

Assessment of Potential for a List of Vegetation Species To be Used as an Indicator of High Water Table or Groundwater Discharge in the Mixed Grass Prairie

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Objective

PTAC project 15-SGRC-08 developed a scientific rationale document supporting an alternate closure protocol for salt-affected wellsites on native prairie grasslands. The PTAC project proposed that specific plants would be indicative of near surface groundwater (either high water table or groundwater discharge). In support of this protocol, a group of vegetation specialists from Salix Resource Management Ltd. (Salix) and Terrestrial Solutions Ltd. (Terrestrial) were asked to review vegetation species in the Mixed Grass or Dry Mixed Grass Natural sub-regions to determine if a list of species could be formulated to act as markers to determine the lack of an elevated water table or groundwater discharge, with the absence of the identified species being an indicator of a low likelihood of near surface groundwater.

Scope

This project was intended as a preliminary assessment to determine whether it was felt that a list of species could be developed to act as markers for areas with increased water. The assessment was intended to be based on existing vegetation and plant community classification systems, as well as the professional experience of the individuals on the project. No field studies were planned as a part of this investigation.

Methodology

In order to develop the desired list of species, the Alberta wetland classification¹ species list for swamps and marshes was utilized as a starting point. Swamps and marshes were chosen as they are the most prevalent wetland types within the subject area and exclude the obvious wetlands that have open water present. While the wetland classification system was utilized as a starting point for the species list, it should be noted that the objective is not to identify “wetlands”, but areas with the potential for upwards movement of water or groundwater discharge. Such areas may not always meet the definition of a “wetland”. For the purposes of this document these areas with upward movement of water, or groundwater discharge are referred to as “moist” ecosystems.

¹ Alberta Environment and Sustainable Resource Development (ESRD). 2015. Alberta Wetland Classification System. Water Policy Branch, Policy and Planning Division, Edmonton, AB.

The wetland list was then cross-referenced to the Alberta Biodiversity Monitoring Institute (ABMI)² species list for species noted to be present in the area of the mixed-grass or dry mixed-grass natural sub-regions. As the ABMI list is not referenced by natural sub-region, an area south of township 32 and east of range 26, west of the 4th meridian was used as a proxy for the two natural sub-regions.

The cross-referenced list produced a list of species which were noted to have been found in marshes and swamps, and have also been found south of township 32 and east of range 26, west of the 4th meridian (See Appendix A). The ABMI list does not separate species out as to prevalence. Therefore, many of the identified species are not common species in the subject area. Additionally, neither database utilized provides species found only in wetlands. Therefore, the list was then reviewed by senior vegetation specialists in Salix and Terrestrial to evaluate which species would be common enough in the subject area, or distinct enough to moist ecosystems, to be used as indicators of moist ecosystems. This ranking of species is found in Appendix A, with common wetland species given a “1”, species too present in uplands to be indicative given a “2”, and species not common enough in mixed grass prairie to be useful given a “3”.

Results

The list of species produced by the comparison of the AB wetland and the ABMI lists consisted of 197 species (Appendix A). After review, 33 species were determined to be too common in uplands to be useful and 142 species were considered not common enough in the subject area to be used as indicator species. The remaining species produced a list of 23 species which were felt had the potential for being used as indicators of moist ecosystems (See Appendix B).

Discussion

After the potential list was produced, the species were reviewed as a group to determine whether presence of any one of these species on a site would be a reasonable indicator of moist ecosystems (either high water table or groundwater discharge). From the experience of the Salix and Terrestrial staff, it was considered that the list would likely identify most of the wetland ecosystems within the subject area. However, some “moist” sites not meeting the definition of a “wetland” may not be identified, and the presence of any one of the species was considered to be so prevalent within upland systems, that the number of false positives (upland areas identified as moist areas) was considered to be too high to make the list a useful tool. Consideration was given to attempting to produce a list of plant associations that would be more indicative of wetlands. However, it was considered that the variability in wetland systems in the area made plant associations too unlikely to accurately identify most of the wetlands without resulting in the same high levels of false positives.

² Alberta Biodiversity Monitoring Institute (ABMI) <http://www.abmi.ca/home.html>

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