Natural Capital Solutions

Approaches to mapping habitat quality and ecosystem condition

ABOUT THIS BRIEF

This is a summary of a project that was commissioned by the Nene Valley Nature Improvement Area Board and the Northamptonshire Local Nature Partnership and was funded by the OxCam Local Natural Capital Plan (LNCP) Project.

BACKGROUND

Information on habitat condition is often missing from natural capital baseline assessments or asset registers, which regularly focus on the extent of habitats, yet information on condition can prove invaluable. Accurate assessment of habitat condition usually requires a site visit, but this is time-consuming, costly, and not always possible due to access restrictions. There is therefore a need for a method to assess condition of habitats at a landscape scale using existing data.

Furthermore, although habitats remain the most fundamental component of natural capital, the concept incorporates much more and it is important to capture broader indicators of air, land, and water assets and their quality, as well as indicators of ecosystem processes and functions for a more complete natural capital baseline assessment. This was the approach used in a project that focused on Northamptonshire and Peterborough, an area that contains the catchment of the River Nene – and it is an approach that can be applied to any location.

AIMS AND APPROACH

The aims of this project were two-fold:

1. To determine if it was possible to assess the condition of habitats at a landscape scale, using existing data and inferences.

2. To bring together a wide range of data from different sources to create maps of natural capital assets and environmental quality.

The first step was to create a detailed natural capital (habitat) basemap for the whole study area. To do this, Ordnance Survey MasterMap polygons were used as the underlying mapping unit. A series of different data sets were then used to classify each polygon to a detailed habitat type and to associate a range of additional data with each polygon.

To map condition, the project then followed a three-step approach:

1) Condition was assigned to all habitats of low or no biodiversity interest.

2) Site of Special Scientific Interest (SSSI) and Local Nature Reserve/County Wildlife Site (LWS) condition data were used to assign condition to the best quality wildlife sites.

3) A number of assumptions were developed, based on other data sources, to assign condition to several of the remaining habitats.

To map natural capital assets and environmental quality, 27 different maps were created, predominantly based on freely available data. Maps included:

- Indicators of environmental quality across air, land, and water
- Stocks of natural capital beyond habitats
- Indicators of risk
- Degree of protection
- Information on public access.

To help determine the usefulness of the outputs and guide recommendations going forward, a stakeholder workshop was held as a fundamental part of the project.

RESULTS

The approach to mapping condition developed for this project enabled 95.4% of the area to be assigned a condition with reasonable confidence. Using the Biodiversity Metric 2.0, conditions were assigned to each category ranging from 'good' to 'poor', with two N/A categories for agriculture and other non-natural habitats. When used in the metric, these categories are also given a score from 0-3.

Based on descriptions in the Biodiversity Metric 2.0, it is possible to assign condition categories to several low-quality categories without the need for any further information. This includes all built habitats such as buildings and infrastructure (N/A – other), arable (N/A – agriculture), improved grassland (poor), and gardens (poor). When these categories were assigned across the study area, 1.475M polygons covering 230,000 ha were given a condition category, accounting for 83.4% of the total study area.

Condition data for SSSIs and LWS then enabled condition to be assigned to 9,600 ha of semi-natural habitats, representing 3.5% of the total area.

In the third step, a series of rules and assumptions were developed based on external data sources, expert advice, and discussions with stakeholders, to assign condition to several of the remaining habitats. Robust assumptions could be made about the condition of broadleaved woodland, coniferous woodland, mixed woodland on ancient woodland sites, amenity grassland, and water bodies. The process of inferring condition for these habitats, resulted in an additional 23,900 ha of habitats being assigned a condition, or 8.7% of Northamptonshire and Peterborough. The final condition map is shown below (Figure 1).

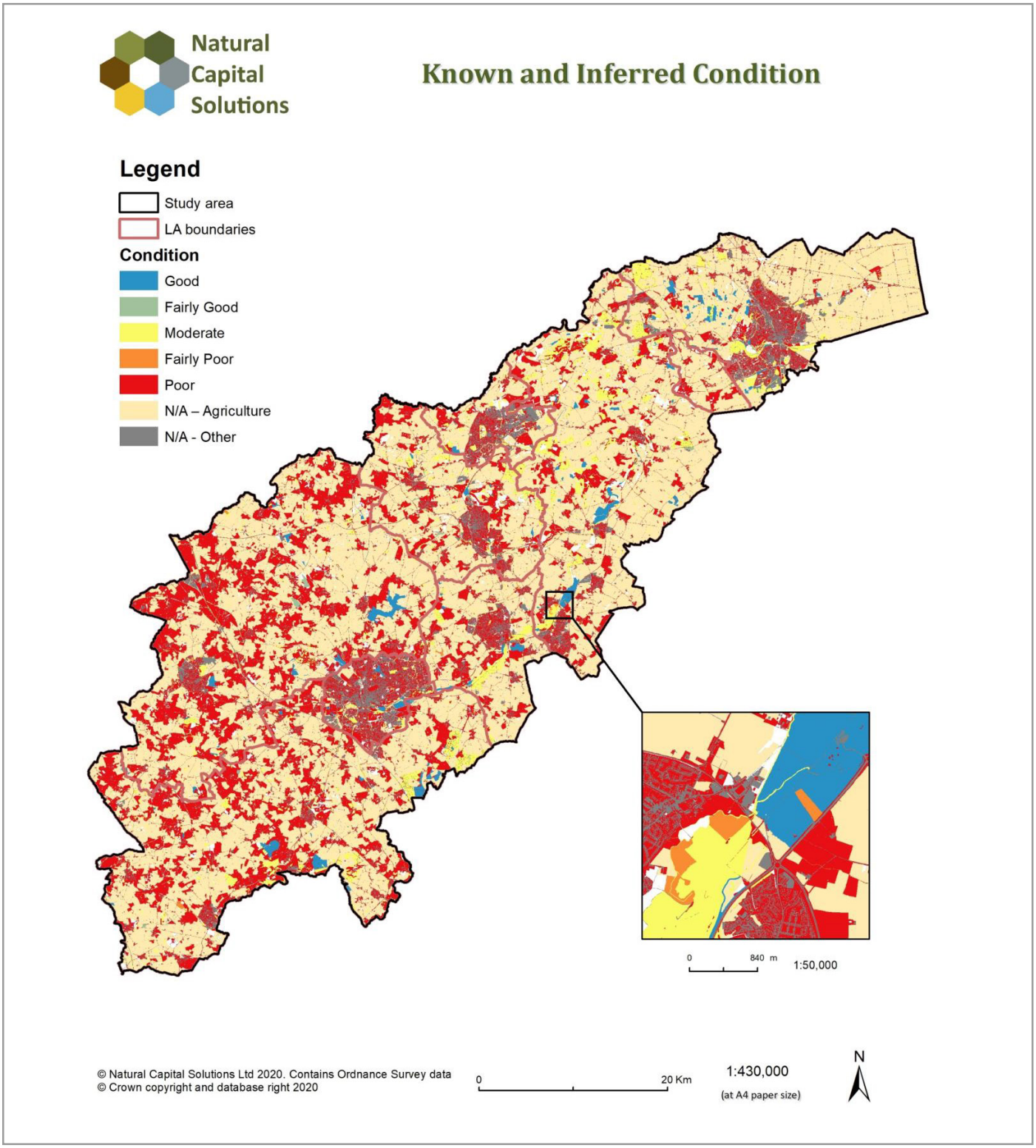

Figure 1. Final map of condition, showing all habitats and sites where condition has been assessed or can be assigned with reasonable confidence. Note that condition has been assigned to 95.4% of the study area, with unassigned areas shown as white space.

Following this process, 12,500 ha of habitat remained unassigned, or 4.6% of the study area, which was predominantly rough and semi-improved grasslands, mixed woodland, scattered trees, and floodplain grazing marsh. The workshop discussed the idea of assigning all unclassified habitats to a standard 'moderate' category to enable completeness of the mapping, however, it was decided that it was better to produce a condition map with gaps where there was reasonable confidence in the categories assigned, rather than one that was complete but relied on a significant number of assumptions, that outweighed the usefulness of the product.

Once condition had been assigned, it was possible to calculate biodiversity units using the Biodiversity Metric 2.0. In total, the study area of Northamptonshire and Peterborough provides 627,231 biodiversity units, excluding the 4.6% of land area that was not classified. The average biodiversity units scored by each habitat type is illustrated below (Figure 2).

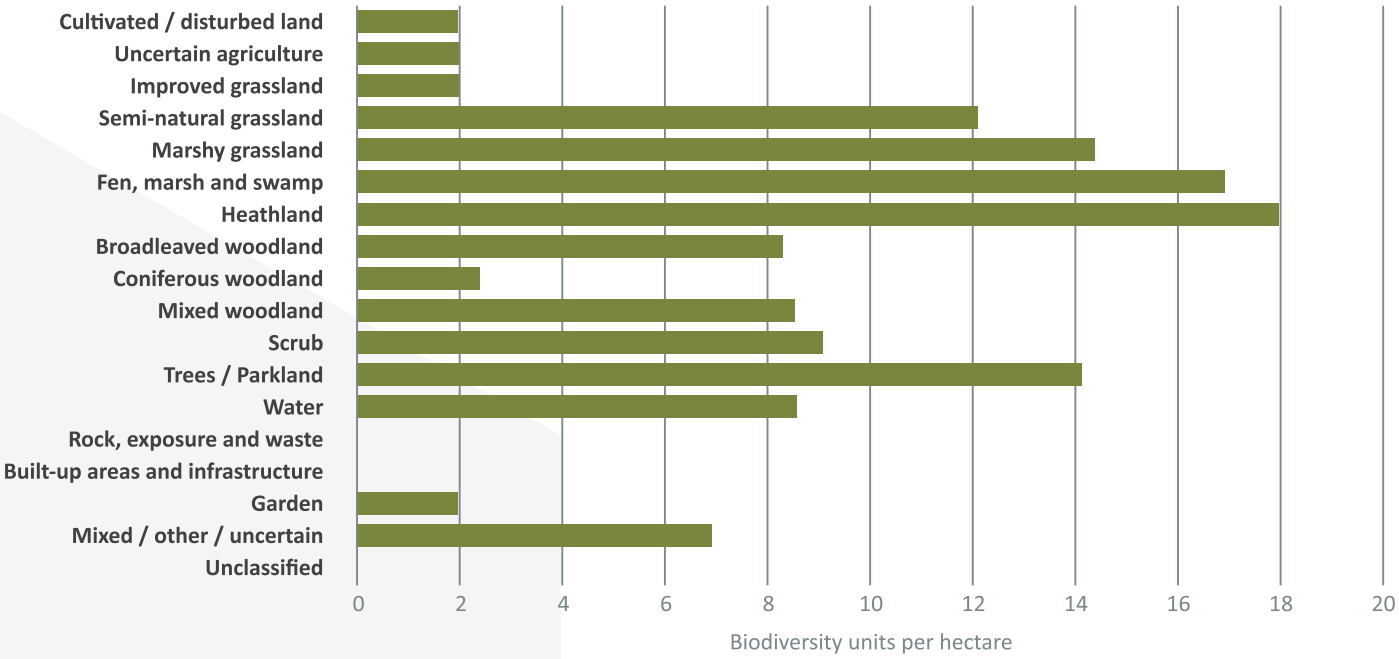

Figure 2. Average biodiversity units per hectare for each habitat type

RECOMMENDATIONS

It would be beneficial if the results of the condition mapping were tested in Northamptonshire and Peterborough. This would require visiting a number of sites and carrying out a condition assessment in situ and comparing the result to the report output.

A large number of Local Nature Reserves do not have a recent condition assessment. Given the increasing focus on assessing condition for a whole range of different applications, it would be a good idea if these sites could be assessed (and funding released to enable this) as a matter of priority.

The approach to assigning condition was developed using Biodiversity Metric 2.0, but should be updated to reflect the latest version of the Metric (currently version 3.1).

The maps can be used for strategic decision-making at the landscape scale, but at a local scale, site surveys and assessment will still be required.

Potential emerging applications for this approach include identification of sites and habitats that are not in good condition and can be the focus of restoration and enhancement projects, Local Nature Recovery Strategies, natural capital investment plans, broad assessments of baseline biodiversity units and biodiversity net gain for planning and development, and the new Environmental Land Management (ELM) Scheme.

To enable a more complete assessment of natural capital assets and environmental quality it would be advisable to also produce maps of air quality, agricultural land classification, overall waterbody status, designations, and Public Rights of Way. Additional maps covering carbon storage, further aspects of public access and green infrastructure, flood risk and agri-environment schemes are also recommended.

Access the full report here:
https://www.oxcamlncp.org/s/Habitat-quality-report-FINAL.pdf