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## Monitoring Rangeland Community/Health Change Using Multispectral and Hyperspectral Satellite Data

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## **Monitoring rangeland community/health change using multispectral and hyperspectral satellite data**

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**Key words :** rangeland , remote sensing , SPOT , hyperspectral , spectral mixture analysis , decision tree

**Introduction** This work aims to develop new remote sensing methodology for mapping rangeland change and health indicators in the province of Alberta in Canada . Change monitoring is performed based on cover fraction at  $\sim 20$ m pixel of the following landcover types : trees , shrubs , grasses/herbaceous , soil and water . The percent cover of plant litter , soil and noxious weed species is considered when monitoring the rangeland health .

**Methods and results** Various satellite data are acquired over four test sites located in southern Alberta . The broad-band multispectral (SPOT) 10m/20m data are collected at least three times during the growing season over each site while hyperspectral (Hyperion and CHRIS) data are collected at least once over each test site . Historical data for both are used to test the developed technologies for mapping rangeland change . In case of the SPOT data , the archived data goes back to 1986 and data from every 5/6 years are used . Hyperspectral data are newer and data goes back only to 2004 .

A spectral library database , including spectra of pure rangeland components and associated targets acquired in situ and in the lab , is also compiled for use in the mapping procedure . Additional parameters indicative of rangeland health such as biomass , water content , and chlorophyll are also acquired .

**Discussion** The methodology developed applies both the spectral mixture analysis and the decision tree to satellite data to derive the percent cover . Performances of these two methods are assessed against field ground-reference information (field data) and cover fraction maps derived from high resolution ( $\sim 1/2$  meter) aerial digital photos .