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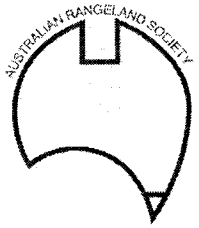

The Australian Rangeland Society

SATELLITE-BASED ACTIVE FIRE MONITORING IN EASTERN AUSTRALIA

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INTRODUCTION

Fire has been a key ecological factor in the evolution of vegetation in Australia's arid and semi-arid rangelands (Leigh and Noble, 1981). Significant changes to rangeland fire regimes over time have affected rangeland ecology and productivity with particular implications for: woodland thickening / weed invasion (Burrows *et al.*, in press); loss of biodiversity (Keith *et al.*, 2002); changes in species composition / loss of productive grasses (Orr *et al.*, 1992); and carbon dynamics (Henry *et al.*, 2002).

Without knowledge of past and current burning patterns it is difficult to fully understand these implications, and for managers to arrive at appropriate fire management strategies for a diverse range of land-use objectives. Fire monitoring also provides rangeland managers and scientists with an independent indicator of grazing land condition, as fire requires enough fuel to burn and therefore implies conservative stocking management. The ongoing monitoring of fire together with the development of spatial fire history data sets are therefore important requirements for rangeland management and resource condition monitoring.

The Climate Impacts and Natural Resource Systems (CINRS) group has developed an operational satellite-based active fire monitoring system, the Satellite Fire Monitor, and is continuing research and development into automated firescar mapping procedures (Collett *et al.*, 2001). Collectively these two spatial data sets will contribute to a fire history for Queensland. This poster paper focuses on the operational Satellite Fire Monitor. The system has been widely adopted by rangeland resource managers and scientists throughout the State as a tool for better decision-making in fire management.

NOAA-AVHRR SATELLITE IMAGERY

The Satellite Fire Monitor uses NOAA-AVHRR satellite imagery, received via the CINRS satellite receiving station in Brisbane to automatically detect fires that are burning at the time of satellite overpass. The imagery received in Brisbane provides complete coverage of the eastern half of Australia from two NOAA satellites approximately four times daily, including early morning, and late afternoon overpasses during daylight hours. Additional imagery from NOAA-16 is received in the early afternoon, however design changes to the sensor means that the imagery cannot be used for active fire detection. Processing of the imagery to enable detection of active fires is described in Taube *et al.*, (2001).

THE SATELLITE FIRE MONITOR

The Satellite Fire Monitor has been operational for two years, providing locations of active fires to stakeholders through both the CINRS' Long Paddock website - www.LongPaddock.qld.gov.au (Peacock *et al.*, 2002) and via an automatic email network. The Long Paddock site provides an interactive web-based GIS enabling users to overlay fire locations on the satellite imagery together with additional information such as shire boundaries, major roads, reserve boundaries etc. The free automatic email system enables subscribers to receive an email fire alert and optional GIS coverage when a fire is detected within their nominated geographical area of interest.

Currently there are approximately eighty subscribers to the Satellite Fire Monitor including property managers, the Cape York Peninsula Development Association, rural fire agencies from Queensland and the Northern Territory, Australian Defence Force and Queensland Government agencies such as the Department of Primary Industries, and Environmental Protection Agency. Valuable feedback from users of the Satellite Fire Monitor system has been important in the ongoing development of the system, providing a means to monitor the quality of the information and to make improvements.

The active fire information is currently used in a variety of ways - as an early warning of fire in remote areas, as part of strategic fire planning, and as a supplementary data set to wider fire monitoring programs. As an example of this third application, the Cape York Peninsula Development Association's Sustainable Fire Management Project (http://www.cypda.com.au/projects/fire.htm), is documenting existing fire regimes in northern Queensland in an attempt to establish best-practice fire management for sustainable use of the natural resource on Cape York Peninsula.

The detection of active fires also supplements the on-going CINRS work into the development of firescar mapping and fire history for Queensland, and the Aussie GRASS project. Aussie GRASS is a national collaborative project that uses a spatial modeling framework to provide up-to-date simulations and forecasts of pasture growth and utilization for use in the assessment of condition and sustainable management decisions. (Hall, *et al.*, 2002).

REFERENCES

Burrows, W.H., Henry, B.K., Back, P.V., Hoffmann, M.B., Tait, L.J., Anderson, E.R., Menke, N., Danaher, T., Carter, J.O., and McKeon, G.M. (2002). Growth and carbon stock change in eucalypt woodlands in northeast Australia: ecological and greenhouse sink implications. *Global Change Biology.* In Press.

Collett, L, Hassett, R., Taube, C., Flood, N., and Hall, W. (2001). Validation of NOAA fire scar maps in the Laura Basin using landsat TM imagery and field data. Final Report to the Cooperative Research Centre for the Sustainable Development of Tropical Savannas. Queensland Department of Natural Resources and Mines. QNRM01021. March, 2001.

Hall, W., Hassett, R., Paull, C., Cafe, L., Bean, J., Richards, R., Watson, I., and Maconochie, J. (2002). Australian Grassland and Rangeland Assessment by Spatial Simulation (AussieGRASS). *Proc. 12th Biennial Conference of the Australian Rangeland Society*, Kalgoorlie, September, 2002.

Henry, B.K., Danaher, T., McKeon, G.M., and Burrows, W.H. (2002). A review of the potential role of greenhouse gas abatement in native vegetation management in Queensland's rangelands. *Rangeland Journal.* **24(1):** pp 112-132

Keith, D.A., Williams, J.E. and Woinarski, J.C.Z. (2002). Fire management and biodiversity conservation: key approaches and principles. In 'Flammable Australia: the Fire Regimes and Biodiversity of a Continent.' Eds: R. A. Bradstock, J. E. Williams, and A. M. Gill, Cambridge University Press, pp 259-77.

Leigh, J.H., and Noble J.C. (1981). The role of fire in the management of rangelands in Australia. In: 'Fire and the Australian Biota.' (Eds: A.M. Gill, R.H. Groves, and L.R. Noble). Australian Academy of Science, Canberra, pp 471-495.

Orr, D.M., McKeon, G.M. and Day, K.A. (1992). Burning and exclosure can rehabilitate degraded black speargrass (*Heteropogon contortus*) pastures. *Tropical Grasslands.* 25: pp333-336

Peacock, A., Flood, N., Ahrens, D., Brook, K., Chilcott, C., Bruget, D., Carter, J., Collett, L., Crimp, S., Day, K., Hall, W., Hassett, R., Henry, B.K., McKeon, G.M., Paull, C., and Stone, R. (2002). The LongPaddock website: climate management information for rural Australia. *Proc. 12th Biennial Conference of the Australian Rangeland Society*, Kalgoorlie, September, 2002.

Taube, C., Collett, L., Hassett, R., Flood, N., and Hall, W. (2001). Ground-cover and fire monitoring in Queensland's arid and semi-arid rangelands. *Proceedings of the International Geoscience and Remote Sensing Symposium.* Sydney, July, 2001.