

# From avian tracking to population processes

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## **Spatial and temporal philopatry of Red-throated Divers (*Gavia stellata*) during migration and wintering**

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### **Abstract**

The Red-throated Diver (*Gavia stellata*) is a strictly protected migratory species breeding primarily in the arctic regions and wintering in temperate coastal waters of the northern hemisphere. It is the most widely distributed member of the diver/loon family. In Europe, the eastern part of the North Sea is known to be an important wintering area for this species with high diver abundances in late winter and spring. However, the movement ecology of this species is still unclear. A better understanding of space utilisation in terms of site fidelity and timing of movements is highly needed to avoid conflicts with or assess impacts of human activities.

We successfully tracked 27 Red-throated Divers, tagged with satellite transmitters in the German North Sea between February and April of 2015 and 2016, throughout their annual cycle. In this study we aimed to answer the following question: Do birds consistently utilise the same wintering, staging, breeding and moulting sites, in both time and space? We used home range analyses to define areas of high utilisation, during different stages along the annual cycle, and we further calculated site fidelity and compared the timing of utilisation within and between years. The tagged Red-throated Divers displayed generally a high site fidelity, indicating that these birds largely utilise the same migration routes as well as the same staging, breeding and to some extent the same wintering areas year after year. Similarity in temporal patterns was also evident. Faithful movement patterns within wintering sites and along their way to breeding areas and back revealed important habitats and connectivity between sites used during wintering and migration.

The high site fidelity of this sensitive species highlights the importance of minimising anthropogenic disturbances within areas highly used by divers.

**Author bio**

**Birgit Kleinschmidt** is a biologist with a main research focus on ecology and conservation. She is particularly interested in ecosystems and species-habitat interactions. She is doing her PhD on movement ecology of Red-throated Divers.