



Measuring Groundwater Contamination in Agricultural & Urban Area Using GIS



Introduction

- Groundwater pollution of aquifer has generated interest both in the political and legal domains as well as in the scientific world.
- Geographical Information System acts as an excellent tool to unify data from various source and integrate them into a single environment to analyze the relationship amongst them.



Problem Statement

- Groundwater may not be seen as a renewable source if it is polluted.
- large amounts of nitrogenous fertilizers and pesticide and poor utilization efficiency may lead to nitrate leaching, and hence, pollution of groundwater (Tang et al, 2004).



Objective

- To gather information and find out how GIS was applied in these studies.
- To assess nutrient and pesticide leaching at the farm scale level and extrapolate the results using GIS techniques.
- To identify high chemical risk area and to assess the relative impact to a specific groundwater resources.
- To allow the creation of basic documents for planning, management and protection of water resources at a territorial level.



Methodology

- The methodology of the term paper will be as follow:
- Title searching.
- Paper collection.
- Literature Review.
- Discussion & Criticize the term paper.
- Conclusion & Recommendation.



Study limitation

- The greatest difficulty comes from the number and complexity of the environmental factors involved.
- Some result from the GIS should be considered relative, rather than absolute.
- The heterogeneous of study area make the assessment difficult.

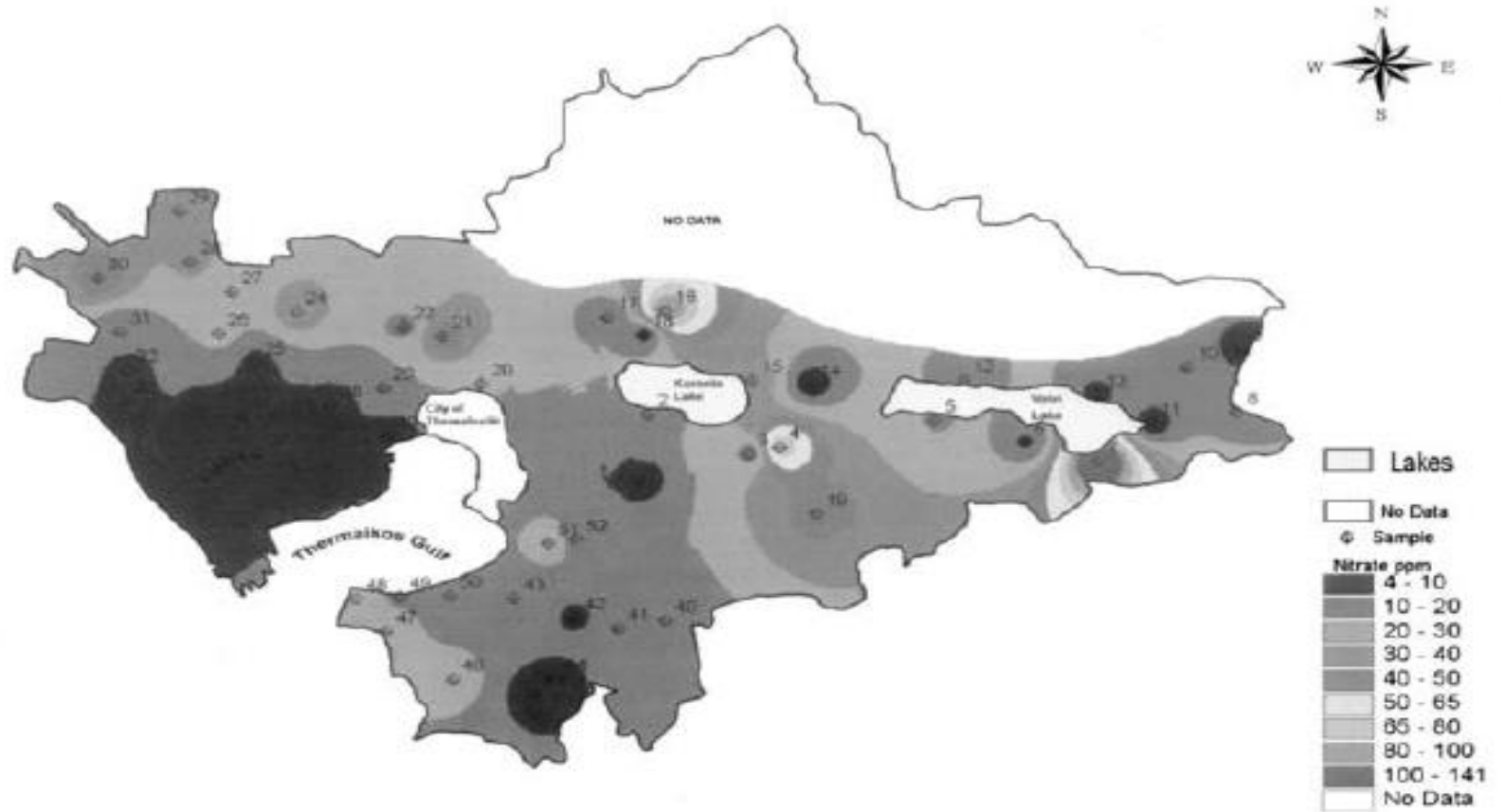


Figure 1. Thessaloniki Prefecture – Nitrate concentration in drinking water (ppm).

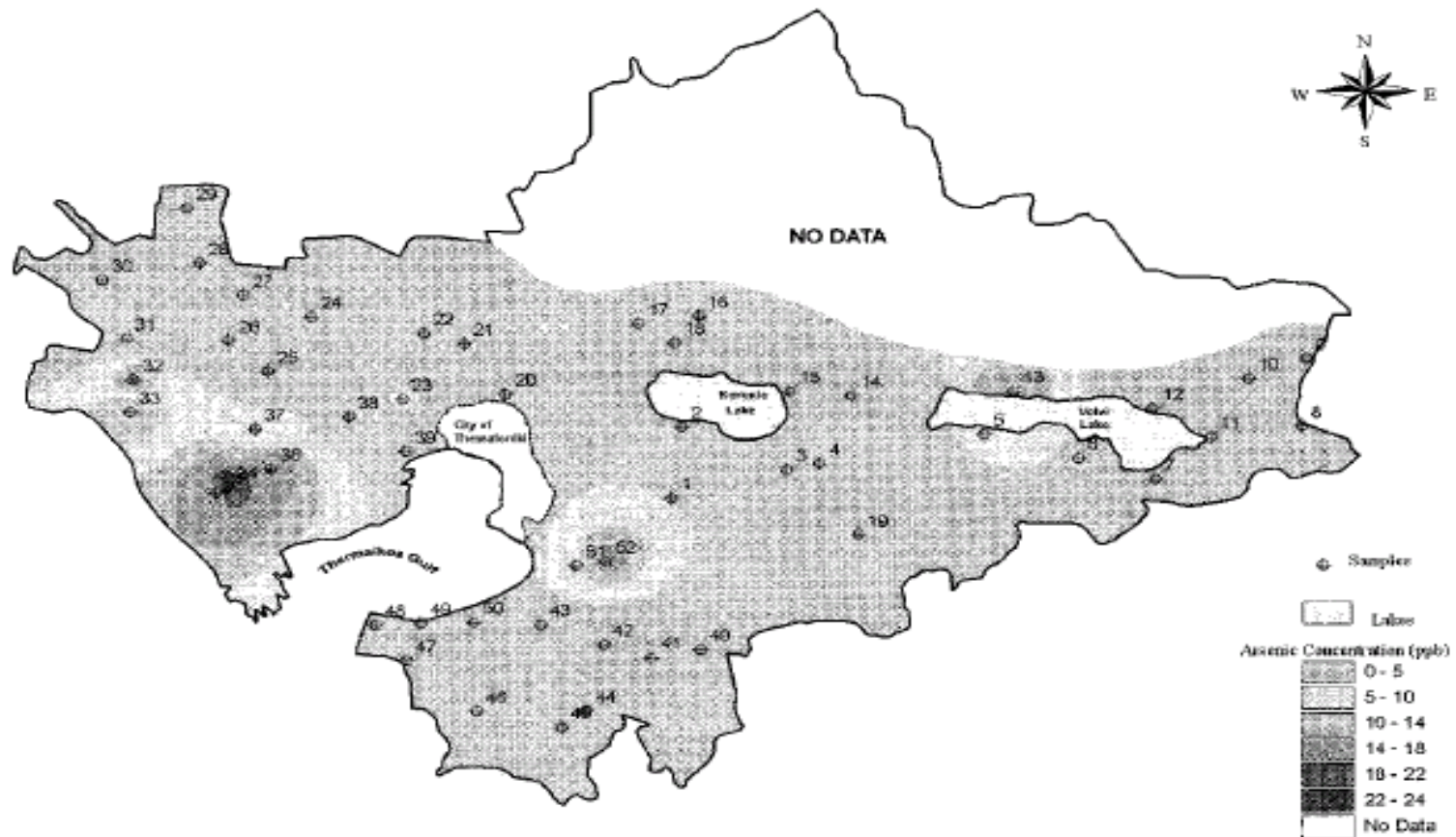


Figure 2. Thessaloniki Prefecture – Arsenic concentration in drinking water (ppm).

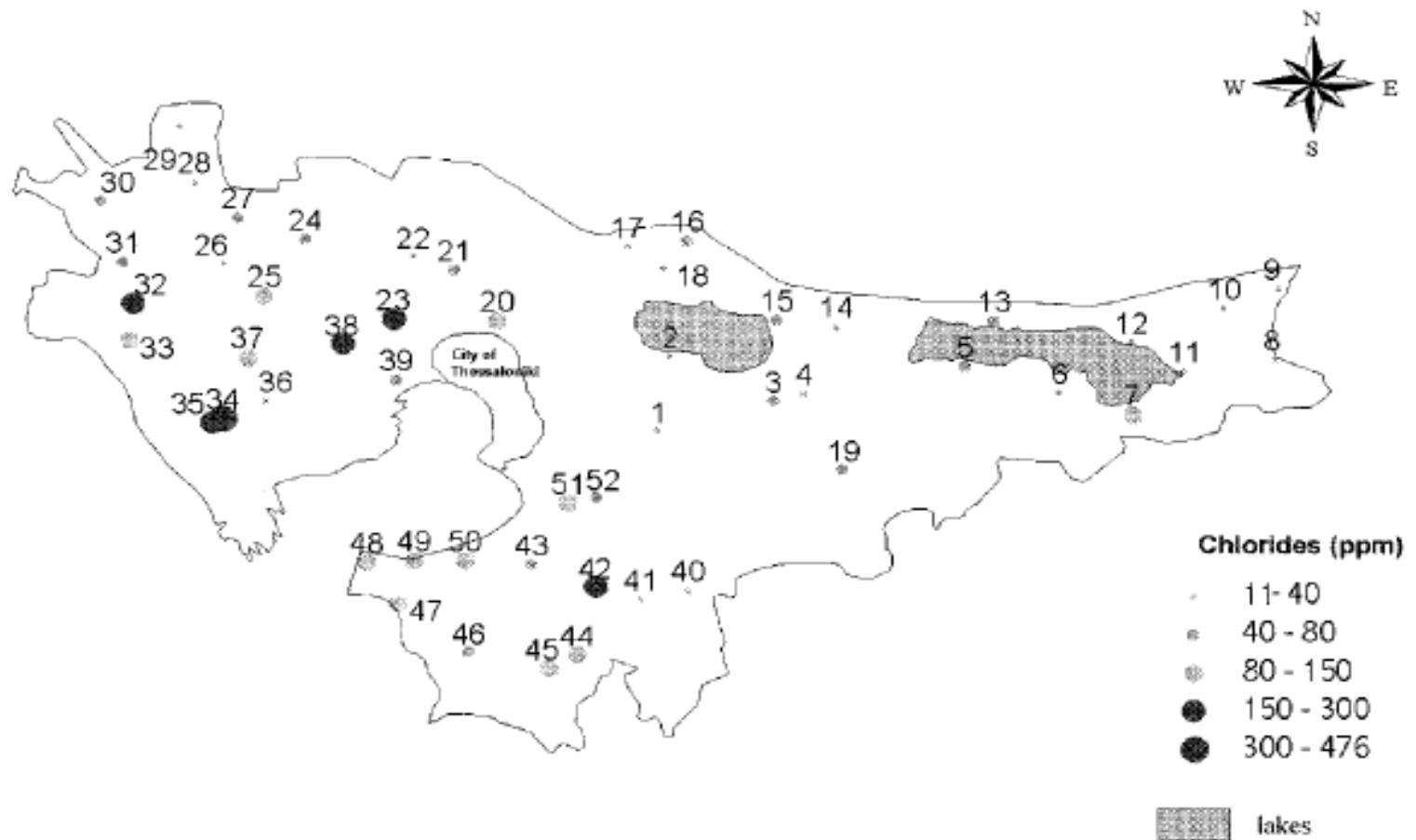


Figure 3. Thessaloniki Prefecture – Chloride concentration in drinking water (ppm).



Analysis / Discussion

- Creating groundwater contamination vulnerability maps.
- decision makers evaluate current land use practices and make recommendations for changes in land use regulations which would better prevent the groundwater from contamination.
- GIS modeling of groundwater contamination has many advantages but it also has a number of drawbacks.
- Errors inherent in GIS are numerous and include errors in source map, digitization, rasterization, and overlay procedures.



Conclusion & Recommendation

- Future improvements to PIRI-GIS are likely to include an atmospheric drift component, to enable assessment of impact due to spray applications.
- The identification of potential high risk farms by ranking soils and agricultural practices.
- Maps fail to indicate extremely accurate results for the areas between the chosen sampling sites.