VALIDATION OF SATELLITE ASSESSMENT METHODS FOR GRASSLAND CURING IN NEW ZEALAND

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INTRODUCTION

Grassland curing (Figure 2) is a crucial input into fire danger and behaviour models. It describes the stage of seasonal die-off in grasses and has an effect on a grassfire's ease of ignition, rate of spread and suppression difficulty. Satellite based techniques to estimate the degree of grassland curing at regional and national scales for Australia and New Zealand have been investigated as part of a Bushfire Cooperative Research Centre (CRC) project.

This research identified four satellite-derived map products based on MODIS (Moderate Resolution Imaging Spectroradiometer) data. The satellite data was used to map grassland curing based on four different representations of the Normalised Difference Vegetation Index (NDVI). The NDVI is known to be a good measure of vegetation greenness and moisture content.

In New Zealand, the four map products were tested during a part season trial in 2009/10. The results from this trial recommended that a further full season trial be conducted using two of the best MODIS algorithms (Maps B & C).

METHOD

The full-season trial was conducted over the 2010/11 fire season. The Bureau of Meteorology (BoM) provided the maps (Figure 1). Feedback was sought from fire managers on a roughly fortnightly basis on which of the two satellite map products best represented the levels of curing around the country.

RESULTS

The results were inconclusive, with Map B being preferred early in the fire season, but a change to Map C favoured during mid- to late summer (Figure 3). Map B also tended to underestimate while Map C tended to overestimate curing. Note: Maps were not produced during weeks 9, & 11-14 due to an error with the NASA satellites and converting the digital data to images.

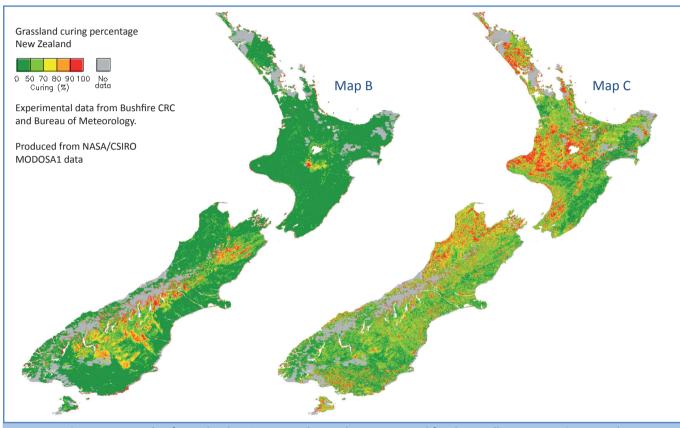


Figure 1: Example of grassland curing maps that end-users received for the satellite compositing period 25 November – 2 December 2011. Note: Areas in grey were obscured by cloud cover.



Figure 2: Visual differences in curing between spring (left) and summer (right) at the Godley Head field site, NZ.

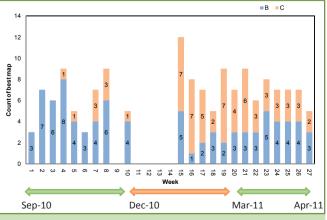


Figure 3: Total votes from New Zealand fire managers on which map best represents the levels of curing.

CONCLUSION

Based on end-user feedback and discussion, neither product (Map B or C) would be currently recommended for operational use in New Zealand.

Further evaluation and improvements to the map algorithms are required before an operational system could be supported.



FURTHER READING