The Shannon index was used in the analysis of bird communities to characterize the diversity and uniformity of the community [2]. The largest value of the Shannon index is Loshitsa estate and Park complex and is 3.27. This means that in this Park the community of avifauna is more diverse and the number of bird species, its components are more aligned. Therefore, this area is the most favorable for the habitat of birds. The lowest value of the index is fixed in the Park named after the 50th anniversary of the Great October-2.49. Therefore, species diversity is of the least importance.

To get a complete picture of the studied community it is necessary to have an idea not only about the species diversity, but also about the degree of dominance. The Berger-Parker index was calculated for this purpose [2]. The dominance of one of the most abundant species is observed in the Park. "Chelyuskintsev" and the Botanical garden (Finch), as well as in the Park named after the 50th anniversary of the great October (great tit). The index is 7.24 and 7.35, respectively. The natural monument "Grove" index made up of 9.65, in the Park "Medvezhino" of 10.25. This means that in these areas there is also the dominance of one species, but it is significantly weaker than in Chelyuskintsev Park and Botanical garden.

Thus, it is established that the biodiversity of birds indicates the environmental conditions of their habitats. So the most favorable place for bird habitat is the Park "Thrushes" (the greatest species diversity and population density of birds). It is located on the outskirts of the capital, anthropogenic and technogenic loads are minimal. Less attractive place for bird life is the Park named after the 50th anniversary of the great October (small species diversity and population density of birds). This area is subject to a large man-made load, as it is located within the industrial district of the city. It can also be concluded that parks play a role in the conservation of bird biodiversity in cities where natural conditions are almost gone.

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SOURCES OF HEAVY METAL INCREASE IN SOILS IN THE TERRITORY OF BREST REGION

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According to FAO, WHO, UNEP, currently heavy metals occupy one of the first places in terms of the level of danger, ahead of such dangerous environmental pollutants as pesticides, carbon dioxide, sulfur compounds, nuclear waste and solid waste. These pollutants are the most dangerous in terms of rates and volumes of release into the environment.

Keywords: sources of pollution, heavy metals, soils.

Currently among heavy metals, Pb, Cd, Zn, Hg, As, Cu are considered to be the priority pollutants. their accumulation in the environment is very fast. The content of various elements in soils is significantly influenced by the atmosphere, when contamination of TM from the atmosphere, the distance on which the soils from the primary source of pollution are important plays an important role. As you move away from it, the intensity of soil contamination decreases, but at the same time the area exposed to pollution increases. Soil contaminants, carried by air, arise not only in the course of human activities, but also in connection with a number of natural factors.

The main sources of airborne contaminants TM in Brest region:

Natural sources of income:

1) soil formation, weathering of rocks and minerals;

2) space (cosmic dust);

3) forest fires.

A great difference is observed in the content of heavy metals between coarse (sandy) and finely dispersed (loamy and clayey rocks): in sand it is several times smaller than in loams and clays. The gross content of elements in natural, unpolluted soils is due to their content in the parent rock. The background content of heavy metals in soils is an important indicator for assessing the degree of their contamination. This is due to the fact that the spread of the content of individual elements in different countries in regions within the same type of soil may overlap with that on other types of soils.

Anthropogenic sources:

1) Transport - locomotive depot in Brest. Brest is the largest railway junction on the border of the CIS and the European Union (lead compounds, exhaust particles of cars, coal dust, ash).

2) Heat power plants (coal dust, ash, smoke, toxic solid particles, gases (a potential source may be the Brest Heat and Power Plant);

3) Metallurgy (ash, soot, dust). On the territory of the Brest region there are the following metallurgical enterprises: Brest Electric Bulb Plant, Brevttortchermet, Beloelectrostroy Assembly LLC, Velcinia LLC, BrestMetallKraft LLC, Metal Bug LLC, Val Vick Plus LLC, JLLC " Lumber, ChTUP AustmetGroup, UP BrestMet, OOO Brestmash, OOO Special Materials (RF) in the Republic of Bashkortostan, ChTSUP Metsnab, Skill LLC, Fina LLC, UE Metall Plus , OJSC "Metalist"; enterprises for the production of electrical products: LLC "VDS", ODO "Belsan"; plant for the production of gas stoves of JV JSC "Brestgazoapparat", etc.

4) The industry of construction materials (cement dust, fluorine, etc.): Beltrim LLC, RUE Brestvodstroy, Azaria Stroy LLC, Inteks, NPKCs, Kultbybkhoztorg OJSC, Brestoblubrador UE, Promtekhmash LLC ", ChUP TP" Zov ", Chernavchitsky ZZHBI, Brest Plant ZHBK, Brest Plant of Building Materials and others.

5) Chemical industry (production of inorganic and organic substances): JSC "Brest Factory of Household Chemicals", JSC "DBK"; paint and varnish industry: JV "Diskom", ChUPP "Modest", ChT PUP "StroyAvtostil", UE "Minsk Lakokraska Bug", LLK Lankvatzer Lakfabrik Bel, ICCHPP "Condor" etc .; production of plastic and packaging: ChUPP "TKL", FE "Skrobot SV", LLC "Riona", PT ChUP Zyudpakbel and others.

6) Pulp and paper industry, printing: "Vecherniy Brest", "Zarya", "Brestsky Courier", "Brest Herald", "Brest Printing House", "Akademia" publishing house.

7) Pharmaceutical industry: Slavex-B firm Slaveks ICCHUP, World of Ecology Regional representative of the DIODE plant in Moscow.

8) Refining of petroleum products: OOO NAAS, IP Lukoil Belarus, Koneel IP, Ideal Standard UTS, Brestoblnefteprodukt, BelTransOil JV.

9) Food and meat and dairy industry (lead compounds): Inco-Food LLC, meat processing plants.

10) Solid and liquid household municipal waste, including SALT.

11) Human settlements (ash, dust).

12) Agriculture (fertilizers, pesticides).

The problem of the accumulation of solid domestic waste and the composts that are produced on their basis, which in the 1980s were used as organic fertilizers in agriculture, is of particular concern. On the territory of the Brest region there are 12 polygons for storage and disposal of wastes (according to the website of the Ministry of Natural Resources, as well as from other Internet sources) landfills of solid waste:

1. Landfill Brest Street. Kovelskaya, 1.

2. Landfill pos. Berestye.

3. Landfill site of Omelino village.

4. Landfill site Medno.

5. Landfill for storing agricultural waste in the village of Vitoski.

6. Sludge removal Brestenergo.

7. Storage tanks for slurries of petrochemicals and bitumen-containing wastes of road building trust No. 4 in the village of Vychulki.

8. Sludge accumulators of Brest stocking plant.

9. Sludge pads for storage of sewage sludge of the Brest city sewage treatment plant in the village. Berestye.

10. Sludge ponds and mud collectors of urban sewage treatment facilities - the territory of treatment facilities and on the territory of the 5th Fort.

Thus, uncontrolled use of sewage sludge and solid household waste in a pure form or as part of composting mixtures carries the danger of contamination of soils and plants with heavy metals, which limits the use of sewage sludge and solid household waste as fertilizers for all types of crops. A certain contribution to the supply of

TM to the atmosphere can be provided by the CHP plant and the waste processing plant located in the city of Brest. Also alarming is the battery plant under construction in the Telma area - 2 in Brest.

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LIGHTING MANAGEMENT IN A CLOSED WATER ENVIRONMENT

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The question of illumination has always been an important aspect in the existence of any living being. The main characteristics of light are its intensity and spectral composition. The development of living organisms depends on light. The most demanding in lighting matters are plants. Due to lack of light, they not only slow down their growth, but they can also die.

Keywords: closed aquatic environment, aquarium, microcontroller, Arduino, light, automatics.

The question of illumination has always been an important aspect in the existence of any living being. The development of living organisms depends on light. One of the most complex environments for controlling the level of lighting is the water environment. For a harmonious development of life under water - the water light day should last at least 14 hours. Not only the growth and multiplication of plants depends on light, but also the process of photosynthesis, which gives the water and water inhabitants the necessary oxygen. The intensity of light and the intensity of photosynthesis are directly related to each other [1].

Different types of fish need different light intensities. Some species are used to live in the twilight or deep at the bottom of the reservoirs. One of the most widespread aquatic environments is the aquarium.

The most popular for illuminating the aquarium are electric incandescent lamps, which are usually fixed in the lid. Another option is the side light, when the lamps are placed on the side of the aquarium, right behind the glass.

With the advent of microelectronics, the issue of control and management of electrical components has been greatly simplified and the automation process has become possible. To create a lighting control system within the aquarium, it is sufficient to use a microcontroller.

One of the popular microcontrollers is Arduino. Arduino is a small board with its own processor and memory. The board contains contacts for connecting the necessary components. The most popular microcontroller is Arduino Nano, which has 14 digital inputs / outputs (6 of which can be used as PWM outputs), 6 analog inputs, a 16 MHz processor, a Mini-USB connector, a power connector, a connector for in-circuit programming ICSP) and the reset button [2].

To control the lighting system, in addition to the Arduino Nano microcontroller, power drivers are needed to regulate the voltage of the lighting elements, a radio module for remote monitoring, a real-time clock to record the timekeeping data, and a system for visual control in the form of a display, control buttons and diodes (Fig.1) [3].