housing)

Charlotte Matthias (HMWEVW)

Dr. Natalie Scheck (HMWEVW)

Klaus-Ulrich Battefeld (HMUKLV – Hessian Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection)

Claudia Sattler (HMUKLV)

Gudrun Huber (UNB Vogelsbergkreis – lower nature conservation authority of the Vogelsberg district)

Gerrit Oberheidt (ONB RP Gießen – upper nature conservation authority at the Gießen Regional Council)

Oliver Tschirschnitz (ONB RP Gießen)

Martin Hormann (Vogelschutzwarte Frankfurt – ornithological centre)

Gerd Morber (HessenEnergie – energy provider)

Michael Häußler (Luftstrom Projektgesellschaft mbH & Co KG – renewable energy company)

Renate Falk (Luftstrom Projektgesellschaft mbH & Co KG)

Dr. Wolfgang Drenthöfer (BUND Hessen e.V. – ENGO in Hesse)

Hartmut Mai (NABU Hessen e.V. – conservation NGO in Hesse)

Suggested citation:

Heuck C, Sommerhage M, Stelbrink P, Höfs C, Geisler K, Gelpke C & S Koschkar (2019): Analysis of red kite flight behaviour under different weather and land-use conditions with special consideration of existing wind turbines in the Vogelsberg SPA – Final report. Prepared on behalf of the Hessian Ministry of Economics, Energy, Transport and Housing, Germany.

1 Summary

More than half of the global red kite population breeds in Germany. The regional state of Hesse hosts between 1000 and 1300 breeding pairs, representing approximately 5% of the European and 10% of the German population respectively. The presence of this above-average proportion of the total population means that Hesse carries great responsibility for this bird species in terms of species conservation and conservation policy. As a species that is vulnerable to collision mortality, the red kite regularly finds itself at the conflict interface between wind power and species protection in Hesse and elsewhere.

The aim of the study was to improve the understanding of red kite flight behaviour in relation to a variety of influencing factors. In 2016, the Hessian Ministry of Economics, Energy, Transport and Housing commissioned a three-year telemetry study in order to gain an understanding of potential links between weather conditions, land use/land management and red kite flight behaviour (activity range, flight altitude). This contribution to the knowledge base is also designed to provide the opportunity to optimise mitigation measures. The project area chosen for this study is the Vogelsberg natural landscape unit. This choice was due to the fact that, within the state of Hesse, the red kite has its centre of distribution in this richly structured cultural landscape with its high proportion of grassland, and at the same time there are a large number of wind turbines (WTs) in the area. Following the full-coverage mapping of red kite nests and territories in the two focal areas of the study, i.e. Freiensteinau and Ulrichstein, six red kites were captured and fitted with transmitters. In the course of the study period (June 2016 - July 2018), the transmitters provided a total of 800,905 telemetry points from the red kites' breeding area. However, originally a total of 12 red kites were to be fitted with transmitters. As a result of low catch success and due to the loss of three transmitter birds during the project term to predation, traffic and poisoning respectively, the available data base is smaller than planned. In parallel to data acquisition by means of telemetry transmitters, data were collected on land-use types and land management events in the vicinity of the transmitter birds' nesting sites. In addition, weather data from several wind farms as well as data recorded at the meteorological station on the Hoherodskopf mountain peak by the German Meteorological Office (Deutscher Wetterdienst, DWD) were used in the analysis.

The project area was found to have a higher red kite population density than other parts of the state of Hesse. The species' breeding success, however, was lower than in other parts of the state during the study period and also lower than success rates found in earlier studies in the project area (see Chapter 4.1.2 **Fehler! Verweisquelle konnte nicht gefunden werden.**). During the course of the day, red kite flight activity generally increased up to midday and then declined again. While around midday during the breeding period more than 60% of all telemetry points were regularly recorded in flight, flight activity decreased significantly once the young kites had fledged. Eighty-one percent of the telemetry points recorded in flight had a flight altitude of less than 100 m above ground level, and 72% were recorded at less than 75 m above ground level. Significant changes were recorded in flight altitudes in the course of the year. The recorded flight altitudes decreased from the

courtship period to the rearing period and slightly increased again in the post-breeding period. The impact of weather variables on red kite flight behaviour was very minor overall. It is therefore not possible to deduce from weather variables any distinct behavioural patterns in terms of flight activity, flight altitude or daily activity range size. North-western, western and south-western slopes had a slight positive effect on flight activity which may be explained by orographic updraughts at these locations. Sunshine duration and unstable air stratification, two weather variables that are important preconditions for thermals, also had a slight positive impact on flight activity. While wind speeds had a slight negative impact on flight altitude, daily activity range size tended to be greater with higher temperatures and unstable air stratification. Only incidental findings for individual birds elucidate the impact of land use and land management on flight behaviour of red kites fitted with transmitters. Most of the land-use types were not utilised by the birds proportionally to their share in land cover. However, significant differences were found for almost all land-use types in the course of the breeding season as well as between individual red kites. Sites that had recently been subject to agricultural management tended to be visited more frequently than sites not currently managed. The analysis of flight behaviour in the vicinity of wind farms showed that the red kites did not fly around entire wind farms or individual wind turbines. There were no indications of obvious avoidance behaviour. Taking into account flight altitudes and rotor blade positions relative to the birds' direction of flight (e.g. parallel flight), no flights of transmitter birds were recorded in the immediate WT danger zone (traversing the rotor-swept zone).

Telemetry data analysis indicates that the technical possibilities of the transmitter type used (e.g. Geofences) combined with the locally recorded data on weather and land use offer significant potential for new insights to be gained on red kite flight behaviour. A large amount of data was collected by means of the transmitter birds (a total of 800,905 telemetry points) which, together with the continuous weather and land-use data records, allowed for robust statistical analyses with a view to answering the crucial question as to the links between weather, land use and the species' flight behaviour (flight altitude, activity range). The data situation for statistical analysis was too poor only with regard to flight behaviour in the immediate vicinity of wind farms. The present study can therefore only offer some initial observations in this regard. It would be desirable in future to also fit red kites with transmitters in landscape regions less structurally rich than the Vogelsberg SPA, with a view to allowing for general and transferable conclusions to be drawn for such regions as well.