

LOOKING AT

LUCAS

+ LAND USE AND CARBON ANALYSIS SYSTEM

+ ISSUE 7 + WINTER 2009 +

Welcome to the seventh 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 satellite imagery is an all-of-government benefit

LUCAS is now delivering satellite imagery under licence negotiated with Spot Imaging Services, Canberra.

The Ministry for the Environment's Chief Executive Paul Reynolds has written to 108 central government agencies, regional and local authorities and some crown entities offering satellite images free of charge subject to conditions in an all-of-government purchase agreement that was negotiated by the LUCAS team.

Any requests for this satellite imagery should go to lucas@mfe.govt.nz

LUCAS manager Steve Botica says the other information available from the LUCAS programme includes data on natural and planted forest and raw LiDAR (Light Detecting and Ranging) data. This is available by applying to the same email address, giving an outline of the use for the data.

However, he says there are some caveats around the availability of the data. "Some of the information may not be available and in other cases it may depend on the use for the data," he says.

LUCAS potential waits to be realised

Some government ministries are already taking advantage of the new data.

Principal Analyst with the Ministry of Agriculture and Forestry (MAF) Paul Lane says LUCAS provides a solid foundation for describing the smaller-scale planted forest estate through the spatial data it supplies. He says information like this will be needed in the future for infrastructure planning, wood processing and other industrial ventures. >>



Spot 5 satellite
©EADS Astrium 2009.

"LUCAS provides a solid foundation for describing the smaller-scale planted forest estate through the spatial data it supplies."



Ministry for the
Environment
Manatū Mō Te Taiao

>> “The fact LUCAS provides spatial information means that we know where the forests are, so we can work out which roads will be used to harvest the forests and which ports the logs and forestry products are likely to go to. It provides really important information for infrastructure planners for organisations such as the New Zealand Transport Agency, local authorities (district and regional councils) and other authorities such as ports.”

“It will also supply information for a range of international reporting that we do on New Zealand’s forests such as Global Forest Resource Assessments.” Mr Lane says New Zealand is also a member of the Montreal Process and needs to collect and report on progress with sustainable forest management.

He says LUCAS information on indigenous forest has the potential to monitor forest condition, forest health and biodiversity. This will be of benefit to both MAF and the Department of Conservation (DOC).

Spatial Analyst with DOC’s Ecosystem and Species Unit, Richard Earl agrees the extra information will be useful for reporting on biodiversity outcomes which has been planned as part of DOC’s Natural Heritage Management Systems Programme.

In collaboration with DOC, Landcare Research has used the species information from the National Natural Forest plot network (which collected carbon and biodiversity information from plots based on an eight-kilometre grid) to statistically identify 24 different forest and shrubland types. Mr Earl is using the underlying environmental variables and disturbance layers (such as historic fires) at each plot location to model these 24 types.

“We will then be able to map them across the country,” Mr Earl says.

He says DOC will then look at using the SPOT 5 imagery to refine its modelling of the extent of these forest types. The types of forest and shrubland will be more closely defined than those provided by LUCAS whose classification system is set to meet the reporting requirements of the United Nations Framework Convention on Climate Change (UNFCCC).

Mr Earl says this information will give a more ecologically based classification than the old New Zealand Forest Survey which focused on the merchantable timber species, rather than the composition of the forest.

Carbon per hectare being revised

The average amount of carbon per hectare sequestered by post-1989 planted forest is being revised.

The LUCAS team is developing a carbon yield table for the four biomass pools based on tree age associated with this activity. It involves using the plot data collected in the field and the Forest Carbon Predictor model to estimate the carbon as at 31 December 2007.

The LUCAS team has field data from 248 post-1989 forest plots located on the intersection of the four-kilometre grid system. It also has LiDAR data for all 295 plots including the 248 measured in the field. For these plots LUCAS will determine the multiple linear regression between LiDAR metrics and the modelled carbon values for total carbon and for each biomass carbon pool. The LiDAR metrics being used are: a measure of tree height, canopy volume and a measure of canopy form. The next step is to use standard double-sampling regression estimator procedures to obtain an unbiased estimate of total carbon-per-hectare and carbon in each biomass pool with known precision.

These estimates will be used in the National Inventory Report to the UNFCCC to be submitted in April 2010.

The age-based carbon yield table is being used to determine the annual carbon stock changes between 1990 and the end of 2007. Planning is underway to inventory the pre-1990 forest plots in 2010, using both LiDAR and field measurements on the eight-kilometre grid system.



Whaka forest, Rotorua

LUCAS data starts to pay dividends

The benefit of the LUCAS data came to the fore when the Minister for Climate Change Issues Dr Nick Smith asked for interim land-use data when the Government was setting the 2020 emissions reduction target last month.

Dr Smith said the Government invested heavily in LUCAS to get better information about New Zealand's land use. The information supplied to Dr Smith confirmed that New Zealand will have a net asset at the end of the Kyoto reporting period.

The next milestone for the LUCAS team is producing the figures for next year's National Inventory Report which includes 2008 data (the Inventory year is 15 months behind the current calendar year). The 2010 Inventory will include the Kyoto tables for the first time.

The LUCAS team will also have to defend New Zealand's approach when the system is reviewed by an international expert review team.

“We won't get the final numbers for New Zealand's position until 2014. So let's be clear the figures won't be definite until they are tabled and reviewed.”

New Zealand ratified the Kyoto Protocol in December 2002. This international agreement commits New Zealand to reducing its average net emissions of greenhouse gases over 2008–2012 (the first commitment period of the Kyoto Protocol or CP1) to 1990 levels or to take responsibility for the difference.

LUCAS manager Steve Botica says New Zealand has chosen to account for its Kyoto obligations at the end of the First Commitment Period. That means our figures can be refined over time and that New Zealand's figures will change.

However, he says while accuracy of the figures continues to improve and uncertainty about area of land-use change is reduced, there will continue to be volatility in the Net Position and National Inventory Report figures.

“With refinement of the figures, we can accurately describe the situation on the ground, but what LUCAS can't do is predict deforestation nor the economic or business decisions

that change land use. In the rural sector, decisions around land use are driven by business and those decisions can have a large impact on New Zealand's figures if it involves the removal of plantation forest or it stops replanting after a forest is harvested.”

At the end of the Kyoto reporting period when all the data sets are loaded, the geospatial tools within the LUCAS system will be able to run automated processes to determine changes in land use between 1990, 2008 and 2012.

Mr Botica says pre-Inventory figures don't become official figures until they are tabled with the United Nations and even then the UNFCCC expects people to improve figures over time.

“We won't get the final numbers for New Zealand's position until 2014. So let's be clear the figures won't be definite until they are tabled and reviewed.”

Natural forest re-measured

The National Natural Forest plot network is being re-measured for the LUCAS programme by Wildland Consultants Ltd. This five-year programme of work will re-measure the 1256 plots that were established and first measured between 2002 and 2007. The first 99 plots were re-measured over the 2008/2009 field season. The field programme will continue through to 2014.

DOC is carrying out an audit of the field work in parallel with the re-measurement programme. The audit will carry out a partial re-measurement of a random selection of 10 per cent of the plots. The audit results from Year-1 have been used to develop data quality standards and quantitative criteria that are applied to assess the quality of the data. The department's audit role will continue throughout the period of re-measurement.

The LUCAS programme takes an all-of-government approach to the data collection programme. While data collected to estimate carbon is also useful to other central government agencies for various purposes, additional data is collected to make the most of the field programme. In particular, DOC has additional requirements that are met through the programme. These include the collection of species inventories of both higher and lower plants and data on forest structure and composition.

Photo competition

Welcome to the fifth LUCAS photo competition to identify a geographical feature on a satellite map. The LUCAS project team introduced the competition last year 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 opposite 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 **Friday 2 October 2009**.

The prize will be drawn on **Friday 16 October 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 SPOT 5 satellite imagery of **Mount Hutt ski resort, Canterbury, South Island**.

171 deg 32'2.765"E, 43 deg 29'4.229"S (Mercator)
2391443.4915746134.762 Meters (NZMG)
1481874 5183458 Meters (NZTM)

The competition winner was **Simon Bardsley**.

Do you know where this SPOT 5 satellite photo is? The answer will appear in Issue 8 of *Looking at LUCAS*. You can get a copy of the SPOT 5 satellite photo by emailing LUCAS (see details below).



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+ 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

To subscribe or unsubscribe from this newsletter please email lucas@mfe.govt.nz

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INFO 439