

## **A GIS semiautomatic tool for classifying and mapping wetland soils**

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Wetlands are one of the most productive and biodiverse ecosystems in the world. Water is the main resource and controls the relationships between agents and factors that determine the quality of the wetland. However, vegetation, wildlife and soils are also essential factors to understand these environments. It is possible that soils have been the least studied resource due to their sampling problems. This feature has caused that sometimes wetland soils have been classified broadly. The traditional methodology states that homogeneous soil units should be based on the five soil forming-factors. The problem can appear when the variation of one soil-forming factor is too small to differentiate a change in soil units, or in case that there is another factor, which is not taken into account (e.g. fluctuating water table). This is the case of Albufera of Valencia, a coastal wetland located in the middle east of the Iberian Peninsula (Spain). The saline water table fluctuates throughout the year and it generates differences in soils. To solve this problem, the objectives of this study were to establish a reliable methodology to avoid that problems, and develop a GIS tool that would allow us to define homogeneous soil units in wetlands. This step is essential for the soil scientist, who has to decide the number of soil profiles in a study.

The research was conducted with data from 133 soil pits of a previous study in the wetland. In that study, soil parameters of 401 samples (organic carbon, salinity, carbonates, n-value, etc.) were analysed. In a first stage, GIS layers were generated according to depth. The method employed was Bayesian Maxim Entropy. Subsequently, it was designed a program in GIS environment that was based on the decision tree algorithms. The goal of this tool was to create a single layer, for each soil variable, according to the different diagnostic criteria of Soil Taxonomy (properties, horizons and diagnostic epipedons). At the end, the program generated a set of layers with the geographical information, which corresponded with each diagnostic criteria. Finally, the superposition of layers generated the different homogeneous soil units where the soil scientist should locate the soil profiles. Historically, the Albufera of Valencia has been classified as a soil homogeneous unit, but it was demonstrated that there were six homogeneous units after the methodology and the GIS tool application. In that regard, the outcome reveals that it had been necessary to open only six profiles, against the 19 profiles opened when the real study was carried out. As a conclusion, the methodology and the SIG tool demonstrated that could be employed in areas where the soil forming-factors cannot be distinguished. The application of rapid measurement methods and this methodology could economise the definition process of homogeneous units.