

## **Effects of Restored Tidal Flats on the Water Quality and Environmental Conditions of a Habitat in an Enclosed Coastal Sea**

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We constructed two tidal flats with two soils of differing in silt clay content in Lake Matumigaura, an enclosed coastal sea, and studied the resulting water purification capacity and bio-habitat of these tidal flats compared with that of a nearby natural tidal flat.

As a result of researching the water purification capacity of tidal flats, we showed that water purification capacity depends on soil parameters (grain size, coefficient of permeability, etc.) and existence of reed beds. Decomposition by soil microorganism leads to higher organic carbon purification on sandy tidal flats, but the respiration rate of macro benthos (bivalves, etc.) is better on gravel tidal flats. Denitrification rates were observed to be higher for sandy soil types and in reed beds than on gravel. Our results also confirmed the high performance of reed beds in water purification (removing organic carbon, nitrogen, and phosphorus).

Furthermore we observed improvements in a number of other environmental parameters through construction of tidal flats. Sulfide contents and COD have decreased, ORP has declined, the area colonized by bivalves has increased, and many rare species can now be found both in the constructed tidal flats and shallow sea area. The colonized species of macro benthos varied with the soil composition of tidal flats, proving that soil grain size influences the ecesis of macro benthos. Finally, we also noted an increase in macro benthos levels including those of species fished for commercially on the constructed tidal flats and the shallow sea constructed with sandy soil.

This project is one of the experiments on improvement of the aquatic environment by using nature, which have been carried out since fiscal 1999 for the Environment Agency. We were contracted for this Environment Agency project through the Shizuoka Prefectural government.