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HYDROGEOLOGICAL PROPOSAL FOR THE DELINEATION OF A GROUNDWATER PROTECTION AREA FOR THE TABAQAT FAHL (PELLA) SPRING

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Authors:	HOBLER, M. MARGANE, A. OURAN, S. ZUHDI, Z.
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Summary

In order to safeguard the quality of the groundwater resources of Jordan in the future, the establishment of groundwater protection zones for wells and springs is very important. In the framework of a technical cooperation project, a groundwater protection area for the Tabaqat Fahl spring in north-western Jordan has been delineated. For this delineation process a method used in Karst areas in Germany has been applied. The delineated groundwater protection Zone III comprises the whole groundwater catchment area and has a size of 34.7 km2.

Zone II, the area in which water will flow to the spring in less than 50 days, is assumed to comprise all areas where infiltration is facilitated by karst features, fractures and faults, and where the velocity of groundwater flow is high. This area has a size of 6.7 km2.

Zone I serves the protection of the spring from any direct contamination and other risks affecting the quality of the groundwater. Since the Tabaqat Fahl spring is also a prominent tourist spot and famous archaeological site the delineation of Zone I is difficult, because it might not be possible to enforce all restrictions normally required in Zone I (prohibition of any type of traffic). Therefore, Zone I should comprise the area which is already fenced and a direct contamination of the spring water will have to be guaranteed by other means. The water of the Tabaqat Fahl spring is already contaminated by coliform bacteria. The watering of livestock at the spring site is seen as the main reason for this pollution. This has to be banned immediately. Since this activity has a longtime tradition in the area, further actions will be necessary to improve the water quality, such as: exchange of gravels at the immediate spring site or drilling of water wells in the upstream area of the spring. Apart from this direct contamination, groundwater resources in the long run are at risk to be polluted by leachates from a landfill located only 2.7 km upstream of the spring. To reduce this risk of contamination for the Tabaqat Fahl spring, the waste has either to be removed or it has to be guaranteed by other means that leachates can not reach the groundwater.

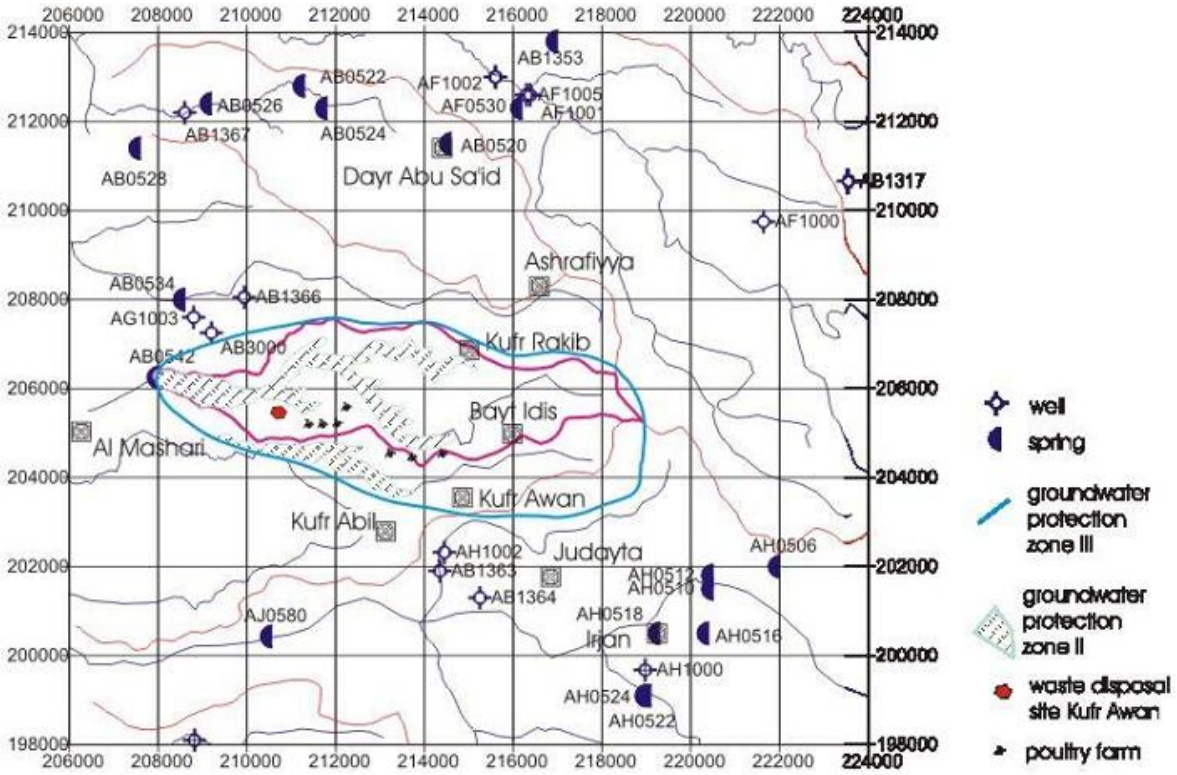

Figure 12 : Proposed Groundwater Protection Zones