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ABOUT AN ENVIRONMENTALLY FRIENDLY WATER USE SCHEME FOR THE INTEGRATED WATER RESOURCES MANAGEMENT ON CARPATHIAN RIVERS

Abstract. The report proposes an original environmentally friendly derivative water use scheme boosting the integrated water resources management for Carpathian Rivers. The scheme might find practical applications for the modernization of water supply and irrigation systems, the improvement of flood control, and developing small hydropower.

Keywords: Carpathian Rivers, environmentally friendly derivative scheme, flood control, integrated water resources management, small hydropower

Examples of small hydropower plants in the Carpathians



Water intake of the Uzhgorod small hydropower plant in the village Nevicke



A small hydropower plant on the river Rika in the Nizhniy Bystryi



Hydro-structures of the Bilinska small hydropower plant



Krasnyanska small hydropower plant



Lopushanska small hydropower plant

The integrated water resources management approach

The crucial pre-condition for the rationalization and greening of environmental management in water resources usage and hydropower development is the integrated water resources management (IWRM). In the modern world, this approach to water resources management has been getting a vital necessity. The need for the integrated use of water resources is also one of the key requirements of current national standards, for example, the standard, which applies to small hydropower too.

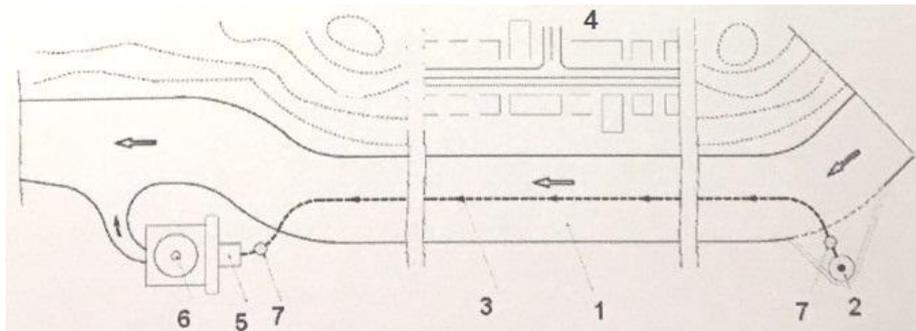
Providing the interests of different sectors of the economy, and also the interests of various water consumers and water users including the interests of the ecological and social spheres, the IWRM allows diversifying the aggregated environmental risks to make more reliable and environmentally friendly decisions promoting the sustainable development of territories and communities.

The IWRM gets of particular relevance in regions of the country where there is an objective need to jointly addressing a number of urgent and largely conflicting water management problems. Firstly, it is the protection of the population from the damaging effects of floods; secondly, it is the need for stable water supply or irrigation; as well as there are considerable private interests in the development of small hydropower, etc. Such regions include the Ukrainian Carpathians, where, in addition, there are rivers being still practically undisturbed. These rivers are unique biodiversity sites involving habitats for many red-list species and at the same time, they are extremely attractive for green tourism and recreation.

The presentation of an environmentally friendly derivative scheme

The contemporary practice of small hydropower in the country, in particular in Transcarpathia and the Precarpathia regions, shows that the decisions taken by private hydropower developers do not always comply with the IWRM principle.

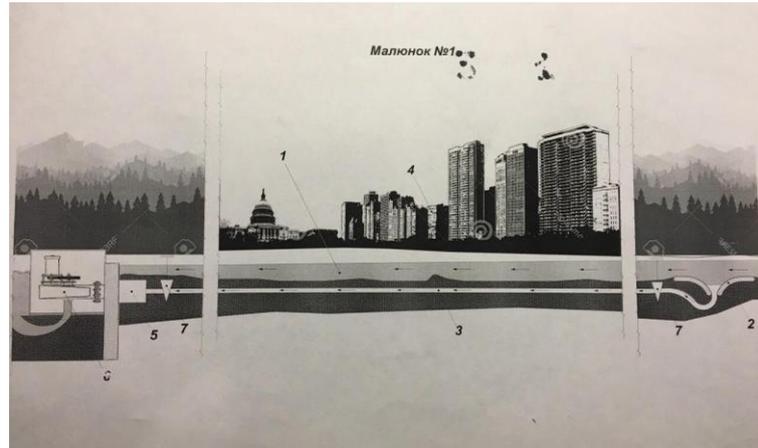
We propose the original derivative scheme, which can be considered at the same time as a part of a flood control system and an environmentally friendly scheme for the use of existing hydropower potential for purposes of small hydropower. This scheme is potentially able to minimize the negative environmental impacts and solve, if necessary, other challenges of the IWRM on the Carpathian Rivers.



1 – river bed; 2 – water intake; 3 – derivative water pressure route; 4 – settlement protected from floods; 5 – pressure basin; 6 – hydro-power unit; 7 – mechanical equipment

Features of the scheme

This scheme is described in detail in the description of utility model patent No. 125637 “Ecological electro-generating flood control system”. Its fundamental feature consists of the absolute ignoring of dam construction.



The derivative tract can be laid both within a river bed and near river shores, which, for example, require additional protection against erosion during floods. Various constructive solutions of this hydraulic structure, which provide reliable protection of river shores, are allowed. In order to realize the multi-purpose usage of the system and to meet environmental requirements according to the IWRM principals, selective water intakes for different needs at different water levels in rivers may also be performed.

Pilot project (Latoritsa River, Mukachevo)

Cost of implementation of the pilot project:

An investment of € 1 250 000,00 is required for the construction of the “Generating Ecological Flood Control System”, with a pipe length of 21 km.

The cost of the project includes:

- Preparation of design documentation;
- Construction works;
- Preparation and construction of the water intake station;
- Placement of the generating complex;
- Installation of a turbine;
- Preparation of the protocol of implementation of flood measures.

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