

Abstract

Physical and biological perturbations linked to marine aggregate extraction in the eastern Channel

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The objectives of the programme SIEGMA (2003-2011) were to complete international knowledge on the impact of marine aggregate extraction in the macrotidal context of the eastern Channel and to test exploitation methods (fallow temporal zoning, levelling) able to minimize this impact and favour restoration on two sites in French waters.

The initial concentration of the turbid plume is influenced by extraction conditions, while its dispersion is linked to the nature of the dredged material and the intensity of tidal currents. Extraction is modifying the topography (furrows, depressions) and the nature of the seabed; a levelling test did not show any increase of its restoration rate. Impact on benthos was quantified after limited extraction periods (fallow tests) with different intensities; extensive exploitation with fallow areas reduces the impact thanks to an opportunistic recolonisation. Impact on demersal fish was direct (temporary disturbance, substrate modification) or indirect through the foodweb; the bigger impact observed is due to high extraction intensity with rarefaction of the benthic preys.

The type of substrate and associated fauna explained the nature of the fish communities. Finally, a food-web model was developed to study the ecological responses of fish species facing particular stress namely related to anthropogenic activities and to analyse the consequences of these activities on the marine ecosystem.