

Groundwater contamination potential - vulnerability assessment

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Águeda watershed is a sub-catchment of the Douro river (northern Portugal) and it is distributed on both Spanish and Portuguese territories. The main core of this work is the achievement of a methodological tool able to be used for vulnerability assessment in transboundary watersheds. Groundwaters' vulnerability mapping was carried out by two different methodological approaches: DRASTIC and DRASTIC Pesticide [1].

DRASTIC is a numerical index derived from ratings and weights assigned to seven parameters – Deep to water, net Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone and hydraulic Conductivity. The obtained values range between 23 (not vulnerable) to 230 (highly vulnerable). Drastic Pesticide uses the same parameters with the reassignment of attributes' weights to stress the importance of agricultural activities.

DRASTIC's map for Águeda watershed shows three spatially distributed vulnerability classes: low (102 - 119), moderate (120 - 139) and moderate to high (140 - 154). The low vulnerable zones occupy almost 78% of the all area while the moderate vulnerable zones correspond to 21% of the remaining area. The moderate to high vulnerable zones represents less than 1% of the total area and it is localized in the central part of the Águeda watershed overlapping the tertiary sedimentary aquifer and the mostly populated area. DRASTIC Pesticide map shows four spatially distributed vulnerability classes: low (120 - 139), low to moderate (140 - 159), moderate to high (160 - 179) and high (180 - 195). The high proportion increases considerably in the central zone of the Águeda watershed representing more than 20% of the land parceling.

Although similar hydrogeological intrinsic characteristics are observed in the central watershed's area obvious differences can be stressed when anthropogenic activities are taken into consideration. Feasibility studies and the development of specific monitoring activities must be addressed in future work.

[1] Aller L, Bennet T, Lehr JH, Petty RJ, Hackett G. 1987.

DRASTIC: a standardized system for evaluating ground water pollution potential using hydrogeologic settings. EPA/600/2-87/035, U.S. Environmental Protection Agency, Ada, Oklahoma, 641 pp.