

Special Report No. 3

Mapping of Groundwater Vulnerability and Hazards to Groundwater in the Irbid Area

by the BGR - WAJ Technical Cooperation Project
Advisory Services to the Water Authority of Jordan

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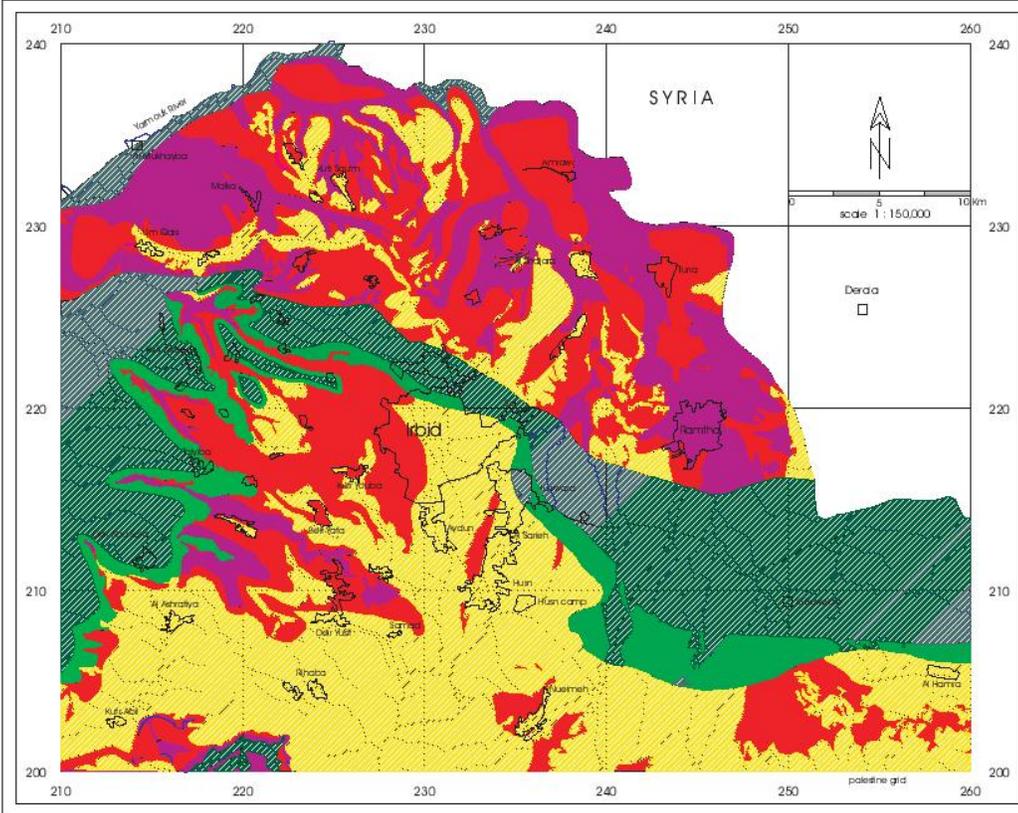
Summary

Rapid urban development, expansion of agriculture and industrialisation increase the risk of groundwater contamination, especially in the main development areas of Jordan. The country however, can ill afford a situation where precious water resources are lost because of pollution. Once the groundwater is polluted it is difficult and costly, if not impossible, to reverse the situation. In general, it is more economic to take preventive measures to reduce the risk of groundwater contamination and to protect the groundwater from pollution. Within the framework of an assessment of the groundwater resources of northern Jordan, it became obvious to the project team that land use planning is often done without taking aspects of groundwater protection sufficiently into account. This clearly showed the need for maps and other documents which inform planners and decision makers about the risks of contaminating the groundwater resources.

For the Irbid area, from the Yarmouk river in the north to the area north of Ajlun and Jerash (Figure 1), a map of the groundwater vulnerability has been prepared at a scale of 1 : 100 000. It shows the areas where the natural protection of the groundwater by the

overlying soil and rock cover is low and the risk of polluting the groundwater, in consequence, is high. Waste disposal sites and uncontrolled handling of contaminating substances should be avoided by any means in areas of high groundwater vulnerability. Since the areas where the groundwater is less sensitive to pollution, are also delineated on the map, it can be used as a tool for the development of strategies for land use planning. Areas of low to very low vulnerability can be seen as potential sites for the identification of suitable locations for activities with high pollution risks. Due to uncertainties in the assessment process the map can not replace detailed geotechnical and hydrogeological studies of a particular site before licensing of any high impact activities. In addition, an inventory of potential hazards to groundwater has been prepared and the results have been presented in a map. Some of the existing dumping sites, effluent treatment plants, factories, and fuel depots, are situated in high risk areas. In these cases special precautions should be taken to protect the groundwater from contamination. Groundwater pollution has been observed in many parts of the area under investigation.

The Water Authority of Jordan participates in land use planning in cooperation with the municipalities and other Jordanian institutions. Since efforts to actively protect the groundwater resources are still insufficient, it was one of the goals of the Jordanian - German cooperation project to support these activities. With the exemplary mapping of the groundwater vulnerability in the Irbid area, these mapping techniques have been introduced to the specialists of the staff of the Water Studies Directorate of WAJ. As environmental problems are increasing, the urgency to take active measures for the protection of the groundwater and to improve the legislation in this field (e.g. establishment of legally binding protection zones) will grow.



Map 1 :
Groundwater Vulnerability

Legend:
Groundwater Vulnerability to Contamination
According to the Protective Effectiveness of
the Overlying Strata and the Thickness of
the Unstructured Zone:

	Vulnerability to Contamination	Protective Effectiveness
	extremely high	very low
	high	low
	medium	moderate
	low	high
	very low	very high

Due to uncertainties in the assessment process this is
a preliminary or general classification. It does not
replace detailed assessments of the risk of groundwater
contamination for particular purposes.

- wadi
- town, village
- roads