

Principles of aquifer management as contextualized and highlighted by a municipal-supply case study



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ABSTRACT

Sound development of groundwater resources requires implementation of a sequential process whereby three major phases are entered and executed. Ideally, expertly guided exploration is conducted to seek and find a suitable aquifer (Phase A). Next, evaluation of a now-identified candidate resource will culminate in establishing the aquifer's yield prospects and sustainability via fuller characterization (Phase B). Lastly, the resource will be exploited within a Phase B-informed management plan that embraces societal needs and preferences, while preserving reliant ecosystem components (Phase C).

Most obviously, an exploration phase will occur in either a random or an organized fashion as dictated by an initial demand associated with, for example, a fledgling community. As decades of municipal growth unfold, further exploration phases are implemented, but potentially with diminishing returns if proximal deployment of new water wells is overly repeated. At some point in such a scenario, likely promoted by shortfall-triggered restrictions, a need for evaluation of the aquifer in terms of its more exact capacity becomes evident (i.e. a need for Phase B). In turn, a need for an actual management plan becomes more compelling.

Thus, a community may be struggling to meet its groundwater supply requirements, while yet to introduce Phase B. Community leaders may also recognize the need for a management plan, but again there may be little Phase B characterization material with which to enable sufficiently informed decision-making.

In this presentation, principles of aquifer management are highlighted by comparison with the progress made by the Town of Edson, Alberta, in implementing its aquifer management plan.