

Identifying a network of protected sites for divers wintering around the UK

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The EU Birds Directive requires Member States to identify Special Protection Areas for birds, both on land and at sea. In the UK, JNCC is in the process of identifying a network of marine areas which regularly support aggregations of great northern diver (*Gavia immer*), black-throated diver (*Gavia arctica*) and red-throated diver (*Gavia stellata*) outside the breeding season. The UK is an important wintering area for these three species, which occur around the entire coast of the UK. Their distributions do not overlap greatly; red-throated divers occur in highest densities in south-east England; great northern divers in north-west Scotland; black-throated divers in a few isolated populations mostly in Scotland.

JNCC is advising the statutory authorities on which areas could be included within a network of marine protected areas using objective, repeatable scientific methods. This was done through a programme of data collection and collation on numbers and distribution of waterbirds around the UK outside the breeding season, in 50 areas identified to potentially hold nationally or internationally important numbers of birds. Data were collected by visual aerial surveys, boat-based surveys and land-based counts. Novel methods were developed for modeling survey data to facilitate SPA boundary setting, using distance sampling, kernel density estimation and maximum curvature. These methods have been used to identify two SPAs which are now classified for red-throated diver and are being applied to many other areas around the coast of the UK to form a network of protected areas.