MAPPING OF REGIONAL GROUNDWATER RESOURCES IN SASKATCHEWAN: ITS HISTORY AND FUTURE

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ABSTRACT
Water is a scarce commodity in southern Saskatchewan because of its semi-arid climate and limited surface water resources. As a result, groundwater plays an important role in the social- economic development of the Province and historically the delineation and characterization of its groundwater resources historically has been an important issue. With the exception of the Cypress Hills and Wood Mountain regions, southern Saskatchewan has been glaciated at least 6 times resulting and is covered by up to 300 m of drift (tills separated by glaciofluvial and glaciolacustrine sediments). The Quaternary deposits overly Tertiary and Late Cretaceous (bedrock) sediments. Potable water supplies are found in both bedrock and Quaternary sediments. From the onset of groundwater resource mapping it was realized that mapping of the Quaternary hydrostratigraphic units needed to be based on lithostratigraphy rather than lithology. However, when the mapping started in the early 1960s the Quaternary stratigraphy was not yet established. Consequently, the first generation of groundwater resource maps (mid 1960s to mid 1980s) defined bedrock aquifers and major buried valley aquifer systems but did not identify aquifers within the drift. The Quaternary stratigraphic framework was established in the late 1960s as a result of the testhole drilling which was done as part of the mapping program and continues to be refined. The stratigraphy is based on identification of till units. These units are separated using texture, carbonate content, presence of oxidation zones, single-point resistance characteristics on electric logs. Based on the Quaternary stratigraphic framework, a second generation of regional groundwater resources maps was prepared using the “layer-cake” approach. Both the bedrock and Quaternary hydrostratigraphical units are identified on these maps. Sustainable development, management and protection of groundwater resources can not be done without considering surface water resources and a large number of other factors which may have an impact on the sustainability of groundwater resources. Consequently, geographic information systems (GIS) will become an integral part in integrated water resource management.

RÉSUMÉ
Cartographie des ressources régionales d’eau souterraine en Saskatchewan: historique et futur.