

Background

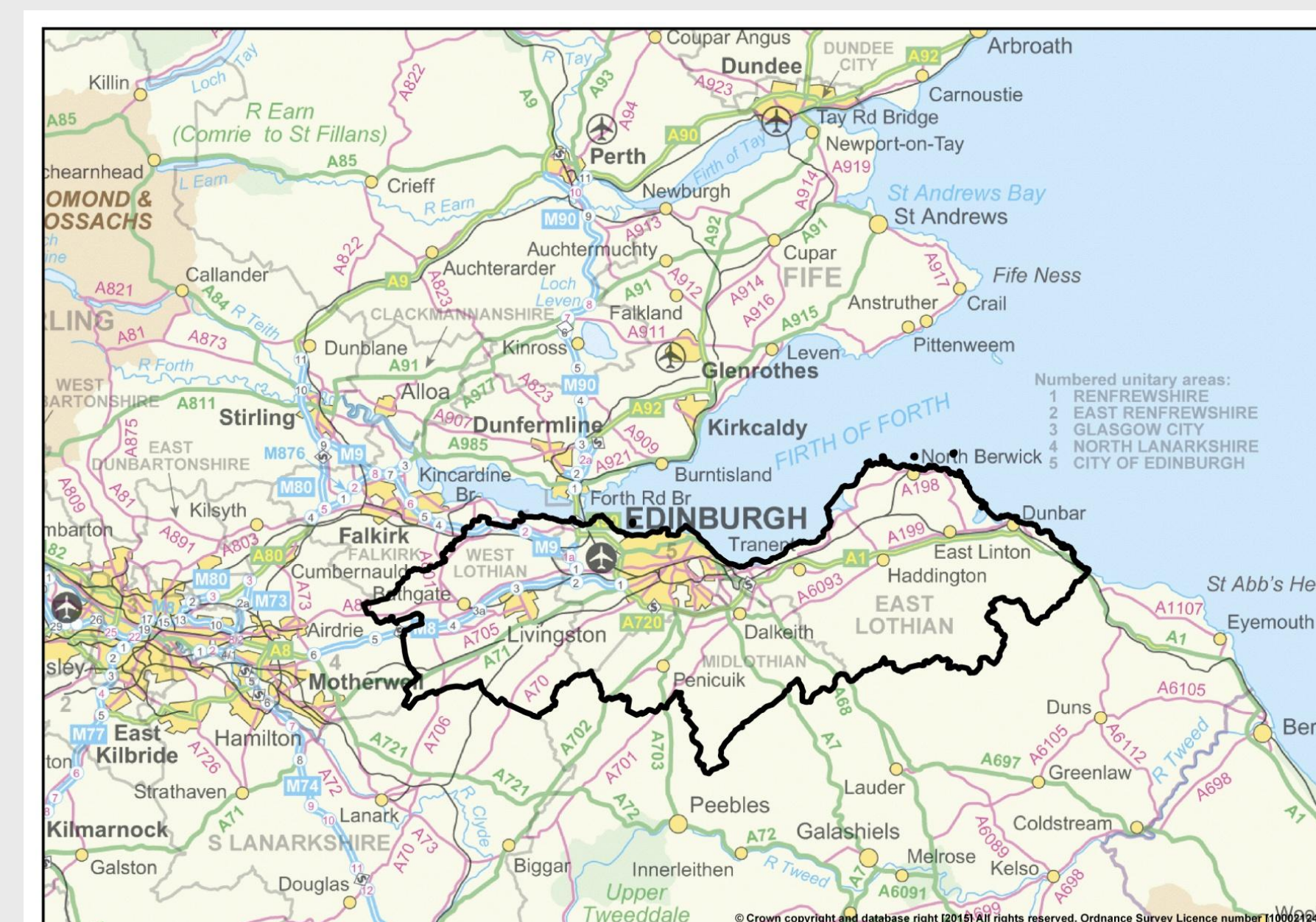
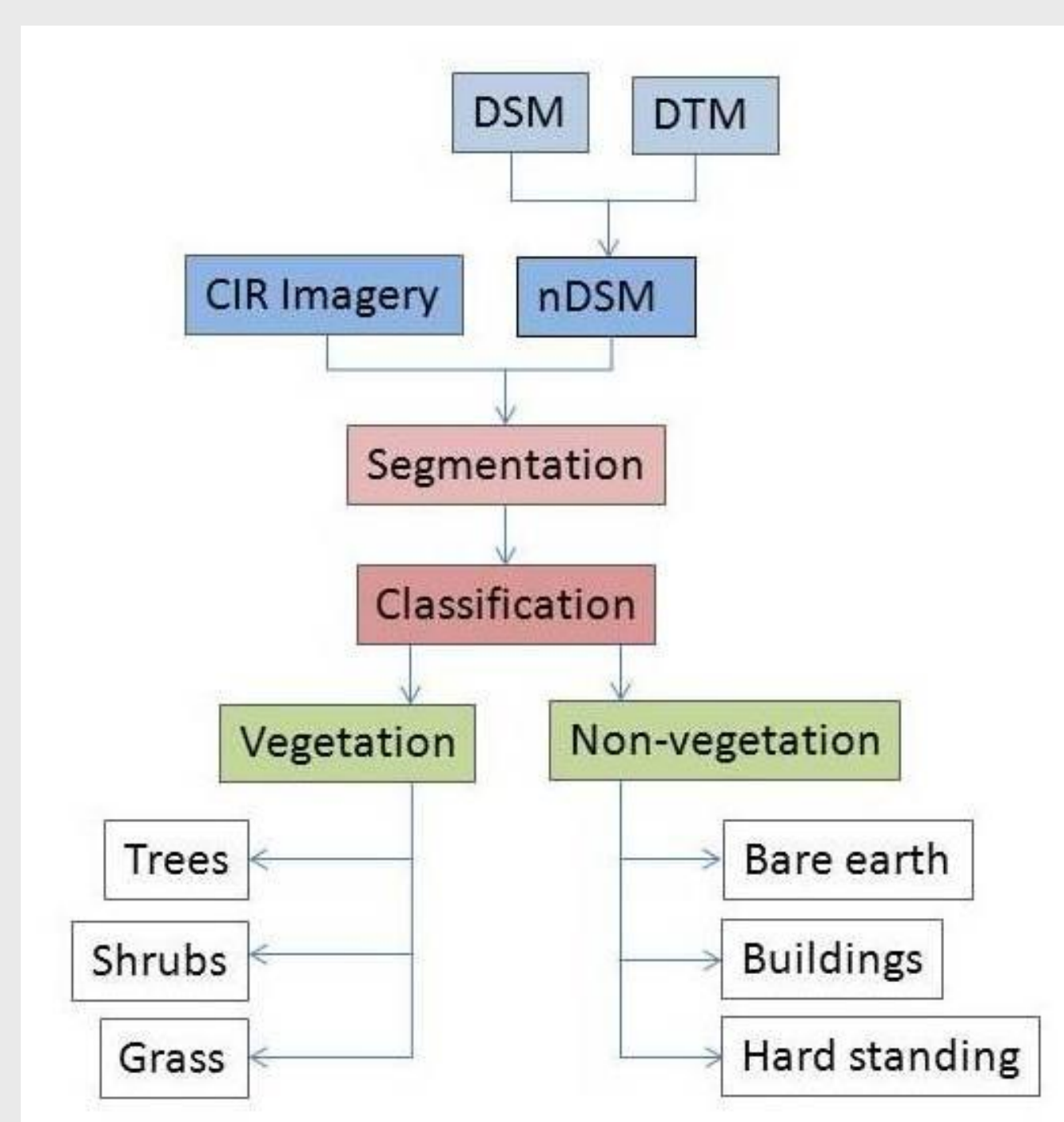
The accurate identification of greenspace typologies enables assessment of the contribution that urban greenspaces make to biodiversity, improving peoples well-being and the green economy, a focus of the EU FP7 project GREENSURGE. It has been shown that the conventional pixel by pixel classifications often cannot obtain satisfactory results especially in complex urban environments and are not able to account for meaningful image objects at different scales. Using remote sensing data and an object rather than pixel based approach allows a more meaningful, accurate and automated approach to classification based on the objects spatial and spectral properties.

Aim

To develop a method using object-based image analysis to assess garden structures including trees, shrubs and grass in a case study area (Edinburgh). The resulting identification and classification of garden types will be combined with biodiversity data to create a biodiversity indicator for each garden type or estate within the case study as well as being used to improve land cover information.

Method

Colour infra-red imagery, 5m Digital terrain model and 2m Digital surface model was obtained for the study area. A normalised digital surface model (nDSM) was then calculated from the data and Definiens eCognition developer software v8 was used to segment the image using a multi-resolution segmentation algorithm for the object-based image analysis. A rule set was developed to classify the image objects into the main garden components; trees, shrubs, and grass (figure 1).



Case study area: Edinburgh

Figure 1.

Analysis workflow



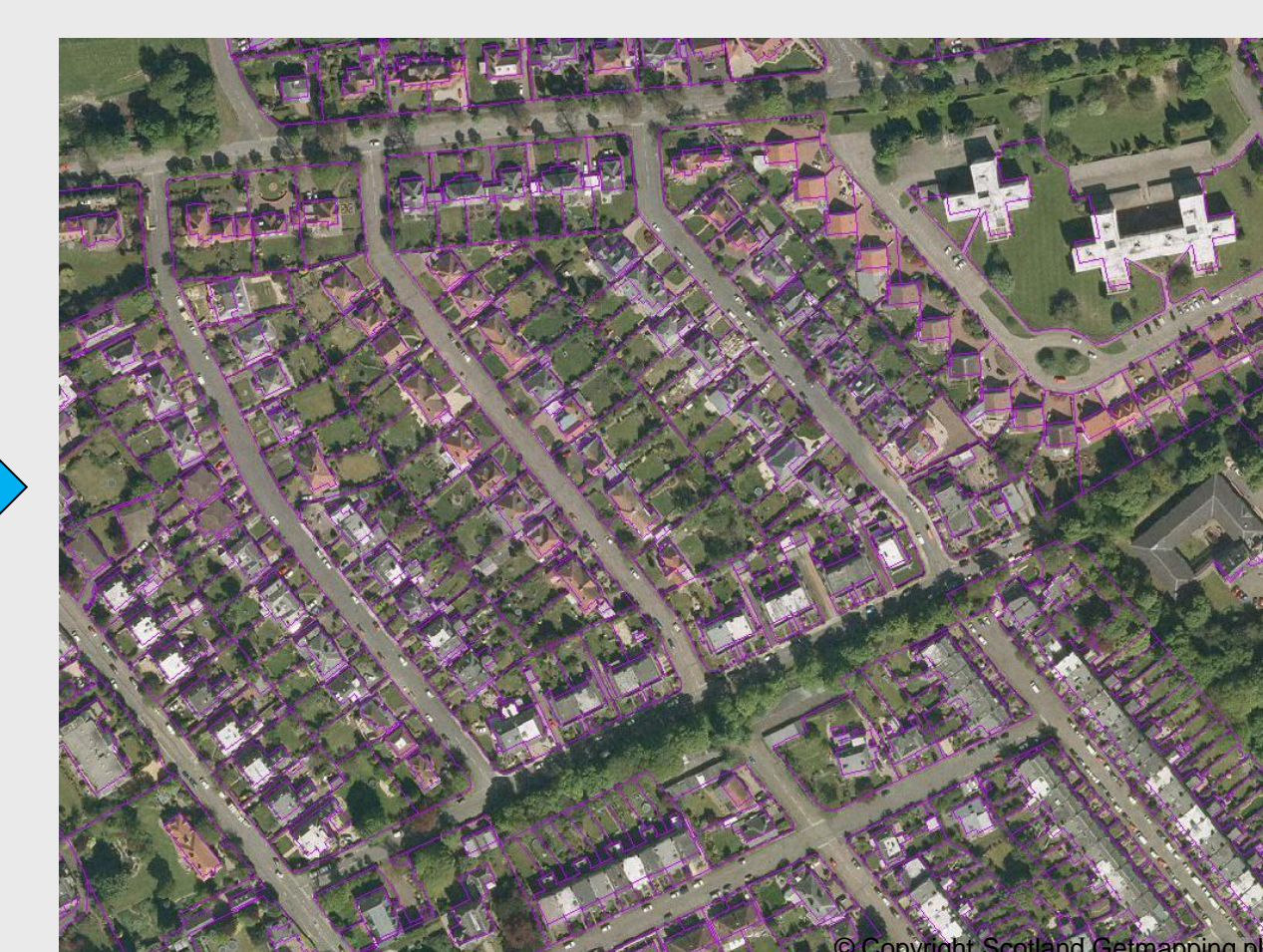
Multi-resolution segmentation created the initial image objects, based on scale, shape and compactness



NDVI was calculated and used to classify vegetation and non-vegetation



Using height of features (from nDSM) trees, shrubs & grass can be delineated and classified



Gardens are defined by OS mastermap and used as boundaries for classification



Initial Classification

Different garden types based on composition of garden components



Examples of different estates with different garden structures in Edinburgh

What is next

The gardens in our case study now need to be classified into categories. Classification will likely be based on percentage of trees in relation to grass and shrubs, indicating more mature gardens, lawn & low shrub gardens and amenity grassland gardens with little or no tall vegetation present. This data alongside biodiversity data will be used to develop a biodiversity indicator for each garden type.

The Greensurge Project

Funded by EU FP7, the European Union's Research and Innovation programme, co-funded by the Forestry Commission.

Project aims to; Explore the potential of European urban green spaces in meeting challenges related to land use conflicts, climate change adaptation, demographic changes, and human health and wellbeing. The project will explore the potential to innovate green infrastructure planning through linking local communities with environmental, social and economic services.



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