

Typology and Stewardship of Groundwater Dependent Ecosystems in the Lower Athabasca Region of Alberta, Canada



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ABSTRACT

The protection of groundwater is often viewed from the perspective of protecting human uses, for instance maintaining groundwater quantity and quality for drinking water supplies. Increasingly, groundwater management is evolving to ensure that ecological water requirements are also protected. Under this paradigm, groundwater dependent ecosystems (GWDEs) - natural areas where the ecosystem is wholly or partially dependent on access to groundwater, also represent groundwater users. While the incorporation of GWDEs in groundwater management has been most prevalent in arid climates (e.g. Australia), the role of groundwater in sustaining phreatophytes, springs, fens, rivers, and lakes highlights the importance of considering ecological water requirements in other areas. In the Lower Athabasca Region of northeastern Alberta, Canada, fens represent a prominent landscape feature. Protection of these fens and other GWDE elements is critical for maintaining the ecological integrity of the region. Fens also provide habitat for plant and animal species associated with traditional use, and are highly valued by local First Nations and Métis peoples.

Due to the juxtaposition of local with more extensive (sub)regional groundwater flow systems in the Lower Athabasca Region, the nature of groundwater associated with each GWDE varies. Interest was focused on GWDEs associated with (sub)regional groundwater flow systems, given that their larger footprint increases the potential for effects by multiple anthropogenic stressors (i.e. cumulative effects). A case study was initiated to identify GWDEs, and define a typology describing the nature of the groundwater flow system associated with each. Management approaches (e.g. indicators and thresholds) for the stewardship of these GWDEs were also evaluated.