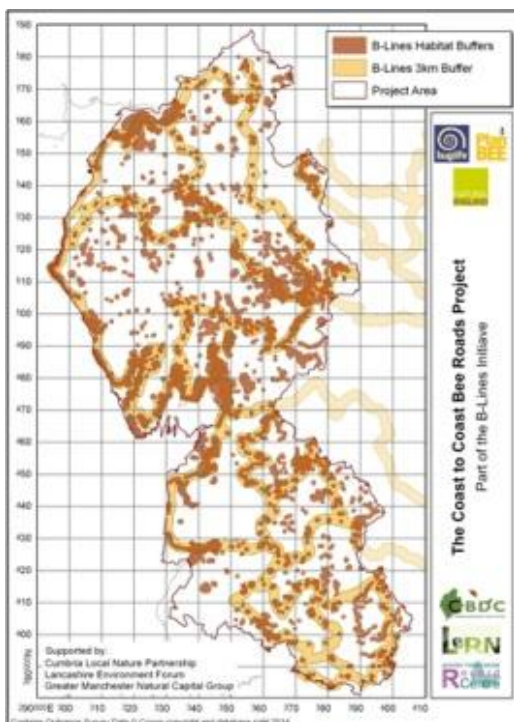# The B-Lines Initiative: Mapping Methodology

The B-Lines are mapped at a 'regional' or county level using a range of national and local data sets. They are refined and agreed with a wide partnership of conservation partners, local authorities and other interested parties.

The primary aim of the mapping is to map key insect pollinator dispersal pathways (B-Lines) across the area, linking in with B-Lines mapped in adjacent counties or regions.

GIS Mapping Method:

The B-Lines mapping is based on both national and local habitat datasets and uses basic 'connectivity' modelling to identify potential pollinator dispersal pathways. It is designed to be both simple and pragmatic, using both existing Green Infrastructure and biodiversity mapping, alongside local stakeholder and partnership knowledge to refine and confirm priority networks.

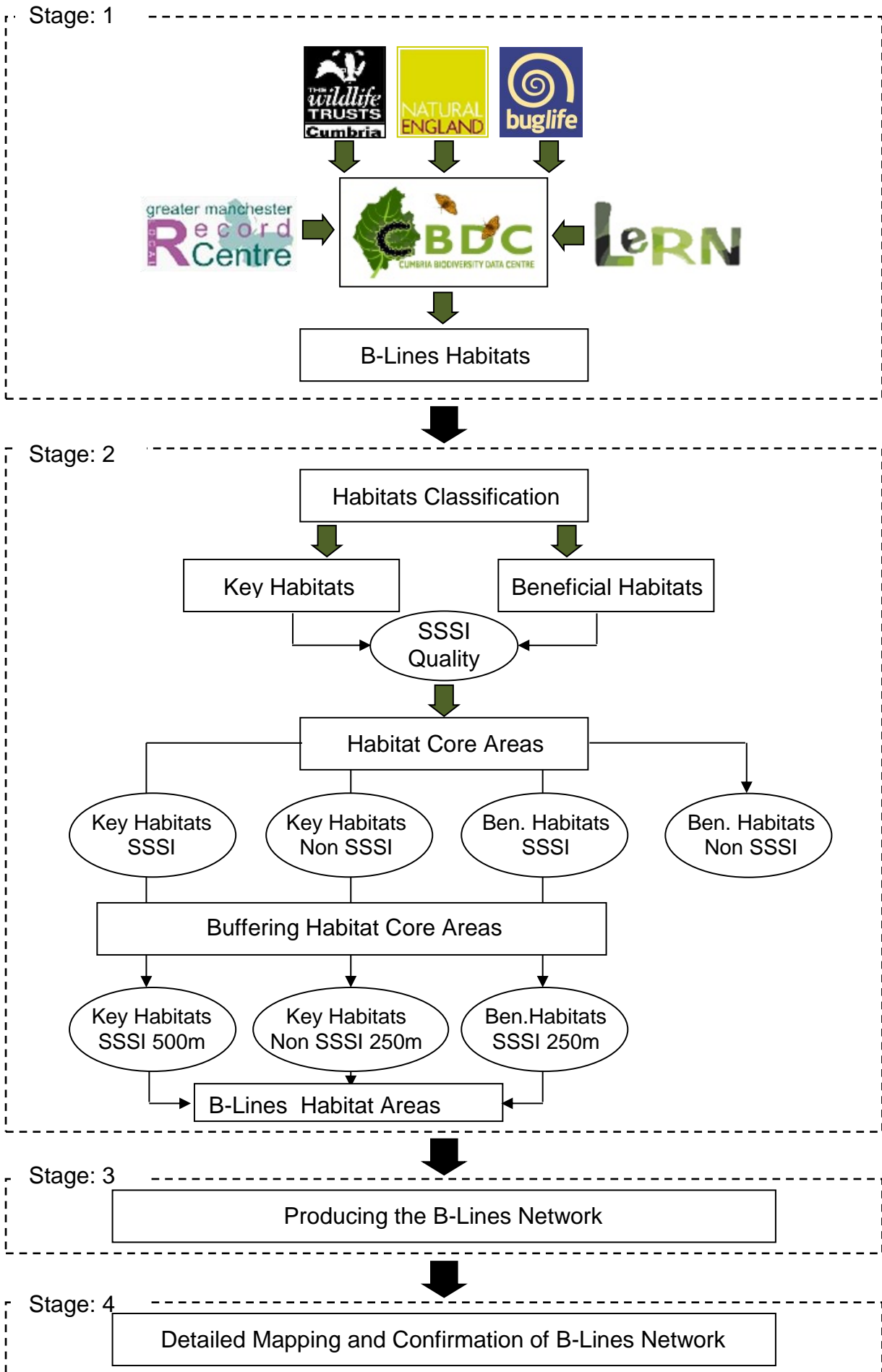An example of a B-Lines map, with underlying habitats is shown below.

The mapping work is ideally co-ordinated by a local 'Steering Group'. This group's role is to help identify key local data, and then to ensure that habitat selection and prioritisation takes into account local wildlife/ landscape distinctiveness. The Steering Group is also responsible for keeping all key stakeholders/partnerships fully updated and engaged in the mapping process.

B-Lines for the North West of England

The mapping methodology is summarised as a flow diagram in Figure 1 (see below). It has four main stages:

  Stage 1: Data Collation
  Stage 2: Identification of the B-Lines core habitat areas
  Stage 3: Producing the B-Lines Network
  Stage 4: Detailed mapping and confirmation of B-Lines Network

Figure 1: Stages of the B-Lines Methodology (taken from the NW England mapping)

Stage: 1

B-Lines Habitats

Stage: 2

Habitats Classification

Key Habitats

Beneficial Habitats

SSSI Quality

Habitat Core Areas

Key Habitats SSSI

Key Habitats Non SSSI

Ben. Habitats SSSI

Ben. Habitats Non SSSI

Buffering Habitat Core Areas

Key Habitats SSSI 500m

Key Habitats Non SSSI 250m

Ben.Habitats SSSI 250m

B-Lines Habitat Areas

Stage: 3

Producing the B-Lines Network

Stage: 4

Detailed Mapping and Confirmation of B-Lines Network

Stage 1: Data Collation

Stage 1 is the collation of habitats data from a wide range of sources (see Annex 1 for examples). The collated data should fulfil the B-Lines criteria by including:

- Wildflower-rich grassland habitats
- Other wildflower-rich habitat types which reflected local landscape character and wildlife interests (e.g. lowland heathland/grassland mosaics, lowland fen, raised bog, wood pasture and parkland).

Non-statutory designated areas such as County Wildlife Sites and Roadside Verges are included where these support relevant habitats.

Stage 2: Identification of Potential B-Lines Core Habitat Areas

The aim of this phase of work is to identify and map the B-Lines core habitat areas which will provide the working foundation for the B-Lines Network. The ArcGIS building model technique 'Model Builder' is used in analysing, editing and mapping the collated habitat data. **A detailed step by step methodology for using this ArcGIS model is provided in Annex 2.** The developed model is a vector data model[1] based on the following B-Lines Guiding Principles:

- *Classifying habitats into key and beneficial habitats*
  The collated habitat data sets are classified into 'key' and 'beneficial' habitats (the classification developed by the mapping Steering Group). Key habitats include those likely to be the most wildflower-rich, and therefore those which should be a priority to include in the B-Lines. A suite of other habitats are defined as beneficial, i.e. habitats which would help support and provide the framework of the network.

- *Producing the B-Lines core habitat areas*
  The designation of Sites of Special Scientific Interest (SSSIs), i.e. the country's very best wildlife areas, is used as a proxy for habitat quality. The intersected areas of the SSSIs and the B-Lines Habitat GIS layers are used to map the core areas for the B-Lines (i.e. recognised as the highest priority to include in the network).

- *Buffering the core habitat areas*

  The B-Lines Core Areas are 'buffered' to reflect the quality of the wildflower-rich areas, and their importance within any network (including their potential level of influence):

  - Key habitats of SSSI quality are buffered by 500m.
  - Key habitats of non SSSI quality are buffered by 250m.
  - Beneficial habitats of SSSI quality are buffered by 250m.
  - Beneficial habitats of non SSSI quality are not buffered.

  All the created buffers are merged together to create one map of the B-Lines Core Habitat Areas.

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[1] Although analysing and mapping B-Lines can be done without the Model Builder tool, using the developed model helps in saving time and efforts especially when updating maps is required during the mapping process.

Stage3: Producing the B-Lines Network

In line with the B-Lines Guiding Principles, the B-Lines are mapped so as to link together existing important wildflower-rich areas. As an aid to build up the B-Lines network 'Linkage Mapper' is used to help identify wildlife habitat connectivity. It is an open source tool consists of several Python scripts, packaged as an ArcGIS toolbox and developed for the Washington Wildlife Habitat Connectivity Working Group's (WHCWG). **Further details on how to utilise 'Linkage Mapper' in the B-Lines work is provided in Annex 2.**

The Linkage Mapper requires a resistance surface map to be created for the project area. Key data sources for producing the resistance map include the Land Cover Map 2007 and the B-Lines Beneficial Habitats (that are not buffered). Other data such as aspect, altitude and slope could also be considered. These are then used to provide the cost-weighted criteria for producing the resistance raster map (see an example in Figure 2). A high score indicates high resistance (i.e. areas where it will be more difficult both for insect pollinators to disperse and were pollinator-friendly habitats could be provided). The given scores should be agreed by the mapping Steering Group.

Figure 2: An example of the B-Lines Resistance Surface Criteria

Land Covers (90%)	Score	Slope degrees (%10)	Score
Broad leaved, mixed and yew woodland	4	1 (0 - 1.9)	10
Littoral sediment	10	2 (2 - 4.5)	10
Built up areas and gardens	5	3 (4.6 - 7.6)	6
Arable and horticulture	6	4 (7.7 - 11)	5
Coniferous woodland	8	5 (12 - 15)	4
Freshwater	10	6 (16 - 19)	2
Littoral rock	8	7 (20 - 24)	5
Salt water	10	8 (25 - 30)	6
Beneficial Habitats	1	9 (31 - 36)	10
Moorland	7	10 (37 - 60)	10
No Data	3		

The Linkage Mapper uses the GIS maps of the B-Lines Core Habitat Areas and the resistance surface raster to allocate the least-cost liner pathways between the B-Lines Core Habitat Areas. All the potential routes are then buffered with 3km wide pathways and a set of maps produced highlighting potential B-Lines across the project areas.

Stage 4: Detailed Mapping and Confirmation of B-Lines Network

A useful tool to use to help partners and stakeholder comment on the draft B-Lines Network is to publish it on Google Earth. A workshop including stakeholder/partners allows stakeholder and partners to discuss the potential B-Lines, use their local knowledge to help refine the B-Lines and then to agree the final mapped B-Lines network.