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FISH AS ECOLOGICAL INDICATORS AND THE CHALLENGE OF CLIMATE CHANGE

Estuaries and lagoons exist at the interface between marine and freshwater realms and are naturally characterized by marked gradients and fluctuations in the environmental variables. As such, their fish fauna is mostly composed of species of both marine and freshwater origin that temporarily reside in the estuary or use it as a pathway of migration between the sea and fresh waters, while only a few species are adapted to spend the whole life cycle in this environment.

Functional groups are used to express the different ways fish use the estuarine environment and its resources (e.g. in terms of habitat use, feeding habits, reproductive modes) and a high similarity has been observed in the functional structure of fish assemblages across European estuaries, as opposed to the high variability in taxonomic composition recorded at both local and geographical scales. As a result, the abundance and diversity of functional groups have been largely used as metrics in the assessment of the ecological status of transitional waters throughout Europe, allowing to establish a reference for the functioning of estuarine ecosystems.

Climate-induced alterations of the estuarine environment (including temperature, hydrological regime, saline intrusion, water quality and habitat availability) are likely to affect fish use of estuaries, leading to physiological and behavioral responses, altering the performance of individuals and populations, influencing dispersal and recruitment and species interactions within communities and ultimately affecting the structure and functioning of estuarine fish communities. Therefore climate change has the potential to shift established baselines thus posing a challenge for the ecological status assessment of transitional waters. This paper presents the available knowledge on the structure and functioning of estuarine fish assemblages and examines the possible effects of climate change on the ability of using these biological components to assess ecological status.