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**DELINEATION OF GROUNDWATER FLOW WITHIN A COASTAL WETLANDS  
SYSTEM USING HYDRAULIC, GEOCHEMICAL AND STABLE ISOTOPE DATA**

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**ABSTRACT:** Both geochemical and stable isotope data provide important supplemental information to more traditional hydraulic data and unravel the processes that underpin the large variations in chemical and stable isotopic composition within a coastal wetland system. The system studied was the Lake Warden wetlands, located in Esperance, in south coast of Western Australia. The spatial and temporal variations of chemical and isotopic composition of the individual water bodies within the system were measured for an annual cycle. In broad terms, the groundwater levels appear to follow the topography but the distinct higher chloride and isotopic concentrations observed within the wetlands were not reflected in the low lying coastal plain groundwater. The hydraulic analysis of the region surrounding the wetlands suggest that the wetlands are flow-through bodies, however the chemical and isotope information indicates the lakes almost invariably act as discharge points for the surface water flows and the north south groundwater flow. The northeast-southwest groundwater flow is along an observed paleochannel within the wetlands system and in this case the chemical and isotopic evidence are complimentary with the hydraulic study.