SCION
forests • products • innovation

Rural Fire Research

HIGHLIGHTS 2011

EVERY YEAR SIGNIFICANT WILDFIRES BREAK OUT IN NEW ZEALAND, CAUSING DAMAGE TO LANDSCAPES AND PROPERTIES.

In summer 2011/12 wildfires have made the headlines yet again, despite it being a wet season across most parts of the country. Although these fires may be small in scale compared with other countries, the costs can be proportionately just as large. When lives are lost, the cost is far too high.

Reducing risks and impacts of forest and rural fires has been a focus of Scion's research for almost 20 years. Senior fire researcher Grant Pearce says that over this period, rural fire management has become increasingly sophisticated in its approach.

"There is a move towards greater professionalism and improved effectiveness of fire fighting operations, which is leading to more uptake of science," he explains.

For every wildfire that breaks out, there is a fire manager reaching straight for fire behaviour field manuals or calculators produced by Scion. Years of data collection from experimental burns and wildfires have gone into building tools that enable managers to make informed decisions in firefighting operations.

"We are also seeing a shift in approach where managers aren't just focused on fire fighting, they're thinking more about reduction and readiness."

Major changes in rural fire management are in the wind, driven by the New Zealand Fire Commission strategy. While the country is currently split into 80 rural fire authorities, the plan is to amalgamate these into larger areas, enabling responsibility and resources to be better shared. Instead of small fire districts being managed by part time staff, larger authorities will be overseen by full-time managers. Grant says this is expected to result in a more strategic approach to risk management.

"We have developed a number of tools and models over recent years that support the four 'Rs' of risk management: reduction, readiness, response and recovery. Fire agencies support our research programmes and are keen to explore new technologies."

Contact: grant.pearce@scionresearch.com

REDUCTION

In New Zealand, as in many areas of the world, human activity is responsible for the vast majority of wildfires. A report completed in 2011 discusses wildfires with a direct human cause, through malicious intent or by accident.

The study highlighted that wildfire arson and malicious lighting of fires are likely to be much more prolific than official statistics suggest. These criminal activities pose a serious risk to New Zealand communities, especially as many such fires are lit close to residential areas. The report highlights various methods employed internationally to reduce the incidence of arson. Options include mapping techniques; investigation and sentencing deterrents; better security; and intervention schemes.

Methods to mitigate the risks of human caused wildfires have been recommended to national agencies and individuals including the National Rural Fire Authority, DOC, New Zealand Police, fire managers and landowners.

Contact: lisa.langer@scionresearch.com

READINESS

Helping New Zealand rural fire agencies to understand changing risks was the focus of two major fire climatology analyses completed during 2011. One study, funded through the New Zealand Fire Service Commission, provided an improved description of current fire climate severity across the country. This study is being used to support the definition of boundaries for proposed enlarged rural fire districts.

The second analysis, conducted as part of a research programme funded by MAF, provides updated estimates of the effects of climate change on future fire danger. Results indicate that fire climate severity is likely to rise significantly in certain regions. A doubling or even trebling of fire danger is possible in some areas as a result of temperature increases, higher wind speeds and lower humidity.

The greatest relative changes are likely in areas where current fire dangers are comparatively low, such as coastal Southland and Wanganui. Significant increases in fire danger are also predicted in the country's current hot spots, namely Gisborne and Christchurch.

Contact: grant.pearce@scionresearch.com

Fire behaviour modelling

Managers have to make fast decisions in wildfire situations, so it is invaluable for them to have information at their fingertips. Over the past year, new fire behaviour models were developed for New Zealand scrub and grassland fuel types. Enhancements include an improved model for predicting rate of fire spread in tussock grasslands using data from tussock fire ecology experiments in Otago. New models have also been developed for native scrub (manuka and kanuka) using data collected from experimental burns in Canterbury.

Scion is incorporating these models into fire behaviour prediction tools used routinely by fire managers to calculate fuel loads and predict fire behaviour.

Contact: grant.pearce@scionresearch.com

A summary of reports arising from these projects can be found on Scion's website:

www.scionresearch.com/fire

Firefighter safety and productivity

Research undertaken by rural fire team leader Richard Parker provides a unique glimpse into the work patterns of people in dangerous occupations. He has developed new ways of measuring workers' activities using wearable video cameras and sensors. This technology enables researchers to gather data about what workers are doing, where they are doing it, and how hard they are working at the time (i.e. heart rate). This research has provided valuable insights into the work of rural fire fighters that will improve productivity and enhance safety.

Monitoring kits have been located with fire crews across the country so they can collect data in real fire situations. Findings from the research to date include data on carbon monoxide exposure in firefighting operations. Results show that carbon monoxide levels do not typically reach dangerous levels in normal operating conditions. However, exposure levels increase significantly for crews working with fire pumps, or in enclosed spaces.

Contact: richard.parker@scionresearch.com

RECOVERY

To learn from past experience, it is important to document lessons from New Zealand wildfires. The review process has contributed to increased understanding of the factors affecting community resilience and recovery following wildfire events. Findings from the 2004 Mount Somers wildfire and other New Zealand case studies were presented to a range of groups interested in rural fire and natural hazard management during the year. These studies highlighted the importance of community networks and relationships, local knowledge, and access to expert knowledge and institutional capacity in helping build adaptive capacity to wildfires. Scion rural fire researchers maintain strong links with the Bushfire Cooperative Research Centre in Australia where studies on community resilience and recovery are highly topical.

Contact: lisa.langer@scionresearch.com

Funding for the Scion Rural Fire Research Group is provided by the Ministry of Science and Innovation along with direct funding and significant in-kind support from NZ Rural Fire Sector organisations. These organisations include the National Rural Fire Authority, NZ Fire Service Commission, NZ Forest Owners Association, Department of Conservation, members of Local Government NZ, NZ Defence Force and Federated Farmers of NZ Inc.

For more information on rural fire research contact:

Richard Parker – Research Leader
PO Box 29237, Fendalton, Christchurch 8540,
New Zealand, Telephone 03 364 2949
www.scionresearch.com/fire