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**Monitoring of Surface Waters Pollution Level in the System
of the
Russian Hydrometeorological Service (as by example of Arkhangelsk Re-
gion)**

Hydrosphere is essential to human life. With the progress of civilization, its role is further enhanced: there are hydraulic structures created and operated, continuously growing demand in water supply and increased fishing and navigation. Surface waters, especially the inland water bodies, have appeared a segment most vulnerable to pollution. This, in turn, has required a thorough control over their state.

The guidelines of surface waters monitoring followed in Environmental Pollution Monitoring Center (EPMC) consist in

- Integral and systemized character of observations;
- Matching the observation time to typical hydrometeorological situations and changes in meteorological conditions;
- Determining the coefficients by methods commonly used in the RF.

The current surface waters monitoring system is designed to fulfill the following functions:

- to monitor the level of atmospheric pollution, as well as physical, chemical, hydrobiological (for water bodies) factors (in rivers, lakes, water storage reservoirs) and sea water and bottom sediments. This monitoring enables to study the process of pollutants' time and space distribution, to assess and forecast the state of environment and determine the efficiency of protection measures;

- to provide state governmental bodies, business entities and the public with systematic and immediate data on economy-induced changes in the water bodies pollution levels and hydrometeorological conditions, with forecasts and warning of the possible changes in pollution levels;

- to provide materials for stakeholders to develop recommendations for nature protection and sustainable use of natural resources, to develop plans of economic development with account of environmental status.

In the structure of Roshydromet (Federal Service for Hydrometeorology and Environmental Monitoring), it is the Environmental Pollution Monitoring Center

(operational Northern Department of Hydrometeorological Service) in charge of systematic monitoring of abiotic environment.

The main objects of surface waters monitoring include sea waters and inland water bodies. In addition, the Center performs monitoring activities under special-purpose programs: GOSMOS/Water program, transboundary transfer program, program for pollutants export into seas, background monitoring program.

For the purposes of surface waters monitoring, EPMC uses its laboratory. The latter is equipped with modern facilities and is accredited for technical competency and independent measurements. The main research methods include AA spectrometry, spectrometry, IR spectrometry, gas chromatography, flame photometry, flourometry, etc.

The Center's special focus is hydrobiological observations, a component of the surface waters monitoring. Its main purpose is to obtain hydrobiological information and assess environmental status. The hydrobiological methods used in monitoring the surface waters quality enable an integral assessment of the state of water body. Whereas hydrochemical methods mainly describe the intensity of anthropogenic impact on a water stream, hydrobiological ones allow assessing biota's response to the overall anthropogenic impact. These two groups of methods naturally complement each other.

The hydrobiological indices used in assessing the quality of water are the state of phytoplankton and zooplankton. The other important indices include the number of biomass of organisms and total number of species. The general assessment is based on sum-total of these indices and specific ecological and zoogeographical features of a given water body.

The systematic monitoring of hydrobiological indices is performed at 19 stations.

Environmental Pollution Monitoring Center also pays special attention to quality control. The quality control is broken down into three: sampling control, outside quality control and in-house quality control.

The sampling control is carried out by inspection of and sending to the monitoring network of blank control samples. The outside quality control includes inspections by guidance counselors from supervising institutes and quality control of quantitative chemical analysis (QCA). The QCA quality control is, indeed, one of the main types of control. It includes departmental control, international quality control and control by accrediting organizations.

The in-house quality control includes operative control, statistical control and information collection and processing control.

EPMC is a participant of several international projects.

There are 5 stations allocated to work on GOSMOS/Water program. The Center also participates in inter-laboratory research of water quality. In 2010, Canada's National Water Research Institute sent us 18 test samples, which were analyzed for 30 indices.

EPMC also participates in the Russian-Finnish project "Enhancing the Comparability of Environmental Monitoring Methods and Results and Improving Their Joint Use in Finland and North-West Russia". In the framework of this project, the Environmental Center of Northern Ostrobothnia (Finland) has performed an audit of the Center's laboratory for monitoring the surface waters pollution and precipitation. The objects of the audit included the procedures implemented by the Center to ensure quality of the analytical work, the compliance of laboratory testing and calibration (including sampling) with the international ISO/IEC 17025-2006 standard. In addition, a comparative analysis is carried out annually. The one performed in July 2010 included 21 indicators.

In performing one of its main tasks – provision of the information on the surface waters pollution level – EPMC publishes a number of information materials intended for stakeholders. The most important ones include the "Monthly Summaries on Surface Waters Pollution Level", Annuals on the quality of inland and sea water bodies, Annual overall surveys of environmental pollution.