# Detecting Fauna Habitat in Semi-Arid Grasslands Using Satellite Imagery

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**The XX International Grassland Congress took place in Ireland and the UK in June-July 2005. The main congress took place in Dublin from 26 June to 1 July and was followed by post congress satellite workshops in Aberystwyth, Belfast, Cork, Glasgow and Oxford. The meeting was hosted by the Irish Grassland Association and the British Grassland Society.**

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**Introduction** Managing grasslands for biodiversity conservation is a relatively recent phenomenon and there is uncertainty over the most effective strategy. Past research has found that intermediate levels of disturbance (e.g. burning or grazing) may be required to maintain the natural mosaic of small-scale patterning required for a diverse range of flora and fauna species. For sustainable grassland management, appropriate methods of spatial assessment and temporal monitoring are required, to facilitate understanding of how past and present climate, land management and landscape features influence vegetation structure. Due to the expense and time-consuming nature of conventional ground-based monitoring, satellite remote-sensing techniques offer a feasible approach.

Plains-wanderers (PWs, *Pedionomus torquatus*), a small ground dwelling bird, are endangered due to the loss of native grasslands in south-eastern Australia, through cropping and inappropriate grazing. Plains-wanderers require an open habitat structure, and cannot survive in grasslands that are too dense or too open. Terrick Terrick National Park (TTNP) is one of the most significant PW habitats in Victoria, Australia. A major role for the park is to provide a drought refuge for PWs when heavy grazing reduces habitat in the surrounding landscape. This study explores the use of satellite imagery in detecting grassland habitat for PWs at TTNP during the drought in 2002.

**Methods** Visual estimates of PW habitat classes (vascular plant cover) were collected at TTNP during mid-spring 2002. One hundred and forty-five sites were sampled, using a stratified random sampling regime, to ensure optimal coverage of variation in vegetation patterns. A cloud-free Landsat 7 ETM+ image (path 93/row 85), acquired on 11 October 2002, was used in this study. Relationships between Landsat TM spectral values and ground-truthed cover data from October 2002 were examined using raw TM bands and various vegetation indices and ratios.

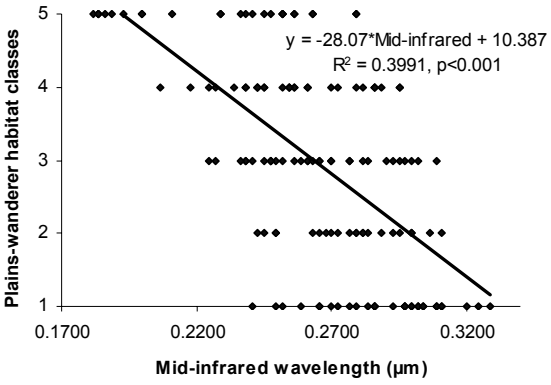


**Figure 1** Relationship between the mid-infrared band and Plains-wanderer habitat classes (1-Much too sparse, 2-Slightly too sparse, 3-Ideal, 4-Slightly too dense, 5-Much too dense)

**Results** Linear regression analyses highlight the ability of the mid-infrared band (TM 7) to predict PW habitat classes (Figure 1). Results indicate that approximately 34.6% of TTNP supported suitable PW habitat during the 2002 drought. Spatial patterning of habitat classes suggests that PW habitat suitability was affected by inter-paddock differences in stocking levels and with paddock differences in factors including stock movement patterns, soils and vegetation type. Comparison of results against soil patterns (results not shown) suggests that grazing patterns may be the major factor affecting habitat availability.

**Conclusion** Results show that satellite imagery can be used to monitor spatial patterns of PW habitat and to identify areas where grazing management can be refined. The strong contrast between the abundance of PW habitat in the east and west of the reserve, for instance, is primarily related to differences in stocking levels during the 2002 drought, rather than to underlying soil or vegetation patterns. In this study, the mid-infrared band (TM 7) showed the strongest correlation to ground-truthed PW habitat values. This strong correlation probably reflects the fact that PWs require a specific amount of open ground cover. Other vegetation attributes (such as greenness which can be detected by the near-infrared band) appear to be less important to PWs. This study demonstrates that remote sensing can be used to identify large-scale patterns of habitat suitability for endangered ground animals. This approach is currently being extended to explore temporal changes in PW habitat in TTNP over the last decade.