

*Acknowledgement:* Dr Stuart Ball (JNCC) is the source of much of the material used in this article and I am grateful to him for agreeing to it being reproduced.

The vice-county system for Great Britain was devised in 1852 by an English botanist, Hewett Cottrell Watson (1804-81), for the purpose of illustrating plant distributions. The system first appeared in the third volume of his work *Cybele Britannica* in 1852 and was refined in later volumes. The boundaries that Watson defined were principally county boundaries as drawn in an atlas published by the Society for the Diffusion of Useful Knowledge in 1844 and reflected the political boundaries as they existed at that time.

Large counties, such as Devon and Sussex, were divided fairly arbitrarily into two or more “vice-counties” and, with time, all of Watson’s areas came to be referred to as vice-counties whether or not they were originally subdivisions of a county. Every vice-county was given a name and, additionally, they were numbered from 1 to 112.

Political boundaries have altered many times since Watson’s day and change has been both piecemeal, as in local minor boundary adjustments, and wholesale as in 1974 and more recent unitary revisions. In the early years of vice-county use, some naturalists proposed changing the boundaries to match these revisions but it was soon realised that much of the value of the vice-counties was in their stability. Stable boundaries make it easier to compare trends over time and also to develop and maintain national networks of vice-county recorders who could coordinate and validate recording in their set areas.

Watson’s map, originally published in 1852, has little detail, being at a scale of 1:4,000,000 and even an updated version which appeared in *Topographical Botany* in 1883 is only at 1:3,000,000. He did however give written descriptions of boundaries, mainly for the subdivision of the larger counties into vice-counties.

In the mid 20th Century vice-counties were being used extensively to describe distributions, but naturalists now had access to detailed Ordnance Survey maps and the poor resolution of Watson's system was problematic. Consequently, the boundaries were defined in greater detail by A.J. Wilmott and J.E. Dandy under the auspices of the Systematics Association. Their work utilised a set of half-inch parish diagram maps provided by the Ordnance Survey which showed changes of boundaries since Watson’s time and these were reviewed by the Association’s Maps and Censuses sub-committee. The outcome of this work was a set of 1:63,360 (1 inch to 1 mile) maps marked up by Dandy and lodged with the British Museum (Natural History), now the Natural History Museum.

These maps were the principal source for a two-map set at 1:625,000 scale (c. 10 miles to the inch) published by the Ray Society in 1969. This set remains the key work for naturalists checking vice-county boundaries and is the usual source for the system quoted in the references of publications.

With the increase in use of IT systems for the storage and analysis of biodiversity information, the provision of an accurate set of vice-county boundaries for use with Geographical Information Systems (GIS) and recording software became necessary. A project to digitise vice-county boundaries was therefore undertaken by the National Biodiversity Network Trust (NBN) in 2003 with some of the funding coming from DEFRA.

GIS systems are designed to display digitised boundaries and they need to be at a high enough resolution to avoid jagged lines and also to maintain a degree of accuracy on large

scale maps. A resolution of 1:10,000 was deemed necessary since this is the scale normally used by conservation bodies and local authorities in relation to planning control systems. The hand drawn source maps were at 1:63,360 as explained above. It is not possible to make data more accurate than its original resolution and so the placing of lines necessarily involves interpretation. The digitisation project was, therefore, more than a simple data capture exercise. It was in fact a new definition of vice county boundaries at a higher level of resolution and took into account the changes that have occurred since Watson and Dandy's time.

The way in which this was achieved was as follows:

The Dandy 1:63,360 maps from the Natural History Museum were scanned and overlaid by the Ordnance Survey Boundary Line 1:10,000 dataset. This shows current administrative boundaries, including parishes. Then:

1. If the mid-point of the line shown on the Dandy map was within 50m of a line in the Boundary Line set, then the Boundary Line data was used. The great majority of the vice-county boundaries plotted by Dandy did in fact coincide quite well with current parish boundaries.

2. If the vice-county boundary line differed by more than 50m, the line was defined from other sources in the following order:

- If the boundary was visible on contemporary 1:10,000 maps, then this was used to define the vice-county boundary,
- If the boundary was visible on historic 1:10,560 maps, then this was used to define the vice-county boundary,
- If no boundary could be found, then the boundary was traced directly from the 1:63,360 scale Dandy map following the centre-line as shown on those maps.

Watson's written descriptions of boundaries were used to aid interpretation where these existed.

The digital files created by the NBN thus represent the definitive version of the vice county boundaries for large scale maps. They may be downloaded from their site free-of-charge to recorders and displayed against an OS map background using GIS software such as MapInfo or the Recorder system.

The MapMate system that is used by the SBS and many other organisations does display vice county boundaries but, because of licensing issues, it is not able to use the NBN digitised files. Instead, the boundaries shown were independently digitised using the Ray Society maps of 1969 and so they will not coincide with the NBN boundaries in all instances.

To help with our recording in Surrey, Robin Day has provided a facility on our website [www.surreyflora.org.uk](http://www.surreyflora.org.uk) that displays the digitised NBN VC17 boundary plotted against Google map images. The zoom facility can be used to show the route of the boundary at a large scale map with a high degree of precision.

PW/16/05/13