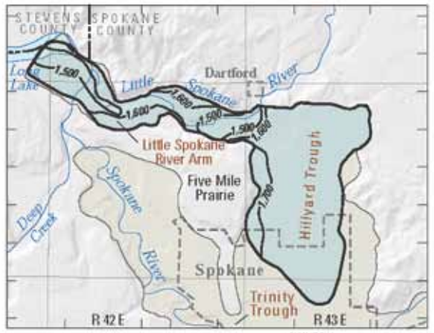


EXPLANATION

APPROXIMATE EXTENT OF FINE-GRAINED LAYER IN HILLYARD TROUGH AND LITTLE SPOKANE RIVER ARM

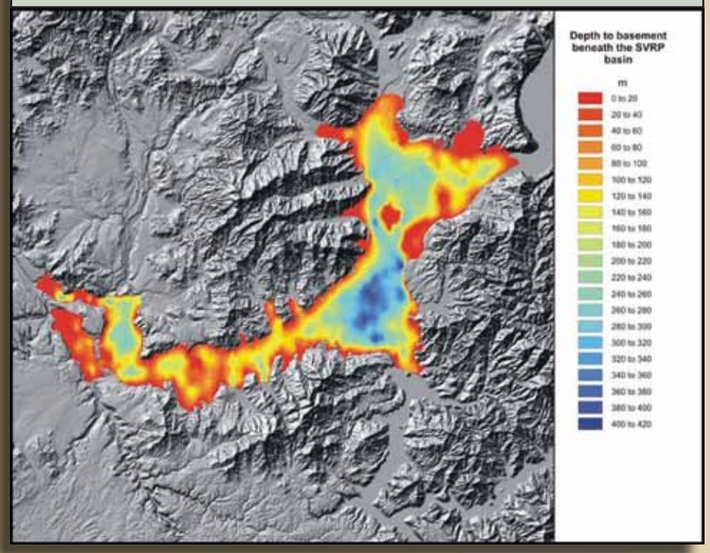
— 1,700 — CONTOUR SHOWING ALTITUDE OF TOP OF FINE-GRAINED LAYER WITHIN THE HILLYARD TROUGH AND LITTLE SPOKANE RIVER ARM—

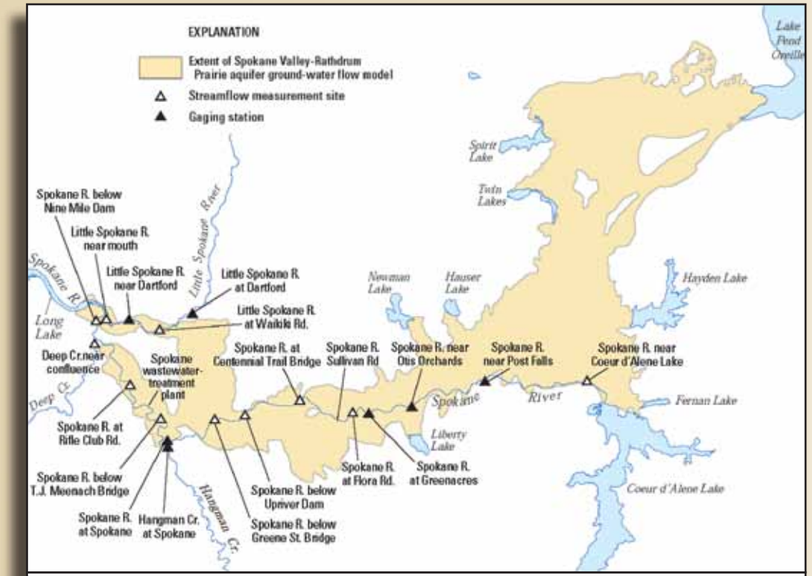
Hillyard Trough

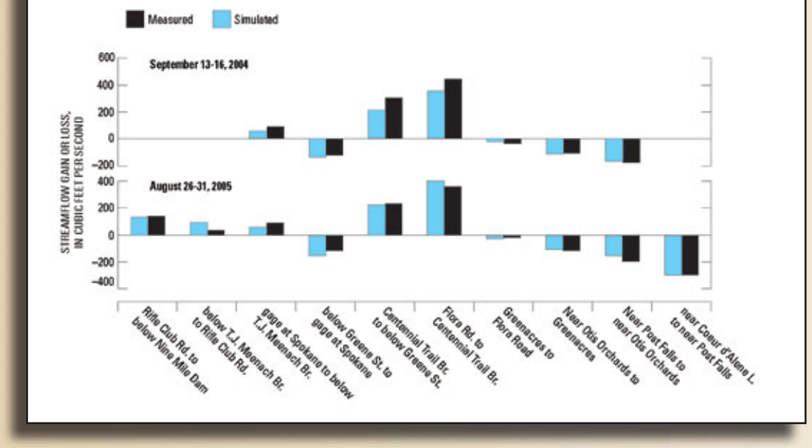
The USGS study confirmed an extensive impervious layer of fine-grained sediments (silts, clay) separates the Aquifer into two units in the Hillyard Trough: a confined aquifer below the fine-grained layer, and an unconfined, or water table aquifer, above it. This Hillyard Trough layer is 162 to 265 feet thick and averages 215 feet. The Little Spokane River arm averages only 130 feet thick. This is the only location where the Aquifer has a confined level. Except for this area, the entire Aquifer is unconfined without a protective impervious cap.

Depth to Bedrock

The map below indicates the depth from the surface to bedrock, the bottom of the Aquifer. The deepest portion is under the Rathdrum Prairie in Idaho.







Lake	2005 Estimates (million gallons per day)	2007 Model (million gallons per day)
Hayden	40	45
Pend Oreille	32	43
Spirit	31	36
Coeur d'Alene	24	89
Twin	23	26
Newman	13	21
Hauser	11	13
Fernan	8	10
Liberty	3	4

Area Lakes Discharge to the Aquifer

When comparing the 2005 estimated values for lake discharge to the Aquifer (page 13) with the 2007 model results, surprising differences can be found. While many values are similar, all the model values are larger, and two lakes, Newman and Coeur d'Alene, are much higher.

A Computer Model of the Aquifer

Two years of collecting comprehensive data about the Aquifer and the Spokane River produced not only thorough and comprehensive data about the Spokane River and the Aquifer, but also provided the data for hydrogeologists to construct a computer model of the Aquifer. This model can help us to better understand the complex interactive relationships of natural and human impacts upon the Aquifer. The computer model can be programmed to simulate "what if" situations, such as drought, heavy spring run-off, increased or reduced groundwater pumping, and the results of these simulations can help us understand how these events might impact water availability in the Spokane River and the Aquifer. The model is a tool to help us better understand and manage the region's water resources.

Calibrating the Groundwater Model

Model calibration is the adjustment of model parameters (such as groundwater flow and area lake contributions) so that the differences between the model values and the measured values in the real world are minimized. The model is calibrated to measured field values of water levels and river flows so that it accurately mimics the modeled period of study. Once the model is calibrated it can be used to evaluate water levels in the Aquifer and rivers in future "predictive scenarios."

The image at left presents a comparison between measured and simulated values for flow in the Spokane River at several locations for two dates. The differences between real world and model values are generally small.

The graphs below present a comparison between measured and simulated groundwater level values for two Aquifer wells. While most model values are close to the measured groundwater levels, they are not exact.

For more information on the Aquifer groundwater model, model calibration and other model results, please see USGS Scientific Investigations Reports 2007-5044.

The information on this page is adapted from USGS Scientific Investigations Reports 2007-5044 and 2007-5041.