

2 Methodology

2.1 Data Sources

Data from a wide variety of sources was used for the project, mostly from secondary sources but including some simple field survey by the author. The secondary data included distribution of twite throughout Britain, land cover classification for Britain and separately for Scotland, land use in the form of Agricultural Census data for Scotland and England & Wales, elevation data in the form of a digital terrain model (DTM), and long-term average rainfall and temperature data for Britain. The field survey involved recording floristic fodder plant scores in areas of South Uist where twite had previously been recorded by Wilkinson and Wilson (2010).

2.1.1 Twite data

Comprehensive data on the distribution of breeding twite across Britain is limited to a very few sources. The original data obtained for *The Atlas of Breeding Birds in Britain and Ireland* (Sharrock 1976) and *The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991* (Gibbons et al 1993) was made obtained from the British Trust for Ornithology (BTO) and data from the first National Twite Survey in 1999 was also made available by the RSPB with permission from the BTO. These datasets form the majority of formal twite records for Britain, although other sporadic datasets are available via the National Biodiversity Network website (NBN 2010). However, the survey methodologies for these records are highly variable and hence their value for a study covering the whole of Britain is questionable. Unfortunately, the data from the current Breeding & Wintering Birds of Britain and Ireland project was unavailable until the project finishes in 2011/12.

A summary of the survey methodologies for the three twite datasets is presented at Appendix 1. The data from the first Atlas (BTO68-72) was recorded from 1968-72 and consisted of 10 km grid squares where twite were recorded during the main breeding season (April to July), along with a status code corresponding to possible (1), probable (2) and confirmed (3) breeding. The data was converted from text (.csv) format to a shapefile using an MS Excel spreadsheet (obtained from RSPB) to convert the alphanumeric 10 km grid references into easting and northing values in the British National Grid projection. Twite were recorded in 787 grid squares in Britain and Ireland. For the purposes of this project the Irish results were discarded as Agricultural Census data was

not available for Ireland. Thus, for Britain twite were recorded in 657 grid squares. Figure 3 shows the distribution of 10 km grid squares where twite were recorded for the first Atlas of Breeding Birds. The map shows the clear concentration of twite in north and west Scotland and in the Pennines of England. The dataset did not include records of grid squares that were surveyed where no twite were recorded, hence this dataset consisted of presence-only data, so it was deemed invalid for model development purposes in this project.

The data from the second atlas (BTO88-91) was recorded from 1988-91 and consisted of a similar set of 10 km grid squares where twite were recorded, but in this case breeding was classified as either suspected (S) or breeding (B). Twite were recorded as either suspected or breeding in 651 grid squares in Britain (excluding Ireland) between 1988 and 1991. Figure 4 illustrates the distribution of 10 km grid squares where twite were recorded for the New Atlas (1988-91).

Figure 5 illustrates the change in distribution of twite between 1968-72 and 1988-91. While there is very little change in the total number of 10 km grid squares with breeding twite, this map illustrates appears to show a loss of twite from parts of the central Highlands of Scotland and gains in central and lowland Scotland, Wales and parts of the fringes of the Pennines area. Once again this was a presence only dataset and so it was discarded from model development use in this project.

This survey also included tetrad (2 x 2 km grid squares) with more detailed data, including confirmed presence/absence (but not necessarily breeding) and abundance. In total 32,784 tetrads were surveyed across Britain (excluding Ireland) and twite were recorded in 1,044 of them (3.2%). Figure 6 shows the tetrads with twite recorded in 1988-91. The two datasets from 1988-91 were produced by very different survey methods (Gibbons et al 1993) and hence produced slightly differing results but the general pattern of distribution was very similar.

10 km Grid Squares with Twite

Source: BTO Atlas of Breeding Birds in Britain & Ireland 1968-72

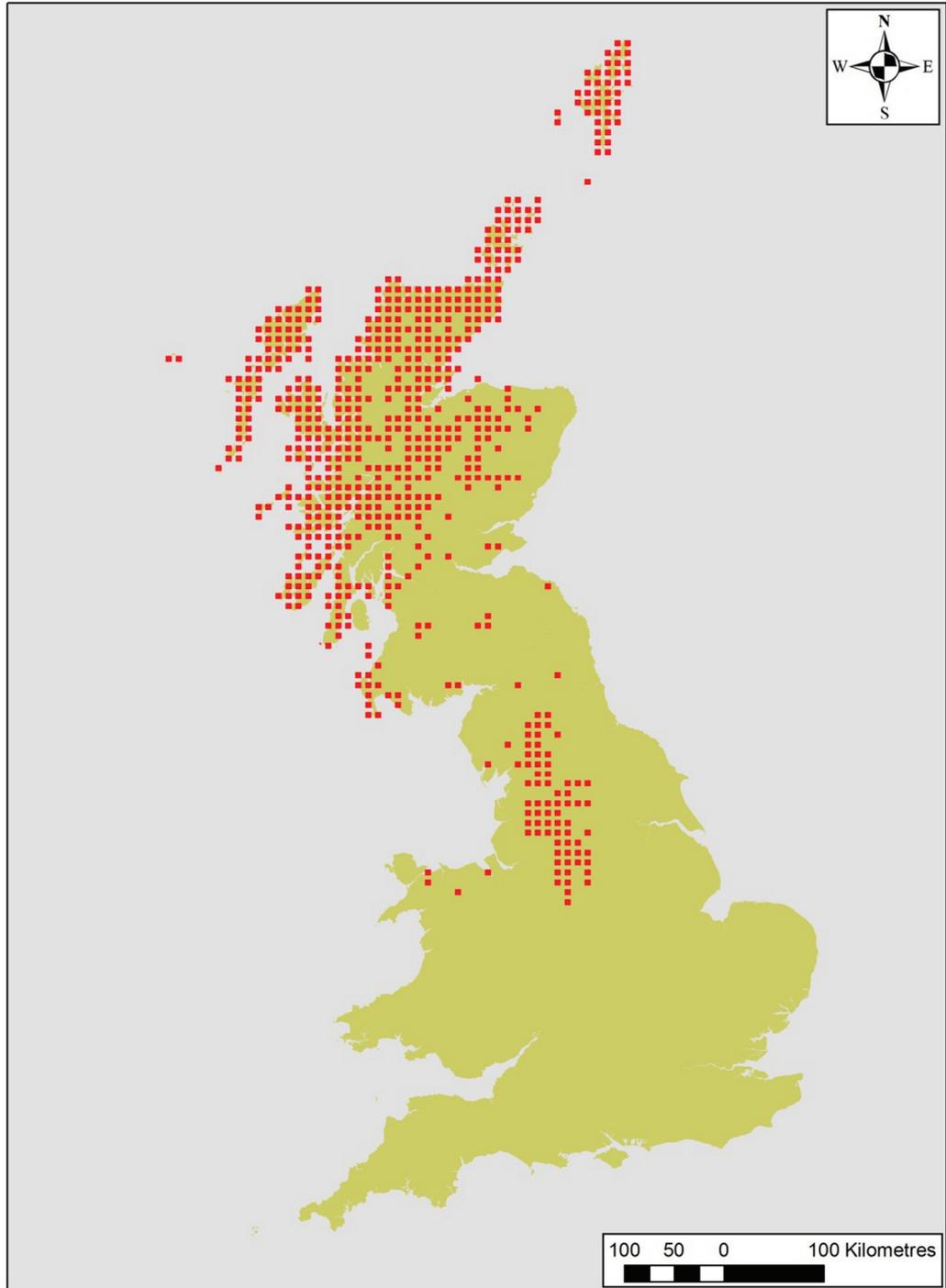


Figure 3 - 10 km Grid Squares with Twite 1968-72

10 km Grid Squares with Twite

Source: BTO New Atlas of Breeding Birds in Britain & Ireland 1988-91

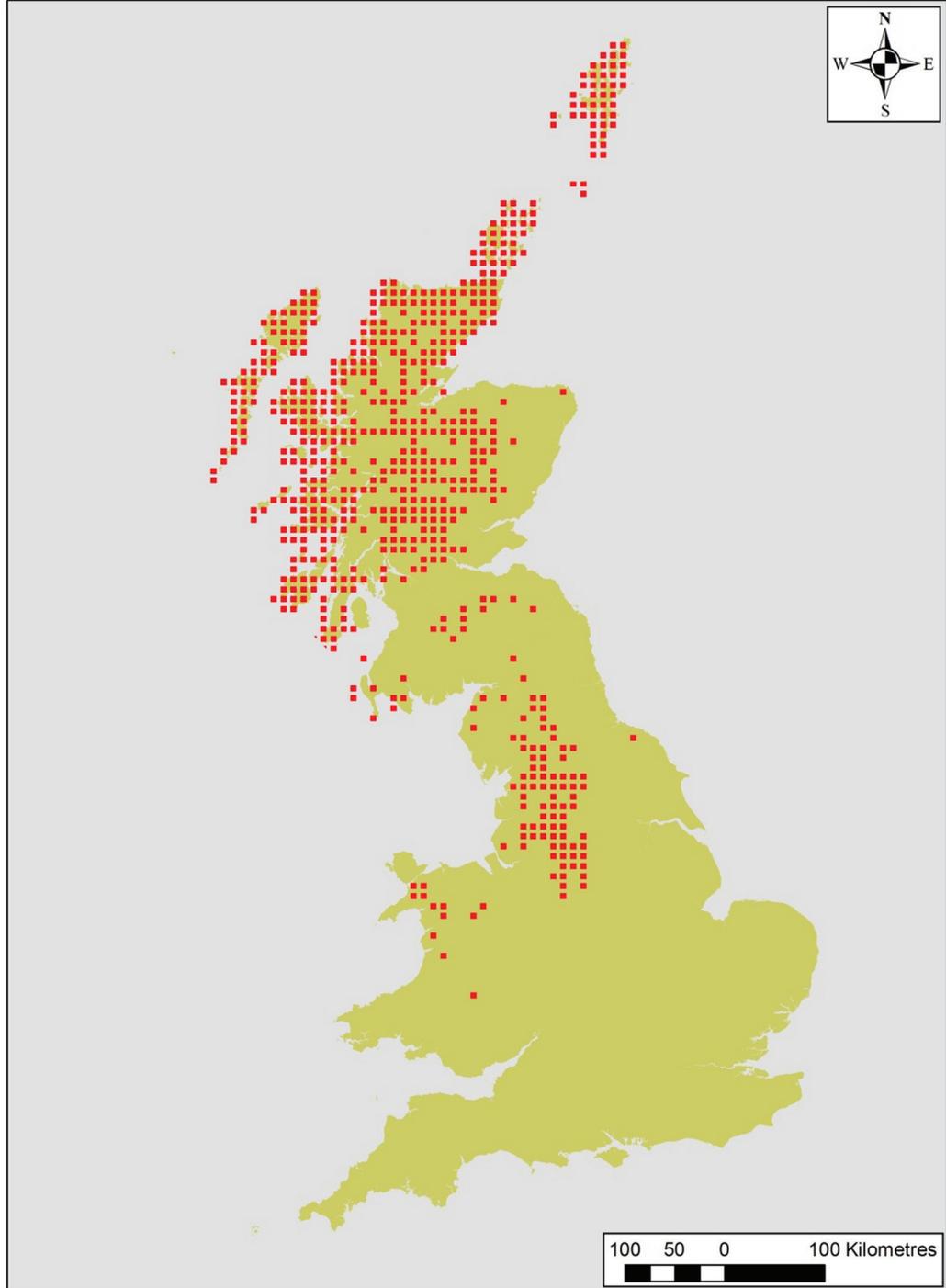


Figure 4 – 10 km Grid Squares with Twite 1988-91

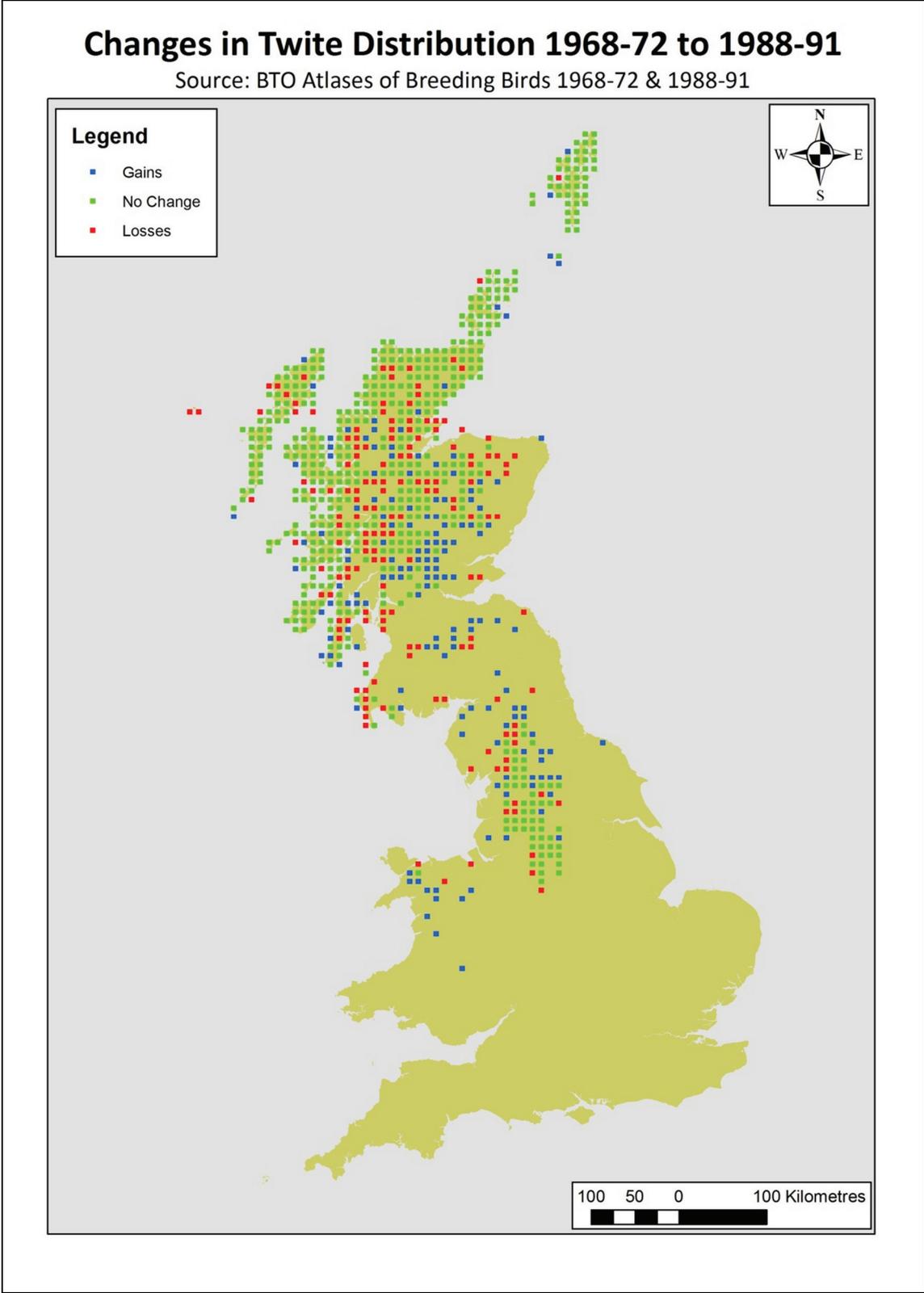


Figure 5 – Changes in Twite Distribution 1968-72

Tetrads with Twite

Source: BTO New Atlas of Breeding Bird in Britain & Ireland 1988-91

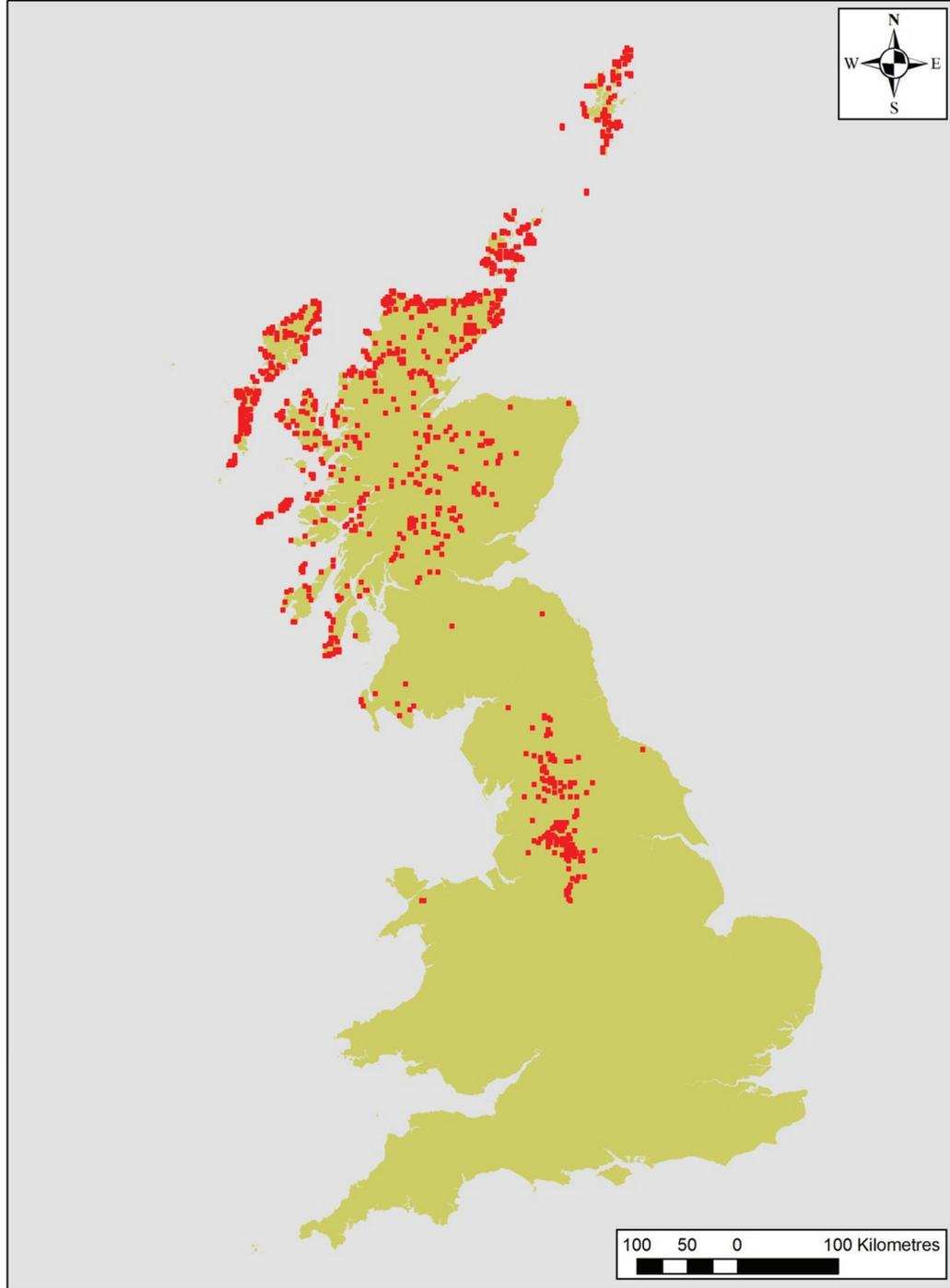


Figure 6 – Tetrads with Breeding Twite 1988-91