NORTH DAKOTA - Improved Grassland-Assessment Methods for Livestock & Wildlife

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Managers of the Dakotas' mixed-grass-prairie public lands rely heavily on manual measurements of vegetation height in autumn to ensure conservation of grassland structure for wildlife and forage for livestock. However, a more comprehensive assessment could be achieved by integrating these field surveys with topographic and spectral-reflectance data.

Interesting relationships between grassland canopy 'structural-attributes' (leaf area, standing-crop mass, vegetation height, nitrogen, and water content) and satellite spectral data were identified at Grand River National Grassland, SD. The area studied included over 400 sections of land, and both canopy structure and spectra varied consistently with topography. These relationships are important because known variation in topography can be layered over spectra to show land managers where grassland canopies are unusually low in structure.

Leaf area, standing-crop mass, vegetation height, nitrogen, and water content were lower at summits than at toe-slopes. Spectra in the short-wave infrared available from the satellite-based Landsat sensor were most related to canopy mass and height at both plot and landscape scales in summer and in autumn. Field measurement results for canopy height, however, change seasonally.

This research was presented to representatives of grazing associations, federal land managers, and representatives from the Washington, D.C., area at a joint meeting this month at the Northern Great Plains Research Lab. The group discussed assessment of the over 1 million acres of North and South Dakota grasslands leased to grazers by the U.S. Forest Service.

Results indicate: 1) grassland structure and satellite-based spectral data vary with topographic position, 2) structure changes with season, and 3) canopy information derived from spectra can be used to comprehensively assess vegetation changes for hundreds of sections of land in one 'snapshot'. Seasonal assessment would enable managers to track changes in plant productivity for large landscapes when management adjustments are feasible.