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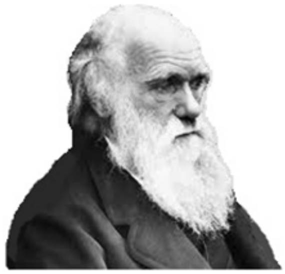

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Quality monitoring of marine coastal waters in Poland

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ABSTRACT

A review of EU legislation and national rules applicable to the assessment of the quality of the marine waters of the Baltic Sea in Poland. A review of the procedures prescribed by law, highlighting some inconsistencies, and pointed to the importance of the innovative approach of the EU Water Directive towards assessing water quality, which now should be based primarily on assessing the health hydrobiont by limiting the amount recommended for the study of chemical indicators of water quality. It pays attention to the progression, and at the same time, retreat from this canon, which manifests itself primarily by gradually increasing the recommended number of chemical indicators of water quality that should undergo mandatory testing - on the road to increasing the number of priority contaminants placed in subsequent acts supplementing and modifying the EU Water Directive.

Keywords**:** Water Directive, the Baltic Sea Ecoregion, evaluation of water quality, water quality assessment criteria

1. INTRODUCTION

Since 2004, the principle of monitoring the quality of marine waters of the Baltic Sea in Poland sets Directive 200/60 / EC. According to her, the water of the Baltic Sea - known as coregion (Fig. 1) - are treated as marine coastal waters, which should be covered by monitoring of the quality of waters. Polish coastal waters are divided for the purpose of assessing water quality in the internal waters (Lagoon Puck, Szczecin Lagoon, Vistula), the so-called. Transitional waters of the sea (the mouth of strange and mouth Świna in the Pomeranian Bay, the mouth of the Vistula River in the Gulf of Gdansk) and the so-called. marine coastal waters (Gulf of Gdansk, Pomeranian Bay). The creators of this classification apparently been diversifying marine coastal waters in Poland according to classification systems A and B, recommended for use by the European Union, and in particular by the A - based on the annual average salinity and depth of waters and by the system B - by identifying the geographic coordinates reservoir according to the oceanographic (more properly in this case: mareograficznymi), and in particular the details of the amplitude changes tides and salinity, as well as the direction and speed of currents, waves, and changes in average annual water temperature, type of mixing water, turbidity, water retention (in Where bays), the type of bottom.

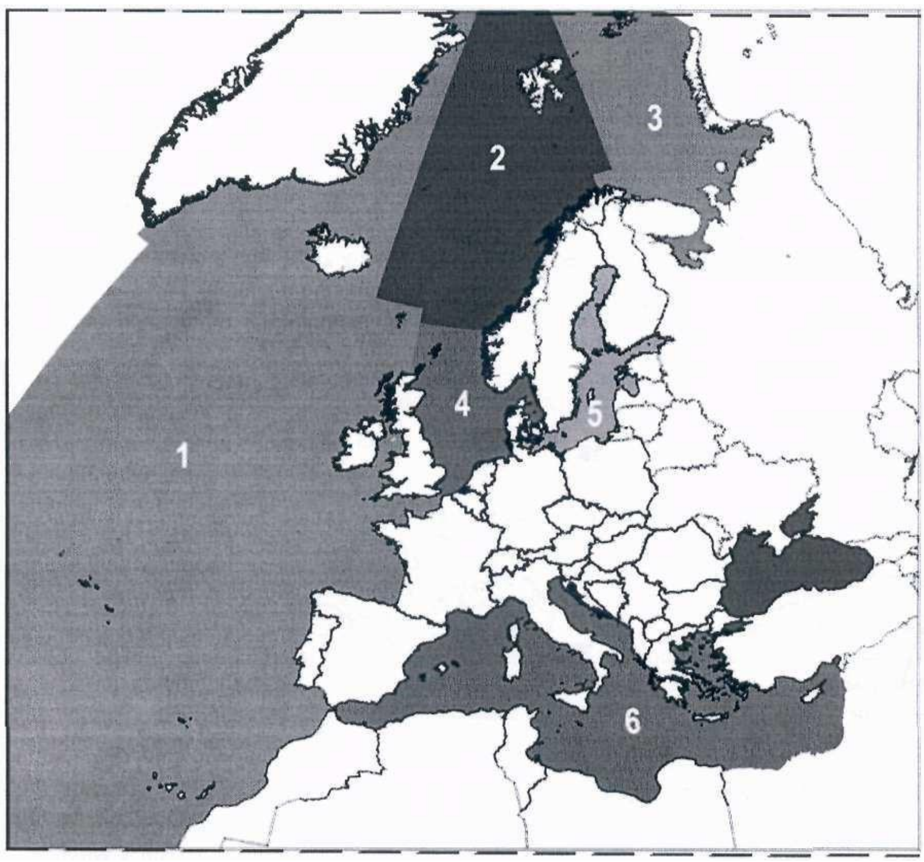

Fig. 1. Baltic Sea Ecoregion Ecoregions and other seas and oceans: 1 - Atlantic Ocean, 2 - Norwegian Sea, 3 - Barents Sea, 4 - North Sea, 5 - Baltic Sea, 6 - Mediterranean Sea

Details of the research and the criteria used to assess the status of water in terms of: very good condition (high status), good (good status) and moderate (moderate status) - In the wake of the relevant criteria set out in - specifies in Poland Appendix 6. Because the state water quality of the reservoir is a general term water quality of the reservoir (or part thereof), set by the so-called. or the so-called ecological status. chemical status - whereby for evaluating the quality shall be the worse of the two above-mentioned. states - monitoring study should include a set of elements to evaluate each of these states. Such tests must be carried out within the framework of specific types of monitoring, ie. Surveillance monitoring, operational and research - respectively with the relevant modifications scope, frequency of measurements and number of measuring stations and their location.

2. TYPES OF MONITORING, SCOPE AND FREQUENCY OF TESTS

2. 1. Surveillance monitoring

Surveillance monitoring, constant monitoring which has the task of determining of the quality of the aquatic environment by determining the ecological status (biological elements plus hydro-morphological elements plus physico-chemical water quality elements) and water chemical status. For the assessment of ecological status with regard to testing of biological elements, these include the study: phytoplankton, other aquatic plants (macroalgae and okrytozalą Ŝkowe) and benthic macroinvertebrates and should be carried out every three years. In the case of hydro-morphological quality elements morphology and hydrology of the basin should be tested every six years. Physico-chemical quality elements, in particular thermal conditions, oxygenation, nutrients and pollutants - every three months, the so-called. particularly dangerous pollutants - substances priorytetowe4 - at one month. This means that surveillance monitoring is properly monitored constant, which enables:

a) assessing the long-term changes of the natural environment;
b) assessment of long-term changes resulting from widespread anthropogenic activity understood;
c) potential changes in the rules of study quality of aquatic ecosystems (defined in Annex II to);
d) changes in the design of monitoring programs.

The location monitoring points are places near the borders, in this case near the Polish border territorial waters and the positions necessary to assess pollution loads in excess of the limits of the state, entering the marine environment [1-26].

2. 2. Operational monitoring

Operational monitoring is undertaken in the event of threats to environmental quality in order to assess changes in the aquatic environment. In this case, position monitoring is a place of danger. In the case of diffuse sources of threat number of monitoring points must be correspondingly greater. Tested according to the list of parameters indicative of the biological quality elements of water, as well as the concentrations of priority substances and other pollutants, and performance indicators belonging to the hydro-morphological quality elements of the environment. In this case, the sampling frequency is determined according to research needs.

2. 3. Investigative monitoring

Investigative monitoring is carried out when you do not know the causes of environmental contamination that was detected during the monitoring of diagnostic and research have not been taken within the framework of operational monitoring. In this case, the sampling frequency is also determined according to research needs.

3. ASSESSMENT OF THE ECOLOGICAL STATUS OF WATERS

3. 1. Biological quality elements

Phytoplankton: The composition and abundance of phytoplankton taxa and biomass of phytoplankton - so to be able to detect the occurrence of phytoplankton blooms.

Macroalgae and angiosperms: levels of macroalgal cover and angiosperm abundance.
Benthic invertebrate fauna: The diversity and abundance of invertebrate taxa with special attention paid to the presence of pollution-sensitive taxa and taxa indicative of pollution.

3. 2. Hydromorphological quality elements

Tidal regime: Number influx of freshwater and its quality and the direction and speed of dominant currents of water, as well as wave exposure.

Morphological conditions: The depth variation, type of substrate coast and seabed particularly in the area of intense movements of water.

3. 3. Physico-chemical quality elements

Indicators to draw up general characteristics: temperature, oxygen, salinity, transparency, concentration of nutrients.

Specific contaminants - water pollutants which may be present in a smaller or a larger amount of test water reservoir.

Priority substances - pollutants specified in complementing Directive 2000/60 / EC regulations before 2008, and since August 2008. Specified in the applicable provisions of law in Poland.

4. EVALUATION OF GROUNDWATER CHEMICAL STATUS

In assessing the chemical status according to Directive 2000/60 / EC, Annex VIII to examine the concentration of substances that may contaminate the aquatic environment, in particular: halogenated (mainly chlorowcometany), organophosphates and organotin, carcinogenic and mutagenic and disturbing of hormones in organisms, persistent hydrocarbons, cyanide, metals and their compounds, arsenic, biocides, suspensions, substances which contribute to increasing eutrophication (nitrogen and phosphorus) and substances that have a significant influence on the oxygen balance (referred to as BOD, COD, etc.). A large part of the above. the substance was formerly specified in, and from August 2008. it is specified in Directive 2008/105 / EC as priority substances. Other Polish legislation before August 2008. Were included in the scope of the research referred to by the Polish authorities. Among the compounds disclosed in Directive 2000/60 / EC, Annex VIII and specified prior to August 2008. In the Ordinance of the Minister of the Environment.

5. ASSESSMENT OF ECOLOGICAL STATUS OF WATERS

The assessment of the biological quality of the environment should be made by comparing the findings of monitoring the terms of the completely undisturbed, which are or should be in the tested waters or in waters that are counterparts (analogs) bodies of the subjects. Sometimes this is a problem, because it is difficult to determine what the conditions are undisturbed conditions. In this situation, there is nothing else, how to refer to the comparison of the environmental quality of the reservoir to the results of evaluation of individual biological elements in aqueous media of a similar type.

In assessing some of the biological elements you can use, or at least be resorted quality classification and evaluation criteria given in the aquatic environment, where are the criteria for judging included: phytoplankton (according to the "index of phytoplankton saprobity"), periphyton (according to the "index saprobity periphyton") and benthic macroinvertebrates (according to the "index nieróżnorodności" and "biotic index"). The values of these indicators allow for differentiation of water quality in classes I to V. In each class of water quality attributed to the corresponding ecological status. Rating hydromorphological quality elements - both in terms of tidal regime (flow) of water and morphology - is to determine whether flows of freshwater and the direction and speed of dominant currents, as well as the quality of the bottom and the quality of the water zones of heavy traffic - in the absence of volatility depth - correspond totally or nearly totally undisturbed conditions or are similar to them.

If the physico-chemical quality elements for compiling general characteristics, and therefore temperature, parameters characterizing the oxygen balance, and transparency, as well as the concentration of nutrients - be classified according to the criteria, as well as a significant part found in marine aquatic ecosystems substances that are impurities. Criteria allow you to specify five classes of water quality, which enables assessment of his quality.

Some of the priority substances appearing in may also be subjected to such a classification. A similar 5-stage classification was posted previously in. Also in is a list of several priority substances (and in particular for cadmium, lead, mercury and polycyclic aromatic hydrocarbons) which may be subject to such classification, and which can not be found. This applies to a very small number among the 33 priority substances. It seems that you would be in the case of 6 of them have recourse to a subsidiary for the classification of water quality standards allowable concentration at which they may be present in treated industrial waste water into waters. The authors of this study, however, believe that any recourse to the standards set forth in the assessment of the marine environment is ineligible.

Existing regulations make it difficult for the clear identification of contaminants tested the aquatic environment - and especially the sea - by priority substances. To solve this problem, the authors of this paper believe that it is necessary in this case to refer to, where it is assumed that in an environment which is in very good condition concentrations of all priority substances should be close to zero or at least below the limit of detection at Using the most commonly used and the most advanced analytical techniques.

6. CONCLUSIONS

The introduction of the Directive 2000/60 / EC meant a revolution when it comes to the principle of quality assessment of aquatic ecosystems that have in Poland benefited from habitat quality evaluation criteria by the dozens of chemical indicators of water quality when considering the 3-4 or a bit more so. biological criteria, which were often only verifiers chemical assessment. The same was indeed also in the world, although already before the year 2000 in the country and in the world proposed the adoption of biological criteria as the most important.

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