

## Welcome

News in this issue from Ascension Island in the South Atlantic and nearer to home from Ireland where we are developing a National Ecosystem methodology. In England we are working on another coastal monitoring programme, this time in the South West. We also worked on a demonstrator project to deliver fast track ecosystem services mapping, for Milton Keynes, using satellite imagery. [editor@envsys.co.uk](mailto:editor@envsys.co.uk)

### Ascension Island



WorldView-2 satellite image of Ascension Island

Environment Systems has been working on Ascension Island, a British Overseas Territory in the South Atlantic Ocean, approximately 1,600 kilometres from the coast of Africa and 2,250 kilometres from the coast of Brazil. The island is the location of RAF Ascension Island, which has a United States Air Force presence

and a European Space Agency rocket tracking station. Working with the Ascension Island Conservation Department, Environment Systems has been tasked with creating a habitat map of the whole Island (100 sq km) under the Darwin Initiative.

The Darwin Initiative is a UK government grants scheme that helps to protect biodiversity and the natural environment through locally based projects worldwide. Ascension has a unique botany, with six native species but also species introduced from Britain, Australia and Mexico. Darwin himself visited the island on the Beagle expedition and the Navy was advised to introduce new vegetation to help with the collection of water. Today lush vegetation and forest clings to the central Green Mountain (859m). The rest of the landscape is largely volcanic, a once barren landscape, which is now populated by introduced species that have thrived, such as Mexican Thorn. The island is also known for its own endemic species of birds including the Ascension

Frigatebird (see Sphere Autumn 2014). Ascension's beaches also play host to green turtle nesting sites.

On a recent visit to the Island Dr Johanna Breyer undertook ground-truthing and field work as part of the work towards creating the island's habitat map. This will be based on the interpretation of WorldView-2 imagery using rule-based object analysis. Whilst there Johanna also delivered a four day training course. This focused on the basics of remote sensing of the environment for stakeholders of the British Overseas Territories in the South Atlantic including data managers from the Falkland Islands and Saint Helena governments. The aim of the course was to improve the understanding of the concepts behind remote sensing and apply them specifically to habitat classification in the territories. A central part of the course addressed how a remote sensing analyst operates when carrying out the image segmentation and how field surveyors work when validating habitat classes on the ground. Time was also spent on field trips to various locations on Ascension, including an east to west traverse of Green Mountain.

## South West Coastal Monitoring Programme

Following on from its work on the North West Coastal Monitoring Framework (see Sphere Autumn 2014) Environment Systems has won the South West Coastal Monitoring Programme for the ecological mapping of an area stretching from Hartland Point in North Devon to Beachley in Gloucestershire. The project is managed by Plymouth Coastal Observatory with Teignbridge District Council as the lead authority and is funded by the Environment Agency.

The ecological habitat mapping is undertaken to provide freely available coastal and terrestrial habitat extent data. The data will be used by Local Authorities, the Environment Agency and Natural England to contribute to their high level reporting and monitoring requirements for Natura 2000 sites, Biodiversity Action Plans and Sites of Special Scientific Interest. The Integrated Habitat System (IHS) is being used as the habitat classification system.

For this region all the data will be disseminated via the Plymouth Coastal Observatory. Data sources will include OS MasterMap, aerial photography, false-colour infrared imagery, Environment Agency salt marsh layer and previous habitat mapping.

On this project as well ecological mapping Environment Systems will be carrying out change analysis, which compares a previous survey from 2008 with the new mapping under preparation. The previous survey was carried out at a different scale and using a different methodology and had a different extent. The older survey will be brought into conformity with the new survey to facilitate the change analysis which involves extending the extent of the earlier survey using data and imagery from 2006.



Aerial image due west of Ilfracombe showing the outlines of the captured polygons

At the time of writing the first section of the coastal area had been delivered with the project due to be completed by March 2016.

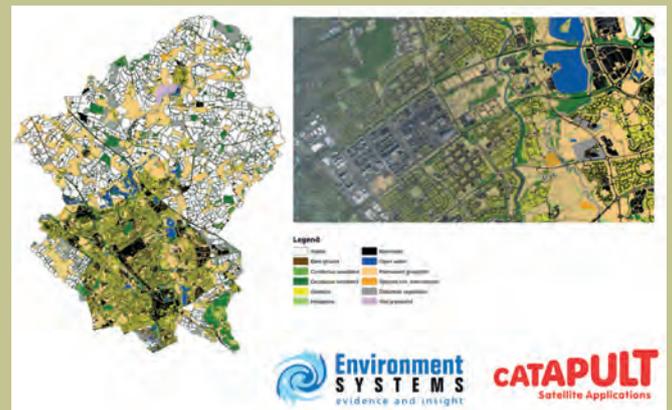
# Milton Keynes - Ecosystem Services Pilot for MK:Smart

Whilst on secondment to the Satellite Applications Catapult in Harwell, Environment Systems' Samuel Pike (Remote Sensing and GIS Consultant) was asked to deliver ecosystem service maps for Milton Keynes. Milton Keynes is one of the fastest growing cities in the UK, however the challenge of supporting sustainable growth without exceeding the capacity of the infrastructure and meeting key carbon reduction targets, is considerable.

The demonstrator pilot study that Samuel led on behalf of the Satellite Applications Catapult was carried out for 'MK:Smart,' a collaborative initiative partly funded by HEFCE (the Higher Education Funding Council for England) and led by the Open University. MK:Smart aims to develop innovative solutions to support economic growth in Milton Keynes. Central to the project is the creation of a state-of-the-art 'MK Data Hub' which supports the acquisition and management of vast amounts of data relevant to city systems from a variety of data sources.

The process required the creation of a broad-scale habitat map derived from satellite imagery and height data, with Ordnance Survey and Natural England thematic layers completing the picture. Once the map had been created each delineated habitat was weighted for its importance to the ecosystem service in question; a high score for a positive effect a low score for a negative. Maps were created to illustrate how habitat provides benefits for five ecosystem service themes including carbon storage, flood prevention, water quality, food provision and pollination. An additional four layers were produced to indicate importance to biodiversity, air quality, erosion risk and where habitats are likely to provide bundles of ecosystem services.

The maps that Samuel produced were very well received and demonstrated how



Broad-scale habitat map created for Milton Keynes

the rapid application of satellite data can be used to visualise and quantify ecosystem services. This project demonstrates the value of an Ecosystem Approach and opens up opportunities to work with the Local Authority using our more rigorous SENCE methodology to produce additional ecosystem services layers. These would focus on flood management, biodiversity conservation and spatial planning.

## Ecosystem Services - Ireland



The rich physical landscape of Ireland is a mix of lowland and upland, of rivers, lakes, and seashores

A team led by Environment Systems is working on the production of a National Ecosystem methodology with Ecosystem Services maps for Ireland. The work is being carried out for the National Park and Wildlife Service (NPWS). The methodology will focus on a number of prioritised and agreed services, which could be mapped based on data currently available.

The European Commission Biodiversity Strategy aims to halt the loss of biodiversity and ecosystem services in the EU by

2020. The Mapping and Assessment of Ecosystems and their Services (MAES) initiative is a core element. Target 2, Action 5 of the Strategy aims to develop the knowledge base on ecosystems and their services within Europe and is a target for each Member State to achieve. It forms the basis of other targets within the strategy which relate to improving the outcomes of EU nature legislation, integrating biodiversity objectives into sectoral policies and helping to avert global biodiversity loss. The MAES initiative has been established by the EC in order to assist member states achieve their targets. It is crucial in ensuring that ecosystems and their services can play a key role in planning, development processes and decisions.

Supported by partners Fabis Consulting, the University of Nottingham, the University of

Kiel and Team Projects, we will be helping the NPWS to progress the MAES Initiative in Ireland by developing a National Ecosystem methodology and an initial set of Ecosystem Service Maps. It is anticipated that this will become the beginning of a National Ecosystem Assessment. The project will adapt the existing JNCC spatial framework, previously developed by Environment Systems in England, specifically for Ireland.

The project has four main tasks:

- Identifying the most important ecosystem services in Ireland, and understanding which habitats or ecosystems support these services
- Developing indicators for selected ecosystem services, using existing and available data
- Collating and preparing data, modelling and mapping the selected ecosystem services across Ireland
- Presenting outputs and recommendations at a stakeholder workshop, outlining methods and identifying key gaps in knowledge and data

The team have just returned from the second MAES project workshop which was held at the National Botanical Gardens in Dublin. The project will be completed in January 2016.