Publications of the Institute of Geophysics, Polish Academy of Sciences
Geophysical Data Bases, Processing and Instrumentation
vol. ??? (?-??), 2025, pp. ?-?
DOI: 10.25171/InstGeoph_PAS_Publs-2025-00?
XLII International School of Hydraulics, Radocza, Poland, 20–23 May 2025

Is the river health concept useful for water management purposes?

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Abstract

The term “river health” was introduced at the end of the second millennium and applied to assessing river conditions. It was seen as analogous to human health, offering the general public a better understanding of ecological challenges in freshwater systems. However, it was unclear how rivers' physical, chemical, and biological characteristics may be integrated into conservation or restoration measures. In this respect, other definitions closer to water management purposes sound more appealing, e.g., a healthy river ecosystem is one “that is sustainable and resilient, maintaining its ecological structure and function over time while continuing to meet societal needs and expectations.” In the EU context, the similarity, in a sense, but focused on the river term “good ecological status,” has been defined and forms a central point of the Water Framework Directive.

For water management purposes, the ecological concepts and water-related services are broken down into indicators to assess and compare different rivers, showing their status and need for conservation or improvement. In most cases, ecologists divide river assessment methods into indicator species or comprehensive index methods. Indicator species methods include fish, phytoplankton, and macroinvertebrates as target objects to assess the quality of a river ecosystem. Comprehensive index methods use indicators combining river physical, chemical, and biological characteristics with socio-economic data. This reflects the river habitat and biota condition, the social and/or economic function, or pressures on the system.

There is a standard agreement that indicators have a fundamental technical basis in science, supporting their usage in decision-making. However, the criteria used in interpreting indicator values (good, bad, acceptable, unacceptable, etc.) are likely to go beyond scientific grounds and, in many cases, are ultimately socially determined. As water management professionals, we are challenged by a lack of acceptance or obstruction for scientifically based good ecological or sustainable resource targets. It means that for communication purposes, this intuitively easy-to-quantify term (healthy river, unhealthy river, etc.) has great potential and can be adopted for water management planning or operating hydraulic structures.