

# Grid References for Biological Recording

Field Studies Guidance Note

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Grid Reference Accuracy



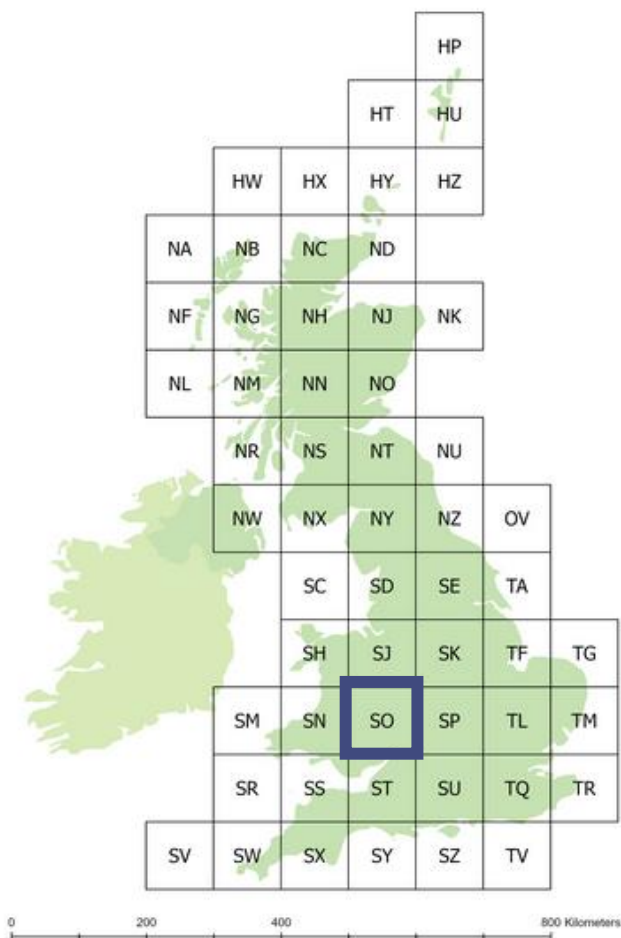
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# Why are Grid References Important?

A crucial part of a biological record is the 'where' – i.e., the location the species is being recorded at. Without a location the biological record cannot be accepted. Ideally, the location should be described using both a georeference and a location name. A georeference enables the record to be identified using coordinates or a specific square on a map. Although there are other georeferences, **grid references** are the most widely used and are the 'gold standard' for biological recording.

## What are Grid References?

A grid reference specifies a square of land, indicating a location through a series of vertical and horizontal grid lines identified by numbers and letters. The size of the square depends on the length of the grid reference.



You may be familiar with what grid references look like. They start with two letters, which are then followed by an even number of figures.

**For example: SO441929**

But what do the two letters at the start of the grid reference mean? Great Britain is covered by grid squares, measuring 100 kilometres across and each of these grid squares is identified by two letters (see map to the left). So, a grid reference beginning with the letters SO places it in the 100x100km square SO, covering parts of Shropshire, Worcestershire, Herefordshire and mid-Wales.

The numbers refer to smaller areas within these larger squares. The 100x100km squares shown on the picture are further divided into smaller squares by grid lines every 10km. These 10km squares are then divided into 1km squares, which are divided into 100m squares, which are in turn divided into a 10m grid, and so on.

# Reading Grid References

Each grid line on an Ordnance Survey (OS) Map is numbered. The lines running vertically from the bottom to the top represent **Eastings** and the number associated with that line increases as you travel from left to right (or west to east) across the map. The lines running horizontally from left to right across the map represent **Northings** and the number associated with that line increases the further up the map (the further north) you go.



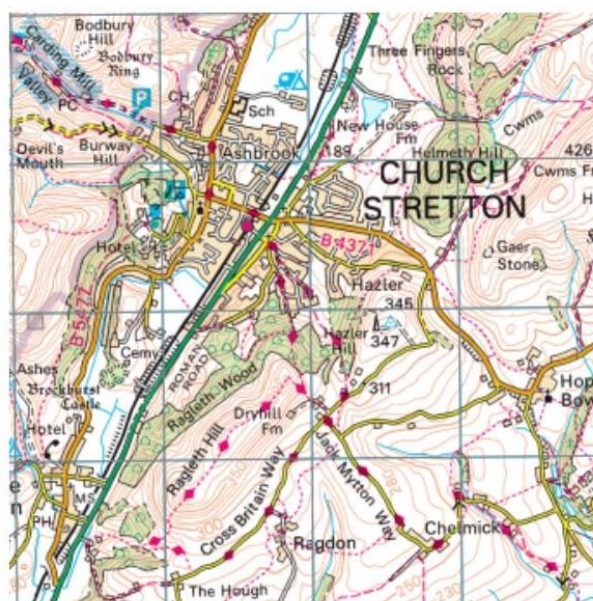
**Blue letters** identify the 100km square somewhere in Great Britain e.g. SO

**Purple numbers** identify the 10km square within the 100km square e.g. SO49

**Green numbers** identify the 1km square within the 10km square e.g. SO4492

**Red numbers** identify the 100m square within the 1km square e.g. SO441929

The first half of the numbers in a grid reference, i.e. SO441929, represent the Eastings. The second half, i.e. SO441929, represents the Northings. Grid references are always written with the Eastings first, then the Northings. Many people use 'along the corridor then up the stairs' to help them remember this.


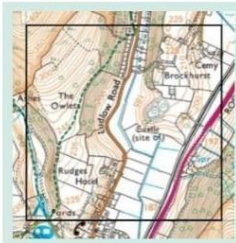
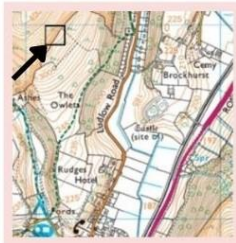



Eastings

Map images from [www.cucaera.co.uk](http://www.cucaera.co.uk). © Crown copyright and database rights 2018 Ordnance Survey.

# What Size Area do They Refer to?

Grid references of different lengths refer to areas of different sizes. The number of digits must be even as these are divided equally to give us the Eastings and Northings. The number of digits relates to the size of the area the grid reference refers to (more digits = smaller area) and the size of this area gives us the grid reference resolution.

|  |  |  |   |                    |
|--|--|--|---|--------------------|
| Two-figure   | Four-figure  | Six-figure   | Eight-figure  | Ten-figure         |
| 10km x 10km  | 1km x 1km  | 100m x 100m  | 10m x 10m   | 1m x 1m            |
| SO49   | S04492   | SO441929   | SO44139298  | SO4413892981       |
|  |  |  |  | Too small to show! |

Map images © Crown copyright and database rights 2019 Ordnance Survey (100049162).

## Latitude and Longitude

Sometimes you will see locations given as Latitude and Longitude ('Lat-Long').

Imagine the Earth was covered in imaginary circles, dividing the planet into sections running around the planet parallel to the equator. These lines are called **latitudes** and specify the north-south position of a location in degrees, relative to the Equator (0° latitude), and the North and South Poles (90° North and 90° South latitudes respectively).

**Longitudes** are similar imaginary circles, but running between the North and South poles, intersecting the Equator. Half of a longitudinal circle is called a Meridian. They specify the east-west position of a location in degrees, relative to the Prime Meridian at Greenwich (0° longitude). Locations can be described by where a latitude and longitude meet, in a similar way to a grid reference. This is a Lat-Long location.

It is easy enough to convert from Lat-Long to grid references using an online converter or app, such as <http://www.bgs.ac.uk/data/webservices/convertForm.cfm>

However, beware that Lat/Long locations are point locations that specify any point on the Earth's surface, and a grid reference refers to the whole square. Wherever possible, it's best to get your locations as grid references to begin with.

# How Long Should a Grid Reference be?

There is no definitive answer as it varies depending on what you are recording and how accurately you are able to establish a grid reference. A good guideline is 'whatever is appropriate for the species being recorded and the survey method used'.

For example, if you are recording a roaming herd of red deer, or surveying a large field, a four-figure grid reference might be the most appropriate scale. A ten-figure grid reference may be useful if you are recording something small and sedentary, for example a rare moss.

**A six-figure grid reference (100m<sup>2</sup>) is appropriate for most species and is the most commonly used length of grid reference.**

## Sensitive Records

Some records may be considered sensitive and therefore the geographic resolution will be blurred to protect the species. For example, species such as badgers (due to badger baiting), rare orchids (due to collectors) and bat roosts (due to their impact on potential developments) will be blurred and access to the record will be limited.

If you have any records that you think may be sensitive, get in touch with the relevant recording scheme for further advice.

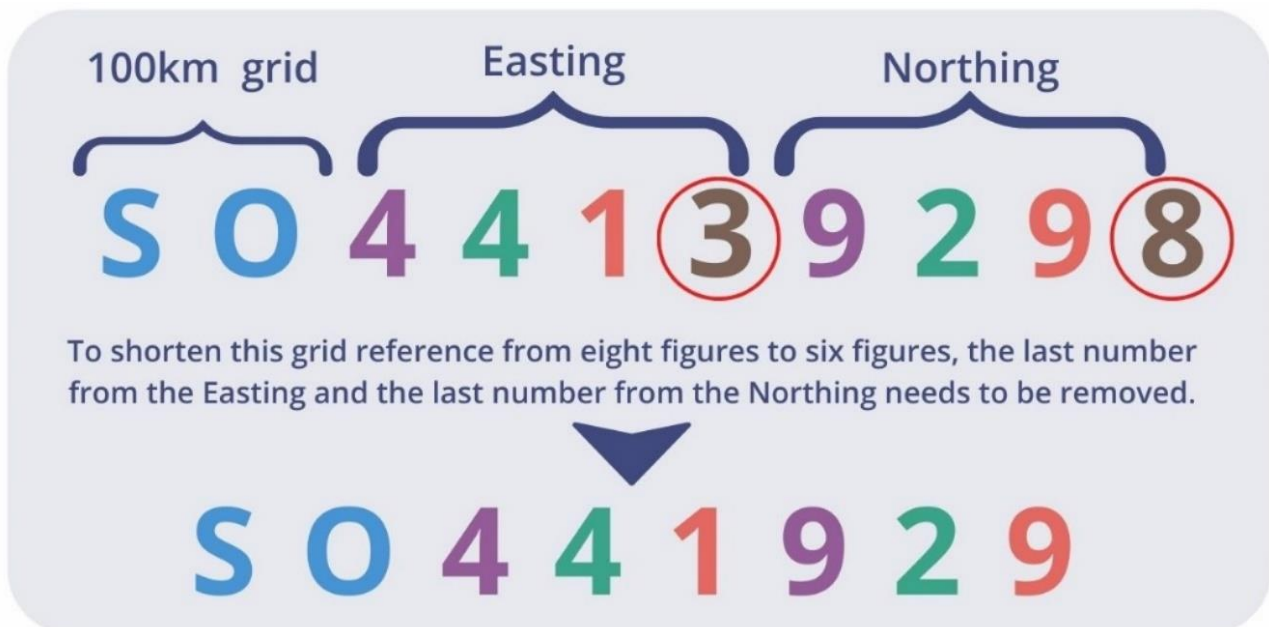
The National Biodiversity Network (NBN) also have further information regarding sensitive species, and they have created sensitive species lists for the UK.

Further information: <https://nbn.org.uk/sensitive-data>



# Shortening Grid References

Often you will find that a grid reference is longer than you want, especially if you are using a location finding app or website, which often produce ten-figure grid references. You will need to convert it to a more appropriate scale e.g. six-figure.



There are two common mistakes when shortening grid references:

1. The first is to remove numbers from the end of the grid reference, which is wrong. Numbers need to be removed from the end of both the Northings and Eastings numbers. If you wish to shorten S044139298 to six figures, removing the '98' from the end is incorrect. You need to remove the '3' from the end of the Easting, and then the '8' from the end of the Northings.
2. The other mistake people make is rounding the remaining numbers up or down. This is also wrong and will translocate the grid reference into a different grid square. Simply remove digits from the end of the Eastings and Northings without doing any rounding.



# Finding a Grid Reference

## Websites

Several websites allow you to click on a map location and find the grid reference. Here are a few useful examples:

- Cucaera (which helpfully also shows you what vice-county the location is in, a useful bit of information for any biological recorder) [www.cucaera.co.uk/grp/](http://www.cucaera.co.uk/grp/)
- Grid Reference Finder (which also allows you to search and convert postcodes) [www.gridreferencefinder.com](http://www.gridreferencefinder.com)
- Bedfordshire Natural History Society Grid Reference Tool (very useful as it shows an aerial photo and an OS map side by side) [www.bnhs.co.uk/2019/technology/grabagridref/gagr.php](http://www.bnhs.co.uk/2019/technology/grabagridref/gagr.php)

## Devices and Gadgets

There are several electronic devices that can help you find a grid reference, such as mobile phone apps, tablets, watches, and handheld GPS units.

There are a huge number of mobile and tablet location apps out there which will give you your location in a variety of formats, including grid references. Search for 'grid reference' and you'll see! Examples include 'OS Locate' and 'GPS OS' – but bear in mind that accuracy can be variable, and it may take several minutes to update your location.

Many specialist watches will give an accurate grid reference, as will a handheld GPS device. However, make sure it is set to the correct 'datum' (grid reference system). If the device is set to the wrong datum your grid references will be incorrect – sometimes by hundreds of miles.

When using digital devices in the field to obtain a grid reference always be aware of the accuracy or precision. This will be displayed as a  $\pm$  figure in metres (e.g.  $\pm 56\text{m}$ ). This figure will need to be taken into consideration when establishing the appropriate grid reference length to use (i.e. an eight figure grid reference would not be appropriate if the grid reference provided has an accuracy of  $\pm 56\text{m}$ ).

In Great Britain use the British National Grid (BNG) or OSGB36 datum. In Northern Ireland make sure you use the Irish Grid Reference system (1965 Datum). If you don't, your device will try and apply the British Grid to Ireland and your grid reference will be incorrect.

## Maps

If all else (and your device battery) fails, you can work out your grid reference using the traditional method – from a paper OS map. The grid line numbers should be printed on the edges of the map and also every now and then on the map itself (blue numbers on blue lines). These numbers will give you a four-figure (i.e.  $\text{km}^2$ ) grid reference – to get a six-figure grid reference you'll have to mentally divide the edge of each  $\text{km}^2$  into 10. Remember to read the Easting first, then the Northing. Six-figures is as accurate as you can get using this method, but that should be fine for biological recording.

# Further Information

## Useful Resources

How to take a 4-figure grid reference with Steve Backshall and Ordnance Survey. A useful video to watch how to obtain a grid reference [https://youtu.be/c0du8v4EE\\_Y](https://youtu.be/c0du8v4EE_Y)

How to take a 6-figure grid reference with Steve Backshall and Ordnance Survey. Another useful video about obtaining grid references [https://youtu.be/FXuo\\_ocVMVU](https://youtu.be/FXuo_ocVMVU)

## References

GetOutside. (no date) *A Beginners guide to grid references* [Online] [30/01/2020] <https://getoutside.ordnancesurvey.co.uk/guides/beginners-guide-to-grid-references/>

Encyclopaedia Britannica (2020) *Latitude and longitude* [Online] [30/01/2020] <https://www.britannica.com/science/latitude>

Ordnance Survey (2015) *Map reading skills: How to read a grid reference* [Online] [30/01/2020] <https://www.ordnancesurvey.co.uk/blog/2015/11/map-reading-skills-how-to-read-a-grid-reference/>



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