RESEARCH PAPERS : CATCHMENT-SCALE MAPPING

Mapping willows at a catchment-scale: comparison of ASTER, SPOT5 and aerial photography

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Research scope

The purpose of this study was to evaluate the potential of using ASTER and SPOT5 satellite imagery to map the distribution of willow along drainage lines.

Results to date

The results of studies undertaken by Noonan & Chafer (2006) and Noonan & Chafer (2007) have shown that:

- imagery acquired at specific stages of willow phenology improved their spectral separability from other native riparian vegetation.
- higher spatial resolution imagery does not necessarily increase the classification accuracy when mapping the distribution of willow.
- ASTER summer imagery provided better spectral separation of willow than autumn.
- SPOT5 summer imagery provided better spectral separation of willow than winter.
- a composite of summer and winter SPOT5 imagery provided better spectral separation of willow than single-date (or seasonal) imagery.
- a composite of summer and autumn ASTER imagery provided better spectral separation of willow than single-date (or seasonal) imagery.
- the SPOT5 summer-winter imagery produced higher classification accuracies than ASTER summer-autumn composite imagery.
- the cost of the ASTER images acquired over the study area was AU$580 each, while the SPOT5 (including panchromatic) was about AU$10,000.

Over 18,000 kilometres of stream network has been mapped for willow using either SPOT5 or ASTER imagery. A total of 162.5 hectares of willow was mapped at a catchment-scale.

Implications for management

The distribution of willow at a catchment scale is required to ensure that the prioritisation of on-ground mitigation works is strategic, so funds are spent in areas that provide greatest environmental and water quality benefit.

The full extent of the infestation of Willow in the catchments is not known. Catchment-scale willow maps provide land managers with a tool for prioritising riparian management programs. Once priority areas have been identified, willow can be mapped at a finer scale using the visual interpretation of high resolution aerial photography and satellite imagery.

Further work needed / gaps

Investigation of other cost-effective satellite imagery.

Related publications

Noonan, M.J. and Chafer, C.C. (2007) A method for mapping the distribution of willow at a catchment-scale using bi-seasonal SPOT5 imagery, *Weed Research*, being published.

Noonan, M.J. and Chafer, C.C. (2006) Comparison of ASTER, SPOT5 and aerial photography for mapping the distribution of willow at a catchment-scale, *Proceedings of the 13th Australasian Remote Sensing and Photogrammetry Conference*, Canberra.

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