Food and Footprint

Case Study

Spatial modelling to build resilient Nature Networks across the Glasgow City Region

Building Nature Networks helps connect Scotland's nature-rich sites, allowing wildlife to move and adapt in a changing climate. This strengthens our natural heritage and supports the wellbeing of people across the country.

Clyde Grasslands

gcr green network

gcrgreennetwork.co.uk

In 2024, the Glasgow City Region Green Network (GCRGN) initiated a project which would offer an approach to identify opportunity areas across the region. Following a tender process, with skills in network modelling, bespoke modelling tools and evidence gained from surveying species-rich grasslands and pollinators in the local area, the contract was awarded to SAC Consulting.

The customer challenge

Pollinators play a crucial role in supporting health ecosystems and their pollination services are estimated to be worth ~£630 M per year in the UK agricultural sector. Pollinating insects, however, face many pressures including the loss of flower-rich habitats such as species-rich grasslands, which have declined by 97%. A key challenge for pollinators is habitat fragmentation, where a lack of habitat connectivity results in pollinator populations becoming isolated.
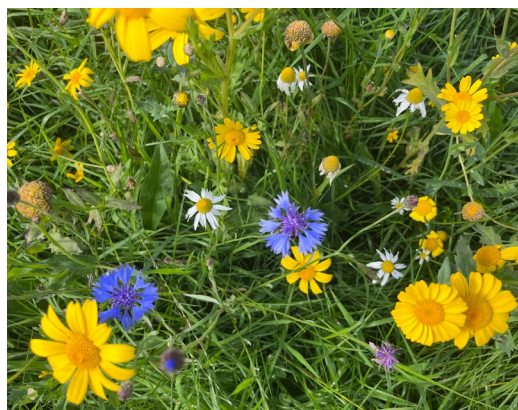
The goal for GCRGN was to build a better spatial understanding of where the remaining core areas of species rich grassland are, and then model networks based on the ability of pollinators to move through the landscape from these core areas. This process in turn would suggest opportunity areas to better connect these fragmented habitats through creation or expansion. GCRGN aimed to use these study outputs to underpin the creation of draft Grassland Nature Networks to restore connectivity and target future resources to best effect.

GCRGN and SAC Consulting were assisted throughout the study by working group partners – Plantlife, Bumblebee Conservation Trust, and Butterfly Conservation, who brought considerable expertise, and a collective commitment to create and restore species-rich grasslands to benefit pollinators and other wildlife. Species-rich grasslands are however poorly captured in spatial datasets, making it challenging to know where to place new meadows to improve connectivity.

Our solutions

To assist the GCRGN, SAC Consulting used an innovative approach that combines spatial datasets with biological records to identify existing patches of species-rich grasslands.

Species-rich grasslands around Scotland are historically poorly mapped and managed, resulting in this habitat being lost to

development and land use change. Identifying species-rich grasslands was the primary focus for data collection.

However, to identify networks, it is important to consider how easy it is for pollinators to move through habitats in the wider landscape. Roads or dense coniferous woodlands, for example, can provide barriers to pollinator movement. Using remotely sensed habitat data, the team was able to consider the wider landscape, to current networks of species-rich grasslands and identify opportunities to link up these networks.

We compiled complex and varied datasets focused on identifying areas with a high likelihood of being species-rich grasslands, and mapping them in our GIS (Geographic Information System). A range of spatial datasets were integrated with biological records for indicator plant and butterfly species. Once species-rich grasslands were identified throughout the catchment area, habitat network modelling was then undertaken to identify the extent of current habitat networks.

Through combing open-source spatial data with biological and historical records, SAC Consulting developed a robust framework to identify and protect species-rich grassland sites. By using network analyses, we were able to detect areas where pollinators are unable to freely move, resulting in their isolation. For example, built-up urban areas prevented species moving with buildings and roads creating barriers.

Knowing the existing networks, provides opportunity to target action on the ground to create new species-rich grasslands, enhancing connectivity. The final step therefore involved identifying opportunity areas where the creation of new species-rich grasslands could optimise habitat connectivity. The opportunity maps created in the project allow the GCRGN to prioritise action on the ground, enabling them to then work with local authorities and land managers to convert opportunity areas to species-rich grasslands.

A further component of the study was to adopt an 'expert knowledge approach'. GCRGN took the draft mapping outputs to sense-check with local experts such as local authority biodiversity officers and biological recorders. Feedback from this process was then used to further refine the final outputs.
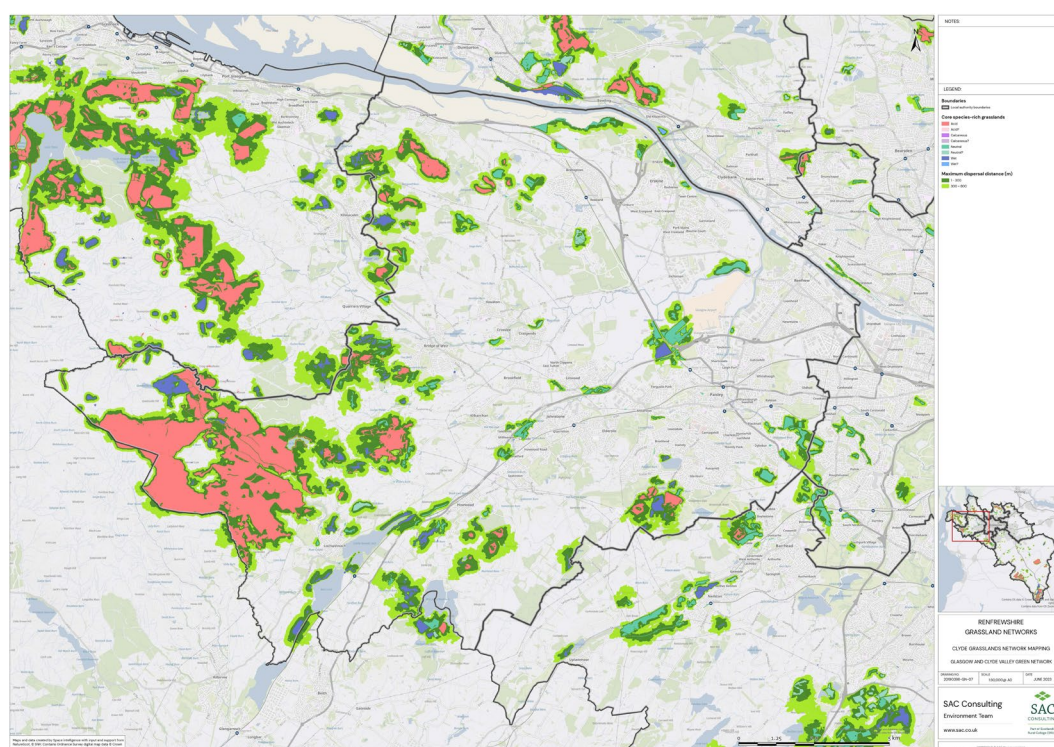
Restoring habitat networks for pollinators and other invertebrates through increased connectivity protects species and allows them to move freely throughout the Glasgow City Region, adapting to environmental change. Building resilient networks of species-rich grasslands is key to the Scottish Government's vision of creating Nature Networks across Scotland. This work has helped the GCRGN, partners, and local authorities to realise this vision in the area.

With funding for conservation limited, it is important that initiatives are spatially targeted to optimise outcomes. Through mapping existing pollinator networks and identifying opportunity areas, we have helped prioritise action for the eight local authorities that make up the GCRGN.

Across the regions, local authorities are already creating and restoring species-rich meadows in identified opportunity areas. This work will help create a network of pollinator-rich habitats across the roughly 330,000 hectares that the GCRGN supports, enabling the local authorities to fulfil commitments to build Nature Networks across the region.
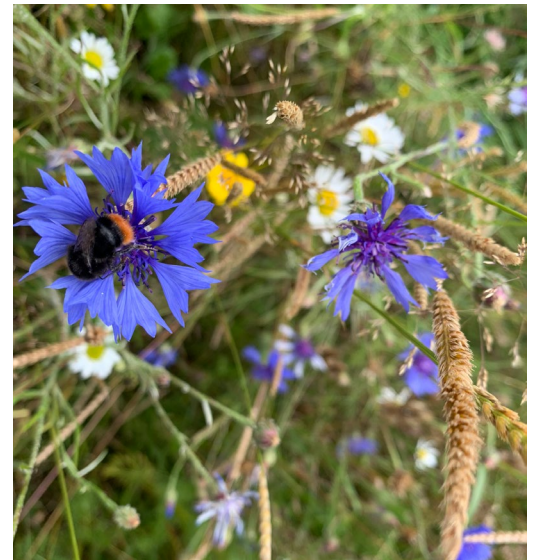
Added value

SAC Consulting was able to integrate key skills in pollinator and plant ecology, with spatial modelling expertise. Their knowledge of existing spatial datasets, alongside network modelling allowed them to develop an innovative framework to identify and model species-rich grassland networks. A clear understanding of pollinator ecology in the Scottish context, alongside science backed evidence (supported by being part of SRUC) ensured that the assumptions and data that underpins our spatial models were robust.

Our customer says

"The GIS outputs from the project have already proved to be absolutely vital, we use the data all the time. The outputs from this study will underpin the identification of regional nature networks, and their subsequent delivery for many years to come. Our requirements for the project were quite specialised, and we were delighted with both the expertise of the SAC Consulting team, as well as the huge effort they put in to ensure the best possible outputs.– it was a really good fit."

Rory McLeod,
Green Network Development Officer,
GCR Green Network