Satellite monitoring of fire impact and recovery

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We propose an index for continuous monitoring of forested areas. It is based on the free of charge Landsat satellite imagery. The index allows the creation of fuel load maps and the reconstruction of post fire fuel re-accumulation curves. Possible applications:

- **prescribed burns assessment,**
- **fire behavior simulation,**
- **fire risk assessment.**

Data and methods

The values in the two short wave infrared bands arranged along a vegetation line(Fig. 1). Wildfires caused a disturbance perpendicular to this line. The values across time progressively fell back to the vegetation line. The perpendicular distance to this line is the Vegetation Structure Perpendicular Index (VSPI).

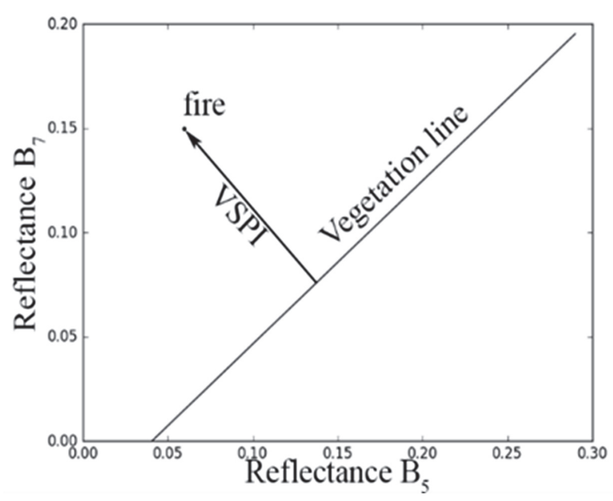
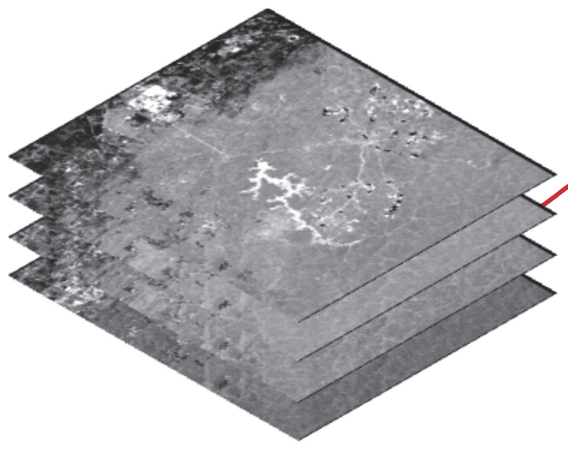
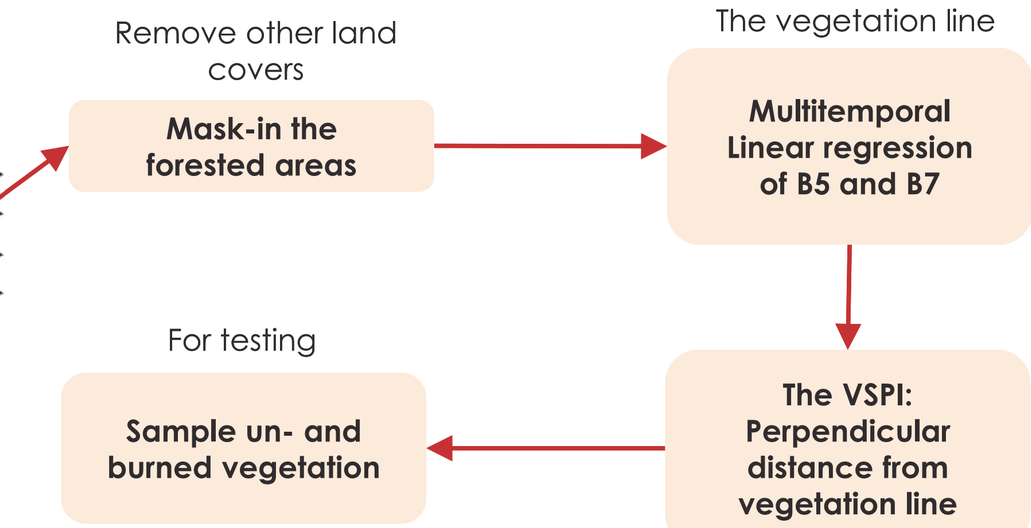


Fig. 1 – Vegetation line and fire induced disturbance.



10 Y Satellite data



Results

We tested the index on **Perth Hills fires** (2005) against the Normalized Burn Ratio (NBR), the most used Landsat-based fire severity indicator (Figs. 2 and 3).

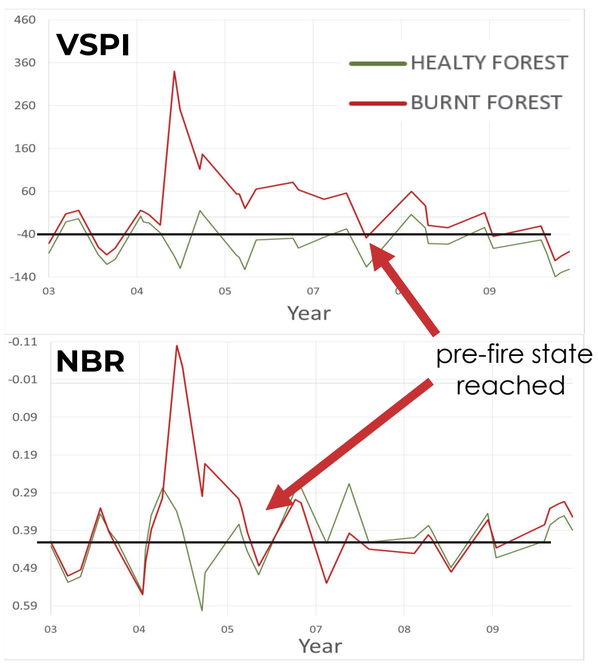


Fig. 2 – VSPI and NBR responses across time for a burned (red) and healthy forest(green)

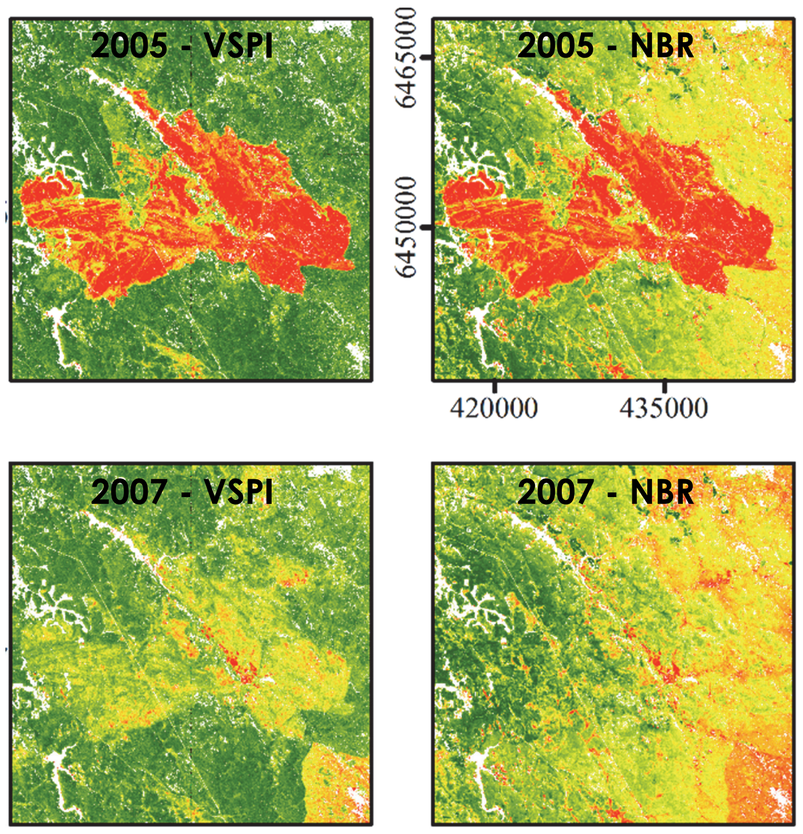


Fig 3 – VSPI (left) and NBR (right) maps. First date available after the Perth Hills wildfire (top) and same area 23 months post fire (bottom).

Post-fire vegetation re-accumulation as seen by satellite

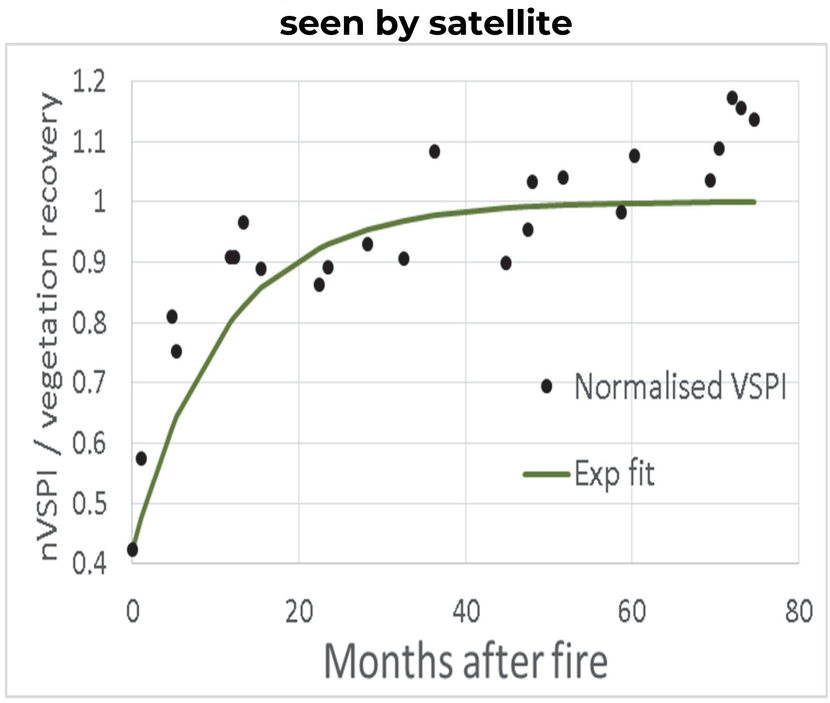


Fig 4 – The VSPI signal can be used to assess the vegetation recovery status after a fire

Discussion and conclusion

- The VSPI detected a disturbance in the burned vegetation for 30 months longer than NBR (Figs 2 and 3).
- The forest fuel re-accumulation was reconstructed and followed an exponential decay curve (Fig. 4).
- Applications in prescribed burns assessment, fire behavior simulation, fire risk assessment.