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Божук Т.Н., канд. мед. наук, доц. (Белгород); *Сокорев В.В.*, канд. пед. наук, доц. (Белгород); *Третьяков А.А.*, канд. пед. наук, доц. (Белгород); *Грицунова С.В.*, канд. экон. наук, доц. (Ростов-на-Дону); *Уралов Б.К.*, канд. техн. наук, доц. (Шымкент); *Войтович В.М.*, канд. экон. наук, доц. (Минск); *Каратаева Л.А.*, канд. мед. наук (Ташкент); *Хашба Б.Г.*, канд. мед. наук (Сухум).

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СЕКЦИЯ «ЕСТЕСТВЕННЫЕ НАУКИ»

ENVIRONMENTAL PROTECTION MEASURES TO PRESERVE
THE IRTYSH RIVER FLOODPLAIN

SAGINOVA G.S.

Chief Specialist,

Yertis Basin Inspectorate for Regulation of the Use and Protection of Water Resources, Committee for Water Resources, Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, Pavlodar, Republic of Kazakhstan

KALIYEVA A.B.

Candidate of Biological Sciences, Associate Professor, Head of the Department of Biology and Ecology, Pavlodar State University named after Toraigyrov, Pavlodar, Republic of Kazakhstan

BITKEYEVA A.A.

Doctor PhD, Associate Professor, Department of Biology and Ecology, Pavlodar State University named after Toraigyrov, Pavlodar, Kazakhstan

KUKUSHEVA A.N.

Doctor PhD, Associate Professor, Department of Biology and Ecology, Pavlodar State University named after Toraigyrov, Pavlodar, Kazakhstan

In this article, the authors describe environmental measures to preserve the floodplain of the Irtysh River - monitoring the environment, water resources, anthropogenic impact on the floodplain. Recommendations are given on preserving the ecosystem of the Ertis River.

Keywords: pollution, environment, floodplain, Irtysh River, water resources.

At present, the problem of the resilience of aquatic ecosystems to external impacts, in particular anthropogenic impacts, is of particular relevance.

Water resources of the Republic of Kazakhstan are the reserves of surface and ground waters concentrated in water bodies, which are used or can be used.

The total amount of guaranteed water resources is 23.2 km³ per year, except for those necessary for environmental purposes and to ensure mandatory flow to neighboring countries.

In case of unfavourable climatic and transboundary hydrological situations, a decrease in surface runoff in Kazakhstan by 11.4 km³ per year is forecasted by 2040.

Water scarcity is a key environmental problem hindering the sustainable development of Kazakhstan.

Water bodies include the concentration of water in the land surface and subsurface of the earth, which have borders, volume and water regime. They are: seas, rivers, canals, lakes, glaciers, surface and underground water bodies.

Surface water bodies are heavily polluted by mining, metallurgical and chemical industry enterprises, agriculture and municipal services.

Polluting industries discharge about 50% of water annually without treatment, which means 1.5-2 km³ of untreated wastewater per year. Due to the lag in the availability of wastewater disposal systems in Kazakhstan, only 29% of wastewater in settlements is recycled prior to discharge (in the UK, 94%, Israel and Singapore, 100%). Groundwater in production and consumption waste disposal areas is also prone to pollution.

At the same time, the quality of river water depends not only on the organized discharges of waste water, which is constantly monitored, but also to a large extent on the area flushed into water sources of various wastes (overburden dumps, ash dumps) from the territory of settlements, chemicals washed away from the fields.

The imbalance between the anthropogenic load on water bodies and their ability to restore has led to the fact that environmental problems have become characteristic of virtually all large river basins and represent a real environmental threat [1, p. 3-7].

The Ertys River is one of the major transboundary water resources of the Republic of Kazakhstan. The upper part of the Ertys River basin is located in China (CPR), the middle part of the basin with the area of about 200 thousand km is located on the territory of the Republic of Kazakhstan and the lower part with the area of 1340 thousand km is located on the territory of Russia. Since the river is transboundary, its rational use has not only economic and environmental significance, but also great political and international significance.

The ecological system of water resources is quite vulnerable, gradually degrades and needs to unite the efforts of all transboundary states for coordinated joint actions to preserve and maintain its biosystem.

The Ertis River is the main waterway of the Pavlodar region of the Republic of Kazakhstan. On the territory of Pavlodar province there is a 720 km long section of the middle course of the river. The area of the catchment area at the river entrance

into the oblast is 276200 km², and on the border of Pavlodar and Omsk oblasts 591100 km².

The main sources of pollutants of the Ertysch River are the enterprises of oil extraction and oil refining, mechanical engineering, metallurgical, construction, timber, woodworking, light and food industries, river port, housing and communal services, as well as unorganized wastewater from residential areas and agricultural lands and transboundary transfer from the territories of neighboring regions and states.

Heavy metal contaminants are also the means of chemicalization, which are widely used in agriculture in the region.

Within the framework of environmental protection measures, mercury monitoring is carried out annually in the region, the main goal being to determine the level of mercury content in the air, soil, surface and ground waters formed after demercurization works.

According to the Mercury Monitoring Program in the area of the Northern industrial zone of Pavlodar for 2018-2025, observations of the condition of atmospheric air, soil and groundwater and surface waters are carried out.

In order to control and monitor the environmental condition of the environment on the territory exposed to mercury pollution, a network of 41 monitoring wells and observation points for changes in mercury content in groundwater, surface water, air and soil has been established.

According to the regulatory authorities, the planned sampling for 2019 is 242 plus 10% duplication of samples (75 atmospheric air samples, 24 soil samples, 16 surface water samples, 87 groundwater samples, 21 biological samples of fish and waterfowl, 9 samples of biological samples of people (hair), 10 samples in snow cover, restoration of 15 observation wells).

Some studies of the environmental condition of the Ertysch River were conducted, the essence of which was hydrological study of the river in order to clarify the area of flooding and justify water management and water protection measures in the floodplain lands of the Pavlodar region.

After the establishment of the long-term regulation of the Ertysch Bukhtarma reservoir, the hydrological regime of the river significantly changed, which contributed to the complication of the water management situation in its basin.

During the years of regulated flow of the Ertysch River, its hydropower use at the Bukhtarma, Ust-Kamenogorsk and Shulbinsk hydroelectric power stations made it difficult to conduct water and agriculture, river transport, fishery development,

caused damage to biogeocenosis of floodplain lands and the environmental situation in general. One of the basic rules of ecology was manifested in action - the rule of integral resource, the content of which says that competing in the use of specific natural systems of the sector of national economy inevitably cause damage to each other and nature, the more they change the jointly exploited ecological component or the entire ecosystem as a whole.

In order to maintain favorable conditions for the functioning of the natural complex of the Ertysch floodplain, a cascade of water reservoirs annually carries out special environmental releases, maximally timed to natural floods. The organization of releases depends on the annual hydrometeorological conditions in the Ertysch River basin, taking into account the interests of many sectors of the economy, and environmental protection [2, p. 2-4].

The Ertysch River floodplain is a very diverse complex of vegetation cover, soils of underlying soils and relief. The depth, duration and conditions of flooding of floodplain massifs depend on the nature of the micro-relief, surface marks and the amplitude of water level fluctuations during the environmental release.

The floodplain of the Ertysch River with a total area of 375 thousand hectares (with water area) is a unique natural complex distinguished by the richness of flora and fauna and geographical landscape.

Much attention is paid to the study of the Ertysch River floodplain, as it is not uncommon to carry out various economic activities on land drainage, construction of dams and dams, and use of groundwater associated with the floodplain territory.

It is difficult to overestimate the importance of the Ertysch River floodplain for the surrounding regions, both in national economy and ecology. During the previous historical epoch, nature has formed a unique landscape that has served and continues to serve the people, while quickly being subjected to destruction by the main consumer - the producer of its own goods - human beings. What has been created over the previous millennia can be destroyed over a period of one generation of people's lives.

Considering one of the negative factors negatively influencing the development of plant communities, anthropogenic impact on the Ertysch River floodplain, which is expressed, first of all, in the haphazard and excessive bleeding of vegetation by agricultural animals [3, p. 10-48].

Recommendations for the conservation of the Ertysch River ecosystem.

When using lands for any agricultural and industrial works, the obligatory element of environmental protection should be landscape optimization, i.e. the choice

of methods for rational land use, in which the potential of the given landscape will be fully consistent with its socio-economic functions.

Stability of the floodplain is determined by its ability to produce stable yields of agricultural structures, i.e. the criterion of stability of the floodplain landscape is its bioproductivity. Studies show that one of the main factors of increasing the crop yield of floodplain lands is their moisture content, regulated by the hydrological regime of the river.

Rational pasture rotation, i.e. uniform distribution of pasture loads over the territory, selective irrigation and watering of pastures, prohibition of cattle grazing in the downed areas, sowing of valuable fodder crops.

Further, the most important environmental protection measures are:

- Landscape planning, which consists of landscape analysis, diagnosis and forecasting of the area's resistance to anthropogenic impact, which should be carried out at the land use planning stage;
- erosion control measures;
- continuous monitoring of the environment and public health;
- fight against flooding of the city territory;
- regulation of the hydrological regime of the Ertysch River through the regulation of water volume by reservoirs.

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II МЕЖДУНАРОДНОЙ НАУЧНО-ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ

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