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Xulin Guo

University of Saskatchewan, Canada

Guodong Han

Inner Mongolia Agricultural University, China

Xiaohui Yang

University of Saskatchewan, Canada

Mengli Zhao

Inner Mongolia Agricultural University, China

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The application of remote sensing to ecosystem health assessment in temperate rangelands

Xulin Guo¹, Guodong Han², Xiaohui Yang¹, and Mengli Zhao²

¹ University of Saskatchewan, 9 Campus Drive, Saskatoon, SK S7N 5A5, Canada. E-mail: Xulin.guo@usask.ca; ² Department of Grassland Science, College of Ecology and Environmental Science, Inner Mongolia Agricultural University, Hohhot-010018, P. R. China

Key words: remote sensing, temperate rangeland, ecosystem health, assessment

Introduction Grassland, covering one fourth of the land vegetation areas (Sims, 1988), plays an important role world wide ecologically and economically (Han, 2007). The temperate grasslands in Inner Mongolia, China have been the focus in the last several decades as the sand storm is getting severe annually in China. It not only affects the environment in China, but also plays a role in the global circulation. Therefore, monitoring the health of the grassland condition is the purpose of this study.

Materials and methods Field level biophysical data were collected in the summer of 2006 in three grassland types, typical steppe, meadow steppe, and desert steppe. Satellite imagery, Landsat Thematic Mapper (TM), was acquired for the same study area as close to field season as possible. Satellite imagery was geometrically, radiometrically and atmospherically corrected. Two study areas were covered with multitemporal images (desert steppe and meadow steppe).

Results and discussion Figure 1 demonstrates that satellite imagery is an effective way of assessing rangeland conditions. A multitemporal approach is more effective than a single image. Spectral vegetation indices especially with soil adjusted indices have significant relationships with biophysical properties (biomass, cover and canopy height) at various levels.

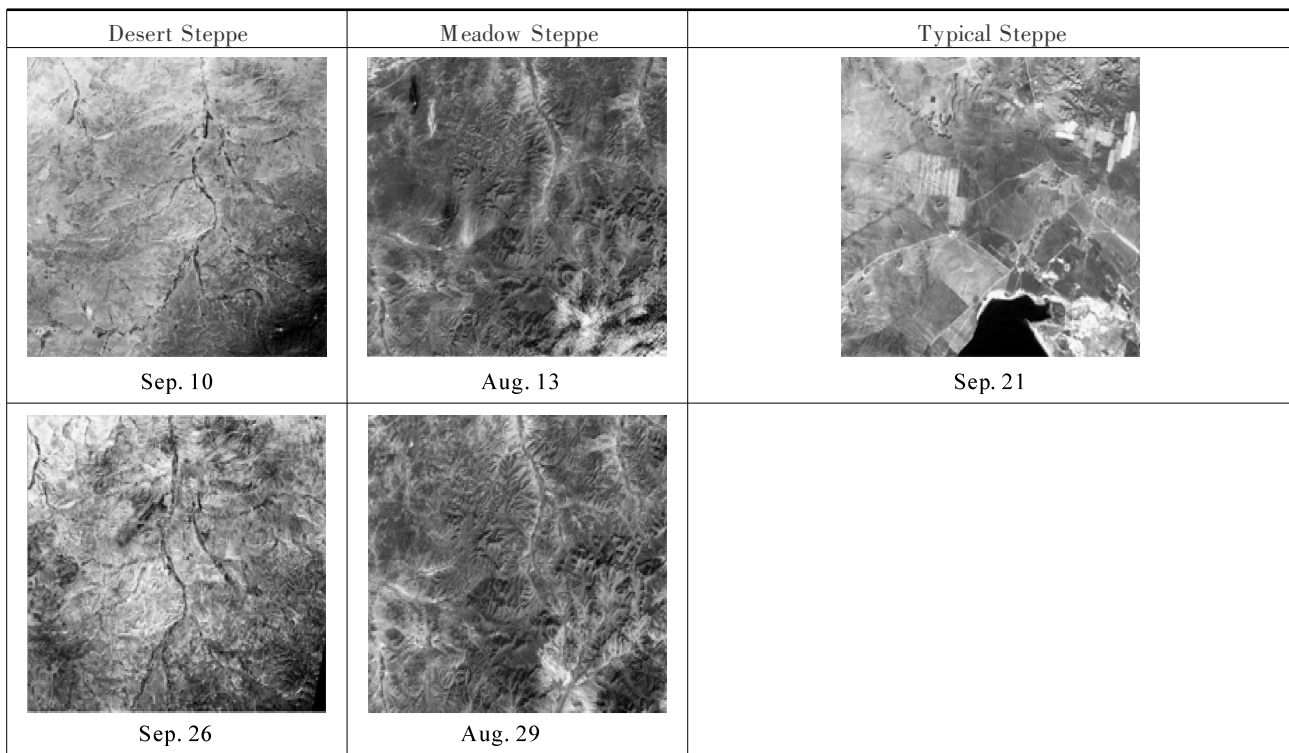


Figure 1 False color composite Landsat TM imagery. Areas in red indicate green vegetation and in blue are low vegetation.

Conclusions This study demonstrated that remote sensing is an effective way to assessing rangeland health. Specific vegetation indices are needed for low vegetation covered areas.

Reference

Sims, P. L., (1988), Grasslands, in Barbour, M. G., and Billings, W. D., eds., North American Terrestrial Vegetation: Cambridge.