

REVIEW

Elena Țuchiu - THE STATE OF THE WATER BODIES ON THE LOWER COURSE OF THE DANUBE BETWEEN BAZIAȘ AND ISACCEA, Transversal Publishing House, Târgoviște, 2020



The work in an extension of 272 pages, includes in addition to text, 233 figures (maps, graphs, models, mostly color), 37 tables and 218 bibliographic titles. The paper that constituted the doctoral thesis defended at the **Institute of Geography of the Romanian Academy** in 2018, under the guidance of Prof. **Petre Gâștescu**. The issue of hydrological characteristics in terms of quantity and quality on the Danube, the provisions introduced by the **Water Framework Directive 2000/60 EC**, European water quality directives and international conventions is a conceptual and methodological first, on the protection and sustainable use of water resources and aquatic ecosystems, not only the Danube ones.

About the author. **Elena Țuchiu** graduated from the **Faculty of Chemistry of the University of Bucharest, specializing in physical chemistry in 1995** and in the over 25 she worked only in the field of water, first as a scientific researcher at the **National Institute for Research and Development for Environmental Protection** and then only in the **Administration National "Romanian Waters"** successively occupying various hierarchical functions on issues of quality, protection, monitoring, management plans, water resources, since 2009 being director of the Management Plans Department.

Elena Țuchiu has been a permanent member of the **European Union's** specialized commissions for the transposition of European and national policies on integrated water management to ensure the achievement and maintenance of

environmental objectives for water bodies, on modern concepts and principles introduced by the Water Framework Directive 2000/60 CE.

As noted in the title of the paper, the term appears, less used until more recently, that of “**body of water**” and why? In this sense, the author in the chapter **Characterization of water bodies on the Danube between Baziaș and Isaccea** mentions that *“integrated sustainable management of water resources in accordance with the provisions of the Water Framework Directive requires the use of water bodies as essential elements in water management activities”* invoking Article 2 of the Water Framework Directive, in which *the body of water* is defined as *“a discrete and significant element of surface waters: river, lake, canal, canal sector, transitional waters, part of coastal waters”, being, constituted from the “mass of water itself, the bed of the riverbed, the riparian space (riparian), respectively the abiotic component to which it is associated and the biotic component”, we add a hydroecosystem / aquatic ecosystem.*

The paper is structured in 8 chapters and numerous subchapters, presenting the current state of the most important European river basin, especially Danube River, argued in addition to the corresponding text and with a special graphic and tabular illustration, especially for the lower Pontic water course, related to Romania, but not before synthesizing the bibliographic dowry on the Danube in the chapter History of knowledge / research.

As was normal, being known the specific phrase of watercourses *“we live downstream”* regarding the state of water quality, in *the first chapter of the paper* is *The characterization of the Danube river basin, on morphohydrographic and hydrological parameters* but more detailed *water quality* with the whole package of chemical and biological indicators and their management, using data from existing literature and the *Transnational Danube Monitoring Network of the International Danube River Protection Commission* and in accordance with the *Water Framework Directive (2000/60 EC)*.

Following this analysis, it is appreciated that from *a temporal point of view*, there is a *tendency to decrease the average annual concentrations* for the period 2006-2015, especially for organic substances and nutrients and therefore the improvement of Danube water quality, as an effect of mitigation measures. of pollution, mainly.

Equally, the same issues were analyzed in more detail and presented in the chapters on *the Lower Danube River between Baziaș and Isaccea*, first the *hydrographic features* including the minor riverbed and the meadow with the subsectors: Baziaș - Gura Văii, respectively the Danube’s Iron Gorge, Gura Văii - Călărași, Călărași - Ceatal Chilia and then the *hydrological characteristics*, respectively, the liquid runoff at multiannual average values and in the two hypostases of maximum and minimum waters during 1931-2016 with the trends

of variation, as well as the influence of anthropogenic factors on the leakage regime.

The qualitative characteristics of the water with the spatial and temporal variation of the physico-chemical and biological quality indicators were selected to reflect the general characteristics as well as the effect / impact of the main pressures identified at the level of the whole basin. variability of quality parameters. The correlation of the liquid leakage with the physico-chemical indicators resulted in a directly proportional connection, except for the metals mercury, lead and less copper and cadmium.

An important aspect in the quantitative and qualitative parameters of water is *the climate*, which is analyzed and presented, for the first time, in the chapter *The impact of climate change on water quality in the lower Danube sector*. Thus, the analysis showed that the variation of the air temperature induced over the water temperature affects the physico-chemical, biological and microbiological balances. From a physico-chemical point of view, the natural processes are affected, especially those of nitrification-denitrification, mineralization of organic matter with changing concentrations and loads of pollutants transported by rivers. Higher water temperatures and reduced flow during the summer lead to decreased dissolved oxygen concentrations and increased CBO5 and phosphorus concentrations that affect the trophic state.

Typology and methodology regarding the delimitation of the *4 water bodies (Iron Gates with the accumulation lake, Ostrovul Mare with the second accumulation lake, Ostrovul Mare - Chiciu / Silistra, Chiciu / Silistra-Isaccea)*, with hydromorphological alterations, identification of point sources and diffuse pollution, interdependence with groundwater bodies, protected sectors, assessment of anthropogenic pressures are analyzed in the chapter *Characterization of water bodies on the Danube between Baziaș and Isaccea* with the conclusion that at the level of 2015, the water bodies were situated below the threshold for ecological and chemical risk.

The evaluation of the anthropogenic pressures related to the 4 water bodies on the lower Danube was made to identify the potentially significant sources of point, diffuse pollution and the quantitative estimation of the pollutants. The hydromorphological alterations are presented chronologically and analyzed the works for the regularization of the lower Danube riverbed, the damming of the floodplain and the hydropower and navigation systems of the Iron Gates and the Great Island. In this respect, the four bodies of water are considered strongly modified anthropically.

It is emphasized that by applying the methodology for assessing the condition of the respective water bodies, the physico-chemical elements in the monitoring sections allows the assessment of several water bodies and avoiding situations of different classification in status / potential classes each year, due to

natural variations of parameters depending on climatic aspects (drought years, years with floods, periods with extreme climates).

The paper contributes significantly to the knowledge of the lower Danube in an original and interdisciplinary way, from a quantitative and qualitative perspective, given the size and spatial trends, temporal dynamics for hydromorphological, physico-chemical and biological parameters, considering natural aspects, but and the effect of anthropogenic pressure and measures implemented, as well as the impact of climate change.

The work *"The state of water bodies on the lower course of the Danube between Baziaș and Isaccea"* taking into account the requirements of European and national legislation for accurate assessment of water status in a planning cycle, is used to assess and classify ecological status / ecological potential in the periodic updating of *the Management Plans of the Romanian Waters National Administration*, in the technical-scientific substantiation, of the management decisions for an integrated management of water resources, not only at the level of the lower Danube but also at the hydrographic basins in Romania.

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