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THE EVALUATION OF THE ENVIRONMENTAL STATUS OF THE DARNYTSYA LAKES, KYIV CITY

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Abstract

The assessment of the environmental status of the Darnytsya system of natural and artificial lakes in the city of Kyiv is presented. These lakes have a complex landscape structure and potentially high diversity of groups that require detailed research and protection. It was established that the main factors affecting lake ecosystems are recreational load and mechanical pollution.

Keywords: environmental pressure, water pollution, eutrophication, landscape structure, biodiversity.

Анотація

Представлено результат оцінка екологічного стану Дарницької системи природних та штучних озер міста Києва. Дані озера мають складну ландшафтну структуру та потенційне різноманіття угрупувань, що потребують детального дослідження і захисту. Встановлено, що основними чинниками впливу на озерні екосистеми є рекреаційне навантаження та механічне забруднення.

Ключові слова: навантаження на навколишнє середовище, забруднення довкілля, евтрофікація, ландшафтна структура, біорізноманіття.

Introduction

Water bodies, such as natural and artificial reservoirs, play an important role in the structure of urban areas. Water bodies are not only an important natural resource, but also an important component of urban social and ecological systems. Historically, water bodies were one of the main factors influencing the development of cities and towns. However, with increasing urbanization, water resources are negatively affected by pollution and changes. Therefore, the study of water bodies in urbanized areas has become an important issue that requires attention and research.

Lakes are typical features of urban landscape; both naturally and artificially created they serve mostly aesthetic purposes. However, their environmental role is more diverse [1]. The characteristic of lakes is that they have a slow exchange of water, do not receive mainly fresh water from rivers, and their currents do not determine the regime of the reservoir. As a result, lakes may work as retention reservoirs, holding additional rainwaters and depositing their pollution in bottom sediments.

Larger lakes have the effect of softening the climate and temperature of the surrounding areas. The shape, size and relief of the bottom of lakes can change due to the accumulation of bottom sediments. As a result, lakes can create groundwater backup, which causes waterlogging of land. In the process of sediment accumulation, thick bottom sediments are formed, and thus a lake enters succession process towards marshes. An important peculiarity of this would be lack of complete coverage of the lake area by this process. This contributes to the formation of diverse flora and fauna, which deserves special survey and conservation efforts.

At the same time lakes undergo considerable pressure from urban residents due to recreational use, solid waste accumulation and pollution with surface run-off and uncontrolled discharges [2]. Such pressure can cause degradation of lake ecosystems and turn them from factors of environmental balance for a city into a source of major environmental problems.

Results and Discussion

The following lakes were selected for the evaluation of the environmental status of water bodies in the Darnytsia district: Zaryvaha, Tyagle, Martysh, Nebrezh, and Vyrlytsia. Each of these lakes has its own

unique characteristics and features that affect their ecological balance. In particular, Zaryvaha, Nebrezh and Vyrlytsia are of natural origin, while Tyagle, Lebedyne and Martysh are man-made lakes. Being located inside the urban area, most of them demonstrate landscape structure with domination of anthropogenic features, with Lebedyne lacking almost all their natural features, while others include at least 10% of natural forests and up to 20% meadow vegetation. In these terms, Martysh Lake possesses the biggest share of natural plant associations, including almost 15% of coastal forest.

All lakes are used for rest and recreation by the water and fishing, which imposes the biggest pressure on all studied ecosystems. Most lakes are fed by precipitation, although some also have an additional source of water from underground springs or tributaries, which keeps the balance of water quality close to satisfactory. This balance is quite unsteady, therefore these lakes are prone to eutrophication: during the period of observation Lebedyne and Zaryvaha showed high level of eutrophication, while Martysh has negligible signs of eutrophication, Tyagle has signs of initial eutrophication and pollution, while Vyrlytsia remains practically untouched by anthropogenic pressure.

All lakes - Zaryvaga, Tyagle, Lebedyne, Nebrezh, Vyrlytsia, and Martish - encounter similar environmental issues necessitating urgent remedial action.

The waters of these lakes have low transparency, high turbidity and distinctive smell, which indicate general water pollution. Eutrophication is observed in all lakes to certain extent and all lakes are impacted by the accumulation of garbage and waste, which negatively affects the aesthetics and quality of water bodies.

Lakes Tyagle, Lebedine and Vyrlytsia have problems with excessive pollution of the shores due to recreational use.

In addition to common problems, each lake has its own unique aspects that should be considered:

- Zaryvaga and Nebrezh suffer from algal blooms and deep coastal pollution.
- Lake Tyagle possesses high level of turbidity, which could be the result of a large amount of garbage and construction materials in the water similar to Lake Vyrlytsya.
- The water of Lebedine has a characteristic sour smell, which can be an indicator of the presence of harmful substances in the water.
- Martysh also faces problems with algae and shoreline debris, although these problems may be less pronounced compared to other lakes.

Although all lakes have their own unique characteristics, their preservation and condition require constant monitoring and attention in order to ensure their ecological stability and future use.

Conclusions

The evaluation of the environmental status of the lakes in the Darnytskyi district reveals a pressing need for immediate intervention due to a multitude of serious challenges. One prominent issue is the proliferation of algae, waste and debris accumulation and recreational overuse. This surge in algal growth stems from heightened nutrient concentrations, often resulting from uncontrolled discharge of fertilizers and organic substances into the lakes. Such overgrowth can lead to adverse effects on other aquatic organisms and degrade water quality.

Furthermore, the pervasive odor of the water, often reminiscent of grassy or marshy scents, poses another significant challenge, impacting the environmental quality and deterring tourism potential in the region. This could diminish the appeal of local water bodies to visitors and raise concerns among the community.

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