Habitat opportunity maps – General Information

Purpose

The future sustainability of habitats requires not only that existing habitat patches are protected, but are expanded and connected across landscapes. Using existing habitats as a starting point, the opportunity maps identify areas of potential habitat creation or restoration to deliver the greatest biodiversity and ecosystem service benefits.

Opportunity maps have been created to identify opportunities to enhance biodiversity, connectivity of existing habitats and ecosystem services by the (re)creation of three broad habitat types, namely (i) woodland, (ii) wetland (iii) heathland.

The maps assign a ranking to the whole landscape of mainland Cornwall (divided into 100 x 100 metre grid cells) in terms of suitability and potential benefits that would result from habitat creation. The maps are intended to inform strategic planning to increase semi-natural habitat cover in Cornwall and also to inform more general land use strategies.

Opportunity maps integrate multiple potential benefits of habitat creation, such as reduced habitat fragmentation and enhanced flood mitigation services, to present a single strategic map to help identify key opportunity areas.

Inherent to opportunity mapping is recognition of the dynamic and often remote effect of areas of land on one another. For example, bigger habitat patches, closer to one another, set in an intervening landscape less hostile to species movement, are likely to be more 'functional' in ecological terms. Similarly, the flood mitigation benefits of many semi-natural habitats will be realized distant from the habitat itself, in downstream communities and industries.

Outline of Methodology

Landscape ranking is produced using the Zonation software of spatial prioritization. The mapping methodology also draws on the methods and expertise applied in previous opportunity mapping.

The methodology involves the following steps:

i. **Identify existing areas of the chosen habitat:** these core areas are designated to ensure they inform the ranking of all opportunity areas in terms of connectivity and aggregation.

ii. **Identify any areas to exclude *a priori* from habitat creation**: these are inherently unsuitable for large-scale habitat restoration, including built-up areas and existing protected areas. Some of these may only be applicable to a specific habitat. Quarries and the China clay sites are generally excluded as although restoration is possible, this would involve much greater use of resources to deliver successful habitat creation.

iii. **Identify and estimate the relative value of habitat "benefits"**: calculation involves an estimation of the potential provision of any key ecosystem services delivered by habitat creation.

iv. **Identify 'facilitating' factors:** that will increase the likelihood, or increase the value, of realising habitat creation opportunities. For example, a variety of topographical factors will facilitate the successful creation of wetland areas.

v. **Identify 'constraining' factors**: that are likely to reduce the likelihood of realising habitat benefits or successful creation. For example, factors such as wind exposure or the presence of deep, peaty soils are constraining factors on woodland creation. Opportunity costs (the loss of land for other uses) have generally not been included.

vi. **Ranking of cells:** the ranking methodology begins with the conceptual assumption that the whole (non-excluded) area is converted to the new habitat and then iteratively removing the least suitable or beneficial areas until left with the existing habitat distribution. Potential benefits, facilitating and constraining factors are expressed through a positive or negative weighting that informs the ranking process. All cells not excluded *a* priori receive a rank.

The most highly ranked areas equate to those areas considered the most suitable for habitat creation or that would generate the greatest strategic benefit.

The Table 1 identifies some of the key facilitating and constraining factors used in the construction of opportunity maps.

Table 1: Key facilitating and constraining factors used in the creation of opportunity maps.

Habitat type	Facilitating factors	Constraining factors
Woodland	Existing scrub habitats	Wind exposure, Soil carbon content, Non-woodland or scrub semi-natural habitats, Exposed coasts, Man-made infrastructure, Wind-farm permits, Historic monuments & World heritage areas.
Wetland	Topographical wetness indicator, Historic wetland locations, Soil wetness, Floodplain	Slope, Non-wetland semi-natural habitats, Man-made infrastructure.
Heathland	Suitable soil type, high wind exposure.	Soil fertility, Non-heathland semi-natural habitats.

Types of Opportunity Map

Three types of habitat opportunity maps are available:

1 Woodland, Heathland, Wetland opportunity maps

For each of the three habitat types the respective Opportunity Map shows the most highly ranked areas, presented in a series of exclusive bands of declining suitability or potential benefit. Each band is about the same size of area as the existing habitat.

For example the three bands shown in the Woodland Opportunity map together indicate an area equal to about three times the existing woodland area that the mapping suggests is most suitable, and/or would generate the greatest benefit from woodland creation or restoration.

2 Woodland opportunity landscape map

For woodland opportunities there is an additional map product: '**Woodland opportunity landscape ranking'** which provides an indicator of suitability and/or benefits for the **whole** of the ranked landscape (along with excluded areas). The map includes both highly ranked areas, included in the opportunity map, and areas receiving a lower ranking.

There are no equivalent landscape ranking maps for Wetlands and Heathlands as opportunities for the recreation of significant areas of these habitats is much more restricted and so the identification of lower ranked areas is less likely to be informative.

3. Combined Opportunity Map

The three individual Opportunity maps are *not* exclusive as some areas may be beneficial for several types of broad habitat. The Combined Opportunity map brings together the three opportunity maps to show the most highly ranked opportunity areas for each broad habitat type. Each area is assigned to only one habitat type on the basis of their rankings. The size of the opportunity areas shown correspond to an area of about the same as existing woodland and heathland habitats, and about double the area of existing wetland.

Using the Maps

It is important to recognize that the methodology by which the maps are generated affects how they should be used. Some of the key limitations affecting all such opportunity maps are given below:

- The mapping is not suitable for assessing priority areas for small-scale habitat restoration of under a hectare.

- The maps prioritize geographical areas and opportunity options rather than defining rigid designations or limits to opportunities.

- Rankings are assigned uniquely on an estimate of potential ecosystem service and biodiversity gains under mature habitat.

- Cell rankings are dependent upon maintaining existing habitat cover. The dependence is evident when considering the habitat connectivity. The creation of a habitat 'corridor' is only meaningful if existing habitats are maintained.

- Higher rankings generally reflect areas that deliver multiple benefits.

- Rankings are assigned on the basis of existing land cover and factors affecting the demand for delivery of ecosystem services.

- Opportunity maps do not consider the benefits of alternative land uses or provide a cost-benefit analysis.

- The three individual habitats opportunity maps are ***not* exclusive** as some areas may be beneficial for multiple types of broad habitat. For example, river valleys may be suitable for both woodland and wetland creation.

- An area that does not feature among the most highly ranked cells **does not imply** that habitat creation or restoration will deliver no service benefits or biodiversity value. Many lower ranked areas might deliver significant local benefits.

- Each broad habitat type includes a very wide variety of potential habitat types within it. For example wetland might mean saltmarsh, grazing marsh, bog or mire to name but a few. The potential ranking assumes that the choice of habitat type and method of creation (whether fostering 'natural' succession or more 'active' methods of creation) will be tailored to local conditions.

- Habitats can persist in areas the mapping would consider 'unsuitable' areas, such as dwarf oak woodland persisting along areas of exposed coastland such as Dizzard Point. Such areas would nonetheless be challenging areas for attempting to create new woodland.

- The maps are indicative *not* prescriptive - not all the factors affecting the potential benefits of

a site or its suitability for habitat restoration are included in the analysis. **On-the-ground assessment of sites is essential** for determining suitability for any habitat creation scheme.

- The maps are to inform decisions not make them unnecessary.

Further Information and Links

For further information about habitat creation and restoration opportunities and methods please consult the links below.

General:

Woodland:

Wetland:

Heathland: