“Specific problems of transboundary water management along eastern borders of EU territories – with special attention to the Bug River Basin”

Abstract: At the beginning of the paper the location of Bug River Basin is shown and few figures are describing size of the catchment, length of the border line etc. With description of the region the outstanding environmental values of the river are underlined. After short reference to history - how the border along Bug River has been set up – the notice to present political & geographical situation is given, with attention to position of the Bug line as important part of Eastern borders of EU and NATO territories. Next, general aspects of transboundary water management have been referred, with concern to basic law regulations and inter-state agreements. Information about international study-project on development of monitoring to support water management and protection of water quality in whole transboundary Bug catchment has been presented. Questions of flood control and problems of utilization of water resources - with classification of water quality - are characterized.

To illustrate a proportion of Bug River to other European rivers of similar length, it becomes right to underline that the length of Bug River is nearly equal to length of Seine or Drava. Therefore Bug River is shorter than Rodan (difference is only ca 40 km), and remarkably longer than Garonne or Po River. Moreover, with account to its length Bug is the fourth river of Poland - the first three are - Vistula, Oder and Warta rivers. Bug River is the tributary of Narew River, which is the greatest eastern tributary of Vistula River. The area of Bug catchment up to northern point of the border line counts 30,000 sq. km. – what means about 75% of total Bug watershed area. Only one-third of those 30,000 sq. km. belongs to Polish state territory – the Ukrainian part is nearly 11,000 sq. km and the Belarussian about 9,000 sq. km. Total length of Bug River is 772 km, length along state boundaries 363 km.

The yearly average discharge at the northern point of state border is 118 cms (ca 77 % of average discharge in the mouth to Narew). With the analogy, extreme flows: the flow of 1% probability is 1600 cms (60 %) and minimum 12 cms (60 %).
The climate of the Bug catchment is temperate, although average temperatures are lower comparing to central regions of Poland. The total runoff for whole Bug Basin is near to 5 000 000 cu. m per year – what means about 125 litres per 1 hectare.

The topographic shape of land may be described as low-lands with numerous moderate hills - what creates very attractive landscape. With the domination of green area, with below noted (see next page) low population density - the whole region can be fairly justified as reach of environment out-standing values and of land beauty. In the harmony to attractive shape of land surface, Bug River has to be regarded as one of the few European rivers being very near to natural conditions. Until now the river course and the valley leaves to be not seriously affected by reclamation and by dike construction. The hydraulic engineering structures are very limited and rare. The bed of the river is unstable - with many movable meanders, islands and small lakes. Banks of the river are often sharpened by erosion, in numerous locations nice gorges have been formed. In spring months the valley becomes inundated with extreme flows, those conditions are propitious to growing of marshy forests inside unregulated river valley.

The complexity of the river network is illustrated above by a piece of Bug catchment map with addition of two zoomed fragments, showing meanders of the river in the upper part of the Polish-Ukrainian state boundary.

The charm of Bug River is shown with photo below:

The initial point of Polish-Ukrainian inter-state river boundary.
Such self-conservation of river natural shape may be considered as the indirect effect due the river was designated as inter-state boundary. That decision causes restrictions to access of people to banks of the river, poses difficulties to industrial and urban development in border-land areas – what brings significant mitigation of anthropogenic impacts to natural environment. That situation is favourable to increase population of wild and rare habitats, is also good place for intensive growing of trees, bushes and grass meadows.

The Polish system of environment protection recognises different categories of areas to be subject of special care:

1. national parks;
2. the areas landscape protection;
3. areas designated to be protected due to function.\(^1\)

In the transboundary part of Bug Basin the significant parts of the river valley have been designated as areas of special environmental attention, as shown on the picture. Zones of protected landscape are marked as red, the complex of “Shatsky National Park” is marked blue, the area of “Western Polesie”, proposed for protection is marked orange. Main cities are pointed and road are traced with dark green. Important category of protected areas are “ecological corridors” traced by nature along rivers – the whole valley of Bug River is concerned as “corridor” of great significance.

The dominating uses of Bug catchment area are: arable land (45%), meadows, pastures and orchards (nearly 20%) and forests (little above 25%). The remaining 10% consist of waters, of urban and village settlements, of not-usable areas etc.

The total number of people living in the Bug Basin is about 3.7 millions, 48% of that figure are citizens of Ukraine, 36% citizens of Poland and 16% - citizens of Belarus. With that number of basin population the average density is nearly 100 per 1 sq. km. However, to illustrate the in-land-density, the given estimate should be corrected accounting two big agglomerations: Brest of Belarus (about 400 000) and Lviv of Ukraine (1 000 000). In Poland the cities are smaller, with the total population ca 300,000 – then the effective density in rural area is less then 60 per 1 sq. km. The figures as above show the region as the area without extensive development, generally free of industry and of intensive urbanization.

The subject of the TRANSCAT Conference is the integrated water management in transboundary catchments. Considering the aspects of the problem defined in this way, it may be recognized to remind the sentence formulated by well known Polish geographer, Eugene Romer, who wrote: “River is not designated by nature as the border”. However this opinion has been formulated with reference to ancient and medieval history, it very well fits situation of Bug River. This river has been set up as the inter-state border in the end of eighteen century, basing on political decisions connected with the division of Polish State territory by neighbouring powers. With the break in the period between First and Second World wars, the line of Bug River was accepted (at conferences in Yalta and Teheran) as the state border between Soviet Union and Poland.

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\(^1\) e.g. areas around municipal water intakes, small areas inside forest complexes - with rare flora & fauna etc.
After the year of 1991, with the new international situation in Central & Eastern Europe, the line of Bug River became the state boundary separating territories of Poland, Ukraine and Belarus. This line is already Eastern border of NATO territory and in the very near future (May of 2004) will be settled as the eastern longest river boundary of European Union.

The political & economical factors influence development conditions in areas located on both sides of state boundaries. The ethnic ties and advanced cultural relations between neighbouring countries may facilitate transboundary cooperation. Interpretation of national border as military line of defence may cause difficulties for neighbouring states and nations. If a river is designated as the inter-state boundary, political conditions and circumstances mentioned above may influence whole course of water resources management in the concerned catchment. The EU Framework Water Directive incorporates rules of catchment integrated management, what obligates EU member countries to close cooperation in all activities in that domain.

In the specific situation, when one of neighbouring countries is not a member of EU, the Directive calls for establishment of agreements, regarding water resources protection in the transboundary catchment area:

> Where a river basin district extends beyond the territory of the Community, the Member State or Member States concerned shall endeavour to establish appropriate coordination with the relevant non-Member States, with the aim of achieving the objectives of this Directive throughout the river basin district. Member States shall ensure the application of the rules of this Directive within their territory.

Therefore, with reference to situation of Poland, few significant questions should be discussed. First of them is the very near perspective of accession to European Union. The decision of that change makes the very great impact to whole political and economic situation of the country. With concern to domain of water management, it means the acceptance and implementation of the policy as expressed in the EU Water Framework Directive.

Second, is the position of transboundary problems in the integrated water management. The total length of boundaries of Poland counts ca 3500 km, 50% of those are traced along sea shores and along edges of Sudeten and Carpathian mountains. Important borders along rivers are:

- Western border along Oder River and along its tributary Nysa Luzycka River, (ca 400 km)
- Eastern border along Bug River (ca 360 km)

In the light of those proportion the Polish problems of transboundary water management have to be interpreted as the state domain of great importance. The similar conclusion as refers to Bug River is obvious. Polish system of water resources management is based on general legislation contained in the Act called “Water Law” - accepted by Polish Parliament in summer of 2001. This Act incorporates regulations defined with accordance to the EU Water Framework Directive. The Accession Treaty, as signed in Athens, contains recommendations and regulations regarding terms & procedures how the introduction and implementation of the EU ecological strategy ought to be proceeded. According to “Water Law” of Poland, the State territory has been divided to two great area units Oder Basin and Vistula Basin. Those great units are divided to smaller parts, called “water districts”. That concept creates the base for implementation of the catchment management system - treated as law principle by EU Water Directive. The Bug catchment is the part of Middle Vistula District and the eastern part of that catchment is the transboundary area.

The questions of transboundary water management have to be arranged and solved on the central state governmental level. Those activities are charged to competency of Ministry of Environment, which is responsible to establish & implement inter-state agreements.
Previously, the inter-state cooperation on water management was regulated by old acts settled during decade of 1960s by governments of Poland and Soviet Union. Situation resulted with historical change in 1990s, when Ukraine and Belarus became independent countries, involved the demand of new inter-state relations.

The transboundary water management in Polish-Ukrainian part of Bug Basin is regulated by the Act settled in October of 1996. This Act contains obligation of both countries to:

1. protection of all waters along border line – including flood control and care on all river engineering structures;
2. harmonization & coordination of planning and of implementation works;
3. exchange of information and permanent consultations regarding all matters of water management in the transboundary area.

The list of targets includes: - monitoring on hydrology and water quality; - protection of water against pollution; - mitigation and response activities concerned with risk to water quality; - stabilization of border line installations (this task will become one of serious attention - regarding meandering & unstable river course - with reflect to demands on safety of EU borders defined in Schengen agreement). The control on implementation of tasks as above is charged to Polish-Ukrainian Commission.

The cooperation in the environment domain, between Poland and Belarus is based on the general agreement (formulated in 1992) concerning whole transboundary ecology problems. In that Act the following tasks are mentioned: (1) - protection against pollution of water, of soil and of air; (2) - construction of sewage treatment installations; (3) - development of water supply and sewage networks; (4) - utilization of wastes. Until now detailed inter-state agreement on water management is not settled, then those questions are interpreted as regulated by old acts formulated in 1960s. It should be noted that to-day contacts between Polish and Belarussian governmental authorities, responsible for water management, are not intensive, infrequent and very rare.

It is necessary to note that mentioned above inter-state acts were formulated before EU Water Framework Directive was proclaimed and before the accession of Poland to UE was finally decided. Moreover, few previous decades brought significant changes in interpretation of general environment protection objectives, expressed now by new detailed law regulations - EU directives. With reference to transboundary catchment of Bug River, it justifies to proceed urgent work on preparation, legislation and implementation of new international agreements in accordance with present state of policy and knowledge. That should bring definition of standards acceptable for three neighbouring countries and create the solid base for permanent, intensive and successful activities of water management in all parts of Bug Basin. Specialized organizations, acting under auspices of state or regional authorities together with numerous different non-governmental agendas will participate in environmental, regional & borderland activities to fulfil standing targets.

In Poland, the supervision on river and water environment conditions is charged to state water administration, realized in cooperation with central & regional administrative agendas. The hydrological monitoring is realized by state services, the processing of gathered data is proceeded by specialized units. The coordination of water management with development of the region is considered as important factor to shape activities of regional administration. As significant, the question of communication network should be noted, with attention to settling of new border crossings and with regard to impact of road & train traffic to natural conditions of Bug valley natural environment.
The broad scope of comprehensive problems, the important position of transboundary Bug River Basin caused a significant pressure to different scientific organizations and to specialized international agendas to undertake studies on regional ecology and sustainable development matters. In the period of 1997-2002, under auspices of EU and UN organizations the pilot study-project was arranged with participation of experts delegated by three neighbouring countries: Poland, Ukraine and Belarus. Basing on Memorandum of Understanding, as signed in 1997, the supervision and controlling on Project execution was charged to Polish-Ukrainian-Norussian Commission. The results of the Project are contained in three successive reports presenting following stages of the study works. Because the scope of that study covers whole area of Bug transboundary catchment, including parts located in three neighbouring countries - the reports, formulated in English, may serve as recommended information source. The analyse of water resources using ad protection led to define main target of water transboundary management: to reach good ecological conditions in Bug River and its tributaries, satisfying needs expressed in EU Water Framework Directive and in other subordinated EU regulations.

Then, the proposals defined in the project are based on the detailed identification of Bug catchment problems, with collection and specification of information needed to be gathered by monitoring network - in the scope sufficient to recognize situation of water quality & quantity in the river - with attention to conditions of ground waters and with care to general ecology matters of the concerned borderland region. Those solutions contain proposed locations of new monitoring points to strengthen present network. The adjacent procedures of monitoring and of data processing are described, regarding standards of EU directives – with consideration to data on water and environment pollution.

Flood control should be considered as the very comprehensive task, joining competencies and activities of many governmental and non-governmental agendas, with significant impacts on all activities of regional communities and on all aspects of regional development. As the obligation settled by Polish “Water Law”, preparation of flood control plans is charged to regional water authorities. Then the problems of flood control in the transboundary valley of Bug River were the subject of study performed for area of Middle Vistula catchment. Length of dikes in Polish part of Bug catchment accounts ca 160 km, what is sufficient to secure 67% of risk area and 84% of regional population. Because, as stated above, the Bug valley is not the area of intensive development, decision on extension of flood protective structures ought to rely on very strict economical calculation – with regard to preserve present satisfactory conditions of natural riverine environment. The optimal strategy of Bug flood control should be based on modern mapping of transboundary risk areas (with application of GIS standards) – the preparation of those maps ought to be initiated as the urgent task to be realized in cooperation of three neighbouring countries. That strategy should regard present approach to flood control as it has been defined at 1994 Yokohama Conference and extended during International Decade of Natural Disasters Reduction. We may assume that new EU-Directive on flood control (now in preparation) will give guidance in those activities.

Surface and underground water resources of Bug River catchment are utilized to cover agricultural, industrial, municipal and village settlement demands. The total average supply in Polish part of Bug catchment is ca 85 millions of cu. m. per year – it includes 47% for agriculture, 15% for industry, 38% for municipal and village networks.2

2 With consideration to whole transboundary Bug catchment, those proportions show greater participation of supply of water for drinking (54%), agriculture: 30% and industry: 16%.
Industrial, municipal and village demands are mainly covered by supply from underground sources. Surface water, supplied for agriculture, is used for irrigation of meadows and for fish ponds. The actual standards of water supply for domestic purposes are significantly lower as comparing to other regions of Poland. In the analyses of surface water resources allocation, the need to guarantee low flows in rivers as regarding riverine ecological demands is seriously considered.

The risk to water quality is caused by outflows of wastes from industry, from municipal and from few village networks. Near to southern edge of Polish-Ukrainian border the pollution, caused by coal and metal industry localized in Ukraine, is observed. It is also necessary to point risk of pollution in Bug River below agglomeration of Brest (Belarus).

With the above illustration, 2002-characteristics of water quality are given as follows:

- A – classification based on physical and chemical parameters
- B – based on “coli test”, and
- C - based on joined physical-chemical-bacteriological criteria

With regard to those characteristics of water quality it is necessary to consider the fact that Bug River mouth is Debe reservoir, where the intake for municipal network of the capital of Poland (Warsaw) is localized. Then improvement of Bug water quality is the very important task to be realized.

In the summary, it has to be pointed that the Bug valley has the big chance to establish and implement regional objectives as well subordinated to general strategy of sustainable development. That favourable perspective is the consequence of actual satisfactory status of regional environment, of present low pressure for intensive industrialization and urbanization. Those circumstances should facilitate harmonic performance of regional investments to improve life standards of people. Attention has to be paid to specific problems connected with boundary and interstate questions (including the necessity to secure stability and safety of the boundary line), with demand for development & exploitation of international communication and traffic. The comprehensive cooperation between Poland, Belarus and Ukraine should include integration of transboundary water management to reach targets incorporated in EU Water Framework Directive - supported by relevant legislation of EU and of those three countries.

NOTE This paper has been formulated basing on publications of Central Statistical Office of Poland, on few materials for monograph of Bug River (that monograph was in preparation during days this paper has been written). Also the reports presenting conclusions of studies, performed with participation of experts from different countries, realized under auspices of UNESCO (those reports are formulated in English) were applied as the very important source of information about concerned transboundary river basin.