

Glenbow Ranch Park Foundation Grassland Restoration Research Project

By: Ashley Easton, Grassland Ecologist with the Glenbow Ranch Park Foundation

Rough fescue grasslands are among the most threatened ecosystems in North America. Anthropogenic impacts on grasslands have intensified to a point that only less than 5 to 16% of these grasslands remain intact throughout the Northern Fescue, Central Parkland and Foothills Fescue Natural Subregions (Kupsch et al., 2013; Adams, 2003). These remaining grasslands continue to be threatened by a combination of activities, including urban and industrial development, agriculture, and invasion of non-native species. The future of grassland ecosystems, and the many species that rely on them, is highly dependent on our ability to restore these natural vegetation communities affected by disturbance.



While there is a comprehensive understanding of how many of the individual species within grassland ecosystems function, there are numerous gaps in our understanding of how to restore the complexity and functionality of these ecosystems. Long-term data on successful restoration techniques and best management practices is also not widely available. For example, while rough fescue can germinate readily from seed, there is currently a poor understanding of how to manage high establishment failures that typically result within the first two years of direct seeding which have historically resulted in failure to re-establish this key species during restoration. Another significant knowledge gap relates to documentation of methodology that will lead to the successful reestablishment of a fescue grassland plant community comprised of the appropriate grasses, forbs and shrubs. Numerous seed mixes, seeding methods, and seeding rates have been used; however, typically do not result in the target native plant community or even one remotely like it. Most of these communities have consisted primarily of grasses, and even then, only a few species have been established and dominate the site. This may not result in successful restoration of the desirable habitat that was once present and is needed for the return of long-term functionality; however, very little documentation of the trends and condition of these sites exists. Although some efforts have been made, important information is also still lacking on the current successes and best practices for the reintroduction of the forb and shrub components into restored sites.



Typical university and industry research programs have provided fantastic short term information, but often only last as long as an individual graduate student takes to complete their degree or until the restoration site has received a reclamation certificate. To address this limitation, a long-term research program is proposed to test current methods

and develop the most effective practices for restoration of fescue grasslands and document the short- and long-term results of techniques being utilized. The objective of the grassland restoration research project at Glenbow Ranch Provincial Park is to provide short, mid and long-term opportunities to look into some of the existing knowledge gaps and attempt to identify efficient, effective methods and procedures by which native fescue habitat can be restored. This research area can also be utilized as an educational tool and help raise awareness with a wider audience of the importance of grassland conservation and restoration.

The establishment of the plots is planned for spring 2016 and will be located within a one hectare section of a previously disturbed area of Glenbow Ranch Provincial Park. The location of the project within a provincial park is ideal for enabling long-term monitoring of restoration, which is key for these long-lived plant communities. While the initial phase is planned to continue for four to five years, the opportunity exists for long-term follow-up studies over at least the next 30 years. During the initial phase, ongoing monitoring of the established plots will provide data on the trajectory of restoration success of the various treatments, while long term monitoring will provide insight into whether the trajectories seen during initial restoration are truly reaching the anticipated restoration goal and at what rate.



The Glenbow Ranch Provincial Park grassland restoration project will initially focus on identifying effective methods for the establishment of the grass component of the communities, since this component is critical for the development and stability of grassland communities. The different methods being evaluated include: different seed mixes for two different Natural Sub-Regions; different methods of seed mix creation; various seeding rates; the use of seed only vs. seed and live plantings; as well as different live planting densities. Within a subset of the research plots, the impacts of seed predation will also be assessed. Use of small plot sizes will allow for examining a large number of treatment options. In total, there will be 240 split research plots for which the experimental design will be fully randomized and each treatment combination will have five replicate plots. Some of the parameters which will be assessed during monitoring include: germination counts, desirable percent cover, tiller counts, live planting growth measurements, live planting mortality counts, plot disturbance locations and frequency, weed species percent cover, and various environmental and soil conditions. Based on the native grasses establishment, forbs and shrubs are planned to be added into a subset of the plots to enable evaluation of the best practices for their inclusion into the restoration process (another future research project following establishment of the first phase).



Along with scientific data and practical application recommendations, we anticipate (and welcome!) the area to be used by Universities and classrooms for all ages, as well as for park programs, to demonstrate and provide hands on learning about native vegetation species, plant communities, and native grasslands, and their important role in ecosystem function and sustainability. A wide range of additional research studies and citizen science projects may be initiated from the established plots depending on the needs which arise in the future, or additional questions the current project will likely uncover.



Sharing lessons learned during the project will enhance our ability to carry out successful restoration, increase public awareness, and empower others to embrace the impact they can have in grassland conservation and stewardship. A better understanding of how to restore our native grasslands, the benefits and challenges of restoration, and more awareness of their importance are essential for the survival of these ecosystems. Improving our techniques, tools and rates of restoration success will provide hope that we might conserve native grasslands, and the essential functions they provide, as part of the Alberta landscape in the future.