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## 4.0 Numeric Model

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SSM personnel constructed and calibrated a steady-state hydrogeologic computer model to assess the groundwater flow system in the study area. In addition to delineating the source water protection areas, the model can be used as a planning tool for water resource issues.

A hydrogeologic flow model numerically simulates groundwater flow using mathematical equations. The model takes a complicated natural system and simplifies it to its basic components. Although the model is constructed from real-world data (*e.g.*, ground surface elevation, stream location, and underlying geology), the model assumes ideal and uniform local conditions that rarely occur in real systems. Therefore, the hydrogeologic flow model provides an approximation (as opposed to a direct measurement) of the groundwater flow regime that can be used to understand the overall hydrogeologic system.

SSM delineated the source water protection areas from the results generated by the hydrogeologic flow model (presented in **Section 8**). The hydrogeologic model was created using US Department of Defense Groundwater Modeling System (GMS) Version 7.0. GMS is an industry-recognized groundwater flow software that couples a model design system and graphical analysis tools with MODFLOW (A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model), PEST (Model-Independent Parameter Estimation), and MODPATH (a particle tracking post-processing program) program codes (BYU, 2009). Detailed descriptions of the program codes are provided on the Data Package CD included with this report.