This document attempts to provide a visual comparison of the distribution of selected dragonfly and damselfly species between two windows in time (the last eleven years of the twentieth century and the six years ending in 2023) according to data held in the National Biodiversity Network Atlas. The following notes might help to avoid any misunderstanding of what these maps represent. They show the relative counts of *records* (not numbers of individuals) in a hectad over the time span of each window. In the NBN Atlas, each record represents a single life stage or activity; for example, two adults in tandem, the female ovipositing, plus exuviae of the same species, all at the same precise location on the same day, would be held as four distinct records. For this document, only one record would be counted.

Thirty species are considered, selected as species which have a significant distribution in Britain, plus a few personal favourites. The selection was made simply by looking at the mini maps in the fourth edition of "Britain's Dragonflies" by Smallshire & Swash but excluding species such as Small Red-eyed Damselfly, Willow Emerald Damselfly, Southern Migrant Hawker and Norfolk Hawker, which were either absent or had a very limited range during the span of the earlier window. Also excluded were scarcities with a wide but thin distribution, specifically Red-veined Darter, Yellow-winged Darter and Lesser Emperor. Ordering of species maps follows the same as in most guidebooks but specifically as in Smallshire & Swash.

The dots on the maps relate to hectads. For each species, the count of records over the length of the window is expressed as a percentage of the total count of records for *all thirty* species over the same period: the darker the tone, the higher the percentage. The variation in tone isn't linear, being weighted so that at even below 1%, presence is apparent. The pair of Blue-tailed Damselfly maps demonstrates the tone effect, where it appears that the species is now less prevalent in southern Britain compared with other species … without any reference to absolute numbers of individuals. Multiple-year windows were chosen (rather than single years) in an attempt to smooth out the erratic effect of varying observer effort and the year-to-year vagaries of the weather during flight season in Britain.

In the earlier windows, distribution might look sparse compared to the later windows, when observer effort was generally higher than in the past. In the case of some species however, there is an obvious shift northwards, westwards or even eastwards. There are also some species that appear to be retreating from the south. The maps can indicate only general trends rather than local details.

An earlier version of this document used only British Dragonfly Society data from the NBN Atlas; as a result, there was a lot of white space, especially in the earlier window maps. This version uses all of the available Atlas data, from thirty-seven NBN data partners including the BDS. Much of the non-BDS data includes records that duplicate (by species/date/precise grid reference) BDS records or those of other partners; such duplicates have been excluded.

Non-BDS data hasn't been through the filter of county recorder verification, so is distinguished from the rest by colour: for any species within a hectad having no corresponding BDS data for the same species, presence is shown in green with a similar range of tone for the percentages; where BDS data does exist, it is shown in red and overrides any other. The first pair of maps, with all thirty species together, indicates how, to some extent, this addresses regions which would otherwise appear to be Odonata deserts ... particularly parts of East Anglia, parts of Wales and almost all of the Isle of Lewis. Away from those regions, the effect of including non-BDS data is generally minimal and in the context of this document, greater coverage has been considered to be more important than avoiding a few potentially spurious details.

Regarding the first pair of maps again, they show the combined distribution of all thirty species in the two windows; in this case, the tone of each dot can be ignored since it is governed by the order in which each species layer was laid onto the maps. The intention is to show how observer coverage has increased over the years, also to show areas for which I have been unable to find data, Wiltshire during the 1990s for example. This pair of maps should be borne in mind when trying to interpret what the individual species maps are indicating.

In an attempt to deal with potentially spurious records, a cut-off has been applied, whereby any *absolute* count of hectad/species records in either window below a certain level (currently 2) is excluded. This has, for example, removed several records which even when BDS-verified might stem from confusion over Small Red Damselfly and Small Red-eyed Damselfly. The downside of this approach is that some viable records will have been excluded, particularly in remote areas which might receive little observer attention. This kind of compromise underlines the fact that these maps can indicate only general trends rather than definitive local details.

The image quality of the maps isn't very good since the screenshots have been through various processes before ending up in a Word document. They look far better in the original QGIS "project", which allows closer examination of the details in each hectad. Anyone familiar with QGIS wishing to know more and even to develop this further, please ask.

Many thanks to the editors of the BDS "Atlas of Dragonflies in Britain and Ireland" published in 2014 and to the editors of the BDS report "State of Dragonflies 2021" for inspiration.

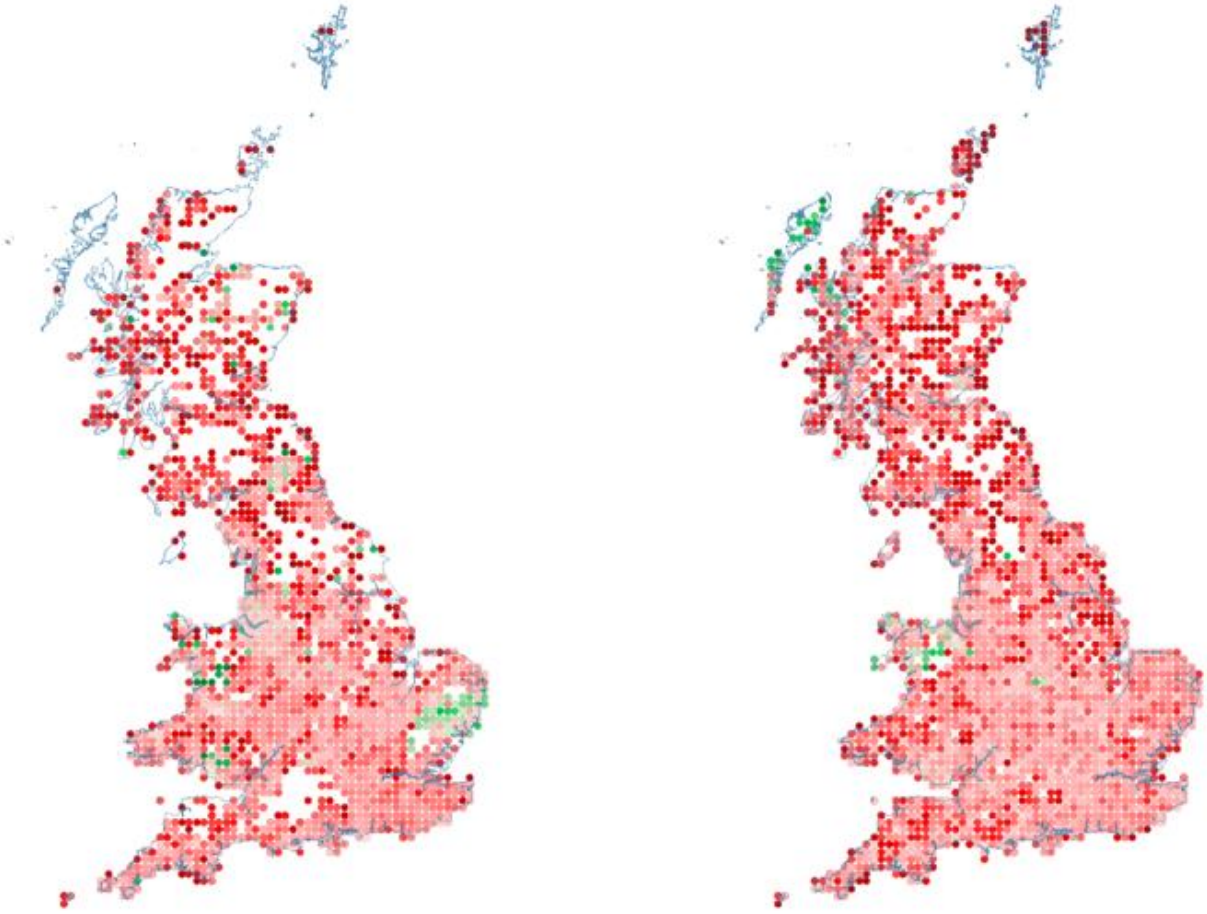
Steve Hewitt, March 2024.

Coastline and tidal waters courtesy of Ordnance Survey. (© Crown copyright and database right 2022).

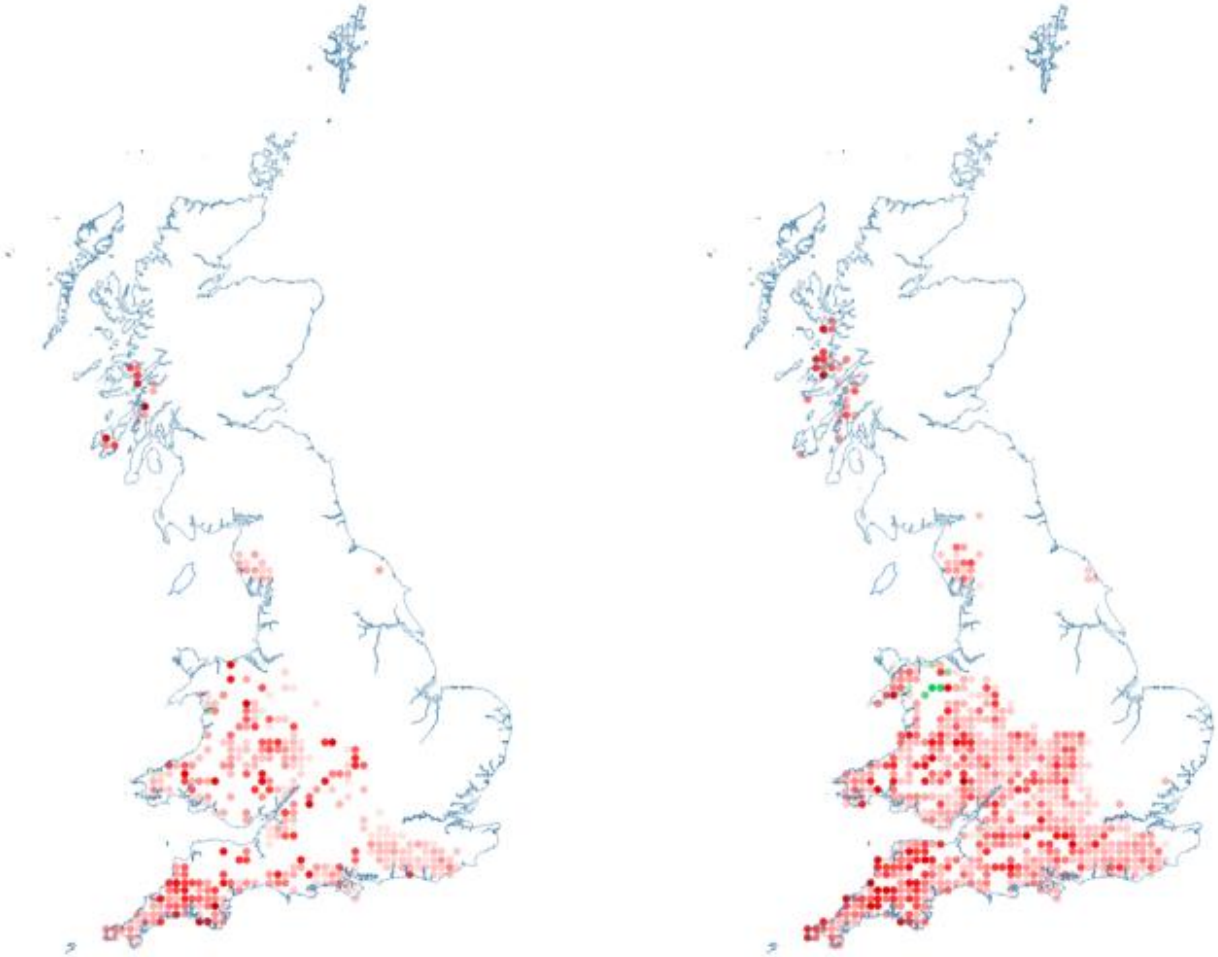
NBN Atlas occurrence downloads at https://nbnatlas.org accessed between November 2023 and February 2024, using data supplied by the following data partners:

Argyll Biological Records Centre
BIS for Powys & Brecon Beacons National Park
Bristol Regional Environmental Records Centre
British Dragonfly Society Recording Scheme
British Trust for Ornithology
Buglife
Dorset Environmental Records Centre
Environmental Records Information Centre North East
Fife Nature Records Centre
Gloucestershire Centre for Environmental Records
Highland Biological Recording Group
Isle of Wight Local Records Centre
Lancashire Environment Record Network
Leicestershire and Rutland Environmental Records Centre
Manx Wildlife Trust
Merseyside BioBank
National Trust
National Trust for Scotland
Natural England
Natural History Museum, London
Natural Resources Wales
Norfolk Biodiversity Information Service
North East Scotland Biological Records Centre
North Wales Environmental Information Service
Nottingham Urban Wildlife Scheme
Outer Hebrides Biological Recording
Record
Rotherham Biological Records Centre
Royal Society for the Protection of Birds
Scottish Wildlife Trust
South East Wales Biodiversity Records Centre
South West Scotland Environmental Information Centre
Staffordshire Ecological Record
Suffolk Biodiversity Information Service
Sussex Biodiversity Record Centre
The Wildlife Information Centre
Yorkshire Wildlife Trust

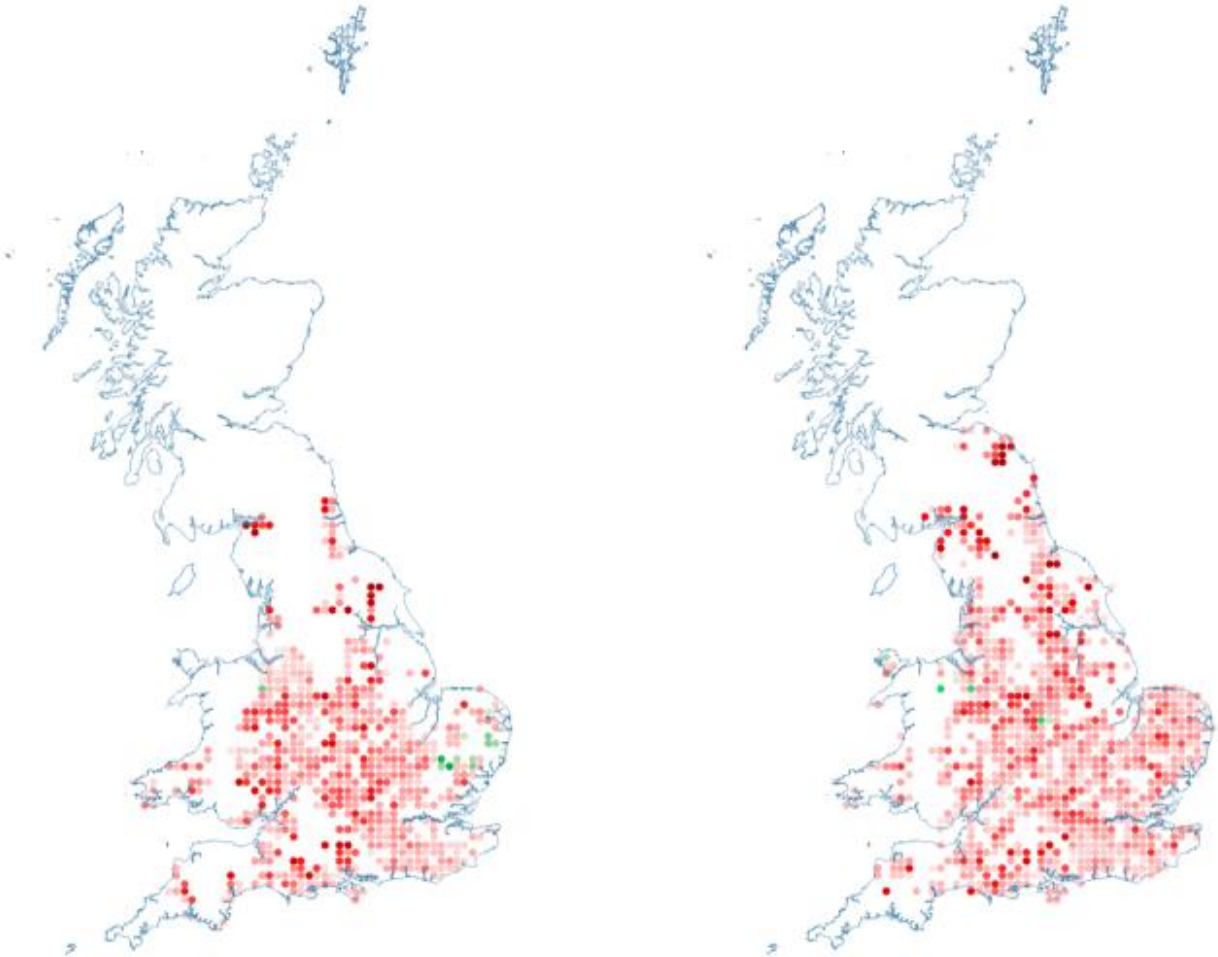
1990-2000 Thirty species 2018-2023



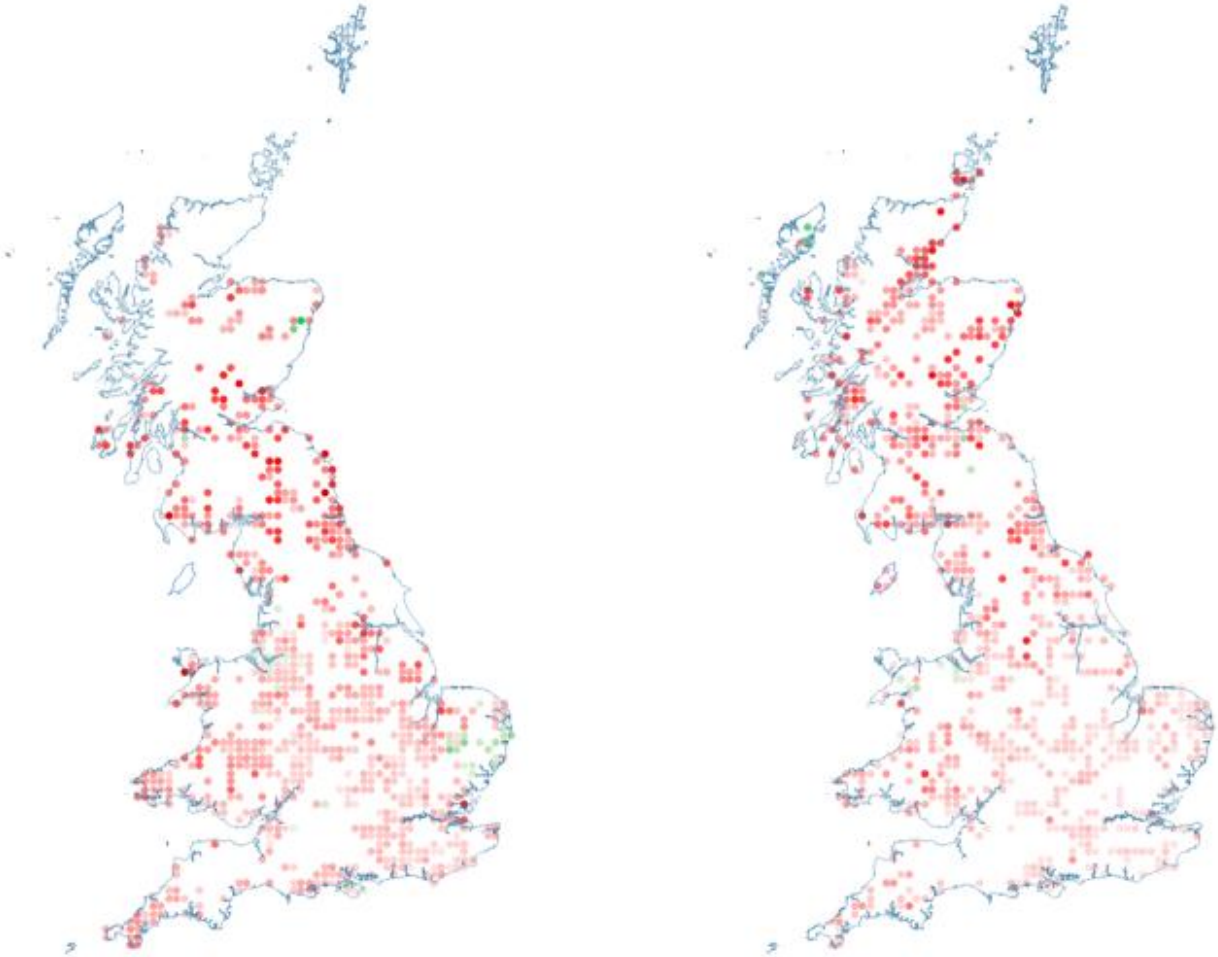
1990-2000 Beautiful Demoiselle 2018-2023



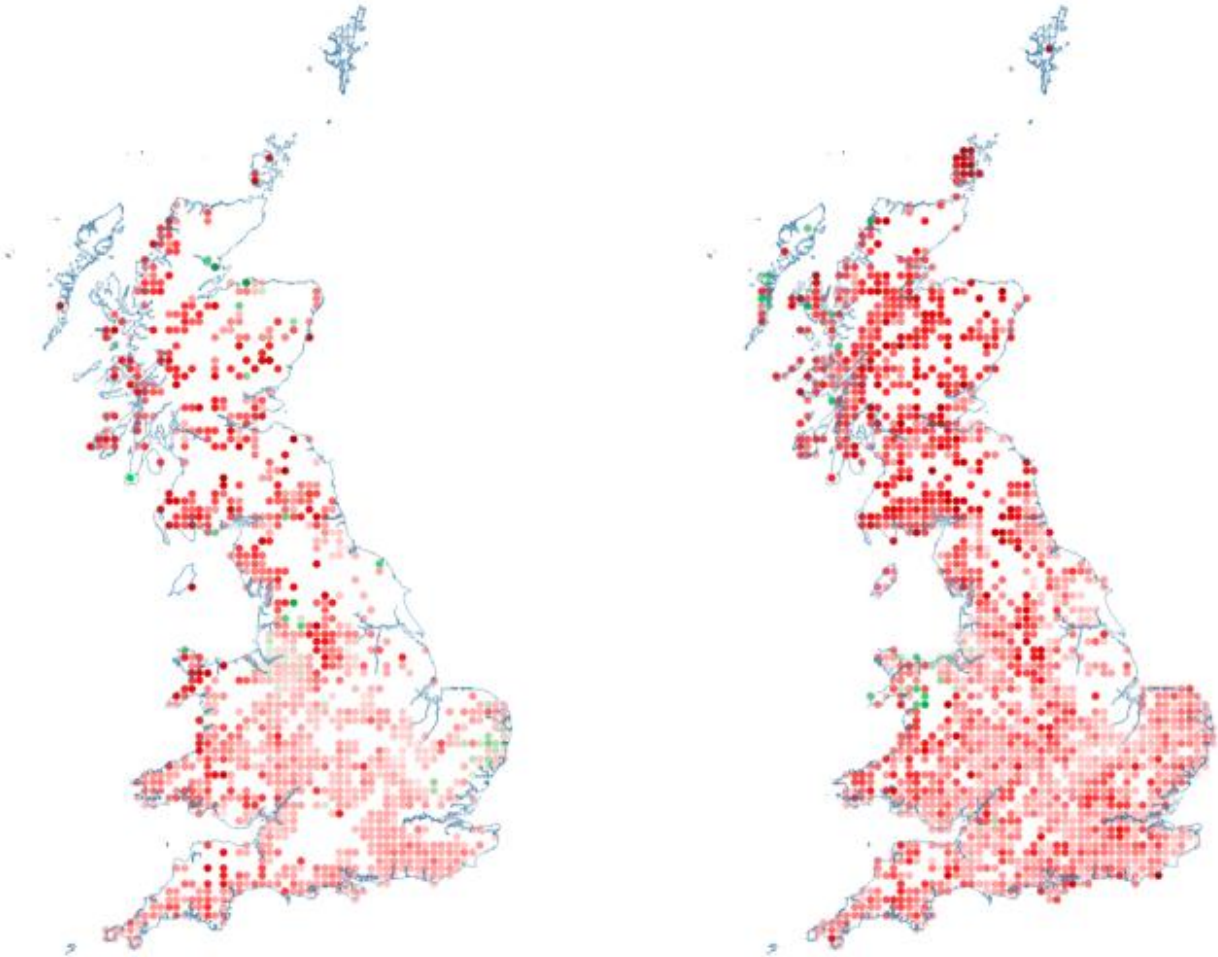
1990-2000 Banded Demoiselle 2018-2023



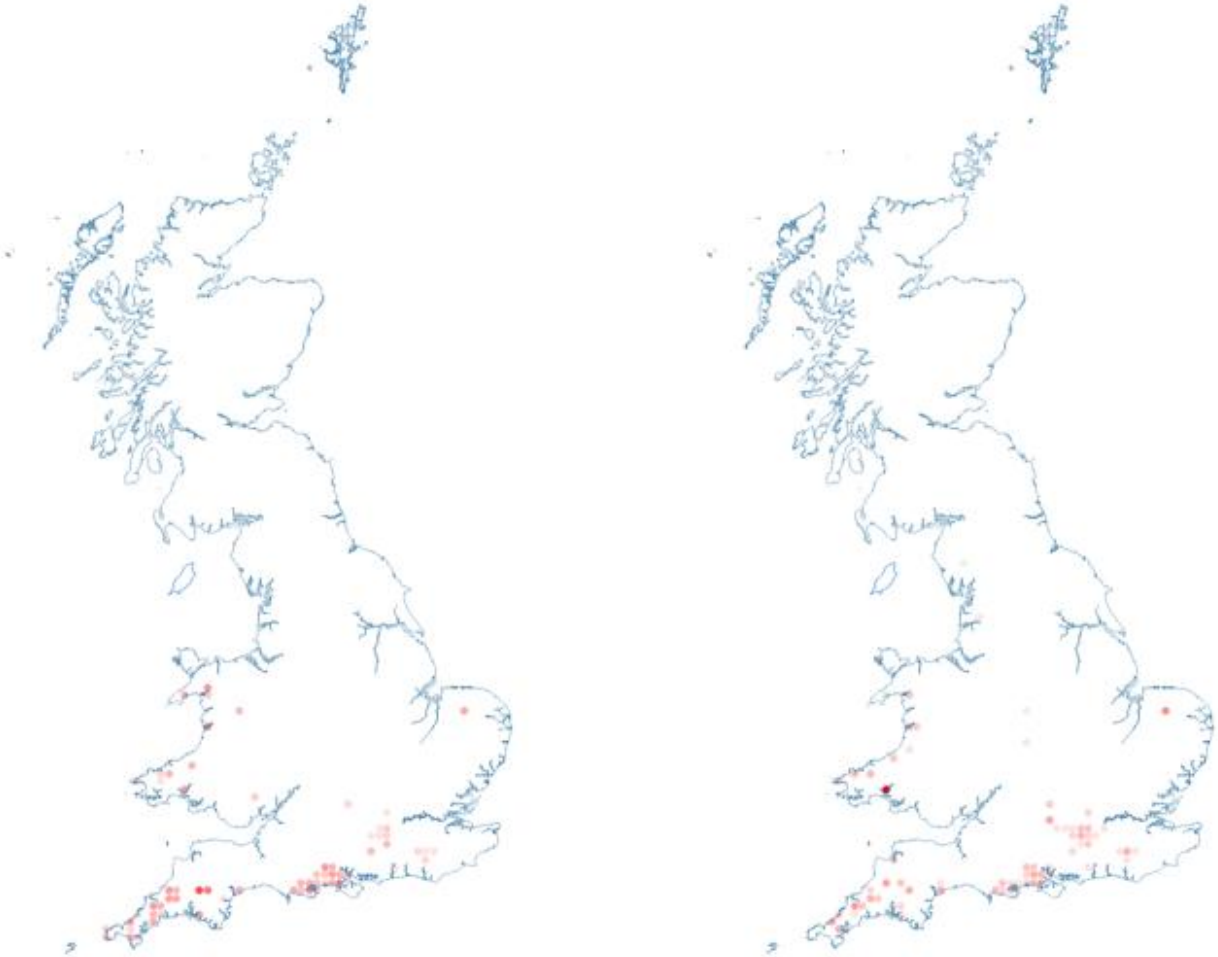
1990-2000 Emerald Damselfly 2018-2023



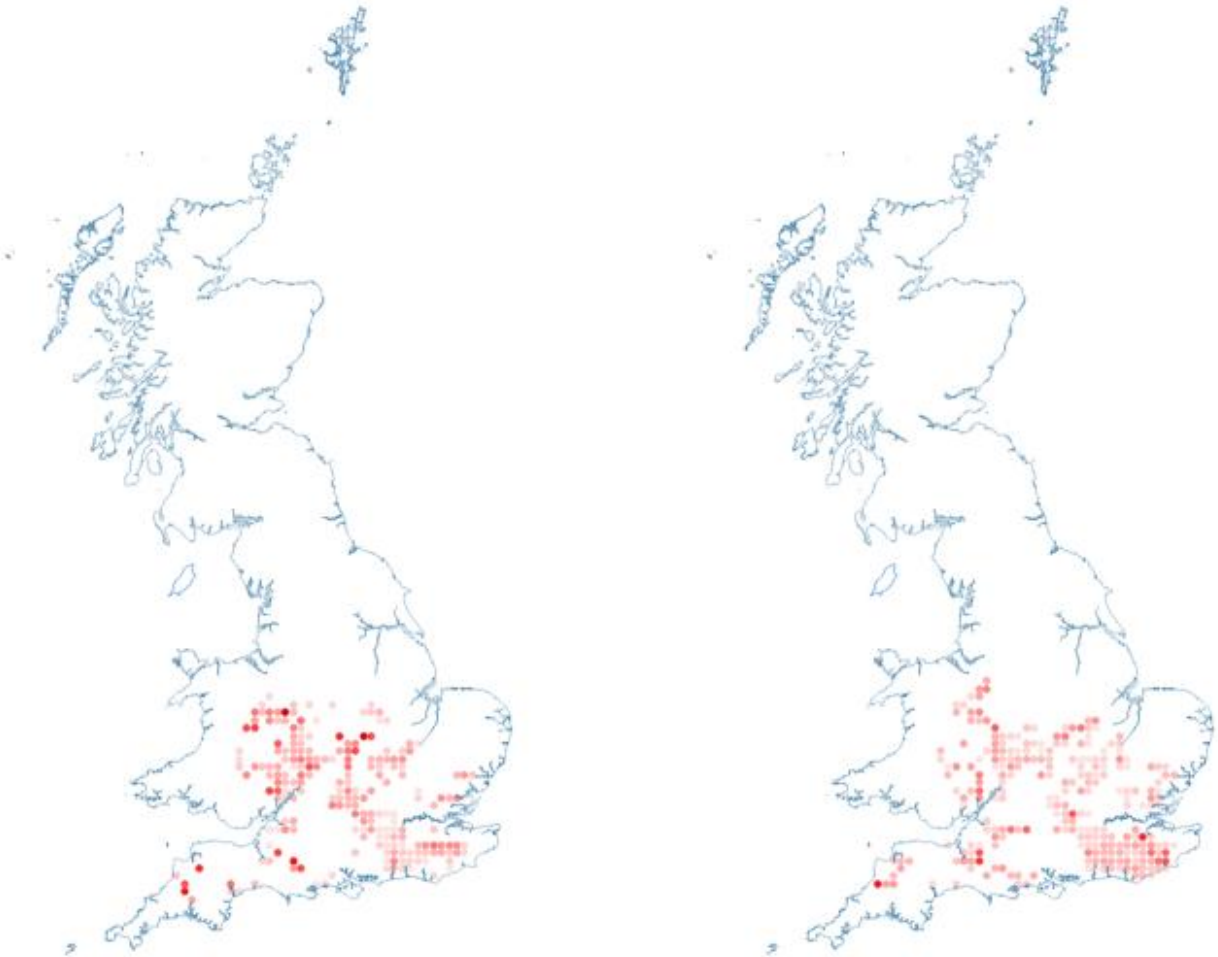
1990-2000 Large Red Damselfly 2018-2023



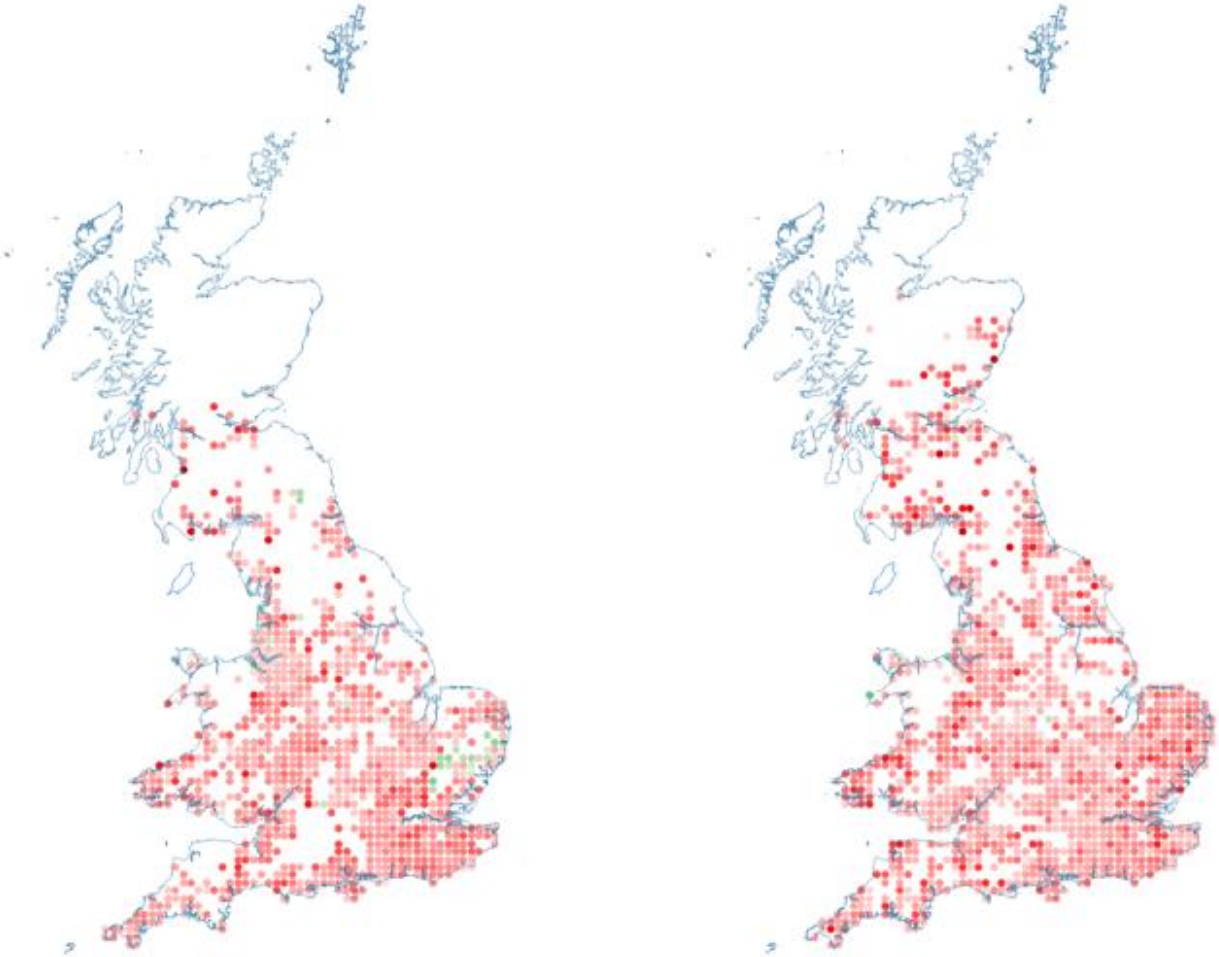
1990-2000 Small Red Damselfly 2018-2023



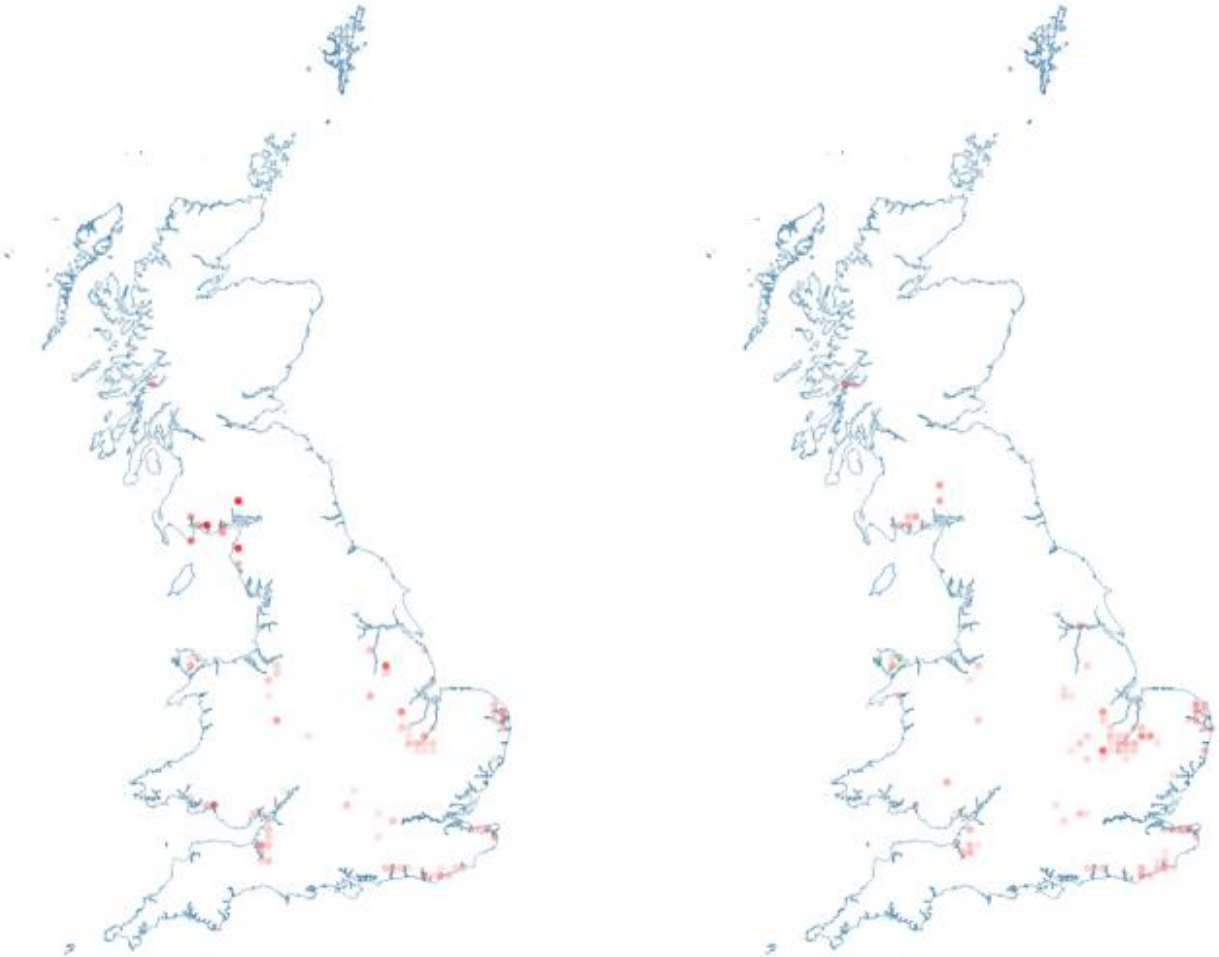
1990-2000 White-legged Damselfly 2018-2023



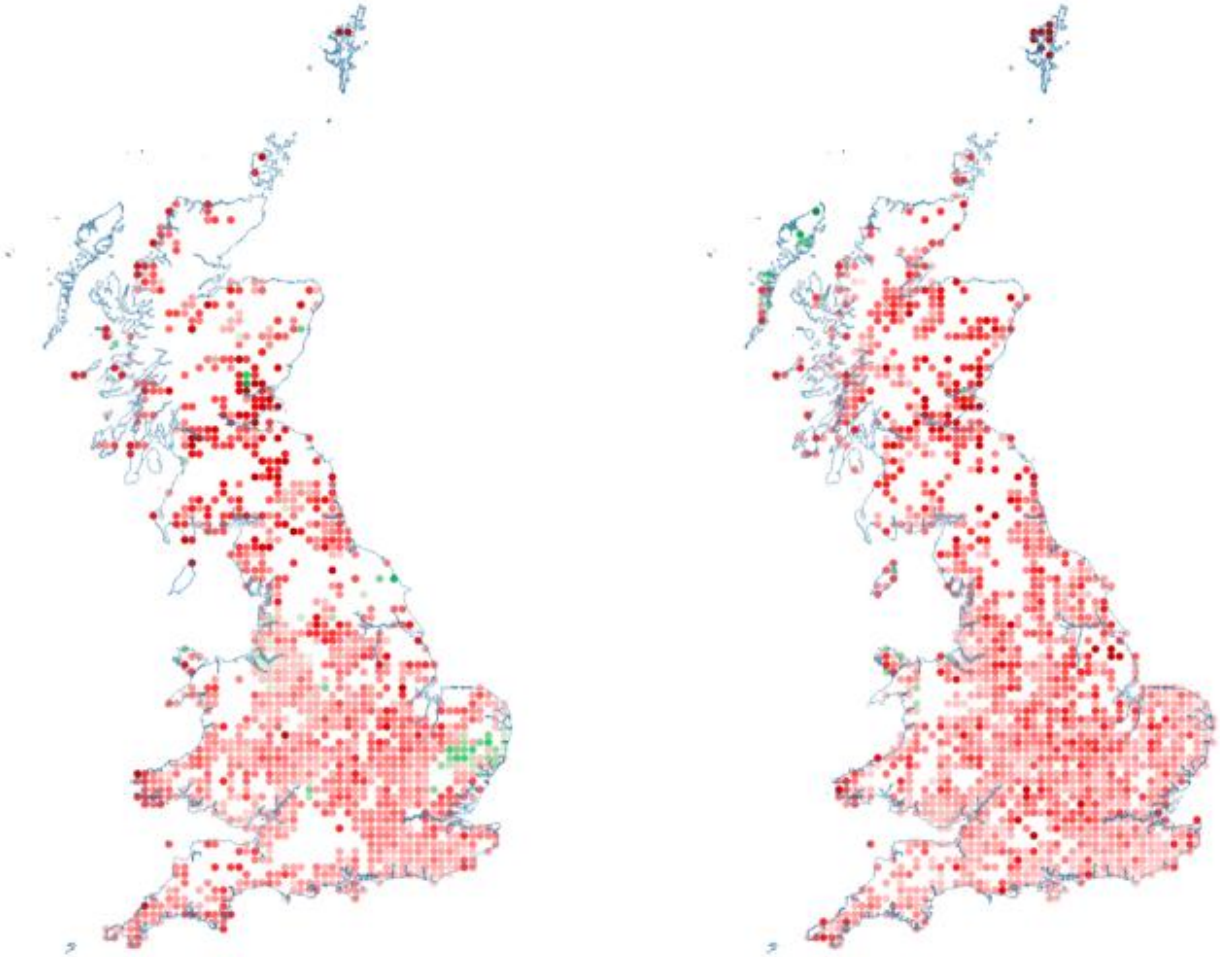
1990-2000 Azure Damselfly 2018-2023



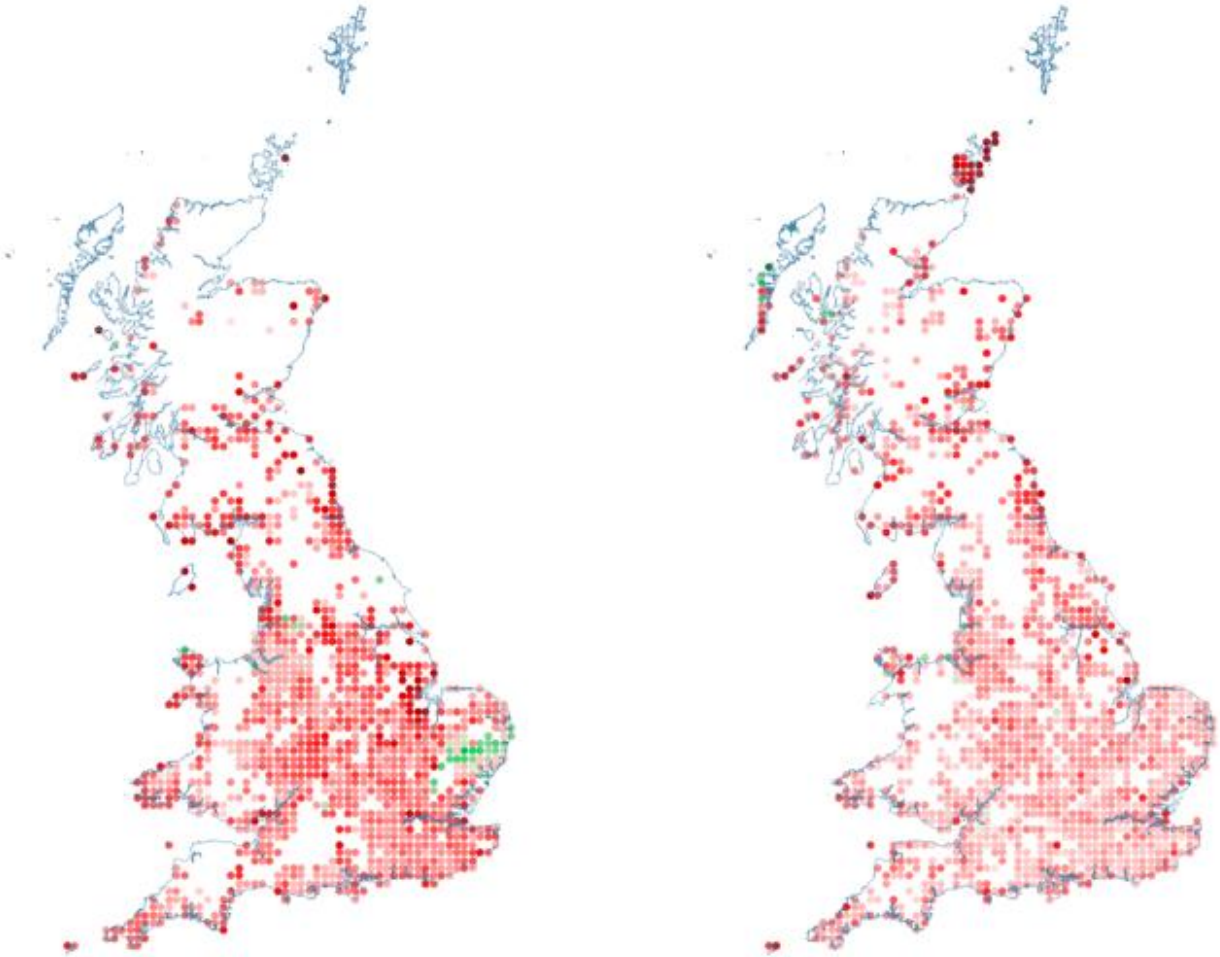
1990-2000 Variable Damselfly 2018-2023



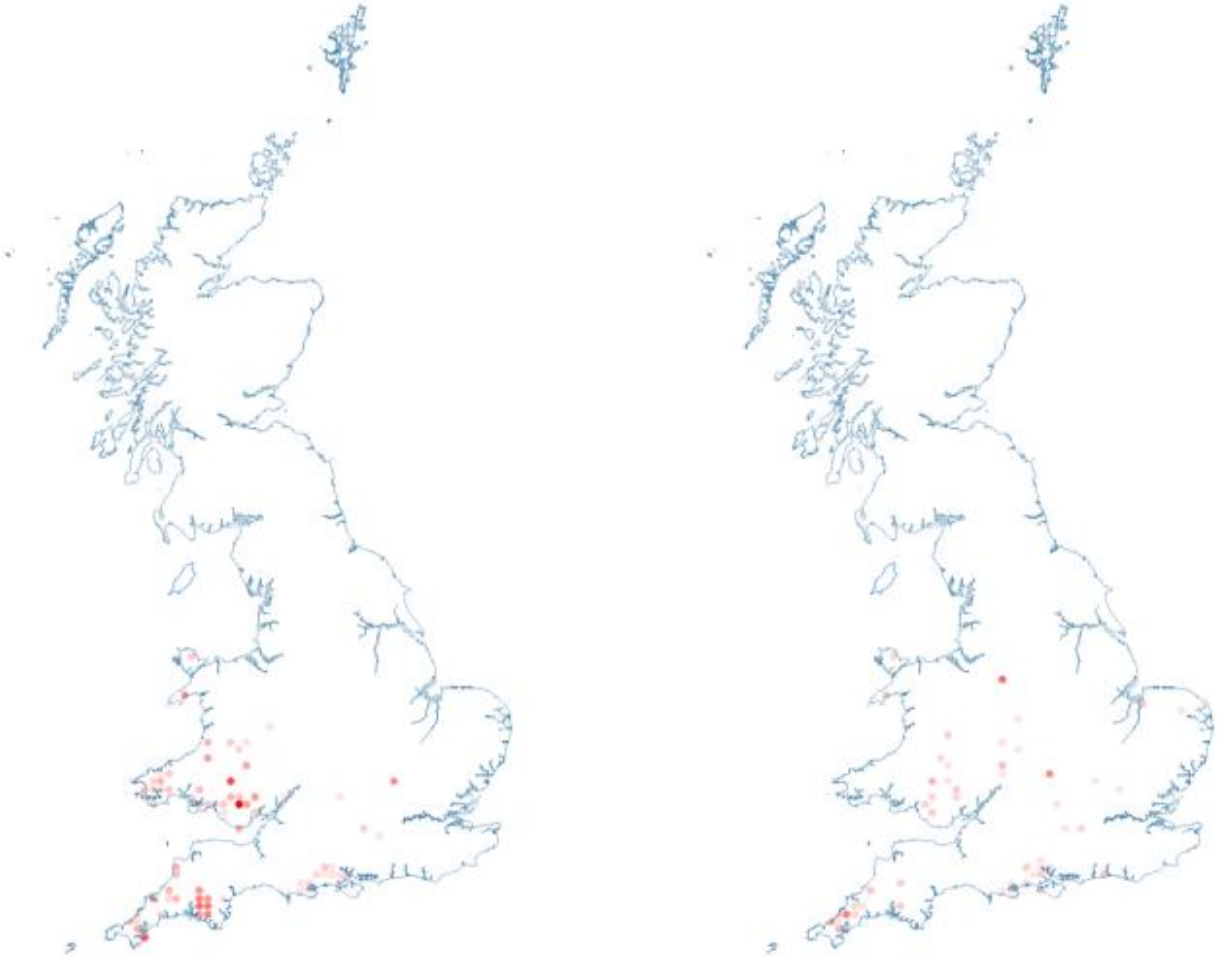
1990-2000 Common Blue Damselfly 2018-2023



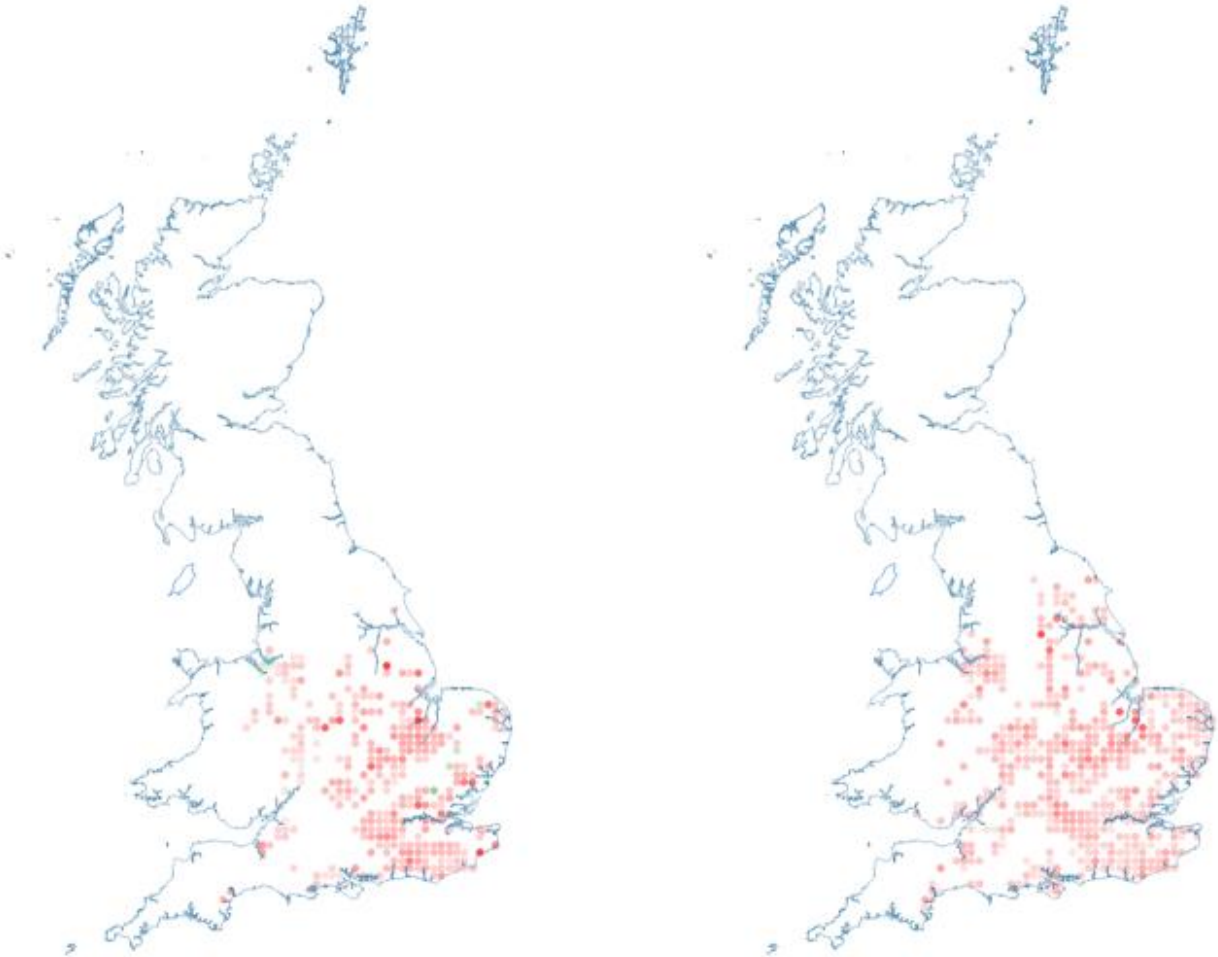
1990-2000 Blue-tailed Damselfly 2018-2023



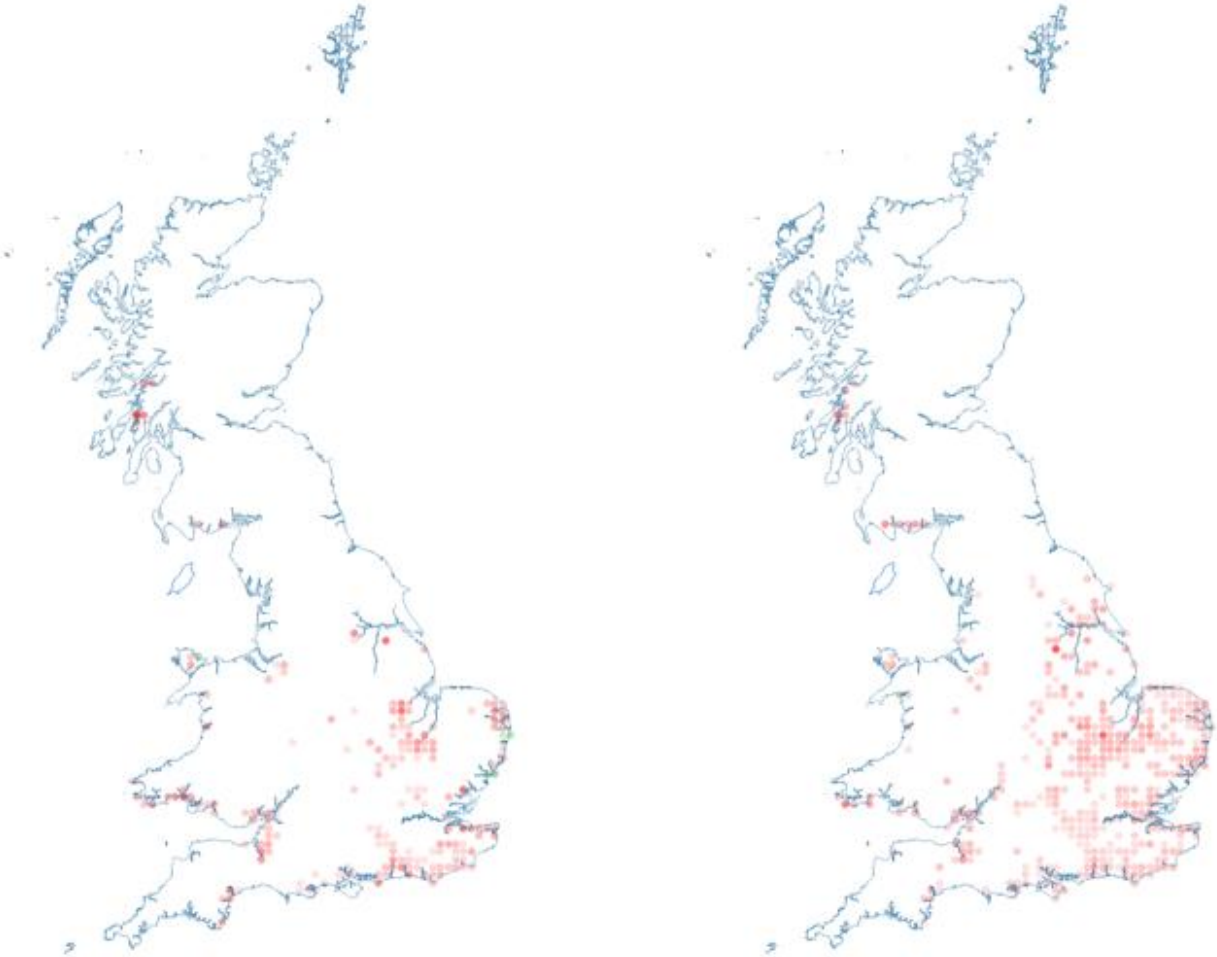
1990-2000 Scarce Blue-tailed Damselfly 2018-2023



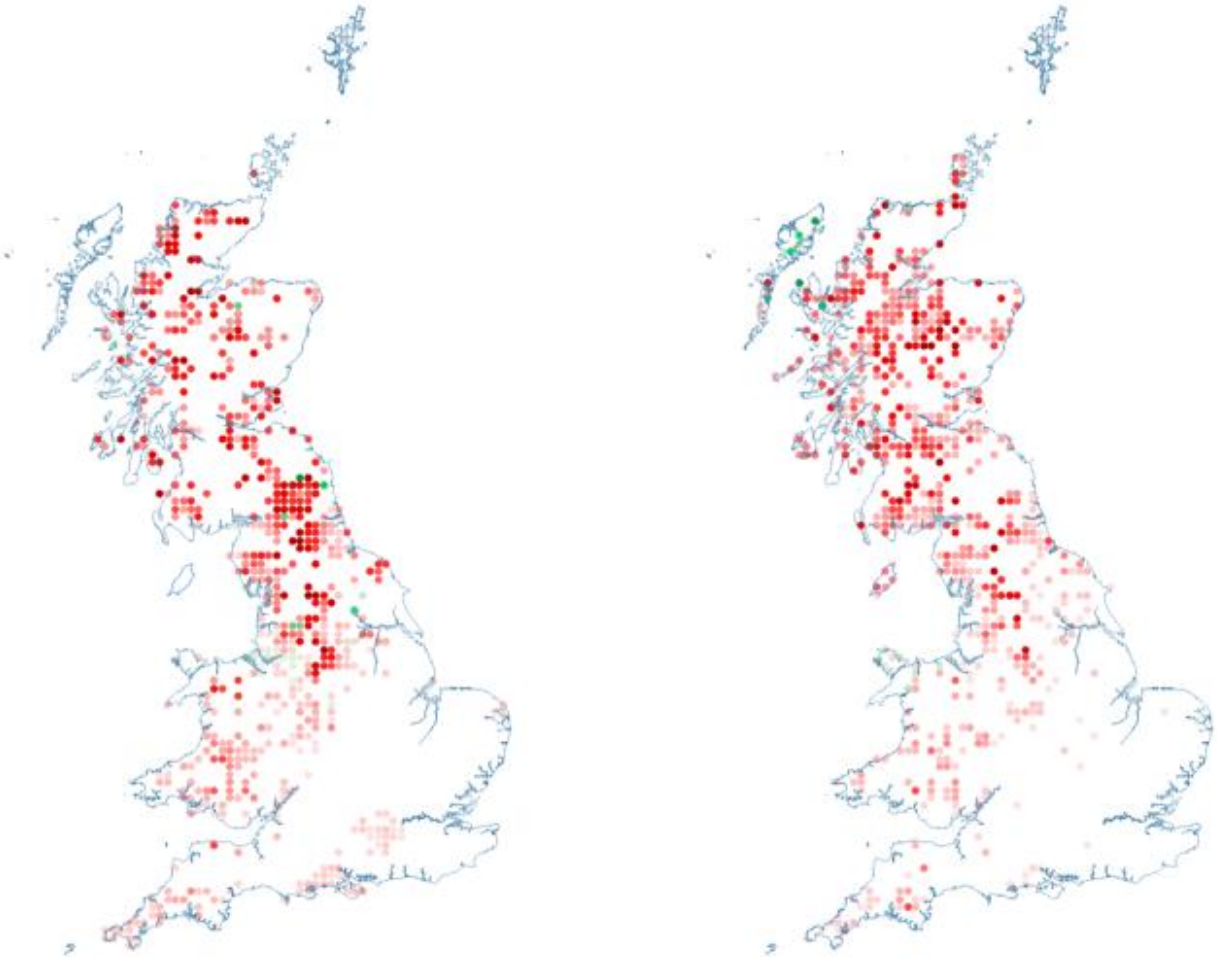
1990-2000 Red-eyed Damselfly 2018-2023



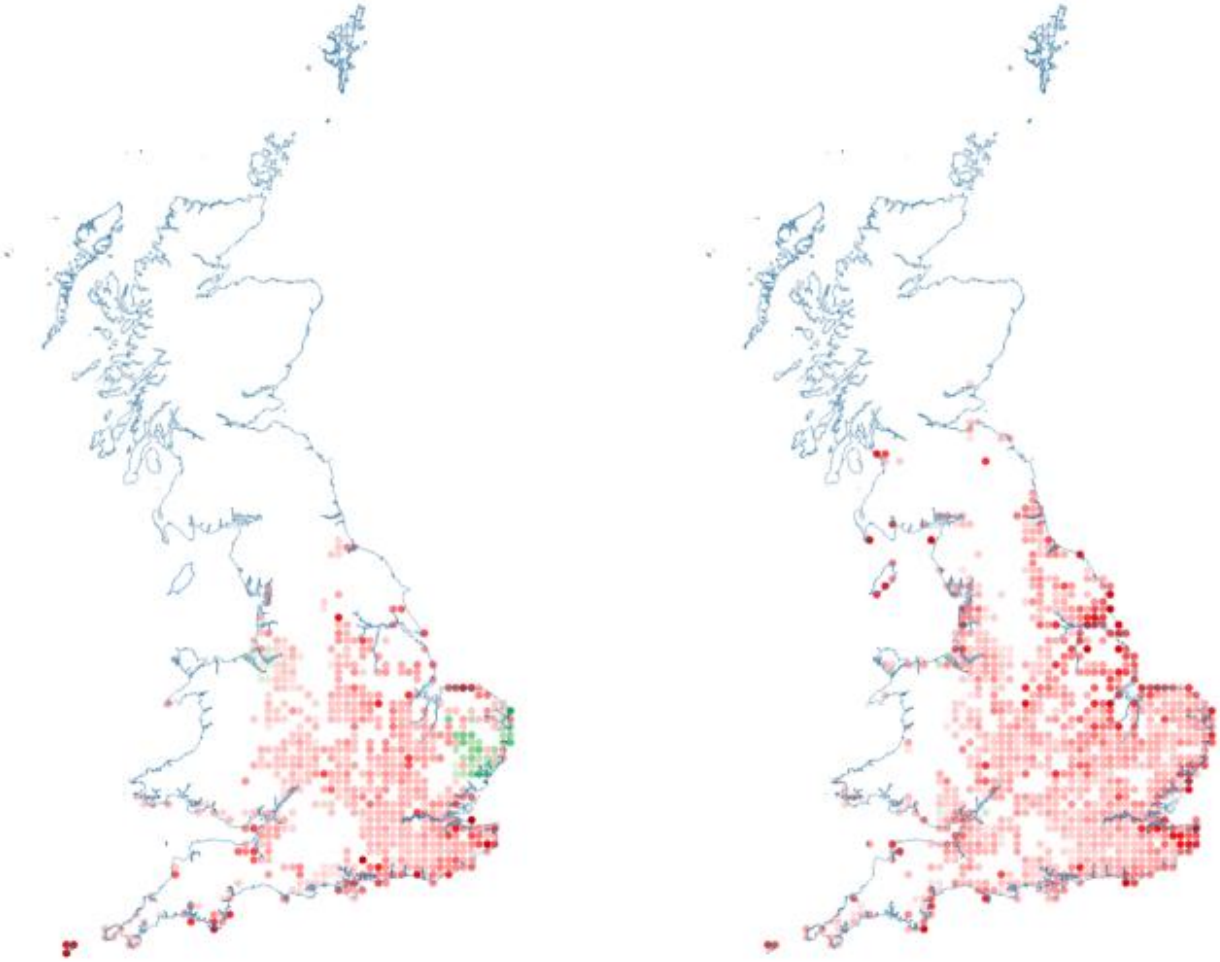
1990-2000 Hairy Dragonfly 2018-2023



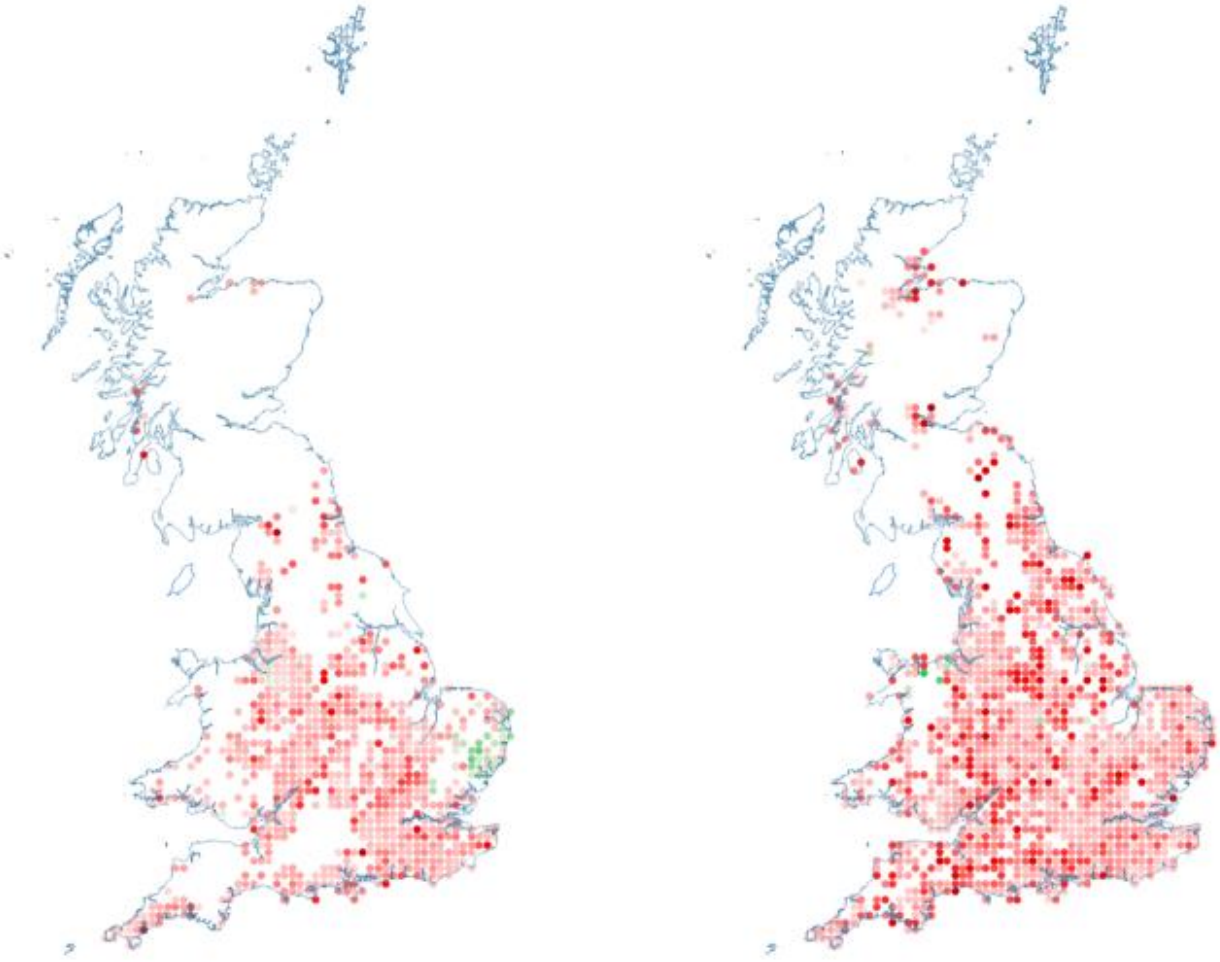
1990-2000 Common Hawker 2018-2023



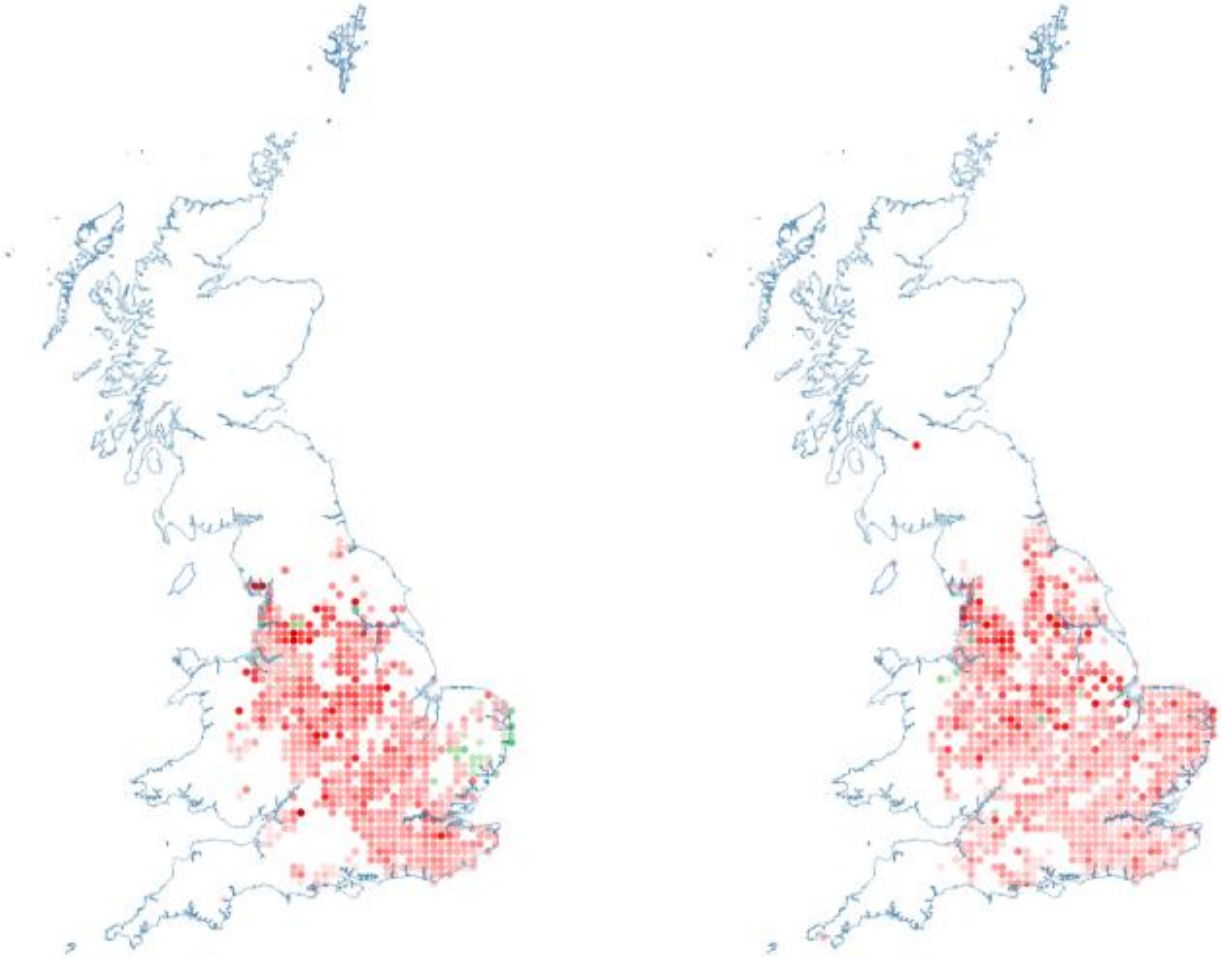
1990-2000 Migrant Hawker 2018-2023



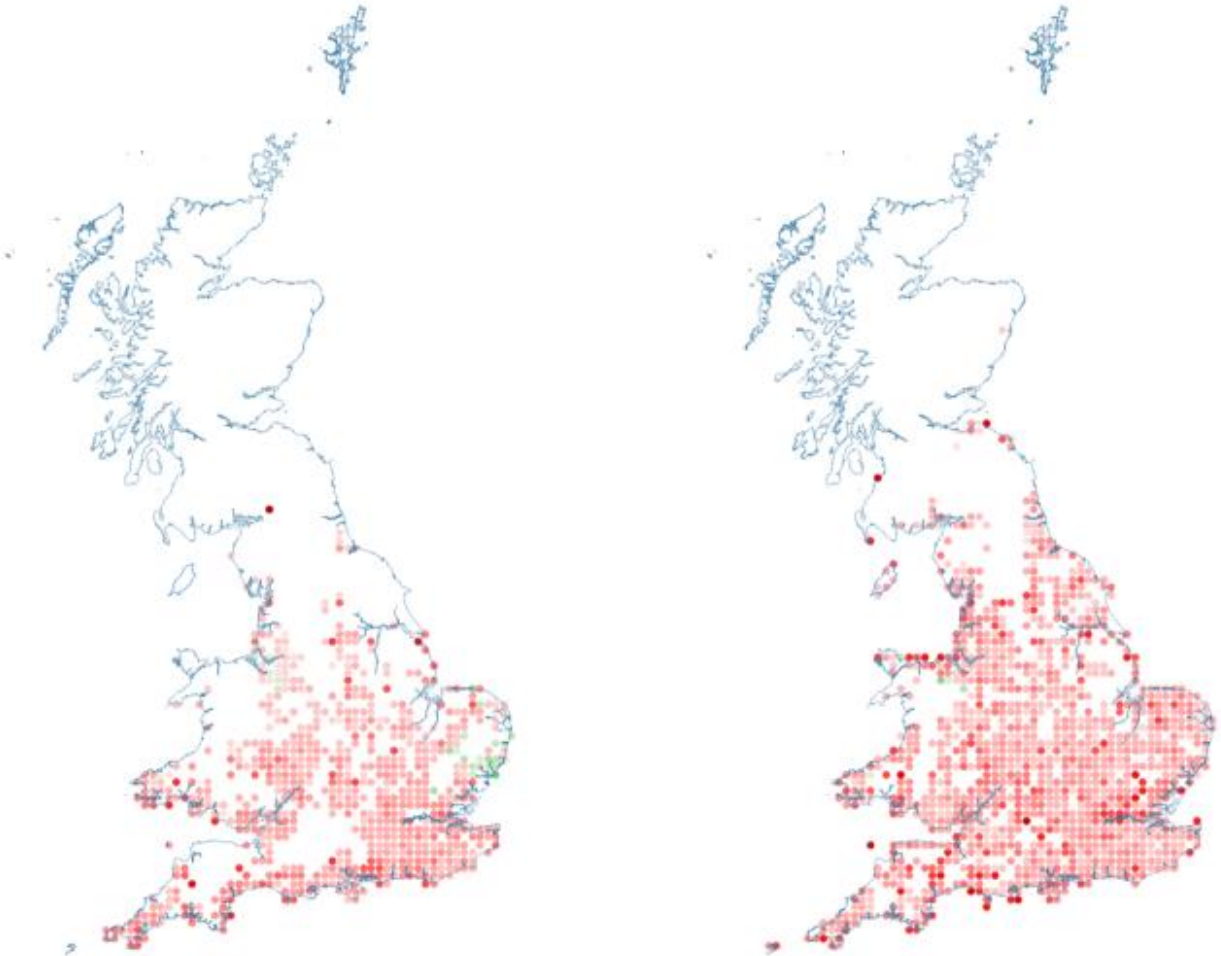
1990-2000 Southern Hawker 2018-2023



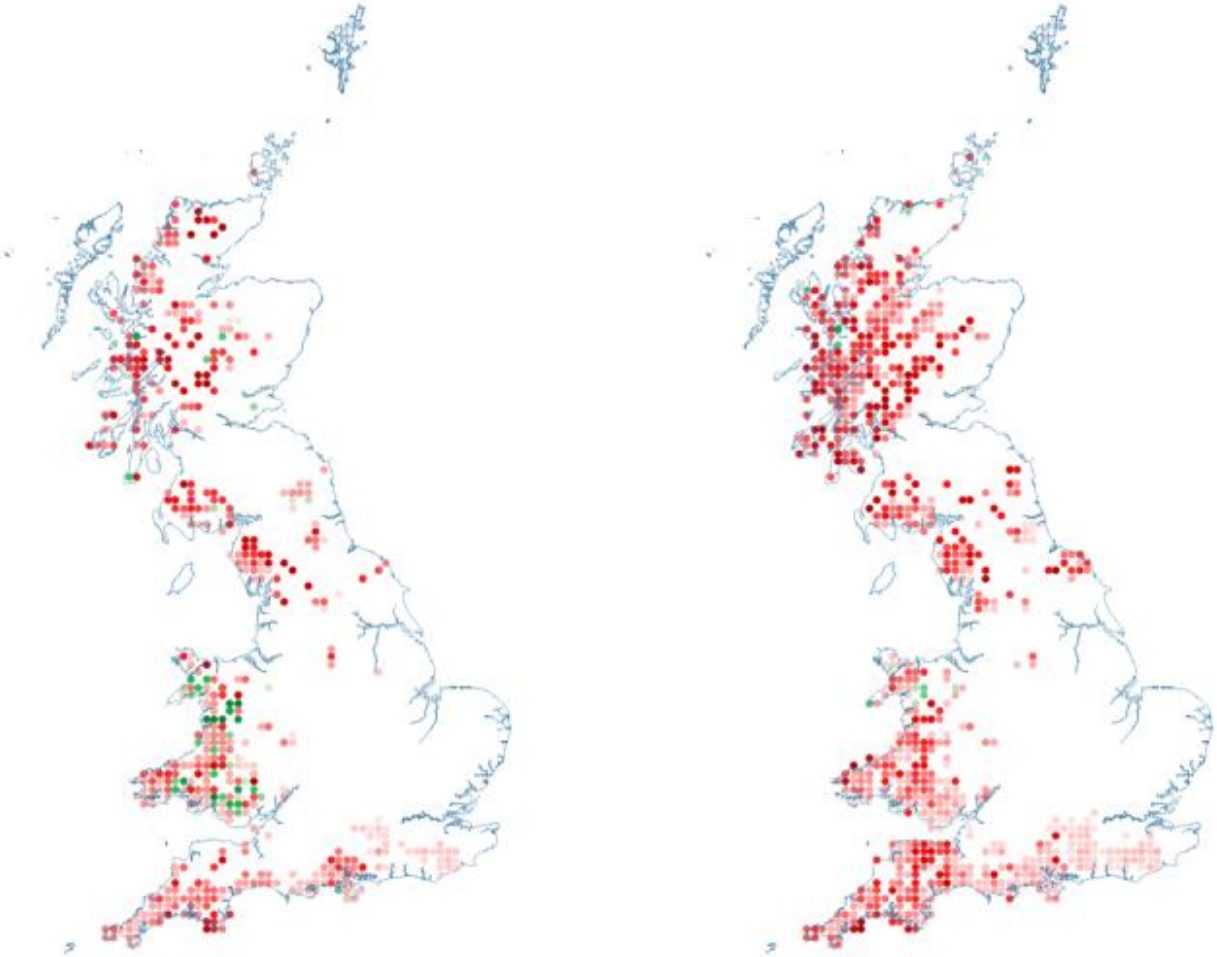
1990-2000 Brown Hawker 2018-2023



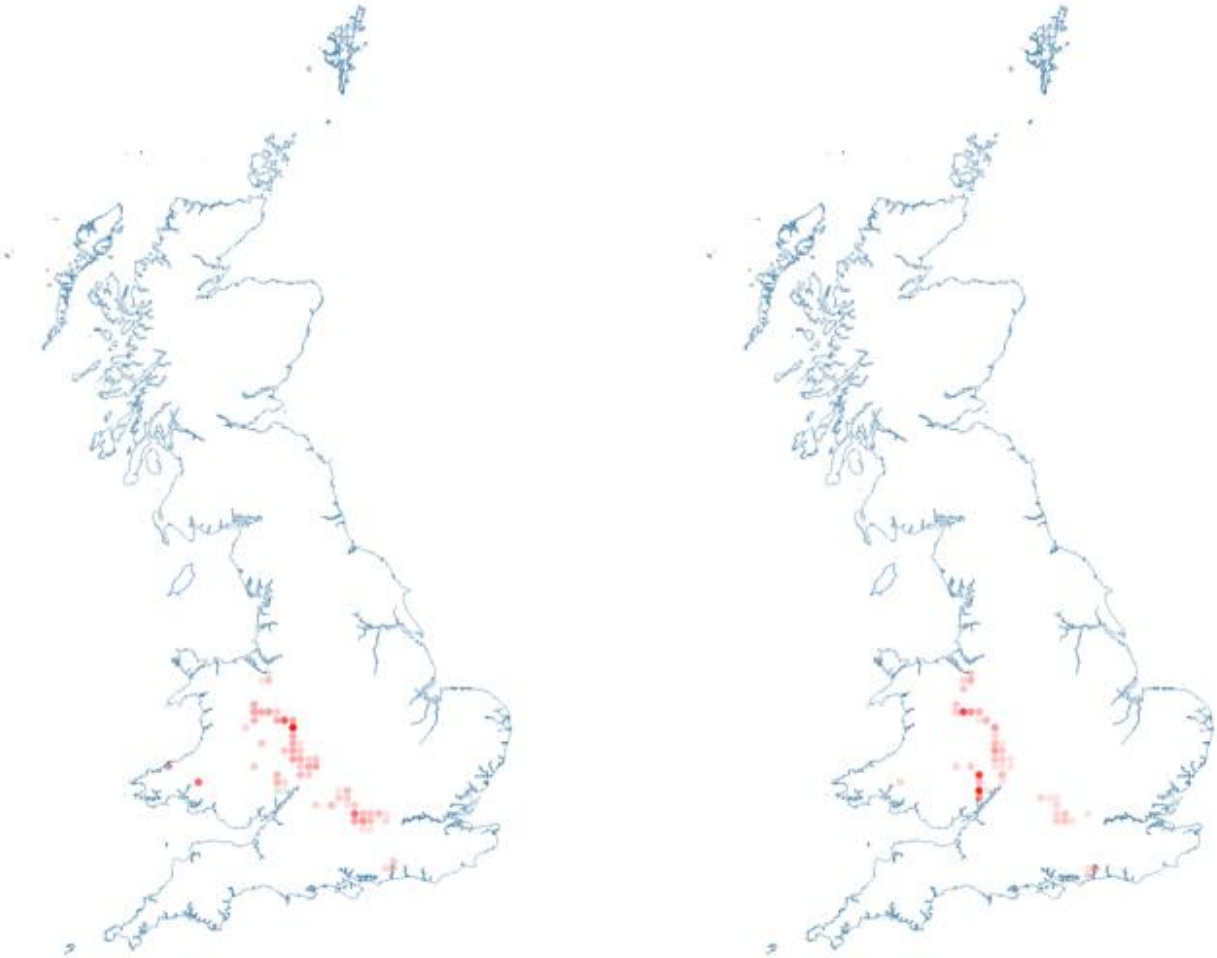
1990-2000 Emperor 2018-2023



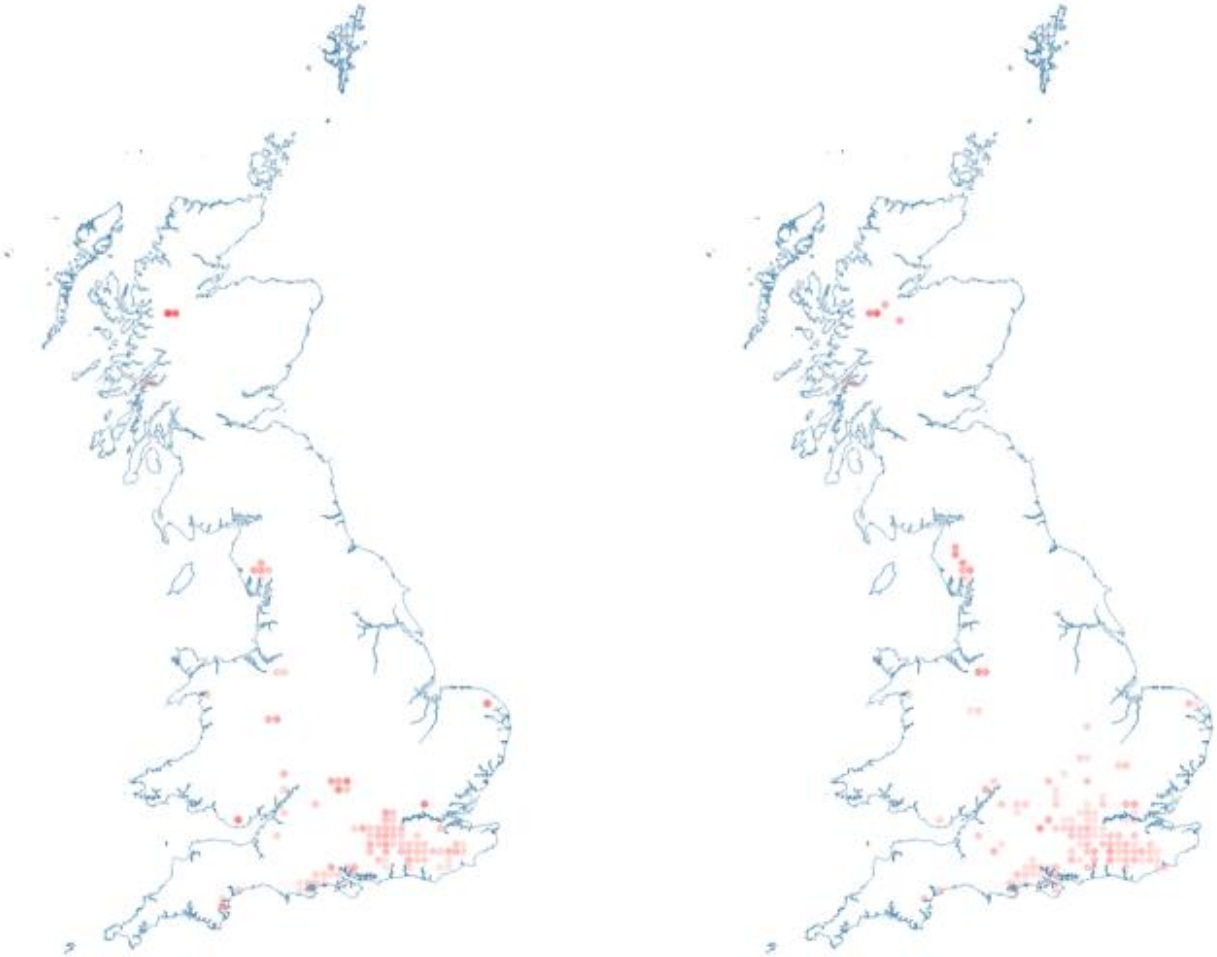
1990-2000 Golden-ringed Dragonfly 2018-2023



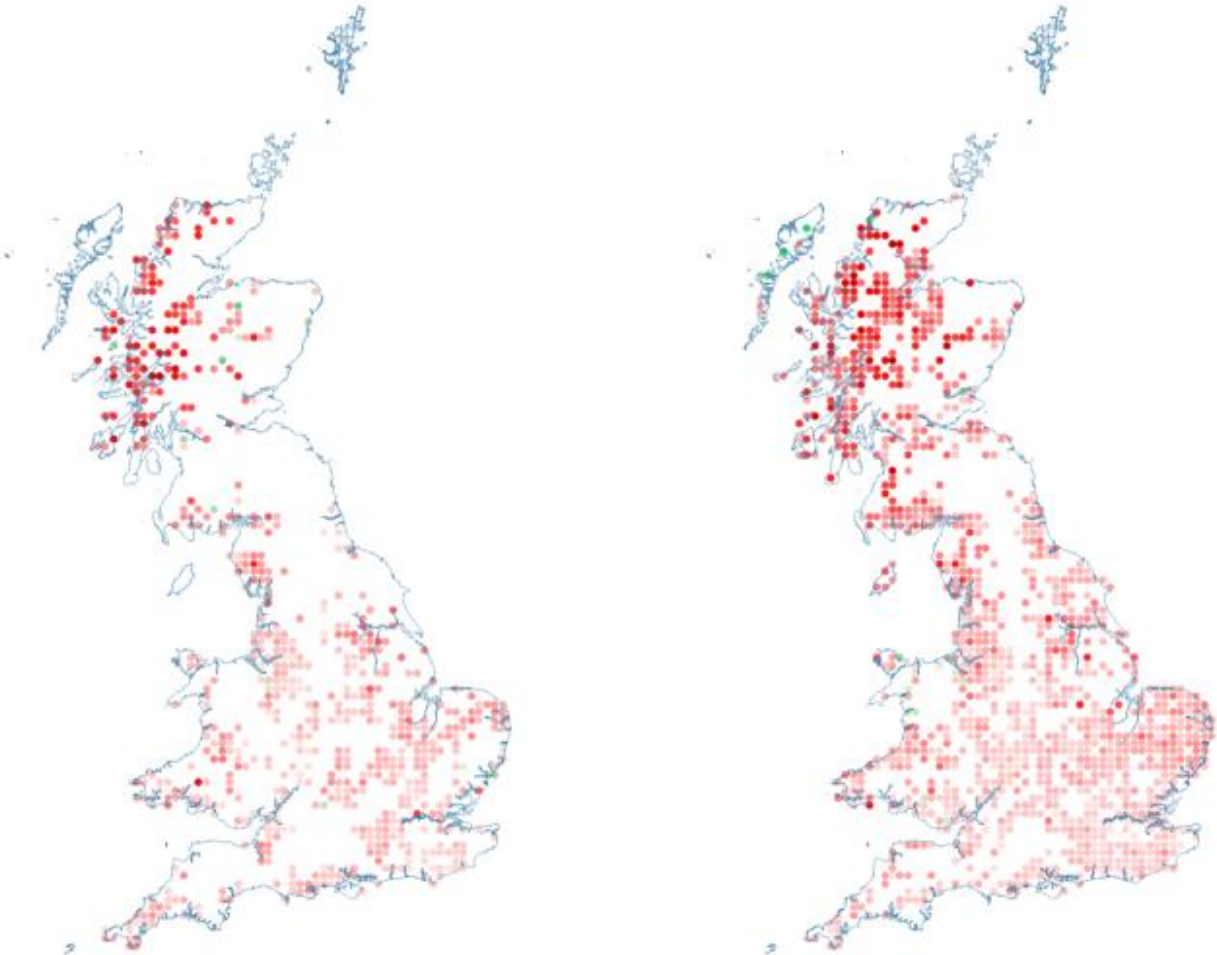
1990-2000 Common Clubtail 2018-2023



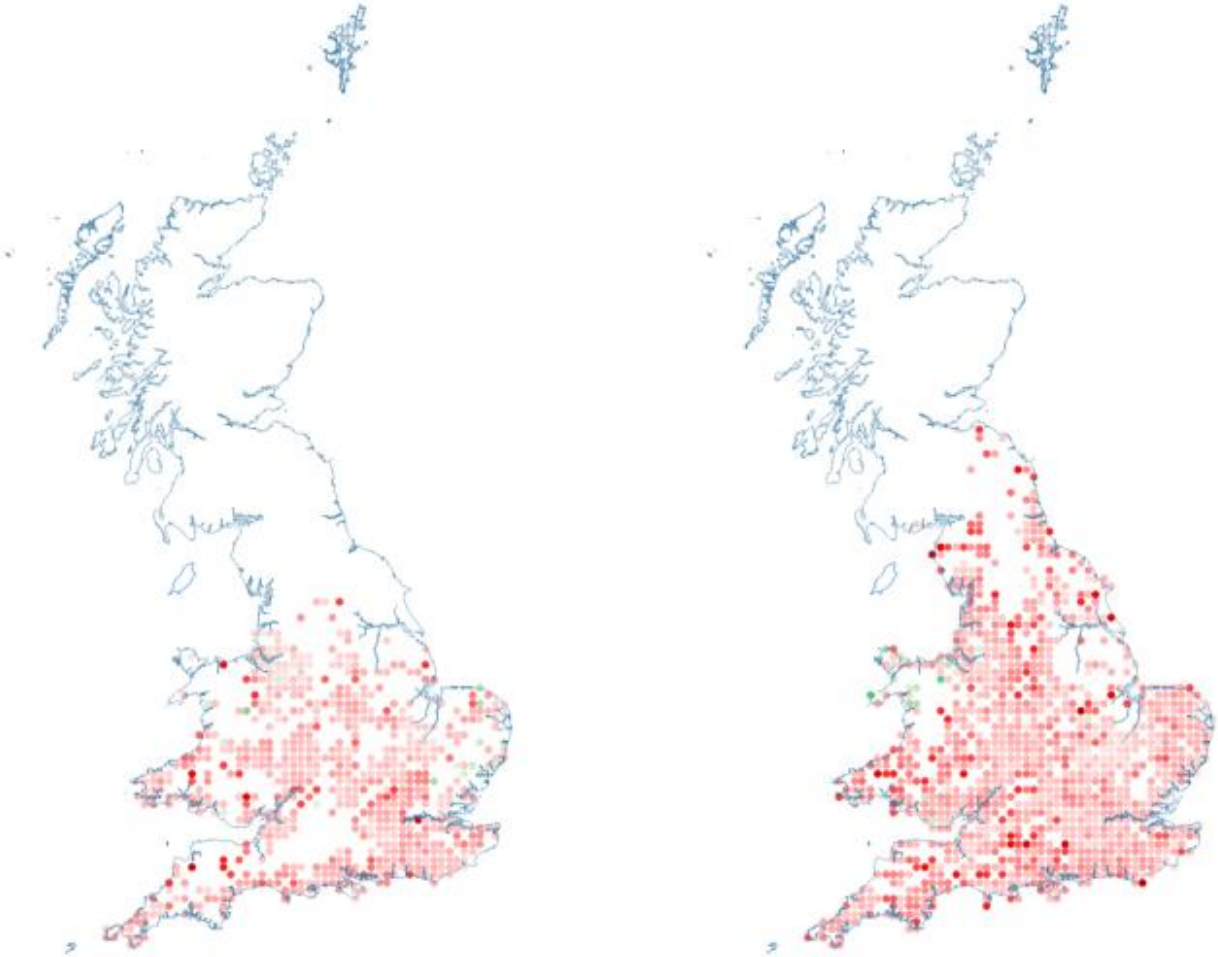
1990-2000 Downy Emerald 2018-2023



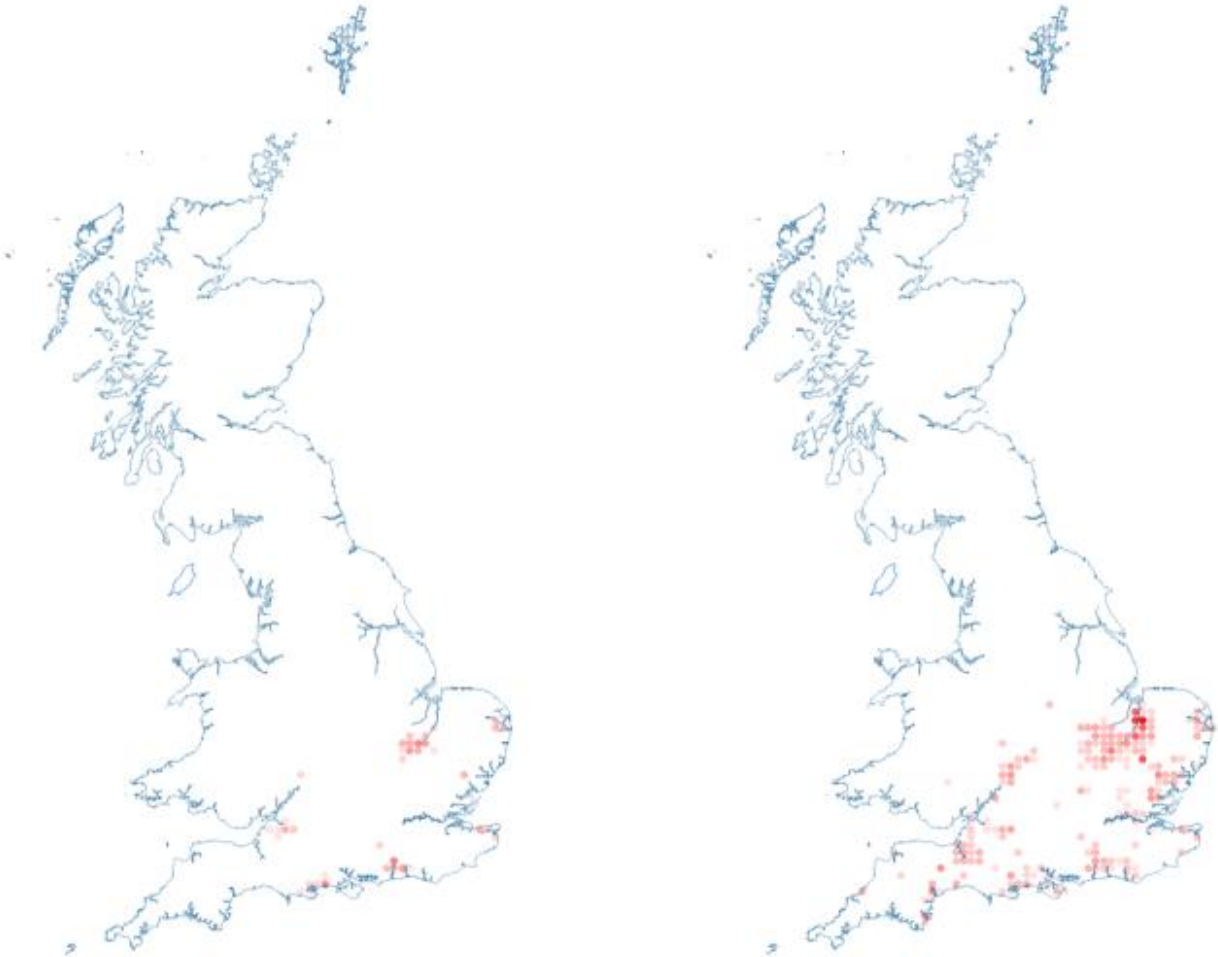
1990-2000 Four-spotted Chaser 2018-2023



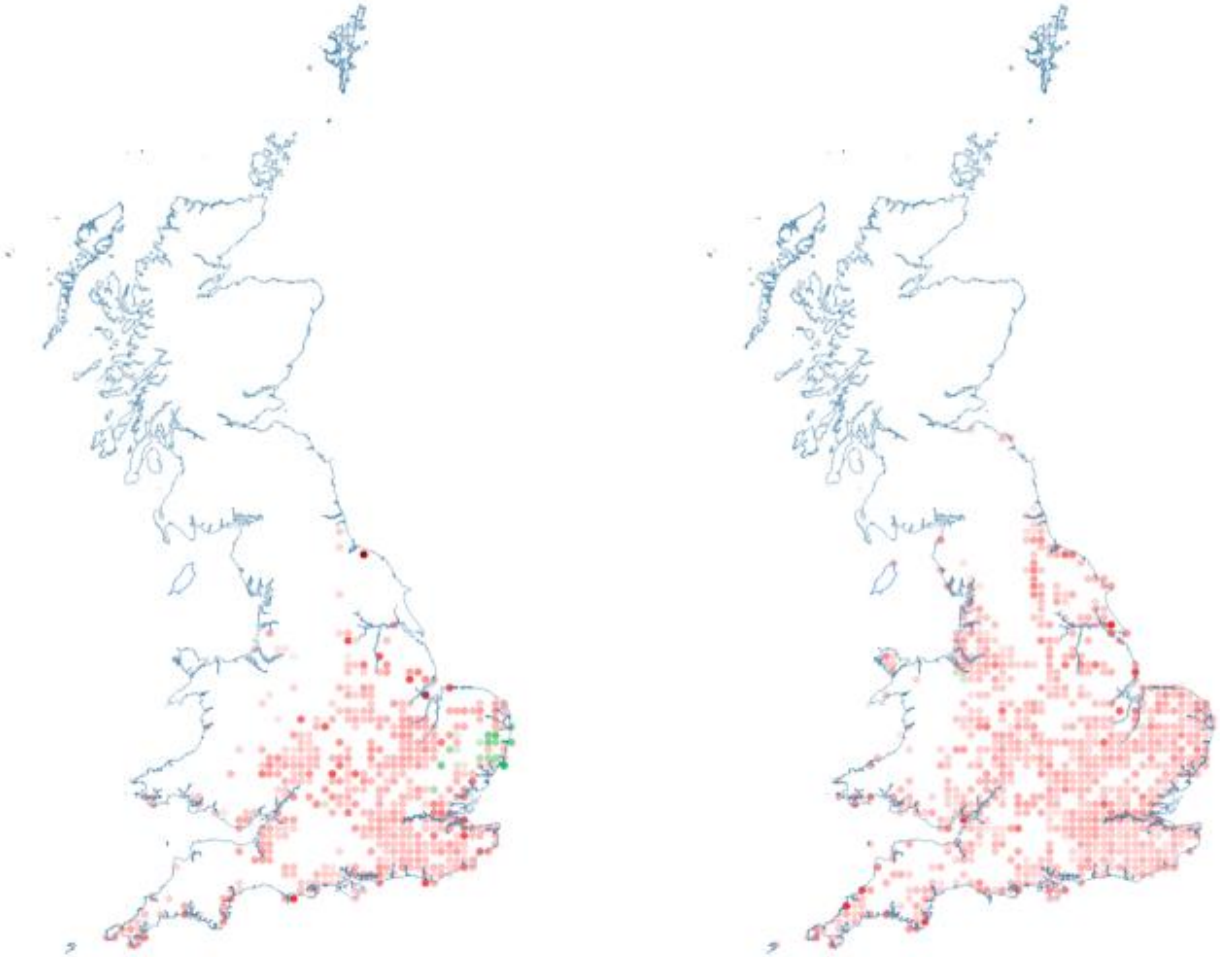
1990-2000 Broad-bodied Chaser 2018-2023



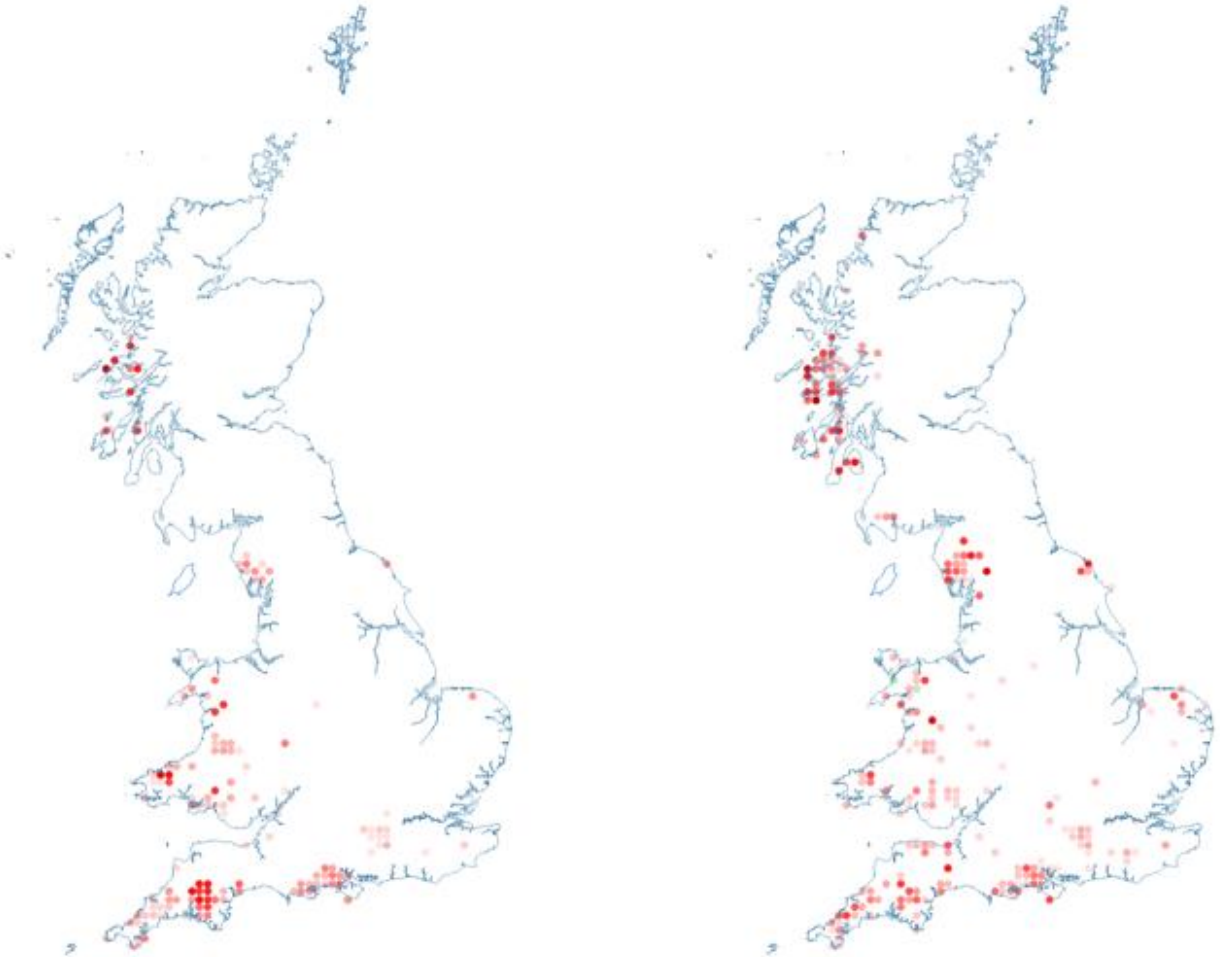
1990-2000 Scarce Chaser 2018-2023



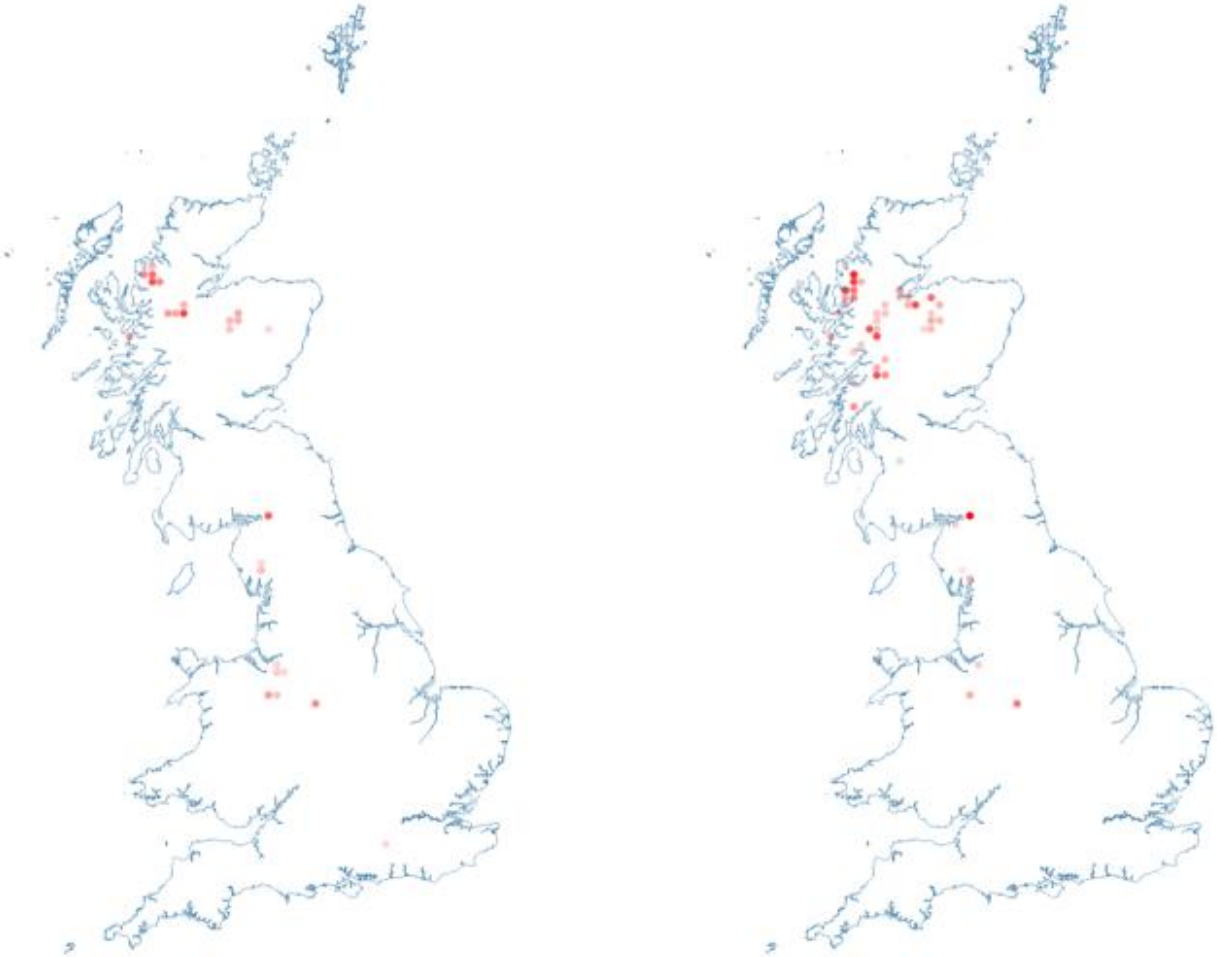
1990-2000 Black-tailed Skimmer 2018-2023



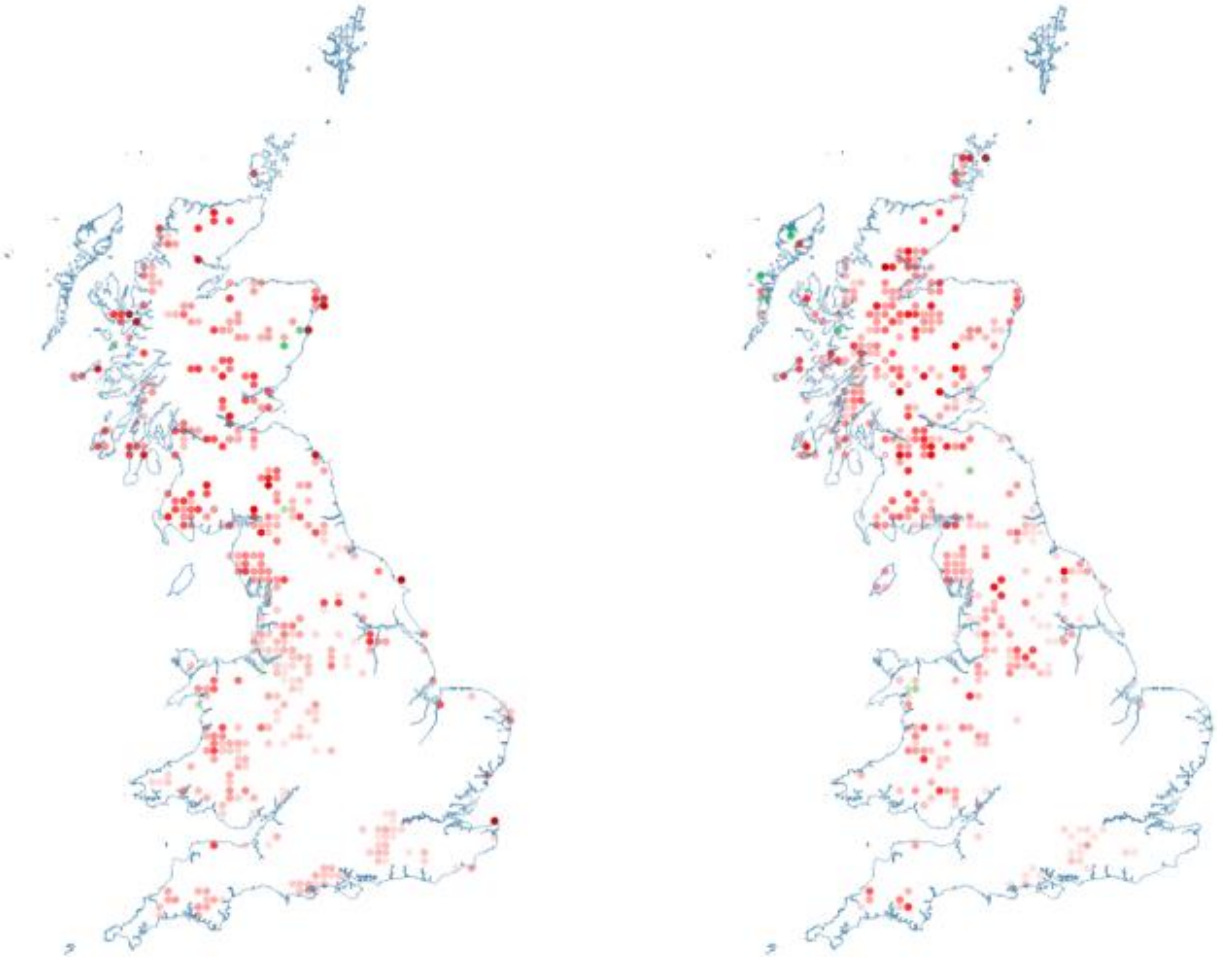
1990-2000 Keeled Skimmer 2018-2023



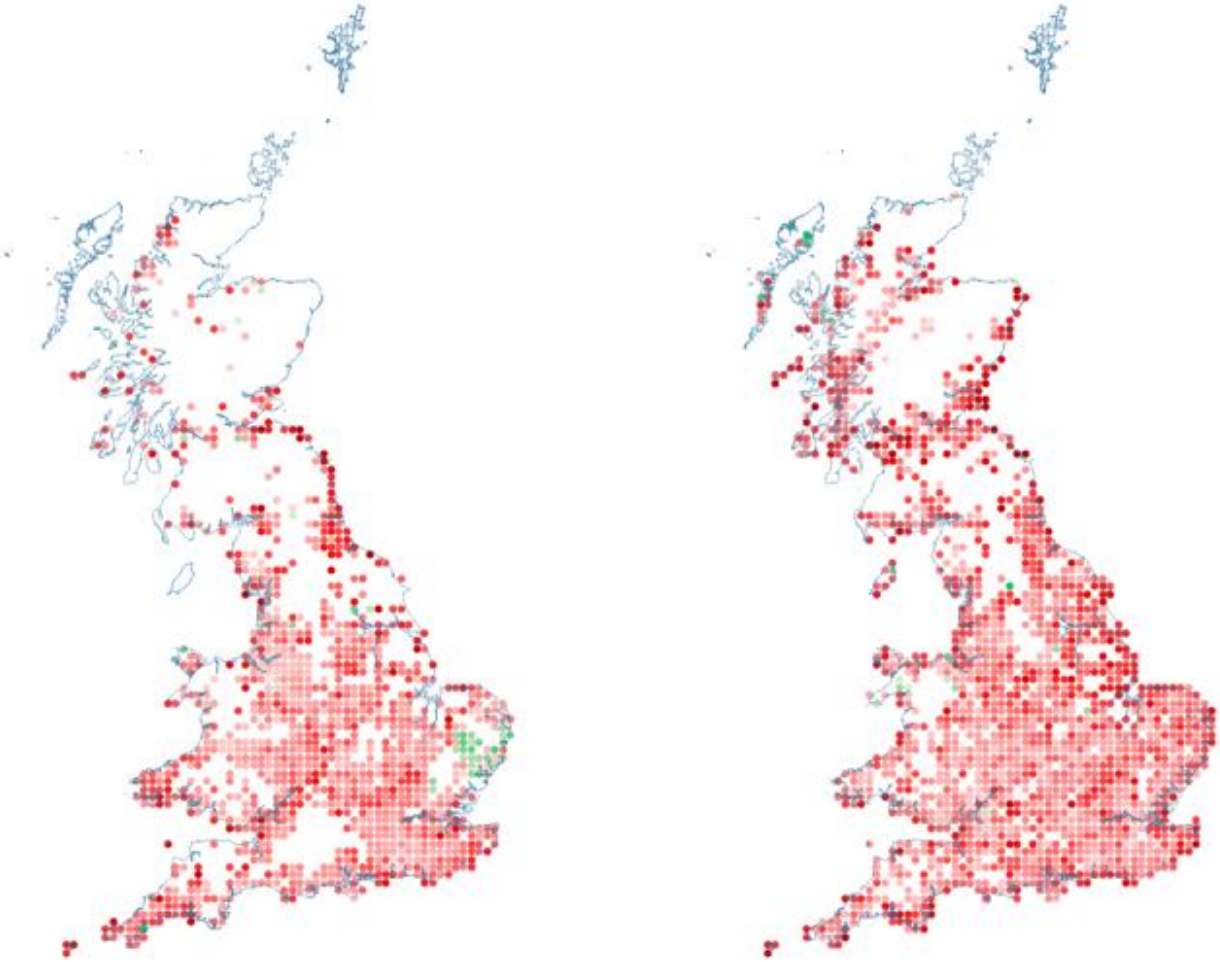
1990-2000 White-faced Darter 2018-2023



1990-2000 Black Darter 2018-2023



1990-2000 Common Darter 2018-2023



1990-2000 Ruddy Darter 2018-2023