

**MANAGEMENT OF WATER
QUALITY WITHIN
TRANSBOUNDARY RIVER
BASINS:
CASE STUDY OF UKRAINE**

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Main objective of water quality management program:

- to ensure the healthy aquatic life in the aquatic ecosystem
- to satisfy the quantity and quality requirements of the water use.

BE

Main river basins of Ukraine

PL

RU

SK

HU

RO

MD

RO

RU

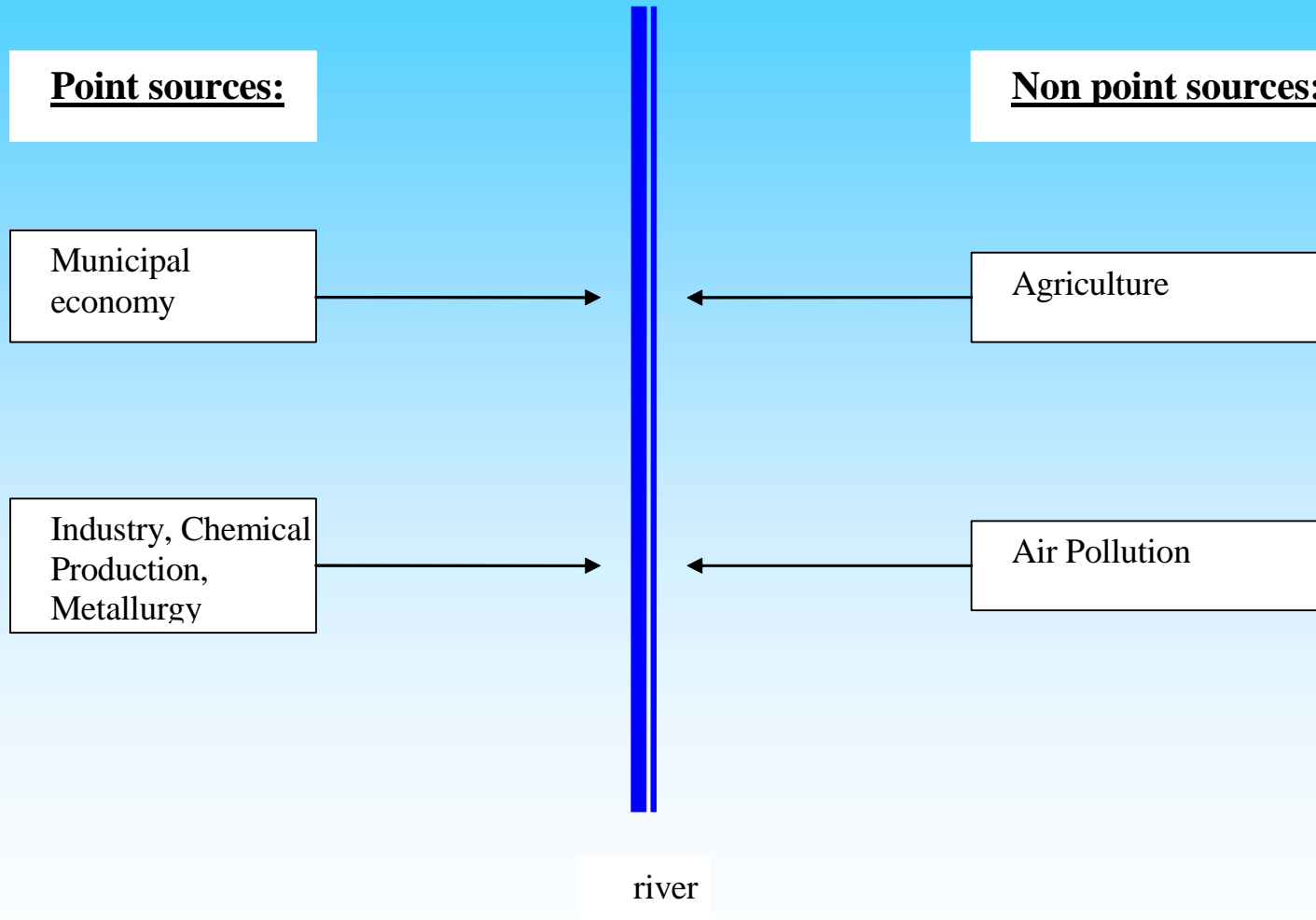
Поділ "ектів України за зонами гідропрогностичної відповідальності



The average annual runoff of the main river basins of Ukraine

River basins	Average annual runoff, km ³		
	Total	Formed in Ukraine	Inflow from other countries
Bug	1.4	1.4	
Danube	133.8	10.8	123.0
Dnister	10.7	9.7	1.0
Southern Bug	3.2	3.2	
Dnipro	53.5	19.1	34.4
Siversky Donets	4.81	2.96	1.85
Black and Azov Seas river basins	1.82	1.82	
Total	209.23	48.98	160.25

Main sources of pollution of transboundary rivers



Main water pollutants:

- **Sulphates**
- **Chlorides**
- **Organic matters**
- **Pesticides**
- **Oil products**
- **Heavy metals**

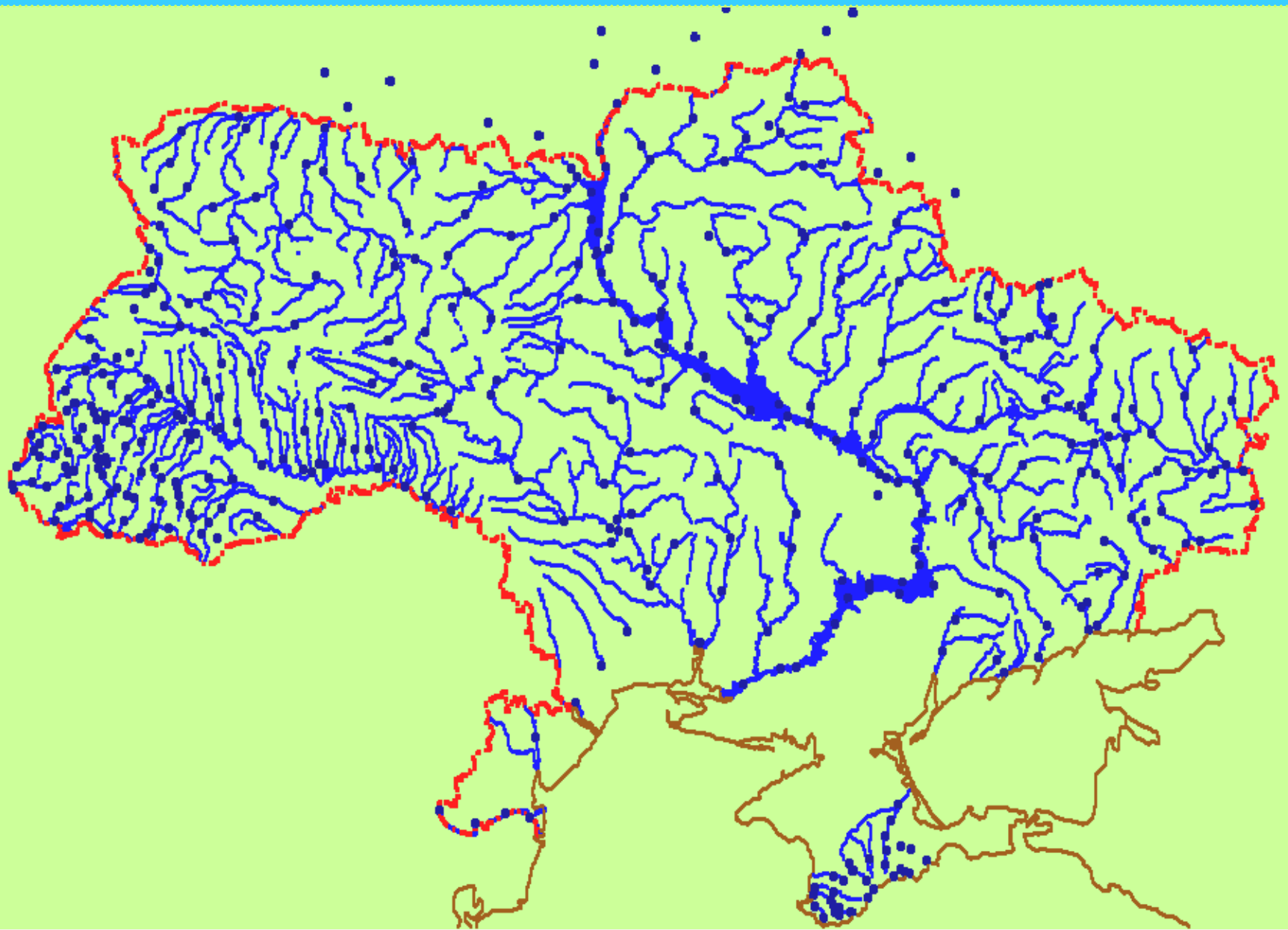
The effectiveness of the water quality management depends on the availability of regular and reliable information on:

- **the pollutants discharges from point and non-point sources into rivers;**
- **pollutant characteristics of the river and their spatial and temporal variation;**
- **environmental weathering of pollutants in the affected aquatic ecosystem;**
- **transportation, migration and pathways of the pollutants within the aquatic ecosystem;**
- **water quality requirements of the intended water uses**

Governmental bodies involved in surface water quality monitoring:

- **Ministry of Environmental Protection: a)co-ordination of monitoring activities of different Agencies;
b) monitoring of ground waters;**
- **State Hydrometeorological Service: water quantity and water quality monitoring of natural water bodies monitoring;**
- **Committee on Water Management – monitoring of man – made water systems and hydroconstructions in places of water intakes;**
- **Ministry of Health – monitoring of drinking water supply sources, monitoring of drinking water quality**

Network of observation points



Characteristic of the monitoring system of the State Hydrometeorological Service

- water quantity observation – 450 points;
- water quality observations – 255 stations
(406 measuring sections)

Principles of planning and implementation of monitoring:

- comprehensiveness and frequency of observations;
- co-ordination of the time of sampling with regular hydrological events and measurement of parameters using unified methods

Main limitations and problems of present water quality monitoring system:

- **lack of clearly formulated objectives of monitoring reflecting its relationship with water quality management;**
- **unclear distribution of responsibilities between institutions involved in the monitoring;**
- **outdated equipment and, as the result, quite limited possibilities to detect toxicants, pesticides, and heavy metals;**
- **lack of modern technologies of on-line transmission of data;**
- **water quality assessment based on outdated and inflexible the maximum allowable concentrations system;**
- **inadequate financial and logistics support of the monitoring activity.**

Sampling of water for chemical analysis



Laboratory analysis of water's samples



Fundamental water-related agreements:

- **Convention on the Transboundary Effects of Industrial Accidents;**
- **Convention on Environmental Impact Assessment in a Transboundary Context;**
- **Convention of Protection and Use of Transboundary Watercourses and International Lakes;**
- **Convention on Protection of the Black Sea from Pollution;**
- **Danube River Protection Convention and Guidelines on Water Quality Monitoring and Assessment;**
- **European Water Framework Directive.**

Components of properly designed monitoring program:

- **updated of water quality standards;**
- **selection of the parameters which determine water quality;**
- **standardizing of laboratory procedure;**
- **international laboratory intercalibration;**
- **international data exchange;**
- **integral quality assurance: analytical procedures and statistical evaluation;**
- **improvement and harmonization of collecting information;**
- **representative network of sampling points;**
- **prevention and control of accident pollution**

Parameters determined during water quality monitoring programme

- **conventional water quality parameters (temperature, pH, conductivity, total dissolved solids, suspended solids, dissolved oxygen, Na, K, Ca, Mg, Cl, SO₄, HCO₃, BOD₅, COD, nutrients, NH₄, NO₂, NO₃, PO₄);**
- **heavy metals (Cd, Pb, Cu, Cr, Zn, etc);**
- **organic micropollutants (oil components, PAHs, phenols, pesticides);**
- **radioactivity indicators (Sr-90, Cs-137);**
- **microbiological indicators;**
- **biological indicators;**
- **water quantity parameters (discharge, flow velocity)**

Principles of establishing of observation points in transnational monitoring network:

- at border sections;**
- upstream/downstream of major cities, tributaries;**
- downstream of the largest point sources of pollution;**
- in ecologically vulnerable areas;**
- connecting to control of water use for drinking water supply**

Elements of Early Warning Pollution System:

- **communicative measures: establishment of a network of Principal International Alert Centers; agreement on international alarm procedures;**

hazard identification: knowledge of expected accidental pollutants; risk analysis based on target values and identification critical risk factors;

- **alarm model forecasting the propagation of the pollutant plume including hydrological parameters;**
- **local screening of water quality: quick and reliable analysis; simple tests to supervise the water quality**

Conclusions and Recommendations

Creation and development of effective water quality monitoring system in transboundary river basin on a basin-wide scale is an essential component of elaboration and implementation of water quality management strategies for pollution abatement, river ecosystem protection and restoration. This system allows to obtain data about different types of pollutants that is very important for water users and ecosystems' health. Development of water quality monitoring programs on the basis of UE WFD can be an instrument for improvement of water quality management in Ukraine



**Thank you very much
for attention !**