



## **Restoration of seagrass meadows in the Berre lagoon needs scientific understanding of local hydro-sedimentary processes**

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The Berre lagoon (Provence, France), one of the largest Mediterranean brackish ecosystems (155 km<sup>2</sup>), was occupied, at the turn of the 20th century, by extensive seagrass meadows, probably covering more than 6000 ha. Afterwards, urbanization and the development of petro-chemical plants along the shoreline caused disturbance to aquatic systems, via the input of chemical and organic pollutants as well as the increasing of nutrient concentrations and subsequent eutrophication. From 1966 on, the diversion of the Durance River towards an hydroelectric power plant, and ultimately then into the Berre lagoon waters, resulted in a heavy input of freshwater. This latter produced a series of effects, such as haline stratification, the decline of surface water salinity from 24-36 to 1-22, eutrophication and, globally, unstable ecological conditions.

The seagrass beds dramatically declined throughout the last decades, and since 1998, they must be considered as functionally extinct, with a total surface area of 1.5 ha in 2004.

From the 1990s on, the Berre lagoon restoration has been actively supported by local stakeholders and has become a major local political issue. The GIPREB, a public agency for the Berre lagoon management and restoration was created in 2000 in order to elaborate and implement the ecosystem recovery plan. As seagrass beds are commonly recognized a key level in coastal lagoon functioning, their restoration has been identified as a major objective among the GIPREB actions.

Despite significant reduction of the main pressures identified (freshwater, chemical pollutants and nutrient inputs), seagrass meadows have been going on shrinking to near extinction (at present, most of the lagoon is occupied by bare silt bottoms). Even experimental seagrass transplantations have shown scarce survival rates. We suspect that the absence of seagrass resilience is at least partially due to the increase in turbidity and silt deposits, resulting from the regression and finally the disappearance of surface meadows, whose role is essential in hindering silt resuspension during wind episodes, frequent in the region. Such processes must be deeply understood and taken into account for the effectiveness of the restoration plan. This is the reason which has led the GIPREB to initiate a collaboration with scientific research institutes, in order to dispose of the knowledge and finally of useful decision-making tools.