AN ANALYSIS OF THE PROXIMITY OF GROUND-WATER WITHDRAWAL TO SELECTED REACHS OF THE SNAKE RIVER ABOVE KING HILL, IDAHO

by
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INTRODUCTION

An analysis was performed to evaluate the effects of proximity of ground-water withdrawal to the four hydraulically-connected reaches of the Snake River as defined by Eastern Snake Plain Aquifer (ESPA) ground water model (see Figure X). Using an analytical method developed by Jenkins (1968), values for stream depletion were computed for each of the reaches. Calibrated values of transmissivity (T) and specific yield (S) from previous detailed modeling studies (grid spacing <= 1 mile) were used as input. Based on this approach, graphs showing distances from each stream reach versus percent of stream depletion were developed.

All stream depletion computations are based on a well pumping at 1 cfs for 7 days continuously. The pumping rate that was selected is independent of the study results since percent of stream depletion was all that was sought. This length of time was chosen because it was thought to represent a typical sprinkler pivot pumping schedule.

COMPUTED STREAM DISTANCE VERSUS DEPLETION

St. Anthony to Lewisville Reach

Within this reach, a multiple aquifer system exists. It is composed of a shallow alluvial aquifer that is hydraulically connected to the Henry's Fork and Snake River in the area and a deeper regional basalt aquifer that is contiguous with the main ESPA. Wytes (1980) developed a model of the shallow aquifer in the area (see Figure X). Based on calibrated results of his model, the T and S values for the hydraulically connected grid nodes are shown below.

Parameter	Minimum	Maximum	Average	Standard Deviation
T (ft^2/day)	10,000	600,000	110,000	120,000
S	0.10	0.35	0.20	

Using the range in values for T and the average value for S, distances from the Henry's Fork / Snake River were computed for various values of stream depletion and are shown on the graph in Figure X..

Blackfoot to Neeley Reach

Within this reach, a multiple aquifer system exists. It is composed of a shallow alluvial aquifer that is hydraulically connected to the Snake River in the area and a deeper regional basalt aquifer that is contiguous with the main ESPA. Spinazola (1999) developed a model of the aquifer system in the area. Based on calibrated results of layer 1 for the model, the T and S values for the hydraulically connected grid nodes are shown below.

Parameter	Minimum	Maximum	Mean	Standard Deviation
T (ft^2/day)	50,000	200,000	100,000	50,000
S	0.15	0.20	0.20	

Using the range in values for T and the average value for S, distances from American Falls Reservoir / Snake River were computed for various values of stream depletion and are shown on the graph in Figure X..

Neeley to Minidoka Reach

Within this reach, a multiple aquifer system exists. It is composed of a shallow alluvial aquifer that is hydraulically connected to the Snake River in the area and a deeper regional basalt aquifer that is contiguous with the main ESPA. Spinazola (1999) developed a model of the aquifer system in the area. Based on calibrated results of layer 1 for the model, the T and S values for the hydraulically connected grid nodes are shown below.

Parameter	Minimum	Maximum	Mean	Standard Deviation
T (ft^2/day)	n/a	n/a	50,000	n/a
S	n/a	n/a	0.20	

Using average values for T and S, distances from Lake Walcott / Snake River were computed for various values of stream depletion and are shown on the graph in Figure X.

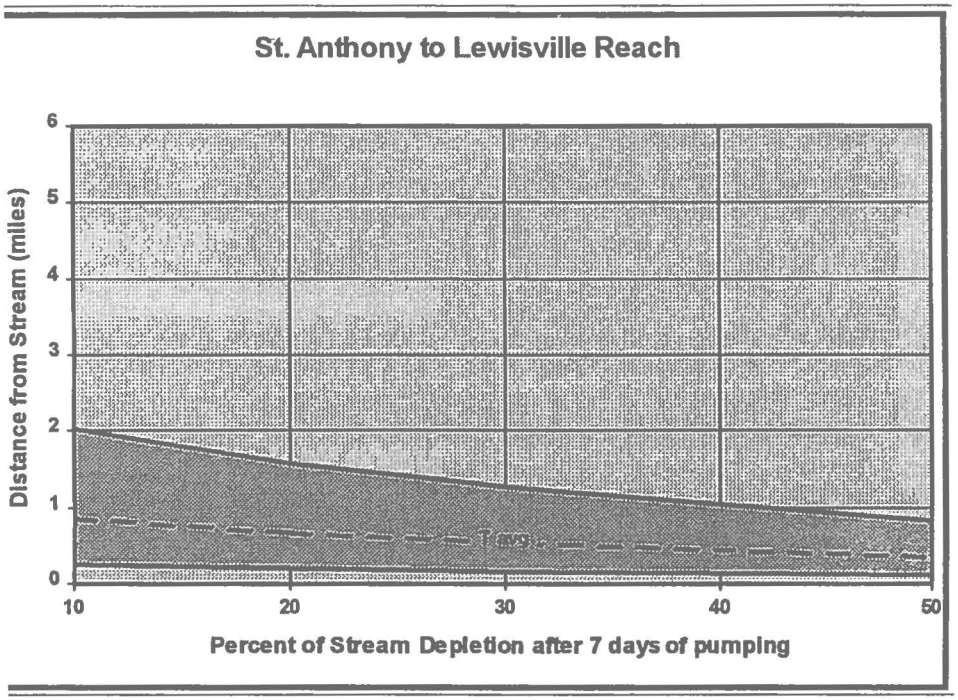
Kimberly to King Hill Reach

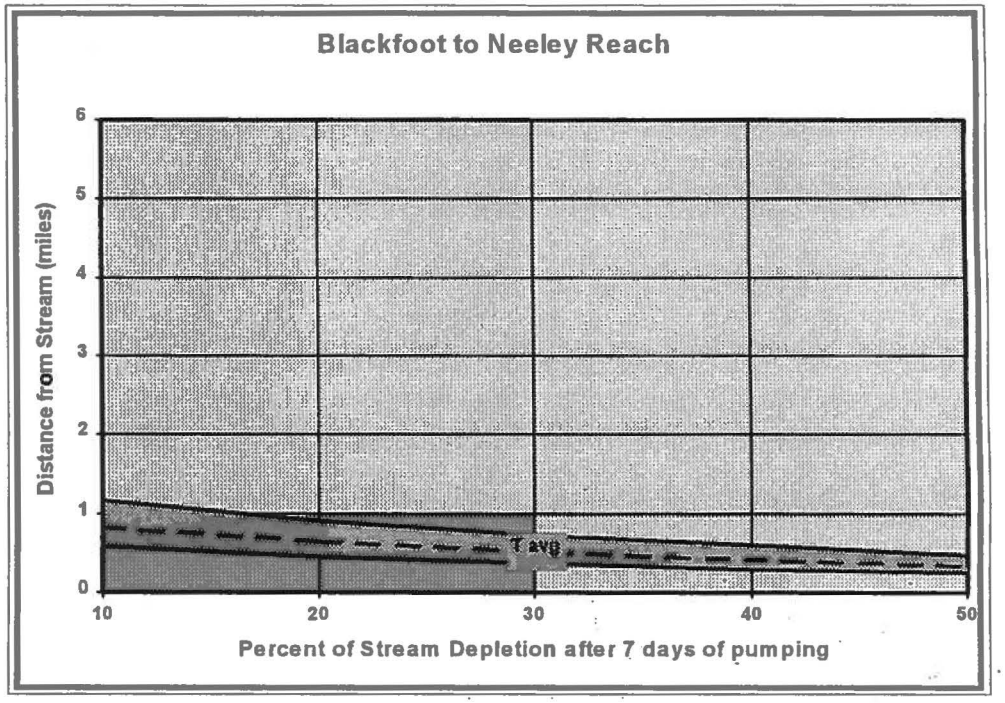
Within this reach, a multiple aquifer system exists. It is composed of a shallow alluvial aquifer that is hydraulically connected to the Snake River in the area and a deeper regional basalt aquifer that is contiguous with the main ESPA. Moreland (1976) developed a model of the aquifer system in the area. Based on calibrated results of the model, the T and S values for the hydraulically connected grid nodes are shown below.

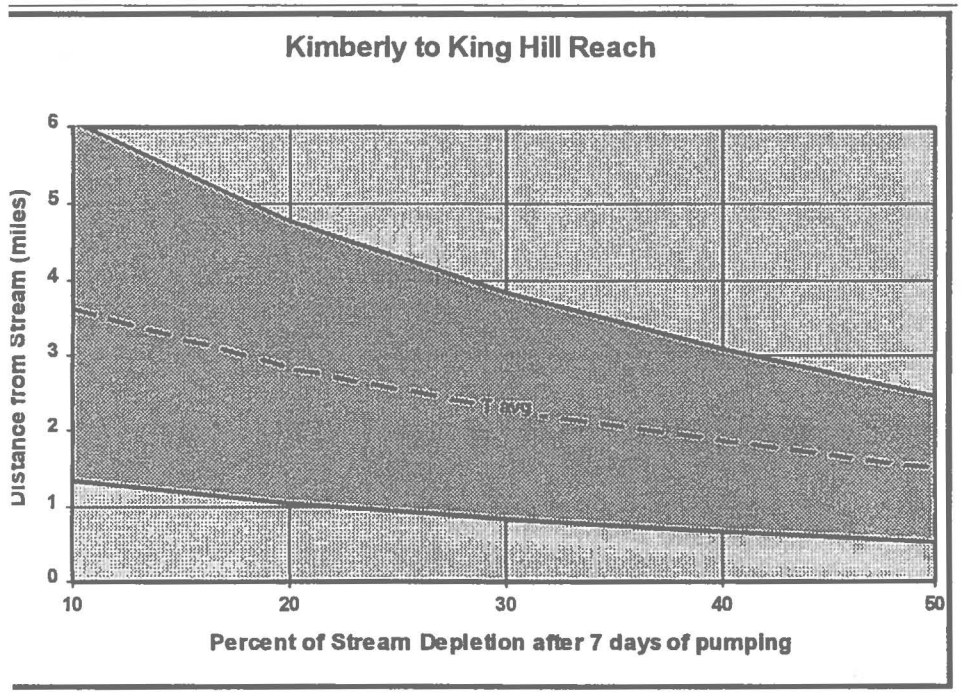
Parameter	Minimum	Maximum	Mean	Standard Deviation
T (ft^2/day)	100,000	2,700,000	970,000	750,000
S	0.07	.15	.10	

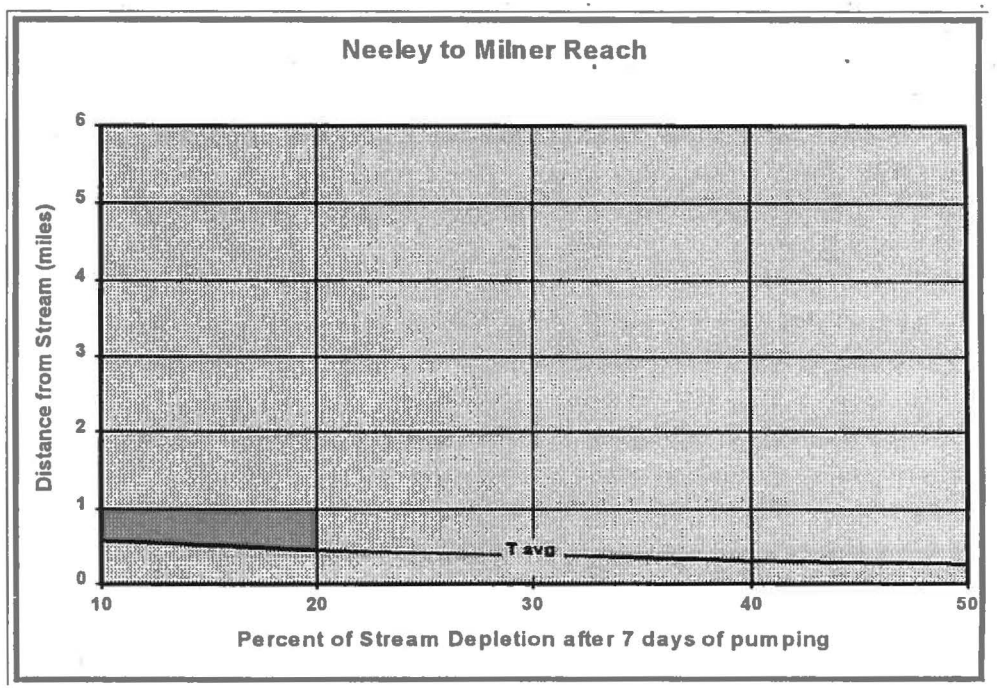
Using the range in values for T and the average value for S, distances from the Snake River were computed for various values of stream depletion and are shown on the graph in Figure X.

DISTANCE VS. DEPLETION FOR SELECTED STREAM REACHES









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