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Information support for regional water resource management in Ukraine

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Water resources availability is a determining factor of human existence. Despite the huge volume of water in the hydrosphere, water resources include only those waters that may be used by humans for drinking and household water supply and those ones that support the sustainable existence of living ecosystems.

The issues of drinking water consumption are particularly important. Only fresh surface water and groundwater, complied with quality standards, may be used for drinking water supply.

At the same time, precisely surface waters are under influence of anthropogenic load primarily due to their depletion and chemical and biological pollution. In some cases, these waters pass into the volume of water unusable for its consumption and threaten the survival of ecosystems.

In Ukraine, similarly to the European Community [1], a policy aimed primarily at stabilizing the human impact on surface water, and improving the ecological status of surface waters in the country was adopted.

Procedures for water resources management require an appropriate information support to justify the adoption of management decisions and subsequent control of their performance.

The information required for management depends on the task of management. Current tasks of management can be divided into two classes - tasks of the current control and of tasks long-term planning.

Water quality data obtained from monitoring network represent information data for the tasks of water quality control but only as ecological indicators.

However monitoring information is insufficient for the long-term planning. Directly componentwise monitoring observations do not provide opportunities for comparative environmental assessment of sites over time. The latest concept is necessary for the ranking of environmental problems, extraction of priorities (hot spots) are requied for efficient use of limited resources.

Therefore, the establishment of information support of water resources management is divided into two interrelated tasks - methodological work on the establishment of adequate environmental assessments and instrument development of information support for environmental assessment.

In Ukraine the work on integrated environmental assessment is not completed yet. Recommended ECE system for environmental assessment [2] to EECCA countries is mainly oriented on control of implementation of international agreement, specifically about reducing human impact on the environment.

For several years USRIEP team performed work on information support of water resources management. Taking into account mainly regional kind of planning
and water-protective activities performed investigations oriented on their usage within the region (river basin or its part within the region or country).

Performed activities were based on the prevailing practice in Ukraine of surface waters protection from pollution, best practices developed in EU countries, in particular the proposed principles in EU Directive 2000/60/EC from 23.10.2000 (WFD) established for the EU's activities in the area of water policy, with additional materials on introduction of GIS elements (explanatory document # 9). Rules of monitoring and water quality assessment of transboundary rivers were also used. These rules were developed by a working group established under the auspices of the European Economic Commission, and aimed at implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992), materials from other organizations that have successfully worked in this area, in particular Ruhrverband (FRG).

The requirements for the presented information are assigned on the basis of national procedures for environmental management.

Methods of integrated assessments of human impact on water resources was developed, such as chemical sewage pollution, water use, waste discharge, fresh water use, etc. The proposed assessment methods have a physical meaning. Developed integrated assessment of human impact was tested in the information and management projects [3].

Information-analytical system "Water resources" was developed as an information management tool for water resources management [4-5]. Information-analytical system is based on GIS technology. The system works interactively with the user.

The main feature of a system is its possibility to construct queries. Electronic maps of the region, hierarchical drop-down menus and dialog boxes are used for queries construction. System user has ample opportunities for designing of complex queries in response to which the system gives statistical or analytical information.

This information system provides a variety of quantitative assessment of water resources in the territorial division and division of water bodies according to their hierarchy.

Assessment of the quality characteristics of surface water – their contamination and suitability for the main types of water consumption - is conducted in a system of ecological monitoring data in relation to the quality control stations, or their selected complex.

Specialized methods of environmental assessment approved at the state level and used for assessing the contamination of surface waters and analysis of the suitability of water resources for drinking and recreational water consumption.

The system also implements the possibility of a more refined analysis of surface water pollution, identifying the most important ingredients.

Particular attention in the system was focused on the reporting of analytical
results to user as one of the most important requests of use. The results are presented in the cartographic (thematic map), tabular and symbolic-numeric form.

This information-analytical system was used for surface water quality management and supply of water resources in Kharkiv and Luhansk regions. It was used during development of the programs aimed to improve the ecological condition of rivers Seversky Donets, Southern Bug, and environmental audits of Tashlykskaya hydroelectric power plant, etc.

Literature


