

## Highways Habitat Connectivity in Devon & Cornwall A30 and A38 in Devon and Cornwall

Kier Highways

BIG Biodiversity Challenge Award category: Large Scale Permanent

### Project overview

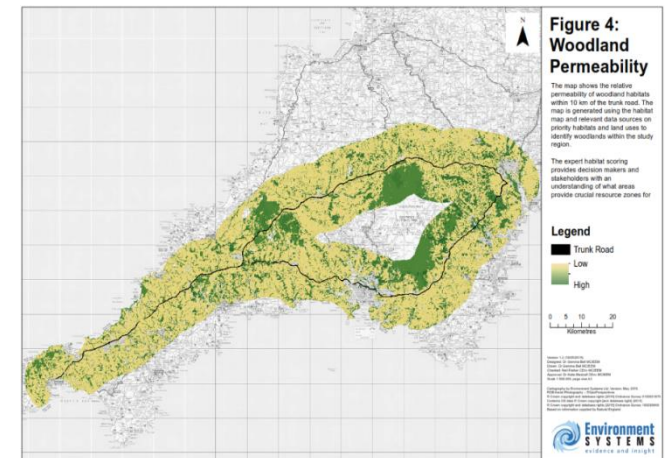
In 2015 we undertook a habitat connectivity project with Environment Systems and the Centre for Ecology and Hydrology (CEH). The project covered the trunk road network in Devon & Cornwall and the surrounding landscape at a cost approximately £60,000. The main aim of the project was to maximise habitat connectivity: Enabling species to move between core areas, by reconnecting habitats and ecosystems to deliver restoration and connection on a significant (landscape) scale. The objectives of this project were to:

- Categorise and map key habitat areas and the intervening land use within 10km of the trunk road using remote sensing (satellite & LiDAR aerial photography);
- Establish habitat permeability for these key habitats based on extensive ecological research coupled with GIS techniques;

- Prioritise areas for targeted habitat creation and protection and develop schemes to improve connectivity.
- Obtain and map 1km occurrence data for a range of priority species in the South West

### Were there any specific conditions that led to you carrying out this work?

The road network itself poses a physical barrier and needs to be made as permeable as possible for species movement. We have been recording road casualty data and it was clear that species struggle to travel across and along the road network. As climate change takes hold many species will need to migrate north to reach cooler temperatures. We need to start planning and mitigating for this now to allow the free movement of species. We need these transport corridors to function as a society, targeted habitat and species



Permeability Map for Woodland Habitat Type

enhancement schemes based on sound research and planning is the best way to mitigate their existence.

### What were the biodiversity conditions on site, prior to the enhancement?

There are some good areas of habitat with a high biodiversity value along the highway verge, such as large areas of woodland and grassland, but also areas of wetland, heath and rock faces.

However, many of these are suffer from fragmentation with isolated populations of protected species.

### What were the biodiversity measures taken?

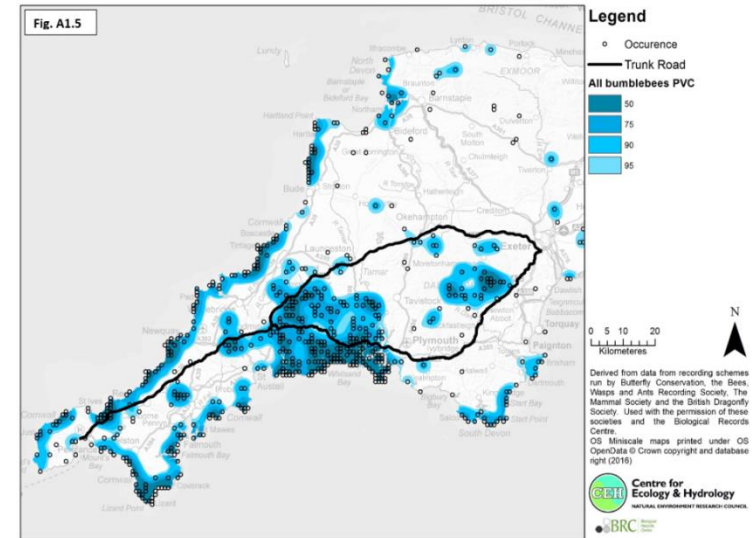
The data and imagery used to undertake the study exist for the whole of the UK and the project can be replicated on varying scales at a relatively low cost in comparison to major developments, when these developments threaten to fragment habitat connectivity.

Using the data & mapping from the study we have prioritised specific locations and created targeted habitat and species enhancements allowing for better long term management, taking a more holistic approach at a landscape scale.

An innovative project such as this focussing on habitat connectivity of the highway verge and the surrounding landscape (to 10km) using remote sensing techniques and then cross mapping the results with species data has never been done before in order to enhance and manage a highway network.

The project focused on several valuable habitat types such as woodland, grassland, wetland, heath and rock faces and allowed us to assess their permeability and value to protected species meaning the habitat created will be of the highest value. Several schemes have been designed and are in development aimed at creating new habitat and joining existing areas of woodland, grassland, wetland and heathland.

By increasing the size and extent of the highest value habitat and reducing their fragmentation a plethora of species will thrive. For example; new areas of species rich grassland will be created in specific locations in order to create stepping stone habitat for pollinating species, resulting in biodiversity net gain.



*Species Occurrence Map - Bumblebees*

Since the completion of the Study, an initial scheme focusing on dormouse habitat has been designed to create 5km of new hedgerows to connect areas of vital habit across **the landscape and another to adapt a culvert so its' passable** for otters.

The species and habitats that exist on the highway verge mirror the surrounding landscape and feature in the Devon and Cornwall BAPs. These BAP species were given priority when mapping the species occurrence data. By also mapping the connectivity 10km either side of the road network we can now start engaging with third party landowners and local communities to improve habitat connectivity at a landscape scale.

How would you best describe the project? An enhancement

### Further information

Using readily available data (GIS, habitat and species data, satellite imagery and LiDAR aerial photography), a habitat map of the area surrounding the trunk road and associated soft estate was prepared. Applying Earth Observation techniques (EO) it was also possible to identify habitat type throughout the area of interest and apply a habitat permeability analysis.

Based upon the habitat map and expert ecological opinion of each habitat type and its likelihood to support priority and protected species (both flora and fauna) it was possible to prepare a general habitat permeability maps for each type. This is being used to implement alternative habitat management options throughout the soft estate.

Additionally we were able to produce a Digital Canopy Height Model using LiDAR-derived measures to provide woody cover within soft estate polygons. This make the identification of gaps, and their extent, in woodland connectivity extremely easy.

A priority species list was then prepared and used to search Biological Records Centre (BRC) and National Recording Schemes and Societies (NSS) databases for all records within Devon and Cornwall. Estimated range of occurrence for each species was estimated using a Kernel Density (KD) analysis and summarised using percent volume contours (PVC). This was successfully completed for 94 priority species.

This work will inform the long term management of the network in several ways:

1) Give guidance to estate planning amending maintenance regimes and identifying the most probable location of good quality habitats and where restoration would bring maximum benefit.



*Digital Woodland Canopy Height Model – connectivity gaps*

- 2) Where new roads and road improvement works are to take place the maps and dataset will provide significant value to planners when evaluating the best places to provide mitigation for proposed schemes.
- 3) The maps could be used to highlight potential conflict with areas of high biodiversity and land uses under development proposals.
- 4) The maps will allow the user to gain a wider appreciation of the landscape scale habitat fragmentation issues without the need to visit site.



### What was your personal motivation for carrying out the enhancement?

The transport corridors that crisscross the country are a necessity for our society and economy to function. They pose one of the biggest barriers to wildlife movement and exacerbate the issue of habitat fragmentation, this issue will only worsen in the face of climate change. However, they also have a huge potential to become corridors for wildlife as well as people. I believe this can only be tackled at a landscape scale and even though projects such as this are above and beyond what is required to manage a road network, they are required to plan and deliver effective solutions and enhancements.