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ANALYSIS OF TRANSITIONAL WATERS ON UKRAINIAN BLACK SEA SHELF BY ZOOPLANKTON INDICATORS (ON THE EXAMPLE OF THE DANUBE DELTA)

Transitional waters are surface water bodies near the mouths of rivers that are partially saline because of their proximity to coastal waters and are largely influenced by freshwater flows according Marine Strategy Framework Directive – MSFD (2008).

The Ukrainian part of the delta (1240 km²) is about 22 % of the total area of the delta. The long-term Danube discharge is 203-210 km³/year, which provides 36 % of the influx of freshwater to the Black Sea and about 77 % of the freshwater runoff in its northwestern part. The Danube Delta has a salinity of 2 - 6 ‰ and up to 17 ‰ in some areas (Berlinsky, 2010).

The determination of the range of response of planktonic organisms to salinity in transit waters is particularly important. This, in turn, affects the indicators such as biomass, number, percentage of prevailing species (Noctiluca and Copepoda) and their qualitative composition (Stefanova, 2016).

The aim of the work is to identify the ecological quality class of transitional waters on the basis of the integral indicator of zooplankton, on example of marine zone infrant of Ukrainian part of the Danube Delta.

Research results: due to long-term monitoring the obtained data of hydrological and biological indicators were analyzed.

The following indicators were chosen to determine the quality of transitional waters (EQR - ecological quality ratio): total biomass of zooplankton, percentage of Noctiluca and Copepoda from total biomass and Shannon index according abundance of organisms.

The observation performed in 1967-1972 was taken as reference conditions before eutrophication. In the period between 1980-1993 the worst conditions for the existence of zooplankton were noted (Guide on the organization and conduct of biological monitoring at fixed sites, 2016).

The results of the monitoring of the Danube waters for 2004-2017 were analyzed determining the quality of water by average monthly values which included the data from 12 to 26 stations. The integral indicator was determined which identifies the ecological quality class in accordance with the methodology of the MSFD.

The Requirements of MSFD are the conclusions of the results of unified five – point grade that gives the characteristic of ecological state of water objects (High, Good, Moderate, Poor, Bad).

Good quality was in November 2004 and in autumn of 2005. Between 2006 and summer 2007, quality deteriorated. In those years there was the worst quality (ecological class – Bad). From 2008 to 2013, quality indicators grew to a Moderate. In September 2015, quality again became Good. Subsequently (autumn 2015 - summer 2016) it was observed a Moderate quality (November 2016). In addition, since 2017 the quality of the water environment improved which was reflected in the indicators of good water quality.

In conclusion, in the period from 2004 to 2017 the ecological class of the Danube Delta quality has varied from Moderate to Good.