

# The Living Maps Method

Practical applications in real-world scenarios • Alexandra Kilcoyne



### Montserrat

Montserrat NT • Environment Systems • JNCC

This project involved collaborations between Montserrat National Trust, Environment Systems and JNCC. The Living Maps Method (LMM) was taken 'as is', with the only adaptations being for new datasets etc. There are two areas of this project that demonstrated the LMM. Firstly, the habitat map for Montserrat and secondly, the adapted version of that habitat map for baseline natural capital accounting. Specific classes, identified as island priorities through stakeholder meetings, were converted to spatial metrics for economic value (e.g. forest canopy density, agricultural classes). The habitat map achieved 73.4% accuracy.

Training points for the north of the island were collected by an experienced ecologist from Montserrat National Trust. For the south of the island, training points were captured by image interpretation, with further image interpretation points added across the island also. One disadvantage of using this method was that some of the classes were underrepresented or even not represented at all.

Using the LMM for this project yielded significant advantages, enabling a cost-efficient delivery. Looking forward, this cost reduction will increase the number of areas that would be interested or could afford to implement this method of habitat mapping.

### The Falkland Islands

SAERI • JNCC

This project aimed to create a broad-scale habitat map for the Falkland Islands. This project forms part of a suite of natural capital projects, funded by the UK FCO and implemented by JNCC, across the UK's South Atlantic and Caribbean Overseas Territories. This work is designed to improve economic stability in the Territories through enhanced environmental resilience.

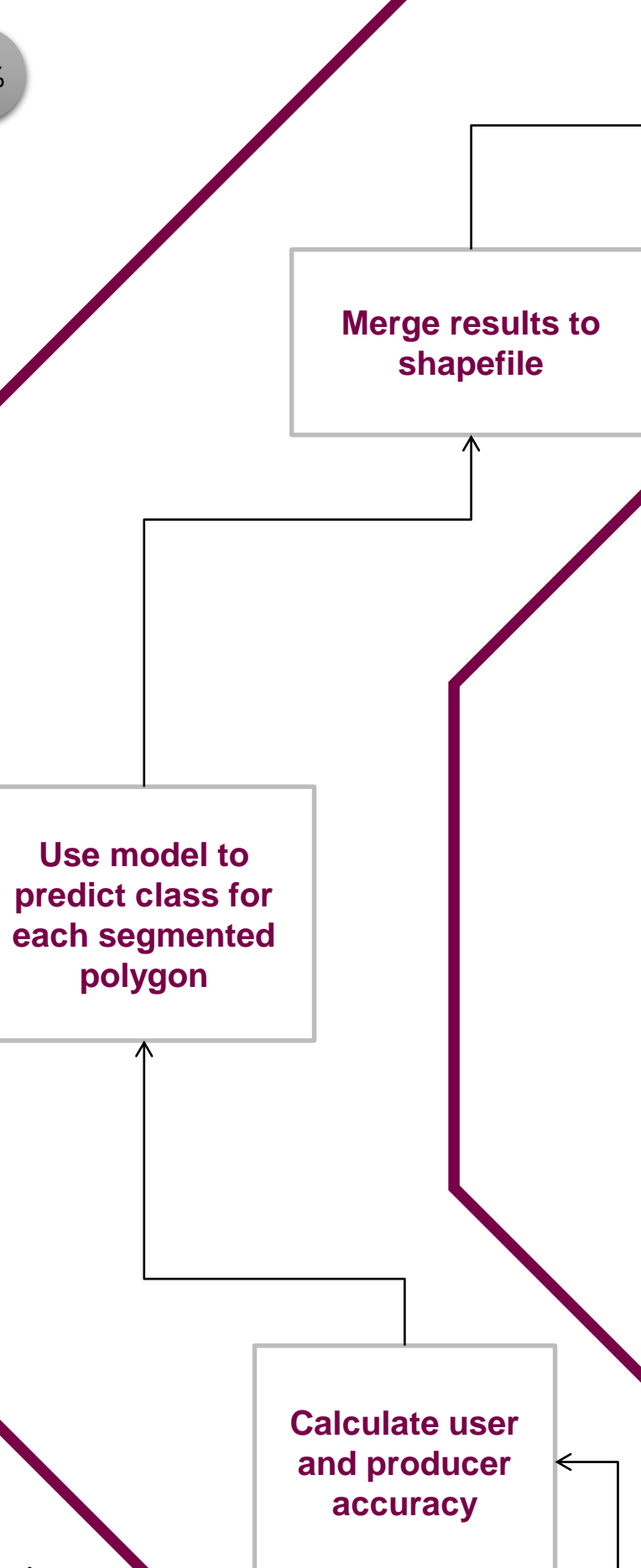
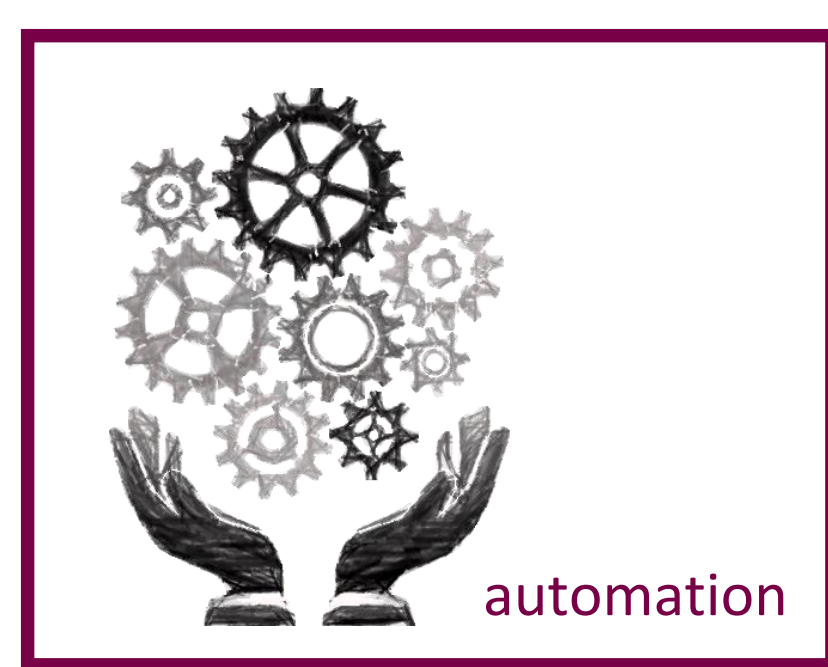
Although a high accuracy was achieved through this work, the pixel-based approach used in this study has almost been superseded by object-oriented analyses in the last few years. Future work is looking to use object-oriented image analysis.

### South Georgia

SAERI • Oregon State University • JNCC • Darwin Plus • GSGSSI

This project aimed to create a habitat map to update the current habitat maps and create ones where they didn't exist. There was a requirement to use cloud-based systems which would negate transferring large Earth observation datasets. There was also an emphasis on cost-effectiveness. This project used the LMM as a method guide, with the processing done through Google Earth Engine, necessitating some re-coding in JavaScript.

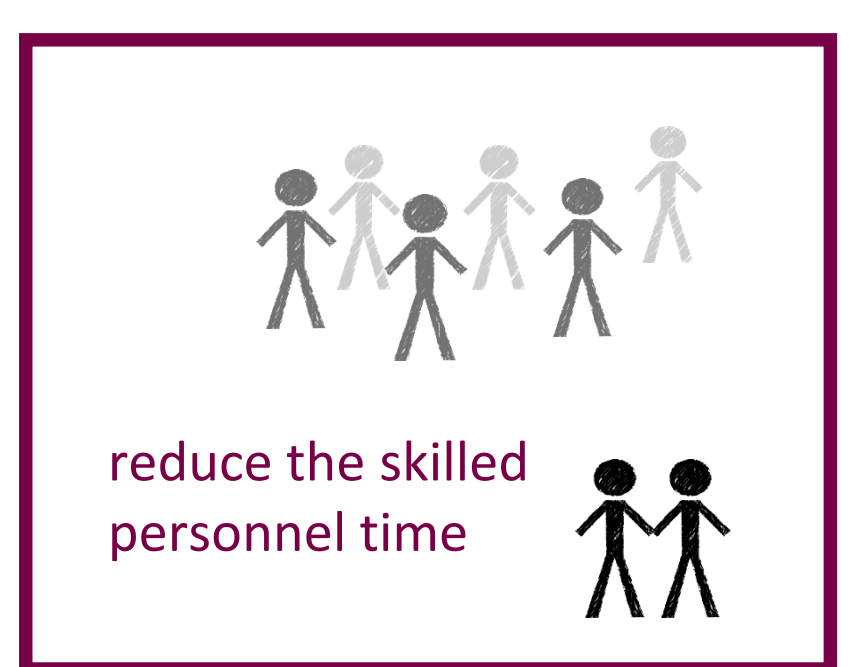
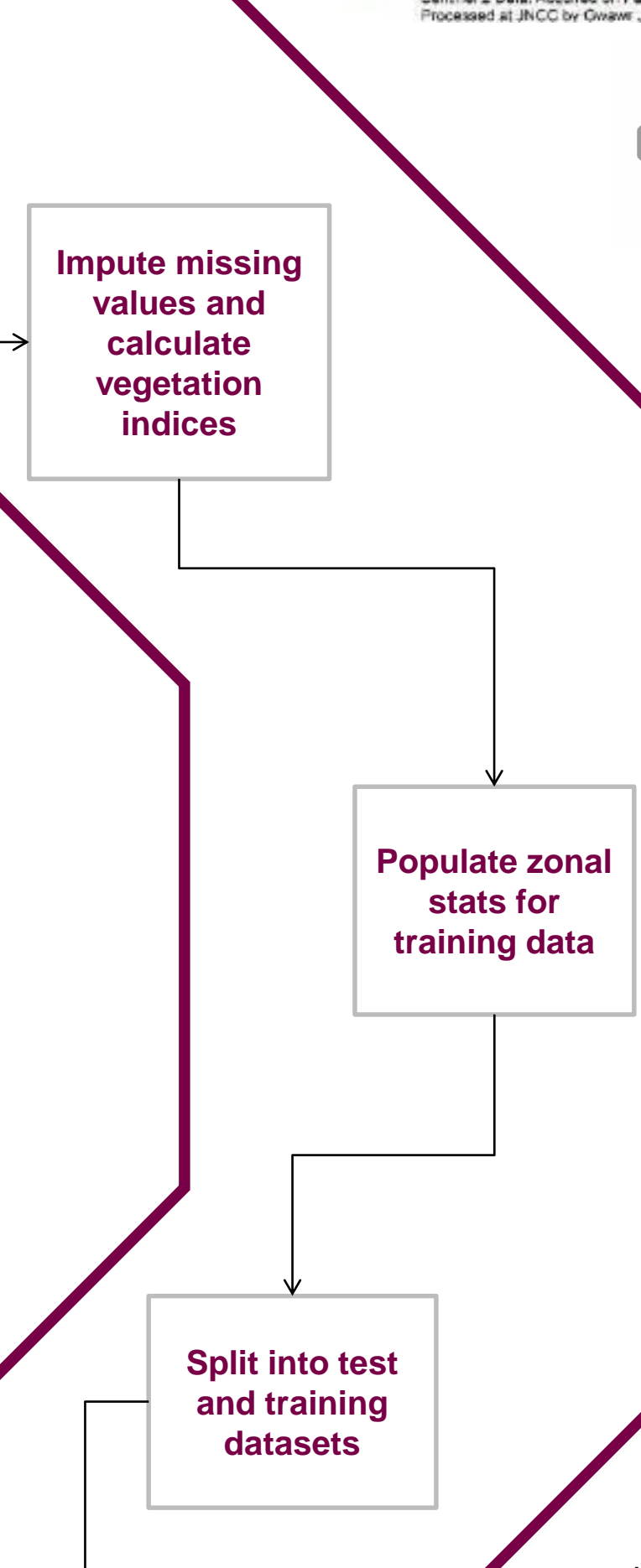
The ground validation data was collected through a field expedition to South Georgia. The ecologists took an observation of the ground cover/habitat at a particular location (latitude/longitude) along with a set of photographs showing the general ground cover/plant life at that location. This project was grant aided by the Darwin Initiative through UK Government funding.



### Abstract

Since last year's presentation at RSPSoc's Annual Conference, the Living Maps Method (LMM), funded by Defra and developed by Natural England, has significantly expanded its applications. This presentation will provide an update on how and why the LMM is being used internationally to create habitat maps in the UK, the UK's overseas territories and beyond. Examples include the translation of the LMM to Google Earth Engine for mapping coastal habitats in South Georgia and the Falklands, and the learning curve of using the LMM for the creation of habitat maps in Northern Ireland, Scotland, Peru, Montserrat and Turks and Caicos Islands.

Sharing code leads to more efficient collaboration between public sector bodies, academia and industry. Additional benefits are improved standardisation and algorithm development for the generation of products that are required across multiple policy areas, such as habitat maps. The provision of open code permits the method to be run on multiple platforms, enabling evolution of the process. The focus on algorithm development, cross-sector collaborations and cost efficiencies are in line with the future direction of the Defra Earth Observation Centre of Excellence, who are continuing to work towards better integration of satellite data.



### North Yorkshire Commons

Natural England • RPA

Following criticism from a European Commission audit, which found areas of ineligibility on Commons which has been claimed on as eligible, the Rural Payments Agency (RPA) proposed that a 3-year programme of land eligibility mapping should commence in 2016 to mitigate against further disallowance.

The preferred approach is not to physically inspect, therefore the aim is to undertake 90% of the work using Earth observation techniques. This involves developing a new remote sensing process to classify features and areas usually found in Common and upland areas and determine the eligibility of those features.

The six week RPA Commons Mapping Pilot aimed to map heather, bracken, permanent grassland and scrub.

The total accuracy achieved was 93%. The main area of confusion was between heather classified as permanent grassland and permanent grassland classified as bracken.

### The Turks and Caicos Islands

DECR • TCI • JNCC

This is a collaboration between the government of Turks and Caicos, through the department of environment and coastal resources and the JNCC, to establish the monetary value of the environment to the economy of the TCI. This project is also taking into account the cultural values, pairing economic and social science techniques to mapped outputs from satellite imagery. The LMM will be used for this application with outputs due this year (2018).

### Fermanagh, Northern Ireland

NIEA • JNCC

The Living Maps Method has been used in Northern Ireland for the Department of Agriculture Environment and Rural Affairs by JNCC, in partnership with Northern Ireland Environment Agency (NIEA).

The landscape of Fermanagh is a very geographically and ecologically diverse. What is particularly exciting about this project is that they have created these maps entirely from open data, namely Sentinel 1 and Sentinel 2. Additionally, this project has used habitat data already held by the agency.

The next phase of this work is to refine the outputs with local knowledge. There are also aspirations to build a habitat classification for the whole of Northern Ireland that is scalable, easily updateable and relevant.