

# ASSESSMENT OF VENETO TRANSITIONAL WATERS BY APPLYING THE MULTIMETRIC PHYTOPLANKTON INDEX AND THE MACROPHYTES QUALITY INDEX.

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The coastline of the north-western Adriatic Sea is characterized by the widest concentration of wetlands in the Mediterranean Ecoregion. Approximately 650 km<sup>2</sup> of such transitional waters fall into the Veneto region area, representing an important socio-economical resource and a relevant ecological heritage. In the attempt of fulfilling the requirements of the Water Framework Directive (EC 2000/60), the present study describes the trophic conditions and the water quality of the most important Veneto wetlands, comprising the Venice lagoon, the Po Delta system area and the Caorle lagoon. In relation to the water body typology all the considered stations were in restricted basins. Due to its extension and historical relevance, the bulk of information concerns the Venice lagoon for which ten-years monthly observations are available. For the other zones, samples were collected seasonally in 2008. The Macrophytes Quality Index (MaQI; Sfriso et al., 2009) is already implemented by the Italian law and it is based on the presence of macrophyte taxa and of their ecological score. The Multimetric Phytoplankton Index (MPI), recently set up and being validated, is composed by 4 metrics including dominance and diversity indices, bloom frequency and chlorophyll *a* concentrations.

In the Venice lagoon, the great variety of environmental conditions and anthropic impacts allowed to individuate all the quality classes: moving seawards from the mainland a progressive improvement of water quality was assessed by both indices. High status was found at the Malamocco inlet, and bad or poor classes were individuated approaching the industrial area. In the Po Delta system the conditions were worse as, on average, all the basins were in poor conditions. Sites characterized by high or good status were not recorded. The Baseleghe lagoon and one station in the Caorle lagoon presented oligohaline salinity values, so MPI and MaQI were not applied.

Data on dissolved nutrient concentrations in water column were measured in all sites, allowing to verify index responses to the trophic load. For some stations in the Venice lagoon also contaminant concentrations were available (heavy metals, PCB, Pesticides, PCDD/F, PAH). Principal component analysis, carried out using nitrogen and phosphorus concentrations of the entire dataset, highlighted significant positive relationship between MPI and MaQI and negative correlations with the nutrient concentrations. Similar results were observed in the case of the other contaminants, with the only exceptions of nickel and chromium, which were not correlated with the other parameters.

MPI and MaQI assessed the water quality in exactly the same class for more than half of the considered sites. Only, in the Venice lagoon, along the Malamocco-Marghera canal, the water assessment changed significantly. In the other cases, the differences were less important, being between adjacent classes.

In conclusion, the concordance of assessment for the great part of the sites and the similar response versus some anthropic pressures allowed to consider both indices as effective and reliable tool in the evaluation of water quality.