

REPUBLIC OF ARMENIA GOVERNMENT

DECREE

-N, dated --/--/2021

**ON ESTABLISHING THE METHOD FOR ASSESSING THE SELF-PURIFICATION
CAPACITY OF THE RIVER AND ITS ENFORCEMENT MECHANISMS**

Governed by Article 68.1 of the Water Code of the Republic of Armenia, the Government of Armenia
decides to:

1. Establish the Method for Assessing the Self-Purification Capacity of the River and its enforcement mechanisms, as specified in the Appendix.
2. This Decree shall enter into force on the tenth day following its official publication.

METHOD

**FOR ASSESSING THE SELF-PURIFICATION CAPACITY OF THE RIVER
AND ITS ENFORCEMENT MECHANISMS**

1. This legal act shall establish the Method for Assessing the Self-Purification Capacity of the River (hereinafter referred to as the Method) and its enforcement mechanisms.
2. This Method shall be applicable to assessment of the self-purification capacity of rivers in the Republic of Armenia.
3. Assessment of the self-purification capacity of rivers shall be carried out considering the hydromorphological, hydrochemical and hydrobiological characteristics of rivers (flow rate, moderate or low mineralization, relatively low content of biogenic substances, etc.); the variety of baseline indicators and the possibility of choosing among them; data on annual and monthly changes in self-purification capacity of the river; the set of pollutants undermining self-purification capacity of the river.
4. The self-purification capacity of the river shall be assessed by the **integral self-purification capacity index** (hereinafter referred to as the Integral Index), which can be computed based on **hydrochemical, hydrobiological and hydromorphological indices** by the following general formula:

$$\text{SPI} = \text{HM} * 0,2 + \text{HC} * 0,4 + \text{HB} * 0,4$$

where:

HC is the index calculated based on hydrochemical indicators,

HB is the index calculated based on hydrobiological indicators, and

HM is the hydromorphological index of diversity.

5. The following formula shall be used to assess the self-purification capacity of the river from hydrochemical perspective:

$$HC = \frac{Q_1}{Q_2} \cdot |C_1 - C_2| \cdot U_2/L$$

where:

HC is the self-purification capacity of water in the given river section (s^{-1}),

Q is the river water discharge (m^3/s) in the given section (at the beginning and at the end of the river section),

C is the overall/combined value of river water quality assessment, calculated by the Canadian Water Quality Index (at the beginning and at the end of the river section),

L is the length of the river section (m), and

U is the river flow rate (m/s) at the end of the river section.

6. The following formula shall be used to assess the self-purification capacity of the river from hydrobiological perspective:

$$\frac{\partial L}{\partial t} = -HB * L$$

$$L = L_0 * \exp(-HB * t)$$

$$HB = \frac{1}{t} * \ln\left(\frac{L_0}{L}\right) = \frac{V}{S} * \ln\left(\frac{L_0}{L}\right)$$

where:

HB is the river water self-purification capacity index,

L_0 is the hydrobiological index of river water pollution at the point of pollution,

L is the hydrobiological index calculated from the source of pollution after a certain period of time (t),

S is the length of the study river section,

V is the mean velocity of river flow in the study river section.

7. Assessment of the self-purification capacity of the river from hydromorphological perspective requires monitoring a) the turbulence of river flow, b) the intensity of bottom sediment transport, c) the bottom morphology, and d) the river flow velocity and depth.

The index shall be calculated by the following method:

- 1) The coefficients of variation of parameters shall be computed for all sections by the following formula:

$$CV_i = \left(\frac{\sigma_i}{\mu_i} \right)$$

where:

CV_i is the coefficient of variation of the i^{th} parameter, σ_i is the mean square deviation of the values of the i^{th} parameter, μ_i is the arithmetic mean of the values of the i^{th} parameter.

- 2) The partial coefficient ($V(i)$) shall be determined for each parameter by the following formula:

$$V(i) = (1 + CV_i) = \left(1 + \frac{\sigma_i}{\mu_i} \right)$$

The hydromorphological index of diversity (**HMID**) of the section shall be determined by the following formula:

$$HM = \sqrt{\prod_{i=1}^n V(i)^2}$$

where n is the number of parameters.

8. Based on the integral self-purification capacity index, the river self-purification capacity can be categorized into the following classes:

Index	Class
< 0.10	V (bad)
0.11-0.20	IV (poor)
0.21-0.30	III (moderate)
0.31-0.44	II (good)
> 0.44	I (high)

9. This Method shall be applied in:

- 1) development of basin/river basin management plans,
- 2) development of monitoring plans,
- 3) establishment of water quality standards for surface water bodies,
- 4) water use permitting, while making decisions on water quality,
- 5) establishment of the maximum permissible levels of wastewater discharge into water resources and the requirements applied thereto,
- 6) planning and development of actions for water resources management, as well as addressing of environmental issues,
- 7) identification of the ecological status of water resources,
- 8) assessment of vulnerability of water resources to climate change and development of adaptability measures, as well as in other cases,
- 9) for educational, scientific-research and other purposes.