

Response of different estuarine zooplankton taxa to instantaneous salinity reductions

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Salinity variation is a key factor influencing the distribution of estuarine biota and constitute a considerable stress on the living organisms. In the ocean and estuarine systems, zooplankton can experience rapid salinity changes due to heavy precipitation, ice and snow melting, storms or its own vertical migration in a stratified waters. However, this rapid natural salinity change has a smoother character, rather than instantaneous changes in salinity of anthropogenic nature, such as periodic discharges of water from dams separating seas and freshwater lakes. A novel cause of anthropogenic salinity variation is a Blue Energy production.

In the Blue Energy production, energy is generated from the mixing of waters with different salinities in a process called Reverse Electrodialysis (RED). The world's first Blue Energy power plant is currently being tested in the Netherlands. Organisms passing through a RED plant are subjected to multiple stressors, including salinity shock that zooplankters experience when sea water and freshwater merge. Rapid salinity reductions may have a negative consequence for planktonic organisms such as mortality, decrease in growth rates and impaired feeding ability, but knowledge on this is currently limited.

We study the possible impact of Blue Energy generation on zooplankton by reviewing available work on the impact of salinity reductions on zooplankton. In a series of controlled experiments using natural zooplankton assemblages collected in the western Wadden Sea we investigate the impact of instantaneous salinity changes on survival of different estuarine mesozooplankton taxa.

Keywords: zooplankton; salinity shock; mortality; blue energy