
Seasonal Hydrological Balance and Salt Accumulation in a Mediterranean Transitional Wetland: Implications for Habitat Management

Abraham Ofori*

DiSTABiF – Department of Environmental, Biological and Pharmaceutical Sciences and Technologies,
Campania University “Luigi Vanvitelli”, Via Vivaldi , Caserta, Italy

Luigi Alessandrino

DiSTABiF – Department of Environmental, Biological and Pharmaceutical Sciences and Technologies,
Campania University “Luigi Vanvitelli”, Via Vivaldi , Caserta, Italy

Alessio Usai

IGF – Istituto di Gestione della Fauna, Napoli, Italy

Nicolò Colombani

SIMAU – Department of Materials, Environmental Sciences and Urban Planning, Marche Polytechnic University,
Via Breccie Bianche, Ancona, Italy

Micòl Mastrocicco

DiSTABiF – Department of Environmental, Biological and Pharmaceutical Sciences and Technologies,
Campania University “Luigi Vanvitelli”, Via Vivaldi , Caserta, Italy

Abstract:

Transitional wetlands are globally distributed ecosystems of significant ecological and economic value, supporting complex food webs and providing key habitats for protected bird species. In Mediterranean regions, these environments face increasing pressure from climate change, making quantitative assessments of their hydrological and geochemical functioning essential for effective conservation management. This study investigates the hydrological and salt dynamics of “Le Soglitelle”, a transitional wetland in the Campania plain (southern Italy), comprising a series of man-made ponds fed by free-flowing artesian wells (ca. 35 m depth). The source water from the wells exhibits electrical conductivity ranging from 55 to 58 mS/cm, a mean temperature of 19 °C, and discharge ranging from 0.4 to 0.8 l/s. A seasonal hydrological balance was established by integrating field measurements with remote sensing data, allowing quantification of the main water fluxes, including precipitation, evapotranspiration, and surface outflow, across contrasting seasons. Hydrochemical data were used simultaneously to construct a salt mass balance, enabling estimation of annual salt accumulation within the wetland system. The combined hydrological and geochemical approach provides a quantitative framework for understanding salinity dynamics and their seasonal variability, offering actionable information to support the management of optimal salinity conditions for the wetland biota, particularly for protected birds that rely on this habitat during different phases of their life cycle.