

LOOKING AT LUCAS

+ LAND USE AND CARBON ANALYSIS SYSTEM

+ ISSUE 5 + SUMMER 2009 +

Welcome to the fifth issue of Looking at LUCAS, the e-newsletter to keep you informed about progress of the Land Use and Carbon Analysis System (LUCAS) programme. We hope you find the newsletter useful and welcome your ideas, feedback and suggestions to lucas@mfe.govt.nz. For further information about the programme see the LUCAS web page www.mfe.govt.nz/issues/climate/lucas/

LUCAS and its land use and land-use change mapping programme

To meet New Zealand's reporting obligations to the Intergovernmental Panel on Climate Change (IPCC) and the Kyoto Protocol, the Land Use and Carbon Analysis System (LUCAS) team at the Ministry for the Environment is required to produce an estimate of New Zealand's carbon stocks and greenhouse gas removals arising from Land Use, Land-Use Change and Forestry (LULUCF) activities.

In order to deliver this information, the LUCAS team at the Ministry is responsible for producing a map which shows the areal extent and spatial location of land use in New Zealand for 1990, 2008 and 2012. >>

These three satellite images show the progression of afforestation in the Gisborne region from 1990 to 2008. ©CNES 2007



Figure 1 Landsat 4 1990 Imagery – Located in Gisborne region



Figure 2 Landsat 7 2001 Imagery – Located in Gisborne region

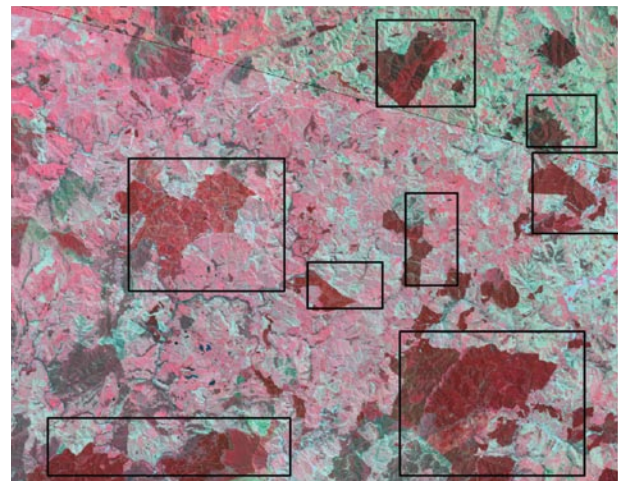


Figure 3 SPOT 5 2008 Imagery – Located in Gisborne region

>> Under the Kyoto agreement, LULUCF land-use categories have been divided into six main types: forest land, cropland, grassland, wetlands, settlements, and other land.

Comparing the differences in the maps will allow New Zealand to provide evidence of the extent and spatial location of land-use changes across the country since 1990. The mapping is based on interpretation of both satellite imagery and aerial photography.

The mapping programme has to meet the IPCC's established Good Practice Guidance by demonstrating levels of completeness, accuracy, uncertainty, transparency, and consistency in time and space. To meet good practice, the LUCAS programme has established comprehensive quality control procedures for all data collected and developed under the programme.

Senior Adviser (LUCAS) Nelson Gapare says most of the work on the 1990 land-use mapping has been completed. This includes quality control activities and collection of sample data for accuracy assessment. A complete draft map of the 1990 land use will become available in May.

However, he says there is still work to be done on the 2008 comparative map. "We have completed acquisition of 10-metre resolution SPOT 5 satellite imagery. Orthorectification and spectral reflectance standardisation work is progressing steadily and on target for completion in May 2009."

Mr Gapare says work has also started on SPOT 5 imagery classification to determine LUCAS land-use categories for the 2008 map. Classification started in the Gisborne region and we are now evaluating preliminary results. "Our objective is to be able to determine land-use change between 1990 and 2008 by June 2009," Mr Gapare says.

Update on natural forest

In 2001, the Ministry commissioned the development of a monitoring programme to determine carbon stocks in New Zealand's natural forests. A permanent plot network was established across the country to measure and monitor natural forest carbon for international reporting.

The aim of this work is to enable reliable and unbiased estimates of the total carbon stocks on a national scale, and of changes in those stocks.

The first round of measurements was completed in early 2007 and the plots are now being re-measured to determine carbon stock change.

Carbon Monitoring Senior Adviser, Andrea Brandon, says the first re-measurement of the 1,255 natural forest plots started in the second week of February 2009. The plot network will be fully re-measured by the end of 2013.

Update on planted forest

Post-1989 forests (forests that are planted after 31 December 1989 into non-forest land)

The primary objective of this work is to determine the forest carbon per unit area in forests planted since 1990. It is estimated that in excess of 600,000 hectares of post-1989 forest has been established since 1990.

As mentioned in the previous newsletter, plots have been measured by field teams (a total of 273 plots) and by airborne scanning LiDAR (a total of 753 plots). The field data has been analysed and the results are being used for completion of the Net Position Forecast, an estimate of the Government's liability associated with the Kyoto Protocol. The LiDAR data has been analysed, and is being independently assessed for quality assurance. The next step is to establish the relationship between LiDAR values and total carbon per plot.

Update on soils

LUCAS has to report carbon stock changes in five carbon pools. There are four biomass pools and a soil carbon pool. LUCAS is using a New Zealand-specific Soil Carbon Monitoring model to determine soil carbon changes associated with land-use change. LUCAS is using historic soil data and new data collected to fill gaps where there are soil/land-use representation issues. Currently, some work is being undertaken to improve the quality of the historic soils dataset by adjusting for any inherent spatial bias.

Photo competition

Welcome to the third LUCAS photo competition to identify a geographical feature on a satellite map. The LUCAS project team introduced the competition in the winter edition of the newsletter to see if readers could identify the part of New Zealand depicted in SPOT 5 satellite imagery.

All those who correctly identify the location of the satellite image overleaf will go into a random draw for the chance to win a copy of the book *No clouds today: the History of aerial mapping in New Zealand and the South Pacific* by Peter Stephens, Piet van Asch and Mairi Clark.

Competition terms and conditions: The prize is not redeemable for cash or transferable. Entrants must supply the exact map coordinates of the satellite image to be entered in the draw. Entries must be submitted by email no later than **Thursday 9 April 2009**. The prize will be drawn on Friday 17 April 2009. The judge's determination of the winner will be final and no correspondence will be entered into. Entry is limited to one per person. The promotion is open to New Zealand residents only. Ministry for the Environment employees, contractors, and their immediate families are disqualified from entering. >>

>> Last time we showed satellite imagery located north-west of Southbridge on the Canterbury Plains – between Lake Ellesmere and the Rakaia River, with the Ellesmere Golf Club in the top right portion of the image and the junction of Feredays Road with Wabys, Willis, Cowans, Tramway and Southbridge Dunsandel Roads in the centre (extra points were given to those who included grid references).

There were nine competition winners. They were David Herries, Derek Phyn, Andrew Steffert, Hayleigh Brereton, Phil Wall, Bryan Clements, Simon Bardsley, Peter Anderson and Mark Parker.

Do you know where this SPOT 5 satellite photo is? The answer will appear in Issue 6 of 'Looking at LUCAS'. You can get a copy of the SPOT 5 satellite photo by emailing LUCAS (see details below).



+ NEED MORE INFORMATION?

The New Zealand Land Use and Carbon Analysis System is a programme of work set up to measure and monitor the amount of carbon (carbon stocks) held in New Zealand's forests and soils. Carbon stock information is required for New Zealand's reporting requirements under the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC). LUCAS is an important part of the Government's climate change policy package and will help inform New Zealand's future international climate change negotiations.

If you require more information about the LUCAS programme, the available SPOT 5 imagery, the LUCAS web pages, or the natural and planted forest inventory activities (including the use of airborne LiDAR) please email lucas@mfe.govt.nz

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