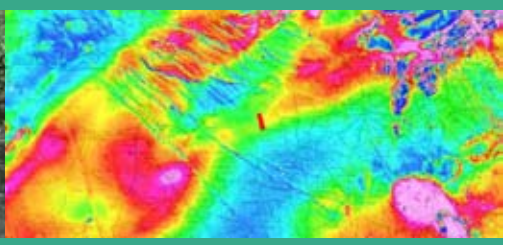
TELLUS BORDER
Understanding Underground

Tellus Border News





Issue 3, Spring/Summer 2012

Introduction

Welcome to the third issue of Tellus Border News, the official newsletter of the Tellus Border project – a ground-breaking project which will map the geology and environment of the border counties of Ireland and extend the work of the Tellus project in Northern Ireland.

European Union
European Regional Development Fund
Investing in your future

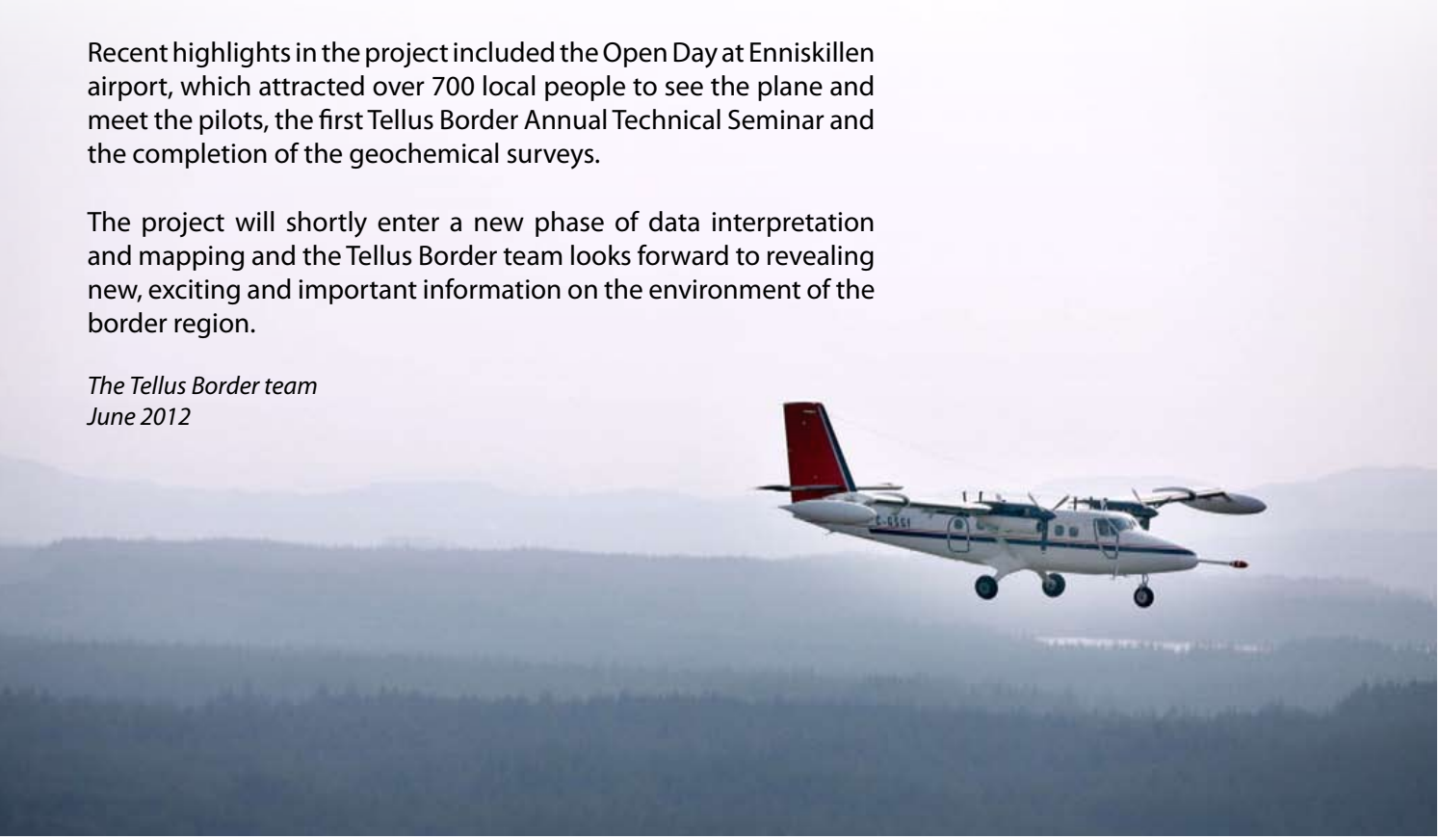
A project supported by the INTERREG IVA Programme managed by the Special EU Programmes Body

The early months of 2012 saw steady progress in the airborne survey, while the geochemical sampling was successfully completed in June, following improving weather and longer days. By now the survey aircraft has become a familiar sight to many in the border region, having flown nearly 54,000 line kilometres!

Recent highlights in the project included the Open Day at Enniskillen airport, which attracted over 700 local people to see the plane and meet the pilots, the first Tellus Border Annual Technical Seminar and the completion of the geochemical surveys.

The project will shortly enter a new phase of data interpretation and mapping and the Tellus Border team looks forward to revealing new, exciting and important information on the environment of the border region.

The Tellus Border team
June 2012



Tellus Border Open Day

Aoife and Matthew Hodgson pan for gold

Local schoolchildren enjoy volcano-making

Tellus Border hosted a Family Fun Open Day at St Angelo Airport, Enniskillen, on Saturday 31st March, which aimed to raise awareness and understanding of the project and bring the subject of geoscience to life for families living in Fermanagh, Cavan and throughout the neighbouring border counties. The day was a huge success and attracted over 700 local people who had the opportunity to see the survey plane, meet the pilots and take part in exciting geoscience activities. Marble Arch Caves Global Geopark, the Ulster Museum, Methodist College Belfast, Sander Geophysics Ltd, OCAE Consultants Ltd and artist Geraldine Tighe were there on the day to help the public get to grips with the science and technology behind this extraordinary mapping project.

The survey aircraft does an impressive fly-by at survey altitude of 60m over St. Angelo airport

Eamonn Rossi (North South Ministerial Council), Marie Cowan (Geological Survey of Northern Ireland), Conor Rossi, Finola Rossi and Koen Verbruggen (Geological Survey of Ireland) at the Open Day

Tellus Border Annual Technical Seminar 2012

Dr. Marie Cowan, Tellus Border Project Manager, address delegates at the Annual Technical Seminar

Tellus Border's first Annual Technical Seminar took place during the Geological Survey of Ireland's Geoscience 2012 conference in Dublin Castle on 19th April 2012. The seminar, which was attended by 100 delegates, presented highlights from the first year of the Tellus Border project including survey progress and research opportunities. Speakers from project partners the Geological Survey of Northern Ireland, Queen's University Belfast, Dundalk IT and project stakeholders in government and industry highlighted the importance of Tellus Border to Ireland's economy, the environment and the agricultural sector. Presentations and abstracts are available to download from the Tellus Border website www.tellusborder.eu.

Gerry Bird

Gerry Bird, agronomist and associate of OCAE Consultants Ltd, passed away suddenly on 20th May 2012. Gerry was a valued colleague who worked on the Tellus Border geochemical surveys and recently spoke at the Tellus Border annual technical seminar. Gerry's passion for his work and enthusiasm for life made a huge impression on anyone who knew him. We extend our sympathies to the Bird family and to Gerry's colleagues at OCAE Consultants Ltd.

Schools Geoscience Careers Conference

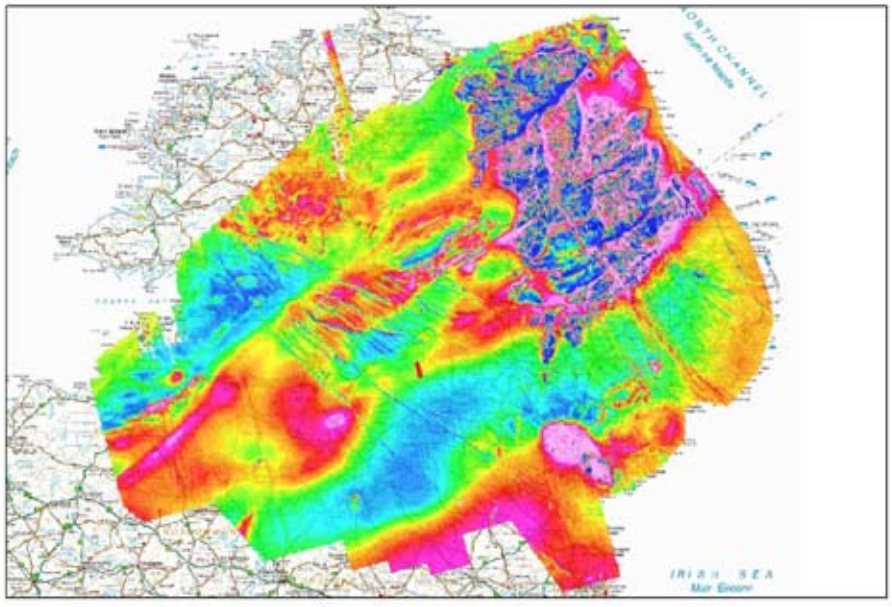
Tellus Border took part in a Geoscience Careers Conference on 7th March 2012, hosted by Sacred Heart Grammar School and led by the Geological Survey of Northern Ireland. The event inspired pupils from the Newry area to consider geoscience study and career opportunities. Pictured L-R (back row): Peter Kincaid, St Colman's College; Amy Trainor, St Mark's, Warrenpoint; Katie Lonergan, Sacred Heart, Newry; Jenny Black, Kilkeel High School; Hannah Byrne, Our Lady's Grammar School, Newry and Jarloth O'Reilly, St Paul's, Bessbrook. Front row (L-R) Dr Suzanne Linnane, Dundalk Institute of Technology; Dr Alastair Ruffell, Queen's University Belfast; and Dr Marie Cowan, Geological Survey of Northern Ireland.

Geophysical Survey

The airborne survey is now complete in counties Louth, Monaghan and Cavan and continues in the hilly terrain of counties Sligo, Leitrim and Donegal. With good spring progress, the survey is over 94% complete, with a total of 53,996 line km flown up to 14th June.

The new raw data is already highlighting many interesting features with prominent igneous dykes extending through the area consistent with images first seen from the Tellus survey in Northern Ireland. These dykes, or "cracks" in the Earth's crust into which hot molten rock has intruded and cooled, are significant regional geological features which can affect groundwater flow and help map buried faults. New information on dyke structure and orientation will help improve existing geological maps of the region and assist understanding of groundwater resources. Other notable features include the Kingscourt Gypsum deposits in Co. Cavan, which show up in the electromagnetic data as a strong conductive anomaly.

A new ground test line has been established to assist with calibration of the airborne data and research on soil carbon and peat thickness underway at Queen's University Belfast. This new line traverses 6 km across Sliabh Beagh, an internationally significant upland blanket bog which straddles the border between counties Monaghan and Tyrone. Work at this unique cross-border study site has been made possible with the kind assistance of Truagh Development Association, a local community organisation based in Co. Monaghan.



Pre-levelled airborne magnetic data collected so far

Geochemical Surveys

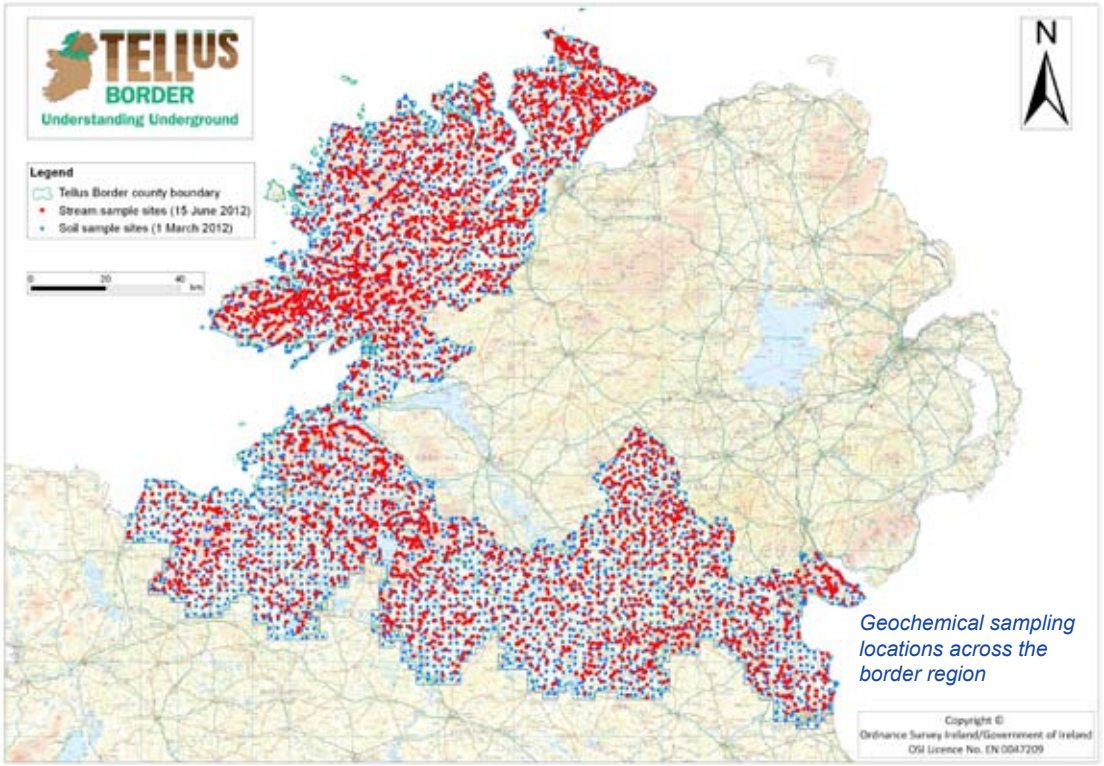
Soil sampling has been successfully completed and samples were shipped to the laboratory on 12th April. The drainage survey, which sampled water, sediment and vegetation from small streams across the border area, finished in June. Minister Fergus O'Dowd, assisted by OCAE Consultants Ltd and pupils of St. Mary's Boys National School, Drogheda, was pleased to take the last sample of the survey near Ardee, Co. Louth on Friday 15th June. Speaking afterwards Minister O'Dowd said "This nationally significant project will provide a wealth of information captured from both the ground and the air to assist with issues fundamental to the health and prosperity of communities in the border region, including increasing agricultural productivity, environmental protection and radon assessment".

Pupils from St Mary's Boys National School Drogheda (Malik Luzha, Jayson Gill and Lorcan Downey), assisted Minister O'Dowd in collecting the final sediment sample of the Tellus Border survey at Ardee, Co. Louth

The completion of the geochemical surveys is a major milestone in the Tellus Border project, marking the beginning of a new phase of sample preparation and analysis. The Geological Survey of Ireland was pleased to award the work in various lots to the British Geological Survey, PANalytical and SGS Ireland Limited following an OJ tender process which concluded in March.

New geochemical data for the border region are expected to be ready in 2013. Integrated geochemical maps of the twelve counties of the northern region of Ireland will reveal more detail on the chemical make-up of the region's soils, sediments and waters.

OCAE Consultants Ltd, who completed the geochemical survey on behalf of the Geological Survey of Ireland, are pictured taking the final soil sample with Minister O'Dowd and the directors of the Geological Surveys of Ireland and Northern Ireland. L-R: Eoin Bird, David O'Connell, Minister O'Dowd, Graham Byrne, Aidan McGee, Koen Verbruggen (Acting Director, GSI) and Mike Young (Director, GSNI)



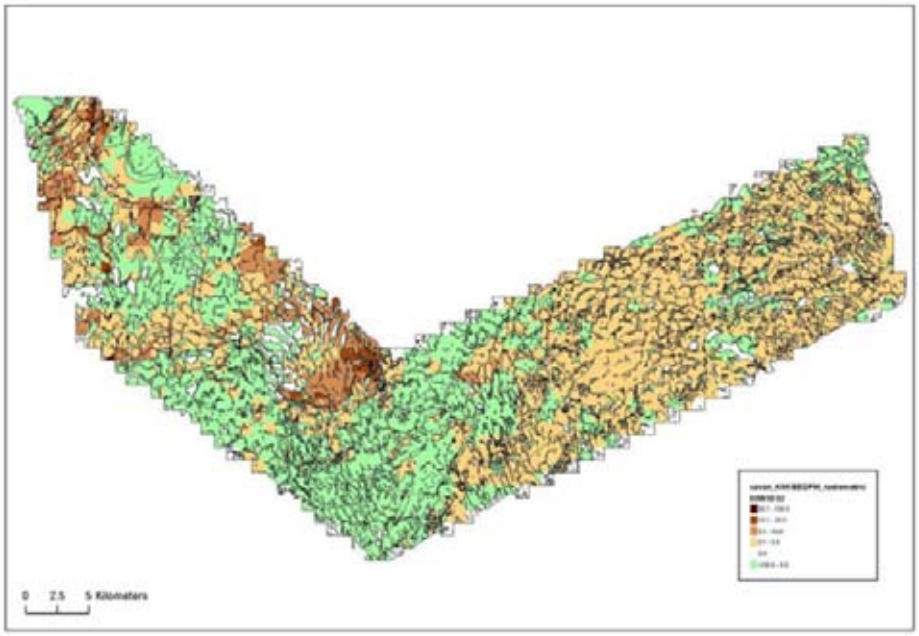
Geochemical sampling locations across the border region

Project Benefits - Radon Assessment

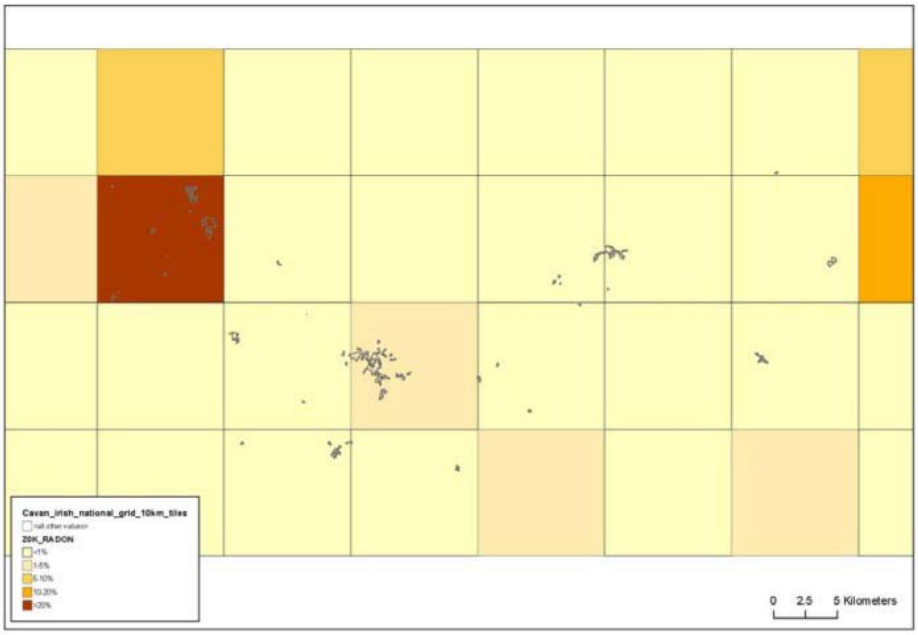
Each issue we'll focus on the benefits of the project in particular areas. This issue, Ray Scanlon, Geological Survey of Ireland Tellus Border manager, talks about Tellus Border and radon.

Naturally occurring radon gas is a significant public health issue in Ireland, with up to 200 lung cancer deaths each year linked to radon. Radon is derived from naturally occurring uranium which is present in small quantities in certain minerals in rocks and soil. In some rock types, such as granite, higher concentrations of radiogenic elements occur, leading to areas with high radon. The Radiological Protection Institute of Ireland (RPII) currently measures radon concentrations in homes and uses this data to produce High Radon Area maps for the country.

As part of Tellus Border airborne geophysical survey, gamma ray radiation from naturally occurring radiogenic elements including uranium are being measured, which will allow attention to be focused on areas where high quantities of radiogenic uranium, and therefore radon, can occur. This will allow the development of a radon risk map which is directly linked to regional geology and rock type. The work will assist the RPII with understanding how radon occurs in particular geological settings in known and new radon "hotspots". The Tellus Border data will be combined with the RPII in-house data in a multivariate model to help indicate the percentage of homes at risk of exceeding the safe threshold level for radon (200 Bequerels per cubic metre, Bq.m-3) in a given area. This work has already been completed for an area in Cavan and Monaghan by the Geological Survey of Ireland and the British Geological Survey (see images right). The RPII radon risk map based on in-house measurements is also shown for comparison.



Estimated percentage of dwellings exceeding 200 Bq m^{-3} in the Cavan-Monaghan area (using Model D200NIK for Carboniferous and D200SEU2 for Ordovician-Silurian bedrock units). From Appleton (2008)[1]

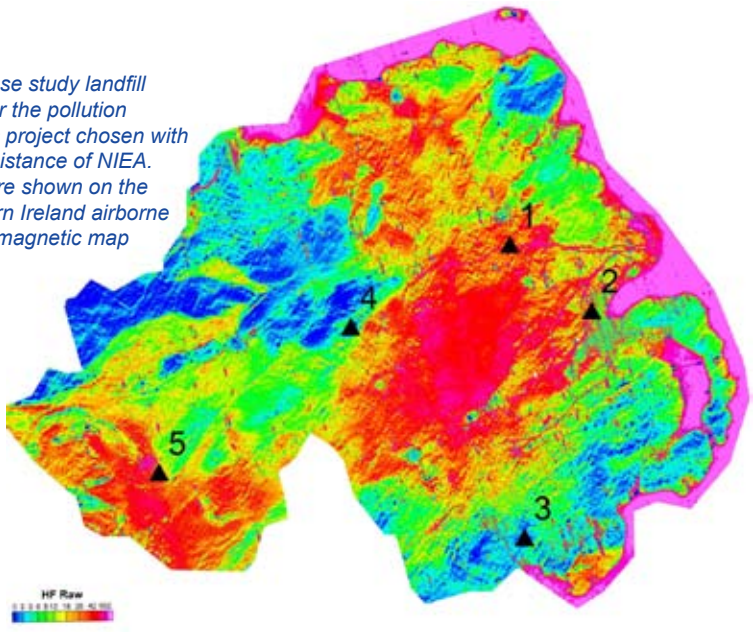


Radiological Protection Institute of Ireland 10 km grid radon prediction map of the Cavan area (Fennell et al., 2002)[2]

[1]APPLETON, J D. 2008. Interpretation of GSI airborne radiometric data for radon hazard mapping . British Geological Survey Commissioned Report, CR/08/006. 141pp.
[2]FENNELL, SG, MACKIN GM, MADDEN JS, ET AL. 2002. Radon in Dwellings. The Irish National Radon Survey. RPII-02/1. Dublin:Radiological Protection Institute of Ireland.

Research Projects

Three research projects are now well underway as part of the Tellus Border project at Queen's University, Belfast (QUB) and Dundalk Institute of Technology (DKIT). All three projects have completed initial desk study stages, established Technical Advisory Groups and are currently undertaking field based work. Project progress was presented in detail at the Tellus Border Annual Technical Conference in April and at several conferences in early 2012.



Five case study landfill sites for the pollution plumes project chosen with the assistance of NIEA. Sites are shown on the Northern Ireland airborne electromagnetic map

Soil carbon and peat depth assessment (QUB)

Dr. Antoinette Keaney

Fieldwork has been on-going for the soil carbon project and currently includes six sites in both Northern Ireland and the Republic of Ireland. Dr Keaney continues to work closely with the Geological Surveys of Ireland and Northern Ireland on ground testing airborne geophysical data at peatland sites in the border region. Analysis has begun on the geophysical datasets in order to explore the relationship between airborne geophysics data, peat depth and peat volume. Contact with a Community Heritage Project called ENVISION at An Carn, Maghera has allowed the placing a Differential GPS system onto a bog which will allow real-time data collection of natural bog movement to be sent directly back to Queen's University Belfast for analysis.

Peat depth probing, Bundoran

Groundwater pollution plumes (Queen's University Belfast)

Dr. Reda Amer

Five case study sites were selected based on information collected from the Northern Ireland Environment Agency. Known landfill sites were chosen in Northern Ireland to compare with existing airborne electromagnetic (AEM) data from the Tellus project and Landsat thermal infrared (TIR) images, which can be used to indicate the existence of contaminated land and/or pollution plumes. The selected sites show conductivity anomalies on the AEM and thermal anomalies on the TIR imagery which are believed to be related to contamination at the sites. Detailed maps of the selected sites (including topography, geology, surface water hydrology and hydrogeology) and conductivity cross-sections were prepared. Field geophysical surveys using electrical resistivity tomography, ground penetrating radar and ground EM will be conducted during the summer to evaluate the results of the airborne data, with the view to extending the method to Republic of Ireland sites.

Wetlands hydrology (Dundalk IT)

Dr. Alec Rolston

Dr. Alec Rolston relocated from Australia at the end of January and has since been working to short-list representative wetland sites for further investigation into their ecological and hydrological character. Alec has met County Council Heritage and Environment Officers within the border counties of the Republic of Ireland and visits have been made to 17 potential sites in both the Republic and Northern Ireland to assess their suitability for further investigation. Six sites have been chosen, with field sampling due to begin in June 2012. Continuing work on the wetlands project literature review is well under way in addition to the development of a broad conceptual model of wetland ecosystem processes that will be adapted for each of the short-listed sites.

Candidate case-study site at Windy Gap Bog in Carlingford Mountain Special Area of Conservation, Co. Louth

Background to the Tellus Border project

The Tellus Border project is funded by the INTERREG IVA development programme of the European Regional Development Fund, which is managed by the Special EU Programmes Body (SEUPB). The SEUPB is a North/South Implementation Body sponsored by the Department of Finance and Personnel in Northern Ireland and the Department of Finance in Ireland. It is responsible for managing two EU structural funds Programmes PEACE III and INTERREG IV designed to enhance cross-border co-operation, promote reconciliation and create a more peaceful and prosperous society. For more information on the SEUPB please visit www.seupb.eu.

Tellus Border is additionally part-funded by the Department of Environment, Community and Local Government and Northern Ireland's Department of the Environment.

Special EU Programmes Body
Foras Um Chláir Speisialta An AE
Boord O Owre Ocht UE Projecks

A project supported by the INTERREG IVA Programme managed by the Special EU Programmes Body

Enterprise, Trade and Investment

Geological Survey of Northern Ireland

Queen's University Belfast

DUNDALK INSTITUTE OF TECHNOLOGY

Contact us

You can contact us by email, phone or through our website to get more information on Tellus Border.

Website address:
www.tellusborder.eu

Email address:
tellusborder@gsi.ie

Information line:
Freephone 1800 303 516
(028 3039 3851 from Northern Ireland).

Tellus Border Project,
Geological Survey of Ireland,
Beggar's Bush,
Haddington Road,
Dublin 4,
Ireland.