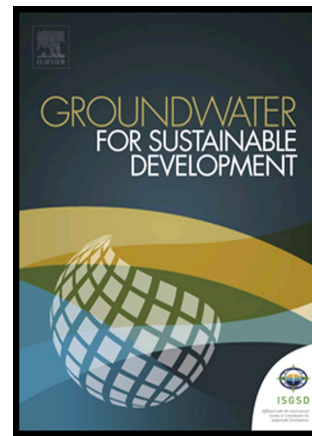


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## Analyzing the Flow of Energies Within the Well Capture Zones Under Steady State Conditions

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### Abstract

Capture zone delineation has been in practice for decades as a part of groundwater management and wellhead protection schemes. The energy possessed by a groundwater particle gets continuously dissipated as it traverses along its path and, is the work done by it. The study of energies within any domain probes into the innate nature of the system and its interaction with the surroundings. Hence energy computations in and around the realms of extraction wells can be used to analyze capture zones from the energy concept. There has been very little research reported on the energy of groundwater flow and specifically that associated with the well capture zones. This work intends to model two-dimensional homogeneous isotropic confined aquifers using finite volume method, then delineate the capture zones and examine the energies within. Steady state aquifer conditions will cause all the work done at the boundaries converted into frictional dissipation. This frictional dissipation was found significant over regions of 95 percent capture surrounding the well within the capture zone.

### Keywords

Groundwater management; capture zone; wellhead protection; frictional dissipation

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