

Determining the Wetland-Dryland Boundary of Depressions Using Littoral Gradient Analysis of Soil Edaphic Factors

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ABSTRACT

Depressional wetlands are highly vulnerable to changes in land surface temperature and rainfall but little is known about their responses to future climate change. This study assessed the variation in edaphic factors between wetlands and along their littoral gradients to detect the boundary between the endorheic wetlands and upland zones. A sample of 202 paired measurements of three edaphic factors were collected (Soil Moisture Content – SMC-g/g, Bulk Density – BD-g/cm³ and Salinity as Electrical Conductivity – EC-dS/m) in 10 m plots along 14 belt transects in eight representative wetlands in the Mpumalanga Lake District, South Africa. In general, there were significant differences between the eight wetlands for SMC and BD but not for EC. SMC and BD generally showed negative trends along the littoral gradients. The trends occurred over short distances, ranging from 30 to 70 m, reflecting the extent of the wetlands. Understanding of the spatial variation of edaphic factors helps in the management and monitoring of depressional wetlands under a changing climate. In addition, the study showed that the current wetland buffer zone stipulated in local legislation was too narrow and recommended that this be extended to 100 m.