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## MEMORANDUM

TO: Groundwater Advisory Committee  
DATE: July 30, 2007  
SUBJECT: Springs definition

FROM: Bob Nauta  
PROJECT No.:

In preparation for the July 26 conference call of the springs subcommittee, George Meyer and Jake Macholl completed some analysis of the database that they have established. This memorandum summarizes their work. The issues addressed were:

- Realistically, how many springs would be included under various thresholds, after factoring out springs falling under other protections; and
- Where are they located.

Table 1 summarizes the springs with recorded flow data. In the second column, the cumulative number of springs are summarized for various flow rates in 0.25 cubic-foot-per-second (“cfs”) increments. This total is then adjusted by factoring out springs that are already protected, due to being associated with existing GPAs (trout streams, Outstanding and Exceptional Resource Waters (“O/ERWs”). As the table indicates, reducing the flow threshold for the definition of a spring to 0.25 cfs would result in 714 springs. Of the 8,088 springs tabulated, 714 represents approximately 8.8 percent of the total. The further reduction, based on spring location, would result in approximately 266 springs (based on springs with recorded flow rates).

Table 2 addresses springs that have been mapped, but have no recorded flow rates. These springs are all located in the northeastern portion of the state. In this area, several conditions will likely result in springs already being protected, including:

- GPAs
- O/ERWs
- Native American lands
- Presence of aquitard

The final category was added due to the presence of the Maquoketa shale, with the assumption that most high capacity wells would be constructed in the deeper sandstone aquifer, and would therefore not impact springs.

Once these categories are factored out of the springs with no flow data (total of 1,648), the resulting number of springs is 434. Applying the 8.8 percent ratio from above results in approximately 38 springs in addition to the 266 summarized above.

**TABLE 1  
SUMMARY OF SPRINGS AT 0.25 CFS INCREMENTS  
SPRINGS WITH FLOW DATA<sup>1</sup>**

<b>FLOW RATE</b>	<b>NUMBER OF SPRINGS</b>	<b>TOTAL</b>	<b>SPRINGS ALREADY PROTECTED<sup>2</sup></b>	<b>REVISED TOTAL</b>
1 cfs and greater	235	235	154	81
0.75 to 0.99 cfs	42	277	27	96
0.5 to 0.74 cfs	114	391	79	131
0.25 to 0.49 cfs	323	714	188	266
0 to 0.24 cfs	7374	8088	1854	5786

<sup>1</sup> Does not include springs with a recorded flow rate of "none" and "dry" in historic surveys.

<sup>2</sup> Springs already protected include springs associated with trout streams, Outstanding Resource Waters and Exceptional Resource Waters.

**TABLE 2  
SUMMARY OF SPRINGS WITH NO FLOW DATA**

<b>CATEGORY</b>	<b>NUMBER OF SPRINGS</b>	<b>TOTAL</b>
Total springs with no flow data		1648
Deduct springs already protected (i.e., associated with trout streams or O/ERWs)	775	873
Deduct springs on Native American lands	41	832
Deduct springs within aquitard areas	182	650
Deduct springs on public lands	216	434