



## In this issue...



### 3 **Topo50 Map Series Rolled Out**

LINZ launched the new Topo50 topographic map series for New Zealand in September. Based on a new datum and projection, the series is compatible with international mapping systems and navigational technology such as GPS.

### 2 **Getting the lowdown on the Fiordland shakedown**

LINZ and GNS Science are working together to better understand the impact of the major earthquake that shook the lower South Island in July.

### 4 **Innovation in spatial information pumps \$1 billion into economy – report**

Innovative use of spatial information pumped more than \$1 billion into the New Zealand economy in 2008 – and better access to data could see that figure soar, according to a new report into the value of spatial information.

### 5 **Tongan Royal Land Commission hosted by LINZ**

LINZ hosted a delegation from the Tongan Royal Land Commission in August.

### 6 **Strategic Direction for Crown Pastoral Land announced**

The Government announced its strategic direction for management of Crown pastoral land in August.

### 7 **New General Managers take up their roles at LINZ**

Three new General Managers and a Chief Information Officer have been appointed to Land Information New Zealand's senior leadership team.

### 8 **Sharon Cottrell retires**

Sharon Cottrell, General Manager of Customer Services, retired at the end of July after a 13 year career at LINZ.

# QUAKE:

## GETTING THE LOWDOWN ON THE FIORDLAND SHAKEDOWN

LINZ and GNS Science are working together to better understand the impact of the major earthquake that shook the lower South Island in July. The earthquake, with an estimated magnitude of between 7.6 and 7.8, was the largest in New Zealand for more than 70 years.

2

One of the key datasets used to analyse the effects of the earthquake is from LINZ's PositionNZ network, which monitors the movement of New Zealand's landscape. The network consists of over 30 continuously operating Global Navigation Satellite System (GNSS) stations around the country.

Shifts in the location of five PositionNZ stations show that the earthquake, centred in southwest Fiordland, caused a large area of the South Island to move in a southwesterly direction. Puysegur Point shifted by 30cm, Mavora Lakes by 6cm, Bluff by 3cm, Alexandra by 2cm, and Dunedin by 1cm. It is expected that continued movement will take months or even years to tail off.

"PositionNZ data, combined with seismic data from GNS Science, is being used to develop a model demonstrating the extent that the Earth's crust was displaced by the earthquake," says LINZ National Geodesist, Graeme Blick.

A preliminary model has already allowed analysts from LINZ and GNS to predict the spread of the earthquake's impact at sites where there are no PositionNZ stations. For instance, Te Anau is predicted to have shifted by about 10cm.

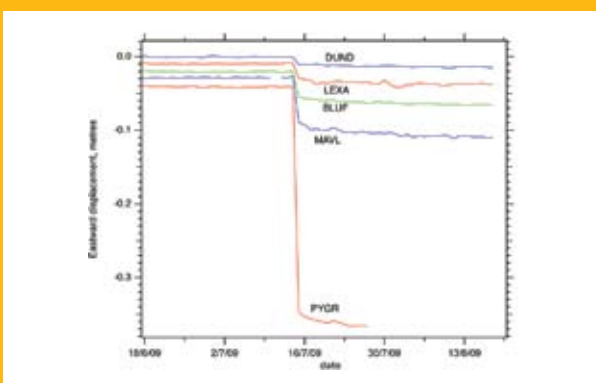
"The main shock was caused by the Australian tectonic plate pushing under the Pacific tectonic plate beneath Fiordland, in a process known as subduction," explains Dr John Beavan of GNS Science. "This is the largest 'subduction thrust' earthquake that has occurred in the written history of New Zealand.

"LINZ's PositionNZ data, along with other measurements of the earthquake, will enable us to construct a 'dislocation model' that describes the size and shape of the fault that broke during the earthquake, and how much motion occurred between the two sides of the fault. Having an accurate dislocation model will allow us to assess the true extent of the quake's impact, and will help us understand the impact a quake like this might have if it struck a more developed and populated area."

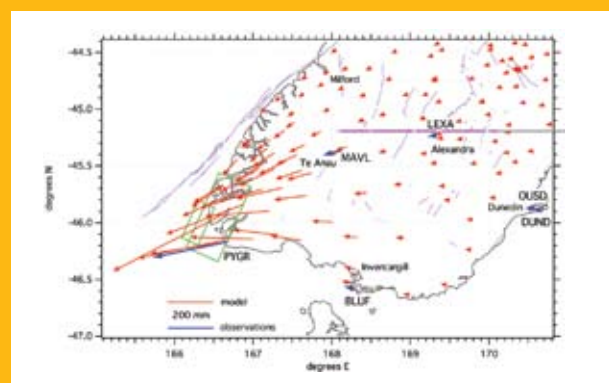
The dislocation model is expected to be ready near the end of September.

### RESHAPING NEW ZEALAND

The significant impact of the earthquake means adjustments need to be made to the datum that mathematically describes New Zealand's shape and allows for coordinates to be created.



Graph of the westward movement caused by the earthquake, recorded at LINZ PositionNZ stations at Puysegur Point (PYGR), Mavora Lakes (MAVL), Bluff (BLUF), Alexandra (LEXA), and Dunedin (DUND). Image courtesy of GNS Science.



Horizontal movements caused by the Fiordland earthquake. The blue arrows indicate displacements observed by LINZ PositionNZ stations at Puysegur Point (PYGR), Mavora Lakes (MAVL), Bluff (BLUF), Alexandra (LEXA), and Dunedin (DUND). The red arrows indicate modelled movements. The green boxes show a preliminary model indicating the extent of the fault that broke in the earthquake. The fault is located between 10 km depth in the west and 30 km depth in the east. Image courtesy of GNS Science.

One of the principal objectives of the PositionNZ network is to monitor this datum—the New Zealand Geodetic Datum 2000 (NZGD2000).

NZGD2000 incorporates a National Deformation Model (NDM), which takes into account the normal changes in New Zealand’s geography caused by tectonic movement. The Fiordland quake is the first earthquake to require the NDM to be updated since its creation in 1998.

LINZ geodetic surveyors have teamed up with scientists from GNS Science to resurvey Fiordland and Western Southland during a one-week field expedition. They used GPS to collect deformation survey data, which will then be incorporated into the NDM.

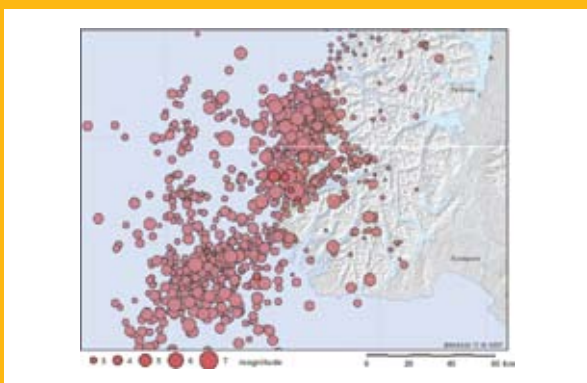
### WHAT IMPACT DO THESE SHIFTS HAVE ON SURVEYING?

For the most part, survey marks in a very local area affected by the quake will have moved about the same distance relative to each other.

“Because of this, and with much of the area being reasonably undeveloped, the impact on surveying is negligible in most cases,” says Graeme.

“For surveys carried out over large distances, however, there are likely to be inconsistencies between the survey’s coordinates and those contained within Landonline (New Zealand’s online register of survey and title information) and the geodetic marks database.”

With the ongoing movements in the quake’s aftermath, coordinates could eventually be out by up to half a metre in western Fiordland and as much as 20cm in western Southland. Until the NZGD2000 is updated to account for the quake’s effects, surveyors will need to tie surveys into local control points to ensure discrepancies can be reliably identified and accounted for.



Aftershocks up until mid-August, following the mainshock on 15 July 2009. The aftershocks, concentrated at either end of the main faulting area, are a mix of faulting mechanisms, reflecting the complexity of tectonics in the area. Image courtesy of GNS Science.



## Topo50 MAP SERIES ROLLED OUT

LINZ launched the new Topo50 topographic map series for New Zealand in September. Based on a new datum and projection, the series is compatible with international mapping systems and navigational technology such as GPS.

The new series of 445 mainland maps and six Chatham Islands maps replaces those of the NZMS260 series, the first of which was published in 1977, and the last in 1996. But unlike the previous map series, the entire Topo50 series has been rolled out at the same time.

While geographic features portrayed on the new series are unchanged, the important difference is that coordinates for those features have changed.

This is because the Topo50 series uses a different survey datum (New Zealand Geodetic Datum 2000) and projection (New Zealand Transverse Mercator 2000) from the earlier series. The new datum and projection bring the maps into line with international systems and are compatible with GPS, making them much more accurate.

With a new A1 portrait format and new sheet numbering, Topo50 maps are easily distinguishable from the NZMS260 series.

New Zealand’s emergency services switched base mapping and 111 systems to the new projection, and are now also using Topo50 maps.

LINZ is undertaking awareness-raising activities to increase knowledge of the maps and where to get them. Map users are advised to switch to the new series as these maps will be used by emergency services.

The maps are available for sale from major map and outdoor retailers as well as Department of Conservation information centres with retail outlets.

## INNOVATION IN SPATIAL INFORMATION PUMPS \$1 BILLION INTO ECONOMY – REPORT



Innovative use of spatial information pumped more than \$1 billion into the New Zealand economy in 2008 – and better access to data could see that figure soar, according to a new report into the value of spatial information.

Land Information New Zealand (LINZ), the Department of Conservation and the Ministry for Economic Development recently commissioned a report to uncover the contribution spatial information makes to the economy.

Spatial information is data that is linked to a geographic location. It has thousands of applications, making it possible to do things like use maps on mobile phones or send emergency services to the right addresses.

*Spatial information in the New Zealand economy – realising productivity gains* was released by LINZ in August. It outlines that use of spatial information added at least \$1.2 billion to the economy last year through productivity gains.

LINZ Chief Executive Colin MacDonald says using spatial information is part of our modern lives, so much so that most people don't even think about it. "But everything happens somewhere – and information about where is used to inform many everyday activities.

"Whether it's an organisation like Fonterra knowing where its milk tankers are so they can be re-directed depending on actual pickup volumes, or someone finding a wedding ring lost at the bottom of Wellington Harbour, the story is the same – location matters."

Wider and better use of spatial information could lead to even greater productivity, adding another \$500 million

to the economy. This doesn't include non-productivity related benefits, such as those used every day by emergency services.

"The value of getting to the victim of a cardiac arrest on time is a matter of life or death. Evaluating non-productivity benefits was beyond the scope of the report, but we should not overlook this additional value to the community."

The report outlined opportunities to grow productivity – quickly and at low-cost – through greater availability of spatial information. LINZ is committed to taking a leadership role to ensure this happened, Mr MacDonald said, and is working to make its own data more accessible.

On 23 September 2009, LINZ launches a new national topographic map series, which contains improved data and available at significantly reduced prices – the result of improved technology. Map files will also be available online free of charge.

LINZ is also working closely with the recently established Spatial Industries Business Association (SIBA), to unlock the potential that spatial information holds for New Zealand, Mr MacDonald said.

"For New Zealand to realise the value of spatial information more fully, a range of pragmatic and ongoing actions are needed by many participants, from industry to the state sector."

The report recommends that government agencies release the existing spatial data they hold – in forms that maximise re-use.



LINZ CE Colin MacDonald (left), Minister for Land Information Maurice Williamson and SIBA chairman Steve Critchlow at the launch of the report into the value of spatial information. Photo by Hannah Rogers.

## TONGAN ROYAL LAND COMMISSION HOSTED BY LINZ

LINZ hosted a delegation from the Tongan Royal Land Commission in August.

5

The Commission was established to inquire into Tonga's land laws and practices. It has recently undertaken a review of the Tongan authority responsible for implementing the laws and practices – The Ministry of Lands, Survey, Natural Resources and Environment. The review has found that the majority of all Tonga's land information management is still conducted manually and the Commission would like to modernise.

While at LINZ, the delegation viewed presentations from LINZ teams, and were given a comprehensive overview and demonstration of the Landonline system.

The delegation sought information about the mechanical functions LINZ undertakes for processing land information. They were particularly interested in Landonline, including its structure and hardware, security issues, training required for users, and data storage and retrieval.

Chief Executive Colin MacDonald says LINZ is committed to providing opportunities for other countries to learn from LINZ.

"In the past we have benefitted considerably from sending delegations to other organisations and learning from their expertise and experience. The visit to LINZ has provided the Tongan delegation with a useful insight into LINZ's process and should give them a wealth of ideas."

"This reinforces our view that spatial data and systems are raw material for innovation – something our innovative and creative citizens and companies can use to create value," Mr MacDonald said.

Steve Critchlow, Chairman of SIBA, said that the private sector and government must work more closely to unleash the potential for spatial technology-led economic growth.

"We must act with urgency – every day we do nothing is costing New Zealand \$1.3 million in lost productivity. The industry is ready to act now. We call on the government to join us," he said.

Mr Critchlow said SIBA was calling for an industry-government forum in November to begin the process of removing the barriers to the uptake of spatial technology throughout the New Zealand economy.

Minister for Land Information Maurice Williamson said spatial information was "the next big thing – bigger than anything you can imagine".

Government had an important role to play in freeing up information across the entire sector, "so that those in the public domain can develop new systems and services", Mr Williamson said.

"Industry and the government sector must work together to realise the benefits of more open access and standardised data, so that the economy can grow further."



LINZ CE Colin MacDonald (centre) with, from left, Mr Kahungunu Barron-Afeaki, Gloria Pole'o, S'ateki Ahio (Deputy High Commissioner, Tongan High Commission, Wellington), Baron Fielakepa (chair of the Tongan Royal Land Commission) and Lord Tupou.

# STRATEGIC DIRECTION FOR CROWN PASTORAL LAND ANNOUNCED

6

The Government announced its strategic direction for management of Crown pastoral land in August. The key features of the strategic direction, outlined in the Cabinet Paper “Crown Pastoral Land – 2009 and Beyond” are outlined below.

## OBJECTIVES

The strategic direction has three objectives for Crown pastoral land, encompassing stewardship, economic use and relationships.

### EFFECTIVE STEWARDSHIP OF CROWN PASTORAL LAND ENSURES THAT:

- ecologically sustainable management is promoted, and
- pastoral and inherent values (including the natural character of lakesides and landscapes) are maintained and protected.

### ECONOMIC USE

- The contribution of Crown pastoral land to the New Zealand economy is promoted.
- Lessees of Crown pastoral land will be charged rent on the basis of the earning capacity of the property.

### RELATIONSHIPS

- The iconic nature of high country farming and its contribution to New Zealand culture is valued; and
- Viable rural high country communities are valued.

### Lakesides and landscapes values

Under the strategic direction, the previous Government’s “lakesides policy,” which effectively prevented leasehold properties within 5 km of a lakeside from entering tenure review, has been rescinded. The values of each lakeside lease will now be considered on a case by case basis, with significant inherent values protected as necessary.

The Government recognises the high value New Zealanders place on lakesides and landscapes and is committed to ensuring these values are protected through tenure review and pastoral lease management.

LINZ, DOC and MAF officials will report back to Ministers on how to address gaps in district plans relating to development of pastoral land freeholded through tenure review.



Until this report back, the Government has asked the Commissioner of Crown Lands to consider the ability of current district plan controls to protect significant inherent values on freeholded pastoral lease land when conducting tenure review. This will include considering potential impacts on open space lakeside views and a lake’s aquatic ecosystem, arising from future land use.

### Tenure review funding approval

The Minister for Land Information will retain the task of approving funding for tenure review substantive proposals. The Minister will no longer receive reports on preliminary proposals, which will speed up the overall process.

Ministerial oversight at the substantive proposal stage will allow the Government to ensure tenure review outcomes accord with its Crown pastoral land objectives. The Minister will also consult with the Minister of Conservation on proposed outcomes.

### Ongoing policy work

The strategic direction sets out an ongoing policy development programme led by LINZ that will support the strategic direction’s goal and objectives. This programme includes:

- a review of the Parliamentary Commissioner for the Environment’s report titled “Change in the High Country – Environmental Stewardship and tenure review”
- an investigation into options for initiatives that recognise the lessee’s role in stewardship of pastoral land, including the potential for greater use of covenants
- development and implementation of policy for earning capacity based rents.

For more detail, view the Cabinet Paper “Crown Pastoral Land – 2009 and Beyond” which is available on the Land Information New Zealand website: <http://www.linz.govt.nz/crown-property/pastoral-land-tenure-review/high-country-policy-update/govt-objectives/index.aspx>

# LINZ GM APPOINTMENTS

Three new General Managers and a Chief Information Officer have been appointed to Land Information New Zealand's senior leadership team. The appointments are a result of existing vacancies and the retirement of Sharon Cottrell from the role of General Manager Customer Services.



**GENERAL MANAGER  
POLICY AND REGULATORY:  
DAVID CRAWFORD**

David Crawford has been appointed as the General Manager Policy and Regulatory. He comes to LINZ from the Ministry of Transport, where he was the General Manager Land Transport Environment and Safety, responsible for land transport safety and environment policy. This included coordination of transport climate change policy, land transport regulation, motor vehicle register and driver licensing policy, and day-to-day relationship management with the New Zealand Transport Agency on safety and environmental programmes.

Before joining the Ministry of Transport, David worked in a range of sectors, including maritime safety and marine protection, biosecurity, oil and gas exploration, conservation, resource management, IT and as an academic at Massey University.

David has a Masters degree in Horticultural Science (in economics and marketing).



**GENERAL MANAGER  
STRATEGIC DEVELOPMENT  
AND SUPPORT:  
SUE GORDON**

Sue Gordon has been appointed General Manager Strategic Development and Support. She joins LINZ from the Ministry of Economic Development (MED) where she has been the Deputy Secretary Organisational Development and Support for six years. In this role, Sue was responsible for organisational development strategy and the communications, finance and facilities management, human resources, information technology, knowledge management, legal and programme management functions.

Before joining MED, Sue previously held organisational development roles in Fonterra, including managing structural changes in early 2003 and previous work on a series of development initiatives. Prior to that, Sue led the organisational development practice area at Sheffield (Wellington). Sue has also held roles at the Ministry of Health and Housing New Zealand, and started her career at the Ministry of Defence. She has an honours degree in Political Studies from the University of Otago and an LLB from Victoria University.



**GENERAL MANAGER  
CUSTOMER SERVICES:  
JAN PIERCE**

Jan Pierce has been appointed General Manager Customer Services. She has spent the last eight years as a member of the leadership team of the rural financial services company, Farmers Mutual Group. Over that time, her responsibilities have included human resources, organisational development, support services, operational leadership of service centres and the development of a contact centre.

Jan started her career in the banking sector, followed by several years in the health sector, where she was the Human Resources Manager of a large Crown Health Enterprise employing over 5000 staff. Jan has an Executive Diploma in Management Studies.



**CHIEF INFORMATION  
OFFICER:  
DEBBIE WARD**

Debbie Ward, who stepped in when Tony Lester retired earlier this year, will continue in the CIO role for the next 12 months. Debbie has been with LINZ for seven years, with responsibility for IT planning and strategic direction setting. During this time Debbie has also held responsibility for a number of other IT or information functions, including information management, development, business analysis and web services.

In November last year, Debbie completed her Executive Masters of Public Administration (EMPA) from the Australian New Zealand School of Government. Before joining LINZ, Debbie worked for the Hutt City Council as the IT Manager. She has also worked in IT management positions at Wools of New Zealand (formerly the New Zealand Wool Board) and MetService.

# SHARON COTTRELL RETIRES

Sharon Cottrell, General Manager of Customer Services, retired at the end of July after a 13 year career at LINZ.



8

As General Manager Policy from 1996, Sharon established the department's Policy Unit and led reviews of the Public Works and Land Acts. Other highlights included work on the automation programme that resulted in Landonline, and work on innovative funding mechanisms.

Appointed General Manager Customer Services in 2002, Sharon, had the opportunity to work on developing the functionality for Landonline, and to champion 100% e-lodgement.

How satisfying was it on a personal level when LINZ achieved 100% e-lodgement earlier this year?

"It was quite a remarkable achievement and a great place to be having developed Landonline as something innovative and world leading. We met customer needs and got them involved. It was personally very rewarding," says Sharon.

"I've really enjoyed being part of the senior management team working on an overall strategy and direction for LINZ.

"We've done the best we can for business transactions now, so going forward it's going to be about our information customers, and about delivering federated geospatial information. LINZ will need to take a leadership role. It's going to be a challenge but that's really exciting."

Sharon's got a busy retirement planned. When not pursuing her passions for tennis and skiing, she intends to continue in public service roles, as a consultant or advisor.

Sharon says she will miss her colleagues at LINZ.

"The people are fantastic and deserve more recognition for what they do. They are experts in their fields, they serve the customer, and they always remember the wider benefit to New Zealand of the work they do. They have been invariably patient, helpful and friendly."

Sharon's replacement is Jan Pierce, who took up her new role in August. See profile on pg 7.

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