DEPARTMENT OF AGRICULTURAL, FOOD AND NUTRITIONAL SCIENCE

MSc Thesis Seminar

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Date:	**Wednesday, October 10, 2018**
Time:	**1:00 p.m.**
Location:	**318J Agriculture/Forestry Centre**
Title:	**Mitigating effects of access mats on construction traffic in Mixedgrass Prairie of Alberta**

ABSTRACT

Access mats are three-ply wooden mats used to mitigate soil compaction and vegetation damage from industrial construction in much of Alberta. This field study, conducted in the Dry Mixedgrass prairie, assessed duration (6, 12, and 24 weeks) and seasonal (early, late, and season long) impacts of heavy equipment traffic occurring directly on grassland and overtop of mats during the growing season using a RCD experimental design. A total of 4 study sites were made, representing loamy and sandy-loam soil textures. Soils were assessed for changes in bulk density, penetration resistance (PR), water infiltration (IR), and nutrient supply rates over two years, while vegetation was monitored for changes in shoot and root biomass for three years. Results indicate traffic without mats (TWOM) increased soil PR, while traffic with mats (TWM) initially reduced PR and increased soil moisture contents (SMC) relative to the non-treated Control, but both PR and SMC returned to Control levels six weeks after mat removal. Water IRs were reduced under TWOM compared to TWM and Controls into the second year. Soil nutrient availability increased under TWM; nitrogen was ten times higher, sulfur double, iron four times higher, and manganese five times higher than Controls. Longer mat placement generally increased levels of available nutrients, although nutrients quickly dissipated to Control levels. Under TWOM nutrients showed little to no change compared to Controls. Grass biomass was reduced into the second year after treatment from mats placed for 12 weeks or longer, while introduced forbs flourished but only the first year. Biomass of grasses and introduced forbs did not differ under TWOM from the Controls. Biomass changes to traffic and matting were also more apparent on sandy-loam than loam ecosites. Overall, mats appeared to mitigate soil compaction and maintain plant community productivity when placed for 6 weeks or less, while the latter changed markedly if mats were placed for longer than 12 weeks.