Antelope Creek Habitat Development Area Range Technician Report 2016

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Antelope Creek Ranch is a 5,500 acre property managed under a partnership of Alberta Fish and Game, Ducks Unlimited Canada, Alberta Environment and Parks, and Wildlife Habitat Canada. The Ranch was purchased in 1986, with the 2016 year marking the 30th anniversary. The Ranch is managed to preserve and integrate wildlife habitat and values with several different competing land use interests. The ranch showcases the mixed use of grazing, oil and gas development, research, education, and maintenance of healthy wildlife habitat.

The Ranch has had many research initiatives and projects over the years, often hiring summer technicians to accomplish work on indexing and monitoring the production values of the rangeland. The most recent project is the inventory and mapping of the plant communities on the Ranch. With advances in technology and an ever-increasing use of GIS mapping and data processing it is important to keep data for projects such as the Ranch up to date and accessible. This project started in the summer of 2015 with Ross Adams who surveyed most of Field 2, Cassils Field, and began work on Field 1. I continued this work in the summer of 2016; completing polygons for Field 3 and some backfill of unfinished riparian areas in Field 2 (Figure 1.5).

Precipitation over the 2016 Field Season;

Figures 1.1 through 1.4 show the precipitation over the 2016 field season. The data for these was taken from the Environment Canada weather station data, located in the city of Brooks, AB. The ranch is located approximately 20km outside of Brooks and may have slightly different precipitation totals. This year was a very wet year for the area, with rainfall exceeding 100% of the normals (Fig 1.9). May exceeded the normal total; with Brooks receiving 70.8 mm of rain as compared to the normal 38.9 mm (Table 1.0). July far exceeded the normal average of 44.9 mm with a total of 105.6mm throughout the month (Table 1.0). While both June and August were slightly under the respective normals the excess rain in May and July accounted for an additional 80 mm of rainfall (Table 1.0). Rainfall events in July were frequent and often heavy, resulting in the grasses staying vegetative well into August and giving some nice regrowth in areas that had been grazed.

Description of duties;

May was largely spent doing various chores around the ranch including checking and repairing all of the fences on the ranch, moving range cages prior to cattle arrival, and cleaning the yard. A week was spent hand picking downy brome in Field 2 where several patches are present on a capped well site.

Downy Brome (*Bromus tectorum*) is an invasive species that flowers early in the season and germinates in fall to overwinter as a seedling. Often this species seeds are introduced as a contaminant on machinery. As such control measures are important to put into place early before large populations, and seed banks, can be established. This lease site and a few locations along the road have shown patches of downy brome in the last few years. The ranch manager and summer technician

spent a week picking in the 2015 summer and the roadside patches seem to have been reduced to a few individual plants that were picked when detected throughout the summer. The lease site had several large patches (in excess of 1 m^2) with high density within patches. Both Cenovus employees and myself picked these sites. However inspection at the end of the 2016 season shows a few small patches that were missed altogether and a strong likelihood that patches that were picked will have more individuals in the 2017 season. GPS points and polygons were taken at occurrences of Downy Brome and input into ArcGIS in mid June.

Vegetation Inventory;

Training for range inventory and range health assessment was provided by Alberta environment and Parks and MULTISAR took place in early June and vegetation inventory began June 20th. The first few days of this were spent with guidance from Craig DeMaere and Tanner Broadbent to ensure consistency of technical assessments.

Mapping of plant community types utilized GVI, AGRASID, and LIDAR data to assist with on the ground observations for determining plant community boundaries (polygons). Once polygons were established a linear 50m transect was run in a representative area of the polygon. Assessment of percent cover of species within a dobbelaere frame was made at 5m increments along the 50m transect for a total of 10 plots. These data included estimation of litter, lichen, and bare ground cover and was entered into Ecosys and used to help establish communities through an ordination at the end of the summer. In addition to the transect data for weeds, shrubs, grazing, and any other notes for the polygon were recorded on the backside of the Prairie MF5 forms used for data collection. Range Health Assessments were also conducted for each polygon following the procedures outlined in the Range Health Assessment Field Workbook and at the contractor training in June. The majority of polygons were assessed with a transect in this manner, however riparian areas and polygons that were small with monospecies features did not receive transects; rather a visual assessment of dominant species composition was recorded (Fig 1.7) .

Field 3 was chosen as the main focus for the summer due to the ongoing GPS collar studies taking place within that field. Collared cattle are being analyzed for utilization of Crested Wheatgrass stands (CWG: *Agropyron pectiniforme*). Field 3 has some of the most CWG of any of the fields as it has the most development and linear disturbances (Figure 1.8). For these reasons the polygons I assigned differed from the GVI polygons far more than those given in Field 2. Where possible CWG dominated communities were given their own polygons; this was achieved by combining field observations with a previous mapping of CWG occurrence in the field.

Crested Wheatgrass is an invasive species and will outcompete native species in the Dry Mixedgrass Region; as such it is a management concern on the ranch. Although palatable while young and vegetative, CWG becomes less palatable as the awns are produced and the plant hardens off. A build up of previous years' growth can cause the plants to become wolfy and avoided by grazers like cattle. Mowing or burning can remove this dry standing old growth, freeing up nutrients and allowing for even grazing. Recently the Ranch Manager has begun to let Cattle into the fields earlier in the season to facilitate grazing of CWG prior to hardening off in the hopes of reducing its competitive ability. Field observations show a high selection for CWG by the cattle in Field 3 with cattle often seen grazing in CWG dominant areas and these areas are showing a much higher utilization than surrounding native communities.

No polygons in Field 3 were given perfect scores under the Range Health Forms Plant Community score. This was often due to the presence of either CWG or a weedy species such as thistle (Cirsium arvense, Sonchus arvensis, Cirsiusm vulgare). While these species may not be highly adverse they do present a management concern. As Field 3 is highly disturbed most polygons have at least some CWG present; often areas without CWG were low-lying areas with a higher incidence of thistle or other weedy species. Range Health scoring is a qualitative judgment and based on the individuals' observations, the scoring from this year may vary from that given in previous or future years. However given that all range health scores are just a guideline and subject to individual bias and error the 2016 assessments seem in line with expected variance. As seen in Figure 1.6 most polygons were rated as healthy with problems, with a handful of healthy and unhealthy occurrences.

Clipping;

Clipping took place in August on the 2nd, 3rd, and 14th. Range cages and enclosures are in all four of the native fields. Field 4 has another six cages in the northwest corner as production varies across this field. Cassils field and the flood fields have cages only (10 and 8 cages, respectively). Clipping of cages and enclosures provides data on production for the fields and the effect of grazing on the production values. Antelope Creek Ranch has been collecting this production data since 1988 providing strong historical records of grazing on the ranch.

Data analysis;

Inputting and analyzing of collected data took up the majority of August and a portion of late July. Polygons were created in ArcGIS through editing of the pre-existing GVI layer and with reference to previously mapped CWG occurrence layers and satellite images. Fencelines for Field 3 were also updated and roads, lease sites, and other disturbances had their own polygons created. All transect data collected was entered into EcoSys for ease of analysis.

Once inputted the data were run through an ordination to group like plant communities. For the purposes of our assessment all agropyrons occupying the same growth habit (*Agropyron dasystachyum, Agropyron smithii, Agropyron*

trachycaulum, Agropyron repens) were consolidated into one 'species' for the ordination. As existing community types are not pulled apart by individual Agropyron species we did not wish to have this occur with our own data. Ordinations were run in groups based on dominant soil type. The majority of our polygons were blowout types, and the remainder (Loamy and Sub irrigated) were consolidated into an "Other" group for the purposes of the ordination. Outliers were comprised of the low-lying or depressional sub irrigated areas that were affected strongly by the increased moisture and salinity or fairly large areas dominated to near exclusivity by single species. Most sites in Field three fell into earlier seral stages of DMGA3, DMGA15 or DMGA35 (Figure 2.0). Once plant community types had been assigned to each transect dataset all relevant information was joined to the polygons created by myself earlier in July.

Concluding remarks;

Field 3 was largely in line with the GVI assessment in areas that were undisturbed, however where there are disturbances or encroaching non-native species polygons were often split or changed. Disturbances included linear pipelines, lease and well sites, old road features, and areas where groundwork was done to facilitate wetland/dugout/slough features. Establishing boundaries of polygons often proved to be the most time consuming component, particularly where changes between plant communities were gradual. As Fields 1 and 4 have less disturbance features it is predicted that they will require less modifying of GVI polygons. The dataset collected in 2015 did not create separate polygons for CWG occurences and as such may require modification to incorporate these features in future. As CWG spreads over time it is recommended that the CWG polygon boundaries be updated at a regular interval. As the current project to inventory the ranch is yet to be completed these data presented here are unfinished and largely meant only as a visual representation of the collected information for the 2016 season.

Figures & Tables:

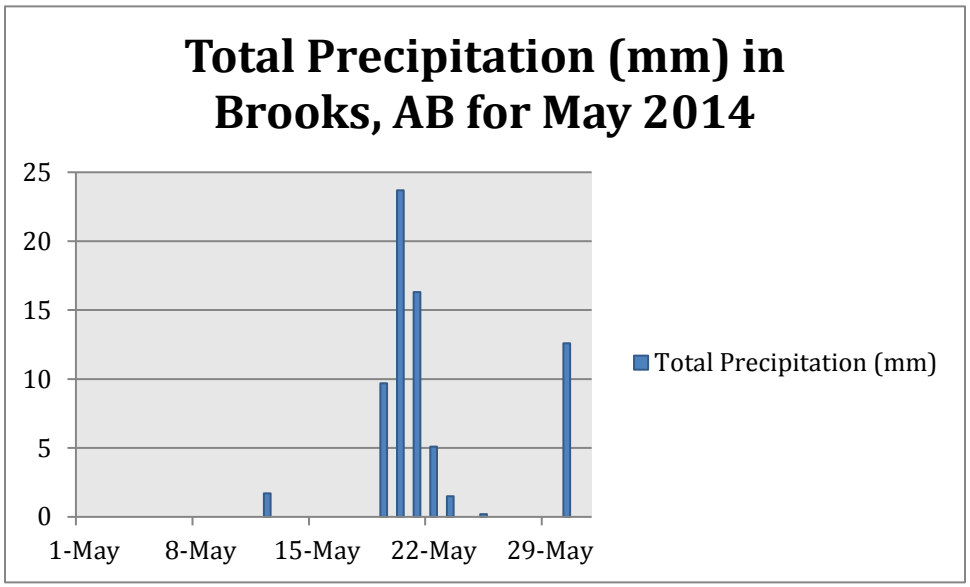

Fig 1.1 Precipitation events for May, Brooks AB

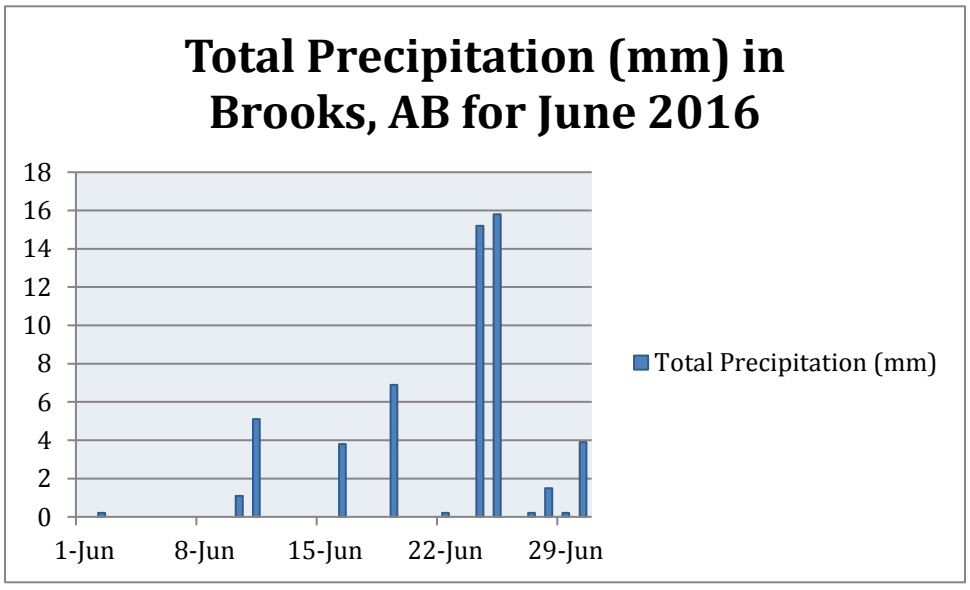

Fig 1.2 Precipitation events for June, Brooks AB

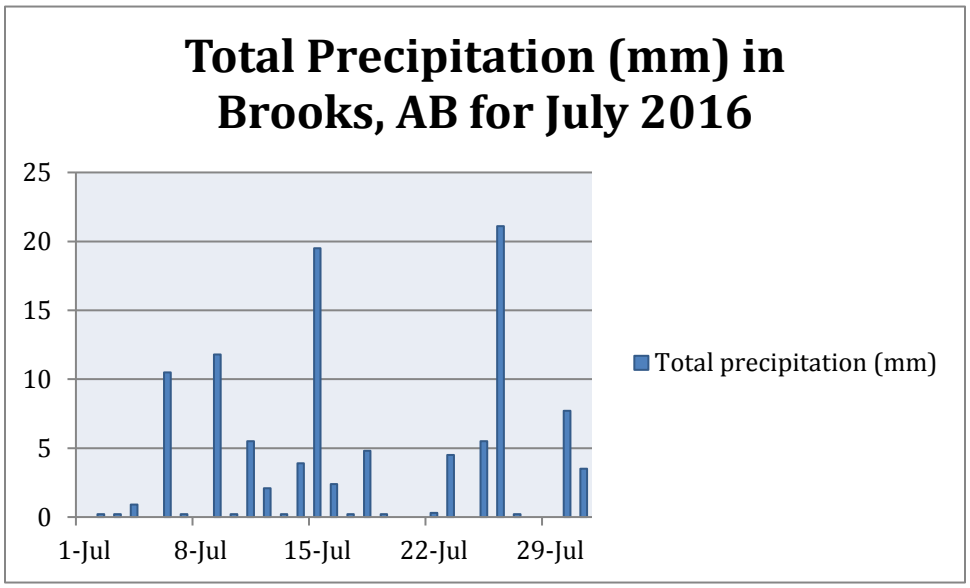

Fig 1.3 Precipitation events for July, Brooks AB

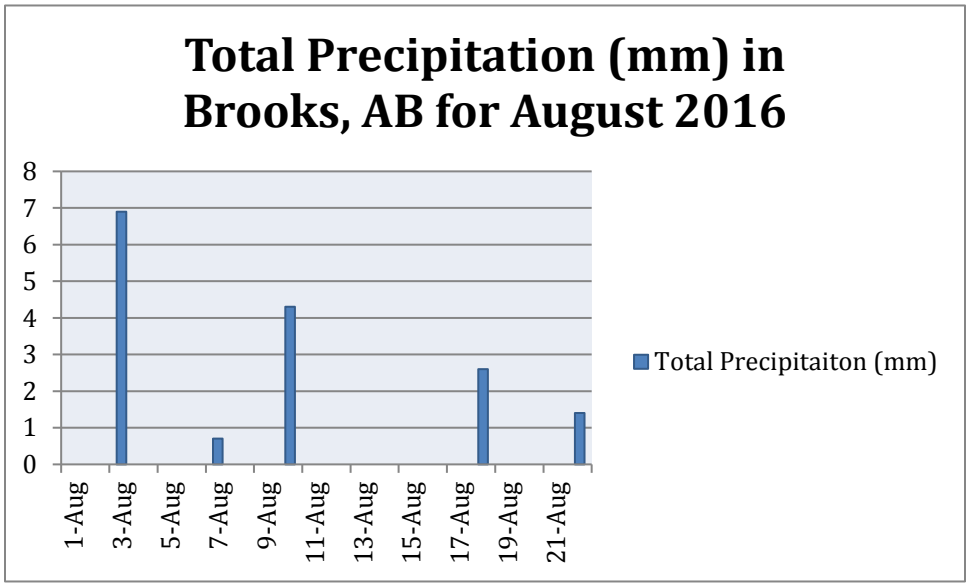

Fig 1.4 Precipitation events for August, Brooks AB

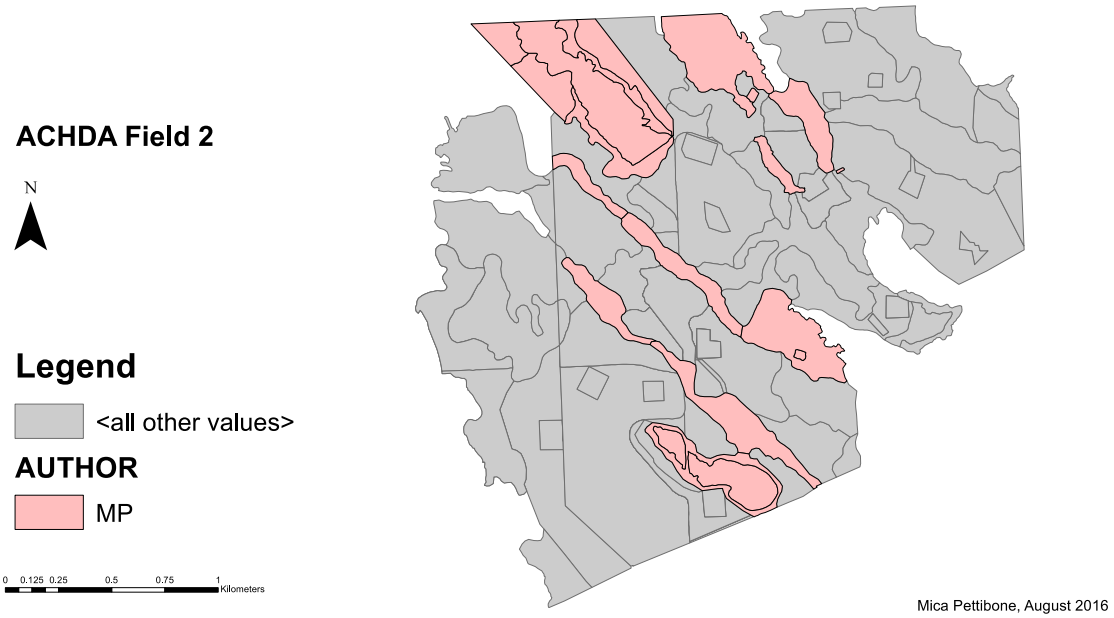

Fig 1.5 polygons in Field 2 completed by Mica Pettibone in the 2016 year

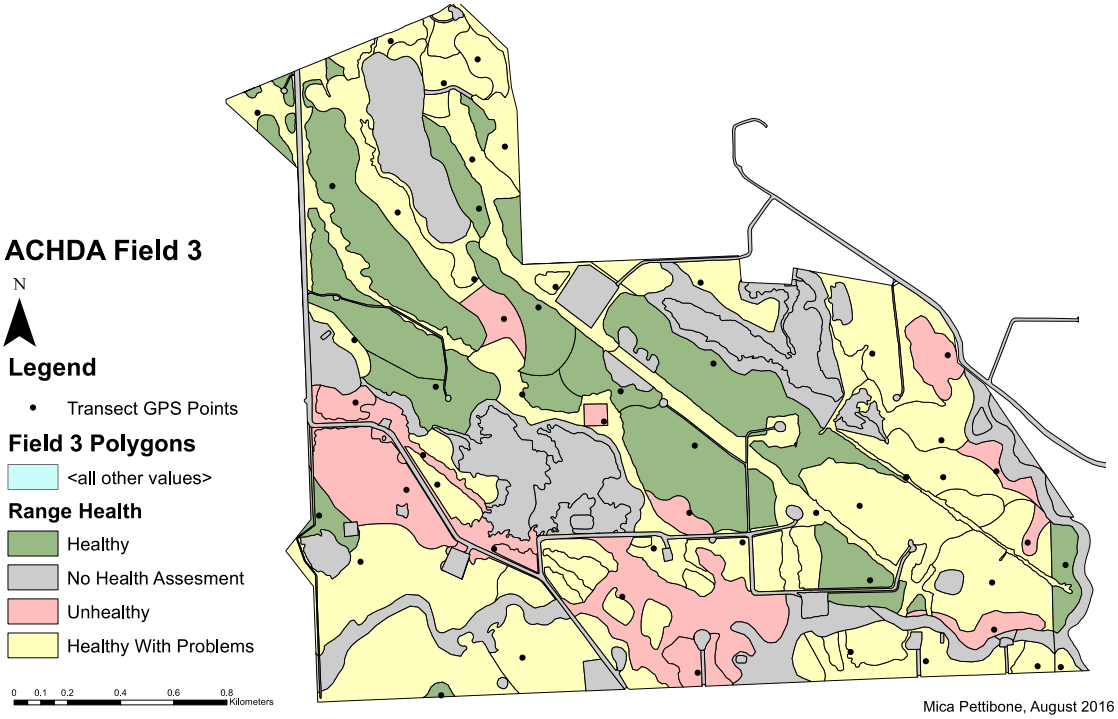

Fig 1.6 Health Condition of Polygons in Field 3

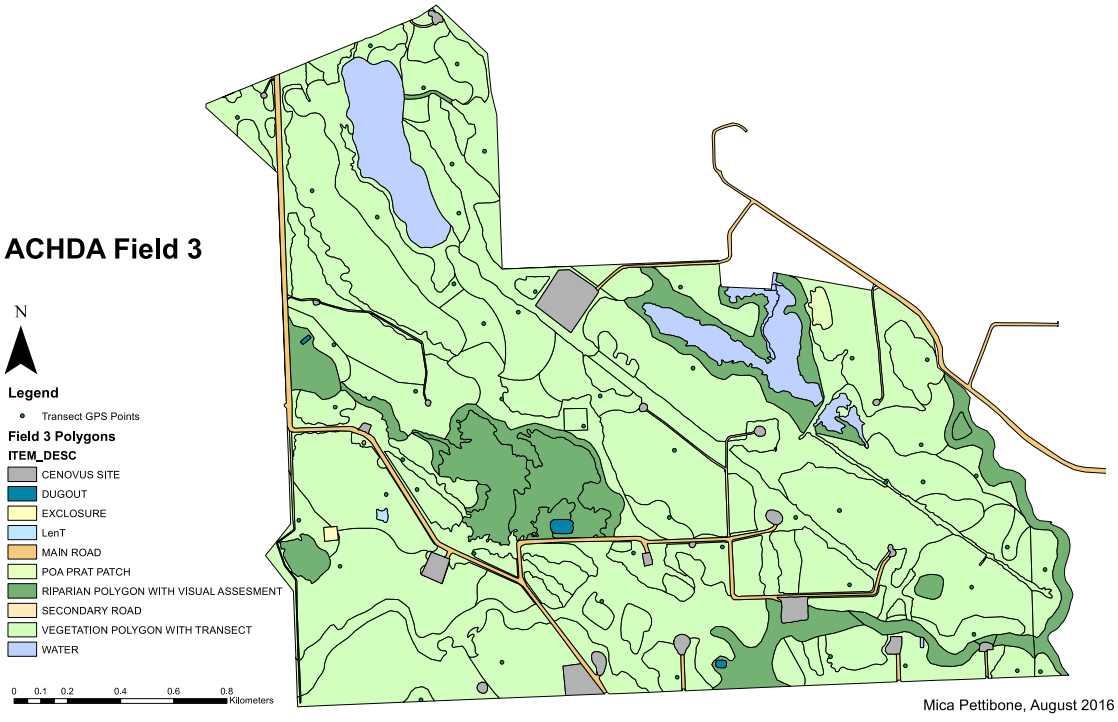

Fig 1.7 Type of Assessment Completed for Polygons in Field 3

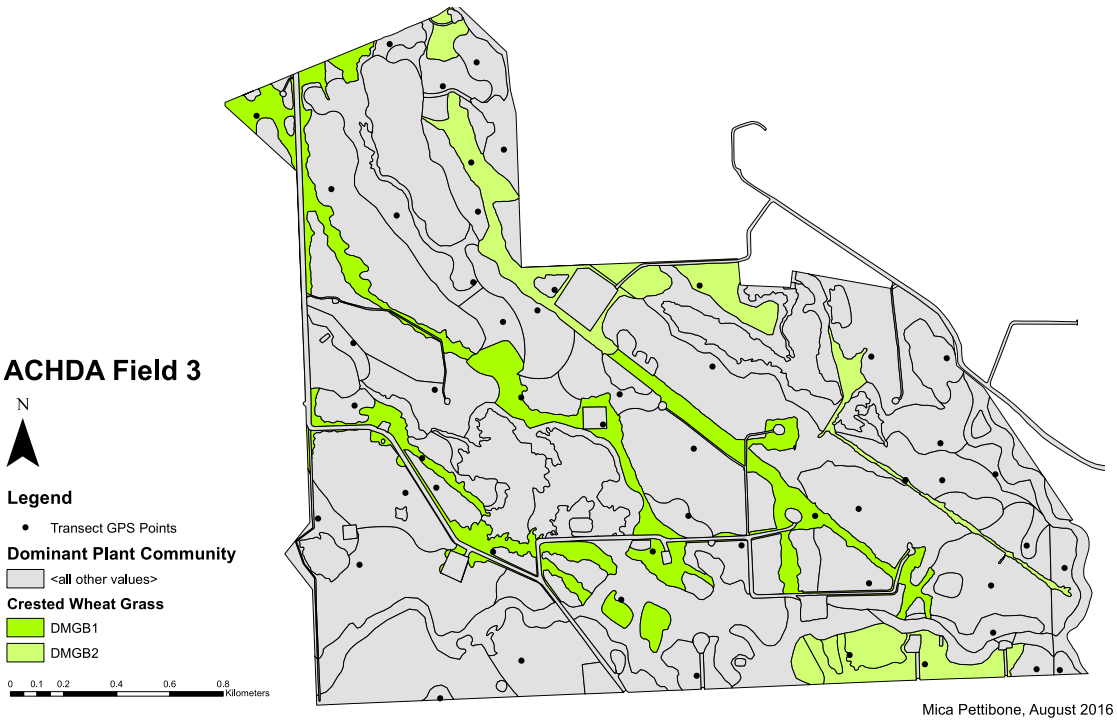

Fig 1.8 Crested Wheat Grass Occurrence and Community Type for Field 3

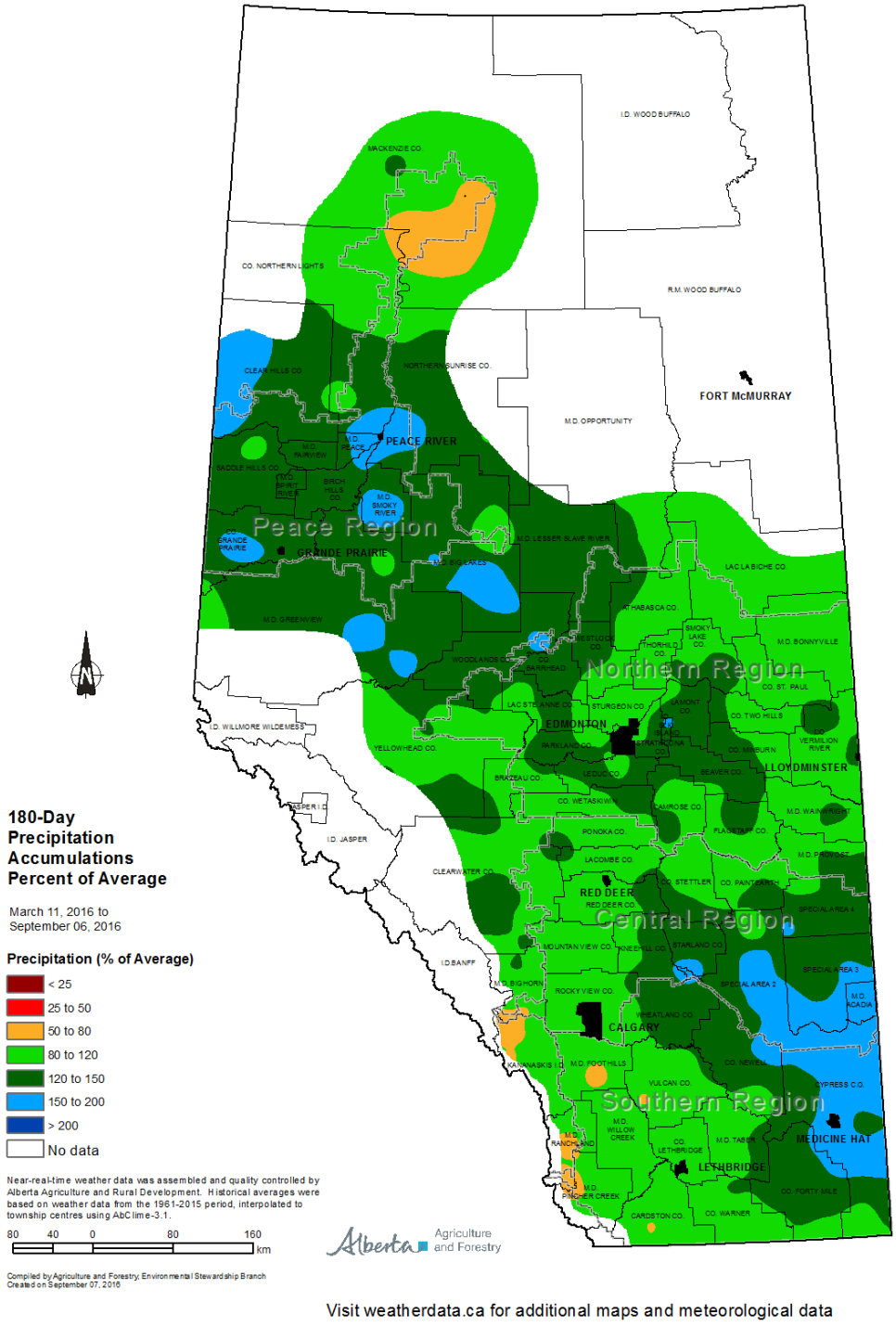

Fig 1.9 Precipitation as Percent of Average for March-September 2016

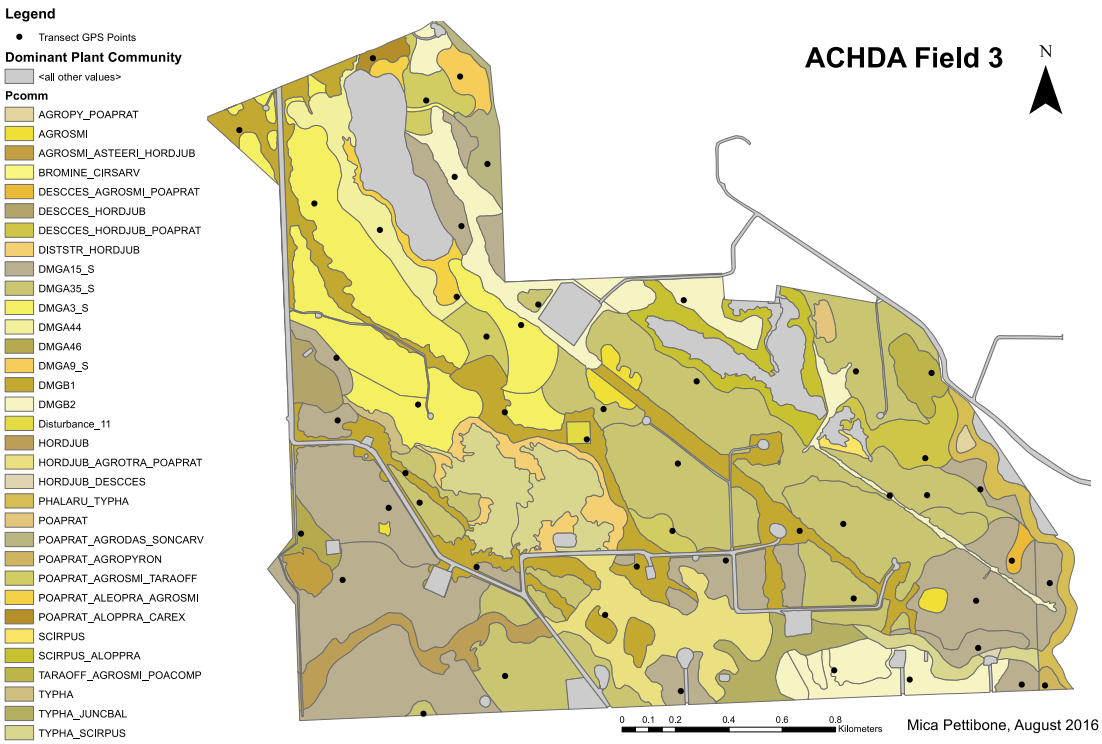

Fig 2.0 Plant Community's in Field 3

Total precipitation (mm)		
Month	**Normals (1981-2010)**	**2016**
May	38.9	70.8
June	64.5	54.1
July	44.9	105.6
August	34.7	32.8
Total	183	263.3

Table 1.0 Precipitation Normals vs 2016 Totals for Brooks Alberta (Data retrieved from http://climate.weather.gc.ca)