

DEPARTMENT OF AGRICULTURAL, FOOD AND NUTRITIONAL SCIENCE

MSc Thesis Seminar

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Date: **Wednesday, January 16, 2019**
Time: **8:30 a.m.**
Location: **410C Agriculture/Forestry Centre**
Title: **The Relationship of Plant Diversity to Alberta's Range Health
Assessment**

ABSTRACT

Grassland conversion to other land uses is the leading cause of decline in biodiversity in these ecosystems. In remaining grasslands, grazing can have positive or negative effects on biodiversity, and the ability to assess grazing effects is critical to apply informed conservation management decisions. One way to measure grazing impacts is with rangeland health, an operational measure of grassland function. Rangeland health is assessed by summing the scores of individual components of community integrity, structure, hydrological function and nutrient cycling, site stability and noxious weed presence. It is often assumed that if rangeland health is maintained then biodiversity is conserved; however, this has not been broadly tested. This study investigated relationships of plant diversity measures with Alberta's Rangeland Health Assessment at two different scales. In the first study, rangeland health was measured at discreet locations across a broad geographic area and plant diversity did not relate to rangeland health. However, components measuring soil erosion, nutrient cycling / hydrological function, structure and noxious weeds all related to diversity metrics, although the relationships were influenced by environmental factors such as topographical and geographical moisture gradients. In the second study, rangeland health was measured in plant communities throughout a pasture and related to community patchiness. The patchiness measure was created by comparing the number of ecosites present to the number of plant communities occurring with the addition of grazing effects. Average health scores and their range (max-min) both related to patchiness within pastures. Furthermore, the relationship between patchiness and rangeland health was influenced by abiotic differences as well as a broad climatic gradient. Implications for grassland conservation and management are that although no direct relationship was found between plant diversity and total rangeland health score at the community level, diversity nevertheless demonstrated a sensitivity to several subcomponents of the health assessment, and therefore may provide utility in tracking ongoing diversity changes. Also, if completed in multiple locations within a pasture, rangeland health can be utilized to indicate community patchiness, which has been shown to be important to biodiversity and a variety of wildlife species. Management goals should be specified between diversity and rangeland health as there may be instances where some areas of lower levels of health can promote patchiness and overall diversity.