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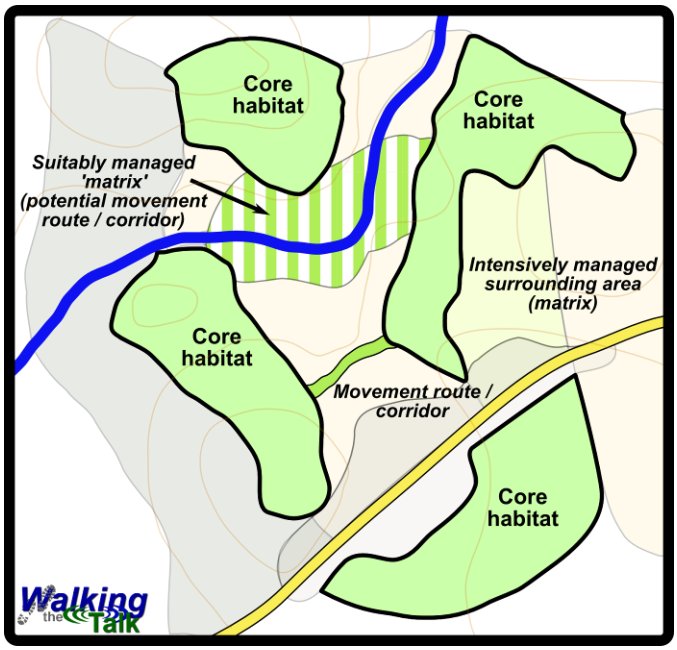
An essential guide to habitat networks



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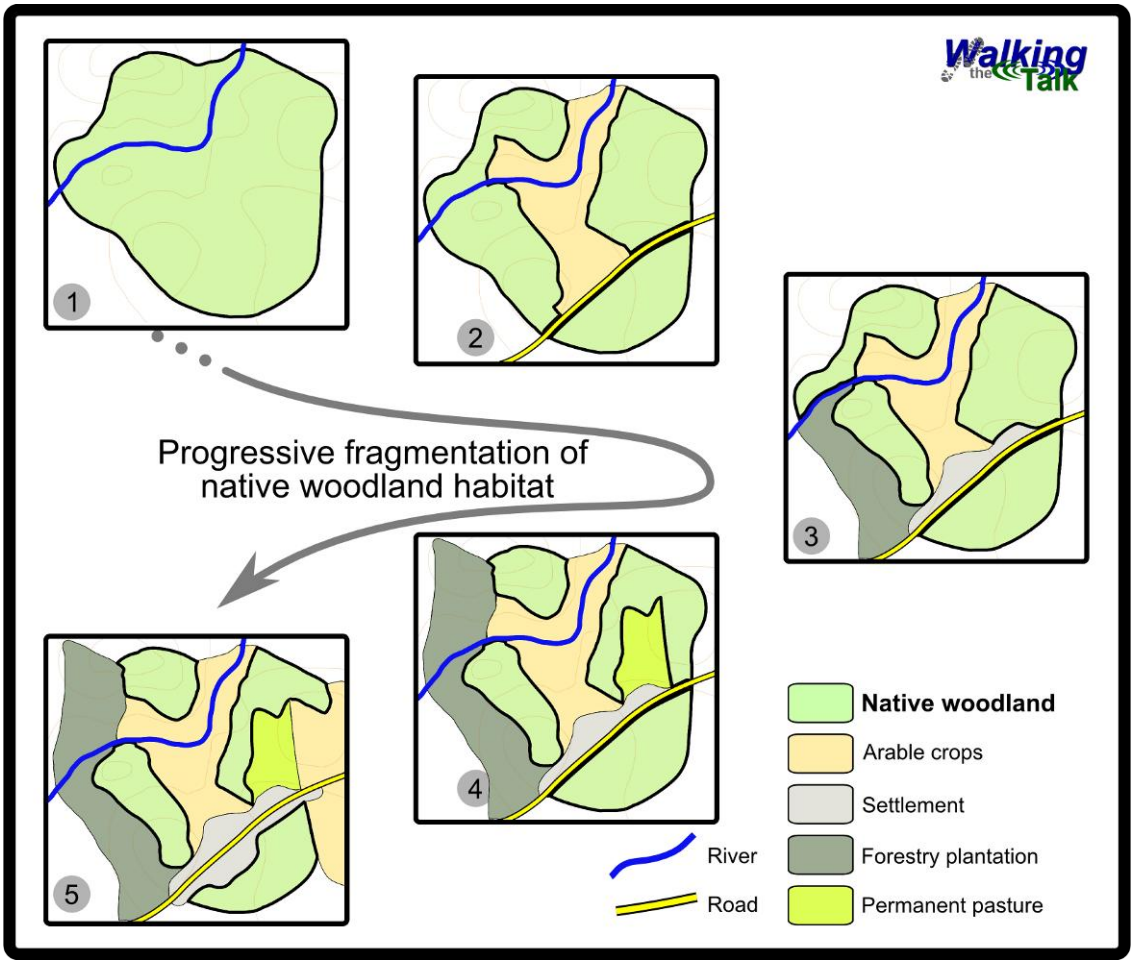
What are habitat networks?

A habitat network is a set of separate areas of habitat that connect together in some way. These connections allow a particular species to be able to move between each individual patch of habitat.

Habitat networks focus on increasing the connectivity of a single habitat such as heathland or pinewoods. Integrated habitat networks focus on several habitats. Habitat networks can also be a part of green networks, which aim to bring economic and social as well as environmental benefits to an area.

Why do we need habitat networks?

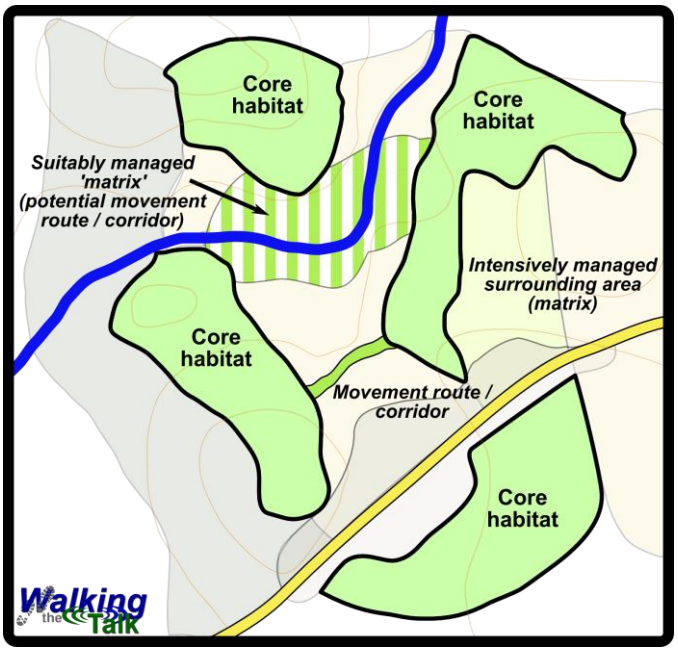
As human impacts on the environment have increased, many habitats have become fragmented. For example, the diagram below shows the process of an area of native woodland fragmenting as roads, farming and development take place. The remaining patches of habitat are highly fragmented and much smaller than the original habitat area. Often these patches have become too small to be suitable for many species and it may be impossible for species to move from one patch to another.



Habitat networks can combat this fragmentation as they provide a way to re-connect individual habitat patches. Usually a habitat network will focus on a particular species and will be used to ensure that there is enough connectivity between the remaining habitat patches to allow that species to flourish.

What do habitat networks contain?

Habitat networks are divided into the following different parts:



Core habitat – these are areas or 'patches' that provide high quality habitat for the species (or group of species) under consideration. They are often areas of land managed specifically for nature conservation e.g. a local nature reserve.

Matrix – this is all the land that surrounds the core areas. To move from one core area to another, an animal or plant will have to cross this matrix. The way the land is used will affect how easily that animal or plant can cross it – for example, urban areas can be harder for some species to cross than open farmland. This is described as the 'permeability' of the matrix.

Movement routes – these are areas that allow plants and animals to move from one core area to another. They can be linear corridors or they might be a series of 'stepping stones' or a particularly permeable bit of the matrix, which can be crossed very easily.

How do habitat networks work?

These component parts can form a network if they are connected in some way. That connectivity can take two different forms:

Structural connectivity – this is where patches of habitat are physically linked together by an area of similar habitat, like the movement route / corridor shown in the diagram above. For example, planting a strip of woodland between two woodland areas that are separated will create structural connectivity. It's easy to see structural connectivity on the ground, but just because there's a physical link between two habitat patches, it doesn't necessarily follow that all species will be able to use it.

Functional connectivity – sometimes patches of habitat can be connected even if they don't appear that way. For example, some species of plants and animals may be able to move through suitably managed areas of matrix between habitat patches. This means the habitat patches are 'functionally' connected and can form a network. For example, an area of pasture might provide functional connectivity for some species between two patches of heathland.

However, assessing functional connectivity can be difficult – you need to know what type of land-use each species will move through and for what distance.

How can you improve connectivity and create a habitat network?

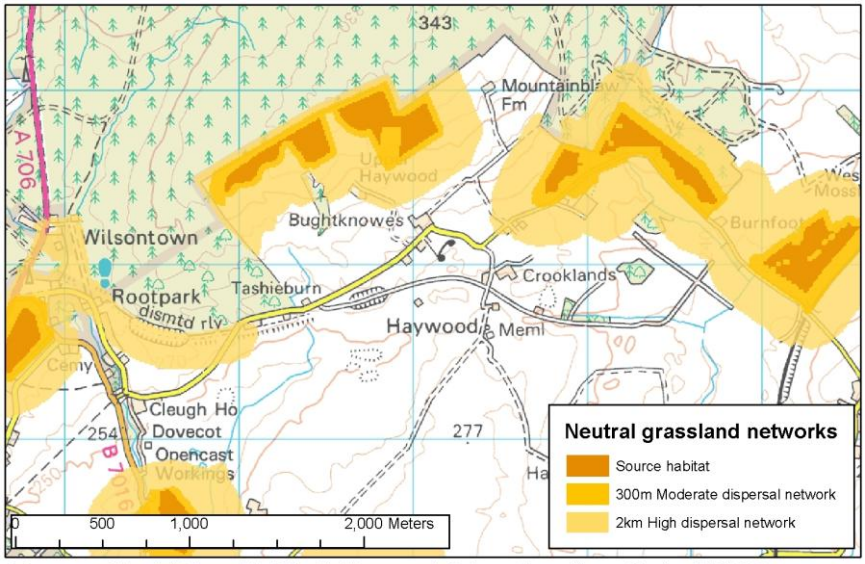
A first step is to establish which habitat or species you are focusing on. You may then be able to restore structural connectivity just by looking at the landscape and seeing where gaps can be bridged with new areas of habitat. However, remember that it is unlikely that a network focussing on a single species or habitat will be equally effective for all habitats and species.

Creating a network with functional connectivity is more complex and usually requires some form of computer modelling. These models look at the existing land cover and assess its permeability for your chosen species / habitat. They are used to work out where there are obvious gaps or where movement between habitat patches is being restricted. These areas can be targeted for habitat creation or changes in land management. An example of this type of model is the GIS BEETLE tool developed by Forest Research, which has mapped forest habitat networks.

What does a habitat network map mean?

This is an example of a habitat network map.

The dark orange area shows where there is suitable habitat for a grassland generalist species, such as a lapwing or red clover. The paler orange areas show where those species could move, or disperse, to - assuming they travelled distances of between 300metres and 2 kilometres.



You can see that the dispersion zone to the south is much bigger than to the north. This is because the way the land is managed in those areas makes it much easier for species to move through – it's more permeable. In contrast, the coniferous woodland is much less permeable and so the dispersal zone is smaller.

Are habitat networks effective?

In theory, habitat networks allow species to move within a fragmented landscape and prevent populations of plants and animals becoming isolated and possibly dying out. That ability to move across a landscape may become even more important as climate change takes effect and some species need to move to find suitable climate conditions.

Most habitat networks are still in their early days and there haven't been many studies to assess how well they work. In particular, there is concern that structural connections (often referred to as wildlife corridors) aren't as effective as we might hope. But some studies have found that species do move between areas once connections between patches are established. And a recent DEFRA review (2008) concluded that "landscape features between habitat patches…can have a role in enhancing connectivity". They also concluded that, given the magnitude of the threat from climate change, the precautionary approach suggests improving connectivity should be a priority.

Where can I find out more?

This document is a short summary of the more detailed information on habitat networks that you can find on SNH's website. On the website, you can also find a list of sources of further information, as well as a glossary, which explains many of the terms used when talking about habitat networks.