



INTERPRETATION OF NITRATE GROUNDWATER POLLUTION HAZARD INDEX NUMBER

**A supporting document for the
UC Center for Water Resources (<http://www.waterresources.ucr.edu>)
Nitrate Groundwater Pollution Hazard Index**

The hazard index number can range from 1 through 80 with the hazard increasing with increasing hazard index number. The first and second laws of groundwater vulnerability (National Research Council, 1993) are important to consider in application of the hazard index. The first law states “all groundwater is vulnerable” which recognizes that some groundwater degradation can occur even with a hazard index of 1. The second law states “uncertainty is inherent in all vulnerability assessments.” Therefore, the following suggestions on interpreting the hazard index number are not absolute and are intended as general guidelines. We invoke the wisdom of Aristotle who stated “It is the mark of an instructed mind to rest satisfied with the degree of precision which the nature of the subject permits, and not to seek an exactness where only an approximation of the truth is possible.”

We propose that a hazard index of 1 through 20 is of minor concern. The farmer must still implement sound management practices but extraordinary procedures are not required. An index number greater than 20 should receive careful attention. The first step is to determine whether the soil, crop, irrigation system, or a combination of them contributed to the larger index number. This evaluation will help the farmer focus on the segment of his management system that requires the greatest attention.

The factors listed in the matrix should be considered in addition to the hazard index number for a crop. For example, if a shallow root system was a factor in raising the hazard index for a given crop, careful attention should be given to irrigation to minimize the water that would percolate below the root zone. If a crop hazard index was high because of a high residual mineral and/or organic N after crop harvest, the use of a cover crop to capture the N and prevent leaching would be advisable.

Assume that the high hazard index number was caused by both a high soil and irrigation system hazard index, careful attention must be given to the irrigation management. If irrigation is by furrows, decreasing the length of the furrow, increasing the flow rate as high as possible without stimulating erosion and decreasing the duration of irrigation to decrease the total amount of infiltration.



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The main message is that the hazard index number per se is of little value unless it is less than 20, which is an indicator that no special management is necessary. If the number is greater than 20, comparing a number of 40 to 60 is not useful. Identifying the factors that lead to the number is important because they identify the management factors, for that specific field, that would reduce the potential for N leaching. Management guidelines for specific hazard factors are presented in other parts of this report.

References:

National Research Council. 1993. Ground water vulnerability assessment – Predicting relative contamination potential under conditions of uncertainty. National Academy Press, Washington, DC.



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