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Implementation of *Water Framework Directive* Principles in Polish Legislation

1. Introduction

Progressing polluting of surface waters and more restrictive demands for fresh waters cause, that the problem of existing clean water resources' preservation and improvement of polluted water status is becoming more and more important. In order to accomplish these purposes there is a need of knowledge about the current status of water and forecasting of its changes. In this process monitoring of waters, identification of pollutants and effects of their influences are very important. The process of the protection of waters requires the elaboration of appropriate law regulations. Countries of European Union formulate many decisions and postulates concerning water that have been placed in *Directive 2000/60* called *Water Framework Directive* (WFD). Basic assumption of directive is to treat water not like a commercial product but as the valuable inherited good whom should be protect and defend. Poland as the member state in the European Union is obliged to realize guidelines of the *Water Framework Directive*. One of them is a new approach to the methods of assessment of surface water quality where the fundamental pressure is being put on the ecological status of water [1].

2. Assessment of Water Status according to *Water Framework Directive*

Water Framework Directive is a document establishing frameworks for community action in the field of water policy. A maintenance and an improvement in the aquatic environment are main establishing the directive in Community. A basic

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aim of directive for member states is achieving at least of good status of the quality of waters, by defining and implementing the necessary measures within integrated programs of measures and maintenance good status of waters. In case of groundwaters, identifying and turning away the increase in concentrations of any pollutants is a purpose of the *Water Framework Directive*. The ultimate aim of directive is to achieve the elimination of priority hazardous substances and contribute to achieving concentrations in the environment near background values for naturally occurring substances. Reaching the good status of waters in 2015 is a priority purpose of the *Water Framework Directive*. Term “good status of water” in case of surface waters means achieving good ecological and chemical status at the same time, in cause of groundwaters means achieving quantitative and chemical status at good level. For groundwaters a quantitative status is determined by groundwaters level and chemical status, associated with the conductivity and with concentrations of pollutants. The quantitative status and the chemical status can according to the directive be categorized as good or poor. In case of surface waters a division into different types of waters was implemented. Rivers, lakes, transitional waters, coastal waters, artificial and heavily modified waters. Good status for rivers, lakes, transitional waters, coastal waters means achieving good ecological and chemical status, for artificial and heavily modified waters means achieving good ecological potential and good chemical status. Figure 1 shows the principles of evaluation of the state of water.

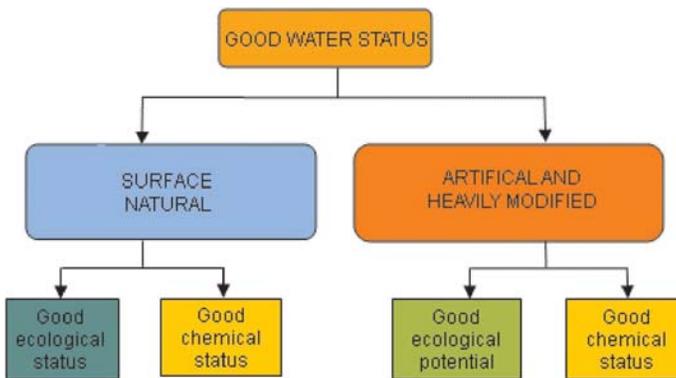


Fig. 1. Evaluation of state of water WFD [7]

Water Framework Directive implementing 5 gradual ranking of the ecological status of waters. There is: high, good, moderate, poor and bad status. The directive contains normative definitions of ecological status – verbal description of biological, hydromorphological and chemical and physico-chemical quality elements for high, good and moderate status (Tab. 1).

Table 1. Definitions of water status [1, annex 5]

High status	Good status	Moderate status
There are no, or only very minor, anthropogenic alterations to the values of the physico-chemical and hydromorphological quality elements for the surface water body type from those normally associated with that type under undisturbed conditions. The values of the biological quality elements for the surface water body reflect those normally associated with that type under undisturbed conditions, and show no, or only very minor, evidence of distortion. These are the type-specific conditions and communities.	The values of the biological quality elements for the surface water body type show low levels of distortion resulting from human activity, but deviate only slightly from those normally associated with the surface water body type under undisturbed conditions.	The values of the biological quality elements for the surface water body type deviate moderately from those normally associated with the surface water body type under undisturbed conditions. The values show moderate signs of distortion resulting from human activity and are significantly more disturbed than under conditions of good status.

Group of quality elements: biological, hydromorphological and chemical and physico-chemical are used to categorized waters status. Basic elements used to evaluate ecological status are biological elements. For rivers – composition and abundance of aquatic flora, composition and abundance of benthic invertebrate fauna and composition, abundance and age structure of fish fauna; in cause of lakes, transitional waters, coastal waters composition, abundance and biomass of phytoplankton is additionally determined.

Hydromorphological and chemical and physico-chemical elements are used as supporting elements. For hydromorphological elements are included: for rivers – hydrological regime, river continuity and morphological conditions; for lakes – hydrological regime and morphological conditions; for transitional and costal waters – morphological conditions and tidal regime.

There are two types of chemical and physico-chemical elements. First one is the general elements: thermal conditions, oxygenation conditions, salinity, nutrient conditions. Additionally for rivers and lakes there are determined acidification status and for lakes, transitional and costal waters, transparency parameter. Second part of chemical and physico-chemical elements are specific pollutants: pollution by all priority substances identified as being discharged into the body of water and pollution by other substances identified as being discharged in significant quantities into the body of water.

Figure 2 present a scheme of evaluations of the status of water on the basis of the entirety of elements: biological, hydromorphological and chemical and physico-chemical.

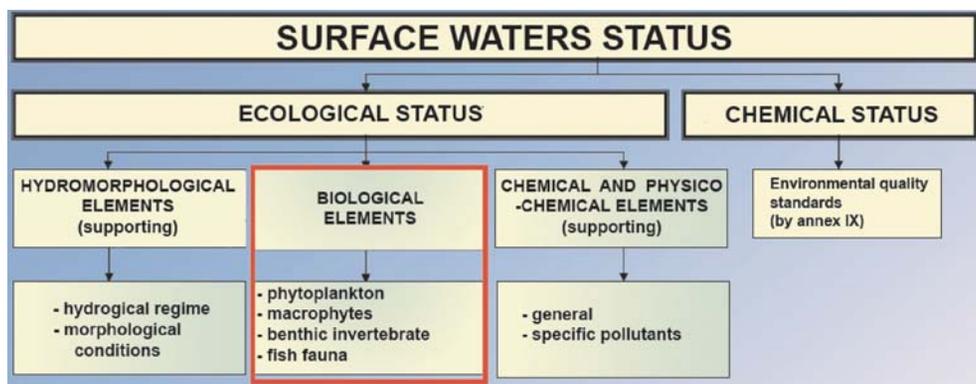


Fig. 2. Evaluation of surface waters status by different elements [6]

3. New Polish Decree in the Field of Water Status Assessment

According to the Treaty of Accession, assuming adapting of the Polish law to the law of the European Community, new *Regulation of the Minister of Environment of 20 August 2008* contains regulations adapted for requirements of the *Water Framework Directive* in the matter of the way of the ranking of the status of uniform body of surface waters.

Till 2008 in Poland it was an act deciding about the quality of waters *Regulation of the Minister of Environment of 11 of February 2004 on classification and presentation of surface waters and groundwaters status, the way of conducting the monitoring and the way of the interpretation of its results and presentation of the status of these waters*. Regulations determining the utility of waters were additional legal documents: assigning to eat [2] and living of fish [3]. This regulation determined classification for presenting the status of ground and surface water, the way of conducting the monitoring and the manner of the interpretation of results and the presentation of the status of waters.

The classification included five classes of water quality, additionally took into consideration three categories of quality for surface waters used for water supply: A1, A2, A3. The description of every of five classes considerate the values of biological indicators. As the biological indicator were used: saprophyte of periphyte and phytoplankton, indexes of benthic invertebrate and chlorophyll "a". The regulation contained also the verbal description of rates of the quality and biological indicators for all 5 classes (Tab. 2).

Actually document being in effect dealing with the quality of surface waters in Poland is a *Regulation of the Ministry of Environment of 20 August 2008 in the matter of the way of classifications of the status of uniform body of surface waters*.

Table 2. Characterization of waters status [4]

Class	Description of biological indicators
First class – very good quality of water	the value of indicators of water quality shows none anthropogenic influences
Second class – good quality of water	The value of indicators of water quality shows slight anthropogenic influences
Third class – satisfactory quality water	The value of indicators of water quality shows moderate anthropogenic influences
Fourth class – non satisfactory quality water	values of biological indicators of water quality are showing as a result of anthropogenic influences, quantitative and quality changes in biological populations
Fifth class – bad quality water	values of biological indicators of water quality are showing as a result of anthropogenic influences, changes consisting in the disappearance of appearing of the considerable part of biological populations

In its elements of classification were implemented to the specimen of the *Water Framework Directive*. In regulation is determined the ecological status, or in case of artificial uniform waters body and heavily modified uniform waters body of surface waters, an ecological potential and chemical status. Ecological status and ecological potential is determined by three groups of elements: biological elements and supporting elements: physico-chemical and hydromorphological. In the regulation the division of surface water was introduced: natural streams like stream, river; lake, natural basin, interior sea waters, transitional waters and coastal waters. Biological indicators for natural streams are: chlorophyll "a", benthic invertebrate, fish, indicator of diatoms IO, river index of macrophytes. Two indicators fish and benthic invertebrate, they aren't being taken into consideration at present in classification since their thresholds are in the process of establishing. Biological indicators for lakes and natural basins are: chlorophyll "a", Schindler factor, diatoms indicator, macrophyte index of ecological status, benthic invertebrate and fish. Biological indicators for interior sea waters, transitional waters and coastal waters are: chlorophyll "a", macroalgae and angiosperms, benthic invertebrate and fish. Three last elements aren't also being taken into consideration in classification since their values still are in the process of establishing. Threshold values for chlorophyll "a", Schindler factor, diatoms indicator, macrophyte index of ecological status are different for different kind of rivers, lakes or basins. Classification of ecological status is based on simple algorithm. This algorithm supposes the consistent comparison of monitoring data with threshold values of appropriate biological elements, then physico-chemical and hydromorphological elements. The Regulation allows to pass over classification by hydromorphological elements, because methodology of evaluation is still not elaborated. According to regulation

a uniform surface waters body could gain good chemical status when threshold values of chemical indicators of quality are not exceeded, or not gain good chemical status when thresholds are exceeded. Finally evaluation of uniform surface waters body status must be given by comparison with scheme ecological/ecological potential with chemical status (Tab. 3).

Table 3. Methods of water status evaluation [5]

Ecological status / ecological potential	Chemical status	
	good	Below good
High ecological status	Good waters status	Bad waters status
Good ecological status / good and above ecological potential	Good waters status	Bad waters status
Moderate ecological status/moderate ecological potential	Bad waters status	Bad waters status
Poor ecological status/poor ecological potential	Bad waters status	Bad waters status
Bad ecological status/bad ecological potential	Bad waters status	Bad waters status

4. Conclusions

The *Water Framework Directive* is presenting the new approach to the problem of the evaluation of the status of waters. According to the directive the evaluation should be based, above all, on the indicators determining the ecological status of waters rather than only on their functional parameters.

The directive shows the way of the assessment of waters quality with the help of biological, physico-chemical and hydromorphological indicators. Priority aim of the directive is achievement of good status of waters till 2015, both in ecological and chemical field.

Regulation of the Ministry of Environment on 20 August 2008 concerning the way of classifications of the status of uniform body of surface waters is based on the main principles of *Water Framework Directive*. Instead of classes there is introducing term of good and bad waters status. Classification is based on elements biological, physico-chemical and hydromorphological and chemical indicators of water quality.

The main difference of the new legislative document is the implementation of ecosystem approach in the field of surface water status assessment.

References

- [1] *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.*
- [2] *Rozporządzenie Ministra Środowiska z dnia 27 listopada 2002 r. w sprawie wymagań, jakim powinny odpowiadać wody powierzchniowe wykorzystywane do zaopatrzenia ludności w wodę przeznaczoną do spożycia.* Dz. U. z 2002 r., Nr 204, poz. 1728.
- [3] *Rozporządzenie Ministra Środowiska z dnia 4 października 2002 r. w sprawie wymagań, jakim powinny odpowiadać wody śródlądowe będące środowiskiem życia ryb w warunkach naturalnych.* Dz. U. z 2002 r., Nr 176, poz. 1455.
- [4] *Rozporządzenie Ministra Środowiska z dnia 11 lutego 2004 r. w sprawie klasyfikacji dla prezentowania stanu wód powierzchniowych i podziemnych, sposobu prowadzenia monitoringu oraz sposobu interpretacji wyników i prezentacji stanu tych wód.* Dz. U. z 2004 r., Nr 32, poz. 284.
- [5] *Rozporządzenie Ministra Środowiska z dnia 20 sierpnia 2008 r. w sprawie sposobu klasyfikacji stanu jednolitych części wód powierzchniowych.* Dz. U. z 2008 r., Nr 162, poz. 1008.
- [6] Soszka H. et al.: *Ramowa Dyrektywa Wodna w Polsce.* Warszawa 2007.
- [7] Website Water Framework Directive, www.rdw.org.pl.